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SAR EVALUATION REPORT

Applicant Name:
Samsung Electronics Co., Ltd.
129, Samsung-ro, Maetan dong,
Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:
06/17/2019 – 07/24/2019
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M1907090118-01.A3L

FCC ID: **A3LSMF900F**

APPLICANT: **SAMSUNG ELECTRONICS CO., LTD.**

DUT Type: Portable Handset
Application Type: Class II Permissive Change
FCC Rule Part(s): CFR §2.1093
Model: SM-F900F
Original Grant Date: 04/11/2019
Permissive Change(s): See FCC Change Document

Equipment Class	Band & Mode	Tx Frequency	SAR					
			1g Head (W/kg)	1g Body-Worn (W/kg)	1g Hotspot (W/kg)	10g Phablet (W/kg)	1g UMPC Body (W/kg)	10g UMPC Extremity (W/kg)
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	N/A	N/A	N/A	0.52	0.51	0.28
PCE	UMTS 1750	1712.4 - 1752.6 MHz	N/A	N/A	N/A	0.93	0.93	0.43
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.15	0.37	N/A	1.35	1.03	0.99
PCE	LTE Band 26 (Cell)	814.7 - 848.3 MHz	N/A	N/A	N/A	N/A	0.83	N/A
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	N/A	N/A	N/A	N/A	N/A	N/A
PCE	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.20	0.69	N/A	1.36	0.90	0.64
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A	N/A	N/A	N/A
PCE	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.12	0.48	N/A	2.29	0.81	2.61
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	N/A	N/A	N/A	N/A	N/A	N/A
PCE	LTE Band 30	2307.5 - 2312.5 MHz	N/A	N/A	N/A	2.35	0.73	2.68
PCE	LTE Band 7	2502.5 - 2567.5 MHz	N/A	N/A	0.93	0.72	1.02	0.33
PCE	LTE Band 38	2572.5 - 2617.5 MHz	0.10	0.15	0.63	2.58	0.92	3.25
PCE	LTE Band 41	2498.5 - 2687.5 MHz	< 0.1	0.10	1.10	1.36	0.58	0.62
DTS	2.4 GHz WLAN	2412 - 2472 MHz	< 0.1	< 0.1	0.22	N/A	0.19	1.48
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	N/A	N/A	N/A	N/A
NII	U-NII-2A	5260 - 5320 MHz	0.10	< 0.1	N/A	1.34	0.25	1.44
NII	U-NII-2C	5500 - 5720 MHz	< 0.1	0.18	N/A	1.81	0.53	1.30
NII	U-NII-3	5745 - 5825 MHz	< 0.1	0.21	0.30	N/A	0.56	1.39
Simultaneous SAR per KDB 690783 D01v01r03:			0.47	1.52	1.58	3.95	1.59	3.99

Note: The table above shows test data evaluated for the current test report. Please refer to RF Exposure Technical Report S/N: 1M1901280020-01-R1.A3L for original compliance evaluation.

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.8 of this report; for North American frequency bands only.
I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.

Randy Ortanez
President

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TESTING CERT#2041.01

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 71	Voice/Data	665.5 - 695.5 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 14	Voice/Data	790.5 - 795.5 MHz
LTE Band 26 (Cell)	Voice/Data	814.7 - 848.3 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 25 (PCS)	Voice/Data	1850.7 - 1914.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 30	Voice/Data	2307.5 - 2312.5 MHz
LTE Band 7	Voice/Data	2502.5 - 2567.5 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
LTE Band 38	Voice/Data	2572.5 - 2617.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2472 MHz
U-NII-1	Voice/Data	5180 - 5240 MHz
U-NII-2A	Voice/Data	5260 - 5320 MHz
U-NII-2C	Voice/Data	5500 - 5720 MHz
U-NII-3	Voice/Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz
ANT+	Data	2402 - 2480 MHz
MST	Data	555 Hz - 8.33 kHz

1.2 Power Reduction for SAR

This device utilizes a power reduction mechanism for some wireless modes and bands for SAR compliance under portable hotspot conditions and under some conditions when the device is being used in close proximity to the user's hand, and when headphones are inserted. All hotspot SAR evaluations for this device were performed at the maximum allowed output power when hotspot is enabled. FCC KDB Publication 616217 D04v01r02 Section 6 and FCC KDB Publication 941225 D07v01r02 were used as a guideline for selecting SAR test distances for this device when being used in phablet and UMPC mini-tablet use conditions. Detailed descriptions of the power reduction mechanism are included in the operational description.

This device uses an independent fixed level power reduction mechanism for WLAN operations during voice or VoIP held to ear scenarios. Per FCC Guidance, the held-to-ear exposure conditions were evaluated at reduced power according to the head SAR positions described in IEEE 1528-2013. Detailed descriptions of the power reduction mechanism are included in the operational description.

1.3 Nominal and Maximum Output Power Specifications

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v06.

1.3.1 Maximum 2G/3G/4G Output Power

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 TX Slot	*1 TX Slots*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*	*1 TX Slots*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*
GSM/GPRS/EDGE 850	Maximum	**34.0**	**34.0**	**33.0**	**31.0**	**28.5**	**28.0**	**26.5**	**24.5**	**23.5**
	Nominal	**33.0**	**33.0**	**32.0**	**30.0**	**27.5**	**27.0**	**25.5**	**23.5**	**22.5**
GSM/GPRS/EDGE 1900	Maximum	**31.5**	**31.5**	**30.5**	**28.0**	**26.0**	**27.0**	**25.5**	**23.5**	**22.5**
	Nominal	**30.5**	**30.5**	**29.5**	**27.0**	**25.0**	**26.0**	**24.5**	**22.5**	**21.5**

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*	*3GPP DC-HSDPA*
UMTS Band 5 (850 MHz)	Maximum	**25.5**	**24.5**	**24.5**	**24.5**
	Nominal	**24.5**	**23.5**	**23.5**	**23.5**
UMTS Band 4 (1750 MHz)	Maximum	**25.5**	**24.5**	**24.5**	**24.5**
	Nominal	**24.5**	**23.5**	**23.5**	**23.5**
UMTS Band 2 (1900 MHz)	Maximum	**25.5**	**24.5**	**24.5**	**24.5**
	Nominal	**24.5**	**23.5**	**23.5**	**23.5**

Mode / Band		Modulated Average (dBm)
LTE Band 71	Maximum	**25.5**
	Nominal	**24.5**
LTE Band 12	Maximum	**25.5**
	Nominal	**24.5**
LTE Band 13	Maximum	**25.5**
	Nominal	**24.5**
LTE Band 14	Maximum	**25.5**
	Nominal	**24.5**
LTE Band 26 (Cell)	Maximum	**25.5**
	Nominal	**24.5**
LTE Band 5 (Cell)	Maximum	**25.5**
	Nominal	**24.5**
LTE Band 66 (AWS)	Maximum	**25.0**
	Nominal	**24.0**
LTE Band 4 (AWS)	Maximum	**25.0**
	Nominal	**24.0**
LTE Band 25 (PCS)	Maximum	**25.0**
	Nominal	**24.0**
LTE Band 2 (PCS)	Maximum	**25.0**
	Nominal	**24.0**
LTE Band 30	Maximum	**25.0**
	Nominal	**24.0**
LTE Band 7	Maximum	**24.6**
	Nominal	**23.6**
LTE Band 38	Maximum	**25.0**
	Nominal	**24.0**
LTE Band 41	Maximum	**24.0**
	Nominal	**23.0**

1.3.2 Reduced 2G/3G/4G Output Power – Hotspot Mode Active

Mode / Band		Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 TX Slots	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*	*1 TX Slots*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*
GPRS/EDGE 1900	Maximum	**29.5**	**28.5**	**26.0**	**24.0**	**27.0**	**25.5**	**23.5**	**22.5**
	Nominal	**28.5**	**27.5**	**25.0**	**23.0**	**26.0**	**24.5**	**22.5**	**21.5**

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*	*3GPP DC-HSDPA*
UMTS Band 4 (1750 MHz)	Maximum	**21.0**	**20.0**	**20.0**	**20.0**
	Nominal	**20.0**	**19.0**	**19.0**	**19.0**
UMTS Band 2 (1900 MHz)	Maximum	**21.5**	**20.5**	**20.5**	**20.5**
	Nominal	**20.5**	**19.5**	**19.5**	**19.5**

Mode / Band		Modulated Average (dBm)
LTE Band 66 (AWS)	Maximum	**20.5**
	Nominal	**19.5**
LTE Band 4 (AWS)	Maximum	**20.5**
	Nominal	**19.5**
LTE Band 25 (PCS)	Maximum	**21.0**
	Nominal	**20.0**
LTE Band 2 (PCS)	Maximum	**21.0**
	Nominal	**20.0**
LTE Band 30	Maximum	**21.0**
	Nominal	**20.0**
LTE Band 7	Maximum	**20.0**
	Nominal	**19.0**
LTE Band 38	Maximum	**21.0**
	Nominal	**20.0**
LTE Band 41	Maximum	**22.5**
	Nominal	**21.5**

1.3.3 Reduced 2G/3G/4G Output Power – Grip Sensor Active

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 TX Slot	*1 TX Slots*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*	*1 TX Slots*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*
GSM/GPRS/EDGE 1900	Maximum	**28.5**	**28.5**	**27.5**	**25.0**	**23.0**	**27.0**	**25.5**	**23.5**	**22.5**
	Nominal	**27.5**	**27.5**	**26.5**	**24.0**	**22.0**	**26.0**	**24.5**	**22.5**	**21.5**

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*	*3GPP DC-HSDPA*
UMTS Band 4 (1750 MHz)	Maximum	**20.5**	**19.5**	**19.5**	**19.5**
	Nominal	**19.5**	**18.5**	**18.5**	**18.5**
UMTS Band 2 (1900 MHz)	Maximum	**21.0**	**20.0**	**20.0**	**20.0**
	Nominal	**20.0**	**19.0**	**19.0**	**19.0**

Mode / Band		Modulated Average (dBm)
LTE Band 66 (AWS)	Maximum	**19.8**
	Nominal	**18.8**
LTE Band 4 (AWS)	Maximum	**19.8**
	Nominal	**18.8**
LTE Band 25 (PCS)	Maximum	**19.5**
	Nominal	**18.5**
LTE Band 2 (PCS)	Maximum	**19.5**
	Nominal	**18.5**
LTE Band 30	Maximum	**20.0**
	Nominal	**19.0**
LTE Band 7	Maximum	**19.5**
	Nominal	**18.5**
LTE Band 38	Maximum	**21.0**
	Nominal	**20.0**
LTE Band 41	Maximum	**21.5**
	Nominal	**20.5**

1.3.4 Reduced 2G/3G/4G Output Power – Earjack Active

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*	*3GPP DC-HSDPA*
UMTS Band 4 (1750 MHz)	Maximum	**21.5**	**20.5**	**20.5**	**20.5**
	Nominal	**20.5**	**19.5**	**19.5**	**19.5**
UMTS Band 2 (1900 MHz)	Maximum	**22.0**	**21.0**	**21.0**	**21.0**
	Nominal	**21.0**	**20.0**	**20.0**	**20.0**

Mode / Band		Modulated Average (dBm)
LTE Band 66 (AWS)	Maximum	**21.0**
	Nominal	**20.0**
LTE Band 4 (AWS)	Maximum	**21.0**
	Nominal	**20.0**
LTE Band 25 (PCS)	Maximum	**21.0**
	Nominal	**20.0**
LTE Band 2 (PCS)	Maximum	**21.0**
	Nominal	**20.0**
LTE Band 30	Maximum	**22.0**
	Nominal	**21.0**
LTE Band 7	Maximum	**22.0**
	Nominal	**21.0**
LTE Band 38	Maximum	**22.0**
	Nominal	**21.0**

1.3.5 Maximum Bluetooth and SISO/MIMO WLAN Output Power

Mode / Band		Modulated Average - Single Tx Chain Antenna 1 (dBm)							
	Channel	1	2	3	4 - 9	10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum	**20.0**						**19.0**	**15.5**
	Nominal	**19.0**						**18.0**	**14.5**
IEEE 802.11g (2.4 GHz)	Maximum	**16.5**	**16.0**	**17.5**	**18.0**	**17.5**	**15.5**	**12.0**	**6.5**
	Nominal	**15.5**	**15.0**	**16.5**	**17.0**	**16.5**	**14.5**	**11.0**	**5.5**
IEEE 802.11n (2.4 GHz)	Maximum	**16.5**	**16.0**	**17.5**	**18.0**	**17.5**	**15.5**	**12.0**	**6.5**
	Nominal	**15.5**	**15.0**	**16.5**	**17.0**	**16.5**	**14.5**	**11.0**	**5.5**
IEEE 802.11ax (SU) (2.4 GHz)	Maximum	**13.5**	**14.5**	**16.0**	**17.0**	**15.5**	**14.5**	**14.5**	**10.0**
	Nominal	**12.5**	**13.5**	**15.0**	**16.0**	**14.5**	**13.5**	**13.5**	**9.0**

Mode / Band		Modulated Average - Single Tx Chain Antenna 2 (dBm)							
	Channel	1	2	3	4 - 9	10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum	**20.0**							**18.5**
	Nominal	**19.0**							**17.5**
IEEE 802.11g (2.4 GHz)	Maximum	**16.5**	**16.0**	**17.5**	**18.0**	**17.5**	**15.5**	**12.0**	**6.5**
	Nominal	**15.5**	**15.0**	**16.5**	**17.0**	**16.5**	**14.5**	**11.0**	**5.5**
IEEE 802.11n (2.4 GHz)	Maximum	**16.5**	**16.0**	**17.5**	**18.0**	**17.5**	**15.5**	**12.0**	**6.5**
	Nominal	**15.5**	**15.0**	**16.5**	**17.0**	**16.5**	**14.5**	**11.0**	**5.5**
IEEE 802.11ax (SU) (2.4 GHz)	Maximum	**17.0**						**16.0**	**13.5**
	Nominal	**16.0**						**15.0**	**12.5**

Mode / Band		Modulated Average - MIMO (dBm)							
	Channel	1	2	3	4 - 9	10	11	12	13
IEEE 802.11g (2.4 GHz)	Maximum	**19.5**	**19.0**	**20.5**	**21.0**	**20.5**	**18.5**	**15.0**	**9.5**
	Nominal	**18.5**	**18.0**	**19.5**	**20.0**	**19.5**	**17.5**	**14.0**	**8.5**
IEEE 802.11n (2.4 GHz)	Maximum	**19.5**	**19.0**	**20.5**	**21.0**	**20.5**	**18.5**	**15.0**	**9.5**
	Nominal	**18.5**	**18.0**	**19.5**	**20.0**	**19.5**	**17.5**	**14.0**	**8.5**
IEEE 802.11ax (SU) (2.4 GHz)	Maximum	**17.0**						**14.0**	
	Nominal	**16.0**						**13.0**	

Mode / Band		Modulated Average - Single Tx Chain (dBm)																						
		20 MHz Bandwidth									40 MHz Bandwidth								80 MHz Bandwidth					
	Channel	36	40-60	64	100	104-140	144	149	153-161	165	38	46-54	62	102	110-134	142	151	159	42	58	106	122	138	155
IEEE 802.11a (5 GHz)	Maximum	**18.0**																						
	Nominal	**17.0**																						
IEEE 802.11n (5 GHz)	Maximum	**18.0**									**15.0**	**17.0**	**15.5**	**15.5**	**17.0**	**17.0**	**17.0**	**17.0**						
	Nominal	**17.0**									**14.0**	**16.0**	**14.5**	**14.5**	**16.0**	**16.0**	**16.0**	**16.0**						
IEEE 802.11ac (5 GHz)	Maximum	**18.0**									**15.0**	**17.0**	**15.5**	**15.5**	**17.0**	**17.0**	**17.0**	**17.0**	**13.0**	**13.0**	**14.5**	**16.0**	**16.0**	**16.0**
	Nominal	**17.0**									**14.0**	**16.0**	**14.5**	**14.5**	**16.0**	**16.0**	**16.0**	**16.0**	**12.0**	**12.0**	**13.5**	**15.0**	**15.0**	**15.0**
IEEE 802.11ax (SU) (5 GHz)	Maximum	**16.0**									**14.0**								**13.0**					
	Nominal	**15.0**									**13.0**								**12.0**					

Mode / Band		Modulated Average - MIMO (dBm)																						
		20 MHz Bandwidth									40 MHz Bandwidth								80 MHz Bandwidth					
	Channel	36	40-60	64	100	104-140	144	149	153-161	165	38	46-54	62	102	110-134	142	151	159	42	58	106	122	138	155
IEEE 802.11a (5 GHz)	Maximum	**21.0**																						
	Nominal	**20.0**																						
IEEE 802.11n (5 GHz)	Maximum	**21.0**									**18.0**	**20.0**	**18.5**	**18.5**	**20.0**	**20.0**	**20.0**	**20.0**						
	Nominal	**20.0**									**17.0**	**19.0**	**17.5**	**17.5**	**19.0**	**19.0**	**19.0**	**19.0**						
IEEE 802.11ac (5 GHz)	Maximum	**21.0**									**18.0**	**20.0**	**18.5**	**18.5**	**20.0**	**20.0**	**20.0**	**20.0**	**13.0**	**13.0**	**17.5**	**19.0**	**19.0**	**19.0**
	Nominal	**20.0**									**17.0**	**19.0**	**17.5**	**17.5**	**19.0**	**19.0**	**19.0**	**19.0**	**12.0**	**12.0**	**16.5**	**18.0**	**18.0**	**18.0**
IEEE 802.11ax (SU) (5 GHz)	Maximum	**16.0**									**14.0**								**13.0**					
	Nominal	**15.0**									**13.0**								**12.0**					

Mode/Band		Modulated Average (dBm)
Bluetooth	Maximum	**16.5**
	Nominal	**15.5**
Bluetooth EDR	Maximum	**10.5**
	Nominal	**9.5**
Bluetooth LE 2Mbps	Maximum	**7.0**
	Nominal	**6.0**
Bluetooth LE 1Mbps, 125/500kbps	Maximum	**5.5**
	Nominal	**4.5**

Note: Targets for 802.11ax RU operations can be found in Appendix I.

1.3.6 Reduced WLAN Output Power

Mode / Band		Modulated Average - Single Tx Chain Antenna 1 (dBm)							
	Channel	1	2	3	4 - 9	10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum	17.0							15.5
	Nominal	16.0							14.5
IEEE 802.11g (2.4 GHz)	Maximum	16.5	16.0	17.0			15.5	12.0	6.5
	Nominal	15.5	15.0	16.0			14.5	11.0	5.5
IEEE 802.11n (2.4 GHz)	Maximum	16.5	16.0	17.0			15.5	12.0	6.5
	Nominal	15.5	15.0	16.0			14.5	11.0	5.5
IEEE 802.11ax (SU) (2.4 GHz)	Maximum	13.5	14.5	16.0	17.0	15.5	14.5		10.0
	Nominal	12.5	13.5	15.0	16.0	14.5	13.5		9.0

Mode / Band		Modulated Average - Single Tx Chain Antenna 2 (dBm)							
	Channel	1	2	3	4 - 9	10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum	17.0							
	Nominal	16.0							
IEEE 802.11g (2.4 GHz)	Maximum	16.5	16.0	17.0			15.5	12.0	6.5
	Nominal	15.5	15.0	16.0			14.5	11.0	5.5
IEEE 802.11n (2.4 GHz)	Maximum	16.5	16.0	17.0			15.5	12.0	6.5
	Nominal	15.5	15.0	16.0			14.5	11.0	5.5
IEEE 802.11ax (SU) (2.4 GHz)	Maximum	17.0						16.0	13.5
	Nominal	16.0						15.0	12.5

Mode / Band		Modulated Average - MIMO (dBm)							
	Channel	1	2	3	4 - 9	10	11	12	13
IEEE 802.11g (2.4 GHz)	Maximum	19.5	19.0	20.0			18.5	15.0	9.5
	Nominal	18.5	18.0	19.0			17.5	14.0	8.5
IEEE 802.11n (2.4 GHz)	Maximum	19.5	19.0	20.0			18.5	15.0	9.5
	Nominal	18.5	18.0	19.0			17.5	14.0	8.5
IEEE 802.11ax (SU) (2.4 GHz)	Maximum	17.0						14.0	
	Nominal	16.0						13.0	

Mode / Band		Modulated Average - Single Tx Chain (dBm)																						
		20 MHz Bandwidth									40 MHz Bandwidth								80 MHz Bandwidth					
	Channel	36	40-60	64	100	104-140	144	149	153-161	165	38	46-54	62	102	110-134	142	151	159	42	58	106	122	138	155
IEEE 802.11a (5 GHz)	Maximum	14.0																						
	Nominal	13.0																						
IEEE 802.11n (5 GHz)	Maximum	14.0									14.0													
	Nominal	13.0									13.0													
IEEE 802.11ac (5 GHz)	Maximum	14.0									14.0								13.0	14.0				
	Nominal	13.0									13.0								12.0	13.0				
IEEE 802.11ax (SU) (5 GHz)	Maximum	14.0									14.0								13.0					
	Nominal	13.0									13.0								12.0					

Mode / Band		Modulated Average - MIMO (dBm)																						
		20 MHz Bandwidth									40 MHz Bandwidth								80 MHz Bandwidth					
	Channel	36	40-60	64	100	104-140	144	149	153-161	165	38	46-54	62	102	110-134	142	151	159	42	58	106	122	138	155
IEEE 802.11a (5 GHz)	Maximum	17.0																						
	Nominal	16.0																						
IEEE 802.11n (5 GHz)	Maximum	17.0									17.0													
	Nominal	16.0									16.0													
IEEE 802.11ac (5 GHz)	Maximum	17.0									17.0								13.0	17.0				
	Nominal	16.0									16.0								12.0	16.0				
IEEE 802.11ax (SU) (5 GHz)	Maximum	16.0									14.0								13.0					
	Nominal	15.0									13.0								12.0					

Note: Targets for 802.11ax RU operations can be found in Appendix I.

1.3.7 Maximum Output Power During Conditions with Simultaneous 2.4 GHz WLAN and 5 GHz WLAN

Mode / Band		Modulated Average - Antenna 1 (dBm)								Modulated Average - Antenna 2 (dBm)								Modulated Average - MIMO (dBm)							
	Channel	1	2	3	4 - 9	10	11	12	13	1	2	3	4 - 9	10	11	12	13	1	2	3	4 - 9	10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum	17.0							15.5	17.0								N/A							
	Nominal	16.0							14.5	16.0								N/A							
IEEE 802.11g (2.4 GHz)	Maximum	16.5	16.0	17.0			15.5	12.0	6.5	16.5	16.0	17.0			15.5	12.0	6.5	19.5	19.0	20.0			18.5	15.0	9.5
	Nominal	15.5	15.0	16.0			14.5	11.0	5.5	15.5	15.0	16.0			14.5	11.0	5.5	18.5	18.0	19.0			17.5	14.0	8.5
IEEE 802.11n (2.4 GHz)	Maximum	16.5	16.0	17.0			15.5	12.0	6.5	16.5	16.0	17.0			15.5	12.0	6.5	19.5	19.0	20.0			18.5	15.0	9.5
	Nominal	15.5	15.0	16.0			14.5	11.0	5.5	15.5	15.0	16.0			14.5	11.0	5.5	18.5	18.0	19.0			17.5	14.0	8.5
IEEE 802.11ax (SU)	Maximum	13.5	14.5	16.0	17.0	15.5	14.5		10.0	17.0						16.0	13.5	17.0						14.0	
	Nominal	12.5	13.5	15.0	16.0	14.5	13.5		9.0	16.0						15.0	12.5	16.0						13.0	

Mode / Band		Modulated Average - Antenna 1 (dBm)	Modulated Average - Antenna 2 (dBm)	Modulated Average - MIMO (dBm)			
		20 MHz Bandwidth	20 MHz Bandwidth	20 MHz Bandwidth			
	Channel	36 -165	36 -165	36	40-60	64	100 -165
IEEE 802.11a (5 GHz)	Maximum	14.0	14.0	17.0			
	Nominal	13.0	13.0	16.0			
IEEE 802.11n (5 GHz)	Maximum	14.0	14.0	17.0			
	Nominal	13.0	13.0	16.0			
IEEE 802.11ac (5 GHz)	Maximum	14.0	14.0	17.0			
	Nominal	13.0	13.0	16.0			
IEEE 802.11ax(SU) (5 GHz)	Maximum	14.0	14.0	16.0			
	Nominal	13.0	13.0	15.0			

Mode / Band		Modulated Average - Antenna 1 (dBm)					Modulated Average - Antenna 2 (dBm)					Modulated Average - MIMO (dBm)				
		40 MHz Bandwidth					40 MHz Bandwidth					40 MHz Bandwidth				
	Channel	38	46-54	62	102	110-159	38	46-54	62	102	110-159	38	46-54	62	102	110-159
IEEE 802.11n (5 GHz)	Maximum	14.0					14.0					17.0				
	Nominal	13.0					13.0					16.0				
IEEE 802.11ac (5 GHz)	Maximum	14.0					14.0					17.0				
	Nominal	13.0					13.0					16.0				
IEEE 802.11ax(SU) (5 GHz)	Maximum	14.0					14.0					14.0				
	Nominal	13.0					13.0					13.0				

Mode / Band		Modulated Average - Antenna 1 (dBm)				Modulated Average - Antenna 2 (dBm)				Modulated Average - MIMO (dBm)			
		80 MHz Bandwidth				80 MHz Bandwidth				80 MHz Bandwidth			
	Channel	42	58	106	122 - 155	42	58	106	122 - 155	42	58	106	122 - 155
IEEE 802.11ac (5 GHz)	Maximum	13.0	13.0	14.0		13.0	13.0	14.0		13.0	13.0	17.0	
	Nominal	12.0	12.0	13.0		12.0	12.0	13.0		12.0	12.0	16.0	
IEEE 802.11ax(SU) (5 GHz)	Maximum	13.0				13.0				13.0			
	Nominal	12.0				12.0				12.0			

Note: Targets for 802.11ax RU operations can be found in Appendix I.

1.3.8 Reduced Output Power During Conditions with Simultaneous 2.4 GHz WLAN and 5 GHz WLAN

Mode / Band		Modulated Average - Antenna 1 (dBm)								Modulated Average - Antenna 2 (dBm)								Modulated Average - MIMO (dBm)							
	Channel	1	2	3	4 - 9	10	11	12	13	1	2	3	4 - 9	10	11	12	13	1	2	3	4 - 9	10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum	14.0								14.0								N/A							
	Nominal	13.0								13.0								N/A							
IEEE 802.11g (2.4 GHz)	Maximum	14.0						12.0	6.5	14.0						12.0	6.5	17.0						15.0	9.5
	Nominal	13.0						11.0	5.5	13.0						11.0	5.5	16.0						14.0	8.5
IEEE 802.11n (2.4 GHz)	Maximum	14.0						12.0	6.5	14.0						12.0	6.5	17.0						15.0	9.5
	Nominal	13.0						11.0	5.5	13.0						11.0	5.5	16.0						14.0	8.5
IEEE 802.11ax (SU)	Maximum	13.5	14.0						10.0	14.0							13.5	16.0	17.0					14.0	
	Nominal	12.5	13.0						9.0	13.0							12.5	15.0	16.0					13.0	

Mode / Band		Modulated Average - Antenna 1 (dBm)	Modulated Average - Antenna 2 (dBm)	Modulated Average - MIMO (dBm)			
		20 MHz Bandwidth	20 MHz Bandwidth	20 MHz Bandwidth			
	Channel	36 -165	36 -165	36	40-60	64	100 -165
IEEE 802.11a (5 GHz)	Maximum	14.0	14.0	17.0			
	Nominal	13.0	13.0	16.0			
IEEE 802.11n (5 GHz)	Maximum	14.0	14.0	17.0			
	Nominal	13.0	13.0	16.0			
IEEE 802.11ac (5 GHz)	Maximum	14.0	14.0	17.0			
	Nominal	13.0	13.0	16.0			
IEEE 802.11ax(SU) (5 GHz)	Maximum	14.0	14.0	16.0			
	Nominal	13.0	13.0	15.0			

Mode / Band		Modulated Average - Antenna 1 (dBm)					Modulated Average - Antenna 2 (dBm)					Modulated Average - MIMO (dBm)				
		40 MHz Bandwidth					40 MHz Bandwidth					40 MHz Bandwidth				
	Channel	38	46-54	62	102	110-159	38	46-54	62	102	110-159	38	46-54	62	102	110-159
IEEE 802.11n (5 GHz)	Maximum	14.0					14.0					17.0				
	Nominal	13.0					13.0					16.0				
IEEE 802.11ac (5 GHz)	Maximum	14.0					14.0					17.0				
	Nominal	13.0					13.0					16.0				
IEEE 802.11ax(SU) (5 GHz)	Maximum	14.0					14.0					14.0				
	Nominal	13.0					13.0					13.0				

Mode / Band		Modulated Average - Antenna 1 (dBm)				Modulated Average - Antenna 2 (dBm)				Modulated Average - MIMO (dBm)			
		80 MHz Bandwidth				80 MHz Bandwidth				80 MHz Bandwidth			
	Channel	42	58	106	122 - 155	42	58	106	122 - 155	42	58	106	122 - 155
IEEE 802.11ac (5 GHz)	Maximum	13.0	13.0	14.0		13.0	13.0	14.0		13.0	13.0	17.0	
	Nominal	12.0	12.0	13.0		12.0	12.0	13.0		12.0	12.0	16.0	
IEEE 802.11ax(SU) (5 GHz)	Maximum	13.0				13.0				13.0			
	Nominal	12.0				12.0				12.0			

Note: Targets for 802.11ax RU operations can be found in Appendix I.

1.4 DUT Antenna Locations

The overall dimensions of this device are > 9 x 5 cm. A diagram showing the location of the device antennas can be found in Appendix F. Since the diagonal dimention of this device is >160mm and <200mm in closed configuration, it is considered a "Phablet". When it is in open configuration, it is considered a "UMPC Mini-tablet". Exact antenna dimensions and separation distances are shown in the Technical Descriptions in the FCC filing.

Table 1-1
Device Edges/Sides for SAR Testing Handset

Mode	Back	Front	Top	Bottom	Right	Left
GPRS 1900	Yes	Yes	No	Yes	Yes	Yes
UMTS 1750	Yes	Yes	No	Yes	Yes	Yes
UMTS 1900	Yes	Yes	No	Yes	Yes	Yes
LTE Band 66 (AWS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 25 (PCS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 30	Yes	Yes	No	Yes	Yes	Yes
LTE Band 7	Yes	Yes	No	Yes	Yes	Yes
LTE Band 38	Yes	Yes	No	Yes	Yes	Yes
LTE Band 41	Yes	Yes	No	Yes	Yes	Yes
2.4 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes

Table 1-2
Device Edges/Sides for SAR Testing UMPC (Body and Extremity)

Mode	Back	Front	Top	Bottom	Right	Left
GPRS 1900	Yes	Yes	No	Yes	Yes	No
UMTS 1750	Yes	Yes	No	Yes	Yes	No
UMTS 1900	Yes	Yes	No	Yes	Yes	No
LTE Band 26 (Cell)	Yes	Yes	No	Yes	Yes	No
LTE Band 66 (AWS)	Yes	Yes	No	Yes	Yes	No
LTE Band 25 (PCS)	Yes	Yes	No	Yes	Yes	No
LTE Band 30	Yes	Yes	No	Yes	Yes	No
LTE Band 7	Yes	Yes	No	Yes	Yes	No
LTE Band 38	Yes	Yes	No	Yes	Yes	No
LTE Band 41	Yes	Yes	No	Yes	Yes	No
2.4 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	No
2.4 GHz WLAN MIMO	Yes	Yes	Yes	No	Yes	No
5 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	No
5 GHz WLAN MIMO	Yes	Yes	Yes	No	Yes	No

Note: 1) Particular DUT edges were not required to be evaluated for wireless router SAR, phablet SAR or UMPC mini-tablet SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v02r01 Section III, FCC KDB Publication 941225 D07v01r02 and FCC KDB Publication 648474 D04v01r03. The distances between the transmit antennas and the edges of the device are included in the filing. When wireless router mode is enabled, U-NII-1, U-NII-2A, U-NII-2C operations are disabled.
2) Testing edges were evaluated for the current report. Please refer to RF Exposure Technical Report S/N: 1M1901280020-01-R1.A3L for original compliance evaluation.

1.5 Near Field Communications (NFC) Antenna

This DUT has NFC operations. The NFC antenna is integrated into the device for this model. Therefore, all SAR tests were performed with the device which already incorporates the NFC antenna. A diagram showing the location of the NFC antenna can be found in Appendix F.

1.6 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be operating simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds.

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v06 4.3.2 procedures.

Table 1-3
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Phablet	Mini Tablet	Notes
1	GSM voice + 2.4 GHz WI-FI	Yes	Yes	N/A	Yes	Yes	
2	GSM voice + 5 GHz WI-FI	Yes	Yes	N/A	Yes	Yes	
3	GSM voice + 2.4 GHz Bluetooth	Yes^	Yes	N/A	Yes	Yes	^ Bluetooth Tethering is considered
4	GSM voice + 2.4 GHz Bluetooth + 5 GHz WI-FI	Yes^	Yes	N/A	Yes	Yes	^ Bluetooth Tethering is considered
5	GSM voice + 2.4 GHz WI-FI MIMO	Yes	Yes	N/A	Yes	Yes	
6	GSM voice + 5 GHz WI-FI MIMO	Yes	Yes	N/A	Yes	Yes	
7	GSM voice + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	N/A	Yes	Yes	
8	GSM voice + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	Yes	Yes	N/A	Yes	Yes	
9	GSM voice + 2.4 GHz Bluetooth + 5 GHz WI-FI MIMO	Yes^	Yes	N/A	Yes	Yes	^ Bluetooth Tethering is considered
10	UMTS + 2.4 GHz WI-FI	Yes	Yes	Yes	Yes	Yes	
11	UMTS + 5 GHz WI-FI	Yes	Yes	Yes	Yes	Yes	
12	UMTS + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	Yes	^ Bluetooth Tethering is considered
13	UMTS + 2.4 GHz Bluetooth + 5 GHz WI-FI	Yes^	Yes	Yes^	Yes	Yes	^ Bluetooth Tethering is considered
14	UMTS + 2.4 GHz WI-FI MIMO	Yes	Yes	Yes	Yes	Yes	
15	UMTS + 5 GHz WI-FI MIMO	Yes	Yes	Yes	Yes	Yes	
16	UMTS + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	Yes	Yes	Yes	
17	UMTS + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	Yes	Yes	Yes	Yes	Yes	
18	UMTS + 2.4 GHz Bluetooth + 5 GHz WI-FI MIMO	Yes^	Yes	Yes^	Yes	Yes	^ Bluetooth Tethering is considered
19	LTE + 2.4 GHz WI-FI	Yes	Yes	Yes	Yes	Yes	
20	LTE + 5 GHz WI-FI	Yes	Yes	Yes	Yes	Yes	
21	LTE + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	Yes	^ Bluetooth Tethering is considered
22	LTE + 2.4 GHz Bluetooth + 5 GHz WI-FI	Yes^	Yes	Yes^	Yes	Yes	^ Bluetooth Tethering is considered
23	LTE + 2.4 GHz WI-FI MIMO	Yes	Yes	Yes	Yes	Yes	
24	LTE + 5 GHz WI-FI MIMO	Yes	Yes	Yes	Yes	Yes	
25	LTE + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	Yes	Yes	Yes	
26	LTE + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	Yes	Yes	Yes	Yes	Yes	
27	LTE + 2.4 GHz Bluetooth + 5 GHz WI-FI MIMO	Yes^	Yes	Yes^	Yes	Yes	^ Bluetooth Tethering is considered
28	GPRS/EDGE + 2.4 GHz WI-FI	N/A	N/A	Yes	Yes	Yes	
29	GPRS/EDGE + 5 GHz WI-FI	N/A	N/A	Yes	Yes	Yes	
30	GPRS/EDGE + 2.4 GHz Bluetooth	N/A	N/A	Yes^	Yes	Yes	^ Bluetooth Tethering is considered
31	GPRS/EDGE + 2.4 GHz Bluetooth + 5 GHz WI-FI	N/A	N/A	Yes^	Yes	Yes	^ Bluetooth Tethering is considered
32	GPRS/EDGE + 2.4 GHz WI-FI MIMO	N/A	N/A	Yes	Yes	Yes	
33	GPRS/EDGE + 5 GHz WI-FI MIMO	N/A	N/A	Yes	Yes	Yes	
34	GPRS/EDGE + 2.4 GHz WI-FI + 5 GHz WI-FI	N/A	N/A	Yes	Yes	Yes	
35	GPRS/EDGE + 2.4 GHz WI-FI MIMO + 5 GHz WI-FI MIMO	N/A	N/A	Yes	Yes	Yes	
36	GPRS/EDGE + 2.4 GHz Bluetooth + 5 GHz WI-FI MIMO	N/A	N/A	Yes^	Yes	Yes	^ Bluetooth Tethering is considered

1. 2.4 GHz WLAN and 2.4 GHz Bluetooth share the same antenna path and cannot transmit simultaneously.
2. All licensed modes share the same antenna path and cannot transmit simultaneously.
3. When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.
4. Per the manufacturer, WIFI Direct is not expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Therefore, there are no simultaneous transmission scenarios involving WIFI direct beyond that listed in the above table.

5. 5 GHz Wireless Router is only supported for the U-NII-3 by S/W, therefore U-NII-1, U-NII2A, and U-NII2C were not evaluated for wireless router conditions.
6. This device supports 2x2 MIMO Tx for WLAN 802.11a/g/n/ac/ax. 802.11a/g/n/ac/ax supports CDD and STBC and 802.11n/ac/ax additionally supports SDM. Each WLAN antenna can transmit independently or together when operating with MIMO.
7. This device supports VOLTE.
8. This device supports VoWIFI.
9. This device supports Bluetooth Tethering.

1.7 Miscellaneous SAR Test Considerations

This test report evaluates bands/modes impacted by the permissive change in this filing. Other bands and modes were confirmed to not have changed from the original filing. Please see RF Exposure Technical Report SN 1M1901280020-01-R1.A3L for original compliance evaluation.

(A) WIFI/BT

Since U-NII-1 and U-NII-2A bands have the same maximum output power and the highest reported SAR for U-NII-2A is less than 1.2 W/kg, SAR is not required for U-NII-1 band according to FCC KDB Publication 248227 D01v02r02.

This device supports channel 1-13 for 2.4 GHz WLAN. However, due to the reduced output power for channels 12 and 13, channels 1, 6, and 11 were considered for SAR testing per KDB 248227 D01v02r02.

Since Wireless Router operations are not allowed by the chipset firmware using U-NII-1, U-NII-2A & U-NII-2C WIFI, only 2.4 GHz and U-NII-3 WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v02r01.

Per April 2019 TCB Workshop Notes, SAR testing was not required for 802.11ax when applying the initial test configuration procedures of KDB 248227, with 802.11ax considered a higher order 802.11 mode. The 802.11ax RU SAR testing exclusion analysis can be found in Appendix I.

This device supports IEEE 802.11ax with the following features:
a) Up to 80 MHz Bandwidth only for 5 GHz
b) Up to 20 MHz Bandwidth only for 2.4 GHz
c) No aggregate channel configurations
d) 2 Tx antenna output
e) Up to 1024 QAM is supported
f) TDWR and Band gap channels are supported for 5 GHz
g) MU-MIMO UL Operations are not supported

Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Because wireless router operations are not supported for U-NII-1, U-NII-2A & U-NII-2C WLAN, phablet SAR tests were performed. Phablet SAR was not evaluated for Bluetooth, 2.4 GHz WLAN, and U-NII-3 WLAN operations since wireless router 1g SAR was < 1.2 W/kg.

(B) Licensed Transmitter(s)

GSM/GPRS/EDGE DTM is not supported for US bands. Therefore, the GSM Voice modes in this report do not transmit simultaneously with GPRS/EDGE Data.

This device is only capable of QPSK HSUPA in the uplink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA in KDB 941225 D01v03r01.

LTE SAR for the higher modulations and lower bandwidths were not tested since the maximum average output power of all required channels and configurations was not more than 0.5 dB higher than the highest bandwidth; and the reported LTE SAR for the highest bandwidth was less than 1.45 W/kg for all configurations according to FCC KDB 941225 D05v02r04.

This device supports LTE Carrier Aggregation (CA) in the downlink. All uplink communications are identical to Release 8 specifications. Per FCC KDB Publication 941225 D05A v01r02, SAR for downlink only LTE CA operations was not needed since the maximum average output power in downlink only LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive. The downlink carrier aggregation exclusion analysis can be found in Appendix H for the current report. LTE Downlink Carrier Aggregation was fully addressed in the RF Exposure Technical Report S/N: 1M1901280020-01-R1.A3L. Per FCC Guidance, no additional measurements were required when there were no changes to the downlink CA implementation for some modes.

Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information)

This device supports 64QAM on the uplink for LTE Operations. Conducted powers for 64QAM uplink configurations were measured per Section 5.1 of FCC KDB Publication 941225D05v02r05. SAR was not required for 64QAM since the highest maximum output power for 64QAM is $\leq \frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is $\leq$ 1.45W/kg, per Section 5.2.4 of FCC KDB Publication 941225 D05v02r05.

This device supports LTE capabilities with overlapping transmission frequency ranges. When the supported frequency range of an LTE Band falls completely within an LTE band with a larger transmission frequency range, both LTE bands have the same target power (or the band with the larger transmission frequency range has a higher target power), and both LTE bands share the same transmission path and signal characteristics, SAR was only assessed for the band with the larger transmission frequency range.

This device supports LTE Carrier Aggregation (CA) for LTE Band 66 and LTE B7 with two component carriers in the uplink. SAR Measurements and conducted powers were evaluated per 2017 Fall TCB Workshop Notes.

1.8 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 941225 D01v03r01, D05v02r04, D05Av01r02, D06v02r01, D07v01r02 (2G/3G/4G Hotspot and UMPC Mini-Tablet)
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v06 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 648474 D04v01r03 (Phablet Procedures)
- FCC KDB Publication 616217 D04v01r02 (Proximity Sensor)
- October 2013 TCB Workshop Notes (GPRS Testing Considerations)
- April 2018 TCB Workshop Notes (LTE Carrier Aggregation)
- April 2019 TCB Workshop Notes (IEEE 802.11ax, Dynamic Antenna Tuning)

1.9 Device Serial Numbers

Several samples with identical hardware were used to support SAR testing. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units. The serial numbers used for each test are indicated alongside the results in Section 11.

2 LTE INFORMATION

LTE Information					
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 71 (665.5 - 695.5 MHz)				
	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 13 (779.5 - 784.5 MHz)				
	LTE Band 14 (790.5 - 795.5 MHz)				
	LTE Band 26 (Cell) (814.7 - 848.3 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 66 (AWS) (1710.7 - 1779.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)				
	LTE Band 25 (PCS) (1850.7 - 1914.3 MHz)				
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)				
	LTE Band 30 (2307.5 - 2312.5 MHz)				
	LTE Band 7 (2502.5 - 2567.5 MHz)				
	LTE Band 38 (2572.5 - 2617.5 MHz)				
	LTE Band 41 (2498.5 - 2687.5 MHz)				
Channel Bandwidths	LTE Band 71: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 13: 5 MHz, 10 MHz				
	LTE Band 14: 5 MHz, 10 MHz				
	LTE Band 26 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 25 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 30: 5 MHz, 10 MHz				
	LTE Band 7: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 38: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 71: 5 MHz	665.5 (133147)		680.5 (133297)	695.5 (133447)	
LTE Band 71: 10 MHz	668 (133172)		680.5 (133297)	693 (133422)	
LTE Band 71: 15 MHz	670.5 (133197)		680.5 (133297)	690.5 (133397)	
LTE Band 71: 20 MHz	673 (133222)		680.5 (133297)	688 (133372)	
LTE Band 12: 1.4 MHz	699.7 (23017)		707.5 (23095)	715.3 (23173)	
LTE Band 12: 3 MHz	700.5 (23025)		707.5 (23095)	714.5 (23165)	
LTE Band 12: 5 MHz	701.5 (23035)		707.5 (23095)	713.5 (23155)	
LTE Band 12: 10 MHz	704 (23060)		707.5 (23095)	711 (23130)	
LTE Band 13: 5 MHz	779.5 (23205)		782 (23230)	784.5 (23255)	
LTE Band 13: 10 MHz	N/A		782 (23230)	N/A	
LTE Band 14: 5 MHz	790.5 (23305)		793 (23330)	795.5 (23355)	
LTE Band 14: 10 MHz	N/A		793 (23330)	N/A	
LTE Band 26 (Cell): 1.4 MHz	814.7 (26697)		831.5 (26865)	848.3 (27033)	
LTE Band 26 (Cell): 3 MHz	815.5 (26705)		831.5 (26865)	847.5 (27025)	
LTE Band 26 (Cell): 5 MHz	816.5 (26715)		831.5 (26865)	846.5 (27015)	
LTE Band 26 (Cell): 10 MHz	819 (26740)		831.5 (26865)	844 (26990)	
LTE Band 26 (Cell): 15 MHz	821.5 (26765)		831.5 (26865)	841.5 (26965)	
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)		836.5 (20525)	848.3 (20643)	
LTE Band 5 (Cell): 3 MHz	825.5 (20415)		836.5 (20525)	847.5 (20635)	
LTE Band 5 (Cell): 5 MHz	826.5 (20425)		836.5 (20525)	846.5 (20625)	
LTE Band 5 (Cell): 10 MHz	829 (20450)		836.5 (20525)	844 (20600)	
LTE Band 66 (AWS): 1.4 MHz	1710.7 (131979)		1745 (132322)	1779.3 (132665)	
LTE Band 66 (AWS): 3 MHz	1711.5 (131987)		1745 (132322)	1778.5 (132657)	
LTE Band 66 (AWS): 5 MHz	1712.5 (131997)		1745 (132322)	1777.5 (132647)	
LTE Band 66 (AWS): 10 MHz	1715 (132022)		1745 (132322)	1775 (132622)	
LTE Band 66 (AWS): 15 MHz	1717.5 (132047)		1745 (132322)	1772.5 (132597)	
LTE Band 66 (AWS): 20 MHz	1720 (132072)		1745 (132322)	1770 (132572)	
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)		1732.5 (20175)	1754.3 (20393)	
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)		1732.5 (20175)	1753.5 (20385)	
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)		1732.5 (20175)	1752.5 (20375)	
LTE Band 4 (AWS): 10 MHz	1715 (20000)		1732.5 (20175)	1750 (20350)	
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)		1732.5 (20175)	1747.5 (20325)	
LTE Band 4 (AWS): 20 MHz	1720 (20050)		1732.5 (20175)	1745 (20300)	
LTE Band 25 (PCS): 1.4 MHz	1850.7 (26047)		1882.5 (26365)	1914.3 (26683)	
LTE Band 25 (PCS): 3 MHz	1851.5 (26055)		1882.5 (26365)	1913.5 (26675)	
LTE Band 25 (PCS): 5 MHz	1852.5 (26065)		1882.5 (26365)	1912.5 (26665)	
LTE Band 25 (PCS): 10 MHz	1855 (26090)		1882.5 (26365)	1910 (26640)	
LTE Band 25 (PCS): 15 MHz	1857.5 (26115)		1882.5 (26365)	1907.5 (26615)	
LTE Band 25 (PCS): 20 MHz	1860 (26140)		1882.5 (26365)	1905 (26590)	
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)		1880 (18900)	1909.3 (19193)	
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)		1880 (18900)	1908.5 (19185)	
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)		1880 (18900)	1907.5 (19175)	
LTE Band 2 (PCS): 10 MHz	1855 (18650)		1880 (18900)	1905 (19150)	
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)		1880 (18900)	1902.5 (19125)	
LTE Band 2 (PCS): 20 MHz	1860 (18700)		1880 (18900)	1900 (19100)	
LTE Band 30: 5 MHz	2307.5 (27685)		2310 (27710)	2312.5 (27735)	
LTE Band 30: 10 MHz	N/A		2310 (27710)	N/A	
LTE Band 7: 5 MHz	2502.5 (20775)		2535 (21100)	2567.5 (21425)	
LTE Band 7: 10 MHz	2505 (20800)		2535 (21100)	2565 (21400)	
LTE Band 7: 15 MHz	2507.5 (20825)		2535 (21100)	2562.5 (21375)	
LTE Band 7: 20 MHz	2510 (20850)		2535 (21100)	2560 (21350)	
LTE Band 38: 5 MHz	2572.5 (37775)		2595 (38000)	2617.5 (38225)	
LTE Band 38: 10 MHz	2575 (37800)		2595 (38000)	2615 (38200)	
LTE Band 38: 15 MHz	2577.5 (37825)		2595 (38000)	2612.5 (38175)	
LTE Band 38: 20 MHz	2580 (37850)		2595 (38000)	2610 (38150)	
LTE Band 41: 5 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 10 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 15 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
UE Category	DL UE Cat 18 (QPSK, 16QAM, 64QAM, 256QAM); UL UE Cat 13 (QPSK, 16QAM, 64QAM)				
Modulations Supported in UL	QPSK, 16QAM, 64QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	YES				
A-MPR (Additional MPR) disabled for SAR Testing?	YES				
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations				
LTE Additional Information	This device does not support full CA features on 3GPP Release 14. It supports carrier aggregation as shown in Section 9 and Appendix H. All other uplink communications are identical to the Release 8 specifications. Uplink communications are done on the PCC unless otherwise specified. The following LTE Release 14 Features are not supported: Relay, HetNet, Enhanced eICIC, WiFi Offloading, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

3 INTRODUCTION

The FCC and Innovation, Science, and Economic Development Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. [1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [3] and Health Canada RF Exposure Guidelines Safety Code 6 [22]. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave [4] is used for guidance in measuring the Specific Absorption Rate (SAR) due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the International Committee for Non-Ionizing Radiation Protection (ICNIRP) in Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," Report No. Vol 74. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

3.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 3-1).

Equation 3-1
SAR Mathematical Equation

$$\boxed{SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{\rho dv}\right)}$$

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \frac{\sigma \cdot E^2}{\rho}$$

where:

σ = conductivity of the tissue-simulating material (S/m)
ρ = mass density of the tissue-simulating material (kg/m^3)
E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

4 DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013:

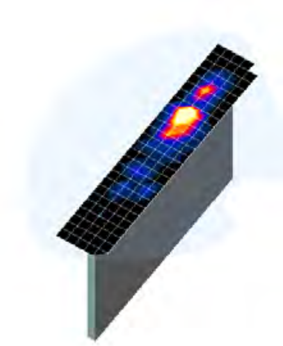


Figure 4-1
Sample SAR Area Scan

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):

   a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).

   b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.

   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

Table 4-1
Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04*

Frequency	Maximum Area Scan Resolution (mm) (Δx_{area}, Δy_{area})	Maximum Zoom Scan Resolution (mm) (Δx_{zoom}, Δy_{zoom})	Maximum Zoom Scan Spatial Resolution (mm)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
			$\Delta z_{zoom}(n)$	$\Delta z_{zoom}(1)$*	$\Delta z_{zoom}(n>1)$*	
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≤ 3	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≤ 2.5	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≤ 2	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 22

*Also compliant to IEEE 1528-2013 Table 6

5 DEFINITION OF REFERENCE POINTS

5.1 EAR REFERENCE POINT

Figure 5-2 shows the front, back and side views of the SAM Twin Phantom. The point "M" is the reference point for the center of the mouth, "LE" is the left ear reference point (ERP), and "RE" is the right ERP. The ERP is 15mm posterior to the entrance to the ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 5-1. The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front), also called the Reference Pivoting Line, is not perpendicular to the reference plane (see Figure 5-1). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

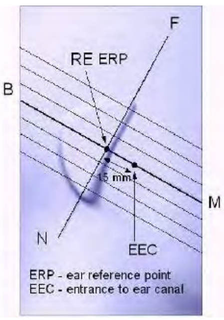


Figure 5-1
Close-Up Side view of ERP

5.2 HANDSET REFERENCE POINTS

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the acoustic output located along the "vertical centerline" on the front of the device aligned to the "ear reference point" (See Figure 5-3). The acoustic output was than located at the same level as the center of the ear reference point. The test device was positioned so that the "vertical centerline" was bisecting the front surface of the handset at its top and bottom edges, positioning the "ear reference point" on the outer surface of the both the left and right head phantoms on the ear reference point.

Figure 5-2
Front, back and side view of SAM Twin Phantom

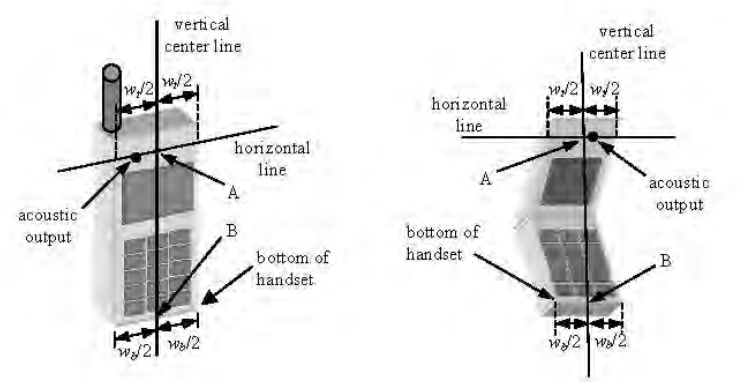


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

6 TEST CONFIGURATION POSITIONS

6.1 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02.

6.2 Positioning for Cheek

1. The test device was positioned with the device close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 6-1), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom.

Figure 6-1 Front, Side and Top View of Cheek Position

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the pinna.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the reference plane.
4. The phone was then rotated around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the device contact with the ear, the device was rotated about the NF line until any point on the handset made contact with a phantom point below the ear (cheek) (See Figure 6-2).

6.3 Positioning for Ear / 15º Tilt

With the test device aligned in the "Cheek Position":

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15degrees.
2. The phone was then rotated around the horizontal line by 15 degrees.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the handset touched the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. In this situation, the tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 6-2).

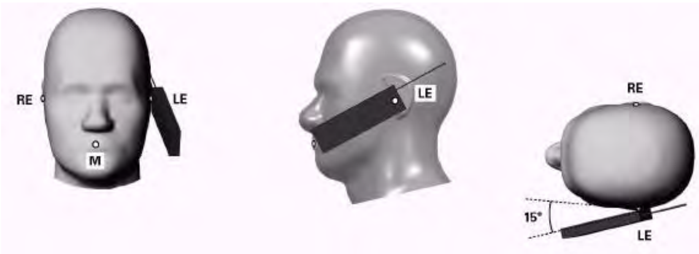


Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

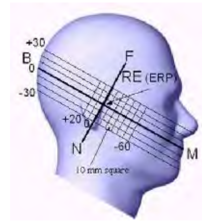


Figure 6-3
Side view w/ relevant markings

6.4 SAR Evaluations near the Mouth/Jaw Regions of the SAM Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones. Per IEEE 1528-2013, a rotated SAM phantom is necessary to allow probe access to such regions. Both SAM heads of the TwinSAM-Chin20 are rotated 20 degrees around the NF line. Each head can be removed from the table for emptying and cleaning.

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04v01r03. The SAR required in these regions of SAM should be measured using a flat phantom. The phone should be positioned with a separation distance of 4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR location identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SAR location to the phone is determined by the straight line passing perpendicularly through the phantom surface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing the required separation at the peak SAR location, the top edge of the phone will be allowed to touch the phantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right while placed in this inclined position to the flat phantom.

6.5 Body-Worn Accessory Configurations

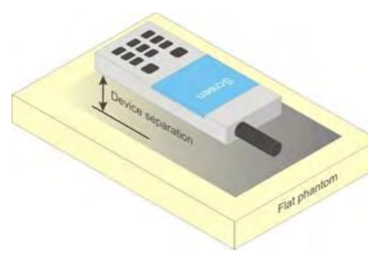


Figure 6-4
Sample Body-Worn Diagram

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 6-4). Per FCC KDB Publication 648474 D04v01r03, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented.
Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

6.6 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1g body and 10g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D01v06 should be applied to determine SAR test requirements.

Per KDB Publication 447498 D01v06, Cell phones (handsets) are not normally designed to be used on extremities or operated in extremity only exposure conditions. The maximum output power levels of handsets generally do not require extremity SAR testing to show compliance. Therefore, extremity SAR was not evaluated for this device.

6.7 Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06v02r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

6.8 Phablet Configurations

For smart phones with a display diagonal dimension > 150 mm or an overall diagonal dimension > 160 mm that provide similar mobile web access and multimedia support found in UMPCs or UMPC UMPCs that support voice calls next to the ear, the phablets procedures outlined in KDB Publication 648474 D04v01r03 should be applied to evaluate SAR compliance. A device marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. In addition to the normally required head and body-worn accessory SAR test procedures required for handsets, the UMPC UMPC procedures must also be applied to test the SAR of all surfaces and edges with an antenna <=25 mm from that surface or edge, in direct contact with the phantom, for 10g SAR. The UMPC UMPC 1g SAR at 5 mm is not required. When hotspot mode applies, 10g SAR is required only for the surfaces and edges with hotspot mode 1g SAR > 1.2 W/kg.

6.9 Proximity Sensor Considerations

This device uses a power reduction mechanism to reduce output powers in certain use conditions when the device is used close the user's body.

When the device's antenna is within a certain distance of the user, the sensor activates and reduces the maximum allowed output power. However, the sensor is not active when the device is moved beyond the sensor triggering distance and the maximum output power is no longer limited. Therefore, additional evaluation is needed in the vicinity of the triggering distance to ensure SAR is compliant when the device is allowed to operate at a non-reduced output power level. FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device at these additional test positions. Sensor triggering distance summary data is included in Appendix G.

The sensor is designed to support sufficient detection range and sensitivity to cover regions of the sensors in all applicable directions since the sensor entirely covers the antennas.

6.10 UMPC Mini-Tablet Configurations

Small hand-held tablets and devices of similar form factors that are designed primarily for interactive hand-held use next to or near the body of users require body SAR and extremity SAR evaluation. This type of mini-tablet is normally optimized for mobile web access and multimedia use. UMPC test procedures are applicable to devices with a display and overall diagonal dimension ≤ 20 cm. Devices are to be setup according to KDB publication 941225 D07v01r02 requirements and are configured with maximum output power during SAR assessment for a worst case SAR evaluation.

Per KDB Publication 941225 D07v01r02, UMPC mini-tablet devices must be tested on all surfaces and edges with an antenna <=25 mm from that surface or edge. A test separation distance of 10 mm may be considered for 1g SAR, with the addition of 10g SAR measurement at 0 mm test separation distance for all measured 1g (10mm) SAR configurations to address hand exposure. For certain conditions when a proximity sensor was used that was triggered at 10 mm, the procedures in KDB 616217 were used to select a secondary test distance at maximum power. See Section 6.9 for more details.

7 RF EXPOSURE LIMITS

7.1 Uncontrolled Environment

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

7.2 Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table 7-1
SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT *General Population* (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT *Occupational* (W/kg) or (mW/g)
Peak Spatial Average SAR Head	1.6	8.0
Whole Body SAR	0.08	0.4
Peak Spatial Average SAR Hands, Feet, Ankle, Wrists, etc.	4.0	20

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

8 FCC MEASUREMENT PROCEDURES

Power measurements for licensed transmitters are performed using a base station simulator under digital average power.

8.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v06, when SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as *reported* SAR. The highest *reported* SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

8.2 3G SAR Test Reduction Procedure

In FCC KDB Publication 941225 D01v03r01, certain transmission modes within a frequency band and wireless mode evaluated for SAR are defined as primary modes. The equivalent modes considered for SAR test reduction are denoted as secondary modes. When the maximum output power including tune-up tolerance specified for production units in a secondary mode is ≤ 0.25 dB higher than the primary mode or when the highest reported SAR of the primary mode, scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode, is ≤ 1.2 W/kg, SAR measurements are not required for the secondary mode. These criteria are referred to as the 3G SAR test reduction procedure. When the 3G SAR test reduction procedure is not satisfied, SAR measurements are additionally required for the secondary mode.

8.3 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01v03r01 “3G SAR Measurement Procedures.”

The device is placed into a simulated call using a base station simulator in a RF shielded chamber. Establishing connections in this manner ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. Devices under test are evaluated prior to testing, with a fully charged battery and were configured to operate at maximum output power. In order to verify that the device is tested throughout the SAR test at maximum output power, the SAR measurement system measures a “point SAR” at an arbitrary reference point at the start and end of the 1 gram SAR evaluation, to assess for any power drifts during the evaluation. If the power drift deviates by more than 5%, the SAR test and drift measurements are repeated.

8.4 SAR Measurement Conditions for UMTS

8.4.1 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC with TPC (transmit power control) set to all “1s” or applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc) are tabulated in this test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations are identified.

8.4.2 Head SAR Measurements

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR in 3.4 kbps SRB (signaling radio bearer) using the highest reported SAR configuration in 12.2 kbps RMC for head exposure.

8.4.3 Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all "1s". The 3G SAR test reduction procedure is applied to other spreading codes and multiple $DPDCH_n$ configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreading code or $DPDCH_n$, for the highest reported SAR configuration in 12.2 kbps RMC.

8.4.4 SAR Measurements with Rel 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, for the highest reported SAR configuration in 12.2 kbps RMC without HSDPA. Handsets with both HSDPA and HSUPA are tested according to Release 6 HSPA test procedures.

8.4.5 SAR Measurements with Rel 6 HSUPA

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 and power control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA.

When VOIP applies to head exposure, the 3G SAR test reduction procedure is applied with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body SAR measurements are applied to head exposure testing.

8.4.6 SAR Measurement Conditions for DC-HSDPA

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

8.5 SAR Measurement Conditions for LTE

LTE modes are tested according to FCC KDB 941225 D05v02r04 publication. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 or Anritsu MT8820C simulators are used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

8.5.1 Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

8.5.2 MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

8.5.3 A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

8.5.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r04:

a. Per Section 5.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
   i. The required channel and offset combination with the highest maximum output power is required for SAR.
   ii. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
   iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
b. Per Section 5.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 5.2.1.
c. Per Section 5.2.3, QPSK SAR is not required for the 100% allocation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
d. Per Section 5.2.4 and 5.3, SAR tests for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sections 5.2.1 through 5.2.3 is less than or equal to ½ dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is <1.45 W/kg.

8.5.5 TDD

LTE TDD testing is performed using the SAR test guidance provided in FCC KDB 941225 D05v02r04. TDD is tested at the highest duty factor using UL-DL configuration 0 with special subframe configuration 6 and applying the FDD LTE procedures in KDB 941225 D05v02r04. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211 Section 4.

8.5.6 Downlink Only Carrier Aggregation

Conducted power measurements with LTE Carrier Aggregation (CA) (downlink only) active are made in accordance to KDB Publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier(s) (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to specifications when downlink carrier aggregation is inactive on the PCC. Additional conducted output powers are measured with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band. Per FCC KDB Publication 941225 D05Av01r02, no SAR measurements are required for downlink only carrier aggregation configurations when the average output power with downlink only carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink only carrier aggregation inactive.

8.6 SAR Testing with 802.11 Transmitters

The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v02r02 for more details.

8.6.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.

A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

8.6.2 U-NII-1 and U-NII-2A

For devices that operate in both U-NII-1 and U-NII-2A bands, when the same maximum output power is specified for both bands, SAR measurement using OFDM SAR test procedures is not required for U-NII-1 unless the highest reported SAR for U-NII-2A is > 1.2 W/kg. When different maximum output powers are specified for the bands, SAR measurement for the U-NII band with the lower maximum output power is not required unless the highest reported SAR for the U-NII band with the higher maximum output power, adjusted by the ratio of lower to higher specified maximum output power for the two bands, is > 1.2 W/kg. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.3 U-NII-2C and U-NII-3

The frequency range covered by U-NII-2C and U-NII-3 is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. When Terminal Doppler Weather Radar (TDWR) restriction applies, the channels at 5.60 – 5.65 GHz in U-NII-2C band must be disabled with acceptable mechanisms and documented in the equipment certification. Unless band gap channels are permanently disabled, SAR must be considered for these channels. Each band is tested independently according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

8.6.4 Initial Test Position Procedure

For exposure conditions with multiple test positions, such as handset operating next to the ear, devices with hotspot mode or UMPC UMPC, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all positions in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.5 2.4 GHz SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

2.4 GHz 802.11 g/n/ax OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.6 OFDM Transmission Mode and SAR Test Channel Selection

When the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n and 802.11ac or 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11a, then 802.11n and 802.11ac or 802.11g then 802.11n, is used for SAR measurement. Per FCC Guidance, 802.11ax was considered a higher order 802.11 mode when compared to a/b/g/n/ac to apply KDB Publication 248227 Guidance. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

8.6.7 Initial Test Configuration Procedure

For OFDM, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order IEEE 802.11 mode. The channel of the transmission mode with the highest average RF output conducted power will be the initial test configuration.

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest

802.11 mode is considered for SAR measurements (See Section 8.6.6). When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.8 Subsequent Test Configuration Procedures

For OFDM configurations in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure. When the highest reported SAR (for the initial test configuration), adjusted by the ratio of the specified maximum output power of the subsequent test configuration to initial test configuration, is ≤ 1.2 W/kg, no additional SAR tests for the subsequent test configurations are required. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.9 MIMO SAR considerations

Per KDB Publication 248227 D01v02r02, the simultaneous SAR provisions in KDB Publication 447498 D01v06 should be applied to determine simultaneous transmission SAR test exclusion for WIFI MIMO. If the sum of 1g single transmission chain SAR measurements is <1.6 W/kg, no additional SAR measurements for MIMO are required. Alternatively, SAR for MIMO can be measured with all antennas transmitting simultaneously at the specified maximum output power of MIMO operation. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

9 RF CONDUCTED POWERS

9.1 GSM Conducted Powers

Table 9-1
Maximum Conducted Power

Maximum Burst-Averaged Output Power										
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 1900	512	30.82	30.88	**29.13**	27.15	25.12	25.98	24.49	22.71	21.58
	661	30.70	30.72	**29.19**	27.13	25.25	26.29	24.66	22.65	21.41
	810	30.64	30.68	**28.85**	26.84	24.88	25.83	24.42	22.34	21.54

Calculated Maximum Frame-Averaged Output Power										
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 1900	512	21.79	21.85	**23.11**	22.89	22.11	16.95	18.47	18.45	18.57
	661	21.67	21.69	**23.17**	22.87	22.24	17.26	18.64	18.39	18.40
	810	21.61	21.65	**22.83**	22.58	21.87	16.80	18.40	18.08	18.53

GSM 1900	**Frame Avg.Targets:**	21.47	21.47	**23.48**	22.74	21.99	16.97	18.48	18.24	18.49

Table 9-2
Reduced Conducted Power – Grip Sensor Active

Maximum Burst-Averaged Output Power										
		Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 1900	512	27.40	27.41	**26.35**	24.31	22.45	26.25	24.62	22.89	21.78
	661	27.50	27.50	**26.31**	24.33	22.43	26.17	24.71	23.01	21.72
	810	26.91	26.92	**25.87**	24.03	22.05	26.14	24.40	22.53	21.70

Calculated Maximum Frame-Averaged Output Power										
		Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 1900	512	18.37	18.38	**20.33**	20.05	19.44	17.22	18.60	18.63	18.77
	661	18.47	18.47	**20.29**	20.07	19.42	17.14	18.69	18.75	18.71
	810	17.88	17.89	**19.85**	19.77	19.04	17.11	18.38	18.27	18.69
GSM 1900	**Frame Avg.Targets:**	18.47	18.47	**20.48**	19.74	18.99	16.97	18.48	18.24	18.49

Note:

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. GPRS/EDGE (GMSK) output powers were measured with coding scheme setting of 1 (CS1) on the base station simulator. CS1 was configured to measure GPRS output power measurements and SAR to ensure GMSK modulation in the signal. Our Investigation has shown that CS1 - CS4 settings do not have any impact on the output levels or modulation in the GPRS modes.
3. EDGE (8-PSK) output powers were measured with MCS7 on the base station simulator. MCS7 coding scheme was used to measure the output powers for EDGE since investigation has shown that choosing MCS7 coding scheme will ensure 8-PSK modulation. It has been shown that MCS levels that produce 8PSK modulation do not have an impact on output power.

GSM Class: B
GPRS Multislot class: 33 (Max 4 Tx uplink slots)
EDGE Multislot class: 33 (Max 4 Tx uplink slots)
DTM Multislot Class: N/A

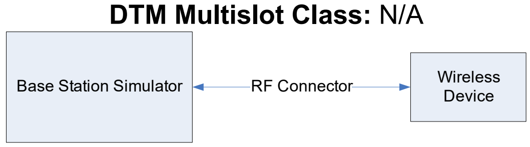


Figure 9-1
Power Measurement Setup

9.2 UMTS Conducted Powers

Table 9-3
Maximum Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	24.18	24.27	24.10	23.61	23.60	23.51	-
99		12.2 kbps AMR	24.19	24.29	24.12	23.58	23.53	23.50	-
6	HSDPA	Subtest 1	23.55	23.66	23.47	22.79	22.89	22.53	0
6		Subtest 2	23.60	23.69	23.49	22.82	22.86	22.51	0
6		Subtest 3	23.06	23.18	22.94	22.31	22.42	22.02	0.5
6		Subtest 4	23.08	23.10	22.97	22.26	22.45	22.00	0.5
6	HSUPA	Subtest 1	23.54	23.66	23.43	22.77	22.85	22.51	0
6		Subtest 2	21.52	21.61	21.39	20.19	20.33	19.94	2
6		Subtest 3	22.50	22.59	22.41	21.71	21.74	21.80	1
6		Subtest 4	21.50	21.57	21.40	20.68	20.80	20.44	2
6		Subtest 5	23.54	23.61	23.47	22.79	22.90	22.53	0
8	DC-HSDPA	Subtest 1	23.55	23.67	23.44	22.33	22.45	22.11	0
8		Subtest 2	23.60	23.46	23.46	22.43	22.49	22.16	0
8		Subtest 3	23.00	23.21	22.93	21.93	22.00	21.66	0.5
8		Subtest 4	23.12	23.18	22.97	21.97	22.06	21.67	0.5

Table 9-4
Reduced Conducted Powers - Grip Sensor Active

3GPP Release Version	Mode	3GPP 34.121 Subtest	AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	19.92	20.02	19.78	19.77	19.92	19.55	-
99		12.2 kbps AMR	19.95	20.06	19.78	19.77	19.93	19.55	-
6	HSDPA	Subtest 1	18.84	18.98	18.75	19.15	19.23	18.87	0
6		Subtest 2	18.80	18.93	18.76	19.13	19.21	18.84	0
6		Subtest 3	18.40	18.56	18.31	18.75	18.87	18.37	0.5
6		Subtest 4	18.46	18.59	18.34	18.70	18.76	18.40	0.5
6	HSUPA	Subtest 1	18.89	18.98	18.79	19.15	19.22	18.89	0
6		Subtest 2	16.98	17.02	16.88	17.09	17.14	16.88	2
6		Subtest 3	17.94	17.99	17.79	18.12	18.20	17.86	1
6		Subtest 4	16.87	17.00	16.85	17.10	17.23	16.90	2
6		Subtest 5	18.95	19.10	18.90	18.82	18.90	18.52	0
8	DC-HSDPA	Subtest 1	18.99	19.02	19.05	18.80	18.83	18.60	0
8		Subtest 2	18.93	19.04	19.05	18.77	18.88	18.51	0
8		Subtest 3	18.48	18.60	18.35	18.38	18.45	18.06	0.5
8		Subtest 4	18.51	18.62	18.36	18.35	18.45	18.05	0.5

DC-HSDPA considerations

- 3GPP Specification 34.121-1 Release 8 Ver 8.10.0 was used for DC-HSDPA guidance
- H-Set 12 (QPSK) was confirmed to be used during DC-HSDPA measurements
- The DUT supports UE category 24 for HSDPA

It is expected by the manufacturer that MPR for some HSPA subtests may be up to 2 dB more than specified by 3GPP, but also as low as 0 dB according to the chipset implementation in this model.

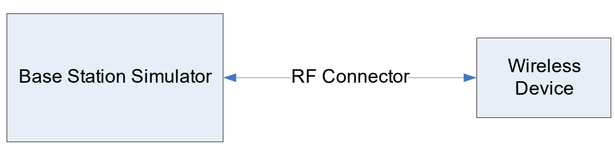


Figure 9-2
Power Measurement Setup

9.3 LTE Conducted Powers

9.3.1 LTE Band 26 (Cell)

Table 9-5
LTE Band 26 (Cell) Conducted Powers - 15 MHz Bandwidth

LTE Band 26 (Cell) 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 26865 (831.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**24.22**	0	0
	1	36	24.17		0
	1	74	24.16		0
	36	0	23.26	0-1	1
	36	18	23.25		1
	36	37	**23.27**		1
	75	0	23.24		1
16QAM	1	0	23.47	0-1	1
	1	36	23.45		1
	1	74	23.40		1
	36	0	22.27	0-2	2
	36	18	22.26		2
	36	37	22.23		2
	75	0	22.29		2
64QAM	1	0	22.44	0-2	2
	1	36	22.46		2
	1	74	22.42		2
	36	0	21.31	0-3	3
	36	18	21.28		3
	36	37	21.32		3
	75	0	21.19		3

Note: LTE Band 26 (Cell) at 15 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 9-6
LTE Band 26 (Cell) Conducted Powers - 10 MHz Bandwidth

LTE Band 26 (Cell) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26740 (819.0 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 26990 (844.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.59	24.31	24.50	0	0
	1	25	24.61	24.24	24.30		0
	1	49	24.66	24.24	24.10		0
	25	0	23.82	23.41	23.54	0-1	1
	25	12	23.87	23.43	23.57		1
	25	25	23.79	23.39	23.51		1
	50	0	23.81	23.43	23.52		1
16QAM	1	0	23.68	23.54	23.75	0-1	1
	1	25	23.76	23.59	23.68		1
	1	49	23.94	23.49	23.58		1
	25	0	22.86	22.43	22.55	0-2	2
	25	12	22.84	22.46	22.57		2
	25	25	22.81	22.39	22.52		2
	50	0	22.78	22.45	22.52		2
64QAM	1	0	22.16	22.46	22.43	0-2	2
	1	25	22.19	22.33	22.33		2
	1	49	22.64	22.16	22.15		2
	25	0	21.40	21.45	21.29	0-3	3
	25	12	21.33	21.46	21.36		3
	25	25	21.26	21.39	21.16		3
	50	0	21.26	21.40	21.21		3

Table 9-7
LTE Band 26 (Cell) Conducted Powers - 5 MHz Bandwidth

LTE Band 26 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26715 (816.5 MHz)	26865 (831.5 MHz)	27015 (846.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.35	24.27	24.30	0	0
	1	12	24.45	24.33	24.27		0
	1	24	24.38	24.31	24.13		0
	12	0	23.76	23.47	23.43	0-1	1
	12	6	23.87	23.52	23.53		1
	12	13	23.83	23.49	23.46		1
	25	0	23.84	23.47	23.40		1
16QAM	1	0	23.47	23.60	23.63	0-1	1
	1	12	23.73	23.70	23.39		1
	1	24	23.61	23.66	23.09		1
	12	0	22.58	22.52	22.44	0-2	2
	12	6	22.71	22.55	22.57		2
	12	13	22.67	22.52	22.52		2
	25	0	22.57	22.43	22.40		2
64QAM	1	0	22.14	22.61	22.46	0-2	2
	1	12	22.27	22.61	22.22		2
	1	24	22.18	22.40	22.15		2
	12	0	21.47	21.49	21.35	0-3	3
	12	6	21.68	21.54	21.24		3
	12	13	21.50	21.53	21.06		3
	25	0	21.41	21.46	21.18		3

Table 9-8
LTE Band 26 (Cell) Conducted Powers - 3 MHz Bandwidth

LTE Band 26 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26705 (815.5 MHz)	26865 (831.5 MHz)	27025 (847.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.14	24.40	24.34	0	0
	1	7	24.26	24.44	24.25		0
	1	14	24.30	24.46	24.07		0
	8	0	23.44	23.51	23.46	0-1	1
	8	4	23.53	23.58	23.50		1
	8	7	23.45	23.60	23.42		1
	15	0	23.50	23.54	23.45		1
16QAM	1	0	23.26	23.78	23.45	0-1	1
	1	7	23.49	23.75	23.34		1
	1	14	23.53	23.77	23.17		1
	8	0	22.42	22.59	22.54	0-2	2
	8	4	22.63	22.60	22.57		2
	8	7	22.53	22.60	22.49		2
	15	0	22.47	22.53	22.44		2
64QAM	1	0	22.08	22.68	22.07	0-2	2
	1	7	22.18	22.52	22.15		2
	1	14	22.32	22.56	22.01		2
	8	0	21.17	21.63	21.25	0-3	3
	8	4	21.39	21.63	21.11		3
	8	7	21.43	21.65	21.25		3
	15	0	21.42	21.57	21.28		3

Table 9-9
LTE Band 26 (Cell) Conducted Powers -1.4 MHz Bandwidth

LTE Band 26 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26697 (814.7 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27033 (848.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.40	24.22	24.30	0	0
	1	2	24.53	24.34	24.39		0
	1	5	24.49	24.26	24.15		0
	3	0	24.47	24.27	24.30		0
	3	2	24.58	24.33	24.25		0
	3	3	24.56	24.26	24.14		0
	6	0	23.71	23.36	23.36	0-1	1
16QAM	1	0	23.59	23.51	23.46	0-1	1
	1	2	23.73	23.63	23.39		1
	1	5	23.73	23.53	23.24		1
	3	0	23.38	23.30	23.36		1
	3	2	23.54	23.40	23.31		1
	3	3	23.58	23.31	23.20		1
	6	0	22.79	22.41	22.43	0-2	2
64QAM	1	0	22.26	22.50	22.26	0-2	2
	1	2	22.32	22.57	22.29		2
	1	5	22.48	22.43	22.11		2
	3	0	22.34	22.40	22.19		2
	3	2	22.43	22.40	22.22		2
	3	3	22.25	22.37	22.11		2
	6	0	21.34	21.40	21.69	0-3	3

9.3.2 LTE Band 66 (AWS)

Table 9-10
LTE Band 66 (AWS) Max Conducted Powers - 20 MHz Bandwidth

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132072 (1720.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132572 (1770.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	**24.32**	24.16	24.08	0	0
	1	50	24.25	24.13	24.05		0
	1	99	23.97	24.26	24.14		0
	50	0	23.26	**23.41**	23.29	0-1	1
	50	25	23.24	23.34	23.30		1
	50	50	23.21	23.32	23.27		1
	100	0	23.21	23.38	23.40		1
16QAM	1	0	23.25	23.32	23.24	0-1	1
	1	50	23.14	23.50	23.23		1
	1	99	23.25	23.14	23.27		1
	50	0	22.29	22.38	22.50	0-2	2
	50	25	22.30	22.41	22.36		2
	50	50	22.22	22.36	22.31		2
	100	0	22.16	22.38	22.40		2
64QAM	1	0	22.26	22.38	22.43	0-2	2
	1	50	22.18	22.24	22.50		2
	1	99	22.32	22.29	22.33		2
	50	0	21.39	21.48	21.32	0-3	3
	50	25	21.15	21.36	21.34		3
	50	50	21.26	21.35	21.28		3
	100	0	21.18	21.46	21.41		3

Table 9-11
LTE Band 66 (AWS) Max Conducted Powers - 15 MHz Bandwidth

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.22	24.30	24.33	0	0
	1	36	24.12	24.25	24.24		0
	1	74	24.11	24.32	24.09		0
	36	0	23.35	23.49	23.37	0-1	1
	36	18	23.33	23.48	23.38		1
	36	37	23.29	23.43	23.32		1
	75	0	23.33	23.47	23.35		1
16QAM	1	0	23.30	23.41	23.34	0-1	1
	1	36	23.26	23.36	23.36		1
	1	74	23.25	23.39	23.23		1
	36	0	22.15	22.28	22.20	0-2	2
	36	18	22.15	22.28	22.17		2
	36	37	22.07	22.24	22.13		2
	75	0	22.10	22.28	22.18		2
64QAM	1	0	22.25	22.40	22.34	0-2	2
	1	36	22.19	22.37	22.28		2
	1	74	22.26	22.40	22.09		2
	36	0	21.18	21.31	21.23	0-3	3
	36	18	21.17	21.33	21.17		3
	36	37	21.14	21.27	21.18		3
	75	0	21.12	21.26	21.20		3

Table 9-12
LTE Band 66 (AWS) Max Conducted Powers - 10 MHz Bandwidth

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.85	24.10	23.77	0	0
	1	25	23.94	24.10	23.94		0
	1	49	24.02	24.07	23.96		0
	25	0	23.10	23.28	23.18	0-1	1
	25	12	23.10	23.28	23.11		1
	25	25	23.04	23.28	23.12		1
	50	0	23.10	23.32	23.17		1
16QAM	1	0	23.26	23.45	23.39	0-1	1
	1	25	23.30	23.43	23.31		1
	1	49	23.34	23.50	23.31		1
	25	0	22.16	22.34	22.21	0-2	2
	25	12	22.15	22.35	22.21		2
	25	25	22.12	22.31	22.18		2
	50	0	22.12	22.36	22.21		2
64QAM	1	0	22.24	22.40	22.28	0-2	2
	1	25	22.33	22.43	22.31		2
	1	49	22.28	22.45	22.33		2
	25	0	21.17	21.35	21.26	0-3	3
	25	12	21.17	21.39	21.25		3
	25	25	21.09	21.31	21.19		3
	50	0	21.17	21.35	21.23		3

Table 9-13
LTE Band 66 (AWS) Max Conducted Powers - 5 MHz Bandwidth

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.94	24.12	24.00	0	0
	1	12	24.02	24.20	24.04		0
	1	24	24.07	24.28	23.99		0
	12	0	23.08	23.27	23.15	0-1	1
	12	6	23.17	23.29	23.19		1
	12	13	23.13	23.36	23.17		1
	25	0	23.16	23.33	23.20		1
16QAM	1	0	23.24	23.36	23.23	0-1	1
	1	12	23.41	23.42	23.32		1
	1	24	23.45	23.46	23.26		1
	12	0	22.14	22.35	22.26	0-2	2
	12	6	22.14	22.36	22.28		2
	12	13	22.12	22.37	22.26		2
	25	0	22.15	22.33	22.20		2
64QAM	1	0	22.22	22.35	22.30	0-2	2
	1	12	22.35	22.47	22.32		2
	1	24	22.34	22.50	22.33		2
	12	0	21.17	21.33	21.23	0-3	3
	12	6	21.17	21.34	21.22		3
	12	13	21.14	21.32	21.24		3
	25	0	21.16	21.28	21.21		3

Table 9-14
LTE Band 66 (AWS) Max Conducted Powers - 3 MHz Bandwidth

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131987 (1711.5 MHz)	132322 (1745.0 MHz)	132657 (1778.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.19	24.27	24.27	0	0
	1	7	24.27	24.34	24.21		0
	1	14	24.30	24.36	24.23		0
	8	0	23.31	23.48	23.43	0-1	1
	8	4	23.42	23.43	23.47		1
	8	7	23.42	23.46	23.44		1
	15	0	23.42	23.43	23.43		1
16QAM	1	0	23.26	23.36	23.37	0-1	1
	1	7	23.38	23.40	23.38		1
	1	14	23.38	23.42	23.33		1
	8	0	22.21	22.38	22.34	0-2	2
	8	4	22.29	22.40	22.33		2
	8	7	22.27	22.40	22.33		2
	15	0	22.20	22.29	22.27		2
64QAM	1	0	22.30	22.38	22.32	0-2	2
	1	7	22.45	22.50	22.38		2
	1	14	22.38	22.47	22.31		2
	8	0	21.21	21.37	21.35	0-3	3
	8	4	21.33	21.43	21.31		3
	8	7	21.32	21.45	21.29		3
	15	0	21.25	21.30	21.27		3

Table 9-15
LTE Band 66 (AWS) Max Conducted Powers -1.4 MHz Bandwidth

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131979 (1710.7 MHz)	132322 (1745.0 MHz)	132665 (1779.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.14	24.26	24.14	0	0
	1	2	24.25	24.33	24.19		0
	1	5	24.21	24.29	24.18		0
	3	0	24.22	24.38	24.21		0
	3	2	24.30	24.45	24.30		0
	3	3	24.26	24.38	24.23		0
	6	0	23.36	23.50	23.35	0-1	1
16QAM	1	0	23.26	23.38	23.28	0-1	1
	1	2	23.36	23.49	23.32		1
	1	5	23.31	23.47	23.31		1
	3	0	23.25	23.32	23.17		1
	3	2	23.27	23.38	23.23		1
	3	3	23.19	23.35	23.17		1
	6	0	22.23	22.36	22.27	0-2	2
64QAM	1	0	22.27	22.40	22.31	0-2	2
	1	2	22.39	22.47	22.32		2
	1	5	22.33	22.44	22.29		2
	3	0	22.26	22.35	22.26		2
	3	2	22.34	22.42	22.27		2
	3	3	22.28	22.41	22.27		2
	6	0	21.18	21.30	21.17	0-3	3

Table 9-16
LTE Band 66 (AWS) Reduced Conducted Powers - 20 MHz Bandwidth – Grip Sensor Active

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132072 (1720.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132572 (1770.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	**19.62**	19.40	19.51	0	0
	1	50	19.53	19.45	19.29		0
	1	99	19.39	19.50	19.29		0
	50	0	19.72	**19.74**	19.71	0-1	0
	50	25	19.70	19.70	19.61		0
	50	50	19.64	19.63	19.54		0
	100	0	19.60	19.49	19.55		0
16QAM	1	0	19.69	19.71	19.73	0-1	0
	1	50	19.75	19.62	19.54		0
	1	99	19.80	19.78	19.59		0
	50	0	19.73	19.68	19.64	0-2	0
	50	25	19.68	19.66	19.69		0
	50	50	19.62	19.66	19.56		0
	100	0	19.67	19.63	19.60		0
64QAM	1	0	19.76	19.78	19.80	0-2	0
	1	50	19.70	19.72	19.57		0
	1	99	19.71	19.73	19.63		0
	50	0	19.77	19.75	19.68	0-3	0
	50	25	19.72	19.72	19.65		0
	50	50	19.68	19.80	19.58		0
	100	0	19.73	19.65	19.65		0

Table 9-17
LTE Band 66 (AWS) Reduced Conducted Powers - 15 MHz Bandwidth – Grip Sensor Active

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.61	19.64	19.60	0	0
	1	36	19.53	19.55	19.55		0
	1	74	19.53	19.58	19.38		0
	36	0	19.77	19.75	19.65	0-1	0
	36	18	19.75	19.70	19.66		0
	36	37	19.71	19.69	19.59		0
	75	0	19.70	19.68	19.61		0
16QAM	1	0	19.80	19.78	19.78	0-1	0
	1	36	19.79	19.80	19.78		0
	1	74	19.80	19.80	19.60		0
	36	0	19.74	19.76	19.77	0-2	0
	36	18	19.69	19.71	19.73		0
	36	37	19.64	19.70	19.71		0
	75	0	19.68	19.75	19.65		0
64QAM	1	0	19.78	19.76	19.77	0-2	0
	1	36	19.80	19.77	19.77		0
	1	74	19.77	19.78	19.70		0
	36	0	19.80	19.74	19.77	0-3	0
	36	18	19.73	19.75	19.69		0
	36	37	19.70	19.73	19.70		0
	75	0	19.80	19.75	19.70		0

Table 9-18
LTE Band 66 (AWS) Reduced Conducted Powers - 10 MHz Bandwidth – Grip Sensor Active

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.43	19.36	19.22	0	0
	1	25	19.40	19.33	19.23		0
	1	49	19.40	19.35	19.25		0
	25	0	19.54	19.53	19.46	0-1	0
	25	12	19.55	19.55	19.45		0
	25	25	19.50	19.51	19.43		0
	50	0	19.55	19.51	19.44		0
16QAM	1	0	19.50	19.44	19.32	0-1	0
	1	25	19.48	19.40	19.33		0
	1	49	19.46	19.44	19.32		0
	25	0	19.62	19.58	19.49	0-2	0
	25	12	19.62	19.60	19.51		0
	25	25	19.55	19.54	19.44		0
	50	0	19.55	19.58	19.47		0
64QAM	1	0	19.33	19.33	19.28	0-2	0
	1	25	19.25	19.29	19.23		0
	1	49	19.33	19.35	19.23		0
	25	0	19.63	19.64	19.58	0-3	0
	25	12	19.66	19.70	19.59		0
	25	25	19.58	19.59	19.49		0
	50	0	19.62	19.61	19.53		0

Table 9-19
LTE Band 66 (AWS) Reduced Conducted Powers - 5 MHz Bandwidth – Grip Sensor Active

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.33	19.33	19.34	0	0
	1	12	19.41	19.39	19.35		0
	1	24	19.45	19.44	19.40		0
	12	0	19.55	19.40	19.46	0-1	0
	12	6	19.59	19.56	19.40		0
	12	13	19.56	19.55	19.44		0
	25	0	19.56	19.48	19.45		0
16QAM	1	0	19.38	19.41	19.57	0-1	0
	1	12	19.55	19.48	19.56		0
	1	24	19.51	19.48	19.61		0
	12	0	19.59	19.50	19.54	0-2	0
	12	6	19.64	19.58	19.55		0
	12	13	19.31	19.60	19.50		0
	25	0	19.54	19.48	19.43		0
64QAM	1	0	19.78	19.77	19.60	0-2	0
	1	12	19.80	19.80	19.60		0
	1	24	19.79	19.75	19.68		0
	12	0	19.60	19.52	19.50	0-3	0
	12	6	19.66	19.62	19.44		0
	12	13	19.63	19.61	19.48		0
	25	0	19.58	19.49	19.54		0

Table 9-20
LTE Band 66 (AWS) Reduced Conducted Powers - 3 MHz Bandwidth – Grip Sensor Active

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131987 (1711.5 MHz)	132322 (1745.0 MHz)	132657 (1778.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	19.19	19.40	19.30	0	0
	1	7	19.26	19.42	19.26		0
	1	14	19.29	19.49	19.33		0
	8	0	19.38	19.48	19.40	0-1	0
	8	4	19.38	19.58	19.41		0
	8	7	19.37	19.50	19.40		0
	15	0	19.36	19.48	19.41		0
16QAM	1	0	19.50	19.80	19.79	0-1	0
	1	7	19.57	19.80	19.78		0
	1	14	19.53	19.78	19.79		0
	8	0	19.40	19.52	19.49	0-2	0
	8	4	19.44	19.63	19.54		0
	8	7	19.41	19.62	19.45		0
	15	0	19.36	19.57	19.51		0
64QAM	1	0	19.48	19.70	19.68	0-2	0
	1	7	19.54	19.70	19.58		0
	1	14	19.61	19.75	19.62		0
	8	0	19.45	19.52	19.49	0-3	0
	8	4	19.47	19.64	19.52		0
	8	7	19.42	19.59	19.42		0
	15	0	19.48	19.50	19.48		0

Table 9-21
LTE Band 66 (AWS) Reduced Conducted Powers -1.4 MHz Bandwidth – Grip Sensor Active

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131979 (1710.7 MHz)	132322 (1745.0 MHz)	132665 (1779.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	19.20	19.17	19.00	0	0
	1	2	19.31	19.25	19.08		0
	1	5	19.24	19.16	19.04		0
	3	0	19.23	19.18	19.05		0
	3	2	19.31	19.20	19.12		0
	3	3	19.27	19.14	19.07		0
	6	0	19.36	19.26	19.14	0-1	0
16QAM	1	0	19.44	19.40	19.27	0-1	0
	1	2	19.54	19.49	19.41		0
	1	5	19.45	19.42	19.28		0
	3	0	19.37	19.32	19.24		0
	3	2	19.45	19.39	19.25		0
	3	3	19.46	19.32	19.23		0
	6	0	19.42	19.36	19.22	0-2	0
64QAM	1	0	19.50	19.50	19.36	0-2	0
	1	2	19.58	19.53	19.39		0
	1	5	19.50	19.46	19.36		0
	3	0	19.47	19.39	19.27		0
	3	2	19.54	19.48	19.32		0
	3	3	19.51	19.41	19.28		0
	6	0	19.43	19.29	19.20	0-3	0

9.3.3 LTE Band 25 (PCS)

Table 9-22
LTE Band 25 (PCS) Max Conducted Powers - 20 MHz Bandwidth

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26140 (1860.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26590 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.63	23.67	23.51	0	0
	1	50	23.67	23.69	23.54		0
	1	99	**23.72**	23.56	23.45		0
	50	0	22.71	22.68	22.49	0-1	1
	50	25	22.82	22.79	22.59		1
	50	50	**22.83**	22.75	22.63		1
	100	0	22.77	22.72	22.58		1
16QAM	1	0	22.91	22.87	22.59	0-1	1
	1	50	22.86	22.85	22.66		1
	1	99	22.97	22.56	22.72		1
	50	0	21.75	21.70	21.47	0-2	2
	50	25	21.67	21.73	21.59		2
	50	50	21.70	21.75	21.60		2
	100	0	21.72	21.71	21.54		2
64QAM	1	0	21.82	21.64	21.53	0-2	2
	1	50	21.86	21.91	21.76		2
	1	99	21.86	21.84	21.78		2
	50	0	20.70	20.65	20.55	0-3	3
	50	25	20.70	20.78	20.64		3
	50	50	20.77	20.81	20.64		3
	100	0	20.72	20.69	20.58		3

Table 9-23
LTE Band 25 (PCS) Max Conducted Powers - 15 MHz Bandwidth

LTE Band 25 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26115 (1857.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26615 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.66	23.83	23.63	0	0
	1	36	23.77	23.80	23.63		0
	1	74	23.84	23.81	23.71		0
	36	0	22.87	22.88	22.66	0-1	1
	36	18	22.92	22.95	22.79		1
	36	37	22.96	22.98	22.80		1
	75	0	22.95	22.92	22.77		1
16QAM	1	0	22.84	23.00	22.76	0-1	1
	1	36	22.90	22.91	22.76		1
	1	74	22.96	22.91	22.78		1
	36	0	21.78	21.76	21.55	0-2	2
	36	18	21.83	21.85	21.62		2
	36	37	21.86	21.83	21.66		2
	75	0	21.78	21.80	21.60		2
64QAM	1	0	21.80	21.97	21.70	0-2	2
	1	36	21.93	21.98	21.71		2
	1	74	21.99	21.86	21.82		2
	36	0	20.69	20.80	20.57	0-3	3
	36	18	20.81	20.88	20.66		3
	36	37	20.84	20.87	20.71		3
	75	0	20.82	20.79	20.62		3

Table 9-24
LTE Band 25 (PCS) Max Conducted Powers - 10 MHz Bandwidth

LTE Band 25 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26090 (1855.0 MHz)	26365 (1882.5 MHz)	26640 (1910.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.73	23.77	23.53	0	0
	1	25	23.66	23.76	23.57		0
	1	49	23.78	23.76	23.67		0
	25	0	22.86	22.90	22.66	0-1	1
	25	12	22.94	22.93	22.72		1
	25	25	22.96	22.88	22.73		1
	50	0	22.88	22.90	22.71		1
16QAM	1	0	22.79	22.86	22.64	0-1	1
	1	25	22.84	22.87	22.70		1
	1	49	22.90	22.89	22.89		1
	25	0	21.70	21.75	21.52	0-2	2
	25	12	21.72	21.80	21.58		2
	25	25	21.75	21.79	21.61		2
	50	0	21.74	21.75	21.54		2
64QAM	1	0	21.80	21.90	21.59	0-2	2
	1	25	21.80	21.90	21.71		2
	1	49	21.92	21.81	21.76		2
	25	0	20.70	20.75	20.53	0-3	3
	25	12	20.72	20.79	20.57		3
	25	25	20.72	20.80	20.60		3
	50	0	20.76	20.78	20.58		3

Table 9-25
LTE Band 25 (PCS) Max Conducted Powers - 5 MHz Bandwidth

LTE Band 25 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26065 (1852.5 MHz)	26365 (1882.5 MHz)	26665 (1912.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.76	23.82	23.61	0	0
	1	12	23.84	23.90	23.70		0
	1	24	23.89	23.83	23.65		0
	12	0	22.92	22.96	22.75	0-1	1
	12	6	22.95	22.99	22.86		1
	12	13	22.99	22.97	22.85		1
	25	0	22.99	22.93	22.82		1
16QAM	1	0	22.87	22.94	22.65	0-1	1
	1	12	22.92	23.00	22.78		1
	1	24	22.95	22.98	22.74		1
	12	0	21.71	21.78	21.57	0-2	2
	12	6	21.85	21.86	21.68		2
	12	13	21.86	21.81	21.70		2
	25	0	21.72	21.72	21.63		2
64QAM	1	0	21.83	21.87	21.65	0-2	2
	1	12	21.97	21.94	21.74		2
	1	24	21.93	21.89	21.69		2
	12	0	20.74	20.79	20.57	0-3	3
	12	6	20.71	20.81	20.56		3
	12	13	20.75	20.79	20.58		3
	25	0	20.83	20.75	20.62		3

Table 9-26
LTE Band 25 (PCS) Max Conducted Powers - 3 MHz Bandwidth

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26055 (1851.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26675 (1913.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.73	23.77	23.52	0	0
	1	7	23.76	23.89	23.65		0
	1	14	23.80	23.83	23.66		0
	8	0	22.90	22.97	22.76	0-1	1
	8	4	22.98	22.99	22.83		1
	8	7	22.96	22.97	22.83		1
	15	0	22.95	22.99	22.77		1
16QAM	1	0	22.82	22.93	22.60	0-1	1
	1	7	22.94	23.00	22.75		1
	1	14	22.91	22.95	22.80		1
	8	0	21.77	21.79	21.60	0-2	2
	8	4	21.82	21.87	21.65		2
	8	7	21.84	21.87	21.68		2
	15	0	21.74	21.82	21.57		2
64QAM	1	0	21.82	21.84	21.69	0-2	2
	1	7	21.82	21.87	21.73		2
	1	14	21.91	21.97	21.78		2
	8	0	20.76	20.82	20.58	0-3	3
	8	4	20.75	20.78	20.58		3
	8	7	20.77	20.82	20.58		3
	15	0	20.75	20.78	20.60		3

Table 9-27
LTE Band 25 (PCS) Max Conducted Powers -1.4 MHz Bandwidth

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26047 (1850.7 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26683 (1914.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.68	23.76	23.57	0	0
	1	2	23.78	23.82	23.68		0
	1	5	23.75	23.75	23.64		0
	3	0	23.76	23.80	23.62		0
	3	2	23.81	23.87	23.66		0
	3	3	23.81	23.80	23.63		0
	6	0	22.83	22.89	22.69	0-1	1
16QAM	1	0	22.83	22.83	22.67	0-1	1
	1	2	22.92	22.86	22.79		1
	1	5	22.87	22.87	22.77		1
	3	0	22.71	22.78	22.61		1
	3	2	22.81	22.84	22.65		1
	3	3	22.71	22.81	22.61		1
	6	0	21.68	21.83	21.57	0-2	2
64QAM	1	0	21.86	21.86	21.66	0-2	2
	1	2	21.86	21.94	21.78		2
	1	5	21.82	21.87	21.75		2
	3	0	21.74	21.83	21.60		2
	3	2	21.75	21.81	21.63		2
	3	3	21.73	21.81	21.61		2
	6	0	20.70	20.74	20.51	0-3	3

Table 9-28
LTE Band 25 (PCS) Reduced Conducted Powers - 20 MHz Bandwidth - Grip Sensor Active

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26140 (1860.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26590 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	**19.19**	19.12	18.83	0	0
	1	50	19.03	19.02	18.80		0
	1	99	19.07	19.01	18.83		0
	50	0	19.09	19.11	18.97	0-1	0
	50	25	19.23	19.25	19.01		0
	50	50	**19.26**	19.20	19.05		0
	100	0	19.18	19.15	19.04		0
16QAM	1	0	19.29	19.29	19.17	0-1	0
	1	50	19.18	19.31	18.84		0
	1	99	19.16	19.31	19.22		0
	50	0	19.11	19.10	18.92	0-2	0
	50	25	19.24	19.17	18.94		0
	50	50	19.23	19.19	18.97		0
	100	0	19.17	19.14	18.94		0
64QAM	1	0	19.24	19.29	19.18	0-2	0
	1	50	19.32	19.21	19.17		0
	1	99	19.35	19.20	19.18		0
	50	0	19.11	19.24	18.98	0-3	0
	50	25	19.15	19.11	18.98		0
	50	50	19.32	19.22	19.06		0
	100	0	19.35	19.17	19.03		0

Table 9-29
LTE Band 25 (PCS) Reduced Conducted Powers - 15 MHz Bandwidth - Grip Sensor Active

LTE Band 25 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26115 (1857.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26615 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.95	19.03	18.80	0	0
	1	36	19.04	19.05	18.84		0
	1	74	19.14	19.07	18.96		0
	36	0	19.17	19.21	18.96	0-1	0
	36	18	19.27	19.26	19.03		0
	36	37	19.30	19.23	19.06		0
	75	0	19.26	19.23	19.03		0
16QAM	1	0	19.29	19.41	19.13	0-1	0
	1	36	19.37	19.41	19.14		0
	1	74	19.43	19.28	19.16		0
	36	0	19.15	19.17	18.94	0-2	0
	36	18	19.22	19.23	19.01		0
	36	37	19.26	19.23	19.02		0
	75	0	19.14	19.13	18.97		0
64QAM	1	0	19.17	19.39	19.09	0-2	0
	1	36	19.31	19.31	19.10		0
	1	74	19.49	19.31	19.19		0
	36	0	19.28	19.23	18.96	0-3	0
	36	18	19.30	19.32	19.06		0
	36	37	19.32	19.31	19.06		0
	75	0	19.28	19.25	19.04		0

Table 9-30
LTE Band 25 (PCS) Reduced Conducted Powers - 10 MHz Bandwidth - Grip Sensor Active

LTE Band 25 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26090 (1855.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26640 (1910.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.04	19.08	18.79	0	0
	1	25	19.09	19.07	18.87		0
	1	49	19.11	19.07	18.91		0
	25	0	19.20	19.24	18.93	0-1	0
	25	12	19.22	19.26	18.98		0
	25	25	19.28	19.27	18.99		0
	50	0	19.29	19.26	19.02		0
16QAM	1	0	19.32	19.40	19.13	0-1	0
	1	25	19.34	19.31	19.06		0
	1	49	19.39	19.35	19.13		0
	25	0	19.23	19.27	18.97	0-2	0
	25	12	19.25	19.28	19.01		0
	25	25	19.29	19.25	19.03		0
	50	0	19.28	19.24	19.01		0
64QAM	1	0	19.29	19.36	19.08	0-2	0
	1	25	19.31	19.41	19.13		0
	1	49	19.35	19.34	19.17		0
	25	0	19.28	19.19	19.03	0-3	0
	25	12	19.27	19.31	19.09		0
	25	25	19.32	19.29	19.10		0
	50	0	19.30	19.33	19.07		0

Table 9-31
LTE Band 25 (PCS) Reduced Conducted Powers - 5 MHz Bandwidth - Grip Sensor Active

LTE Band 25 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26065 (1852.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26665 (1912.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.97	19.00	18.71	0	0
	1	12	19.07	19.07	18.83		0
	1	24	19.13	19.04	18.76		0
	12	0	19.16	19.17	18.91	0-1	0
	12	6	19.25	19.22	19.00		0
	12	13	19.23	19.18	19.02		0
	25	0	19.20	19.15	18.97		0
16QAM	1	0	19.25	19.36	19.00	0-1	0
	1	12	19.33	19.44	19.14		0
	1	24	19.44	19.27	19.05		0
	12	0	19.20	19.22	18.95	0-2	0
	12	6	19.29	19.34	19.03		0
	12	13	19.25	19.23	19.10		0
	25	0	19.21	19.19	18.98		0
64QAM	1	0	19.27	19.35	19.01	0-2	0
	1	12	19.33	19.38	19.15		0
	1	24	19.36	19.33	19.06		0
	12	0	19.21	19.25	19.00	0-3	0
	12	6	19.20	19.24	19.00		0
	12	13	19.23	19.26	18.94		0
	25	0	19.27	19.20	19.02		0

Table 9-32
LTE Band 25 (PCS) Reduced Conducted Powers - 3 MHz Bandwidth - Grip Sensor Active

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26055 (1851.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26675 (1913.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.98	19.00	18.79	0	0
	1	7	19.06	19.09	18.83		0
	1	14	19.08	19.08	18.87		0
	8	0	19.19	19.16	18.93	0-1	0
	8	4	19.25	19.25	19.00		0
	8	7	19.18	19.21	18.99		0
	15	0	19.18	19.23	19.00		0
16QAM	1	0	19.17	19.24	18.98	0-1	0
	1	7	19.30	19.28	19.11		0
	1	14	19.36	19.38	19.08		0
	8	0	19.19	19.25	18.95	0-2	0
	8	4	19.26	19.32	19.04		0
	8	7	19.24	19.30	19.05		0
	15	0	19.15	19.18	18.97		0
64QAM	1	0	19.18	19.25	19.04	0-2	0
	1	7	19.30	19.33	19.04		0
	1	14	19.31	19.32	19.11		0
	8	0	19.17	19.20	18.92	0-3	0
	8	4	19.20	19.22	18.95		0
	8	7	19.22	19.17	19.08		0
	15	0	19.13	19.15	18.99		0

Table 9-33
LTE Band 25 (PCS) Reduced Conducted Powers – 1.4 MHz Bandwidth - Grip Sensor Active

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26047 (1850.7 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26683 (1914.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.02	19.03	18.81	0	0
	1	2	19.12	19.14	18.91		0
	1	5	19.05	19.09	18.88		0
	3	0	19.10	19.14	18.88		0
	3	2	19.16	19.15	18.94		0
	3	3	19.12	19.13	18.88		0
	6	0	19.18	19.24	18.99	0-1	0
16QAM	1	0	19.29	19.34	19.05	0-1	0
	1	2	19.38	19.46	19.15		0
	1	5	19.30	19.31	19.16		0
	3	0	19.23	19.24	18.98		0
	3	2	19.29	19.28	19.10		0
	3	3	19.24	19.31	19.06		0
	6	0	19.25	19.33	19.05	0-2	0
64QAM	1	0	19.30	19.32	19.12	0-2	0
	1	2	19.34	19.42	19.19		0
	1	5	19.33	19.35	19.14		0
	3	0	19.24	19.33	19.05		0
	3	2	19.27	19.31	19.06		0
	3	3	19.30	19.28	19.05		0
	6	0	19.23	19.19	19.00	0-3	0

9.3.4 LTE Band 30

Table 9-34
LTE Band 30 Max Conducted Powers - 10 MHz Bandwidth

LTE Band 30 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.64	0	0
	1	25	**24.68**		0
	1	49	24.57		0
	25	0	**23.76**	0-1	1
	25	12	23.70		1
	25	25	23.68		1
	50	0	23.73		1
16QAM	1	0	23.74	0-1	1
	1	25	23.39		1
	1	49	23.73		1
	25	0	22.73	0-2	2
	25	12	22.69		2
	25	25	22.70		2
	50	0	22.74		2
64QAM	1	0	22.62	0-2	2
	1	25	22.75		2
	1	49	22.91		2
	25	0	21.67	0-3	3
	25	12	21.72		3
	25	25	21.77		3
	50	0	21.71		3

Table 9-35
LTE Band 30 Max Conducted Powers - 5 MHz Bandwidth

LTE Band 30 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.50	0	0
	1	12	24.48		0
	1	24	24.39		0
	12	0	23.78	0-1	1
	12	6	23.74		1
	12	13	23.69		1
	25	0	23.74		1
16QAM	1	0	23.93	0-1	1
	1	12	23.81		1
	1	24	23.68		1
	12	0	22.81	0-2	2
	12	6	22.75		2
	12	13	22.70		2
	25	0	22.69		2
64QAM	1	0	22.86	0-2	2
	1	12	22.89		2
	1	24	22.73		2
	12	0	21.80	0-3	3
	12	6	21.77		3
	12	13	21.70		3
	25	0	21.71		3

Note: LTE Band 30 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 9-36
LTE Band 30 Reduced Conducted Powers - 10 MHz Bandwidth – Grip Sensor Active

LTE Band 30 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**19.50**	0	0
	1	25	19.45		0
	1	49	19.40		0
	25	0	**19.59**	0-1	0
	25	12	19.57		0
	25	25	19.53		0
	50	0	19.49		0
16QAM	1	0	19.66	0-1	0
	1	25	19.53		0
	1	49	19.50		0
	25	0	19.65	0-2	0
	25	12	19.57		0
	25	25	19.61		0
	50	0	19.64		0
64QAM	1	0	19.77	0-2	0
	1	25	19.59		0
	1	49	19.57		0
	25	0	19.66	0-3	0
	25	12	19.56		0
	25	25	19.56		0
	50	0	19.64		0

Table 9-37
LTE Band 30 Reduced Conducted Powers - 5 MHz Bandwidth – Grip Sensor Active

LTE Band 30 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	19.38	0	0
	1	12	19.30		0
	1	24	19.26		0
	12	0	19.52	0-1	0
	12	6	19.49		0
	12	13	19.45		0
	25	0	19.60		0
16QAM	1	0	19.70	0-1	0
	1	12	19.72		0
	1	24	19.56		0
	12	0	19.66	0-2	0
	12	6	19.61		0
	12	13	19.57		0
	25	0	19.84		0
64QAM	1	0	19.64	0-2	0
	1	12	19.66		0
	1	24	19.50		0
	12	0	19.64	0-3	0
	12	6	19.60		0
	12	13	19.52		0
	25	0	19.56		0

Note: LTE Band 30 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

9.3.5 LTE Band 7

Table 9-38
LTE Band 7 Max Conducted Powers - 20 MHz Bandwidth

LTE Band 7 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20850 (2510.0 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21350 (2560.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.09	24.30	24.06	0	0
	1	50	24.09	24.12	24.11		0
	1	99	24.13	24.09	**24.37**		0
	50	0	23.18	23.37	23.34	0-1	1
	50	25	23.28	23.33	23.33		1
	50	50	23.34	23.25	**23.38**		1
	100	0	23.28	23.31	23.33		1
16QAM	1	0	23.35	23.44	23.31	0-1	1
	1	50	23.37	23.32	23.37		1
	1	99	23.37	23.37	23.60		1
	50	0	22.18	22.32	22.32	0-2	2
	50	25	22.28	22.28	22.32		2
	50	50	22.34	22.22	22.35		2
	100	0	22.24	22.25	22.30		2
64QAM	1	0	22.26	22.47	22.26	0-2	2
	1	50	22.29	22.30	21.96		2
	1	99	22.31	22.33	22.43		2
	50	0	21.14	21.31	21.00	0-3	3
	50	25	21.26	21.30	20.98		3
	50	50	21.32	21.24	21.28		3
	100	0	21.23	21.28	21.05		3

Table 9-39
LTE Band 7 Max Conducted Powers - 15 MHz Bandwidth

LTE Band 7 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20825 (2507.5 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21375 (2562.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.03	24.22	24.16	0	0
	1	36	24.01	24.07	24.19		0
	1	74	24.16	23.95	24.36		0
	36	0	23.26	23.37	23.32	0-1	1
	36	18	23.30	23.36	23.39		1
	36	37	23.32	23.22	23.44		1
	75	0	23.28	23.28	23.40		1
16QAM	1	0	23.32	23.52	23.44	0-1	1
	1	36	23.33	23.40	23.50		1
	1	74	23.40	23.34	23.57		1
	36	0	22.25	22.37	22.36	0-2	2
	36	18	22.31	22.33	22.38		2
	36	37	22.34	22.26	22.44		2
	75	0	22.28	22.32	22.39		2
64QAM	1	0	22.33	22.50	22.04	0-2	2
	1	36	22.35	22.44	21.89		2
	1	74	22.40	22.26	22.18		2
	36	0	21.25	21.41	20.88	0-3	3
	36	18	21.32	21.36	20.97		3
	36	37	21.32	21.26	21.21		3
	75	0	21.26	21.31	20.87		3

Table 9-40
LTE Band 7 Max Conducted Powers - 10 MHz Bandwidth

LTE Band 7 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20800 (2505.0 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21400 (2565.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.11	24.29	24.14	0	0
	1	25	24.18	24.22	24.12		0
	1	49	24.18	24.11	24.37		0
	25	0	23.40	23.48	23.35	0-1	1
	25	12	23.39	23.46	23.38		1
	25	25	23.38	23.34	23.43		1
	50	0	23.39	23.44	23.38		1
16QAM	1	0	23.54	23.56	23.41	0-1	1
	1	25	23.53	23.50	23.52		1
	1	49	23.60	23.44	23.58		1
	25	0	22.39	22.48	22.35	0-2	2
	25	12	22.40	22.48	22.40		2
	25	25	22.37	22.38	22.41		2
	50	0	22.40	22.43	22.40		2
64QAM	1	0	22.53	22.58	21.96	0-2	2
	1	25	22.42	22.46	22.39		2
	1	49	22.49	22.43	22.31		2
	25	0	21.39	21.50	21.07	0-3	3
	25	12	21.43	21.45	21.28		3
	25	25	21.41	21.37	21.28		3
	50	0	21.40	21.45	21.03		3

Table 9-41
LTE Band 7 Max Conducted Powers - 5 MHz Bandwidth

LTE Band 7 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20775 (2502.5 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21425 (2567.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.07	24.14	24.14	0	0
	1	12	24.14	24.22	24.37		0
	1	24	24.06	24.19	24.43		0
	12	0	23.31	23.36	23.35	0-1	1
	12	6	23.35	23.43	23.53		1
	12	13	23.29	23.37	23.57		1
	25	0	23.28	23.39	23.45		1
16QAM	1	0	23.41	23.53	23.46	0-1	1
	1	12	23.51	23.57	23.60		1
	1	24	23.51	23.52	23.58		1
	12	0	22.34	22.40	22.39	0-2	2
	12	6	22.42	22.49	22.59		2
	12	13	22.34	22.42	22.58		2
	25	0	22.28	22.40	22.43		2
64QAM	1	0	22.43	22.47	22.16	0-2	2
	1	12	22.50	22.55	22.39		2
	1	24	22.45	22.51	22.23		2
	12	0	21.36	21.40	21.38	0-3	3
	12	6	21.44	21.46	21.41		3
	12	13	21.35	21.44	21.30		3
	25	0	21.25	21.40	21.24		3

Table 9-42
LTE Band 7 Reduced Conducted Powers - 20 MHz Bandwidth – Grip Sensor Active

LTE Band 7 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20850 (2510.0 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21350 (2560.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.42	19.28	19.15	0	0
	1	50	**19.43**	19.03	19.04		0
	1	99	19.42	18.98	19.26		0
	50	0	**19.47**	19.29	19.30	0-1	0
	50	25	19.41	19.27	19.24		0
	50	50	19.45	19.09	19.27		0
	100	0	19.35	19.21	19.33		0
16QAM	1	0	19.46	19.49	19.36	0-1	0
	1	50	19.41	19.27	19.32		0
	1	99	19.50	19.17	19.50		0
	50	0	19.40	19.27	19.43	0-2	0
	50	25	19.50	19.25	19.39		0
	50	50	19.49	19.14	19.25		0
	100	0	19.43	19.23	19.27		0
64QAM	1	0	19.44	19.50	19.42	0-2	0
	1	50	19.50	19.24	19.32		0
	1	99	19.46	19.34	19.28		0
	50	0	19.46	19.35	19.35	0-3	0
	50	25	19.50	19.25	19.33		0
	50	50	19.50	19.23	19.28		0
	100	0	19.48	19.20	19.27		0

Table 9-43
LTE Band 7 Reduced Conducted Powers - 15 MHz Bandwidth – Grip Sensor Active

LTE Band 7 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20825 (2507.5 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21375 (2562.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.27	19.28	19.13	0	0
	1	36	19.25	19.04	19.16		0
	1	74	19.32	19.06	19.24		0
	36	0	19.35	19.21	19.32	0-1	0
	36	18	19.39	19.21	19.31		0
	36	37	19.44	19.12	19.34		0
	75	0	19.40	19.19	19.34		0
16QAM	1	0	19.49	19.38	19.38	0-1	0
	1	36	19.48	19.29	19.45		0
	1	74	19.50	19.35	19.50		0
	36	0	19.33	19.28	19.32	0-2	0
	36	18	19.31	19.27	19.35		0
	36	37	19.32	19.17	19.34		0
	75	0	19.39	19.21	19.30		0
64QAM	1	0	19.47	19.40	19.39	0-2	0
	1	36	19.44	19.34	19.47		0
	1	74	19.49	19.36	19.50		0
	36	0	19.31	19.34	19.33	0-3	0
	36	18	19.50	19.35	19.40		0
	36	37	19.50	19.16	19.40		0
	75	0	19.43	19.25	19.35		0

Table 9-44
LTE Band 7 Reduced Conducted Powers - 10 MHz Bandwidth – Grip Sensor Active

LTE Band 7 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20800 (2505.0 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21400 (2565.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.22	18.97	19.17	0	0
	1	25	19.25	18.93	19.15		0
	1	49	19.30	18.85	19.20		0
	25	0	19.38	19.09	19.28	0-1	0
	25	12	19.38	19.06	19.29		0
	25	25	19.36	19.02	19.32		0
	50	0	19.39	19.01	19.30		0
16QAM	1	0	19.48	19.22	19.34	0-1	0
	1	25	19.50	19.13	19.34		0
	1	49	19.47	19.10	19.44		0
	25	0	19.39	19.11	19.33	0-2	0
	25	12	19.40	19.10	19.28		0
	25	25	19.37	19.00	19.33		0
	50	0	19.35	19.07	19.31		0
64QAM	1	0	19.46	19.27	19.35	0-2	0
	1	25	19.47	19.17	19.40		0
	1	49	19.50	19.15	19.49		0
	25	0	19.43	19.12	19.29	0-3	0
	25	12	19.38	19.15	19.33		0
	25	25	19.44	19.07	19.36		0
	50	0	19.47	19.08	19.35		0

Table 9-45
LTE Band 7 Reduced Conducted Powers - 5 MHz Bandwidth – Grip Sensor Active

LTE Band 7 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20775 (2502.5 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21425 (2567.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.32	19.00	19.13	0	0
	1	12	19.34	19.00	19.32		0
	1	24	19.31	19.00	19.37		0
	12	0	19.40	19.08	19.26	0-1	0
	12	6	19.49	19.15	19.43		0
	12	13	19.41	19.14	19.44		0
	25	0	19.43	19.10	19.34		0
16QAM	1	0	19.50	19.29	19.29	0-1	0
	1	12	19.50	19.25	19.45		0
	1	24	19.45	19.30	19.43		0
	12	0	19.46	19.11	19.27	0-2	0
	12	6	19.48	19.18	19.45		0
	12	13	19.47	19.16	19.45		0
	25	0	19.44	19.10	19.34		0
64QAM	1	0	19.48	19.25	19.42	0-2	0
	1	12	19.50	19.28	19.50		0
	1	24	19.47	19.30	19.49		0
	12	0	19.48	19.16	19.32	0-3	0
	12	6	19.50	19.16	19.49		0
	12	13	19.47	19.21	19.50		0
	25	0	19.50	19.22	19.38		0

Table 9-46
LTE Band 7 Reduced Conducted Powers - 20 MHz Bandwidth – Hotspot Mode Active

LTE Band 7 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20850 (2510.0 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21350 (2560.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.70	**19.74**	19.40	0	0
	1	50	19.49	19.59	19.34		0
	1	99	19.55	19.47	19.33		0
	50	0	19.53	19.78	19.53	0-1	0
	50	25	19.57	**19.79**	19.52		0
	50	50	19.65	19.62	19.45		0
	100	0	19.66	19.64	19.52		0
16QAM	1	0	19.92	19.86	19.76	0-1	0
	1	50	19.88	19.81	19.62		0
	1	99	19.94	19.75	19.82		0
	50	0	19.58	19.70	19.56	0-2	0
	50	25	19.71	19.71	19.45		0
	50	50	19.74	19.69	19.50		0
	100	0	19.76	19.66	19.48		0
64QAM	1	0	19.83	19.98	19.84	0-2	0
	1	50	19.90	19.72	19.65		0
	1	99	19.95	19.93	19.65		0
	50	0	19.67	19.79	19.74	0-3	0
	50	25	19.76	19.76	19.58		0
	50	50	19.81	19.74	19.53		0
	100	0	19.75	19.74	19.64		0

Table 9-47
LTE Band 7 Reduced Conducted Powers - 15 MHz Bandwidth – Hotspot Mode Active

LTE Band 7 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20825 (2507.5 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21375 (2562.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.75	19.61	19.58	0	0
	1	36	19.72	19.60	19.64		0
	1	74	19.83	19.49	19.81		0
	36	0	19.85	19.58	19.65	0-1	0
	36	18	19.95	19.56	19.72		0
	36	37	19.99	19.48	19.76		0
	75	0	19.89	19.54	19.73		0
16QAM	1	0	19.94	19.59	19.53	0-1	0
	1	36	19.89	19.52	19.41		0
	1	74	19.80	19.49	19.60		0
	36	0	19.92	19.62	19.71	0-2	0
	36	18	19.99	19.62	19.77		0
	36	37	19.91	19.54	19.82		0
	75	0	19.97	19.53	19.79		0
64QAM	1	0	19.92	19.73	19.40	0-2	0
	1	36	19.97	19.60	19.44		0
	1	74	19.89	19.62	19.62		0
	36	0	19.92	19.68	19.74	0-3	0
	36	18	19.98	19.63	19.77		0
	36	37	19.87	19.58	19.81		0
	75	0	19.85	19.53	19.85		0

Table 9-48
LTE Band 7 Reduced Conducted Powers - 10 MHz Bandwidth – Hotspot Mode Active

LTE Band 7 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20800 (2505.0 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21400 (2565.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.56	19.68	19.59	0	0
	1	25	19.52	19.64	19.63		0
	1	49	19.68	19.58	19.60		0
	25	0	19.82	19.49	19.60	0-1	0
	25	12	19.83	19.49	19.63		0
	25	25	19.85	19.43	19.68		0
	50	0	19.81	19.46	19.67		0
16QAM	1	0	19.79	19.62	19.49	0-1	0
	1	25	19.89	19.54	19.70		0
	1	49	19.91	19.19	19.86		0
	25	0	19.85	19.59	19.67	0-2	0
	25	12	19.88	19.54	19.72		0
	25	25	19.87	19.49	19.76		0
	50	0	19.86	19.49	19.71		0
64QAM	1	0	19.85	19.69	19.73	0-2	0
	1	25	19.78	19.84	19.62		0
	1	49	19.77	19.45	19.78		0
	25	0	19.85	19.58	19.69	0-3	0
	25	12	19.90	19.53	19.73		0
	25	25	19.91	19.54	19.76		0
	50	0	19.87	19.51	19.71		0

Table 9-49
LTE Band 7 Reduced Conducted Powers - 5 MHz Bandwidth – Hotspot Mode Active

LTE Band 7 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20775 (2502.5 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21425 (2567.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.70	19.55	19.51	0	0
	1	12	19.75	19.45	19.46		0
	1	24	19.68	19.43	19.55		0
	12	0	19.77	19.41	19.52	0-1	0
	12	6	19.85	19.44	19.66		0
	12	13	19.80	19.45	19.73		0
	25	0	19.73	19.66	19.62		0
16QAM	1	0	19.64	19.54	19.47	0-1	0
	1	12	19.73	19.61	19.73		0
	1	24	19.72	19.62	19.70		0
	12	0	19.78	19.46	19.57	0-2	0
	12	6	19.89	19.53	19.75		0
	12	13	19.82	19.53	19.78		0
	25	0	19.78	19.45	19.66		0
64QAM	1	0	19.64	19.55	19.47	0-2	0
	1	12	19.74	19.64	19.72		0
	1	24	19.72	19.62	19.77		0
	12	0	19.81	19.47	19.57	0-3	0
	12	6	19.90	19.52	19.65		0
	12	13	19.82	19.57	19.78		0
	25	0	19.79	19.45	19.64		0

9.3.6 LTE Band 38

Table 9-50
LTE Band 38 Max Conducted Powers - 20 MHz Bandwidth

LTE Band 38 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 38000 (2595.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**24.00**	0	0
	1	50	23.89		0
	1	99	23.87		0
	50	0	22.98	0-1	1
	50	25	**23.00**		1
	50	50	22.94		1
	100	0	22.95		1
16QAM	1	0	23.00	0-1	1
	1	50	22.86		1
	1	99	22.87		1
	50	0	21.99	0-2	2
	50	25	22.00		2
	50	50	21.95		2
	100	0	22.00		2
64QAM	1	0	21.71	0-2	2
	1	50	21.51		2
	1	99	21.48		2
	50	0	21.00	0-3	3
	50	25	20.99		3
	50	50	20.96		3
	100	0	20.94		3

Table 9-51
LTE Band 38 Max Conducted Powers - 15 MHz Bandwidth

LTE Band 38 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 37825 (2577.5 MHz)	Mid Channel 38000 (2595.0 MHz)	High Channel 38175 (2612.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.31	24.03	24.07	0	0
	1	36	24.12	23.99	24.00		0
	1	74	24.06	23.96	23.93		0
	36	0	23.22	23.18	23.20	0-1	1
	36	18	23.31	23.20	23.24		1
	36	37	23.22	23.17	23.16		1
	75	0	23.26	23.21	23.21		1
16QAM	1	0	23.12	22.96	23.16	0-1	1
	1	36	23.03	22.94	23.00		1
	1	74	23.08	22.92	22.97		1
	36	0	22.24	22.03	22.14	0-2	2
	36	18	22.38	22.08	22.15		2
	36	37	22.25	21.97	22.10		2
	75	0	22.24	22.17	22.20		2
64QAM	1	0	22.00	21.81	21.85	0-2	2
	1	36	21.85	21.65	21.81		2
	1	74	21.78	21.83	21.70		2
	36	0	21.30	21.15	21.19	0-3	3
	36	18	21.31	21.06	21.22		3
	36	37	21.26	21.07	21.16		3
	75	0	21.32	21.12	21.19		3

Table 9-52
LTE Band 38 Max Conducted Powers - 10 MHz Bandwidth

LTE Band 38 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 37800 (2575.0 MHz)	Mid Channel 38000 (2595.0 MHz)	High Channel 38200 (2615.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.08	23.95	24.01	0	0
	1	25	24.16	23.87	23.88		0
	1	49	24.05	23.85	23.96		0
	25	0	23.22	22.98	23.09	0-1	1
	25	12	23.12	23.01	23.11		1
	25	25	23.10	23.00	23.07		1
	50	0	23.19	23.02	23.12		1
16QAM	1	0	23.02	22.78	22.88	0-1	1
	1	25	23.09	22.80	22.95		1
	1	49	22.99	22.83	22.91		1
	25	0	22.48	21.95	22.17	0-2	2
	25	12	22.25	22.06	22.18		2
	25	25	22.30	22.09	22.10		2
	50	0	22.33	22.01	22.13		2
64QAM	1	0	21.71	21.62	21.69	0-2	2
	1	25	21.87	21.53	21.65		2
	1	49	21.69	21.56	21.63		2
	25	0	21.06	20.95	21.09	0-3	3
	25	12	21.25	21.03	21.08		3
	25	25	21.19	20.97	21.01		3
	50	0	21.29	21.08	21.18		3

Table 9-53
LTE Band 38 Max Conducted Powers - 5 MHz Bandwidth

LTE Band 38 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 37775 (2572.5 MHz)	Mid Channel 38000 (2595.0 MHz)	High Channel 38225 (2617.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.22	23.89	23.98	0	0
	1	12	24.18	23.92	24.09		0
	1	24	24.16	24.05	24.05		0
	12	0	23.26	22.88	23.02	0-1	1
	12	6	23.30	23.04	23.02		1
	12	13	23.29	23.08	23.13		1
	25	0	23.22	23.03	23.06		1
16QAM	1	0	23.15	22.85	22.95	0-1	1
	1	12	23.11	22.98	23.04		1
	1	24	23.10	23.00	23.07		1
	12	0	22.22	21.89	21.96	0-2	2
	12	6	22.19	22.05	22.04		2
	12	13	22.14	22.01	22.06		2
	25	0	22.34	22.04	22.10		2
64QAM	1	0	21.95	21.55	21.68	0-2	2
	1	12	21.89	21.69	21.81		2
	1	24	21.85	21.65	21.86		2
	12	0	21.06	20.91	20.98	0-3	3
	12	6	21.24	20.99	21.05		3
	12	13	21.22	21.09	21.13		3
	25	0	21.26	21.02	21.03		3

Table 9-54
LTE Band 38 Reduced Conducted Powers - 20 MHz Bandwidth – Hotspot Mode/Grip Sensor Active

LTE Band 38 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 38000 (2595.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**19.85**	0	0
	1	50	19.65		0
	1	99	19.63		0
	50	0	19.92	0-1	0
	50	25	**19.97**		0
	50	50	19.89		0
	100	0	19.81		0
16QAM	1	0	19.81	0-1	0
	1	50	19.70		0
	1	99	19.70		0
	50	0	19.95	0-2	0
	50	25	19.97		0
	50	50	19.92		0
	100	0	19.95		0
64QAM	1	0	19.59	0-2	0
	1	50	19.47		0
	1	99	19.41		0
	50	0	19.99	0-3	0
	50	25	20.00		0
	50	50	19.95		0
	100	0	19.95		0

Table 9-55
LTE Band 38 Reduced Conducted Powers - 15 MHz Bandwidth – Hotspot Mode/Grip Sensor Active

LTE Band 38 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			37825 (2577.5 MHz)	38000 (2595.0 MHz)	38175 (2612.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.25	20.01	20.08	0	0
	1	36	20.26	19.99	20.04		0
	1	74	20.12	19.98	20.01		0
	36	0	20.19	20.03	20.08	0-1	0
	36	18	20.21	20.04	20.11		0
	36	37	20.22	20.02	20.11		0
	75	0	20.25	19.98	20.08		0
16QAM	1	0	20.28	19.82	20.11	0-1	0
	1	36	20.26	19.75	20.04		0
	1	74	20.15	19.69	20.07		0
	36	0	20.17	19.95	20.13	0-2	0
	36	18	20.23	20.13	20.16		0
	36	37	20.24	20.10	20.10		0
	75	0	20.25	20.07	20.05		0
64QAM	1	0	19.95	19.93	20.10	0-2	0
	1	36	19.93	19.85	20.03		0
	1	74	19.82	19.85	20.01		0
	36	0	20.17	20.02	20.09	0-3	0
	36	18	20.22	20.11	20.08		0
	36	37	20.26	20.09	20.05		0
	75	0	20.27	20.05	20.11		0

Table 9-56
LTE Band 38 Reduced Conducted Powers - 10 MHz Bandwidth – Hotspot Mode/Grip Sensor Active

LTE Band 38 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 37800 (2575.0 MHz)	Mid Channel 38000 (2595.0 MHz)	High Channel 38200 (2615.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.14	19.98	20.10	0	0
	1	25	20.08	19.93	19.94		0
	1	49	20.16	19.93	19.98		0
	25	0	20.21	19.96	20.00	0-1	0
	25	12	20.25	19.98	20.09		0
	25	25	20.20	19.96	20.13		0
	50	0	20.20	19.96	20.01		0
16QAM	1	0	20.16	20.16	19.88	0-1	0
	1	25	20.20	20.13	19.80		0
	1	49	20.18	20.10	19.81		0
	25	0	20.17	19.98	20.03	0-2	0
	25	12	20.22	19.97	20.12		0
	25	25	20.17	19.96	20.05		0
	50	0	20.20	20.01	20.08		0
64QAM	1	0	20.19	19.80	20.00	0-2	0
	1	25	20.14	19.82	20.05		0
	1	49	20.12	19.71	19.99		0
	25	0	20.15	20.01	20.05	0-3	0
	25	12	20.23	20.05	20.11		0
	25	25	20.16	20.04	20.05		0
	50	0	20.29	20.03	20.04		0

Table 9-57
LTE Band 38 Reduced Conducted Powers - 5 MHz Bandwidth – Hotspot Mode/Grip Sensor Active

LTE Band 38 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 37775 (2572.5 MHz)	Mid Channel 38000 (2595.0 MHz)	High Channel 38225 (2617.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.28	19.76	19.88	0	0
	1	12	20.23	19.78	20.03		0
	1	24	20.23	19.84	20.01		0
	12	0	20.22	19.76	19.84	0-1	0
	12	6	20.26	19.88	19.93		0
	12	13	20.19	19.94	20.00		0
	25	0	20.25	19.89	19.94		0
16QAM	1	0	20.30	19.44	19.59	0-1	0
	1	12	20.27	19.57	19.69		0
	1	24	20.24	19.58	19.75		0
	12	0	20.31	19.87	19.96	0-2	0
	12	6	20.36	20.01	19.99		0
	12	13	20.29	20.01	20.08		0
	25	0	20.18	19.93	19.92		0
64QAM	1	0	20.21	19.75	19.82	0-2	0
	1	12	20.17	19.85	19.94		0
	1	24	20.27	19.90	19.92		0
	12	0	20.24	19.81	19.98	0-3	0
	12	6	20.29	19.90	20.06		0
	12	13	20.23	19.93	20.10		0
	25	0	20.17	19.84	19.93		0

9.3.7 LTE Band 41

Table 9-58
LTE Band 41 Max Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.53	23.38	23.16	23.42	23.35	0	0
	1	50	23.60	23.34	23.17	23.28	23.41		0
	1	99	**23.63**	23.36	23.14	23.01	23.55		0
	50	0	22.78	22.59	22.38	22.45	22.55	0-1	1
	50	25	**22.84**	22.58	22.38	22.47	22.61		1
	50	50	22.83	22.55	22.35	22.37	22.70		1
	100	0	22.72	22.58	22.41	22.55	22.70		1
16QAM	1	0	22.78	22.55	22.45	22.78	22.66	0-1	1
	1	50	22.69	22.62	22.46	22.58	22.56		1
	1	99	22.90	22.57	22.43	22.48	22.92		1
	50	0	21.78	21.50	21.41	21.60	21.66	0-2	2
	50	25	21.85	21.62	21.50	21.46	21.66		2
	50	50	21.82	21.55	21.42	21.41	21.69		2
	100	0	21.83	21.58	21.36	21.47	21.71		2
64QAM	1	0	21.62	21.53	21.22	21.32	21.34	0-2	2
	1	50	21.49	21.35	21.23	21.31	21.41		2
	1	99	21.69	21.14	21.08	21.18	21.65		2
	50	0	20.78	20.60	20.44	20.57	20.74	0-3	3
	50	25	20.89	20.58	20.35	20.53	20.37		3
	50	50	20.84	20.60	20.39	20.46	20.72		3
	100	0	20.79	20.53	20.43	20.53	20.64		3

Table 9-59
LTE Band 41 Max Conducted Powers - 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.57	23.46	23.24	23.47	23.34	0	0
	1	36	23.47	23.38	23.18	23.27	23.36		0
	1	74	23.51	23.39	23.17	23.16	23.49		0
	36	0	22.70	22.61	22.37	22.48	22.53	0-1	1
	36	18	22.73	22.63	22.40	22.47	22.58		1
	36	37	22.73	22.59	22.40	22.38	22.62		1
	75	0	22.72	22.64	22.42	22.46	22.58		1
16QAM	1	0	22.66	22.52	22.29	22.51	22.40	0-1	1
	1	36	22.54	22.45	22.25	22.34	22.41		1
	1	74	22.57	22.41	22.25	22.22	22.62		1
	36	0	21.69	21.62	21.36	21.48	21.51	0-2	2
	36	18	21.73	21.63	21.40	21.46	21.58		2
	36	37	21.73	21.58	21.38	21.38	21.59		2
	75	0	21.74	21.62	21.40	21.44	21.58		2
64QAM	1	0	21.31	21.13	21.23	21.12	21.03	0-2	2
	1	36	21.21	21.11	21.18	20.97	21.07		2
	1	74	21.27	21.09	21.07	20.87	21.26		2
	36	0	20.66	20.57	20.35	20.44	20.48	0-3	3
	36	18	20.71	20.60	20.39	20.44	20.53		3
	36	37	20.68	20.55	20.36	20.36	20.56		3
	75	0	20.74	20.61	20.42	20.46	20.58		3

Table 9-60
LTE Band 41 Max Conducted Powers - 10 MHz Bandwidth

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.52	23.46	23.33	23.39	23.39	0	0
	1	25	23.48	23.50	23.34	23.36	23.38		0
	1	49	23.44	23.37	23.17	23.22	23.27		0
	25	0	22.68	22.62	22.46	22.53	22.53	0-1	1
	25	12	22.69	22.63	22.46	22.51	22.54		1
	25	25	22.63	22.57	22.42	22.46	22.48		1
	50	0	22.68	22.64	22.48	22.53	22.53		1
16QAM	1	0	22.67	22.55	22.41	22.48	22.43	0-1	1
	1	25	22.59	22.56	22.40	22.40	22.45		1
	1	49	22.63	22.51	22.33	22.37	22.36		1
	25	0	21.60	21.57	21.39	21.44	21.44	0-2	2
	25	12	21.62	21.56	21.39	21.44	21.44		2
	25	25	21.57	21.53	21.34	21.38	21.40		2
	50	0	21.71	21.64	21.49	21.54	21.53		2
64QAM	1	0	21.29	21.14	21.05	21.10	21.10	0-2	2
	1	25	21.24	21.20	21.04	21.08	21.08		2
	1	49	21.19	21.14	20.97	21.01	21.00		2
	25	0	20.70	20.68	20.51	20.56	20.56	0-3	3
	25	12	20.72	20.67	20.50	20.55	20.56		3
	25	25	20.67	20.64	20.44	20.52	20.52		3
	50	0	20.69	20.65	20.47	20.53	20.54		3

Table 9-61
LTE Band 41 Max Conducted Powers - 5 MHz Bandwidth

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.62	23.50	23.31	23.32	23.57	0	0
	1	12	23.61	23.45	23.35	23.38	23.57		0
	1	24	23.61	23.43	23.35	23.35	23.60		0
	12	0	22.68	22.52	22.29	22.37	22.60	0-1	1
	12	6	22.73	22.58	22.35	22.40	22.69		1
	12	13	22.70	22.54	22.37	22.45	22.65		1
	25	0	22.70	22.50	22.33	22.39	22.67		1
16QAM	1	0	22.67	22.55	22.33	22.42	22.60	0-1	1
	1	12	22.68	22.52	22.33	22.45	22.59		1
	1	24	22.67	22.50	22.40	22.46	22.62		1
	12	0	21.74	21.55	21.32	21.40	21.59	0-2	2
	12	6	21.74	21.57	21.36	21.39	21.70		2
	12	13	21.72	21.51	21.39	21.45	21.68		2
	25	0	21.64	21.45	21.27	21.33	21.57		2
64QAM	1	0	21.34	21.17	21.07	21.25	21.31	0-2	2
	1	12	21.29	21.16	20.97	21.00	21.25		2
	1	24	21.32	21.14	21.02	21.02	21.27		2
	12	0	20.71	20.55	20.35	20.38	20.59	0-3	3
	12	6	20.74	20.58	20.35	20.41	20.68		3
	12	13	20.75	20.52	20.41	20.45	20.67		3
	25	0	20.76	20.55	20.37	20.42	20.67		3

Table 9-62
LTE Band 41 Reduced Conducted Powers - 20 MHz Bandwidth - Hotspot Mode Active

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	21.65	21.61	21.65	21.74	21.61	0	0
	1	50	21.57	21.64	21.53	21.65	21.66		0
	1	99	21.60	21.58	21.49	21.45	**21.80**		0
	50	0	21.81	21.78	21.77	21.80	21.70	0-1	0
	50	25	21.83	21.79	21.80	21.78	21.82		0
	50	50	21.82	21.74	21.78	21.66	**21.85**		0
	100	0	21.64	21.76	21.60	21.79	21.71		0
16QAM	1	0	21.71	21.73	21.60	21.75	21.67	0-1	0
	1	50	21.58	21.56	21.55	21.63	21.60		0
	1	99	21.68	21.79	21.57	21.45	21.76		0
	50	0	21.44	21.32	21.23	21.32	21.52	0-2	0.5
	50	25	21.46	21.31	21.24	21.27	21.56		0.5
	50	50	21.46	21.29	21.22	21.21	21.60		0.5
	100	0	21.44	21.33	21.25	21.28	21.56		0.5
64QAM	1	0	21.21	20.92	20.83	21.02	21.05	0-2	0.5
	1	50	21.13	20.86	20.82	20.85	21.13		0.5
	1	99	21.15	20.87	20.72	20.68	21.27		0.5
	50	0	20.66	20.46	20.32	20.43	20.60	0-3	1.5
	50	25	20.66	20.41	20.37	20.36	20.65		1.5
	50	50	20.67	20.39	20.33	20.29	20.69		1.5
	100	0	20.66	20.38	20.33	20.35	20.64		1.5

Table 9-63
LTE Band 41 Reduced Conducted Powers - 15 MHz Bandwidth - Hotspot Mode Active

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	21.88	21.89	21.69	21.93	21.95	0	0
	1	36	21.75	21.80	21.65	21.82	21.90		0
	1	74	22.00	21.81	21.67	21.74	22.00		0
	36	0	21.97	21.86	21.65	21.92	21.94	0-1	0
	36	18	21.84	21.91	21.76	21.92	22.01		0
	36	37	22.06	21.85	21.75	21.88	22.03		0
	75	0	22.08	21.86	21.72	21.86	21.95		0
16QAM	1	0	21.59	21.92	21.69	21.96	21.92	0-1	0
	1	36	21.68	21.91	21.70	21.86	21.96		0
	1	74	21.66	21.91	21.69	21.79	22.07		0
	36	0	21.50	21.32	21.12	21.37	21.32	0-2	0.5
	36	18	21.54	21.31	21.17	21.33	21.42		0.5
	36	37	21.57	21.32	21.17	21.31	21.45		0.5
	75	0	21.47	21.26	21.11	21.45	21.38		0.5
64QAM	1	0	21.37	21.11	20.94	21.30	21.30	0-2	0.5
	1	36	21.25	21.11	20.95	21.24	21.15		0.5
	1	74	21.42	21.15	21.05	21.06	21.34		0.5
	36	0	20.49	20.28	20.13	20.33	20.36	0-3	1.5
	36	18	20.53	20.35	20.17	20.34	20.41		1.5
	36	37	20.56	20.27	20.16	20.31	20.44		1.5
	75	0	20.51	20.29	20.16	20.30	20.37		1.5

Table 9-64
LTE Band 41 Reduced Conducted Powers - 10 MHz Bandwidth - Hotspot Mode Active

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	21.96	21.75	21.53	21.68	21.73	0	0
	1	25	21.85	21.69	21.45	21.74	21.66		0
	1	49	21.83	21.71	21.44	21.65	21.69		0
	25	0	21.93	21.77	21.54	21.72	21.77	0-1	0
	25	12	21.96	21.78	21.59	21.73	21.82		0
	25	25	21.93	21.78	21.56	21.73	21.77		0
	50	0	21.96	21.75	21.54	21.69	21.81		0
16QAM	1	0	21.82	21.77	21.51	21.38	21.87	0-1	0
	1	25	21.81	21.67	21.45	21.26	21.77		0
	1	49	21.68	21.77	21.52	21.32	21.77		0
	25	0	21.30	21.18	20.97	21.15	21.16	0-2	0.5
	25	12	21.31	21.20	20.97	21.18	21.21		0.5
	25	25	21.26	21.14	20.93	21.14	21.16		0.5
	50	0	21.34	21.21	20.99	21.13	21.22		0.5
64QAM	1	0	21.14	21.05	20.77	21.25	21.02	0-2	0.5
	1	25	21.07	20.85	20.65	21.11	20.86		0.5
	1	49	21.56	21.03	20.71	21.25	20.96		0.5
	25	0	20.27	20.22	20.04	20.14	20.22	0-3	1.5
	25	12	20.32	20.27	20.05	20.16	20.28		1.5
	25	25	20.26	20.26	20.04	20.12	20.26		1.5
	50	0	20.37	20.24	20.00	20.08	20.24		1.5

Table 9-65
LTE Band 41 Reduced Conducted Powers - 5 MHz Bandwidth - Hotspot Mode Active

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	21.96	21.77	21.54	21.65	21.80	0	0
	1	12	21.99	21.72	21.59	21.67	21.84		0
	1	24	21.97	21.74	21.58	21.78	21.86		0
	12	0	21.97	21.78	21.51	21.65	21.75	0-1	0
	12	6	21.98	21.82	21.56	21.68	21.85		0
	12	13	21.97	21.74	21.61	21.77	21.84		0
	25	0	21.99	21.76	21.53	21.68	21.85		0
16QAM	1	0	21.59	21.46	21.10	21.29	21.40	0-1	0
	1	12	21.57	21.44	21.15	21.34	21.38		0
	1	24	21.59	21.39	21.17	21.41	21.41		0
	12	0	21.50	21.37	21.09	21.23	21.35	0-2	0.5
	12	6	21.53	21.38	21.11	21.27	21.42		0.5
	12	13	21.55	21.33	21.15	21.31	21.37		0.5
	25	0	21.46	21.25	21.07	21.21	21.34		0.5
64QAM	1	0	21.45	21.35	21.05	21.17	21.30	0-2	0.5
	1	12	21.48	21.34	21.10	21.21	21.32		0.5
	1	24	21.47	21.29	21.11	21.27	21.33		0.5
	12	0	20.53	20.40	20.12	20.26	20.36	0-3	1.5
	12	6	20.53	20.43	20.14	20.31	20.45		1.5
	12	13	20.54	20.33	20.19	20.35	20.41		1.5
	25	0	20.47	20.26	20.03	20.20	20.30		1.5

Table 9-66
LTE Band 41 Reduced Conducted Powers - 20 MHz Bandwidth – Grip Sensor Active

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	**20.55**	20.25	20.15	20.15	20.15	0	0
	1	50	20.53	20.05	20.14	20.06	20.22		0
	1	99	20.53	20.06	20.04	19.84	20.34		0
	50	0	20.75	20.58	20.38	20.34	20.35	0-1	0
	50	25	20.77	20.47	20.36	20.25	20.46		0
	50	50	**20.79**	20.40	20.30	20.18	20.55		0
	100	0	20.54	20.43	20.32	20.25	20.44		0
16QAM	1	0	20.83	20.54	20.39	20.47	20.40	0-1	0
	1	50	20.79	20.46	20.39	20.34	20.53		0
	1	99	20.89	20.44	20.30	20.09	20.70		0
	50	0	20.85	20.49	20.38	20.38	20.44	0-2	0
	50	25	20.82	20.49	20.37	20.23	20.47		0
	50	50	20.81	20.41	20.33	20.23	20.56		0
	100	0	20.80	20.43	20.35	20.28	20.54		0
64QAM	1	0	20.59	20.34	20.18	20.24	20.20	0-2	0
	1	50	20.56	20.30	20.23	20.17	20.27		0
	1	99	20.60	20.19	20.12	20.08	20.52		0
	50	0	20.82	20.50	20.37	20.34	20.54	0-3	0.5
	50	25	20.80	20.49	20.44	20.30	20.43		0.5
	50	50	20.77	20.41	20.34	20.21	20.51		0.5
	100	0	20.76	20.46	20.36	20.29	20.52		0.5

Table 9-67
LTE Band 41 Reduced Conducted Powers - 15 MHz Bandwidth – Grip Sensor Active

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	20.54	20.34	20.16	20.38	20.39	0	0
	1	36	20.43	20.25	20.01	20.19	20.30		0
	1	74	20.52	20.18	20.07	20.08	20.40		0
	36	0	20.55	20.31	20.14	20.43	20.40	0-1	0
	36	18	20.59	20.33	20.17	20.36	20.43		0
	36	37	20.59	20.31	20.18	20.30	20.48		0
	75	0	20.55	20.29	20.12	20.32	20.36		0
16QAM	1	0	20.80	20.60	20.09	20.52	20.61	0-1	0
	1	36	20.73	20.62	20.17	20.25	20.65		0
	1	74	20.83	20.54	20.20	20.30	20.72		0
	36	0	20.57	20.37	20.13	20.37	20.39	0-2	0
	36	18	20.60	20.37	20.15	20.34	20.48		0
	36	37	20.64	20.34	20.17	20.29	20.51		0
	75	0	20.61	20.33	20.16	20.34	20.41		0
64QAM	1	0	20.40	20.18	20.22	20.43	20.15	0-2	0
	1	36	20.27	20.03	20.22	20.45	20.31		0
	1	74	20.36	20.14	20.24	20.31	20.44		0
	36	0	20.54	20.34	20.10	20.34	20.35	0-3	0.5
	36	18	20.62	20.37	20.14	20.29	20.45		0.5
	36	37	20.60	20.30	20.13	20.24	20.47		0.5
	75	0	20.61	20.33	20.24	20.41	20.42		0.5

Table 9-68
LTE Band 41 Reduced Conducted Powers - 10 MHz Bandwidth – Grip Sensor Active

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	20.68	20.59	20.34	20.48	20.61	0	0
	1	25	20.62	20.44	20.33	20.45	20.55		0
	1	49	20.82	20.51	20.28	20.33	20.55		0
	25	0	20.80	20.63	20.34	20.52	20.62	0-1	0
	25	12	20.82	20.66	20.38	20.54	20.64		0
	25	25	20.80	20.60	20.33	20.47	20.60		0
	50	0	20.79	20.60	20.35	20.53	20.63		0
16QAM	1	0	20.99	20.83	20.56	20.64	20.90	0-1	0
	1	25	21.00	20.86	20.44	20.22	20.83		0
	1	49	21.04	20.86	20.55	20.57	20.82		0
	25	0	20.80	20.62	20.35	20.51	20.60	0-2	0
	25	12	20.80	20.64	20.37	20.50	20.62		0
	25	25	20.77	20.62	20.31	20.46	20.60		0
	50	0	20.84	20.63	20.40	20.53	20.68		0
64QAM	1	0	20.61	20.41	20.20	20.73	20.52	0-2	0
	1	25	20.52	20.53	20.15	20.61	20.40		0
	1	49	20.64	20.47	20.19	20.24	20.68		0
	25	0	20.86	20.69	20.41	20.47	20.72	0-3	0.5
	25	12	20.86	20.70	20.47	20.47	20.72		0.5
	25	25	20.84	20.65	20.41	20.41	20.66		0.5
	50	0	20.85	20.68	20.41	20.57	20.68		0.5

Table 9-69
LTE Band 41 Reduced Conducted Powers - 5 MHz Bandwidth – Grip Sensor Active

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	20.69	20.49	20.29	20.46	20.58	0	0
	1	12	20.63	20.54	20.26	20.41	20.55		0
	1	24	20.65	20.50	20.27	20.48	20.63		0
	12	0	20.67	20.51	20.28	20.41	20.50	0-1	0
	12	6	20.71	20.53	20.32	20.44	20.58		0
	12	13	20.70	20.49	20.37	20.48	20.60		0
	25	0	20.68	20.49	20.29	20.42	20.57		0
16QAM	1	0	20.35	20.31	20.01	20.18	20.53	0-1	0
	1	12	20.39	20.33	19.99	20.22	20.50		0
	1	24	20.39	20.26	20.03	20.25	20.56		0
	12	0	20.78	20.63	20.36	20.48	20.62	0-2	0
	12	6	20.79	20.62	20.39	20.53	20.69		0
	12	13	20.79	20.57	20.44	20.57	20.70		0
	25	0	20.72	20.50	20.33	20.41	20.54		0
64QAM	1	0	20.67	20.56	20.36	20.39	20.91	0-2	0
	1	12	20.67	20.59	20.38	20.46	20.83		0
	1	24	20.66	20.51	20.35	20.49	20.92		0
	12	0	20.69	20.65	20.27	20.50	20.54	0-3	0.5
	12	6	20.71	20.64	20.31	20.51	20.65		0.5
	12	13	20.72	20.59	20.36	20.58	20.59		0.5
	25	0	20.65	20.48	20.27	20.50	20.49		0.5

9.3.8 LTE Uplink Carrier Aggregation Conducted Powers

Table 9-70
LTE Band 66 Uplink Carrier Aggregation Maximum Conducted Powers

		PCC									SCC										Power	
	Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	PCC DL Channel	PCC DL Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
SCC higher	CA_66C	LTE B66	20	132072	1720.0	66536	2120.0	QPSK	1	99	LTE B66	20	132270	1739.8	66734	2139.8	QPSK	1	0	24.20	23.97
SCC lower	CA_66C	LTE B66	20	132572	1770.0	67036	2170.0	QPSK	1	0	LTE B66	20	132374	1750.2	66838	2150.2	QPSK	1	99	23.77	24.08
SCC higher	CA_66B	LTE B66	10	132022	1715.0	66486	2115.0	QPSK	1	49	LTE B66	10	132121	1724.9	66585	2124.9	QPSK	1	0	24.25	24.02
SCC lower	CA_66B	LTE B66	10	132622	1775.0	67086	2175.0	QPSK	1	0	LTE B66	10	132523	1765.1	66987	2165.1	QPSK	1	49	24.33	23.77

Table 9-71
LTE Band 7 Uplink Carrier Aggregation Maximum Conducted Powers

	PCC									SCC										Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC UL Channel	PCC UL Frequency [MHz]	PCC DL Channel	PCC DL Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC UL Channel	SCC UL Frequency [MHz]	SCC DL Channel	SCC DL Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_7C	LTE B7	20	20850	2510.0	2850	2630.0	QPSK	1	99	LTE B7	20	21048	2529.8	3048	2649.8	QPSK	1	0	23.82	24.13
CA_7C	LTE B7	20	21350	2560.0	3350	2680.0	QPSK	1	0	LTE B7	20	21152	2540.2	3152	2660.2	QPSK	1	99	23.12	24.06

Notes:

1. This device supports uplink carrier aggregation for LTE CA_66B, LTE CA_66C, and LTE CA_7C with a maximum of two component carriers. For intraband contiguous carrier aggregation scenarios, 3GPP 36.101 Table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when non-contiguous RB allocation is implemented. The conducted powers and MPR settings in this device are permanently implemented per the above 3GPP requirements.
2. Per FCC Guidance, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.

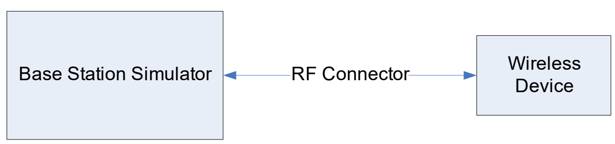


Figure 9-3
Power Measurement Setup

9.4 WLAN Conducted Powers

Note: Powers for 802.11ax RU operations can be found in Appendix I.

Table 9-72
2.4 GHz WLAN Maximum Average RF Power – Ant 2

2.4GHz Conducted Power [dBm]					
Freq [MHz]	Channel	IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ax(SU)
		Average	Average	Average	Average
2412	1	**19.98**	16.28	16.23	16.54
2427	4	N/A	17.63	17.98	N/A
2437	6	19.95	17.66	17.89	16.60
2452	9	N/A	17.38	17.85	16.98
2462	11	19.75	15.10	15.45	16.91

Table 9-73
2.4 GHz WLAN Maximum Average RF Power – MIMO

2.4GHz 802.11n Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
2412	1	16.26	16.23	19.26
2427	4	17.76	17.98	20.88
2437	6	17.85	17.89	20.88
2452	9	**17.96**	**17.85**	20.92
2462	11	15.48	15.45	18.48

Table 9-74
2.4 GHz WLAN Reduced Average RF Power – Ant 2

2.4GHz Conducted Power [dBm]					
Freq [MHz]	Channel	IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ax(SU)
		Average	Average	Average	Average
2412	1	16.68	16.11	16.03	16.81
2422	3	N/A	16.25	16.36	N/A
2437	6	16.55	16.84	16.75	16.93
2457	10	N/A	16.70	16.62	N/A
2462	11	**16.82**	15.10	15.45	16.75

Table 9-75
2.4 GHz WLAN Reduced Average RF Power – MIMO

2.4GHz 802.11n Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
2412	1	16.43	16.03	19.24
2422	3	16.92	16.36	19.66
2437	6	16.60	16.75	19.69
2457	10	**16.76**	**16.62**	19.70
2462	11	15.48	15.45	18.48

Table 9-76
5 GHz WLAN Maximum Average RF Power – Ant 2

5GHz (20MHz) Conducted Power [dBm]					
Freq [MHz]	Channel	IEEE Transmission Mode			
		802.11a	802.11n	802.11ac	802.11ax(SU)
		Average	Average	Average	Average
5180	36	17.79	17.76	17.73	15.62
5200	40	17.85	17.88	17.94	15.67
5220	44	17.92	17.95	17.97	15.77
5240	48	17.98	17.98	17.99	15.96
5260	52	17.87	17.91	17.89	15.74
5280	56	**17.99**	17.99	17.98	15.83
5300	60	17.68	17.69	17.66	15.98
5320	64	17.65	17.62	17.97	15.94
5500	100	17.84	17.86	17.82	15.71
5600	120	17.68	17.74	17.73	15.89
5620	124	17.76	17.71	17.69	15.92
5720	144	**17.98**	17.96	17.98	15.84
5745	149	17.73	17.66	17.81	15.97
5785	157	**17.86**	17.84	17.78	15.64
5825	165	17.76	17.77	17.76	15.98

Table 9-77
5 GHz WLAN Maximum Average RF Power – MIMO

5GHz (20MHz) 802.11n Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
5180	36	17.94	17.76	20.86
5200	40	17.98	17.88	20.94
5220	44	17.99	17.95	20.98
5240	48	17.68	17.98	20.84
5260	52	17.76	17.91	20.85
5280	56	**17.90**	**17.99**	**20.96**
5300	60	17.89	17.69	20.80
5320	64	17.77	17.62	20.71
5500	100	**17.94**	**17.86**	**20.91**
5600	120	17.66	17.74	20.71
5620	124	17.72	17.71	20.73
5720	144	17.82	17.96	20.90
5745	149	17.89	17.66	20.79
5785	157	**17.91**	**17.84**	**20.89**
5825	165	17.93	17.77	20.86

Table 9-78
5 GHz WLAN Reduced Average RF Power – Ant 2

5GHz (40MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11n	802.11ac	802.11ax(SU)
		Average	Average	Average
5190	38	13.65	13.60	13.95
5230	46	13.74	13.76	13.64
5270	54	13.92	13.55	13.76
5310	62	**13.94**	13.95	13.61
5510	102	13.93	13.88	13.93
5590	118	13.95	13.92	13.95
5630	126	13.67	13.61	13.95
5710	142	13.81	13.72	13.51
5755	151	13.66	13.71	13.86
5795	159	13.53	13.52	13.75

5GHz (80MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11ac	802.11ax(SU)
		Average	Average
5210	42	12.88	12.55
5290	58	12.72	12.57
5530	106	12.80	12.56
5610	122	**12.86**	12.47
5690	138	12.36	12.68
5775	155	**12.85**	12.79

Table 9-79
5 GHz WLAN Reduced Average RF Power – MIMO

5GHz (40MHz) 802.11n Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
5190	38	13.63	13.65	16.65
5230	46	13.68	13.74	16.72
5270	54	13.76	13.92	16.85
5310	62	**13.87**	**13.94**	**16.92**
5510	102	13.59	13.93	16.77
5590	118	13.86	13.95	16.92
5630	126	13.80	13.67	16.75
5710	142	13.90	13.81	16.87
5755	151	13.68	13.66	16.68
5795	159	13.45	13.53	16.50

5GHz (80MHz) 802.11ac Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
5210	42	9.10	9.96	12.56
5290	58	9.74	9.76	12.76
5530	106	**12.86**	**12.80**	**15.84**
5610	122	12.78	12.86	15.83
5690	138	12.82	12.36	15.61
5775	155	**12.58**	**12.85**	**15.73**

Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission modes with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, due to an even number of channels, both channels were measured.
- The bolded data rate and channel above were tested for SAR.

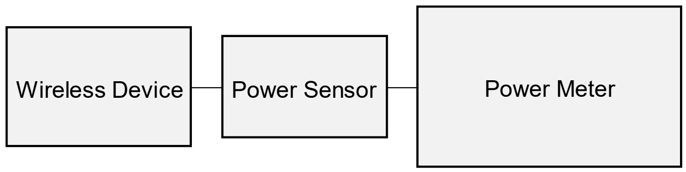


Figure 9-4
Power Measurement Setup

10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Head Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (˚C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
6/19/2019	1750H	22.8	1710	1.338	39.843	1.348	40.142	-0.74%	-0.74%
			1750	1.362	39.781	1.371	40.079	-0.66%	-0.74%
			1790	1.385	39.699	1.394	40.016	-0.65%	-0.79%
6/21/2019	1900H	21.8	1850	1.391	38.945	1.400	40.000	-0.64%	-2.64%
			1880	1.408	38.903	1.400	40.000	0.57%	-2.74%
			1910	1.427	38.864	1.400	40.000	1.93%	-2.84%
6/19/2019	2450H	21.4	2400	1.773	39.321	1.756	39.289	0.97%	0.08%
			2450	1.813	39.236	1.800	39.200	0.72%	0.09%
			2500	1.853	39.160	1.855	39.136	-0.11%	0.06%
			2550	1.892	39.072	1.909	39.073	-0.89%	0.00%
			2600	1.933	38.985	1.964	39.009	-1.58%	-0.06%
			2650	1.970	38.902	2.018	38.945	-2.38%	-0.11%
			2700	2.012	38.807	2.073	38.882	-2.94%	-0.19%
6/26/2019	2450H	21.7	2500	1.898	40.568	1.855	39.136	2.32%	3.66%
			2550	1.937	40.489	1.909	39.073	1.47%	3.62%
			2600	1.981	40.418	1.964	39.009	0.87%	3.61%
			2650	2.021	40.332	2.018	38.945	0.15%	3.56%
			2700	2.065	40.239	2.073	38.882	-0.39%	3.49%
7/1/2019	2450H	21.3	2400	1.771	39.484	1.756	39.289	0.85%	0.50%
			2450	1.808	39.401	1.800	39.200	0.44%	0.51%
			2500	1.847	39.328	1.855	39.136	-0.43%	0.49%
07/01/2019	5200H-5800H	22.5	5180	4.468	34.852	4.635	36.009	-3.60%	-3.21%
			5200	4.491	34.811	4.655	35.986	-3.52%	-3.27%
			5220	4.512	34.782	4.676	35.963	-3.51%	-3.28%
			5240	4.531	34.758	4.696	35.940	-3.51%	-3.29%
			5260	4.551	34.722	4.717	35.917	-3.52%	-3.33%
			5280	4.577	34.677	4.737	35.894	-3.38%	-3.39%
			5300	4.598	34.642	4.758	35.871	-3.36%	-3.43%
			5320	4.619	34.611	4.778	35.849	-3.33%	-3.45%
			5500	4.811	34.305	4.963	35.643	-3.06%	-3.75%
			5520	4.834	34.264	4.983	35.620	-2.99%	-3.81%
			5540	4.860	34.229	5.004	35.597	-2.88%	-3.84%
			5560	4.885	34.194	5.024	35.574	-2.77%	-3.88%
			5580	4.907	34.172	5.045	35.551	-2.74%	-3.88%
			5600	4.928	34.134	5.065	35.529	-2.70%	-3.93%
			5620	4.950	34.094	5.086	35.506	-2.67%	-3.98%
			5640	4.973	34.043	5.106	35.483	-2.60%	-4.06%
			5660	4.998	33.998	5.127	35.460	-2.52%	-4.12%
			5680	5.024	33.984	5.147	35.437	-2.39%	-4.10%
			5700	5.044	33.959	5.168	35.414	-2.40%	-4.11%
			5745	5.094	33.880	5.214	35.363	-2.30%	-4.19%
			5765	5.116	33.831	5.234	35.340	-2.25%	-4.27%
			5785	5.143	33.803	5.255	35.317	-2.13%	-4.29%
			5800	5.159	33.778	5.270	35.300	-2.11%	-4.31%
			5805	5.164	33.772	5.275	35.294	-2.10%	-4.31%
			5825	5.184	33.748	5.296	35.271	-2.11%	-4.32%

Table 10-2
Measured Body Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (˚C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
6/26/2019	835B	22.0	820	0.951	54.645	0.969	55.258	-1.86%	-1.11%
			835	0.965	54.499	0.970	55.200	-0.52%	-1.27%
			850	0.980	54.357	0.988	55.154	-0.81%	-1.45%
6/19/2019	1750B	22.5	1710	1.394	55.281	1.463	53.537	-4.72%	3.26%
			1750	1.420	55.258	1.488	53.432	-4.57%	3.42%
			1790	1.450	55.241	1.514	53.326	-4.23%	3.59%
6/23/2019	1750B	21.9	1710	1.454	51.238	1.463	53.537	-0.62%	-4.29%
			1750	1.500	51.102	1.488	53.432	0.81%	-4.36%
			1790	1.545	50.940	1.514	53.326	2.05%	-4.47%
6/26/2019	1750B	21.7	1710	1.451	52.834	1.463	53.537	-0.82%	-1.31%
			1750	1.497	52.681	1.488	53.432	0.60%	-1.41%
			1790	1.539	52.515	1.514	53.326	1.65%	-1.52%
7/3/2019	1750B	21.9	1710	1.497	51.941	1.463	53.537	2.32%	-2.98%
			1750	1.543	51.760	1.488	53.432	3.70%	-3.13%
			1790	1.586	51.573	1.514	53.326	4.76%	-3.29%
7/8/2019	1750B	22.4	1710	1.421	52.883	1.463	53.537	-2.87%	-1.22%
			1750	1.467	52.748	1.488	53.432	-1.41%	-1.28%
			1790	1.509	52.593	1.514	53.326	-0.33%	-1.37%
7/15/2019	1750B	21.4	1710	1.402	53.538	1.463	53.537	-4.17%	0.00%
			1750	1.429	53.479	1.488	53.432	-3.97%	0.09%
			1790	1.456	53.437	1.514	53.326	-3.83%	0.21%
6/19/2019	1900B	20.4	1850	1.529	54.539	1.520	53.300	0.59%	2.32%
			1880	1.550	54.518	1.520	53.300	1.97%	2.29%
			1910	1.574	54.508	1.520	53.300	3.55%	2.27%
6/21/2019	1900B	19.5	1850	1.530	55.168	1.520	53.300	0.66%	3.50%
			1880	1.553	55.131	1.520	53.300	2.17%	3.44%
			1910	1.576	55.092	1.520	53.300	3.68%	3.36%
6/23/2019	1900B	20.3	1850	1.540	55.153	1.520	53.300	1.32%	3.48%
			1880	1.563	55.129	1.520	53.300	2.83%	3.43%
			1910	1.587	55.092	1.520	53.300	4.41%	3.36%
7/5/2019	1900B	24.8	1850	1.496	52.937	1.520	53.300	-1.58%	-0.68%
			1880	1.529	52.827	1.520	53.300	0.59%	-0.89%
			1910	1.562	52.735	1.520	53.300	2.76%	-1.06%
7/10/2019	1900B	22.6	1850	1.527	51.963	1.520	53.300	0.46%	-2.51%
			1880	1.563	51.862	1.520	53.300	2.83%	-2.70%
			1910	1.595	51.774	1.520	53.300	4.93%	-2.86%
7/15/2019	1900B	22.6	1850	1.519	53.790	1.520	53.300	-0.07%	0.92%
			1880	1.553	53.697	1.520	53.300	2.17%	0.74%
			1910	1.587	53.615	1.520	53.300	4.41%	0.59%

Table 10-3
Measured Body Tissue Properties Continued

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
6/17/2019	2450B	23.6	2400	1.975	51.140	1.902	52.767	3.84%	-3.08%
			2450	2.035	50.996	1.950	52.700	4.36%	-3.23%
			2500	2.096	50.841	2.021	52.636	3.71%	-3.41%
			2550	2.154	50.685	2.092	52.573	2.96%	-3.59%
			2600	2.215	50.516	2.163	52.509	2.40%	-3.80%
			2650	2.274	50.365	2.234	52.445	1.79%	-3.97%
			2700	2.336	50.196	2.305	52.382	1.34%	-4.17%
6/23/2019	2450B	22.4	2300	1.858	52.233	1.809	52.900	2.71%	-1.26%
			2310	1.869	52.188	1.816	52.887	2.92%	-1.32%
			2320	1.881	52.151	1.826	52.873	3.01%	-1.37%
6/25/2019	2450B	22.2	2400	1.977	51.014	1.902	52.767	3.94%	-3.32%
			2450	2.035	50.873	1.950	52.700	4.36%	-3.47%
			2500	2.098	50.720	2.021	52.636	3.81%	-3.64%
			2550	2.159	50.577	2.092	52.573	3.20%	-3.80%
			2600	2.221	50.392	2.163	52.509	2.68%	-4.03%
			2650	2.281	50.241	2.234	52.445	2.10%	-4.20%
			2700	2.343	50.068	2.305	52.382	1.65%	-4.42%
6/26/2019	2450B	21.7	2500	2.076	53.022	2.021	52.636	2.72%	0.73%
			2550	2.123	52.958	2.092	52.573	1.48%	0.73%
			2600	2.172	52.884	2.163	52.509	0.42%	0.71%
			2650	2.221	52.793	2.234	52.445	-0.58%	0.66%
			2700	2.272	52.719	2.305	52.382	-1.43%	0.64%
6/29/2019	2450B	23.0	2400	1.966	51.937	1.902	52.767	3.36%	-1.57%
			2450	2.022	51.804	1.950	52.700	3.69%	-1.70%
			2500	2.081	51.660	2.021	52.636	2.97%	-1.85%
7/10/2019	2450B	23.0	2400	1.979	51.763	1.902	52.767	4.05%	-1.90%
			2450	2.035	51.648	1.950	52.700	4.36%	-2.00%
			2500	2.094	51.512	2.021	52.636	3.61%	-2.14%
			2550	2.158	51.371	2.092	52.573	3.15%	-2.29%
			2600	2.218	51.237	2.163	52.509	2.54%	-2.42%
			2650	2.282	51.064	2.234	52.445	2.15%	-2.63%
			2700	2.343	50.927	2.305	52.382	1.65%	-2.78%
7/11/2019	2450B	20.6	2300	1.865	52.774	1.809	52.900	3.10%	-0.24%
			2310	1.875	52.758	1.816	52.887	3.25%	-0.24%
			2320	1.884	52.738	1.826	52.873	3.18%	-0.26%
7/15/2019	2450B	22.9	2400	1.983	52.283	1.902	52.767	4.26%	-0.92%
			2450	2.042	52.138	1.950	52.700	4.72%	-1.07%
			2500	2.105	51.983	2.021	52.636	4.16%	-1.24%
			2550	2.164	51.830	2.092	52.573	3.44%	-1.41%
			2600	2.228	51.661	2.163	52.509	3.01%	-1.61%
			2650	2.286	51.520	2.234	52.445	2.33%	-1.76%
			2700	2.349	51.338	2.305	52.382	1.91%	-1.99%
7/24/2019	2450B	23.2	2400	1.959	51.397	1.902	52.767	3.00%	-2.60%
			2450	2.020	51.266	1.950	52.700	3.59%	-2.72%
			2500	2.074	51.124	2.021	52.636	2.62%	-2.87%
			2550	2.138	50.984	2.092	52.573	2.20%	-3.02%
			2600	2.190	50.860	2.163	52.509	1.25%	-3.14%
			2650	2.254	50.679	2.234	52.445	0.90%	-3.37%
			2700	2.312	50.544	2.305	52.382	0.30%	-3.51%
07/08/2019	5200B-5800B	22.1	5180	5.345	49.519	5.276	49.041	1.31%	0.97%
			5200	5.381	49.469	5.299	49.014	1.55%	0.93%
			5220	5.411	49.430	5.323	48.987	1.65%	0.90%
			5240	5.441	49.374	5.346	48.960	1.78%	0.85%
			5260	5.471	49.331	5.369	48.933	1.90%	0.81%
			5280	5.497	49.307	5.393	48.906	1.93%	0.82%
			5300	5.523	49.277	5.416	48.879	1.98%	0.81%
			5320	5.553	49.236	5.439	48.851	2.10%	0.79%
			5500	5.813	48.901	5.650	48.607	2.88%	0.60%
			5520	5.847	48.873	5.673	48.580	3.07%	0.60%
			5540	5.877	48.809	5.696	48.553	3.18%	0.53%
			5560	5.908	48.761	5.720	48.526	3.29%	0.48%
			5580	5.941	48.730	5.743	48.499	3.45%	0.48%
			5600	5.968	48.695	5.766	48.471	3.50%	0.46%
			5620	5.997	48.660	5.790	48.444	3.58%	0.45%
			5640	6.029	48.629	5.813	48.417	3.72%	0.44%
			5660	6.060	48.575	5.837	48.390	3.82%	0.38%
			5680	6.096	48.534	5.860	48.363	4.03%	0.35%
			5700	6.127	48.517	5.883	48.336	4.15%	0.37%
			5745	6.197	48.434	5.936	48.275	4.40%	0.33%
			5765	6.226	48.367	5.959	48.248	4.48%	0.25%
			5785	6.257	48.336	5.982	48.220	4.60%	0.24%
			5800	6.281	48.327	6.000	48.200	4.68%	0.26%
			5805	6.289	48.321	6.006	48.193	4.71%	0.27%
			5825	6.318	48.289	6.029	48.166	4.79%	0.26%

The above measured tissue parameters were used in the DASY software. The DASY software was used to perform interpolation to determine the dielectric parameters at the SAR test device frequencies (per KDB Publication 865664 D01v01r04 and IEEE 1528-2013 6.6.1.2). The tissue parameters listed in the SAR test plots may slightly differ from the table above due to significant digit rounding in the software.

10.2 Test System Verification

Prior to SAR assessment, the system is verified to ±10% of the SAR measurement on the reference dipole at the time of calibration by the calibration facility. Full system validation status and result summary can be found in Appendix E.

Table 10-4
System Verification Results – 1g

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	$Deviation_{1g}$ (%)
H	1750	HEAD	06/19/2019	21.9	22.0	0.100	1008	7406	3.860	36.200	38.600	6.63%
G	1900	HEAD	06/21/2019	22.6	21.8	0.100	5d149	7410	3.890	39.300	38.900	-1.02%
E	2450	HEAD	06/19/2019	24.0	21.4	0.100	797	3589	5.250	52.700	52.500	-0.38%
E	2450	HEAD	07/01/2019	22.1	21.3	0.100	797	3589	5.320	52.700	53.200	0.95%
E	2600	HEAD	06/19/2019	24.0	21.4	0.100	1071	3589	5.840	56.300	58.400	3.73%
E	2600	HEAD	06/26/2019	22.1	21.7	0.100	1126	3589	5.830	54.500	58.300	6.97%
H	5250	HEAD	07/01/2019	20.9	20.7	0.050	1191	7406	4.000	78.900	80.000	1.39%
H	5600	HEAD	07/01/2019	20.9	20.7	0.050	1191	7406	4.220	83.600	84.400	0.96%
H	5750	HEAD	07/01/2019	20.9	20.7	0.050	1191	7406	4.050	79.100	81.000	2.40%
G	835	BODY	06/26/2019	23.0	22.0	0.200	4d132	7410	2.010	9.670	10.050	3.93%
I	1750	BODY	06/23/2019	19.5	21.6	0.100	1150	7357	3.880	36.600	38.800	6.01%
I	1750	BODY	06/26/2019	21.2	21.7	0.100	1150	7357	3.960	36.600	39.600	8.20%
I	1750	BODY	07/03/2019	23.9	21.9	0.100	1150	7357	3.780	36.600	37.800	3.28%
G	1750	BODY	07/15/2019	21.9	21.4	0.100	1150	7409	3.810	36.600	38.100	4.10%
J	1900	BODY	06/19/2019	21.3	20.4	0.100	5d148	7488	4.120	39.100	41.200	5.37%
J	1900	BODY	06/21/2019	21.1	19.4	0.100	5d149	7488	4.090	39.400	40.900	3.81%
J	1900	BODY	07/05/2019	21.3	24.8	0.100	5d080	7488	4.170	39.200	41.700	6.38%
J	1900	BODY	07/10/2019	22.9	22.6	0.100	5d080	7488	4.090	39.200	40.900	4.34%
J	1900	BODY	07/15/2019	19.3	22.6	0.100	5d080	7488	4.140	39.200	41.400	5.61%
L	2300	BODY	07/11/2019	22.2	20.6	0.100	1073	7308	5.040	47.700	50.400	5.66%
K	2450	BODY	06/17/2019	23.9	22.9	0.100	719	7417	5.130	50.100	51.300	2.40%
K	2450	BODY	06/25/2019	23.2	22.3	0.100	719	7417	5.060	50.100	50.600	1.00%
K	2450	BODY	06/29/2019	22.2	21.4	0.100	719	7417	5.060	50.100	50.600	1.00%
K	2450	BODY	07/15/2019	22.2	22.1	0.100	719	7417	5.130	50.100	51.300	2.40%
K	2450	BODY	07/24/2019	22.5	22.8	0.100	719	7417	5.270	50.100	52.700	5.19%
K	2600	BODY	06/17/2019	23.9	22.9	0.100	1004	7417	5.250	54.800	52.500	-4.20%
K	2600	BODY	06/25/2019	23.2	22.3	0.100	1004	7417	5.480	54.800	54.800	0.00%
L	2600	BODY	06/26/2019	22.2	21.1	0.100	1071	7308	5.450	54.200	54.500	0.55%
K	2600	BODY	07/15/2019	22.2	22.1	0.100	1004	7417	5.620	54.800	56.200	2.55%
K	2600	BODY	07/24/2019	22.5	22.8	0.100	1004	7417	5.380	54.800	53.800	-1.82%
L	5250	BODY	07/08/2019	22.2	21.6	0.050	1057	7308	3.670	75.900	73.400	-3.29%
L	5600	BODY	07/08/2019	22.2	21.6	0.050	1057	7308	4.240	79.900	84.800	6.13%
L	5750	BODY	07/08/2019	22.2	21.6	0.050	1057	7308	3.680	76.700	73.600	-4.04%

Table 10-5
System Verification Results – 10g

System Verification TARGET & MEASURED													
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR_{10g} (W/kg)	1 W Target SAR_{10g} (W/kg)	1 W Normalized SAR_{10g} (W/kg)	$Deviation_{10g}$ (%)
I	1750	BODY	06/19/2019	22.2	22.5	0.100	1150	7357	2.060	19.400	20.600	6.19%
I	1750	BODY	06/23/2019	19.5	21.6	0.100	1150	7357	2.040	19.400	20.400	5.15%
I	1750	BODY	07/03/2019	23.9	21.9	0.100	1150	7357	1.980	19.400	19.800	2.06%
I	1750	BODY	07/08/2019	22.3	21.6	0.100	1150	7357	2.010	19.400	20.100	3.61%
J	1900	BODY	06/19/2019	21.3	20.4	0.100	5d148	7488	2.140	20.500	21.400	4.39%
J	1900	BODY	06/21/2019	21.1	19.4	0.100	5d149	7488	2.140	20.700	21.400	3.38%
J	1900	BODY	06/23/2019	20.1	20.3	0.100	5d149	7488	2.150	20.700	21.500	3.86%
J	1900	BODY	07/15/2019	19.3	22.6	0.100	5d080	7488	2.110	20.600	21.100	2.43%
K	2300	BODY	06/23/2019	21.6	22.0	0.100	1073	7417	2.380	23.200	23.800	2.59%
K	2450	BODY	06/17/2019	23.9	22.9	0.100	719	7417	2.340	23.700	23.400	-1.27%
K	2450	BODY	06/29/2019	22.2	21.4	0.100	719	7417	2.320	23.700	23.200	-2.11%
K	2450	BODY	07/10/2019	22.7	22.5	0.100	719	7417	2.350	23.700	23.500	-0.84%
K	2450	BODY	07/15/2019	22.2	22.1	0.100	719	7417	2.340	23.700	23.400	-1.27%
K	2450	BODY	07/24/2019	22.5	22.8	0.100	719	7417	2.400	23.700	24.000	1.27%
K	2600	BODY	06/17/2019	23.9	22.9	0.100	1004	7417	2.310	24.700	23.100	-6.48%
L	2600	BODY	06/26/2019	22.2	21.1	0.100	1071	7308	2.420	24.500	24.200	-1.22%
K	2600	BODY	07/10/2019	22.7	22.5	0.100	1004	7417	2.360	24.700	23.600	-4.45%
K	2600	BODY	07/15/2019	22.2	22.1	0.100	1004	7417	2.470	24.700	24.700	0.00%
K	2600	BODY	07/24/2019	22.5	22.8	0.100	1004	7417	2.380	24.700	23.800	-3.64%
L	5250	BODY	07/08/2019	22.2	21.6	0.050	1057	7308	1.020	21.100	20.400	-3.32%
L	5600	BODY	07/08/2019	22.2	21.6	0.050	1057	7308	1.160	22.300	23.200	4.04%
L	5750	BODY	07/08/2019	22.2	21.6	0.050	1057	7308	1.030	21.200	20.600	-2.83%

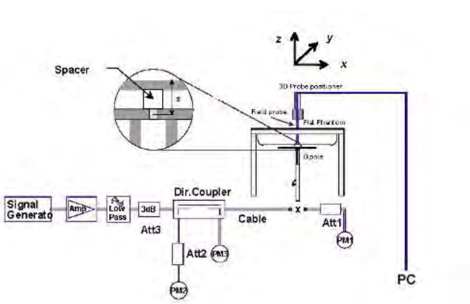


Figure 10-1
System Verification Setup Diagram

Figure 10-2
System Verification Setup Photo

11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
UMTS 1900 Handset Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	0.12	Right	Cheek	54574	1:1	0.078	1.549	0.121	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	0.07	Right	Tilt	54574	1:1	0.068	1.549	0.105	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	-0.17	Left	Cheek	54574	1:1	0.097	1.549	0.150	A1
1880.00	9400	UMTS 1900	RMC	25.5	23.60	0.12	Left	Tilt	54574	1:1	0.041	1.549	0.064	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Head** **1.6 W/kg (mW/g)** averaged over 1 gram							

Table 11-2
LTE Band 66 (AWS) Handset Head SAR

MEASUREMENT RESULTS																					
1 CC Uplink | 2 CC Uplink	Component Carrier	FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
		MHz	Ch.															(W/kg)		(W/kg)	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	-0.03	0	Right	Cheek	QPSK	1	0	54954	1:1	0.135	1.169	0.158	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	0.06	1	Right	Cheek	QPSK	50	0	54954	1:1	0.087	1.146	0.100	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.01	0	Right	Tilt	QPSK	1	0	54954	1:1	0.109	1.169	0.127	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	0.07	1	Right	Tilt	QPSK	50	0	54954	1:1	0.093	1.146	0.107	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.00	0	Left	Cheek	QPSK	1	0	54954	1:1	0.156	1.169	0.182	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	23.97	0.13	0	Left	Cheek	QPSK	1	99	54954	1:1	0.151	1.268	0.191	
1 CC Uplink	N/A	1715.00	132022	Low	LTE Band 66 (AWS)	10	25.0	24.02	0.15	0	Left	Cheek	QPSK	1	49	54954	1:1	0.159	1.253	**0.199**	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	0.06	1	Left	Cheek	QPSK	50	0	54954	1:1	0.123	1.146	0.141	
2 CC Uplink CA_66C	PCC	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.20	0.01	0	Left	Cheek	QPSK	1	99	54954	1:1	0.144	1.202	0.173	
	SCC	1739.80	132270			20								1	0						
2 CC Uplink CA_66B	PCC	1715.00	132022	Low	LTE Band 66 (AWS)	10	25.0	24.25	0.08	0	Left	Cheek	QPSK	1	49	54954	1:1	0.169	1.189	**0.201**	A2
	SCC	1724.90	132121			10								1	0						
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.08	0	Left	Tilt	QPSK	1	0	54954	1:1	0.100	1.169	0.117	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	0.07	1	Left	Tilt	QPSK	50	0	54954	1:1	0.089	1.146	0.102	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**											**Head** **1.6 W/kg (mW/g)** averaged over 1 gram										

Table 11-3
LTE Band 25 (PCS) Handset Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	-0.19	0	Right	Cheek	QPSK	1	99	54574	1:1	0.076	1.343	0.102	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	0.03	1	Right	Cheek	QPSK	50	50	54574	1:1	0.061	1.309	0.080	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	0.07	0	Right	Tilt	QPSK	1	99	54574	1:1	0.079	1.343	0.106	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	0.05	1	Right	Tilt	QPSK	50	50	54574	1:1	0.058	1.309	0.076	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	0.12	0	Left	Cheek	QPSK	1	99	54574	1:1	0.089	1.343	0.120	A3
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	0.04	1	Left	Cheek	QPSK	50	50	54574	1:1	0.081	1.309	0.106	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	0.13	0	Left	Tilt	QPSK	1	99	54574	1:1	0.058	1.343	0.078	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	0.12	1	Left	Tilt	QPSK	50	50	54574	1:1	0.043	1.309	0.056	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-4
LTE Band 38 Handset Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	0.18	0	Right	Cheek	QPSK	1	0	54509	1:1.58	0.059	1.259	0.074	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	-0.10	1	Right	Cheek	QPSK	50	25	54509	1:1.58	0.045	1.259	0.057	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	-0.19	0	Right	Tilt	QPSK	1	0	54509	1:1.58	0.041	1.259	0.052	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	-0.01	1	Right	Tilt	QPSK	50	25	54509	1:1.58	0.026	1.259	0.033	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	0.02	0	Left	Cheek	QPSK	1	0	54509	1:1.58	0.082	1.259	0.103	A4
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	-0.08	1	Left	Cheek	QPSK	50	25	54509	1:1.58	0.063	1.259	0.079	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	0.14	0	Left	Tilt	QPSK	1	0	54509	1:1.58	0.025	1.259	0.031	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	0.12	1	Left	Tilt	QPSK	50	25	54509	1:1.58	0.022	1.259	0.028	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-5
LTE Band 41 Handset Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	0.15	0	Right	Cheek	QPSK	1	99	54657	1:1.58	0.058	1.089	0.063	
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	-0.02	1	Right	Cheek	QPSK	50	25	54657	1:1.58	0.048	1.038	0.050	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	0.05	0	Right	Tilt	QPSK	1	99	54657	1:1.58	0.042	1.089	0.046	
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	0.16	1	Right	Tilt	QPSK	50	25	54657	1:1.58	0.034	1.038	0.035	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	0.13	0	Left	Cheek	QPSK	1	99	54657	1:1.58	0.062	1.089	0.068	A5
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	0.06	1	Left	Cheek	QPSK	50	25	54657	1:1.58	0.056	1.038	0.058	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	-0.06	0	Left	Tilt	QPSK	1	99	54657	1:1.58	0.017	1.089	0.019	
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	0.21	1	Left	Tilt	QPSK	50	25	54657	1:1.58	0.012	1.038	0.012	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-6
DTS Handset Head SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2462	11	802.11b	DSSS	22	17.0	16.82	0.13	Right	Cheek	2	54608	1	99.9	0.111	-	1.042	1.001	-	
2462	11	802.11b	DSSS	22	17.0	16.82	0.14	Right	Tilt	2	54608	1	99.9	0.106	-	1.042	1.001	-	
2462	11	802.11b	DSSS	22	17.0	16.82	0.11	Left	Cheek	2	54608	1	99.9	0.072	-	1.042	1.001	-	
2462	11	802.11b	DSSS	22	17.0	16.82	0.12	Left	Tilt	2	54608	1	99.9	0.123	0.054	1.042	1.001	**0.056**	A6
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram											

Table 11-7
NII Handset Head SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5310	62	802.11n	OFDM	40	14.0	13.94	0.18	Right	Cheek	2	54574	13.5	97.2	0.200	0.096	1.014	1.029	**0.100**	A7
5310	62	802.11n	OFDM	40	14.0	13.94	0.07	Right	Tilt	2	54574	13.5	97.2	0.152	-	1.014	1.029	-	
5310	62	802.11n	OFDM	40	14.0	13.94	-0.07	Left	Cheek	2	54574	13.5	97.2	0.175	-	1.014	1.029	-	
5310	62	802.11n	OFDM	40	14.0	13.94	0.18	Left	Tilt	2	54574	13.5	97.2	0.141	-	1.014	1.029	-	
5610	122	802.11ac	OFDM	80	14.0	12.86	0.18	Right	Cheek	2	54574	29.3	96.2	0.081	-	1.300	1.040	-	
5610	122	802.11ac	OFDM	80	14.0	12.86	0.18	Right	Tilt	2	54574	29.3	96.2	0.142	0.059	1.300	1.040	0.080	
5610	122	802.11ac	OFDM	80	14.0	12.86	0.10	Left	Cheek	2	54574	29.3	96.2	0.084	-	1.300	1.040	-	
5610	122	802.11ac	OFDM	80	14.0	12.86	0.15	Left	Tilt	2	54574	29.3	96.2	0.138	-	1.300	1.040	-	
5775	155	802.11ac	OFDM	80	14.0	12.85	0.18	Right	Cheek	2	54574	29.3	96.2	0.035	-	1.303	1.040	-	
5775	155	802.11ac	OFDM	80	14.0	12.85	0.19	Right	Tilt	2	54574	29.3	96.2	0.054	0.023	1.303	1.040	0.031	
5775	155	802.11ac	OFDM	80	14.0	12.85	0.15	Left	Cheek	2	54574	29.3	96.2	0.038	-	1.303	1.040	-	
5775	155	802.11ac	OFDM	80	14.0	12.85	0.13	Left	Tilt	2	54574	29.3	96.2	0.051	-	1.303	1.040	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram											

11.2 Standalone Body-Worn SAR Data

Table 11-8
UMTS Handset Body-Worn SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	-0.04	15 mm	54509	1:1	back	0.239	1.549	0.370	A8
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-9
LTE Handset Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.12	0	55399	QPSK	1	0	15 mm	back	1:1	0.590	1.169	0.690	A9
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.0	24.26	0.01	0	55399	QPSK	1	99	15 mm	back	1:1	0.557	1.186	0.661	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.14	0.05	0	55399	QPSK	1	99	15 mm	back	1:1	0.522	1.219	0.636	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	0.03	1	55399	QPSK	50	0	15 mm	back	1:1	0.536	1.146	0.614	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	-0.05	0	54509	QPSK	1	99	15 mm	back	1:1	0.355	1.343	0.477	A10
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	-0.08	1	54509	QPSK	50	50	15 mm	back	1:1	0.289	1.309	0.378	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	-0.14	0	53436	QPSK	1	0	15 mm	back	1:1.58	0.118	1.259	0.149	A12
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	-0.19	1	53436	QPSK	50	25	15 mm	back	1:1.58	0.089	1.259	0.112	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	0.12	0	54608	QPSK	1	99	15 mm	back	1:1.58	0.092	1.089	0.100	A14
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	0.10	1	54608	QPSK	50	25	15 mm	back	1:1.58	0.078	1.038	0.081	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-10
DTS SISO Handset Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	20.0	19.98	0.18	15 mm	2	54574	1	back	99.9	0.122	0.083	1.005	1.001	0.083	A16
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											

Table 11-11
DTS MIMO Handset Body-Worn SAR Data for Conditions with 2.4 GHz and 5 GHz WLAN SAR

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
2457	10	802.11n	OFDM	20	17.0	16.76	17.0	16.62	-0.18	15 mm	MIMO	54574	13	back	98.7	0.099	0.064	1.091	1.013	0.071	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram											

DTS MIMO was additionally evaluated at the maximum allowed output power during operations with Simultaneous 2.4 GHz and 5 GHz WLAN. 5 GHz WIFI was not transmitting during the above evaluations.

Table 11-12
NII Handset Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5280	56	802.11a	OFDM	20	18.0	17.99	-0.12	15 mm	2	53592	6	back	98.7	0.175	0.072	1.002	1.013	0.073	
5720	144	802.11a	OFDM	20	18.0	17.98	-0.12	15 mm	2	53592	6	back	98.7	0.413	0.181	1.005	1.013	0.184	
5785	157	802.11a	OFDM	20	18.0	17.86	-0.12	15 mm	2	53592	6	back	98.7	0.446	0.204	1.033	1.013	**0.213**	A18
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											

11.3 Standalone Hotspot SAR Data

Table 11-13
LTE Band 7 Handset Hotspot SAR

FREQUENCY MHz	Ch.		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Reported SAR (1g) (W/kg)	Plot #
2535.00	21100	Mid	LTE Band 7	20	20.0	19.74	-0.08	0	54608	QPSK	1	0	10 mm	back	1:1	0.175	1.062	0.186	
2535.00	21100	Mid	LTE Band 7	20	20.0	19.79	-0.02	0	54608	QPSK	50	25	10 mm	back	1:1	0.175	1.050	0.184	
2535.00	21100	Mid	LTE Band 7	20	20.0	19.74	-0.01	0	54608	QPSK	1	0	10 mm	front	1:1	0.479	1.062	0.509	
2535.00	21100	Mid	LTE Band 7	20	20.0	19.79	-0.02	0	54608	QPSK	50	25	10 mm	front	1:1	0.457	1.050	0.480	
2510.00	20850	Low	LTE Band 7	20	20.0	19.70	-0.03	0	54608	QPSK	1	0	10 mm	bottom	1:1	0.721	1.072	0.773	
2535.00	21100	Mid	LTE Band 7	20	20.0	19.74	-0.05	0	54608	QPSK	1	0	10 mm	bottom	1:1	0.865	1.062	0.919	
2560.00	21350	High	LTE Band 7	20	20.0	19.40	-0.09	0	54608	QPSK	1	0	10 mm	bottom	1:1	0.771	1.148	0.885	
2510.00	20850	Low	LTE Band 7	20	20.0	19.65	-0.02	0	54608	QPSK	50	50	10 mm	bottom	1:1	0.738	1.084	0.800	
2535.00	21100	Mid	LTE Band 7	20	20.0	19.79	-0.03	0	54608	QPSK	50	25	10 mm	bottom	1:1	0.884	1.050	0.928	A11
2560.00	21350	High	LTE Band 7	20	20.0	19.53	-0.05	0	54608	QPSK	50	0	10 mm	bottom	1:1	0.797	1.114	0.888	
2510.00	20850	Low	LTE Band 7	20	20.0	19.66	-0.10	0	54608	QPSK	100	0	10 mm	bottom	1:1	0.738	1.081	0.798	
2535.00	21100	Mid	LTE Band 7	20	20.0	19.74	-0.01	0	54608	QPSK	1	0	10 mm	right	1:1	0.064	1.062	0.068	
2535.00	21100	Mid	LTE Band 7	20	20.0	19.79	-0.01	0	54608	QPSK	50	25	10 mm	right	1:1	0.067	1.050	0.070	
2535.00	21100	Mid	LTE Band 7	20	20.0	19.74	-0.01	0	54608	QPSK	1	0	10 mm	left	1:1	0.083	1.062	0.088	
2535.00	21100	Mid	LTE Band 7	20	20.0	19.79	-0.01	0	54608	QPSK	50	25	10 mm	left	1:1	0.083	1.050	0.087	
2535.00	21100	Mid	LTE Band 7	20	20.0	19.79	-0.09	0	54608	QPSK	50	25	10 mm	bottom	1:1	0.876	1.050	0.920	

ANSI / IEEE C95.1 1992 - SAFETY LIMIT	Body
Spatial Peak	1.6 W/kg (mW/g)
Uncontrolled Exposure/General Population	averaged over 1 gram

Note: Blue Entry represents variability measurement

Table 11-14
LTE Band 38 Handset Hotspot SAR

FREQUENCY MHz	Ch.		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Reported SAR (1g) (W/kg)	Plot #
2595.00	38000	Mid	LTE Band 38	20	21.0	19.85	-0.03	0	53436	QPSK	1	0	10 mm	back	1:1.58	0.097	1.303	0.126	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.97	-0.10	0	53436	QPSK	50	25	10 mm	back	1:1.58	0.093	1.268	0.118	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.85	-0.11	0	53436	QPSK	1	0	10 mm	front	1:1.58	0.218	1.303	0.284	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.97	-0.08	0	53436	QPSK	50	25	10 mm	front	1:1.58	0.208	1.268	0.264	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.85	-0.12	0	53436	QPSK	1	0	10 mm	bottom	1:1.58	0.480	1.303	0.625	A13
2595.00	38000	Mid	LTE Band 38	20	21.0	19.97	-0.14	0	53436	QPSK	50	25	10 mm	bottom	1:1.58	0.458	1.268	0.581	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.85	0.03	0	53436	QPSK	1	0	10 mm	right	1:1.58	0.043	1.303	0.056	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.97	-0.13	0	53436	QPSK	50	25	10 mm	right	1:1.58	0.043	1.268	0.055	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.85	0.00	0	53436	QPSK	1	0	10 mm	left	1:1.58	0.050	1.303	0.065	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.97	-0.04	0	53436	QPSK	50	25	10 mm	left	1:1.58	0.050	1.268	0.063	

ANSI / IEEE C95.1 1992 - SAFETY LIMIT	Body
Spatial Peak	1.6 W/kg (mW/g)
Uncontrolled Exposure/General Population	averaged over 1 gram

Table 11-15
LTE Band 41 Handset Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Side	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2680.00	41490	High	LTE Band 41	20	22.5	21.80	-0.03	0	54608	QPSK	1	99	10 mm	back	1:1.58	0.132	1.175	0.155	
2680.00	41490	High	LTE Band 41	20	22.5	21.85	-0.04	0	54608	QPSK	50	50	10 mm	back	1:1.58	0.138	1.161	0.160	
2680.00	41490	High	LTE Band 41	20	22.5	21.80	-0.05	0	54608	QPSK	1	99	10 mm	front	1:1.58	0.310	1.175	0.364	
2680.00	41490	High	LTE Band 41	20	22.5	21.85	0.05	0	54608	QPSK	50	50	10 mm	front	1:1.58	0.330	1.161	0.383	
2506.00	39750	Low	LTE Band 41	20	22.5	21.65	-0.04	0	54608	QPSK	1	0	10 mm	bottom	1:1.58	0.902	1.216	**1.097**	A15
2549.50	40185	Low-Mid	LTE Band 41	20	22.5	21.64	-0.06	0	54608	QPSK	1	50	10 mm	bottom	1:1.58	0.676	1.219	0.824	
2593.00	40620	Mid	LTE Band 41	20	22.5	21.65	-0.10	0	54608	QPSK	1	0	10 mm	bottom	1:1.58	0.635	1.216	0.772	
2636.50	41055	Mid-High	LTE Band 41	20	22.5	21.74	-0.10	0	54608	QPSK	1	0	10 mm	bottom	1:1.58	0.628	1.191	0.748	
2680.00	41490	High	LTE Band 41	20	22.5	21.80	-0.09	0	54608	QPSK	1	99	10 mm	bottom	1:1.58	0.549	1.175	0.645	
2506.00	39750	Low	LTE Band 41	20	22.5	21.83	0.05	0	54608	QPSK	50	25	10 mm	bottom	1:1.58	0.896	1.167	1.046	
2549.50	40185	Low-Mid	LTE Band 41	20	22.5	21.79	-0.07	0	54608	QPSK	50	25	10 mm	bottom	1:1.58	0.691	1.178	0.814	
2593.00	40620	Mid	LTE Band 41	20	22.5	21.80	-0.09	0	54608	QPSK	50	25	10 mm	bottom	1:1.58	0.661	1.175	0.777	
2636.50	41055	Mid-High	LTE Band 41	20	22.5	21.80	-0.16	0	54608	QPSK	50	0	10 mm	bottom	1:1.58	0.638	1.175	0.750	
2680.00	41490	High	LTE Band 41	20	22.5	21.85	-0.12	0	54608	QPSK	50	50	10 mm	bottom	1:1.58	0.558	1.161	0.648	
2636.50	41055	Mid-High	LTE Band 41	20	22.5	21.79	-0.10	0	54608	QPSK	100	0	10 mm	bottom	1:1.58	0.688	1.178	0.810	
2680.00	41490	High	LTE Band 41	20	22.5	21.80	0.13	0	54608	QPSK	1	99	10 mm	right	1:1.58	0.066	1.175	0.078	
2680.00	41490	High	LTE Band 41	20	22.5	21.85	0.02	0	54608	QPSK	50	50	10 mm	right	1:1.58	0.061	1.161	0.071	
2680.00	41490	High	LTE Band 41	20	22.5	21.80	-0.01	0	54608	QPSK	1	99	10 mm	left	1:1.58	0.076	1.175	0.089	
2680.00	41490	High	LTE Band 41	20	22.5	21.85	-0.02	0	54608	QPSK	50	50	10 mm	left	1:1.58	0.079	1.161	0.092	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-16
WLAN Handset Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	20.0	19.98	0.03	10 mm	2	54574	1	back	99.9	0.334	0.221	1.005	1.001	**0.222**	A17
2412	1	802.11b	DSSS	22	20.0	19.98	0.18	10 mm	2	54574	1	front	99.9	0.077	-	1.005	1.001	-	
2412	1	802.11b	DSSS	22	20.0	19.98	0.14	10 mm	2	54574	1	top	99.9	0.222	-	1.005	1.001	-	
2412	1	802.11b	DSSS	22	20.0	19.98	0.14	10 mm	2	54574	1	left	99.9	0.055	-	1.005	1.001	-	
5785	157	802.11a	OFDM	20	18.0	17.86	-0.12	10 mm	2	53592	6	back	98.7	0.592	0.289	1.033	1.013	**0.302**	A19
5785	157	802.11a	OFDM	20	18.0	17.86	0.14	10 mm	2	53592	6	front	98.7	0.045	-	1.033	1.013	-	
5785	157	802.11a	OFDM	20	18.0	17.86	-0.12	10 mm	2	53592	6	top	98.7	0.412	-	1.033	1.013	-	
5785	157	802.11a	OFDM	20	18.0	17.86	0.18	10 mm	2	53592	6	left	98.7	0.107	-	1.033	1.013	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

11.4 Standalone Phablet SAR Data

Table 11-17
GPRS/UMTS Handset Phablet SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GPRS	30.5	29.19	0.16	11 mm	55399	2	1:4.15	back	0.282	1.352	0.381	
1880.00	661	GSM 1900	GPRS	30.5	29.19	-0.02	13 mm	55399	2	1:4.15	bottom	0.385	1.352	0.521	A20
1732.40	1412	UMTS 1750	RMC	25.5	24.27	0.00	11 mm	55399	N/A	1:1	back	0.536	1.327	0.711	
1732.40	1412	UMTS 1750	RMC	25.5	24.27	-0.01	13 mm	55399	N/A	1:1	bottom	0.700	1.327	0.929	A21
1880.00	9400	UMTS 1900	RMC	25.5	23.60	0.06	11 mm	54509	N/A	1:1	back	0.273	1.549	0.423	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	-0.18	0 mm	54509	N/A	1:1	front	0.872	1.549	1.351	A22
1880.00	9400	UMTS 1900	RMC	25.5	23.60	-0.06	13 mm	54509	N/A	1:1	bottom	0.509	1.549	0.788	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	0.13	0 mm	54509	N/A	1:1	right	0.416	1.549	0.644	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	0.01	0 mm	54509	N/A	1:1	left	0.222	1.549	0.344	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Phablet 4.0 W/kg (mW/g) averaged over 10 grams								

Table 11-18
LTE Band 66 (AWS) Handset Phablet SAR

MEASUREMENT RESULTS																					
1 CC Uplink | 2 CC Uplink	Component Carrier	FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
		MHz	Ch.															(W/kg)		(W/kg)	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	-0.05	0	55399	QPSK	1	0	11 mm	back	1:1	0.525	1.169	0.614	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	0.02	1	55399	QPSK	50	0	11 mm	back	1:1	0.423	1.146	0.485	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.03	0	55399	QPSK	1	0	0 mm	front	1:1	1.040	1.169	1.216	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	23.97	-0.10	0	55399	QPSK	1	99	0 mm	front	1:1	1.040	1.268	1.319	
1 CC Uplink	N/A	1715.00	132022	Low	LTE Band 66 (AWS)	10	25.0	24.02	-0.04	0	55399	QPSK	1	49	0 mm	front	1:1	1.010	1.253	1.266	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	-0.01	1	55399	QPSK	50	0	0 mm	front	1:1	0.832	1.146	0.953	
2 CC Uplink CA_66C	PCC	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.20	-0.15	0	55399	QPSK	1	99	0 mm	front	1:1	1.130	1.202	1.358	A23
	SCC	1739.80	132270	Low	LTE Band 66 (AWS)	20							1	0							
2 CC Uplink CA_66B	PCC	1715.00	132022	Low	LTE Band 66 (AWS)	10	25.0	24.25	0.01	0	55399	QPSK	1	49	0 mm	front	1:1	1.090	1.189	1.296	
	SCC	1724.90	132121	Low	LTE Band 66 (AWS)	10							1	0							
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.04	0	55399	QPSK	1	0	13 mm	bottom	1:1	0.594	1.169	0.694	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	0.02	1	55399	QPSK	50	0	13 mm	bottom	1:1	0.532	1.146	0.610	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.07	0	55399	QPSK	1	0	0 mm	right	1:1	0.665	1.169	0.777	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	0.05	1	55399	QPSK	50	0	0 mm	right	1:1	0.528	1.146	0.605	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.02	0	55399	QPSK	1	0	0 mm	left	1:1	0.361	1.169	0.422	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	-0.11	1	55399	QPSK	50	0	0 mm	left	1:1	0.304	1.146	0.348	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Phablet 4.0 W/kg (mW/g) averaged over 10 grams											

Table 11-19
LTE Band 25 (PCS) Handset Phablet SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	-0.01	0	54509	QPSK	1	99	11 mm	back	1:1	0.335	1.343	0.450	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	0.00	1	54509	QPSK	50	50	11 mm	back	1:1	0.284	1.309	0.372	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	-0.10	0	54509	QPSK	1	99	0 mm	front	1:1	0.941	1.343	1.264	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	-0.10	1	54509	QPSK	50	50	0 mm	front	1:1	0.775	1.309	1.014	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	-0.08	0	54509	QPSK	1	99	13 mm	bottom	1:1	0.538	1.343	0.723	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	0.01	1	54509	QPSK	50	50	13 mm	bottom	1:1	0.437	1.309	0.572	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	-0.08	0	54509	QPSK	1	99	0 mm	right	1:1	0.549	1.343	0.737	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	-0.08	1	54509	QPSK	50	50	0 mm	right	1:1	0.460	1.309	0.602	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	0.00	0	54509	QPSK	1	99	0 mm	left	1:1	0.266	1.343	0.357	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	-0.06	1	54509	QPSK	50	50	0 mm	left	1:1	0.229	1.309	0.300	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.19	-0.21	0	54509	QPSK	1	0	0 mm	back	1:1	1.090	1.074	1.171	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.26	-0.20	0	54509	QPSK	50	50	0 mm	back	1:1	1.140	1.057	1.205	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.19	-0.09	0	54509	QPSK	1	0	0 mm	bottom	1:1	1.850	1.074	1.987	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.26	-0.10	0	54509	QPSK	50	50	0 mm	bottom	1:1	2.010	1.057	2.125	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.5	19.25	-0.11	0	54509	QPSK	50	25	0 mm	bottom	1:1	2.040	1.059	2.160	
1905.00	26590	High	LTE Band 25 (PCS)	20	19.5	19.05	-0.10	0	54509	QPSK	50	50	0 mm	bottom	1:1	2.060	1.109	2.285	A24
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.18	-0.12	0	54509	QPSK	100	0	0 mm	bottom	1:1	1.980	1.076	2.130	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Phablet 4.0 W/kg (mW/g) averaged over 10 grams										

Table 11-20
LTE Band 30 Handset Phablet SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2310.00	27710	Mid	LTE Band 30	10	25.0	24.68	-0.07	0	54608	QPSK	1	25	11 mm	back	1:1	0.392	1.076	0.422	
2310.00	27710	Mid	LTE Band 30	10	24.0	23.76	-0.13	1	54608	QPSK	25	0	11 mm	back	1:1	0.324	1.057	0.342	
2310.00	27710	Mid	LTE Band 30	10	25.0	24.68	-0.10	0	54608	QPSK	1	25	13 mm	bottom	1:1	0.570	1.076	0.613	
2310.00	27710	Mid	LTE Band 30	10	24.0	23.76	-0.11	1	54608	QPSK	25	0	13 mm	bottom	1:1	0.471	1.057	0.498	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.50	-0.02	0	54608	QPSK	1	0	0 mm	back	1:1	0.885	1.122	0.993	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.59	-0.02	0	54608	QPSK	25	0	0 mm	back	1:1	0.918	1.099	1.009	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.50	-0.19	0	54608	QPSK	1	0	0 mm	bottom	1:1	1.990	1.122	2.233	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.59	-0.17	0	54608	QPSK	25	0	0 mm	bottom	1:1	2.090	1.099	2.297	A25
2310.00	27710	Mid	LTE Band 30	10	20.0	19.49	-0.18	0	54608	QPSK	50	0	0 mm	bottom	1:1	2.090	1.125	2.351	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Phablet 4.0 W/kg (mW/g) averaged over 10 grams										

Table 11-21
LTE Band 7 Handset Phablet SAR

MEASUREMENT RESULTS																						
1 CC Uplink | 2 CC Uplink	Component Carrier	FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
		MHz	Ch.															(W/kg)		(W/kg)	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	24.6	24.37	-0.08	0	54509	QPSK	1	99	11 mm	back	1:1	0.157	1.054	0.165	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	23.6	23.38	-0.01	1	54509	QPSK	50	50	11 mm	back	1:1	0.132	1.052	0.139	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	24.6	24.06	-0.04	0	54509	QPSK	1	0	13 mm	bottom	1:1	0.640	1.132	0.724	A26
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	24.6	24.37	0.02	0	54509	QPSK	1	99	13 mm	bottom	1:1	0.604	1.054	0.637	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	23.6	23.38	-0.09	1	54509	QPSK	50	50	13 mm	bottom	1:1	0.529	1.052	0.557	
2 CC Uplink	PCC	2560.00	21350	High	LTE Band 7	20	24.6	23.12	-0.05	0	54509	QPSK	1	0	13 mm	bottom	1:1	0.490	1.406	0.689	
	SCC	2540.20	21152	High	LTE Band 7	20							1	99							
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population											Phablet 4.0 W/kg (mW/g) averaged over 10 grams										

Table 11-22
LTE Band 38 Handset Phablet SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	-0.06	0	53436	QPSK	1	0	11 mm	back	1:1.58	0.072	1.259	0.091	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	-0.13	1	53436	QPSK	50	25	11 mm	back	1:1.58	0.059	1.259	0.074	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	-0.13	0	53436	QPSK	1	0	0 mm	front	1:1.58	1.680	1.259	2.115	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	-0.19	1	53436	QPSK	50	25	0 mm	front	1:1.58	1.340	1.259	1.687	
2595.00	38000	Mid	LTE Band 38	20	24.0	22.95	-0.16	1	53436	QPSK	100	0	0 mm	front	1:1.58	1.330	1.274	1.694	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	-0.16	0	53436	QPSK	1	0	13 mm	bottom	1:1.58	0.310	1.259	0.390	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	-0.17	1	53436	QPSK	50	25	13 mm	bottom	1:1.58	0.236	1.259	0.297	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	-0.13	0	53436	QPSK	1	0	0 mm	right	1:1.58	0.493	1.259	0.621	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	-0.13	1	53436	QPSK	50	25	0 mm	right	1:1.58	0.197	1.259	0.248	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	0.08	0	53436	QPSK	1	0	0 mm	left	1:1.58	0.308	1.259	0.388	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	-0.17	1	53436	QPSK	50	25	0 mm	left	1:1.58	0.147	1.259	0.185	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.85	-0.08	0	53436	QPSK	1	0	0 mm	back	1:1.58	0.418	1.303	0.545	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.97	-0.10	0	53436	QPSK	50	25	0 mm	back	1:1.58	0.416	1.268	0.527	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.85	-0.16	0	53436	QPSK	1	0	0 mm	bottom	1:1.58	1.880	1.303	2.450	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.97	-0.16	0	53436	QPSK	50	25	0 mm	bottom	1:1.58	1.980	1.268	2.511	A27
2595.00	38000	Mid	LTE Band 38	20	21.0	19.81	-0.19	0	53436	QPSK	100	0	0 mm	bottom	1:1.58	1.960	1.315	2.577	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Phablet 4.0 W/kg (mW/g) averaged over 10 grams										

Table 11-23
LTE Band 41 Handset Phablet SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	0.00	0	54509	QPSK	1	99	11 mm	back	1:1.58	0.090	1.089	0.098	
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	-0.10	1	54509	QPSK	50	25	11 mm	back	1:1.58	0.078	1.038	0.081	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	-0.12	0	54509	QPSK	1	99	0 mm	front	1:1.58	1.250	1.089	1.361	A28
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	-0.21	1	54509	QPSK	50	25	0 mm	front	1:1.58	1.040	1.038	1.080	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	-0.05	0	54509	QPSK	1	99	13 mm	bottom	1:1.58	0.379	1.089	0.413	
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	-0.16	1	54509	QPSK	50	25	13 mm	bottom	1:1.58	0.330	1.038	0.343	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	-0.14	0	54509	QPSK	1	99	0 mm	right	1:1.58	0.326	1.089	0.355	
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	-0.12	1	54509	QPSK	50	25	0 mm	right	1:1.58	0.264	1.038	0.274	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	0.02	0	54509	QPSK	1	99	0 mm	left	1:1.58	0.354	1.089	0.386	
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	-0.01	1	54509	QPSK	50	25	0 mm	left	1:1.58	0.282	1.038	0.293	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**									**Phablet** **4.0 W/kg (mW/g)** averaged over 10 grams										

Table 11-24
WLAN Handset Phablet SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5280	56	802.11a	OFDM	20	18.0	17.99	-0.12	0 mm	2	53592	6	back	98.7	18.552	1.320	1.002	1.013	1.340	
5280	56	802.11a	OFDM	20	18.0	17.99	-0.17	0 mm	2	53592	6	front	98.7	1.209	0.162	1.002	1.013	0.164	
5280	56	802.11a	OFDM	20	18.0	17.99	0.15	0 mm	2	53592	6	top	98.7	4.542	0.522	1.002	1.013	0.530	
5280	56	802.11a	OFDM	20	18.0	17.99	0.15	0 mm	2	53592	6	left	98.7	0.171	-	1.002	1.013	-	
5500	100	802.11a	OFDM	20	18.0	17.84	-0.17	0 mm	2	53592	6	back	98.7	15.975	1.720	1.038	1.013	1.809	A29
5620	124	802.11a	OFDM	20	18.0	17.76	-0.15	0 mm	2	53592	6	back	98.7	16.761	1.650	1.057	1.013	1.767	
5720	144	802.11a	OFDM	20	18.0	17.98	-0.01	0 mm	2	53592	6	back	98.7	11.331	1.650	1.005	1.013	1.680	
5720	144	802.11a	OFDM	20	18.0	17.98	-0.16	0 mm	2	53592	6	front	98.7	0.546	0.045	1.005	1.013	0.046	
5720	144	802.11a	OFDM	20	18.0	17.98	0.15	0 mm	2	53592	6	top	98.7	12.848	0.966	1.005	1.013	0.983	
5720	144	802.11a	OFDM	20	18.0	17.98	0.06	0 mm	2	53592	6	left	98.7	0.558	-	1.005	1.013	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**									**Phablet** **4.0 W/kg (mW/g)** averaged over 10 grams										

11.5 Standalone UMPC Body SAR Data

Table 11-25
GPRS/UMTS UMPC Body 1g SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GPRS	30.5	29.19	0.05	12 mm	55399	2	1:4.15	back	0.295	1.352	0.399	
1880.00	661	GSM 1900	GPRS	27.5	26.31	0.05	10 mm	55399	2	1:4.15	back	0.299	1.315	0.393	
1880.00	661	GSM 1900	GPRS	30.5	29.19	-0.01	11 mm	55399	2	1:4.15	front	0.322	1.352	0.435	
1880.00	661	GSM 1900	GPRS	27.5	26.31	0.03	10 mm	55399	2	1:4.15	front	0.235	1.315	0.309	
1880.00	661	GSM 1900	GPRS	30.5	29.19	-0.09	16 mm	55399	2	1:4.15	bottom	0.380	1.352	0.514	A30
1732.40	1412	UMTS 1750	RMC	25.5	24.27	0.01	12 mm	55399	N/A	1:1	back	0.574	1.327	0.762	
1732.40	1412	UMTS 1750	RMC	20.5	20.02	0.04	10 mm	55399	N/A	1:1	back	0.254	1.117	0.284	
1712.40	1312	UMTS 1750	RMC	25.5	24.18	0.00	11 mm	55399	N/A	1:1	front	0.639	1.355	0.866	
1732.40	1412	UMTS 1750	RMC	25.5	24.27	0.03	11 mm	55399	N/A	1:1	front	0.616	1.327	0.817	
1752.60	1513	UMTS 1750	RMC	25.5	24.10	0.00	11 mm	55399	N/A	1:1	front	0.670	1.380	0.925	A31
1732.40	1412	UMTS 1750	RMC	20.5	20.02	0.00	10 mm	55399	N/A	1:1	front	0.243	1.117	0.271	
1712.40	1312	UMTS 1750	RMC	25.5	24.18	-0.05	16 mm	55399	N/A	1:1	bottom	0.481	1.355	0.652	
1732.40	1412	UMTS 1750	RMC	25.5	24.27	-0.02	16 mm	55399	N/A	1:1	bottom	0.499	1.327	0.662	
1752.60	1513	UMTS 1750	RMC	25.5	24.10	-0.07	16 mm	55399	N/A	1:1	bottom	0.533	1.380	0.736	
1732.40	1412	UMTS 1750	RMC	20.5	20.02	0.10	10 mm	55399	N/A	1:1	bottom	0.376	1.117	0.420	
1732.40	1412	UMTS 1750	RMC	25.5	24.27	-0.01	10 mm	55399	N/A	1:1	right	0.243	1.327	0.322	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	-0.03	12 mm	54657	N/A	1:1	back	0.491	1.549	0.761	
1880.00	9400	UMTS 1900	RMC	21.0	19.92	-0.06	10 mm	54657	N/A	1:1	back	0.259	1.282	0.332	
1852.40	9262	UMTS 1900	RMC	25.5	23.61	0.05	11 mm	54657	N/A	1:1	front	0.543	1.545	0.839	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	0.01	11 mm	54657	N/A	1:1	front	0.558	1.549	0.864	
1907.60	9538	UMTS 1900	RMC	25.5	23.51	0.03	11 mm	54657	N/A	1:1	front	0.478	1.581	0.756	
1880.00	9400	UMTS 1900	RMC	21.0	19.92	-0.01	10 mm	54657	N/A	1:1	front	0.292	1.282	0.374	
1852.40	9262	UMTS 1900	RMC	25.5	23.61	-0.03	16 mm	54657	N/A	1:1	bottom	0.664	1.545	**1.026**	A32
1880.00	9400	UMTS 1900	RMC	25.5	23.60	-0.07	16 mm	54657	N/A	1:1	bottom	0.637	1.549	0.987	
1907.60	9538	UMTS 1900	RMC	25.5	23.51	0.00	16 mm	54657	N/A	1:1	bottom	0.631	1.581	0.998	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	0.04	10 mm	54657	N/A	1:1	right	0.214	1.549	0.331	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**UMPC Body** **1.6 W/kg (mW/g)** averaged over 1 gram								

Table 11-26
LTE Band 26 (Cell) UMPC Body 1g SAR Data

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Ant State	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	24.22	-0.09	0	0	54509	QPSK	1	0	10 mm	back	1:1	0.620	1.343	0.833	A33
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.27	-0.08	1	0	54509	QPSK	36	37	10 mm	back	1:1	0.528	1.327	0.701	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.24	0.01	1	0	54509	QPSK	75	0	10 mm	back	1:1	0.516	1.337	0.690	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	24.22	0.01	0	0	54509	QPSK	1	0	10 mm	front	1:1	0.537	1.343	0.721	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.27	0.00	1	0	54509	QPSK	36	37	10 mm	front	1:1	0.455	1.327	0.604	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	24.22	0.00	0	0	54509	QPSK	1	0	10 mm	bottom	1:1	0.408	1.343	0.548	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.27	0.04	1	0	54509	QPSK	36	37	10 mm	bottom	1:1	0.353	1.327	0.468	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	24.22	0.01	0	0	54509	QPSK	1	0	10 mm	right	1:1	0.419	1.343	0.563	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.27	-0.05	1	0	54509	QPSK	36	37	10 mm	right	1:1	0.354	1.327	0.470	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								UMPC Body 1.6 W/kg (mW/g) averaged over 1 gram												

Table 11-27
LTE Band 66 (AWS) UMPC Body 1g SAR Data

MEASUREMENT RESULTS																					
1 CC Uplink | 2 CC Uplink	Component Carrier	FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
		MHz	Ch.															(W/kg)		(W/kg)	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.09	0	55399	QPSK	1	0	12 mm	back	1:1	0.527	1.169	0.616	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	-0.02	1	55399	QPSK	50	0	12 mm	back	1:1	0.452	1.146	0.518	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	19.8	19.62	0.02	0	55399	QPSK	1	0	10 mm	back	1:1	0.244	1.042	0.254	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	19.8	19.74	0.02	0	55399	QPSK	50	0	10 mm	back	1:1	0.261	1.014	0.265	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.02	0	55399	QPSK	1	0	11 mm	front	1:1	0.580	1.169	0.678	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.0	24.26	0.12	0	55399	QPSK	1	99	11 mm	front	1:1	0.632	1.186	0.750	
1 CC Uplink	N/A	1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.08	-0.10	0	55399	QPSK	1	0	11 mm	front	1:1	0.699	1.236	0.864	
1 CC Uplink	N/A	1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.14	-0.04	0	55399	QPSK	1	99	11 mm	front	1:1	0.702	1.219	0.856	
1 CC Uplink	N/A	1775.00	132622	High	LTE Band 66 (AWS)	10	25.0	23.77	-0.14	0	55399	QPSK	1	0	11 mm	front	1:1	0.619	1.327	0.821	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	0.04	1	55399	QPSK	50	0	11 mm	front	1:1	0.504	1.146	0.578	
1 CC Uplink	N/A	1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.40	-0.05	1	55399	QPSK	100	0	11 mm	front	1:1	0.551	1.148	0.633	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	19.8	19.62	0.03	0	55399	QPSK	1	0	10 mm	front	1:1	0.242	1.042	0.252	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	19.8	19.74	0.01	0	55399	QPSK	50	0	10 mm	front	1:1	0.263	1.014	0.267	
2 CC Uplink CA_66C	PCC	1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	23.77	-0.01	0	55399	QPSK	1	0	11 mm	front	1:1	0.681	1.327	0.904	
	SCC	1750.20	132374	High	LTE Band 66 (AWS)	20							1	99							
2 CC Uplink CA_66B	PCC	1775.00	132622	High	LTE Band 66 (AWS)	10	25.0	24.33	-0.13	0	55399	QPSK	1	0	11 mm	front	1:1	0.730	1.167	0.852	A34
	SCC	1765.10	132523	High	LTE Band 66 (AWS)	10							1	49							
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	-0.02	0	55399	QPSK	1	0	16 mm	bottom	1:1	0.471	1.169	0.551	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	-0.07	1	55399	QPSK	50	0	16 mm	bottom	1:1	0.425	1.146	0.487	
1 CC Uplink	N/A	1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.10	0	55399	QPSK	1	0	10 mm	right	1:1	0.252	1.169	0.295	
1 CC Uplink	N/A	1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	0.18	1	55399	QPSK	50	0	10 mm	right	1:1	0.165	1.146	0.189	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										UMPC Body 1.6 W/kg (mW/g) averaged over 1 gram											

Table 11-28
LTE Band 25 (PCS) UMPC Body 1g SAR Data

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	-0.06	0	54657	QPSK	1	99	12 mm	back	1:1	0.555	1.343	0.745	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	-0.05	1	54657	QPSK	50	50	12 mm	back	1:1	0.455	1.309	0.596	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.19	-0.03	0	54657	QPSK	1	0	10 mm	back	1:1	0.232	1.074	0.249	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.26	-0.10	0	54657	QPSK	50	50	10 mm	back	1:1	0.236	1.057	0.249	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	0.03	0	54657	QPSK	1	99	11 mm	front	1:1	0.468	1.343	0.629	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	0.00	1	54657	QPSK	50	50	11 mm	front	1:1	0.383	1.309	0.501	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.19	0.00	0	54657	QPSK	1	0	10 mm	front	1:1	0.229	1.074	0.246	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.26	0.00	0	54657	QPSK	50	50	10 mm	front	1:1	0.229	1.057	0.242	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	-0.04	0	54657	QPSK	1	99	16 mm	bottom	1:1	0.564	1.343	0.757	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.0	23.69	-0.04	0	54657	QPSK	1	50	16 mm	bottom	1:1	0.556	1.352	0.752	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.0	23.54	-0.20	0	54657	QPSK	1	50	16 mm	bottom	1:1	0.578	1.400	0.809	A35
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	-0.05	1	54657	QPSK	50	50	16 mm	bottom	1:1	0.456	1.309	0.597	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.77	-0.03	1	54657	QPSK	100	0	16 mm	bottom	1:1	0.417	1.327	0.553	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.19	-0.07	0	54657	QPSK	1	0	10 mm	bottom	1:1	0.502	1.074	0.539	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.26	-0.04	0	54657	QPSK	50	50	10 mm	bottom	1:1	0.518	1.057	0.548	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	0.02	0	54657	QPSK	1	99	10 mm	right	1:1	0.179	1.343	0.240	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	0.00	1	54657	QPSK	50	50	10 mm	right	1:1	0.144	1.309	0.188	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									UMPC Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-29
LTE Band 30 UMPC Body 1g SAR Data

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2310.00	27710	Mid	LTE Band 30	10	25.0	24.68	-0.02	0	54509	QPSK	1	25	12 mm	back	1:1	0.534	1.076	0.575	
2310.00	27710	Mid	LTE Band 30	10	24.0	23.76	-0.01	1	54509	QPSK	25	0	12 mm	back	1:1	0.443	1.057	0.468	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.50	-0.11	0	54509	QPSK	1	0	10 mm	back	1:1	0.217	1.122	0.243	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.59	0.00	0	54509	QPSK	25	0	10 mm	back	1:1	0.226	1.099	0.248	
2310.00	27710	Mid	LTE Band 30	10	25.0	24.68	0.01	0	54509	QPSK	1	25	11 mm	front	1:1	0.641	1.076	0.690	
2310.00	27710	Mid	LTE Band 30	10	24.0	23.76	-0.08	1	54509	QPSK	25	0	11 mm	front	1:1	0.547	1.057	0.578	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.50	-0.06	0	54509	QPSK	1	0	10 mm	front	1:1	0.236	1.122	0.265	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.59	-0.08	0	54509	QPSK	25	0	10 mm	front	1:1	0.243	1.099	0.267	
2310.00	27710	Mid	LTE Band 30	10	25.0	24.68	-0.07	0	54509	QPSK	1	25	16 mm	bottom	1:1	0.674	1.076	0.725	A36
2310.00	27710	Mid	LTE Band 30	10	24.0	23.76	-0.05	1	54509	QPSK	25	0	16 mm	bottom	1:1	0.553	1.057	0.585	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.50	-0.04	0	54509	QPSK	1	0	10 mm	bottom	1:1	0.509	1.122	0.571	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.59	-0.11	0	54509	QPSK	25	0	10 mm	bottom	1:1	0.522	1.099	0.574	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									UMPC Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-30
LTE Band 7 UMPC Body 1g SAR Data

MEASUREMENT RESULTS																					
1 CC Uplink | 2 CC Uplink	Component Carrier	FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
		MHz	Ch.															(W/kg)		(W/kg)	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	24.6	24.37	-0.02	0	54608	QPSK	1	99	12 mm	back	1:1	0.544	1.054	0.573	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	23.6	23.38	-0.06	1	54608	QPSK	50	50	12 mm	back	1:1	0.438	1.052	0.461	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	19.5	19.43	-0.01	0	54608	QPSK	1	50	10 mm	back	1:1	0.273	1.016	0.277	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	19.5	19.47	0.00	0	54608	QPSK	50	0	10 mm	back	1:1	0.273	1.007	0.275	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	24.6	24.37	-0.06	0	54608	QPSK	1	99	11 mm	front	1:1	0.531	1.054	0.560	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	23.6	23.38	-0.08	1	54608	QPSK	50	50	11 mm	front	1:1	0.420	1.052	0.442	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	19.5	19.43	-0.03	0	54608	QPSK	1	50	10 mm	front	1:1	0.235	1.016	0.239	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	19.5	19.47	-0.09	0	54608	QPSK	50	0	10 mm	front	1:1	0.231	1.007	0.233	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	24.6	24.13	-0.06	0	54608	QPSK	1	99	16 mm	bottom	1:1	0.913	1.114	1.017	A37
1 CC Uplink	N/A	2535.00	21100	Mid	LTE Band 7	20	24.6	24.30	-0.10	0	54608	QPSK	1	0	16 mm	bottom	1:1	0.720	1.072	0.772	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	24.6	24.37	0.00	0	54608	QPSK	1	99	16 mm	bottom	1:1	0.610	1.054	0.643	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	23.6	23.38	-0.09	1	54608	QPSK	50	50	16 mm	bottom	1:1	0.403	1.052	0.424	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	23.6	23.33	0.17	1	54608	QPSK	100	0	16 mm	bottom	1:1	0.413	1.064	0.439	
2 CC Uplink	PCC	2510.00	20850	Low	LTE Band 7	20	24.6	23.82	0.04	0	54608	QPSK	1	99	16 mm	bottom	1:1	0.802	1.197	0.960	
	SCC	2529.80	21048	Low	LTE Band 7	20							1	0							
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	24.6	24.13	-0.12	0	54608	QPSK	1	99	16 mm	bottom	1:1	0.862	1.114	0.960	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population											UMPC Body 1.6 W/kg (mW/g) averaged over 1 gram										

Note: Blue Entry represents variability measurement

Table 11-31
LTE Band 38 UMPC Body 1g SAR Data

MEASUREMENT RESULTS																		
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	0.02	0	54608	QPSK	1	0	12 mm	back	1:1.58	0.628	1.259	0.791	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	0.00	1	54608	QPSK	50	25	12 mm	back	1:1.58	0.493	1.259	0.621	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.82	0.12	0	54608	QPSK	1	0	10 mm	back	1:1.58	0.364	1.312	0.478	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.93	-0.02	0	54608	QPSK	50	25	10 mm	back	1:1.58	0.351	1.279	0.449	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	-0.05	0	54608	QPSK	1	0	11 mm	front	1:1.58	0.591	1.259	0.744	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	-0.05	1	54608	QPSK	50	25	11 mm	front	1:1.58	0.469	1.259	0.590	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.82	-0.19	0	54608	QPSK	1	0	10 mm	front	1:1.58	0.401	1.312	0.526	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.93	-0.01	0	54608	QPSK	50	25	10 mm	front	1:1.58	0.398	1.279	0.509	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	0.02	0	54608	QPSK	1	0	16 mm	bottom	1:1.58	0.734	1.259	0.924	A38
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	0.05	1	54608	QPSK	50	25	16 mm	bottom	1:1.58	0.579	1.259	0.729	
2595.00	38000	Mid	LTE Band 38	20	24.0	22.95	0.01	1	54608	QPSK	100	0	16 mm	bottom	1:1.58	0.578	1.274	0.736	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.82	-0.03	0	55126	QPSK	1	0	10 mm	bottom	1:1.58	0.609	1.312	0.799	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.93	-0.05	0	55126	QPSK	50	25	10 mm	bottom	1:1.58	0.614	1.279	0.785	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.81	-0.02	0	55126	QPSK	100	0	10 mm	bottom	1:1.58	0.612	1.315	0.805	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	-0.03	0	55126	QPSK	1	0	10 mm	right	1:1.58	0.297	1.259	0.374	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	0.01	1	55126	QPSK	50	25	10 mm	right	1:1.58	0.224	1.259	0.282	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									UMPC Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-32
LTE Band 41 UMPC Body 1g SAR Data

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Serial Number	Modulation	RB Offset	MPR [dB]	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	-0.01	0	54608	QPSK	1	99	12 mm	back	1:1.58	0.444	1.089	0.484	
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	0.01	1	54608	QPSK	50	25	12 mm	back	1:1.58	0.365	1.038	0.379	
2506.00	39750	Low	LTE Band 41	20	21.5	20.55	-0.01	0	54608	QPSK	1	0	10 mm	back	1:1.58	0.278	1.245	0.346	
2506.00	39750	Low	LTE Band 41	20	21.5	20.79	0.02	0	54608	QPSK	50	50	10 mm	back	1:1.58	0.295	1.178	0.348	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	-0.07	0	54608	QPSK	1	99	11 mm	front	1:1.58	0.528	1.089	0.575	
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	-0.04	1	54608	QPSK	50	25	11 mm	front	1:1.58	0.430	1.038	0.446	
2506.00	39750	Low	LTE Band 41	20	21.5	20.55	-0.04	0	54608	QPSK	1	0	10 mm	front	1:1.58	0.282	1.245	0.351	
2506.00	39750	Low	LTE Band 41	20	21.5	20.79	-0.04	0	54608	QPSK	50	50	10 mm	front	1:1.58	0.286	1.178	0.337	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	-0.07	0	54608	QPSK	1	99	16 mm	bottom	1:1.58	0.536	1.089	0.584	A39
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	-0.05	1	54608	QPSK	50	25	16 mm	bottom	1:1.58	0.434	1.038	0.450	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	-0.05	0	54608	QPSK	1	99	10 mm	right	1:1.58	0.175	1.089	0.191	
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	0.06	1	54608	QPSK	50	25	10 mm	right	1:1.58	0.140	1.038	0.145	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										UMPC Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-33
DTS SISO UMPC Body 1g SAR Data

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	20.0	19.98	-0.14	10 mm	2	54574	1	back	99.9	0.319	0.188	1.005	1.001	**0.189**	
2412	1	802.11b	DSSS	22	20.0	19.98	0.17	10 mm	2	54574	1	front	99.9	0.189	-	1.005	1.001	-	
2412	1	802.11b	DSSS	22	20.0	19.98	0.15	10 mm	2	54574	1	top	99.9	0.273	-	1.005	1.001	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-34
DTS MIMO UMPC Body 1g SAR Data

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
2452	9	802.11n	OFDM	20	18.0	17.96	18.0	17.85	0.00	10 mm	MIMO	54574	13	back	98.7	0.169	0.111	1.035	1.013	0.116	
2452	9	802.11n	OFDM	20	18.0	17.96	18.0	17.85	0.02	10 mm	MIMO	54574	13	front	98.7	0.213	0.151	1.035	1.013	0.158	
2452	9	802.11n	OFDM	20	18.0	17.96	18.0	17.85	0.13	10 mm	MIMO	54574	13	top	98.7	0.416	0.264	1.035	1.013	0.277	A40
2452	9	802.11n	OFDM	20	18.0	17.96	18.0	17.85	0.13	10 mm	MIMO	54574	13	right	98.7	0.150	-	1.035	1.013	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram											

To achieve the 21.0 dBm maximum allowed MIMO power shown in the documentation, each antenna transmits at a maximum allowed power of 18.0 dBm

Table 11-35
DTS MIMO UMPC Body 1g SAR Data for Conditions with 2.4 GHz and 5 GHz WLAN SAR

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
2457	10	802.11n	OFDM	20	17.0	16.76	17.0	16.62	-0.05	10 mm	MIMO	54608	13	back	98.7	0.135	0.089	1.091	1.013	0.098	
2457	10	802.11n	OFDM	20	17.0	16.76	17.0	16.62	-0.07	10 mm	MIMO	54608	13	front	98.7	0.120	0.095	1.091	1.013	0.105	
2457	10	802.11n	OFDM	20	17.0	16.76	17.0	16.62	0.14	10 mm	MIMO	54608	13	top	98.7	0.263	0.172	1.091	1.013	0.190	
2457	10	802.11n	OFDM	20	17.0	16.76	17.0	16.62	0.16	10 mm	MIMO	54608	13	right	98.7	0.086	-	1.091	1.013	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population											Body 1.6 W/kg (mW/g) averaged over 1 gram										

DTS MIMO was additionally evaluated at the maximum allowed output power during operations with Simultaneous 2.4 GHz and 5 GHz WLAN. 5 GHz WIFI was not transmitting during the above evaluations.

Table 11-36
NII SISO UMPC Body 1g SAR Data

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5280	56	802.11a	OFDM	20	18.0	17.99	-0.17	10 mm	2	53592	6	back	98.7	0.575	0.246	1.002	1.013	0.250	
5280	56	802.11a	OFDM	20	18.0	17.99	0.12	10 mm	2	53592	6	front	98.7	0.138	-	1.002	1.013	-	
5280	56	802.11a	OFDM	20	18.0	17.99	0.00	10 mm	2	53592	6	top	98.7	0.182	-	1.002	1.013	-	
5720	144	802.11a	OFDM	20	18.0	17.98	-0.01	10 mm	2	53592	6	back	98.7	1.384	0.522	1.005	1.013	0.531	
5720	144	802.11a	OFDM	20	18.0	17.98	0.12	10 mm	2	53592	6	front	98.7	0.174	-	1.005	1.013	-	
5720	144	802.11a	OFDM	20	18.0	17.98	0.16	10 mm	2	53592	6	top	98.7	0.439	0.187	1.005	1.013	0.190	
5785	157	802.11a	OFDM	20	18.0	17.86	-0.15	10 mm	2	53592	6	back	98.7	1.392	0.535	1.033	1.013	**0.560**	
5785	157	802.11a	OFDM	20	18.0	17.86	0.14	10 mm	2	53592	6	front	98.7	0.126	-	1.033	1.013	-	
5785	157	802.11a	OFDM	20	18.0	17.86	0.12	10 mm	2	53592	6	top	98.7	0.517	0.217	1.033	1.013	0.227	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-37
NII MIMO UMPC Body 1g SAR Data

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
5280	56	802.11n	OFDM	20	18.0	17.90	18.0	17.99	-0.02	10 mm	MIMO	53592	13	back	98.6	0.748	0.360	1.023	1.014	0.373	
5280	56	802.11n	OFDM	20	18.0	17.90	18.0	17.99	-0.20	10 mm	MIMO	53592	13	front	98.6	0.509	0.162	1.023	1.014	0.168	
5280	56	802.11n	OFDM	20	18.0	17.90	18.0	17.99	0.05	10 mm	MIMO	53592	13	top	98.6	0.638	0.268	1.023	1.014	0.278	
5280	56	802.11n	OFDM	20	18.0	17.90	18.0	17.99	-0.17	10 mm	MIMO	53592	13	right	98.6	0.123	-	1.023	1.014	-	
5500	100	802.11n	OFDM	20	18.0	17.94	18.0	17.86	0.08	10 mm	MIMO	53592	13	back	98.6	1.146	0.602	1.033	1.014	0.631	
5500	100	802.11n	OFDM	20	18.0	17.94	18.0	17.86	0.12	10 mm	MIMO	53592	13	front	98.6	0.509	0.202	1.033	1.014	0.212	
5500	100	802.11n	OFDM	20	18.0	17.94	18.0	17.86	-0.14	10 mm	MIMO	53592	13	top	98.6	0.842	0.368	1.033	1.014	0.385	
5500	100	802.11n	OFDM	20	18.0	17.94	18.0	17.86	-0.14	10 mm	MIMO	53592	13	right	98.6	0.166	-	1.033	1.014	-	
5745	149	802.11n	OFDM	20	18.0	17.89	18.0	17.66	-0.15	10 mm	MIMO	53592	13	back	98.6	1.596	0.731	1.081	1.014	0.801	
5785	157	802.11n	OFDM	20	18.0	17.91	18.0	17.84	-0.09	10 mm	MIMO	53592	13	back	98.6	1.536	0.680	1.038	1.014	0.716	
5825	165	802.11n	OFDM	20	18.0	17.93	18.0	17.77	-0.12	10 mm	MIMO	53592	13	back	98.6	2.065	0.846	1.054	1.014	0.904	A41
5785	157	802.11n	OFDM	20	18.0	17.91	18.0	17.84	-0.01	10 mm	MIMO	53592	13	front	98.6	0.748	0.289	1.038	1.014	0.304	
5785	157	802.11n	OFDM	20	18.0	17.91	18.0	17.84	-0.06	10 mm	MIMO	53592	13	top	98.6	1.307	0.530	1.038	1.014	0.558	
5785	157	802.11n	OFDM	20	18.0	17.91	18.0	17.84	-0.19	10 mm	MIMO	53592	13	right	98.6	0.260	-	1.038	1.014	-	
5825	165	802.11n	OFDM	20	18.0	17.93	18.0	17.77	-0.15	10 mm	MIMO	53592	13	back	98.6	1.786	0.844	1.054	1.014	0.902	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram									

Note: 1) Blue Entry represents variability measurement. 2) To achieve the 21.0 dBm maximum allowed MIMO power shown in the documentation, each antenna transmits at a maximum allowed power of 18.0 dBm

Table 11-38
NII MIMO UMPC Body 1g SAR Data for Conditions with 2.4 GHz and 5 GHz WLAN SAR

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
5310	62	802.11n	OFDM	40	14.0	13.87	14.0	13.94	-0.09	10 mm	MIMO	53592	27	back	97.3	0.400	0.181	1.030	1.028	0.192	
5310	62	802.11n	OFDM	40	14.0	13.87	14.0	13.94	-0.19	10 mm	MIMO	53592	27	front	97.3	0.095	0.034	1.030	1.028	0.036	
5310	62	802.11n	OFDM	40	14.0	13.87	14.0	13.94	0.06	10 mm	MIMO	53592	27	top	97.3	0.166	-	1.030	1.028	-	
5310	62	802.11n	OFDM	40	14.0	13.87	14.0	13.94	-0.13	10 mm	MIMO	53592	27	right	97.3	0.035	-	1.030	1.028	-	
5530	106	802.11ac	OFDM	80	14.0	12.86	14.0	12.80	0.11	10 mm	MIMO	53592	58.5	back	90.7	0.518	0.255	1.318	1.103	0.371	
5530	106	802.11ac	OFDM	80	14.0	12.86	14.0	12.80	-0.13	10 mm	MIMO	53592	58.5	front	90.7	0.124	0.043	1.318	1.103	0.063	
5530	106	802.11ac	OFDM	80	14.0	12.86	14.0	12.80	-0.14	10 mm	MIMO	53592	58.5	top	90.7	0.204	-	1.318	1.103	-	
5530	106	802.11ac	OFDM	80	14.0	12.86	14.0	12.80	-0.15	10 mm	MIMO	53592	58.5	right	90.7	0.041	-	1.318	1.103	-	
5775	155	802.11ac	OFDM	80	14.0	12.58	14.0	12.85	-0.10	10 mm	MIMO	53592	58.5	back	90.7	0.693	0.276	1.387	1.103	0.422	
5775	155	802.11ac	OFDM	80	14.0	12.58	14.0	12.85	-0.13	10 mm	MIMO	53592	58.5	front	90.7	0.119	0.040	1.387	1.103	0.061	
5775	155	802.11ac	OFDM	80	14.0	12.58	14.0	12.85	-0.17	10 mm	MIMO	53592	58.5	top	90.7	0.213	0.094	1.387	1.103	0.144	
5775	155	802.11ac	OFDM	80	14.0	12.58	14.0	12.85	0.16	10 mm	MIMO	53592	58.5	right	90.7	0.054	-	1.387	1.103	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram									

NII MIMO was additionally evaluated at the maximum allowed output power during operations with Simultaneous 2.4 GHz and 5 GHz WLAN. 2.4 GHz WIFI was not transmitting during the above evaluations.

11.6 Standalone UMPC Extremity SAR Data

Table 11-39
GPRS/UMTS UMPC Extremity 10g SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GPRS	30.5	29.19	0.05	12 mm	55399	2	1:4.15	back	0.174	1.352	0.235	
1880.00	661	GSM 1900	GPRS	30.5	29.19	-0.01	11 mm	55399	2	1:4.15	front	0.179	1.352	0.242	
1880.00	661	GSM 1900	GPRS	30.5	29.19	-0.09	16 mm	55399	2	1:4.15	bottom	0.210	1.352	0.284	A42
1732.40	1412	UMTS 1750	RMC	25.5	24.27	0.01	12 mm	55399	N/A	1:1	back	0.320	1.327	0.425	
1732.40	1412	UMTS 1750	RMC	25.5	24.27	0.03	11 mm	55399	N/A	1:1	front	0.327	1.327	0.434	A43
1732.40	1412	UMTS 1750	RMC	25.5	24.27	-0.02	16 mm	55399	N/A	1:1	bottom	0.275	1.327	0.365	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	-0.03	12 mm	54657	N/A	1:1	back	0.288	1.549	0.446	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	0.01	11 mm	54657	N/A	1:1	front	0.309	1.549	0.479	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	-0.07	16 mm	54657	N/A	1:1	bottom	0.353	1.549	0.547	
1880.00	9400	UMTS 1900	RMC	25.5	23.60	-0.07	0 mm	54657	N/A	1:1	right	0.640	1.549	0.991	A44
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							UMPC Extremity 4.0 W/kg (mW/g) averaged over 10 grams								

Table 11-40
LTE Band 66 (AWS) UMPC Extremity 10g SAR Data

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.09	0	55399	QPSK	1	0	12 mm	back	1:1	0.294	1.169	0.344	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	-0.02	1	55399	QPSK	50	0	12 mm	back	1:1	0.253	1.146	0.290	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.02	0	55399	QPSK	1	0	11 mm	front	1:1	0.310	1.169	0.362	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	0.04	1	55399	QPSK	50	0	11 mm	front	1:1	0.271	1.146	0.311	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	-0.02	0	55399	QPSK	1	0	16 mm	bottom	1:1	0.260	1.169	0.304	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	-0.07	1	55399	QPSK	50	0	16 mm	bottom	1:1	0.233	1.146	0.267	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.32	0.00	0	55399	QPSK	1	0	0 mm	right	1:1	0.543	1.169	0.635	A45
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.41	0.00	1	55399	QPSK	50	0	0 mm	right	1:1	0.409	1.146	0.469	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								UMPC Extremity 4.0 W/kg (mW/g) averaged over 10 grams											

Table 11-41
LTE Band 25 (PCS) UMPC Extremity 10g SAR Data

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	-0.06	0	54657	QPSK	1	99	12 mm	back	1:1	0.318	1.343	0.427	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	-0.05	1	54657	QPSK	50	50	12 mm	back	1:1	0.261	1.309	0.342	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	-0.03	0	54657	QPSK	1	99	11 mm	front	1:1	0.261	1.343	0.351	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	0.00	1	54657	QPSK	50	50	11 mm	front	1:1	0.213	1.309	0.279	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	-0.04	0	54657	QPSK	1	99	16 mm	bottom	1:1	0.310	1.343	0.416	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	-0.05	1	54657	QPSK	50	50	16 mm	bottom	1:1	0.251	1.309	0.329	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	23.72	0.07	0	54657	QPSK	1	99	0 mm	right	1:1	0.567	1.343	0.761	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	22.83	0.11	1	54657	QPSK	50	50	0 mm	right	1:1	0.454	1.309	0.594	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.19	-0.12	0	54657	QPSK	1	0	0 mm	back	1:1	1.000	1.074	1.074	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.26	-0.12	0	54657	QPSK	50	50	0 mm	back	1:1	1.050	1.057	1.110	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.19	0.01	0	54657	QPSK	1	0	0 mm	front	1:1	1.110	1.074	1.192	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.26	-0.02	0	54657	QPSK	50	50	0 mm	front	1:1	1.170	1.057	1.237	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.19	-0.07	0	54657	QPSK	1	0	0 mm	bottom	1:1	2.240	1.074	2.406	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.5	19.12	-0.05	0	54657	QPSK	1	0	0 mm	bottom	1:1	2.260	1.091	2.466	
1905.00	26590	High	LTE Band 25 (PCS)	20	19.5	18.83	-0.08	0	54657	QPSK	1	0	0 mm	bottom	1:1	2.230	1.167	2.602	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.26	-0.08	0	54657	QPSK	50	50	0 mm	bottom	1:1	2.390	1.057	2.526	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.5	19.25	-0.07	0	54657	QPSK	50	25	0 mm	bottom	1:1	2.400	1.059	2.542	A46
1905.00	26590	High	LTE Band 25 (PCS)	20	19.5	19.05	-0.07	0	54657	QPSK	50	50	0 mm	bottom	1:1	2.350	1.109	2.606	
1860.00	26140	Low	LTE Band 25 (PCS)	20	19.5	19.18	-0.10	0	54657	QPSK	100	0	0 mm	bottom	1:1	2.370	1.076	2.550	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	19.5	19.25	-0.10	0	54657	QPSK	50	25	0 mm	bottom	1:1	2.380	1.059	2.520	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								UMPC Extremity 4.0 W/kg (mW/g) averaged over 10 grams											

Note: Blue Entry represents variability measurement

Table 11-42
LTE Band 30 UMPC Extremity 10g SAR Data

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2310.00	27710	Mid	LTE Band 30	10	25.0	24.68	-0.02	0	54509	QPSK	1	25	12 mm	back	1:1	0.282	1.076	0.303	
2310.00	27710	Mid	LTE Band 30	10	24.0	23.76	-0.01	1	54509	QPSK	25	0	12 mm	back	1:1	0.233	1.057	0.246	
2310.00	27710	Mid	LTE Band 30	10	25.0	24.68	0.01	0	54509	QPSK	1	25	11 mm	front	1:1	0.320	1.076	0.344	
2310.00	27710	Mid	LTE Band 30	10	24.0	23.76	-0.08	1	54509	QPSK	25	0	11 mm	front	1:1	0.274	1.057	0.290	
2310.00	27710	Mid	LTE Band 30	10	25.0	24.68	0.07	0	54509	QPSK	1	25	16 mm	bottom	1:1	0.356	1.076	0.383	
2310.00	27710	Mid	LTE Band 30	10	24.0	23.76	-0.05	1	54509	QPSK	25	0	16 mm	bottom	1:1	0.290	1.057	0.307	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.50	0.06	0	54608	QPSK	1	0	0 mm	back	1:1	0.884	1.122	0.992	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.59	0.02	0	54608	QPSK	25	0	0 mm	back	1:1	0.922	1.099	1.013	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.50	-0.10	0	54608	QPSK	1	0	0 mm	front	1:1	0.918	1.122	1.030	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.59	-0.02	0	54608	QPSK	25	0	0 mm	front	1:1	0.960	1.099	1.055	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.50	-0.06	0	54608	QPSK	1	0	0 mm	bottom	1:1	2.260	1.122	2.536	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.59	-0.06	0	54608	QPSK	25	0	0 mm	bottom	1:1	2.390	1.099	2.627	A47
2310.00	27710	Mid	LTE Band 30	10	20.0	19.49	-0.05	0	54608	QPSK	50	0	0 mm	bottom	1:1	2.380	1.125	2.678	
2310.00	27710	Mid	LTE Band 30	10	20.0	19.59	-0.10	0	54608	QPSK	25	0	0 mm	bottom	1:1	2.370	1.099	2.605	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										UMPC Extremity 4.0 W/kg (mW/g) averaged over 10 grams									

Note: Blue Entry represents variability measurement

Table 11-43
LTE Band 7 UMPC Extremity 10g SAR Data

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2560.00	21350	High	LTE Band 7	20	24.6	24.37	-0.02	0	54608	QPSK	1	99	12 mm	back	1:1	0.274	1.054	0.289	
2560.00	21350	High	LTE Band 7	20	23.6	23.38	-0.06	1	54608	QPSK	50	50	12 mm	back	1:1	0.221	1.052	0.232	
2560.00	21350	High	LTE Band 7	20	24.6	24.37	-0.06	0	54608	QPSK	1	99	11 mm	front	1:1	0.257	1.054	0.271	
2560.00	21350	High	LTE Band 7	20	23.6	23.38	-0.08	1	54608	QPSK	50	50	11 mm	front	1:1	0.204	1.052	0.215	
2560.00	21350	High	LTE Band 7	20	24.6	24.37	0.00	0	54608	QPSK	1	99	16 mm	bottom	1:1	0.308	1.054	0.325	A48
2560.00	21350	High	LTE Band 7	20	23.6	23.38	-0.09	1	54608	QPSK	50	50	16 mm	bottom	1:1	0.202	1.052	0.213	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										UMPC Extremity 4.0 W/kg (mW/g) averaged over 10 grams									

Table 11-44
LTE Band 38 UMPC Extremity 10g SAR Data

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	0.02	0	54608	QPSK	1	0	12 mm	back	1:1.58	0.312	1.259	0.393	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	0.00	1	54608	QPSK	50	25	12 mm	back	1:1.58	0.244	1.259	0.307	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	-0.05	0	54608	QPSK	1	0	11 mm	front	1:1.58	0.288	1.259	0.363	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	-0.05	1	54608	QPSK	50	25	11 mm	front	1:1.58	0.228	1.259	0.287	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	0.02	0	54608	QPSK	1	0	16 mm	bottom	1:1.58	0.368	1.259	0.463	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	0.05	1	54608	QPSK	50	25	16 mm	bottom	1:1.58	0.288	1.259	0.363	
2595.00	38000	Mid	LTE Band 38	20	25.0	24.00	-0.16	0	54608	QPSK	1	0	0 mm	right	1:1.58	1.100	1.259	1.385	
2595.00	38000	Mid	LTE Band 38	20	24.0	23.00	-0.12	1	54608	QPSK	50	25	0 mm	right	1:1.58	0.897	1.259	1.129	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.85	0.00	0	54608	QPSK	1	0	0 mm	back	1:1.58	0.929	1.303	1.210	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.97	-0.08	0	54608	QPSK	50	25	0 mm	back	1:1.58	0.956	1.268	1.212	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.85	0.05	0	54608	QPSK	1	0	0 mm	front	1:1.58	1.020	1.303	1.329	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.97	0.03	0	54608	QPSK	50	25	0 mm	front	1:1.58	1.030	1.268	1.306	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.85	-0.01	0	54608	QPSK	1	0	0 mm	bottom	1:1.58	2.410	1.303	3.140	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.97	-0.05	0	54608	QPSK	50	25	0 mm	bottom	1:1.58	2.510	1.268	3.183	A49
2595.00	38000	Mid	LTE Band 38	20	21.0	19.81	-0.04	0	54608	QPSK	100	0	0 mm	bottom	1:1.58	2.470	1.315	3.248	
2595.00	38000	Mid	LTE Band 38	20	21.0	19.97	-0.05	0	54608	QPSK	50	25	0 mm	bottom	1:1.58	2.480	1.268	3.145	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									UMPC Extremity 4.0 W/kg (mW/g) averaged over 10 grams										

Note: Blue Entry represents variability measurement

Table 11-45
LTE Band 41 UMPC Extremity 10g SAR Data

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	-0.01	0	54608	QPSK	1	99	12 mm	back	1:1.58	0.224	1.089	0.244	
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	0.01	1	54608	QPSK	50	25	12 mm	back	1:1.58	0.184	1.038	0.191	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	-0.07	0	54608	QPSK	1	99	11 mm	front	1:1.58	0.254	1.089	0.277	
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	-0.04	1	54608	QPSK	50	25	11 mm	front	1:1.58	0.207	1.038	0.215	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	-0.07	0	54608	QPSK	1	99	16 mm	bottom	1:1.58	0.270	1.089	0.294	
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	-0.05	1	54608	QPSK	50	25	16 mm	bottom	1:1.58	0.219	1.038	0.227	
2506.00	39750	Low	LTE Band 41	20	24.0	23.63	0.13	0	54608	QPSK	1	99	0 mm	right	1:1.58	0.568	1.089	0.619	A50
2506.00	39750	Low	LTE Band 41	20	23.0	22.84	0.14	1	54608	QPSK	50	25	0 mm	right	1:1.58	0.440	1.038	0.457	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									UMPC Extremity 4.0 W/kg (mW/g) averaged over 10 grams										

Table 11-46
DTS SISO UMPC Extremity 10g SAR Data

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	20.0	19.98	-0.14	0 mm	2	54574	1	back	99.9	9.851	1.470	1.005	1.001	1.479	A51
2412	1	802.11b	DSSS	22	20.0	19.98	0.03	0 mm	2	54574	1	front	99.9	2.395	0.519	1.005	1.001	0.522	
2412	1	802.11b	DSSS	22	20.0	19.98	0.16	0 mm	2	54574	1	top	99.9	7.753	1.230	1.005	1.001	1.237	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								UMPC Extremity 4.0 W/kg (mW/g) averaged over 10 grams											

Table 11-47
DTS MIMO UMPC Extremity 10g SAR Data

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
2452	9	802.11n	OFDM	20	18.0	17.96	18.0	17.85	-0.14	0 mm	MIMO	54574	13	back	98.7	2.485	0.544	1.035	1.013	0.570	
2452	9	802.11n	OFDM	20	18.0	17.96	18.0	17.85	0.00	0 mm	MIMO	54574	13	front	98.7	4.571	1.070	1.035	1.013	1.122	
2452	9	802.11n	OFDM	20	18.0	17.96	18.0	17.85	0.14	0 mm	MIMO	54574	13	top	98.7	6.236	1.210	1.035	1.013	1.269	
2452	9	802.11n	OFDM	20	18.0	17.96	18.0	17.85	0.14	0 mm	MIMO	54574	13	right	98.7	1.372	-	1.035	1.013	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										UMPC Extremity 4.0 W/kg (mW/g) averaged over 10 grams											

Note: To achieve the 21.0 dBm maximum allowed MIMO power shown in the documentation, each antenna transmits at a maximum allowed power of 18.0 dBm.

Table 11-48
NII UMPC Extremity 10g SAR Data

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5280	56	802.11a	OFDM	20	18.0	17.99	-0.10	0 mm	2	53592	6	back	98.7	19.261	1.420	1.002	1.013	1.441	A52
5280	56	802.11a	OFDM	20	18.0	17.99	-0.19	0 mm	2	53592	6	front	98.7	1.169	0.589	1.002	1.013	0.598	
5280	56	802.11a	OFDM	20	18.0	17.99	-0.17	0 mm	2	53592	6	top	98.7	2.587	0.266	1.002	1.013	0.270	
5720	144	802.11a	OFDM	20	18.0	17.98	-0.16	0 mm	2	53592	6	back	98.7	29.207	1.280	1.005	1.013	1.303	
5720	144	802.11a	OFDM	20	18.0	17.98	-0.15	0 mm	2	53592	6	front	98.7	1.040	0.356	1.005	1.013	0.362	
5720	144	802.11a	OFDM	20	18.0	17.98	-0.16	0 mm	2	53592	6	top	98.7	5.431	0.396	1.005	1.013	0.403	
5785	157	802.11a	OFDM	20	18.0	17.86	-0.13	0 mm	2	53592	6	back	98.7	31.878	1.330	1.033	1.013	1.392	
5785	157	802.11a	OFDM	20	18.0	17.86	-0.12	0 mm	2	53592	6	front	98.7	1.194	0.317	1.033	1.013	0.332	
5785	157	802.11a	OFDM	20	18.0	17.86	-0.16	0 mm	2	53592	6	top	98.7	5.914	0.436	1.033	1.013	0.456	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								UMPC Extremity 4.0 W/kg (mW/g) averaged over 10 grams											

Table 11-49
NII MIMO UMPC Extremity 10g SAR Data for Conditions with 2.4 GHz and 5 GHz WLAN SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
5310	62	802.11n	OFDM	40	14.0	13.87	14.0	13.94	0.16	0 mm	MIMO	53592	27	back	97.3	7.194	0.564	1.030	1.028	0.597	
5310	62	802.11n	OFDM	40	14.0	13.87	14.0	13.94	-0.13	0 mm	MIMO	53592	27	front	97.3	2.912	-	1.030	1.028	-	
5310	62	802.11n	OFDM	40	14.0	13.87	14.0	13.94	-0.16	0 mm	MIMO	53592	27	top	97.3	1.778	-	1.030	1.028	-	
5310	62	802.11n	OFDM	40	14.0	13.87	14.0	13.94	-0.12	0 mm	MIMO	53592	27	right	97.3	0.244	-	1.030	1.028	-	
5530	106	802.11ac	OFDM	80	14.0	12.86	14.0	12.80	-0.19	0 mm	MIMO	53592	58.5	back	90.7	6.658	0.457	1.318	1.103	0.664	
5530	106	802.11ac	OFDM	80	14.0	12.86	14.0	12.80	-0.08	0 mm	MIMO	53592	58.5	front	90.7	1.840	-	1.318	1.103	-	
5530	106	802.11ac	OFDM	80	14.0	12.86	14.0	12.80	-0.11	0 mm	MIMO	53592	58.5	top	90.7	1.731	-	1.318	1.103	-	
5530	106	802.11ac	OFDM	80	14.0	12.86	14.0	12.80	-0.17	0 mm	MIMO	53592	58.5	right	90.7	0.253	-	1.318	1.103	-	
5775	155	802.11ac	OFDM	80	14.0	12.58	14.0	12.85	0.09	0 mm	MIMO	53592	58.5	back	90.7	6.264	0.590	1.387	1.103	0.903	
5775	155	802.11ac	OFDM	80	14.0	12.58	14.0	12.85	-0.16	0 mm	MIMO	53592	58.5	front	90.7	1.782	-	1.387	1.103	-	
5775	155	802.11ac	OFDM	80	14.0	12.58	14.0	12.85	0.21	0 mm	MIMO	53592	58.5	top	90.7	2.287	-	1.387	1.103	-	
5775	155	802.11ac	OFDM	80	14.0	12.58	14.0	12.85	0.17	0 mm	MIMO	53592	58.5	right	90.7	0.199	-	1.387	1.103	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										UMPC Extremity 4.0 W/kg (mW/g) averaged over 10 grams											

NII MIMO was additionally evaluated at the maximum allowed output power during operations with Simultaneous 2.4 GHz and 5 GHz WLAN. 2.4 GHz WIFI was not transmitting during the above evaluations.

11.7 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 15 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB 865664 D01v01r04, variability SAR tests were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg for 1g SAR and 2.0 W/kg for 10g SAR. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 13 for variability analysis.
8. Per FCC KDB Publication 648474 D04v01r03, body-worn SAR was evaluated without a headset connected to the device. Since the standalone reported body-worn SAR was ≤1.2 W/kg, no additional body-worn SAR evaluations using a headset cable were required.
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v02r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
10. Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is > 160 mm and < 200 mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg.
11. This device supports dynamic antenna tuning for some bands. Per FCC Guidance, SAR was measured according to the normally required SAR measurement configurations with tuner active. The auto-tune state determined by the device was verified before and after each SAR measurement and is listed in tables above. Please see Section 14 for supplemental data.
12. This device utilizes power reduction for some wireless modes and technologies, as outlined in Section 1.3. The maximum output power allowed for each transmitter and exposure condition was evaluated for SAR compliance based on expected use conditions and simultaneous transmission scenarios.
13. Unless otherwise noted, when 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds below.
14. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information).
15. Per FCC KDB Publication 941225 D07v01r02, this device is considered a "UMPC mini-tablet" when it is in open configuration. UMPC body 1g SAR test are required on all surfaces and edges with an antenna <=25 mm from that surface or edge at a test separation distance of 10mm. Therefore, to address hand exposure, UMPC extremity 10g SAR tests are required at a test separation distance of 0mm for all measured 1g (10 mm) SAR configurations.

GSM Test Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
2. Justification for reduced test configurations per KDB Publication 941225 D01v03r01 and October 2013 TCB Workshop Notes: The source-based frame-averaged output power was evaluated for all GPRS/EDGE slot configurations. The configuration with the highest target frame averaged output power was evaluated for hotspot SAR. When the maximum frame-averaged powers are equivalent across two or more slots (within 0.25 dB), the configuration with the most number of time slots was tested.
3. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g evaluations then testing at

the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

UMTS Notes:

1. UMTS mode in was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03r01. AMR and HSPA SAR was not required per the 3G Test Reduction Procedure in KDB Publication 941225 D01v03r01.
2. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g evaluations then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r04. The general test procedures used for testing can be found in Section 8.5.4.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 and MCC=001 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).
4. Per FCC KDB Publication 447498 D01v06, when the reported LTE Band 41 SAR measured at the highest output power channel in a given a test configuration was > 0.6 W/kg for 1g evaluations, testing at the other channels was required for such test configurations.
5. TDD LTE was tested per the guidance provided in FCC KDB Publication 941225 D05v02r04. Testing was performed using UL-DL configuration 0 with 6 UL subframes and 2 S subframes using extended cyclic prefix only and special subframe configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Section 4, the duty factor for special subframe configuration 6 using extended cyclic prefix is 0.633.
6. Per KDB Publication 941225 D05Av01r02, SAR for downlink only LTE CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.
7. For LTE Band 66, and LTE Band 7, per FCC guidance, SAR was first measured with only a single carrier active in the uplink (carrier aggregation not active). For each exposure condition, the uplink CA scenario with two component carriers was additionally tested for the configuration with the highest SAR when carrier aggregation was not active. The SCC was configured with the closest available contiguous channel. The two component carriers were configured so the resource blocks are physically allocated side by side to achieve the maximum output power.

WLAN Notes:

1. For held-to-ear, and hotspot, phablet, and UMPC mini-tablet operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg for 1g evaluations, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS

was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n/ax) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 8.6.5 for more information.

3. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg for 1g evaluations. See Section 8.6.6 for more information.
4. Per KDB Publication 248227 D01v02r02, SAR for MIMO was evaluated by following the simultaneous SAR provisions from KDB Publication 447498 D01v06 by either evaluating the sum of the 1g SAR values of each antenna transmitting independently or making a SAR measurement with both antennas transmitting simultaneously.
5. When the maximum reported 1g averaged SAR is ≤0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured.
6. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated EMC test reports.
7. When 10-g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v06 are applicable to devices with built-in unlicensed transmitters such as 802.11 and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

Please see the original compliance evaluation in RF Exposure Technical Report S/N: 1M1901280020-01-R1.A3L for the standalone reported SAR for modes and bands not evaluated for this permissive change.

12.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore, simultaneous transmission analysis is required. Per FCC KDB Publication 447498 D01v06 4.3.2 and IEEE 1528-2013 Section 6.3.4.1.2, simultaneous transmission SAR test exclusion may be applied when the sum of the 1g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 W/kg. The different test positions in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1g or 10g SAR.

(*) For test positions that were not required to be evaluated for WLAN SAR per FCC KDB Publication 248227, the worst case WLAN SAR result for the applicable exposure condition was used for simultaneous transmission analysis.

Per FCC KDB Publication 648474 D04 Handset SAR v01r01, the devices edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR (“-“).

12.3 Head SAR Simultaneous Transmission Analysis: 1g Handset

Table 12-1
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Held to Ear)

Exposure Condition	Mode	3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	UMTS 1900	0.150	0.052	0.056	0.202	0.206	0.258
	LTE Band 66 (AWS)	0.201	0.052	0.056	0.253	0.257	**0.309**
	LTE Band 25 (PCS)	0.120	0.052	0.056	0.172	0.176	0.228
	LTE Band 38	0.103	0.052	0.056	0.155	0.159	0.211
	LTE Band 41	0.068	0.052	0.056	0.120	0.124	0.176

Table 12-2
Simultaneous Transmission Scenario with 5 GHz WLAN (Held to Ear)

Exposure Condition	Mode	3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	UMTS 1900	0.150	0.061	0.100	0.211	0.250	0.311
	LTE Band 66 (AWS)	0.201	0.061	0.100	0.262	0.301	**0.362**
	LTE Band 25 (PCS)	0.120	0.061	0.100	0.181	0.220	0.281
	LTE Band 38	0.103	0.061	0.100	0.164	0.203	0.264
	LTE Band 41	0.068	0.061	0.100	0.129	0.168	0.229

Table 12-3
Simultaneous Transmission Scenario with 2.4 GHz WLAN MIMO and 5 GHz WLAN MIMO (Held to Ear)

Exposure Condition	Mode	3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	5	1+2+3+4+5
Head SAR	UMTS 1900	0.150	0.052	0.056	0.061	0.100	0.419
	LTE Band 66 (AWS)	0.201	0.052	0.056	0.061	0.100	**0.470**
	LTE Band 25 (PCS)	0.120	0.052	0.056	0.061	0.100	0.389
	LTE Band 38	0.103	0.052	0.056	0.061	0.100	0.372
	LTE Band 41	0.068	0.052	0.056	0.061	0.100	0.337

Table 12-4
Simultaneous Transmission Scenario with Bluetooth (Held to Ear)

Exposure Condition	Mode	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	UMTS 1900	0.150	0.077	0.227
	LTE Band 66 (AWS)	0.201	0.077	**0.278**
	LTE Band 25 (PCS)	0.120	0.077	0.197
	LTE Band 38	0.103	0.077	0.180
	LTE Band 41	0.068	0.077	0.145

Table 12-5
Simultaneous Transmission Scenario with Bluetooth and 5GHz WLAN (Held to Ear)

Exposure Condition	Mode	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	UMTS 1900	0.150	0.077	0.061	0.288
	LTE Band 66 (AWS)	0.201	0.077	0.061	**0.339**
	LTE Band 25 (PCS)	0.120	0.077	0.061	0.258
	LTE Band 38	0.103	0.077	0.061	0.241
	LTE Band 41	0.068	0.077	0.061	0.206

Exposure Condition	Mode	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	UMTS 1900	0.150	0.077	0.100	0.327
	LTE Band 66 (AWS)	0.201	0.077	0.100	**0.378**
	LTE Band 25 (PCS)	0.120	0.077	0.100	0.297
	LTE Band 38	0.103	0.077	0.100	0.280
	LTE Band 41	0.068	0.077	0.100	0.245

Exposure Condition	Mode	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
Head SAR	UMTS 1900	0.150	0.077	0.061	0.100	0.388
	LTE Band 66 (AWS)	0.201	0.077	0.061	0.100	**0.439**
	LTE Band 25 (PCS)	0.120	0.077	0.061	0.100	0.358
	LTE Band 38	0.103	0.077	0.061	0.100	0.341
	LTE Band 41	0.068	0.077	0.061	0.100	0.306

12.4 Body-Worn Simultaneous Transmission Analysis: 1g Handset

Table 12-6
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body-Worn at 1.5 cm)

Exposure Condition	Mode	3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body-Worn	UMTS 1900	0.370	0.103	0.083	0.473	0.453	0.556
	LTE Band 66 (AWS)	0.690	0.103	0.083	0.793	0.773	**0.876**
	LTE Band 25 (PCS)	0.477	0.103	0.083	0.580	0.560	0.663
	LTE Band 38	0.149	0.103	0.083	0.252	0.232	0.335
	LTE Band 41	0.100	0.103	0.083	0.203	0.183	0.286

Table 12-7
Simultaneous Transmission Scenario with 5 GHz WLAN (Body-Worn at 1.5 cm)

Exposure Condition	Mode	3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body-Worn	UMTS 1900	0.370	0.544	0.213	0.914	0.583	1.127
	LTE Band 66 (AWS)	0.690	0.544	0.213	1.234	0.903	**1.447**
	LTE Band 25 (PCS)	0.477	0.544	0.213	1.021	0.690	1.234
	LTE Band 38	0.149	0.544	0.213	0.693	0.362	0.906
	LTE Band 41	0.100	0.544	0.213	0.644	0.313	0.857

Table 12-8
Simultaneous Transmission Scenario with 2.4 GHz WLAN MIMO and 5 GHz WLAN MIMO (Body-Worn at 1.5 cm)

Exposure Condition	Mode	3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO at 19 dBm SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
Body-Worn	UMTS 1900	0.370	0.071	0.544	0.213	1.198
	LTE Band 66 (AWS)	0.690	0.071	0.544	0.213	**1.518**
	LTE Band 25 (PCS)	0.477	0.071	0.544	0.213	1.305
	LTE Band 38	0.149	0.071	0.544	0.213	0.977
	LTE Band 41	0.100	0.071	0.544	0.213	0.928

Table 12-9
Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 1.5 cm)

Exposure Condition	Mode	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	UMTS 1900	0.370	0.014	0.384
	LTE Band 66 (AWS)	0.690	0.014	**0.704**
	LTE Band 25 (PCS)	0.477	0.014	0.491
	LTE Band 38	0.149	0.014	0.163
	LTE Band 41	0.100	0.014	0.114

Table 12-10
Simultaneous Transmission Scenario with Bluetooth and 5GHz WLAN (Body-Worn at 1.5 cm)

Exposure Condition	Mode	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body-Worn	UMTS 1900	0.370	0.014	0.544	0.928
	LTE Band 66 (AWS)	0.690	0.014	0.544	**1.248**
	LTE Band 25 (PCS)	0.477	0.014	0.544	1.035
	LTE Band 38	0.149	0.014	0.544	0.707
	LTE Band 41	0.100	0.014	0.544	0.658

Exposure Condition	Mode	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body-Worn	UMTS 1900	0.370	0.014	0.213	0.597
	LTE Band 66 (AWS)	0.690	0.014	0.213	**0.917**
	LTE Band 25 (PCS)	0.477	0.014	0.213	0.704
	LTE Band 38	0.149	0.014	0.213	0.376
	LTE Band 41	0.100	0.014	0.213	0.327

Exposure Condition	Mode	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
Body-Worn	UMTS 1900	0.370	0.014	0.544	0.213	1.141
	LTE Band 66 (AWS)	0.690	0.014	0.544	0.213	**1.461**
	LTE Band 25 (PCS)	0.477	0.014	0.544	0.213	1.248
	LTE Band 38	0.149	0.014	0.544	0.213	0.920
	LTE Band 41	0.100	0.014	0.544	0.213	0.871

12.5 Hotspot SAR Simultaneous Transmission Analysis: 1g Handset

Table 12-11
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	LTE Band 7	0.928	0.233	0.222	1.161	1.150	1.383
	LTE Band 38	0.625	0.233	0.222	0.858	0.847	1.080
	LTE Band 41	1.097	0.233	0.222	1.330	1.319	**1.552**

Table 12-12
Simultaneous Transmission Scenario with 5 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	LTE Band 7	0.928	0.182	0.302	1.110	1.230	1.412
	LTE Band 38	0.625	0.182	0.302	0.807	0.927	1.109
	LTE Band 41	1.097	0.182	0.302	1.279	1.399	**1.581**

Table 12-13
Simultaneous Transmission Scenario with 2.4 GHz WLAN MIMO and 5 GHz WLAN MIMO (Hotspot at 1.0 cm)

Exposure Condition	Mode	4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	5	1+2+3+4+5
Hotspot SAR	LTE Band 7	0.928	0.233	0.222	0.182	0.302	See Table Below
	LTE Band 38	0.625	0.233	0.222	0.182	0.302	**1.564**
	LTE Band 41	1.097	0.233	0.222	0.182	0.302	See Table Below

Simult Tx	Configuration	LTE Band 7 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	5	1+2+3+4+5
Hotspot SAR	Back	0.186	0.233*	0.222	0.182	0.302	1.125
	Front	0.509	0.233*	0.222*	0.182*	0.302*	**1.448**
	Top	-	0.233	0.222*	0.182*	0.302*	0.939
	Bottom	0.928	-	-	-	-	0.928
	Right	0.070	0.233*	-	0.182*	-	0.485
	Left	0.088	-	0.222*	-	0.302*	0.612

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	5	1+2+3+4+5
Hotspot SAR	Back	0.160	0.233*	0.222	0.182	0.302	1.099
	Front	0.383	0.233*	0.222*	0.182*	0.302*	**1.322**
	Top	-	0.233	0.222*	0.182*	0.302*	0.939
	Bottom	1.097	-	-	-	-	1.097
	Right	0.078	0.233*	-	0.182*	-	0.493
	Left	0.092	-	0.222*	-	0.302*	0.616

Table 12-14
Simultaneous Transmission Scenario with Bluetooth (Hotspot at 1.0 cm)

Exposure Condition	Mode	4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	LTE Band 7	0.928	0.038	0.966
	LTE Band 38	0.625	0.038	0.663
	LTE Band 41	1.097	0.038	**1.135**

Table 12-15
Simultaneous Transmission Scenario with Bluetooth and 5GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	LTE Band 7	0.928	0.038	0.182	1.148
	LTE Band 38	0.625	0.038	0.182	0.845
	LTE Band 41	1.097	0.038	0.182	**1.317**

Exposure Condition	Mode	4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	LTE Band 7	0.928	0.038	0.302	1.268
	LTE Band 38	0.625	0.038	0.302	0.965
	LTE Band 41	1.097	0.038	0.302	**1.437**

Exposure Condition	Mode	4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
Hotspot SAR	LTE Band 7	0.928	0.038	0.182	0.302	**1.450**
	LTE Band 38	0.625	0.038	0.182	0.302	1.147
	LTE Band 41	1.097	0.038	0.182	0.302	See Table Below

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
Hotspot SAR	Back	0.160	0.038	0.182	0.302	0.682
	Front	0.383	0.006	0.182*	0.302*	0.873
	Top	-	0.028	0.182*	0.302*	0.512
	Bottom	1.097	-	-	-	**1.097**
	Right	0.078	0.028	0.182*	-	0.288
	Left	0.092	-	-	0.302*	0.394

12.6 Phablet Simultaneous Transmission Analysis: 10g Handset

Per FCC KDB Publication 648474 D04 Handset SAR, Phablet SAR tests were not required if wireless router 1g SAR (scaled to the maximum output power, including tolerance) < 1.2 W/kg. Therefore, no further analysis beyond the tables included in this section was required to determine that possible simultaneous transmission scenarios would not exceed the SAR limit.

For SAR summation, the highest reported SAR across all test distances was used as the most conservative evaluation for simultaneous transmission analysis for each device edge.

Table 12-16
Simultaneous Transmission Scenario with 5 GHz WLAN (Phablet)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Phablet SAR	GPRS 1900	0.521	0.777	1.809	1.298	2.330	3.107
	UMTS 1750	0.929	0.777	1.809	1.706	2.738	3.515
	UMTS 1900	1.351	0.777	1.809	2.128	3.160	3.937
	LTE Band 66 (AWS)	1.358	0.777	1.809	2.135	3.167	3.944
	LTE Band 25 (PCS)	2.285	0.777	1.809	3.062	See Table Below	See Table Below
	LTE Band 30	2.351	0.777	1.809	3.128	See Table Below	See Table Below
	LTE Band 7	0.724	0.777	1.809	1.501	2.533	3.310
	LTE Band 38	2.577	0.777	1.809	3.354	See Table Below	See Table Below
	LTE Band 41	1.361	0.777	1.809	2.138	3.170	**3.947**

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Phablet SAR	Back	1.205	0.777	1.809	1.982	3.014	**3.791**
	Front	1.264	0.777*	0.164	2.041	1.428	2.205
	Top	-	0.777*	0.983	0.777	0.983	1.760
	Bottom	2.285	-	-	2.285	2.285	2.285
	Right	0.737	0.777*	-	1.514	0.737	1.514
	Left	0.357	-	1.809*	0.357	2.166	2.166

Simult Tx	Configuration	LTE Band 30 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Phablet SAR	Back	1.009	0.777	1.809	1.786	2.818	**3.595**
	Front	-	0.777*	0.164	0.777	0.164	0.941
	Top	-	0.777*	0.983	0.777	0.983	1.760
	Bottom	2.351	-	-	2.351	2.351	2.351
	Right	-	0.777*	-	0.777	0.000	0.777
	Left	-	-	1.809*	0.000	1.809	1.809

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Phablet SAR	Back	0.545	0.777	1.809	1.322	2.354	**3.131**
	Front	2.115	0.777*	0.164	2.892	2.279	3.056
	Top	-	0.777*	0.983	0.777	0.983	1.760
	Bottom	2.577	-	-	2.577	2.577	2.577
	Right	0.621	0.777*	-	1.398	0.621	1.398
	Left	0.388	-	1.809*	0.388	2.197	2.197

12.7 Body Simultaneous Transmission Analysis: 1g UMPC Body

For SAR summation, the highest reported SAR across all test distances was used as the most conservative evaluation for simultaneous transmission analysis for each device edge.

Table 12-17
Simultaneous Transmission Scenario with 2.4 GHz WLAN (UMPC Body)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
UMPC Body SAR	GPRS 1900	0.514	0.497	0.189	1.011	0.703
	UMTS 1750	0.925	0.497	0.189	1.422	1.114
	UMTS 1900	1.026	0.497	0.189	**1.523**	1.215
	LTE Band 26 (Cell)	0.833	0.497	0.189	1.330	1.022
	LTE Band 66 (AWS)	0.904	0.497	0.189	1.401	1.093
	LTE Band 25 (PCS)	0.809	0.497	0.189	1.306	0.998
	LTE Band 30	0.725	0.497	0.189	1.222	0.914
	LTE Band 7	1.017	0.497	0.189	1.514	1.206
	LTE Band 38	0.924	0.497	0.189	1.421	1.113
	LTE Band 41	0.584	0.497	0.189	1.081	0.773

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Body SAR	GPRS 1900	0.514	0.277	0.791
	UMTS 1750	0.925	0.277	1.202
	UMTS 1900	1.026	0.277	**1.303**
	LTE Band 26 (Cell)	0.833	0.277	1.110
	LTE Band 66 (AWS)	0.904	0.277	1.181
	LTE Band 25 (PCS)	0.809	0.277	1.086
	LTE Band 30	0.725	0.277	1.002
	LTE Band 7	1.017	0.277	1.294
	LTE Band 38	0.924	0.277	1.201
	LTE Band 41	0.584	0.277	0.861

Table 12-18
Simultaneous Transmission Scenario with 5 GHz WLAN (UMPC Body)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
UMPC Body SAR	GPRS 1900	0.514	0.742	0.560	1.256	1.074
	UMTS 1750	0.925	0.742	0.560	See Table Below	1.485
	UMTS 1900	1.026	0.742	0.560	See Table Below	**1.586**
	LTE Band 26 (Cell)	0.833	0.742	0.560	1.575	1.393
	LTE Band 66 (AWS)	0.904	0.742	0.560	See Table Below	1.464
	LTE Band 25 (PCS)	0.809	0.742	0.560	1.551	1.369
	LTE Band 30	0.725	0.742	0.560	1.467	1.285
	LTE Band 7	1.017	0.742	0.560	See Table Below	1.577
	LTE Band 38	0.924	0.742	0.560	See Table Below	1.484
	LTE Band 41	0.584	0.742	0.560	1.326	1.144

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Body SAR	Back	0.762	0.742	**1.504**
	Front	0.925	0.172	1.097
	Top	-	0.167	0.167
	Bottom	0.736	-	0.736
	Right	0.322	0.742*	1.064
	Left	-	-	0.000

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
UMPC Body SAR	Back	0.761	0.742	0.560	**1.503**	1.321
	Front	0.864	0.172	0.560*	1.036	1.424
	Top	-	0.167	0.227	0.167	0.227
	Bottom	1.026	-	-	1.026	1.026
	Right	0.331	0.742*	-	1.073	0.331
	Left	-	-	-	0.000	0.000

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Body SAR	Back	0.616	0.742	**1.358**
	Front	0.904	0.172	1.076
	Top	-	0.167	0.167
	Bottom	0.551	-	0.551
	Right	0.295	0.742*	1.037
	Left	-	-	0.000

Simult Tx	Configuration	LTE Band 7 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Body SAR	Back	0.573	0.742	**1.315**
	Front	0.560	0.172	0.732
	Top	-	0.167	0.167
	Bottom	1.017	-	1.017
	Right	-	0.742*	0.742
	Left	-	-	0.000

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Body SAR	Back	0.791	0.742	**1.533**
	Front	0.744	0.172	0.916
	Top	-	0.167	0.167
	Bottom	0.924	-	0.924
	Right	0.374	0.742*	1.116
	Left	-	-	0.000

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Body SAR	GPRS 1900	0.514	0.904	1.418
	UMTS 1750	0.925	0.904	See Table Below
	UMTS 1900	1.026	0.904	See Table Below
	LTE Band 26 (Cell)	0.833	0.904	See Table Below
	LTE Band 66 (AWS)	0.904	0.904	See Table Below
	LTE Band 25 (PCS)	0.809	0.904	See Table Below
	LTE Band 30	0.725	0.904	See Table Below
	LTE Band 7	1.017	0.904	See Table Below
	LTE Band 38	0.924	0.904	See Table Below
	LTE Band 41	0.584	0.904	**1.488**

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
UMPC Body SAR	Back	0.762	0.904	See Note 1	0.01
	Front	0.925	0.304	**1.229**	N/A
	Top	-	0.558	0.558	N/A
	Bottom	0.736	-	0.736	N/A
	Right	0.322	0.904*	1.226	N/A
	Left	-	-	0.000	N/A

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
UMPC Body SAR	Back	0.761	0.904	See Note 1	0.01
	Front	0.864	0.304	1.168	N/A
	Top	-	0.558	0.558	N/A
	Bottom	1.026	-	1.026	N/A
	Right	0.331	0.904*	**1.235**	N/A
	Left	-	-	0.000	N/A

Simult Tx	Configuration	LTE Band 26 (Cell) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
UMPC Body SAR	Back	0.833	0.904	See Note 1	0.01
	Front	0.721	0.304	1.025	N/A
	Top	-	0.558	0.558	N/A
	Bottom	0.548	-	0.548	N/A
	Right	0.563	0.904*	**1.467**	N/A
	Left	-	-	0.000	N/A

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Body SAR	Back	0.616	0.904	**1.520**
	Front	0.904	0.304	1.208
	Top	-	0.558	0.558
	Bottom	0.551	-	0.551
	Right	0.295	0.904*	1.199
	Left	-	-	0.000

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
UMPC Body SAR	Back	0.745	0.904	See Note 1	0.01
	Front	0.629	0.304	0.933	N/A
	Top	-	0.558	0.558	N/A
	Bottom	0.809	-	0.809	N/A
	Right	0.240	0.904*	**1.144**	N/A
	Left	-	-	0.000	N/A

Simult Tx	Configuration	LTE Band 30 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Body SAR	Back	0.575	0.904	**1.479**
	Front	0.690	0.304	0.994
	Top	-	0.558	0.558
	Bottom	0.725	-	0.725
	Right	-	0.904*	0.904
	Left	-	-	0.000

Simult Tx	Configuration	LTE Band 7 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Body SAR	Back	0.573	0.904	**1.477**
	Front	0.560	0.304	0.864
	Top	-	0.558	0.558
	Bottom	1.017	-	1.017
	Right	-	0.904*	0.904
	Left	-	-	0.000

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
UMPC Body SAR	Back	0.791	0.904	See Note 1	0.01
	Front	0.744	0.304	1.048	N/A
	Top	-	0.558	0.558	N/A
	Bottom	0.924	-	0.924	N/A
	Right	0.374	0.904*	**1.278**	N/A
	Left	-	-	0.000	N/A

Table 12-19
Simultaneous Transmission Scenario with 2.4 GHz WLAN MIMO and 5 GHz WLAN MIMO (UMPC Body)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO at 19 dBm SAR (W/kg)	5 GHz WLAN MIMO at 16 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	GPRS 1900	0.514	0.190	0.422	1.126
	UMTS 1750	0.925	0.190	0.422	**1.537**
	UMTS 1900	1.026	0.190	0.422	See Table Below
	LTE Band 26 (Cell)	0.833	0.190	0.422	1.445
	LTE Band 66 (AWS)	0.904	0.190	0.422	1.516
	LTE Band 25 (PCS)	0.809	0.190	0.422	1.421
	LTE Band 30	0.725	0.190	0.422	1.337
	LTE Band 7	1.017	0.190	0.422	See Table Below
	LTE Band 38	0.924	0.190	0.422	1.536
	LTE Band 41	0.584	0.190	0.422	1.196

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN MIMO at 19 dBm SAR (W/kg)	5 GHz WLAN MIMO at 16 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.761	0.098	0.422	**1.281**
	Front	0.864	0.105	0.063	1.032
	Top	-	0.190	0.144	0.334
	Bottom	1.026	-	-	1.026
	Right	0.331	0.190*	0.422*	0.943
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 7 SAR (W/kg)	2.4 GHz WLAN MIMO at 19 dBm SAR (W/kg)	5 GHz WLAN MIMO at 16 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.573	0.098	0.422	**1.093**
	Front	0.560	0.105	0.063	0.728
	Top	-	0.190	0.144	0.334
	Bottom	1.017	-	-	1.017
	Right	-	0.190*	0.422*	0.612
	Left	-	-	-	0.000

Table 12-20
Simultaneous Transmission Scenario with Bluetooth (UMPC Body)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Body SAR	GPRS 1900	0.514	0.140	0.654
	UMTS 1750	0.925	0.140	1.065
	UMTS 1900	1.026	0.140	**1.166**
	LTE Band 26 (Cell)	0.833	0.140	0.973
	LTE Band 66 (AWS)	0.904	0.140	1.044
	LTE Band 25 (PCS)	0.809	0.140	0.949
	LTE Band 30	0.725	0.140	0.865
	LTE Band 7	1.017	0.140	1.157
	LTE Band 38	0.924	0.140	1.064
	LTE Band 41	0.584	0.140	0.724

Table 12-21
Simultaneous Transmission Scenario with Bluetooth and 5GHz WLAN (UMPC Body)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	GPRS 1900	0.514	0.140	0.742	1.396
	UMTS 1750	0.925	0.140	0.742	See Table Below
	UMTS 1900	1.026	0.140	0.742	See Table Below
	LTE Band 26 (Cell)	0.833	0.140	0.742	See Table Below
	LTE Band 66 (AWS)	0.904	0.140	0.742	See Table Below
	LTE Band 25 (PCS)	0.809	0.140	0.742	See Table Below
	LTE Band 30	0.725	0.140	0.742	See Table Below
	LTE Band 7	1.017	0.140	0.742	See Table Below
	LTE Band 38	0.924	0.140	0.742	See Table Below
	LTE Band 41	0.584	0.140	0.742	**1.466**

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.762	0.084	0.742	**1.588**
	Front	0.925	0.096	0.172	1.193
	Top	-	0.140	0.167	0.307
	Bottom	0.736	-	-	0.736
	Right	0.322	0.077	0.742*	1.141
	Left	-	-	-	0.000

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.761	0.084	0.742	**1.587**
	Front	0.864	0.096	0.172	1.132
	Top	-	0.140	0.167	0.307
	Bottom	1.026	-	-	1.026
	Right	0.331	0.077	0.742*	1.150
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 26 (Cell) SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	SPLSR		
		1	2	3	1+2+3	1+2	1+3	2+3
UMPC Body SAR	Back	0.833	0.084	0.742	See Note 1	0.01	0.01	0.02
	Front	0.721	0.096	0.172	0.989	N/A	N/A	N/A
	Top	-	0.140	0.167	0.307	N/A	N/A	N/A
	Bottom	0.548	-	-	0.548	N/A	N/A	N/A
	Right	0.563	0.077	0.742*	1.382	N/A	N/A	N/A
	Left	-	-	-	0.000	N/A	N/A	N/A

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.616	0.084	0.742	**1.442**
	Front	0.904	0.096	0.172	1.172
	Top	-	0.140	0.167	0.307
	Bottom	0.551	-	-	0.551
	Right	0.295	0.077	0.742*	1.114
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.745	0.084	0.742	**1.571**
	Front	0.629	0.096	0.172	0.897
	Top	-	0.140	0.167	0.307
	Bottom	0.809	-	-	0.809
	Right	0.240	0.077	0.742*	1.059
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 30 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.575	0.084	0.742	**1.401**
	Front	0.690	0.096	0.172	0.958
	Top	-	0.140	0.167	0.307
	Bottom	0.725	-	-	0.725
	Right	-	0.077	0.742*	0.819
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 7 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.573	0.084	0.742	**1.399**
	Front	0.560	0.096	0.172	0.828
	Top	-	0.140	0.167	0.307
	Bottom	1.017	-	-	1.017
	Right	-	0.077	0.742*	0.819
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	SPLSR		
		1	2	3	1+2+3	1+2	1+3	2+3
UMPC Body SAR	Back	0.791	0.084	0.742	See Note 1	0.01	0.01	0.02
	Front	0.744	0.096	0.172	1.012	N/A	N/A	N/A
	Top	-	0.140	0.167	0.307	N/A	N/A	N/A
	Bottom	0.924	-	-	0.924	N/A	N/A	N/A
	Right	0.374	0.077	0.742*	1.193	N/A	N/A	N/A
	Left	-	-	-	0.000	N/A	N/A	N/A

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	GPRS 1900	0.514	0.140	0.560	1.214
	UMTS 1750	0.925	0.140	0.560	See Table Below
	UMTS 1900	1.026	0.140	0.560	See Table Below
	LTE Band 26 (Cell)	0.833	0.140	0.560	**1.533**
	LTE Band 66 (AWS)	0.904	0.140	0.560	See Table Below
	LTE Band 25 (PCS)	0.809	0.140	0.560	1.509
	LTE Band 30	0.725	0.140	0.560	1.425
	LTE Band 7	1.017	0.140	0.560	See Table Below
	LTE Band 38	0.924	0.140	0.560	See Table Below
	LTE Band 41	0.584	0.140	0.560	1.284

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.762	0.084	0.560	1.406
	Front	0.925	0.096	0.560*	**1.581**
	Top	-	0.140	0.227	0.367
	Bottom	0.736	-	-	0.736
	Right	0.322	0.077	-	0.399
	Left	-	-	-	0.000

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.761	0.084	0.560	1.405
	Front	0.864	0.096	0.560*	**1.520**
	Top	-	0.140	0.227	0.367
	Bottom	1.026	-	-	1.026
	Right	0.331	0.077	-	0.408
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.616	0.084	0.560	1.260
	Front	0.904	0.096	0.560*	**1.560**
	Top	-	0.140	0.227	0.367
	Bottom	0.551	-	-	0.551
	Right	0.295	0.077	-	0.372
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 7 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.573	0.084	0.560	**1.217**
	Front	0.560	0.096	0.560*	1.216
	Top	-	0.140	0.227	0.367
	Bottom	1.017	-	-	1.017
	Right	-	0.077	-	0.077
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.791	0.084	0.560	**1.435**
	Front	0.744	0.096	0.560*	1.400
	Top	-	0.140	0.227	0.367
	Bottom	0.924	-	-	0.924
	Right	0.374	0.077	-	0.451
	Left	-	-	-	0.000

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	GPRS 1900	0.514	0.140	0.904	**1.558**
	UMTS 1750	0.925	0.140	0.904	See Table Below
	UMTS 1900	1.026	0.140	0.904	See Table Below
	LTE Band 26 (Cell)	0.833	0.140	0.904	See Table Below
	LTE Band 66 (AWS)	0.904	0.140	0.904	See Table Below
	LTE Band 25 (PCS)	0.809	0.140	0.904	See Table Below
	LTE Band 30	0.725	0.140	0.904	See Table Below
	LTE Band 7	1.017	0.140	0.904	See Table Below
	LTE Band 38	0.924	0.140	0.904	See Table Below
	LTE Band 41	0.584	0.140	0.904	See Table Below

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR		
		1	2	3	1+2+3	1+2	1+3	2+3
UMPC Body SAR	Back	0.762	0.084	0.904	See Note 1	0.01	0.01	0.02
	Front	0.925	0.096	0.304	**1.325**	N/A	N/A	N/A
	Top	-	0.140	0.558	0.698	N/A	N/A	N/A
	Bottom	0.736	-	-	0.736	N/A	N/A	N/A
	Right	0.322	0.077	0.904*	1.303	N/A	N/A	N/A
	Left	-	-	-	0.000	N/A	N/A	N/A

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR		
		1	2	3	1+2+3	1+2	1+3	2+3
UMPC Body SAR	Back	0.761	0.084	0.904	See Note 1	0.01	0.01	0.02
	Front	0.864	0.096	0.304	1.264	N/A	N/A	N/A
	Top	-	0.140	0.558	0.698	N/A	N/A	N/A
	Bottom	1.026	-	-	1.026	N/A	N/A	N/A
	Right	0.331	0.077	0.904*	**1.312**	N/A	N/A	N/A
	Left	-	-	-	0.000	N/A	N/A	N/A

Simult Tx	Configuration	LTE Band 26 (Cell) SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR		
		1	2	3	1+2+3	1+2	1+3	2+3
UMPC Body SAR	Back	0.833	0.084	0.904	See Note 1	0.01	0.01	0.02
	Front	0.721	0.096	0.304	1.121	N/A	N/A	N/A
	Top	-	0.140	0.558	0.698	N/A	N/A	N/A
	Bottom	0.548	-	-	0.548	N/A	N/A	N/A
	Right	0.563	0.077	0.904*	**1.544**	N/A	N/A	N/A
	Left	-	-	-	0.000	N/A	N/A	N/A

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR		
		1	2	3	1+2+3	1+2	1+3	2+3
UMPC Body SAR	Back	0.616	0.084	0.904	See Note 1	0.00	0.01	0.02
	Front	0.904	0.096	0.304	1.304	N/A	N/A	N/A
	Top	-	0.140	0.558	0.698	N/A	N/A	N/A
	Bottom	0.551	-	-	0.551	N/A	N/A	N/A
	Right	0.295	0.077	0.904*	1.276	N/A	N/A	N/A
	Left	-	-	-	0.000	N/A	N/A	N/A

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR		
		1	2	3	1+2+3	1+2	1+3	2+3
UMPC Body SAR	Back	0.745	0.084	0.904	See Note 1	0.01	0.01	0.02
	Front	0.629	0.096	0.304	1.029	N/A	N/A	N/A
	Top	-	0.140	0.558	0.698	N/A	N/A	N/A
	Bottom	0.809	-	-	0.809	N/A	N/A	N/A
	Right	0.240	0.077	0.904*	**1.221**	N/A	N/A	N/A
	Left	-	-	-	0.000	N/A	N/A	N/A

Simult Tx	Configuration	LTE Band 30 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.575	0.084	0.904	**1.563**
	Front	0.690	0.096	0.304	1.090
	Top	-	0.140	0.558	0.698
	Bottom	0.725	-	-	0.725
	Right	-	0.077	0.904*	0.981
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 7 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.573	0.084	0.904	**1.561**
	Front	0.560	0.096	0.304	0.960
	Top	-	0.140	0.558	0.698
	Bottom	1.017	-	-	1.017
	Right	-	0.077	0.904*	0.981
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR		
		1	2	3	1+2+3	1+2	1+3	2+3
UMPC Body SAR	Back	0.791	0.084	0.904	See Note 1	0.01	0.01	0.02
	Front	0.744	0.096	0.304	1.144	N/A	N/A	N/A
	Top	-	0.140	0.558	0.698	N/A	N/A	N/A
	Bottom	0.924	-	-	0.924	N/A	N/A	N/A
	Right	0.374	0.077	0.904*	**1.355**	N/A	N/A	N/A
	Left	-	-	-	0.000	N/A	N/A	N/A

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Body SAR	Back	0.484	0.084	0.904	**1.472**
	Front	0.575	0.096	0.304	0.975
	Top	-	0.140	0.558	0.698
	Bottom	0.584	-	-	0.584
	Right	0.191	0.077	0.904*	1.172
	Left	-	-	-	0.000

Notes: 1. No evaluation was performed to determine the aggregate 1g SAR for these configurations as the SPLS ratio between the antenna pairs was not greater than 0.04 per FCC KDB 447498 D01v06. See Section 12.9 for detailed SPLS ratio analysis.

12.8 Extremity Simultaneous Transmission Analysis: 10g UMPC Extremity

For SAR summation, the highest reported SAR across all test distances was used as the most conservative evaluation for simultaneous transmission analysis for each device edge.

Table 12-22
Simultaneous Transmission Scenario with 2.4 GHz WLAN (UMPC Extremity)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
UMPC Extremity SAR	GPRS 1900	0.284	3.185	1.479	3.469	1.763
	UMTS 1750	0.434	3.185	1.479	3.619	1.913
	UMTS 1900	0.991	3.185	1.479	See Table Below	2.470
	LTE Band 66 (AWS)	0.635	3.185	1.479	**3.820**	2.114
	LTE Band 25 (PCS)	2.606	3.185	1.479	See Table Below	See Table Below
	LTE Band 30	2.678	3.185	1.479	See Table Below	See Table Below
	LTE Band 7	0.325	3.185	1.479	3.510	1.804
	LTE Band 38	3.248	3.185	1.479	See Table Below	See Table Below
	LTE Band 41	0.619	3.185	1.479	3.804	2.098

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
UMPC Extremity SAR	Back	0.446	1.764	1.479	2.210	1.925
	Front	0.479	3.185	0.522	**3.664**	1.001
	Top	-	2.399	1.237	2.399	1.237
	Bottom	0.547	-	-	0.547	0.547
	Right	0.991	0.860	-	1.851	0.991
	Left	-	-	-	0.000	0.000

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		SPLSR
		1	2	3	1+2	1+3	1+2
UMPC Extremity SAR	Back	1.110	1.764	1.479	2.874	2.589	N/A
	Front	1.237	3.185	0.522	See Note 1	1.759	0.06
	Top	-	2.399	1.237	2.399	1.237	N/A
	Bottom	2.606	-	-	2.606	2.606	N/A
	Right	0.761	0.860	-	1.621	0.761	N/A
	Left	-	-	-	0.000	0.000	N/A

Simult Tx	Configuration	LTE Band 30 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		SPLSR
		1	2	3	1+2	1+3	1+2
UMPC Extremity SAR	Back	1.013	1.764	1.479	2.777	2.492	N/A
	Front	1.055	3.185	0.522	See Note 1	1.577	0.06
	Top	-	2.399	1.237	2.399	1.237	N/A
	Bottom	2.678	-	-	2.678	2.678	N/A
	Right	-	0.860	-	0.860	0.000	N/A
	Left	-	-	-	0.000	0.000	N/A

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		SPLSR
		1	2	3	1+2	1+3	1+2
UMPC Extremity SAR	Back	1.212	1.764	1.479	2.976	2.691	N/A
	Front	1.329	3.185	0.522	See Note 1	1.851	0.06
	Top	-	2.399	1.237	2.399	1.237	N/A
	Bottom	3.248	-	-	**3.248**	**3.248**	N/A
	Right	1.385	0.860	-	2.245	1.385	N/A
	Left	-	-	-	0.000	0.000	N/A

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Extremity SAR	GPRS 1900	0.284	1.269	1.553
	UMTS 1750	0.434	1.269	1.703
	UMTS 1900	0.991	1.269	2.260
	LTE Band 66 (AWS)	0.635	1.269	1.904
	LTE Band 25 (PCS)	2.606	1.269	3.875
	LTE Band 30	2.678	1.269	**3.947**
	LTE Band 7	0.325	1.269	1.594
	LTE Band 38	3.248	1.269	See Table Below
	LTE Band 41	0.619	1.269	1.888

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Extremity SAR	Back	1.212	0.570	1.782
	Front	1.329	1.122	2.451
	Top	-	1.269	1.269
	Bottom	3.248	-	**3.248**
	Right	1.385	1.269*	2.654
	Left	-	-	0.000

Table 12-23
Simultaneous Transmission Scenario with 5 GHz WLAN (UMPC Extremity)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
UMPC Extremity SAR	GPRS 1900	0.284	0.849	1.441	1.133	1.725	2.574
	UMTS 1750	0.434	0.849	1.441	1.283	1.875	2.724
	UMTS 1900	0.991	0.849	1.441	1.840	2.432	3.281
	LTE Band 66 (AWS)	0.635	0.849	1.441	1.484	2.076	2.925
	LTE Band 25 (PCS)	2.606	0.849	1.441	3.455	See Table Below	See Table Below
	LTE Band 30	2.678	0.849	1.441	**3.527**	See Table Below	See Table Below
	LTE Band 7	0.325	0.849	1.441	1.174	1.766	2.615
	LTE Band 38	3.248	0.849	1.441	See Table Below	See Table Below	See Table Below
	LTE Band 41	0.619	0.849	1.441	1.468	2.060	2.909

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
UMPC Extremity SAR	Back	1.110	0.849	1.441	1.959	2.551	**3.400**
	Front	1.237	0.582	0.598	1.819	1.835	2.417
	Top	-	0.849*	0.456	0.849	0.456	1.305
	Bottom	2.606	-	-	2.606	2.606	2.606
	Right	0.761	0.849*	-	1.610	0.761	1.610
	Left	-	-	-	0.000	0.000	0.000

Simult Tx	Configuration	LTE Band 30 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
UMPC Extremity SAR	Back	1.013	0.849	1.441	1.862	2.454	**3.303**
	Front	1.055	0.582	0.598	1.637	1.653	2.235
	Top	-	0.849*	0.456	0.849	0.456	1.305
	Bottom	2.678	-	-	2.678	2.678	2.678
	Right	-	0.849*	-	0.849	0.000	0.849
	Left	-	-	-	0.000	0.000	0.000

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
UMPC Extremity SAR	Back	1.212	0.849	1.441	2.061	2.653	**3.502**
	Front	1.329	0.582	0.598	1.911	1.927	2.509
	Top	-	0.849*	0.456	0.849	0.456	1.305
	Bottom	3.248	-	-	3.248	3.248	3.248
	Right	1.385	0.849*	-	2.234	1.385	2.234
	Left	-	-	-	0.000	0.000	0.000

Table 12-24
Simultaneous Transmission Scenario with 2.4 GHz WLAN MIMO and 5 GHz WLAN MIMO (UMPC Extremity)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO at 16 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Extremity SAR	GPRS 1900	0.284	1.269	0.903	2.456
	UMTS 1750	0.434	1.269	0.903	2.606
	UMTS 1900	0.991	1.269	0.903	**3.163**
	LTE Band 66 (AWS)	0.635	1.269	0.903	2.807
	LTE Band 25 (PCS)	2.606	1.269	0.903	See Table Below
	LTE Band 30	2.678	1.269	0.903	See Table Below
	LTE Band 7	0.325	1.269	0.903	2.497
	LTE Band 38	3.248	1.269	0.903	See Table Below
	LTE Band 41	0.619	1.269	0.903	2.791

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO at 16 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Extremity SAR	Back	1.110	0.570	0.903	2.583
	Front	1.237	1.122	0.903*	**3.262**
	Top	-	1.269	0.903*	2.172
	Bottom	2.606	-	-	2.606
	Right	0.761	1.269*	0.903*	2.933
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 30 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO at 16 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Extremity SAR	Back	1.013	0.570	0.903	2.486
	Front	1.055	1.122	0.903*	**3.080**
	Top	-	1.269	0.903*	2.172
	Bottom	2.678	-	-	2.678
	Right	-	1.269*	0.903*	2.172
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO at 16 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Extremity SAR	Back	1.212	0.570	0.903	2.685
	Front	1.329	1.122	0.903*	3.354
	Top	-	1.269	0.903*	2.172
	Bottom	3.248	-	-	3.248
	Right	1.385	1.269*	0.903*	**3.557**
	Left	-	-	-	0.000

Table 12-25
Simultaneous Transmission Scenario with Bluetooth (UMPC Extremity

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Extremity SAR	GPRS 1900	0.284	0.869	1.153
	UMTS 1750	0.434	0.869	1.303
	UMTS 1900	0.991	0.869	1.860
	LTE Band 66 (AWS)	0.635	0.869	1.504
	LTE Band 25 (PCS)	2.606	0.869	3.475
	LTE Band 30	2.678	0.869	**3.547**
	LTE Band 7	0.325	0.869	1.194
	LTE Band 38	3.248	0.869	See Table Below
	LTE Band 41	0.619	0.869	1.488

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
UMPC Extremity SAR	Back	1.212	0.487	1.699
	Front	1.329	0.869	2.198
	Top	-	0.724	0.724
	Bottom	3.248	-	**3.248**
	Right	1.385	0.234	1.619
	Left	-	-	0.000

Table 12-26
Simultaneous Transmission Scenario with Bluetooth and 5GHz WLAN (UMPC Extremity)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Extremity SAR	GPRS 1900	0.284	0.869	0.849	2.002
	UMTS 1750	0.434	0.869	0.849	2.152
	UMTS 1900	0.991	0.869	0.849	**2.709**
	LTE Band 66 (AWS)	0.635	0.869	0.849	2.353
	LTE Band 25 (PCS)	2.606	0.869	0.849	See Table Below
	LTE Band 30	2.678	0.869	0.849	See Table Below
	LTE Band 7	0.325	0.869	0.849	2.043
	LTE Band 38	3.248	0.869	0.849	See Table Below
	LTE Band 41	0.619	0.869	0.849	2.337

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Extremity SAR	Back	1.110	0.487	0.849	2.446
	Front	1.237	0.869	0.582	**2.688**
	Top	-	0.724	0.849*	1.573
	Bottom	2.606	-	-	2.606
	Right	0.761	0.234	0.849*	1.844
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 30 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Extremity SAR	Back	1.013	0.487	0.849	2.349
	Front	1.055	0.869	0.582	2.506
	Top	-	0.724	0.849*	1.573
	Bottom	2.678	-	-	**2.678**
	Right	-	0.234	0.849*	1.083
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Extremity SAR	Back	1.212	0.487	0.849	2.548
	Front	1.329	0.869	0.582	2.780
	Top	-	0.724	0.849*	1.573
	Bottom	3.248	-	-	**3.248**
	Right	1.385	0.234	0.849*	2.468
	Left	-	-	-	0.000

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Extremity SAR	GPRS 1900	0.284	0.869	1.441	2.594
	UMTS 1750	0.434	0.869	1.441	2.744
	UMTS 1900	0.991	0.869	1.441	**3.301**
	LTE Band 66 (AWS)	0.635	0.869	1.441	2.945
	LTE Band 25 (PCS)	2.606	0.869	1.441	See Table Below
	LTE Band 30	2.678	0.869	1.441	See Table Below
	LTE Band 7	0.325	0.869	1.441	2.635
	LTE Band 38	3.248	0.869	1.441	See Table Below
	LTE Band 41	0.619	0.869	1.441	2.929

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Extremity SAR	Back	1.110	0.487	1.441	**3.038**
	Front	1.237	0.869	0.598	2.704
	Top	-	0.724	0.456	1.180
	Bottom	2.606	-	-	2.606
	Right	0.761	0.234	-	0.995
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 30 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Extremity SAR	Back	1.013	0.487	1.441	**2.941**
	Front	1.055	0.869	0.598	2.522
	Top	-	0.724	0.456	1.180
	Bottom	2.678	-	-	2.678
	Right	-	0.234	-	0.234
	Left	-	-	-	0.000

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
UMPC Extremity SAR	Back	1.212	0.487	1.441	3.140
	Front	1.329	0.869	0.598	2.796
	Top	-	0.724	0.456	1.180
	Bottom	3.248	-	-	**3.248**
	Right	1.385	0.234	-	1.619
	Left	-	-	-	0.000

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
UMPC Extremity SAR	GPRS 1900	0.284	0.869	0.849	1.441	3.443
	UMTS 1750	0.434	0.869	0.849	1.441	3.593
	UMTS 1900	0.991	0.869	0.849	1.441	See Table Below
	LTE Band 66 (AWS)	0.635	0.869	0.849	1.441	**3.794**
	LTE Band 25 (PCS)	2.606	0.869	0.849	1.441	See Table Below
	LTE Band 30	2.678	0.869	0.849	1.441	See Table Below
	LTE Band 7	0.325	0.869	0.849	1.441	3.484
	LTE Band 38	3.248	0.869	0.849	1.441	See Table Below
	LTE Band 41	0.619	0.869	0.849	1.441	3.778

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
UMPC Extremity SAR	Back	0.446	0.487	0.849	1.441	**3.223**
	Front	0.479	0.869	0.582	0.598	2.528
	Top	-	0.724	0.849*	0.456	2.029
	Bottom	0.547	-	-	-	0.547
	Right	0.991	0.234	0.849*	-	2.074
	Left	-	-	-	-	0.000

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
UMPC Extremity SAR	Back	1.110	0.487	0.849	1.441	**3.887**
	Front	1.237	0.869	0.582	0.598	3.286
	Top	-	0.724	0.849*	0.456	2.029
	Bottom	2.606	-	-	-	2.606
	Right	0.761	0.234	0.849*	-	1.844
	Left	-	-	-	-	0.000

Simult Tx	Configuration	LTE Band 30 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
UMPC Extremity SAR	Back	1.013	0.487	0.849	1.441	**3.790**
	Front	1.055	0.869	0.582	0.598	3.104
	Top	-	0.724	0.849*	0.456	2.029
	Bottom	2.678	-	-	-	2.678
	Right	-	0.234	0.849*	-	1.083
	Left	-	-	-	-	0.000

Simult Tx	Configuration	LTE Band 38 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
UMPC Extremity SAR	Back	1.212	0.487	0.849	1.441	**3.989**
	Front	1.329	0.869	0.582	0.598	3.378
	Top	-	0.724	0.849*	0.456	2.029
	Bottom	3.248	-	-	-	3.248
	Right	1.385	0.234	0.849*	-	2.468
	Left	-	-	-	-	0.000

Notes: 1. No evaluation was performed to determine the aggregate 10g SAR for these configurations as the SPLS ratio between the antenna pairs was not greater than 0.10 per FCC KDB 447498 D01v06. See Section 12.9 for detailed SPLS ratio analysis.

12.9 SPLSR Evaluation and Analysis

Per FCC KDB Publication 447498 D01v06, when the sum of the standalone transmitters is more than 1.6 W/kg for 1g and 4 W/kg for 10g, the SAR sum to peak locations can be analyzed to determine SAR distribution overlaps. When the SAR peak to location ratio (shown below) for each pair of antennas is $\leq$ 0.04 for 1g and $\leq$0.10 for 10g, simultaneous SAR evaluation is not required. The distance between the transmitters was calculated using the following formula.

$$\text{Distance}_{Tx1-Tx2} = R_i = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} \text{ (UMPC Body, UMPC Extremity)}$$

$$\text{SPLS Ratio} = \frac{(SAR_1 + SAR_2)^{1.5}}{R_i}$$

12.9.1 UMPC Body Back Side SPLSR Evaluation and Analysis

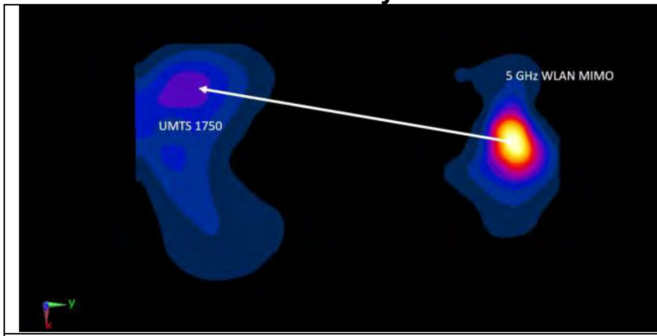
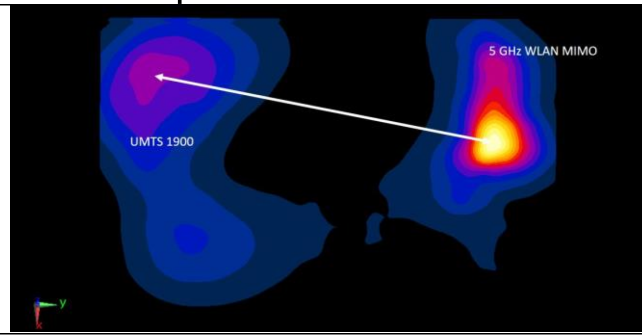
Table 12-27
Peak SAR Locations for UMPC Body Back Side

Mode/Band	x (mm)	y (mm)
2.4 GHz Bluetooth	-81.40	66.00
5 GHz WLAN Ant 1	-46.00	74.00
5 GHz WLAN MIMO	-36.00	72.00
UMTS 1750	-67.00	-77.00
UMTS 1900	-57.50	-78.50
LTE Band 26 (Cell)	-70.00	-77.00
LTE Band 66 (AWS)	-67.00	-77.00
LTE Band 25 (PCS)	-57.50	-80.00
LTE Band 38	-55.00	-82.80

Table 12-28
UMPC Body Back Side SAR to Peak Location Separation Ratio Calculations

Antenna Pair		Standalone SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio	Plot Number
Ant "a"	Ant "b"	a	b	a+b	D_{a-b}	$(a+b)^{1.5}/D_{a-b}$	
5 GHz WLAN MIMO	UMTS 1750	0.904	0.762	1.666	152.19	0.01	1
5 GHz WLAN MIMO	UMTS 1900	0.904	0.761	1.665	152.03	0.01	2
5 GHz WLAN MIMO	LTE Band 26 (Cell)	0.904	0.833	1.737	152.83	0.01	3
5 GHz WLAN MIMO	LTE Band 25 (PCS)	0.904	0.745	1.649	153.51	0.01	4
5 GHz WLAN MIMO	LTE Band 38	0.904	0.791	1.695	155.96	0.01	5
2.4 GHz Bluetooth	LTE Band 26 (Cell)	0.084	0.833	0.917	143.45	0.01	6
5 GHz WLAN Ant 1	LTE Band 26 (Cell)	0.742	0.833	1.575	152.90	0.01	
2.4 GHz Bluetooth	5 GHz WLAN Ant 1	0.084	0.742	0.826	36.29	0.02	
2.4 GHz Bluetooth	LTE Band 38	0.084	0.791	0.875	151.12	0.01	7
5 GHz WLAN Ant 1	LTE Band 38	0.742	0.791	1.533	157.06	0.01	
2.4 GHz Bluetooth	5 GHz WLAN Ant 1	0.084	0.742	0.826	36.29	0.02	
2.4 GHz Bluetooth	UMTS 1750	0.084	0.762	0.846	143.72	0.01	8
5 GHz WLAN MIMO	UMTS 1750	0.904	0.762	1.666	152.19	0.01	
2.4 GHz Bluetooth	5 GHz WLAN MIMO	0.084	0.904	0.988	45.79	0.02	
2.4 GHz Bluetooth	UMTS 1900	0.084	0.761	0.845	146.46	0.01	9
5 GHz WLAN MIMO	UMTS 1900	0.904	0.761	1.665	152.03	0.01	
2.4 GHz Bluetooth	5 GHz WLAN MIMO	0.084	0.904	0.988	45.79	0.02	
2.4 GHz Bluetooth	LTE Band 26 (Cell)	0.084	0.833	0.917	143.45	0.01	10
5 GHz WLAN MIMO	LTE Band 26 (Cell)	0.904	0.833	1.737	152.83	0.01	
2.4 GHz Bluetooth	5 GHz WLAN MIMO	0.084	0.904	0.988	45.79	0.02	
2.4 GHz Bluetooth	LTE Band 66 (AWS)	0.084	0.616	0.7	143.72	0.00	11
5 GHz WLAN MIMO	LTE Band 66 (AWS)	0.904	0.616	1.52	152.19	0.01	
2.4 GHz Bluetooth	5 GHz WLAN MIMO	0.084	0.904	0.988	45.79	0.02	
2.4 GHz Bluetooth	LTE Band 25 (PCS)	0.084	0.745	0.829	147.94	0.01	12
5 GHz WLAN MIMO	LTE Band 25 (PCS)	0.904	0.745	1.649	153.51	0.01	
2.4 GHz Bluetooth	5 GHz WLAN MIMO	0.084	0.904	0.988	45.79	0.02	
2.4 GHz Bluetooth	LTE Band 38	0.084	0.791	0.875	151.12	0.01	13
5 GHz WLAN MIMO	LTE Band 38	0.904	0.791	1.695	155.96	0.01	
2.4 GHz Bluetooth	5 GHz WLAN MIMO	0.084	0.904	0.988	45.79	0.02	

Table 12-29
UMPC Body Back Side SAR to Peak Location Separation Ratio Plots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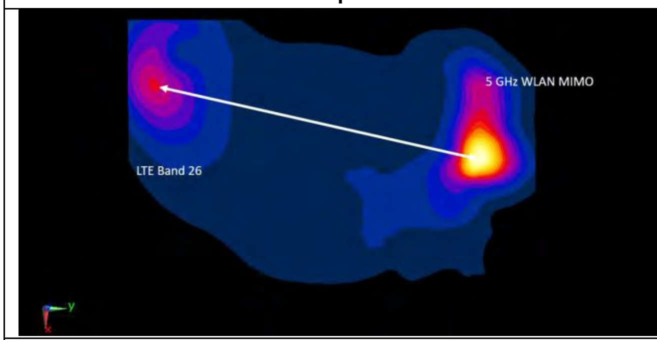	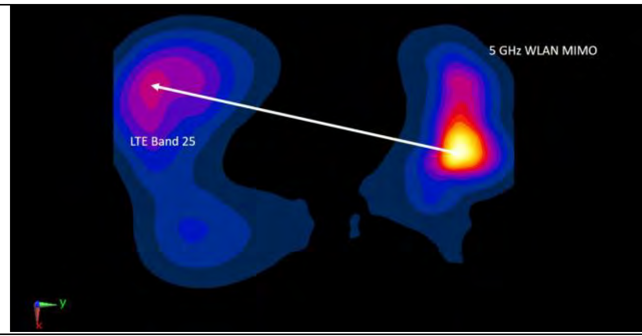
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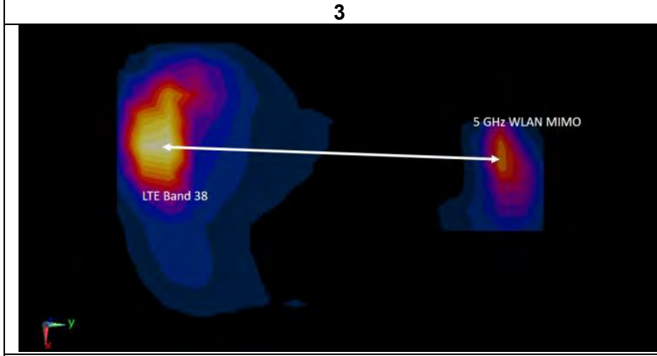	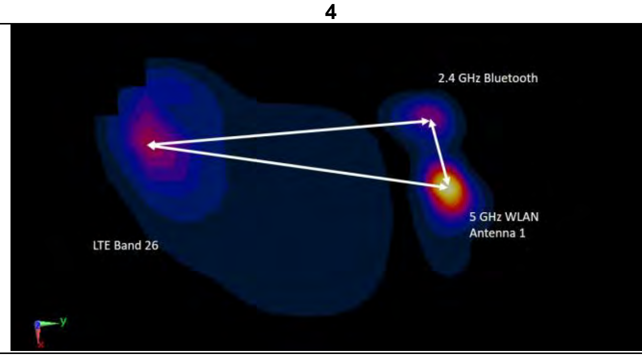
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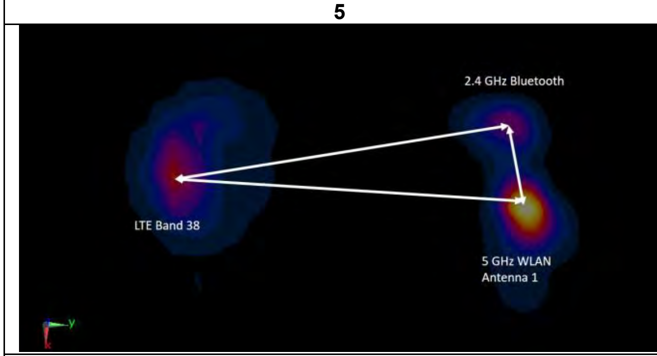	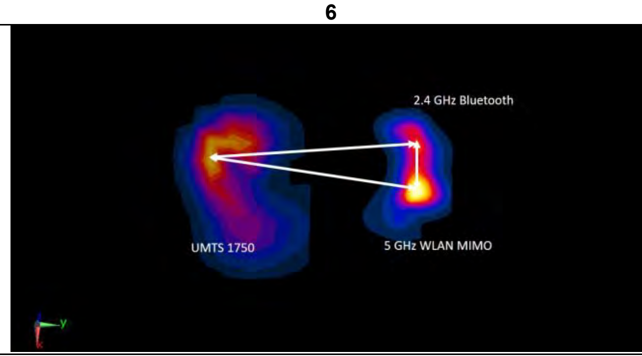
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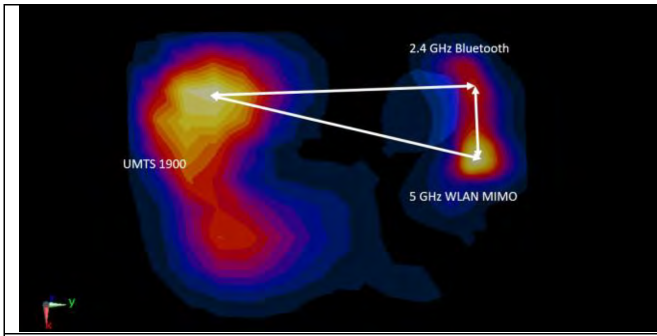
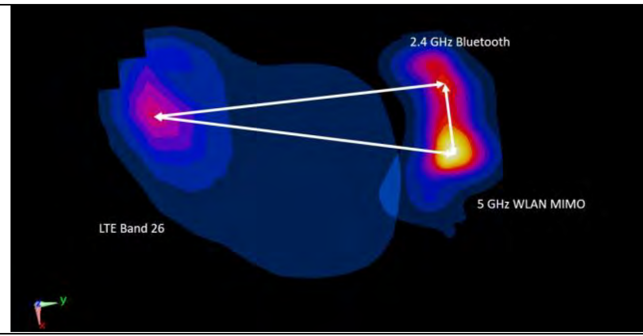
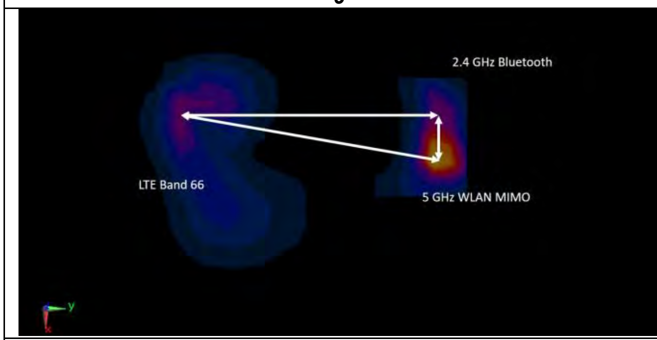

2.4 GHz Bluetooth
UMTS 1900
5 GHz WLAN MIMO

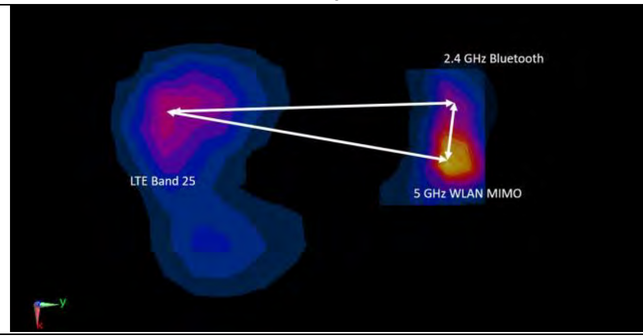
9


2.4 GHz Bluetooth
5 GHz WLAN MIMO
LTE Band 26

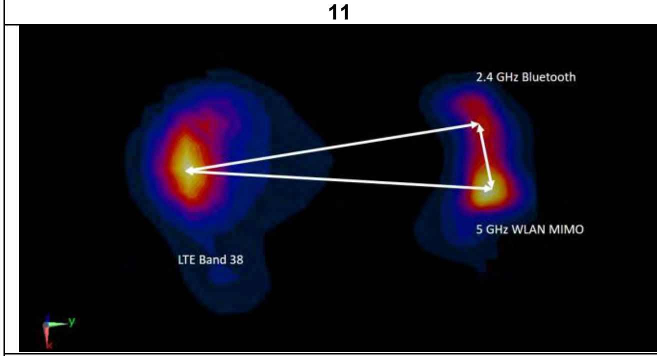
10


2.4 GHz Bluetooth
LTE Band 66
5 GHz WLAN MIMO

11


2.4 GHz Bluetooth
LTE Band 25
5 GHz WLAN MIMO

12


2.4 GHz Bluetooth
5 GHz WLAN MIMO
LTE Band 38

13

12.9.2 UMPC Extremity Front Side at 0mm SPLSR Evaluation and Analysis

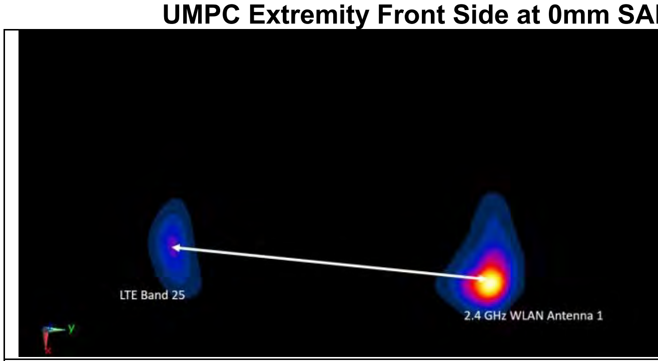
Table 12-30
Peak SAR Locations for UMPC Extremity Front Side at 0mm

Mode/Band	x (mm)	y (mm)
2.4 GHz WLAN Ant 1	28.00	69.40
LTE Band 25 (PCS)	-0.50	-76.50
LTE Band 30	-5.80	-81.60
LTE Band 38	-1.00	-82.00

Table 12-31
UMPC Extremity Front Side at 0mm SAR to Peak Location Separation Ratio Calculations

Antenna Pair		Standalone SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio	Plot Number
Ant "a"	Ant "b"	a	b	a+b	D_{a-b}	$(a+b)^{1.5}/D_{a-b}$	
2.4 GHz WLAN Ant 1	LTE Band 25 (PCS)	3.185	1.237	4.422	148.66	0.06	1
2.4 GHz WLAN Ant 1	LTE Band 30	3.185	1.055	4.24	154.74	0.06	2
2.4 GHz WLAN Ant 1	LTE Band 38	3.185	1.329	4.514	154.15	0.06	3

Table 12-32
UMPC Extremity Front Side at 0mm SAR to Peak Location Separation Ratio Plots



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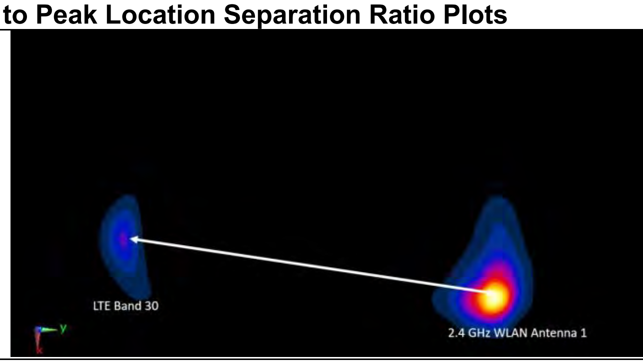

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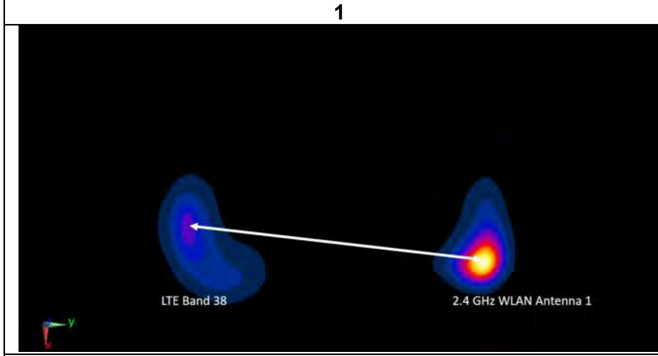

3

12.10 Simultaneous Transmission Conclusion

The above numerical summed SAR results and SPLSR analysis are sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528- 2013 Section 6.3.4.1.2. Additionally, it was determined that all other combinations for bands/modes not addressed in this report are compliant.

13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1g SAR limit).
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg
5) When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

Table 13-1
Body SAR Measurement Variability Results 1g

BODY VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	Configuration	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.						(W/kg)	(W/kg)		(W/kg)		(W/kg)	
2450	2510.00	20850	LTE Band 7, 20 MHz Bandwidth	QPSK, 1 RB, 99 RB Offset	UMPC Body	bottom	16 mm	0.913	0.862	1.06	N/A	N/A	N/A	N/A
2600	2535.00	21100	LTE Band 7, 20 MHz Bandwidth	QPSK, 50 RB, 25 RB Offset	Handset Hotspot	bottom	10 mm	0.884	0.876	1.01	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 13-2
Body SAR Measurement Variability Results 10g

PHABLET/EXTREMITY VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	Configuration	Side	Spacing	Measured SAR (10g)	1st Repeated SAR (10g)	Ratio	2nd Repeated SAR (10g)	Ratio	3rd Repeated SAR (10g)	Ratio
	MHz	Ch.						(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1900	1882.50	26365	LTE Band 25 (PCS), 20 MHz Bandwidth	QPSK, 50 RB, 25 RB Offset	UMPC Extremity	bottom	0 mm	2.400	2.380	1.01	N/A	N/A	N/A	N/A
2300	2310.00	27710	LTE Band 30, 10 MHz Bandwidth	QPSK, 25 RB, 0 RB Offset	UMPC Extremity	bottom	0 mm	2.390	2.370	1.01	N/A	N/A	N/A	N/A
2600	2595.00	38000	LTE Band 38, 20 MHz Bandwidth	QPSK, 50 RB, 25 RB Offset	UMPC Extremity	bottom	0 mm	2.510	2.480	1.01	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Phablet/Extremity 4.0 W/kg (mW/g) averaged over 10 grams							

13.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg for 1g and <3.75 W/kg for 10g for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE 1528-2013 was not required.

14 ADDITIONAL TESTING PER FCC GUIDANCE

14.1 Tuner Testing

The following test procedures were followed to demonstrate that the SAR results in Section 11 represented the appropriate SAR test conditions. For bands with dynamic tuning implemented, SAR was measured according to the required FCC SAR test procedures with the dynamic tuner active to allow the device to automatically tune to the antenna state for the respective RF exposure test configurations. Additional single point SAR time-sweep measurements were evaluated for other tuner states to determine that the other tuner configurations would result in equivalent or lower SAR values. The additional tuner hardware has no influence on the antenna characteristics, other than impedance matching.

Tuner states shown below is for current test report. Please refer to RF Exposure Technical Report S/N: 1M1901280020-01-R1.A3L for original full DAT compliance. Single point time-sweep measurements were performed at the peak SAR location determined by the zoom scan of the configuration with the highest reported SAR for each combination. The tuner state was able to be established remotely so that the device was not moved for the entire series of single point SAR for the tuner states in each combination. The SAR probe remained stationary at the same position throughout the entire series of single point measurements for each combination. When the single point SAR or 1g SAR was > 1.2 W/kg for a particular band/mode/exposure condition, point SAR measurements were made for all 80 states.

The operational description contains more information about the design and implementation of the dynamic antenna tuning.

Table 14-1
LTE Supplemental Body SAR Data

Supplemental Body SAR Data			
LTE Band 26			
QPSK, 15MHz Bandwidth, 1 RB, 0 RB Offsets			
Test Position		Back Side, UMPC Body	
Spacing		10 mm	
Frequency (MHz)		831.5	
Channel		26865	
Measured 1g SAR (W/kg)		0.620	
Average Value of Time Sweep (W/kg)			
Auto-tune (State 0)		0.998	
Default (State 16)		0.581	
State 0	0.964	State 40	0.599
State 1	0.895	State 41	0.500
State 2	0.910	State 42	0.401
State 3	0.888	State 43	0.316
State 4	0.875	State 44	0.221
State 5	0.864	State 45	0.173
State 6	0.824	State 46	0.126
State 7	0.797	State 47	0.084
State 8	0.777	State 48	0.852
State 9	0.695	State 49	0.850
State 10	0.601	State 50	0.772
State 11	0.507	State 51	0.752
State 12	0.387	State 52	0.741
State 13	0.316	State 53	0.729
State 14	0.243	State 54	0.691
State 15	0.156	State 55	0.666
State 16	0.581	State 56	0.645
State 17	0.614	State 57	0.564
State 18	0.464	State 58	0.484
State 19	0.443	State 59	0.406
State 20	0.432	State 60	0.309
State 21	0.421	State 61	0.254
State 22	0.385	State 62	0.196
State 23	0.367	State 63	0.137
State 24	0.353	State 64	0.960
State 25	0.299	State 65	0.609
State 26	0.250	State 66	0.798
State 27	0.207	State 67	0.842
State 28	0.157	State 68	0.962
State 29	0.129	State 69	0.607
State 30	0.130	State 70	0.811
State 31	0.072	State 71	0.851
State 32	0.812	State 72	0.959
State 33	0.806	State 73	0.611
State 34	0.756	State 74	0.804
State 35	0.733	State 75	0.847
State 36	0.724	State 76	0.962
State 37	0.712	State 77	0.609
State 38	0.653	State 78	0.812
State 39	0.622	State 79	0.853

15 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	85033E	3.5mm Standard Calibration Kit	8/13/2018	Annual	8/13/2019	MY53402352
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	CBT	N/A	CBT	3051A00187
Agilent	8753E	(30kHz-6GHz) Network Analyzer	9/28/2018	Annual	9/28/2019	JP38020182
Agilent	8753ES	Network Analyzer	3/19/2019	Annual	3/19/2020	MY40001472
Agilent	8753ES	S-Parameter Network Analyzer	10/2/2018	Annual	10/2/2019	US39170118
Agilent	8753ES	S-Parameter Vector Network Analyzer	8/30/2018	Annual	8/30/2019	MY40003841
Agilent	E4438C	ESG Vector Signal Generator	5/22/2019	Annual	5/22/2020	MY45091346
Agilent	E4440A	PSA Series Spectrum Analyzer	11/14/2018	Annual	11/14/2019	MY46186272
Agilent	E5515C	8960 Series 10 Wireless Communications Test Set	12/18/2018	Annual	12/18/2019	GB42230325
Agilent	E5515C	Wireless Communications Test Set	2/28/2018	Biennial	2/28/2020	GB41450275
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB44450273
Agilent	N5182A	MXG Vector Signal Generator	11/28/2018	Annual	11/28/2019	MY47420603
Agilent	N9020A	MXA Signal Analyzer	4/20/2019	Annual	4/20/2020	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	6/12/2019	Annual	6/12/2020	MY52350166
Amplifier Research	150A100C	Amplifier	CBT	N/A	CBT	350132
Anritsu	MA24106A	USB Power Sensor	9/20/2018	Annual	9/20/2019	1344545
Anritsu	MA24106A	USB Power Sensor	9/20/2018	Annual	9/20/2019	1344559
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1126066
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1207470
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Anritsu	MT8820C	Radio Communication Analyzer	3/29/2019	Annual	3/29/2020	6201300731
Anritsu	MT8821C	Radio Communication Analyzer	7/24/2018	Annual	7/24/2019	6201664756
Control Company	4040	Therm./ Clock/ Humidity Monitor	1/8/2019	Annual	1/8/2020	160473909
Control Company	4040	Therm./ Clock/ Humidity Monitor	1/8/2019	Annual	1/8/2020	160574418
Control Company	4352	Ultra Long Stem Thermometer	2/28/2018	Biennial	2/28/2020	170330160
Control Company	4352	Ultra Long Stem Thermometer	2/28/2018	Biennial	2/28/2020	170330158
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	4/19/2019	Annual	4/19/2020	11401010036
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mitutoyo	CD-6"CSX	Digital Caliper	4/18/2018	Biennial	4/18/2020	13264165
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	NC-100	Torque Wrench	11/1/2017	Biennial	11/1/2019	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMW500	Radio Communication Tester	10/12/2018	Annual	10/12/2019	166462
Rohde & Schwarz	CMW500	Radio Communication Tester	11/14/2018	Annual	11/14/2019	100976
SPEAG	D1750V2	1750 MHz SAR Dipole	10/22/2018	Annual	10/22/2019	1150
SPEAG	D1765V2	1765 MHz SAR Dipole	5/23/2018	Biennial	5/23/2020	1008
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Annual	10/23/2019	5d149
SPEAG	D1900V2	1900 MHz SAR Dipole	2/21/2019	Annual	2/21/2020	5d148
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Annual	10/23/2019	5d080
SPEAG	D2300V2	2300 MHz SAR Dipole	8/13/2018	Annual	8/13/2019	1073
SPEAG	D2450V2	2450 MHz SAR Dipole	8/17/2017	Biennial	8/17/2019	719
SPEAG	D2450V2	2450 MHz SAR Dipole	9/11/2017	Biennial	9/11/2019	797
SPEAG	D2600V2	2600 MHz SAR Dipole	9/13/2016	Triennial	9/13/2019	1071
SPEAG	D2600V2	2600 MHz SAR Dipole	8/13/2018	Annual	8/13/2019	1126
SPEAG	D2600V2	2600 MHz SAR Dipole	4/11/2018	Biennial	4/11/2020	1004
SPEAG	D5GHzV2	5 GHz SAR Dipole	9/21/2016	Triennial	9/21/2019	1191
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/16/2018	Biennial	1/16/2020	1057
SPEAG	D835V2	835 MHz SAR Dipole	1/22/2019	Annual	1/22/2020	4d132
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2018	Annual	7/11/2019	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/8/2019	Annual	5/8/2020	859
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/22/2018	Annual	8/22/2019	1450
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/18/2019	Annual	4/18/2020	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/15/2019	Annual	1/15/2020	1530
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/13/2019	Annual	2/13/2020	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/3/2018	Annual	10/3/2019	1558
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/20/2019	Annual	6/20/2020	1334
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/11/2018	Annual	9/11/2019	1091
SPEAG	EX3DV4	SAR Probe	4/24/2019	Annual	4/24/2020	7357
SPEAG	EX3DV4	SAR Probe	1/24/2019	Annual	1/24/2020	7488
SPEAG	EX3DV4	SAR Probe	2/19/2019	Annual	2/19/2020	7417
SPEAG	EX3DV4	SAR Probe	8/23/2018	Annual	8/23/2019	7308
SPEAG	EX3DV4	SAR Probe	7/20/2018	Annual	7/20/2019	7410
SPEAG	EX3DV4	SAR Probe	5/16/2019	Annual	5/16/2020	7406
SPEAG	EX3DV4	SAR Probe	1/25/2019	Annual	1/25/2020	3589
SPEAG	EX3DV4	SAR Probe	6/19/2019	Annual	6/19/2020	7409

Note: 1. Each Equipment item was used solely within its respective calibration period.
2. CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

a	c	d	e = f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	Tol. (± %)	Prob. Dist.	Div.	c_i 1gm	c_i 10 gms	1gm u_i (± %)	10gms u_i (± %)	v_i
Measurement System								
Probe Calibration	6.55	N	1	1.0	1.0	6.6	6.6	∞
Axial Isotropy	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	2.0	R	1.73	1.0	1.0	1.2	1.2	∞
Linearity	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	0.25	R	1.73	1.0	1.0	0.1	0.1	∞
Readout Electronics	0.3	N	1	1.0	1.0	0.3	0.3	∞
Response Time	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions - Noise	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
RF Ambient Conditions - Reflections	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	6.7	R	1.73	1.0	1.0	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Test Sample Related								
Test Sample Positioning	2.7	N	1	1.0	1.0	2.7	2.7	35
Device Holder Uncertainty	1.67	N	1	1.0	1.0	1.7	1.7	5
Output Power Variation - SAR drift measurement	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
SAR Scaling	0.0	R	1.73	1.0	1.0	0.0	0.0	∞
Phantom & Tissue Parameters								
Phantom Uncertainty (Shape & Thickness tolerances)	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	4.2	N	1	0.78	0.71	3.3	3.0	10
Liquid Permittivity - measurement uncertainty	4.1	N	1	0.23	0.26	1.0	1.1	10
Liquid Conductivity - Temperature Uncertainty	3.4	R	1.73	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Unceritainty	0.6	R	1.73	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)		RSS				11.5	11.3	60
Expanded Uncertainty (95% CONFIDENCE LEVEL)		k=2				23.0	22.6	

17 CONCLUSION

17.1 Measurement Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Innovation, Science, and Economic Development Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]

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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54574

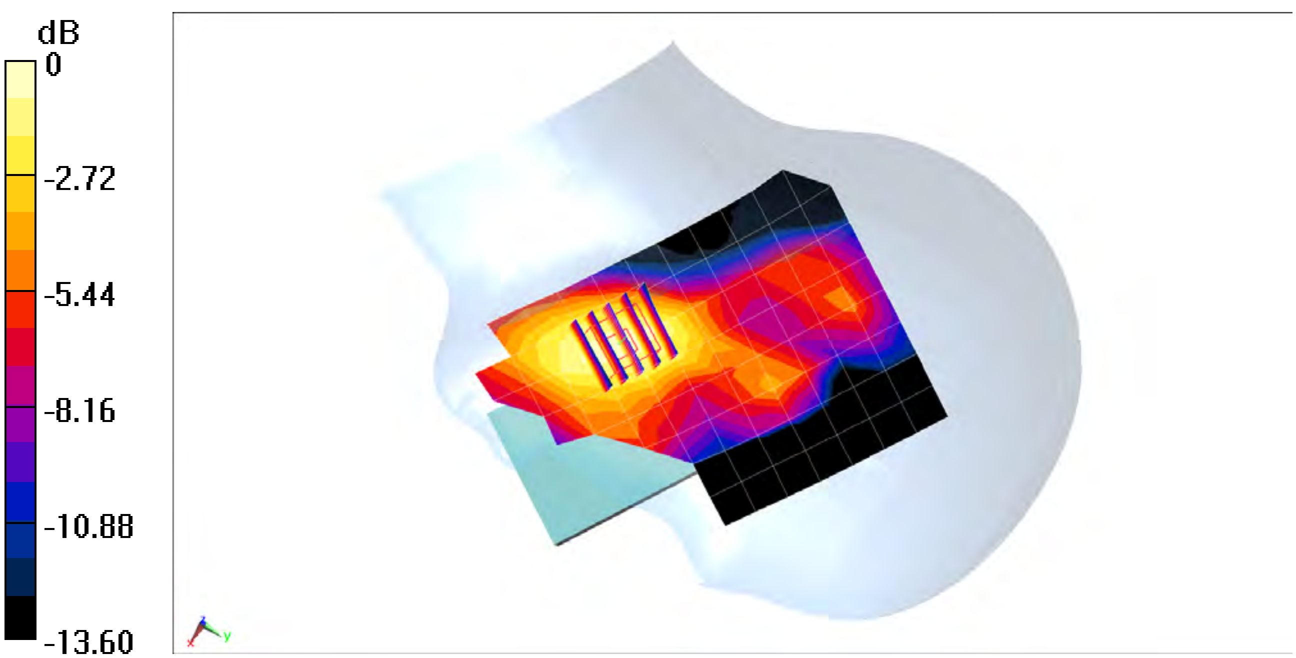
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.408 S/m; ε_r = 38.903; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-21-2019; Ambient Temp: 22.6°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7410; ConvF(8.16, 8.16, 8.16) @ 1880 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1900, Left Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.735 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.146 W/kg
SAR(1 g) = 0.097 W/kg



0 dB = 0.130 W/kg = -8.86 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54954

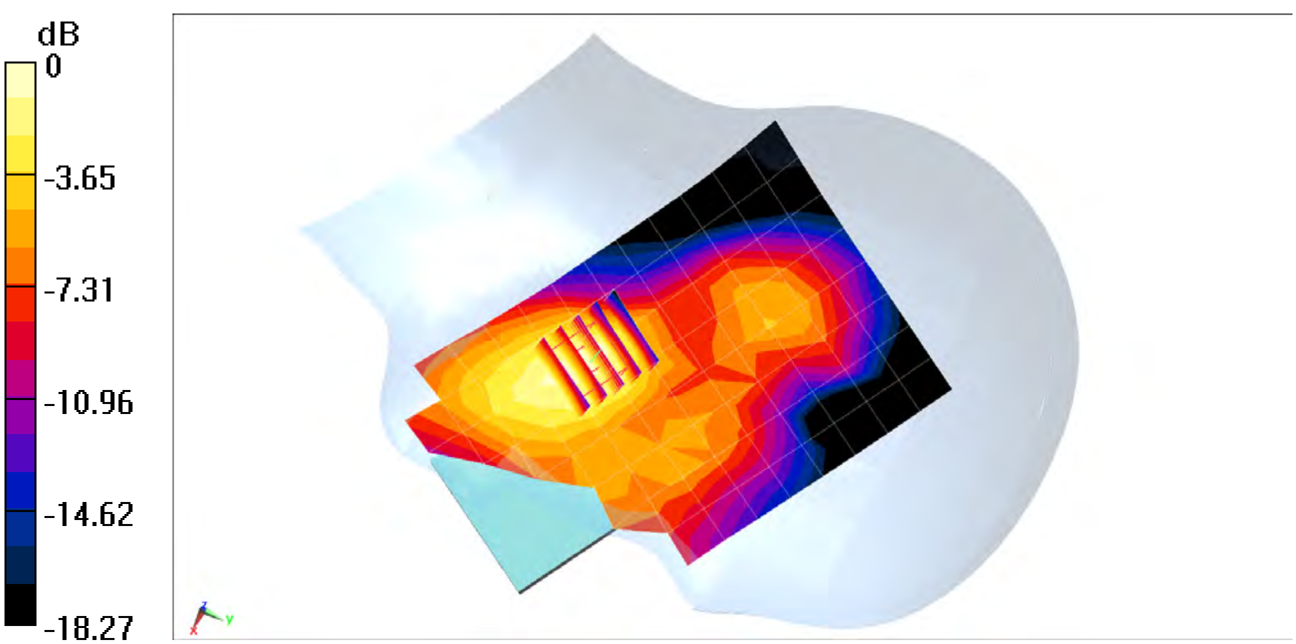
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1715 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
f = 1715 MHz; σ = 1.341 S/m; ε_r = 39.835; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-19-2019; Ambient Temp: 21.9°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7406; ConvF(8.57, 8.57, 8.57) @ 1715 MHz; Calibrated: 5/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/8/2019
Phantom: SAM 30 with CRP v5.0 right; Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 66 (AWS), 66B ULCA, Left Head, Cheek, Low Ch.
PCC: 10 MHz Bandwidth, QPSK, Ch. 132022, 1 RB, 49 RB Offset
SCC: 10 MHz Bandwidth, QPSK, Ch. 132121, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.23 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.267 W/kg
SAR(1 g) = 0.169 W/kg



0 dB = 0.232 W/kg = -6.35 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54574

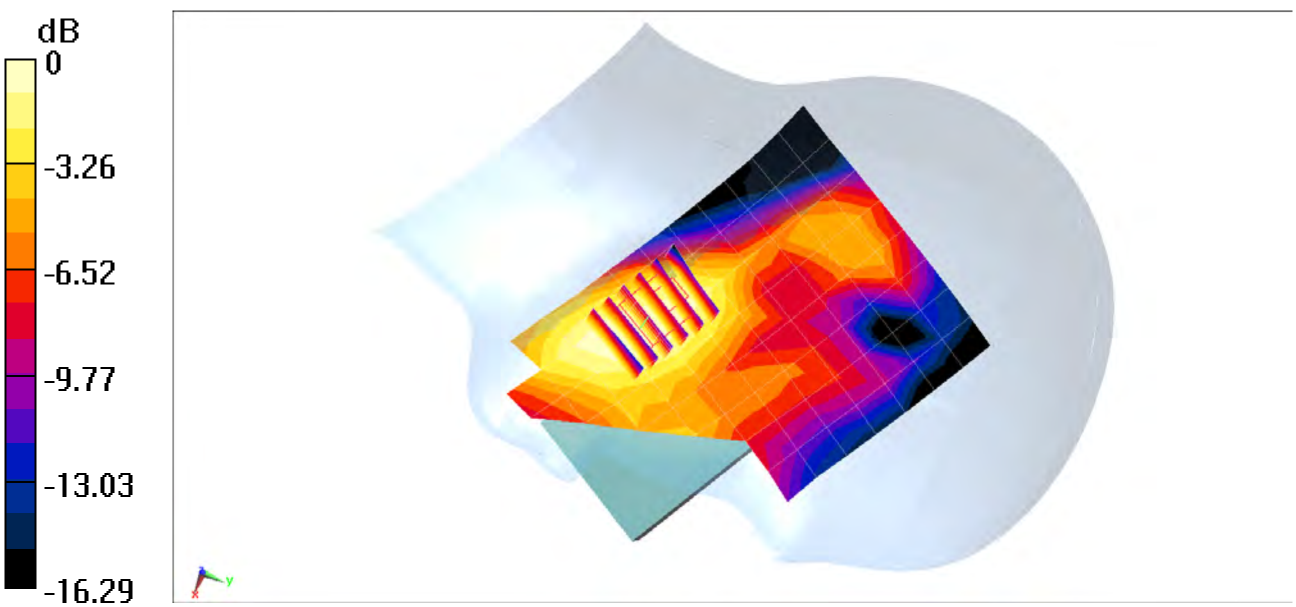
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1860 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1860 MHz; σ = 1.397 S/m; ε_r = 38.931; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-21-2019; Ambient Temp: 22.6°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7410; ConvF(8.16, 8.16, 8.16) @ 1860 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 25 (PCS), Left Head, Cheek, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.758 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.141 W/kg
SAR(1 g) = 0.089 W/kg



0 dB = 0.117 W/kg = -9.32 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54509

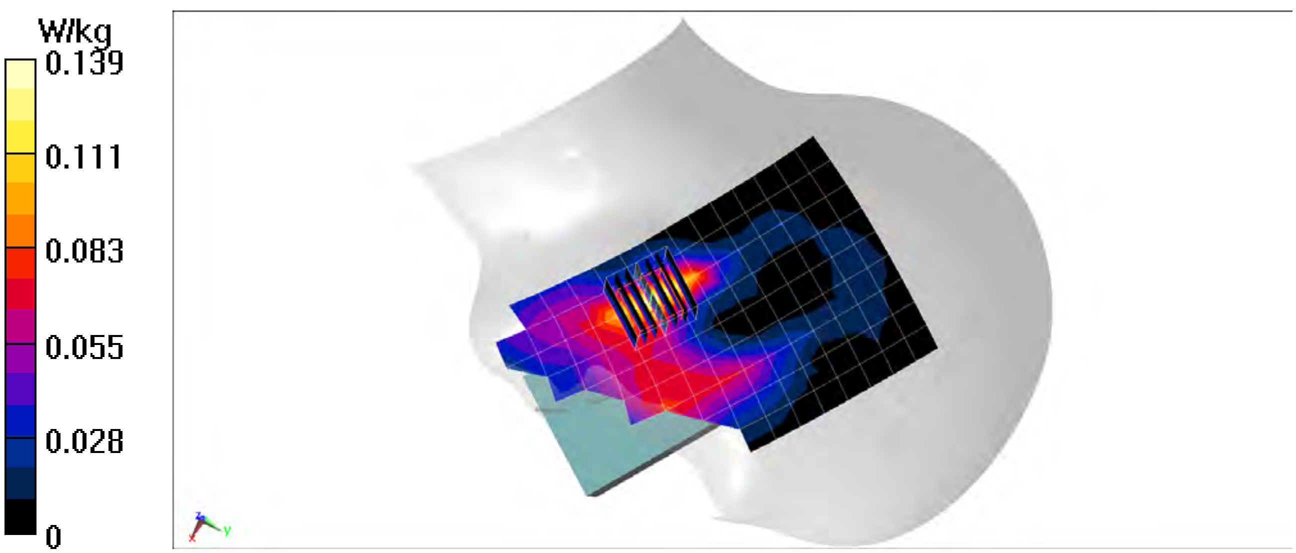
Communication System: UID 0, LTE Band 38; Frequency: 2595 MHz; Duty Cycle: 1:1.58
Medium: 2450 Head Medium parameters used (interpolated):
f = 2595 MHz; σ = 1.977 S/m; ε_r = 40.425; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-26-2019; Ambient Temp: 22.1°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN3589; ConvF(6.25, 6.25, 6.25) @ 2595 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 38, Left Head, Cheek, Mid.ch, QPSK,
20 MHz Bandwidth, 1 RB, 0 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.462 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.173 W/kg
SAR(1 g) = 0.082 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54657

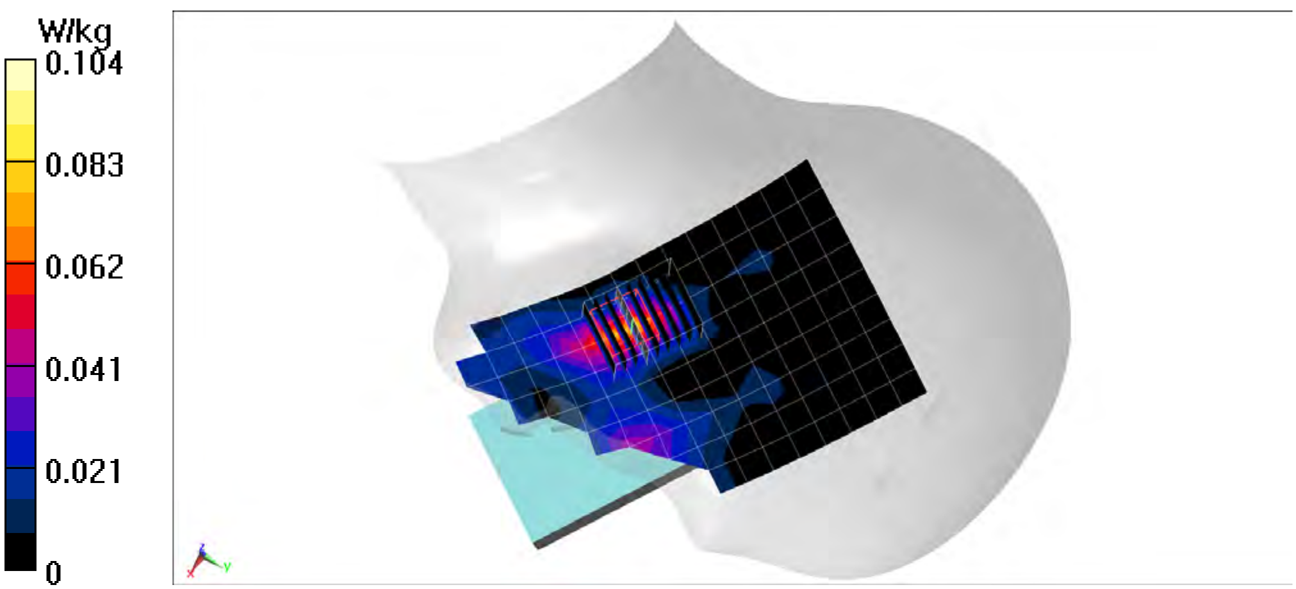
Communication System: UID 0, LTE Band 41; Frequency: 2506 MHz; Duty Cycle: 1:1.58
Medium: 2450 Head Medium parameters used (interpolated):
f = 2506 MHz; σ = 1.858 S/m; ε_r = 39.149; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-19-2019; Ambient Temp: 24.0°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN3589; ConvF(6.46, 6.46, 6.46) @ 2506 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41, Left Head, Cheek, Low.ch, QPSK,
20 MHz Bandwidth, 1 RB, 99 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x9x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.081 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.140 W/kg
SAR(1 g) = 0.062 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54608

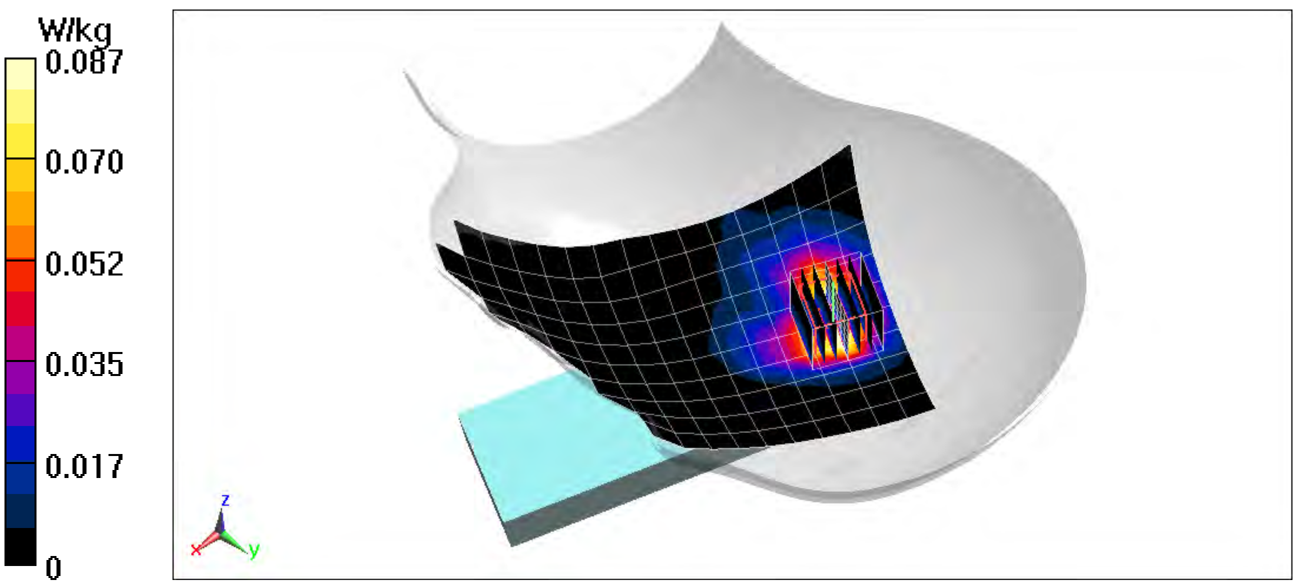
Communication System: UID 0, _IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.817 S/m; ε_r = 39.383; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 07-01-2019; Ambient Temp: 22.1°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3589; ConvF(6.46, 6.46, 6.46) @ 2462 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11b, Antenna 2, 22 MHz Bandwidth, Left Head, Tilt, Ch 11, 1 Mbps

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.646 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.112 W/kg
SAR(1 g) = 0.054 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54574

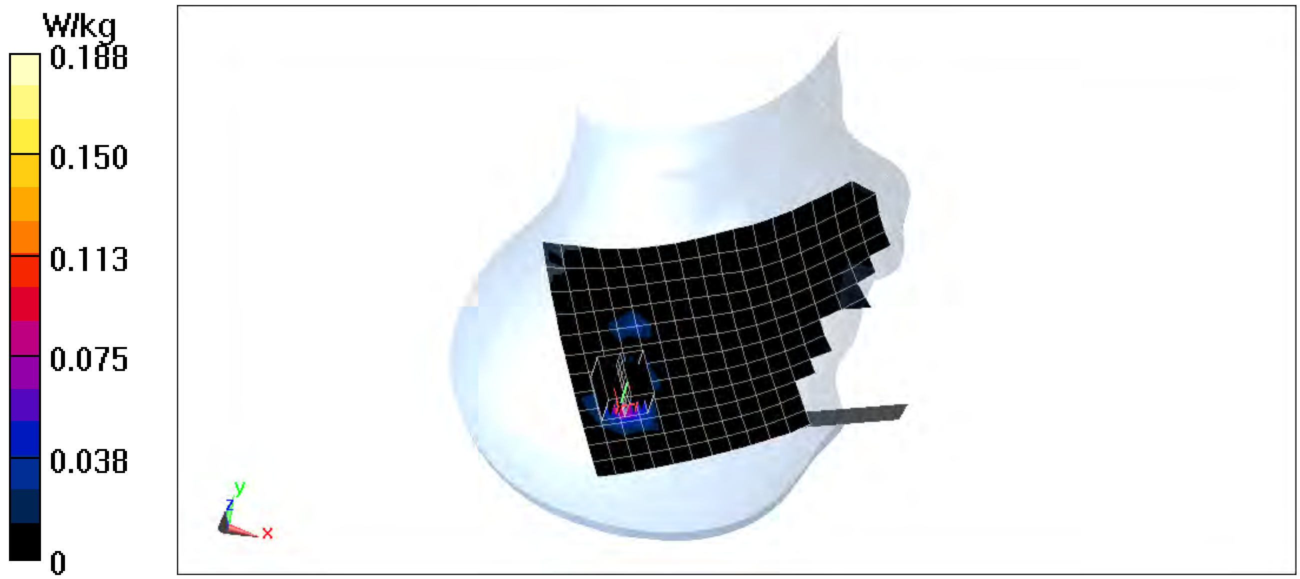
Communication System: UID 0, 802.11n 5.2-5.8 GHz Band; Frequency: 5310 MHz; Duty Cycle: 1:1
Medium: 5GHz Head Medium parameters used (interpolated):
f = 5310 MHz; σ = 4.608 S/m; ε_r = 34.627; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 07-01-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7406; ConvF(5.54, 5.54, 5.54) @ 5310 MHz; Calibrated: 5/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/8/2019
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11n, U-NII-2A, 40 MHz Bandwidth,
Antenna 2, Right Head, Cheek, Ch 62, 13.5 Mbps

Area Scan (13x13x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 3.303 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.409 W/kg
SAR(1 g) = 0.096 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54509

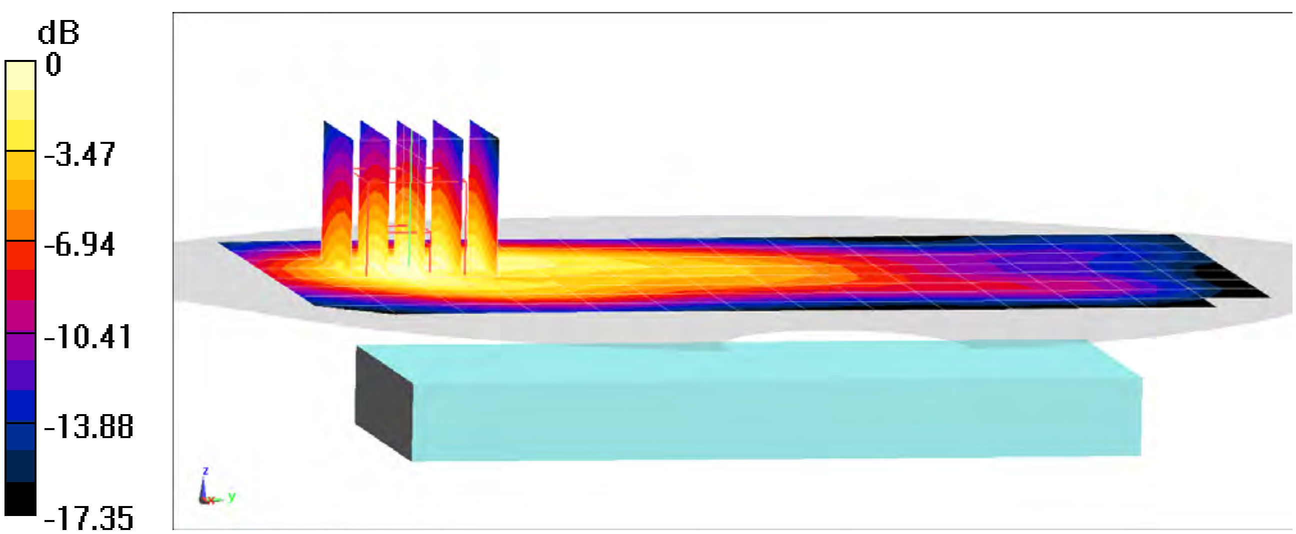
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.55 S/m; ε_r = 54.518; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-19-2019; Ambient Temp: 21.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1880 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1900, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.95 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.389 W/kg
SAR(1 g) = 0.239 W/kg



0 dB = 0.336 W/kg = -4.74 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 55399

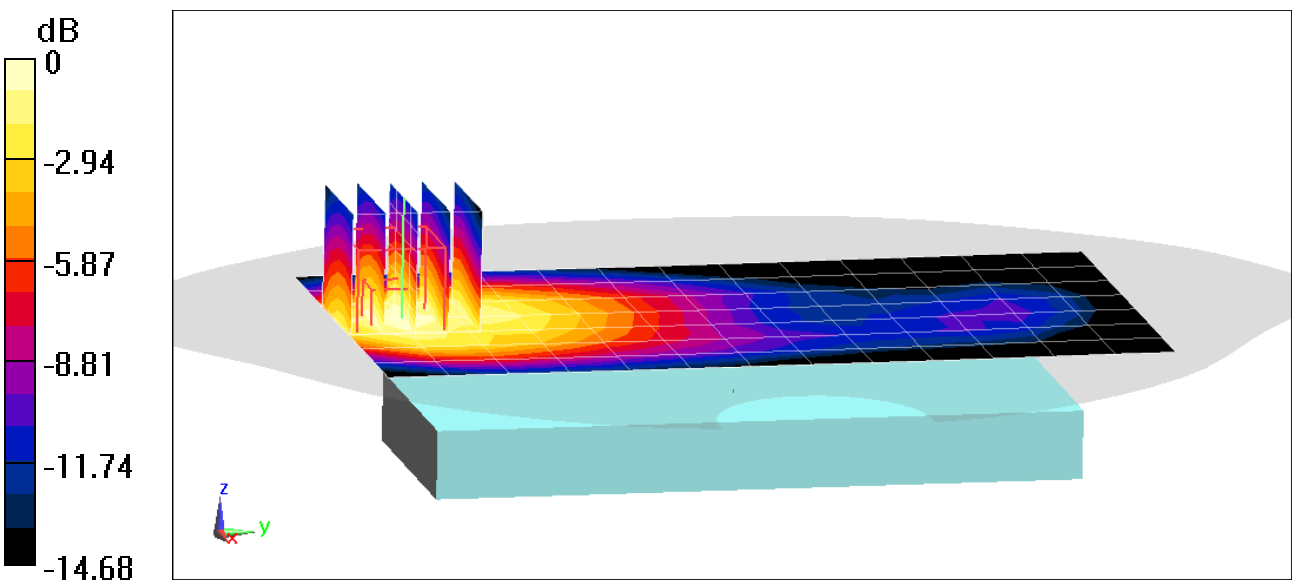
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1720 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1720 MHz; σ = 1.462 S/m; ε_r = 52.796; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-26-2019; Ambient Temp: 21.2°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1720 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V5.0 Back Right; Type: QD 000 P40 CD; Serial: 1692
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 66 (AWS), Body SAR, Back side,
Low.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.21 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.946 W/kg
SAR(1 g) = 0.590 W/kg



0 dB = 0.779 W/kg = -1.08 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54509

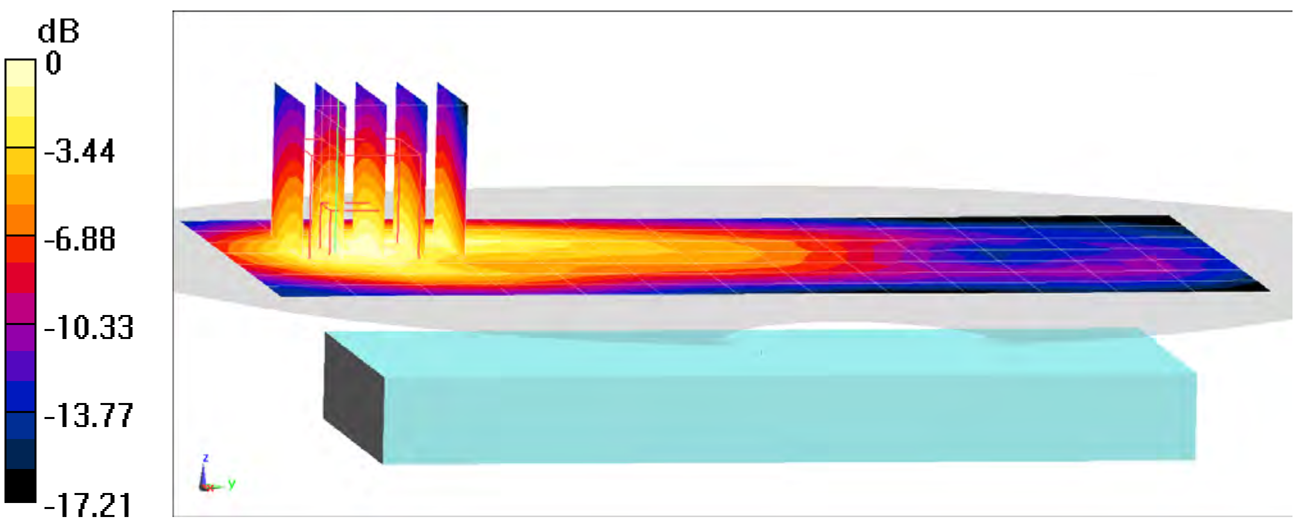
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1860 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1860 MHz; σ = 1.538 S/m; ε_r = 55.156; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-21-2019; Ambient Temp: 21.1°C; Tissue Temp: 19.4°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1860 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 25 (PCS), Body SAR, Back side, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.48 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.576 W/kg
SAR(1 g) = 0.355 W/kg



0 dB = 0.477 W/kg = -3.21 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54608

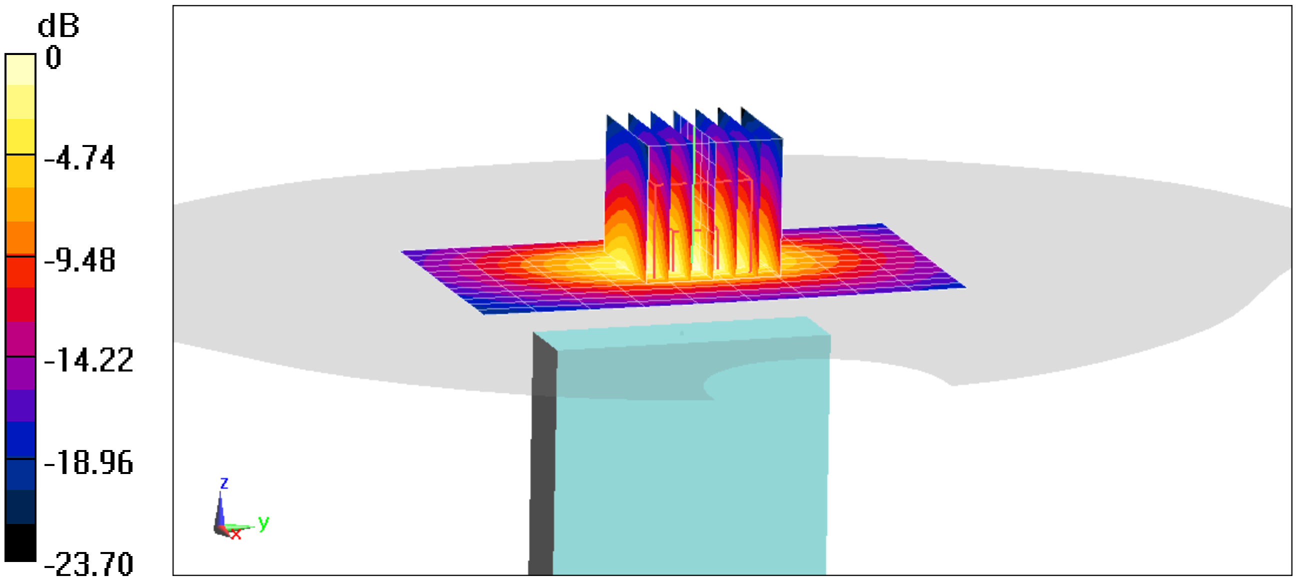
Communication System: UID 0, LTE Band 7; Frequency: 2535 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2535 MHz; σ = 2.119 S/m; ε_r = 51.026; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-24-2019; Ambient Temp: 22.5°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2535 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 7, Body SAR, Bottom Edge, Mid.ch,
20 MHz Bandwidth, QPSK, 50 RB, 25 RB Offset

Area Scan (13x10x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.94 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.80 W/kg
SAR(1 g) = 0.884 W/kg



0 dB = 1.46 W/kg = 1.64 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 53436

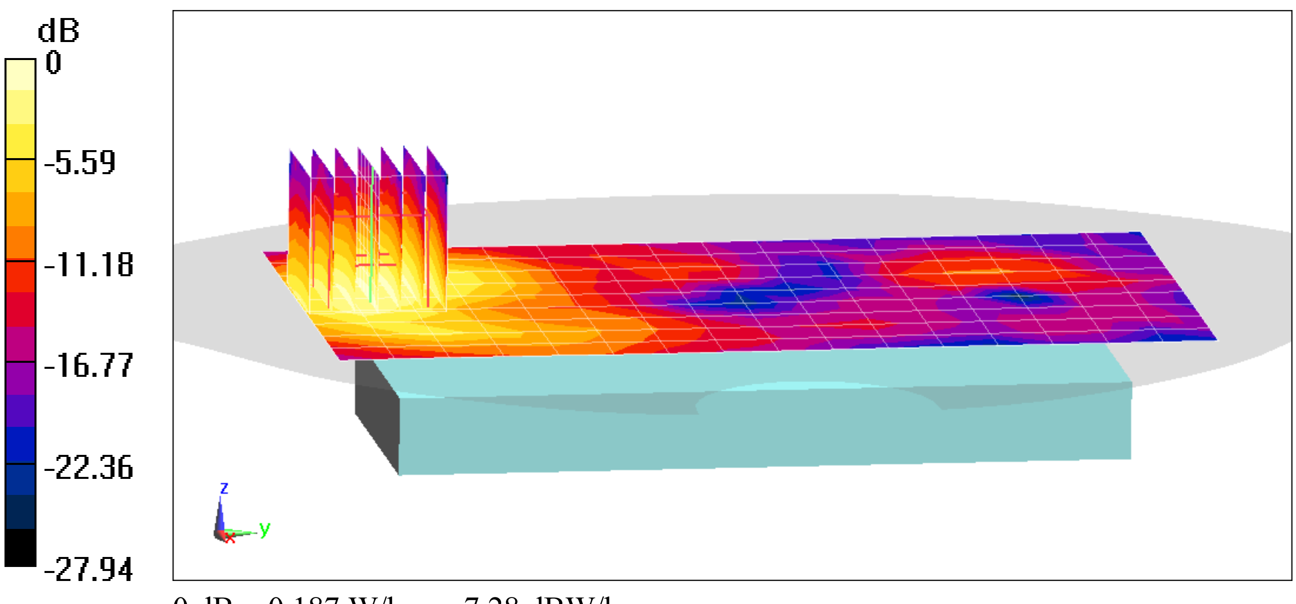
Communication System: UID 0, _LTE Band 38; Frequency: 2595 MHz; Duty Cycle: 1:1.58
Medium: 2450 MHz Body Medium parameters used (interpolated):
f = 2595 MHz; σ = 2.167 S/m; ε_r = 52.891; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-26-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7308; ConvF(7.4, 7.4, 7.4) @ 2595 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 38, Body SAR, Back side, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.120 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.233 W/kg
SAR(1 g) = 0.118 W/kg



0 dB = 0.187 W/kg = -7.28 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 53436

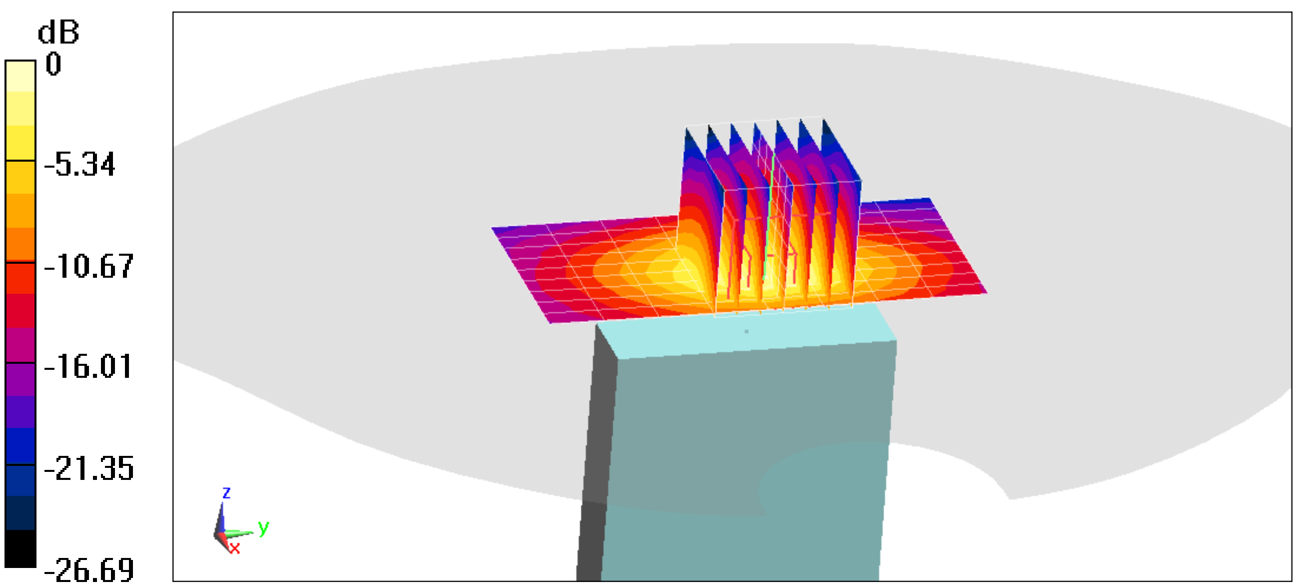
Communication System: UID 0, _LTE Band 38; Frequency: 2595 MHz; Duty Cycle: 1:1.58
Medium: 2450 MHz Body Medium parameters used (interpolated):
f = 2595 MHz; σ = 2.167 S/m; ε_r = 52.891; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-26-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7308; ConvF(7.4, 7.4, 7.4) @ 2595 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

**Mode: LTE Band 38, Body SAR, Bottom Edge, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.94 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.968 W/kg
SAR(1 g) = 0.480 W/kg



0 dB = 0.787 W/kg = -1.04 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54608

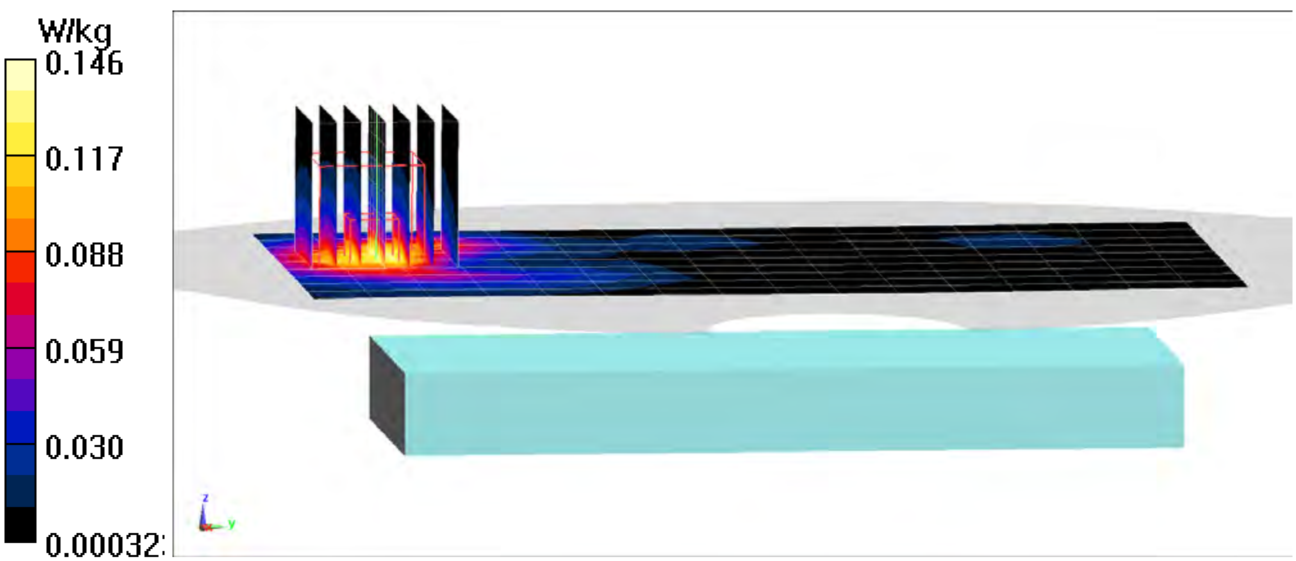
Communication System: UID 0, LTE Band 41; Frequency: 2506 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body Medium parameters used (interpolated):
f = 2506 MHz; σ = 2.103 S/m; ε_r = 50.822; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-17-2019; Ambient Temp: 23.9°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2506 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41, Body SAR, Back side, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.871 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.182 W/kg
SAR(1 g) = 0.092 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54608

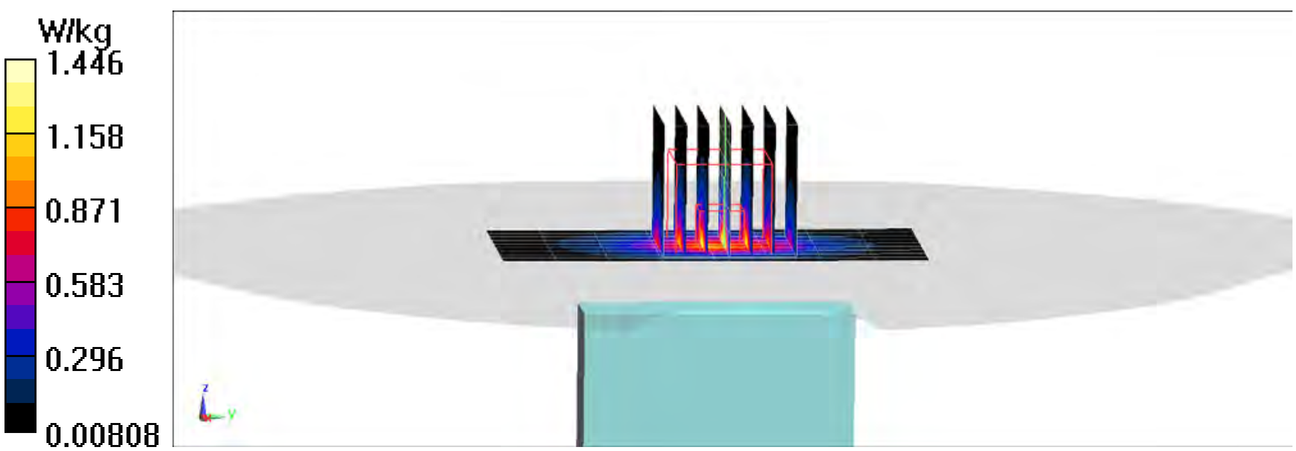
Communication System: UID 0, LTE Band 41; Frequency: 2506 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body Medium parameters used (interpolated):
f = 2506 MHz; σ = 2.105 S/m; ε_r = 50.703; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-25-2019; Ambient Temp: 23.2°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2506 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41, Body SAR, Bottom Edge, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.22 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.79 W/kg
SAR(1 g) = 0.902 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54574

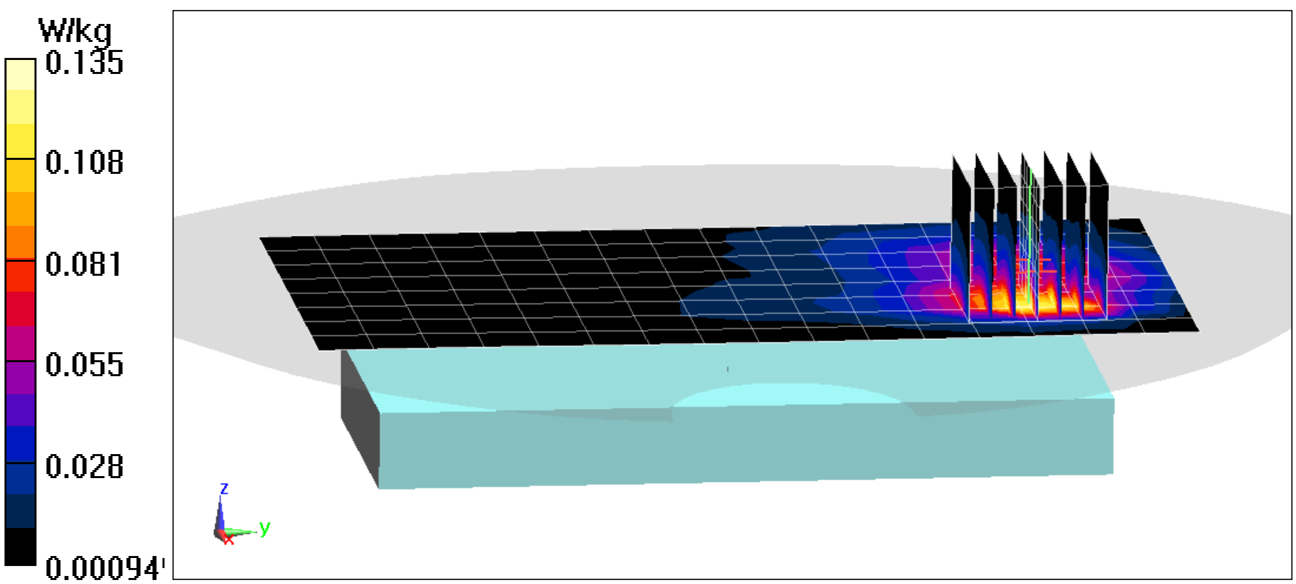
Communication System: UID 0, _IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2412 MHz; σ = 1.979 S/m; ε_r = 51.905; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-29-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2412 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11b, 22 MHz Bandwidth,
Body SAR, Ch 01, Antenna 2, 1 Mbps, Back Side

Area Scan (9x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.230 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.173 W/kg
SAR(1 g) = 0.083 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54574

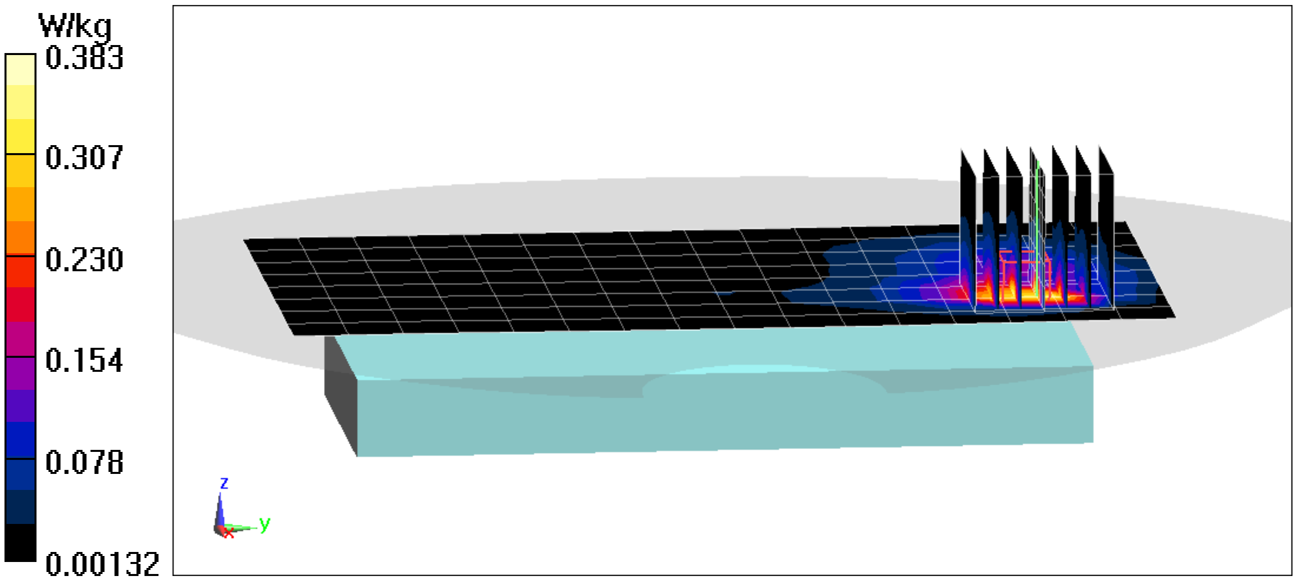
Communication System: UID 0, _IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2412 MHz; σ = 1.979 S/m; ε_r = 51.905; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-29-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2412 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11b, 22 MHz Bandwidth,
Body SAR, Ch 01, Antenna 2, 1 Mbps, Back Side

Area Scan (9x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.431 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.503 W/kg
SAR(1 g) = 0.221 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 53592

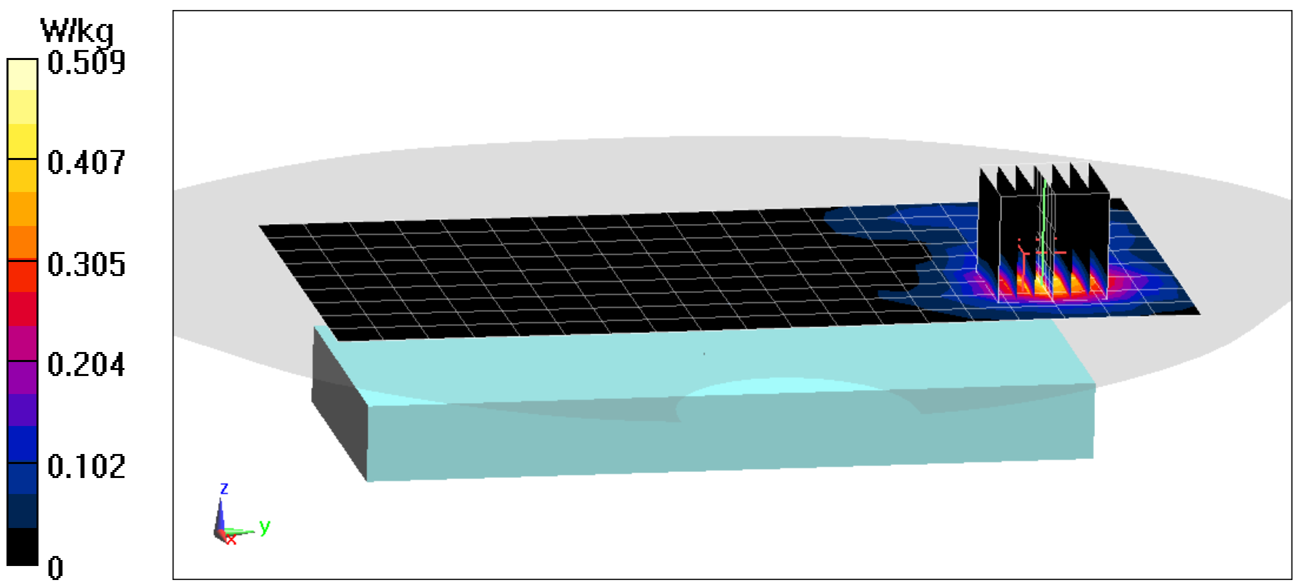
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5785 MHz; σ = 6.257 S/m; ε_r = 48.336; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 07-08-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7308; ConvF(4.18, 4.18, 4.18) @ 5785 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11a, UNII-3, Antenna 2, 20 MHz Bandwidth, Body SAR, Ch 157, 6 Mbps, Back Side

Area Scan (10x20x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 5.840 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.873 W/kg
SAR(1 g) = 0.204 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 53592

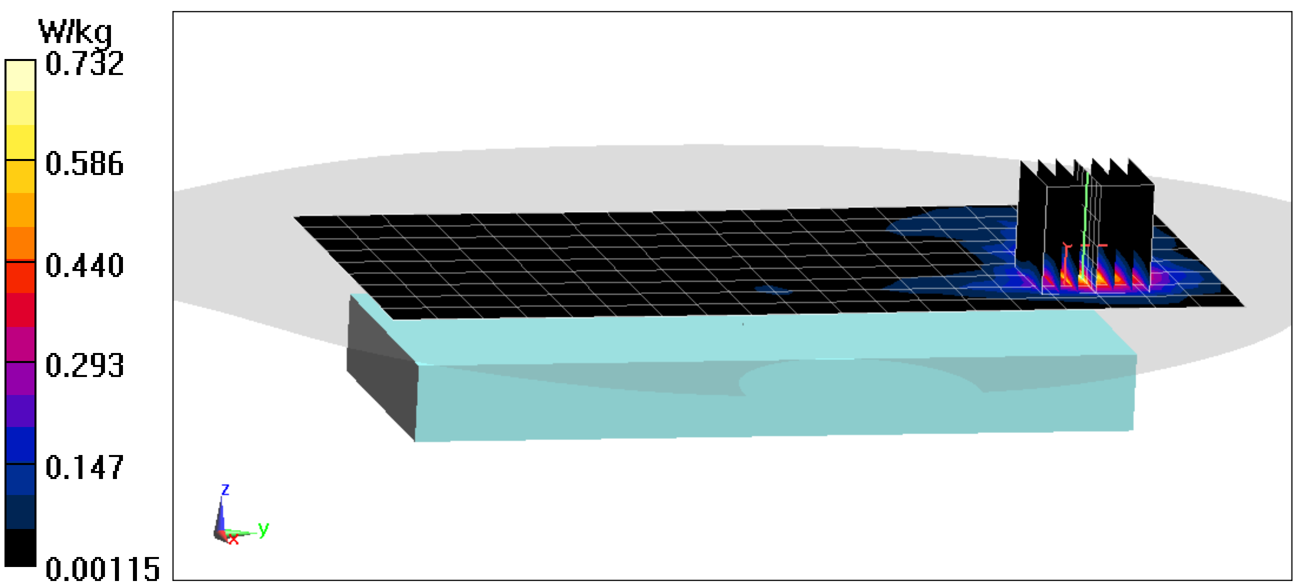
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5785 MHz; σ = 6.257 S/m; ε_r = 48.336; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-08-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7308; ConvF(4.18, 4.18, 4.18) @ 5785 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11a, UNII-3, Antenna 2, 20 MHz Bandwidth, Body SAR, Ch 157, 6 Mbps, Back Side

Area Scan (10x20x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 7.210 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 1.27 W/kg
SAR(1 g) = 0.289 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 55399

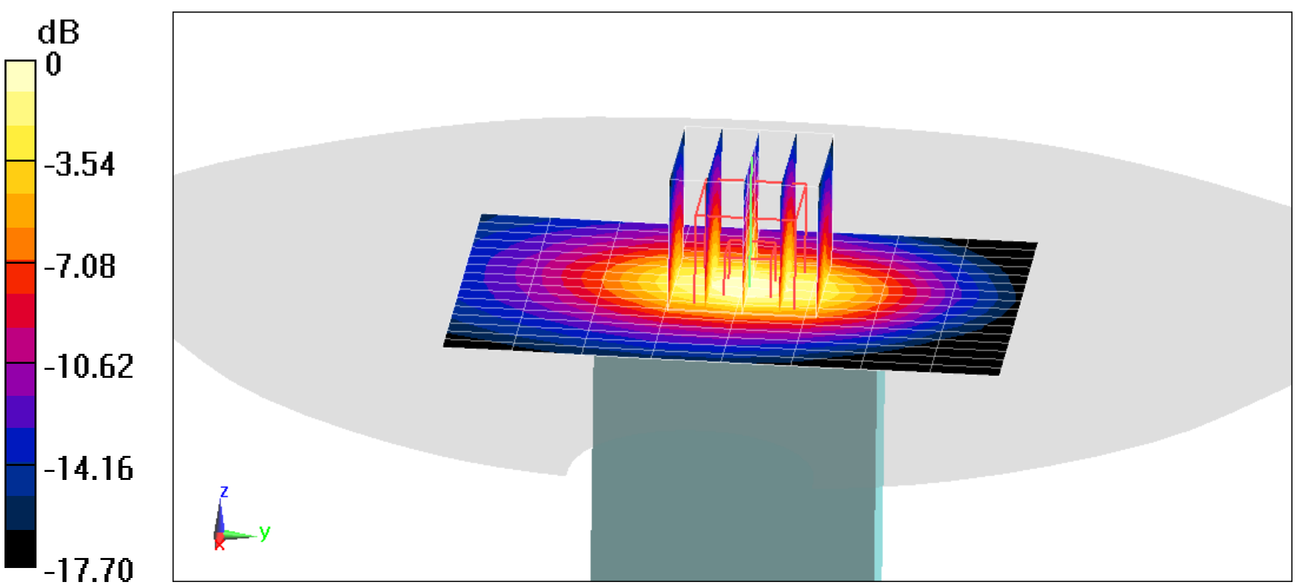
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.553 S/m; ε_r = 53.697; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.3 cm

Test Date: 07-15-2019; Ambient Temp: 19.3°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1880 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 1900, Phablet SAR, Bottom Edge, Mid.ch, 2 Tx Slots

Area Scan (17x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.66 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(10 g) = 0.385 W/kg



0 dB = 1.05 W/kg = 0.21 dBW/kg

DUT: A3LSMF900F; Type: Portable Handset; Serial: 55399

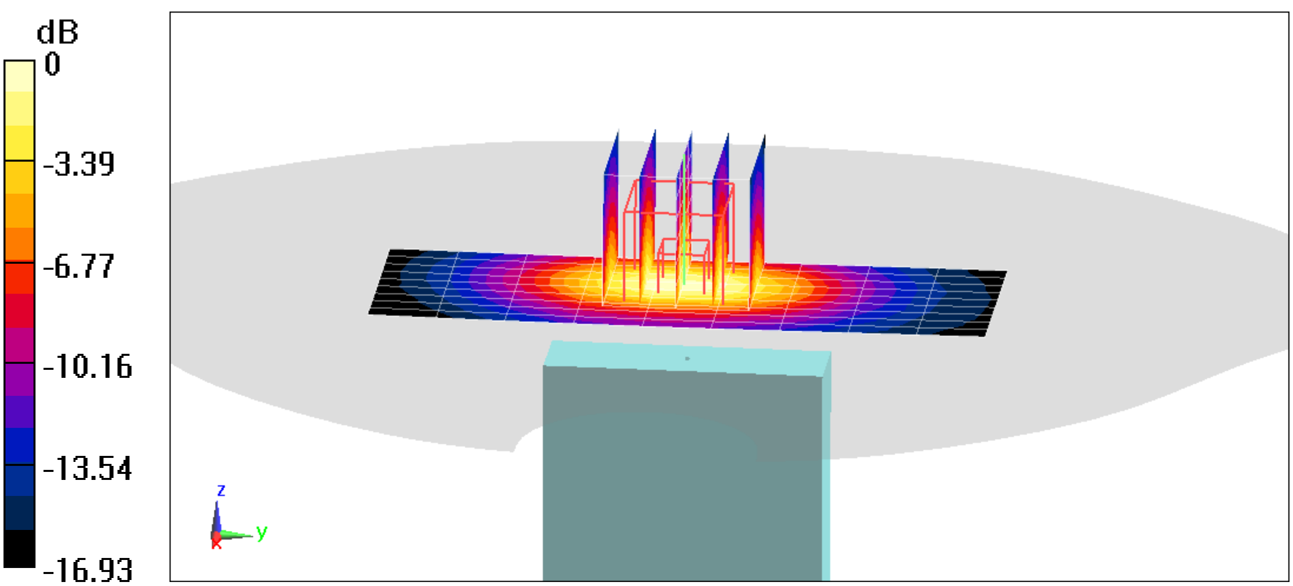
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.447 S/m; ε_r = 52.807; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.3 cm

Test Date: 07-08-2019; Ambient Temp: 22.3°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1732.4 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1750, Phablet SAR, Bottom Edge, Mid.ch

Area Scan (10x10x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.17 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 2.16 W/kg
SAR(10 g) = 0.700 W/kg



0 dB = 2.34 W/kg = 3.69 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54509

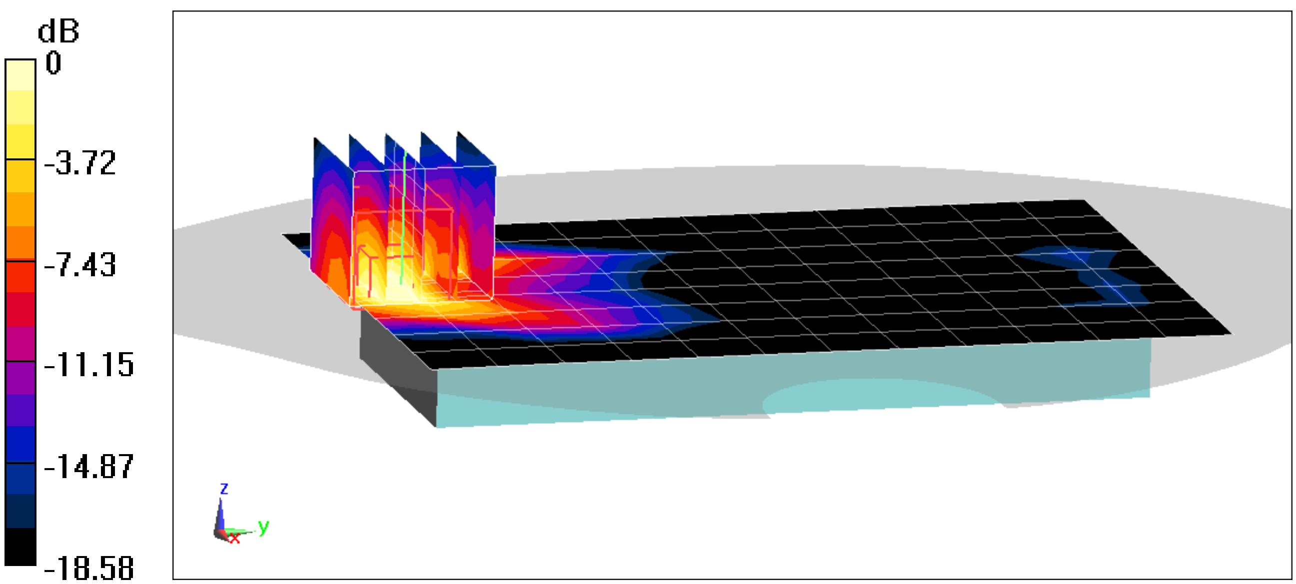
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; $\sigma = 1.55$ S/m; $\varepsilon_r = 54.518$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-19-2019; Ambient Temp: 21.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1880 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1900, Phablet SAR, Front side, Mid.ch

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.45 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 3.77 W/kg
SAR(10 g) = 0.872 W/kg



0 dB = 2.73 W/kg = 4.36 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 55399

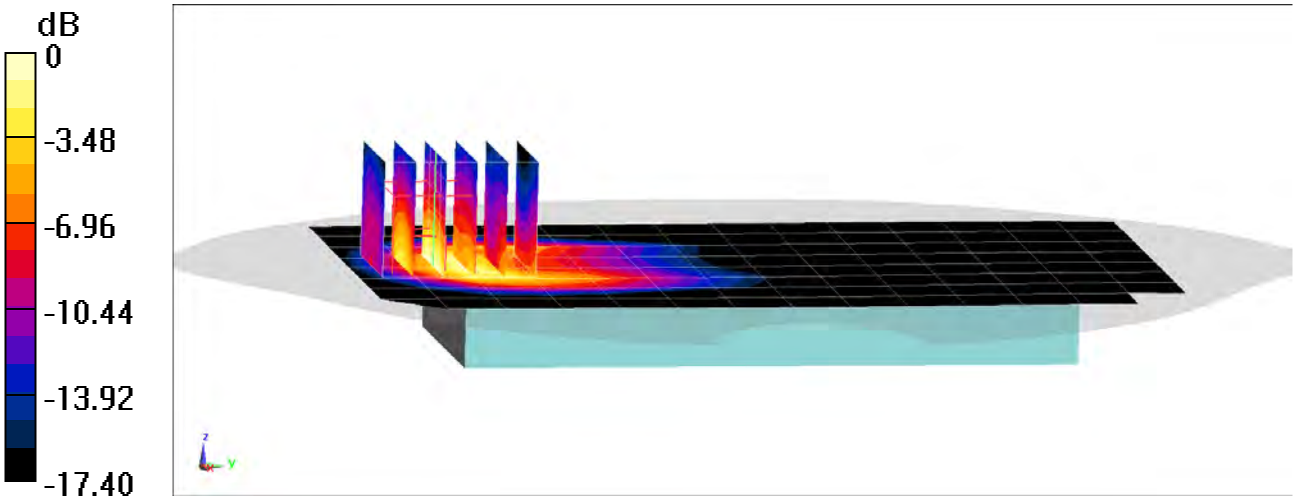
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1720 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1720 MHz; σ = 1.4 S/m; ε_r = 55.275; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-19-2019; Ambient Temp: 22.2°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1720 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 66 (AWS), 66C ULCA, Phablet SAR, Front side, Low.ch,
PCC: 20 MHz Bandwidth, QPSK, Ch. 132072, 1 RB, 99 RB Offset
SCC: 20 MHz Bandwidth, QPSK, Ch. 132270, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.88 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 4.14 W/kg
SAR(10 g) = 1.13 W/kg



0 dB = 3.56 W/kg = 5.51 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54509

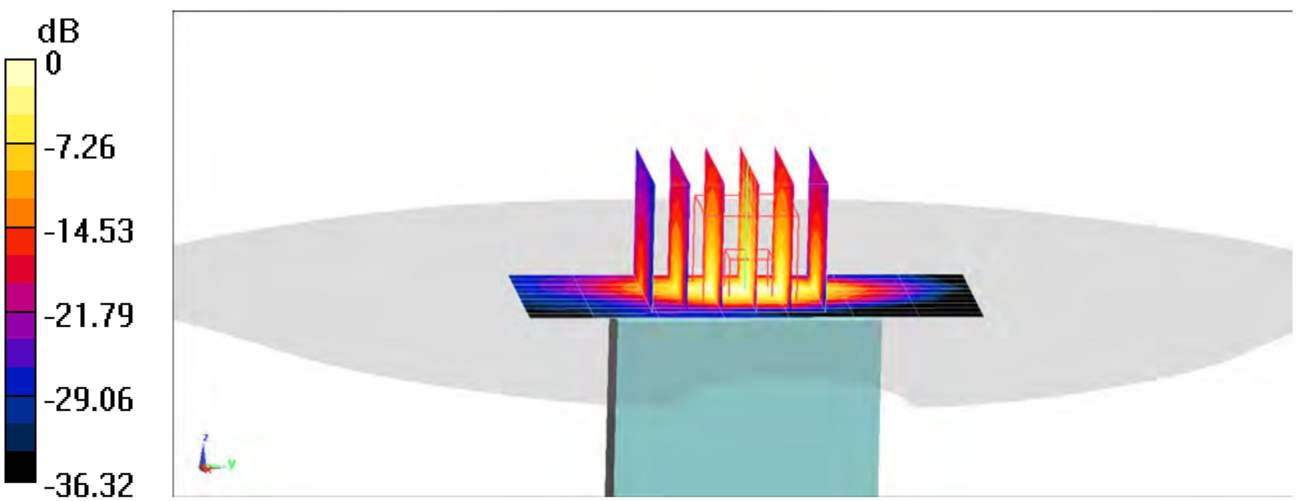
Communication System: UID 0, _LTE Band 25 (PCS); Frequency: 1905 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1905 MHz; σ = 1.572 S/m; ε_r = 55.098; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-21-2019; Ambient Temp: 21.1°C; Tissue Temp: 19.4°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1905 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

**Mode: LTE Band 25 (PCS), Phablet SAR, Bottom Edge, High.ch,
20 MHz Bandwidth, QPSK, 50 RB, 50 RB Offset**

Area Scan (10x8x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 52.55 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 11.7 W/kg
SAR(10 g) = 2.06 W/kg



0 dB = 8.77 W/kg = 9.43 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54608

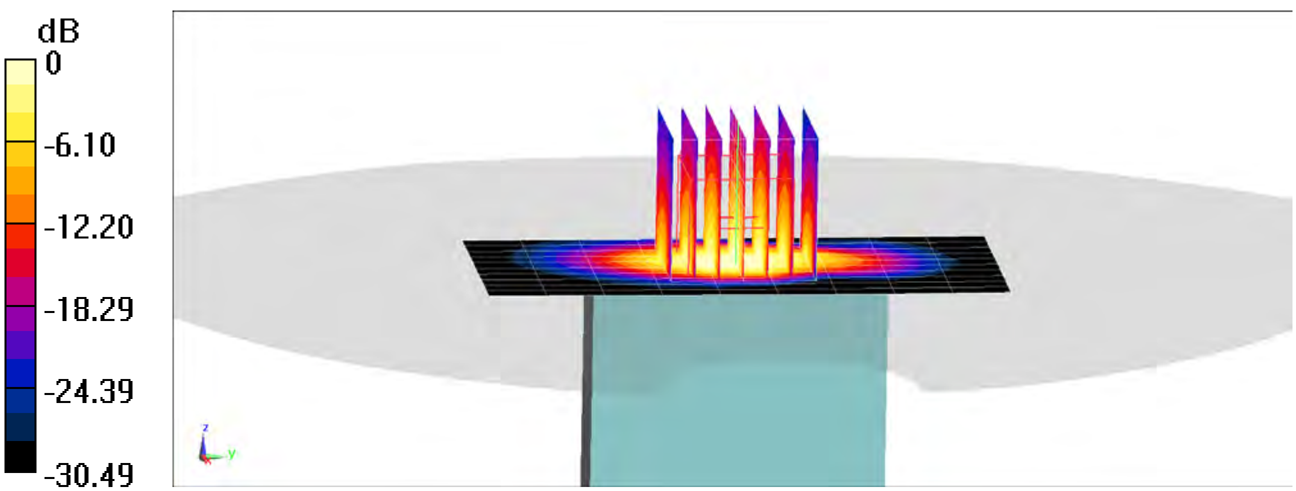
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2310 MHz; σ = 1.869 S/m; ε_r = 52.188; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-23-2019; Ambient Temp: 21.6°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7417; ConvF(7.64, 7.64, 7.64) @ 2310 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 30, Phablet SAR, Bottom Edge, Mid.ch,
10 MHz Bandwidth, QPSK, 25 RB, 0 RB Offset

Area Scan (11x10x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.42 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 12.3 W/kg
SAR(10 g) = 2.09 W/kg



0 dB = 8.56 W/kg = 9.32 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54509

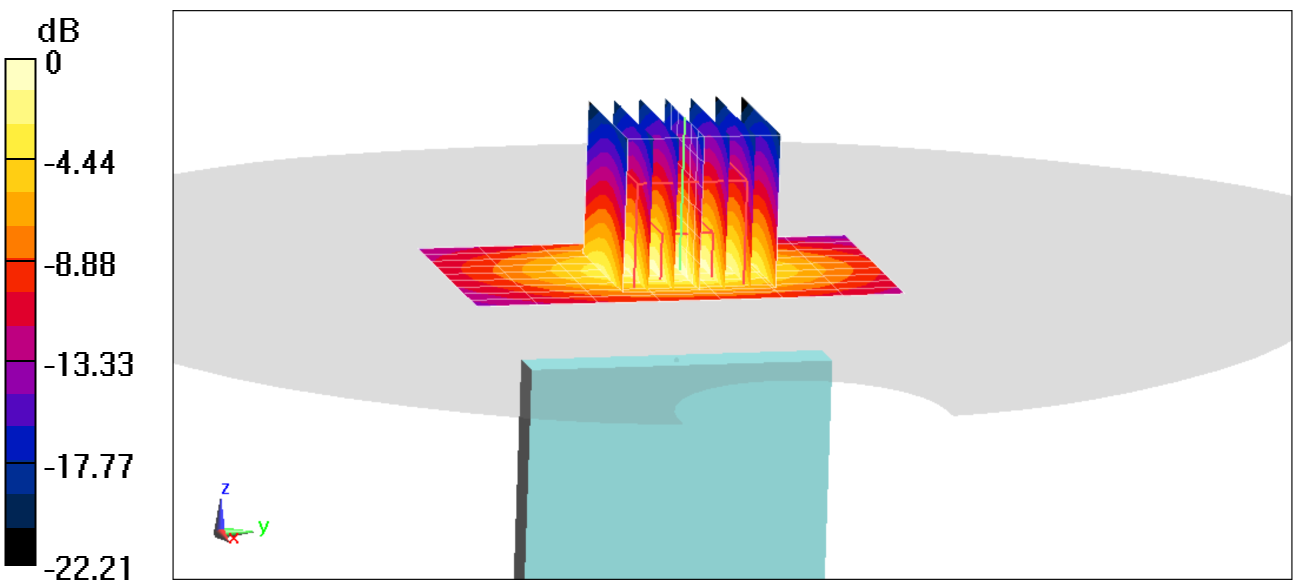
Communication System: UID 0, _LTE Band 7; Frequency: 2560 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2560 MHz; σ = 2.177 S/m; ε_r = 51.796; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.3 cm

Test Date: 07-15-2019; Ambient Temp: 22.2°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2560 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 7, Phablet SAR, Bottom Edge, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x8x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.85 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 2.53 W/kg
SAR(10 g) = 0.640 W/kg



0 dB = 2.07 W/kg = 3.16 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 53436

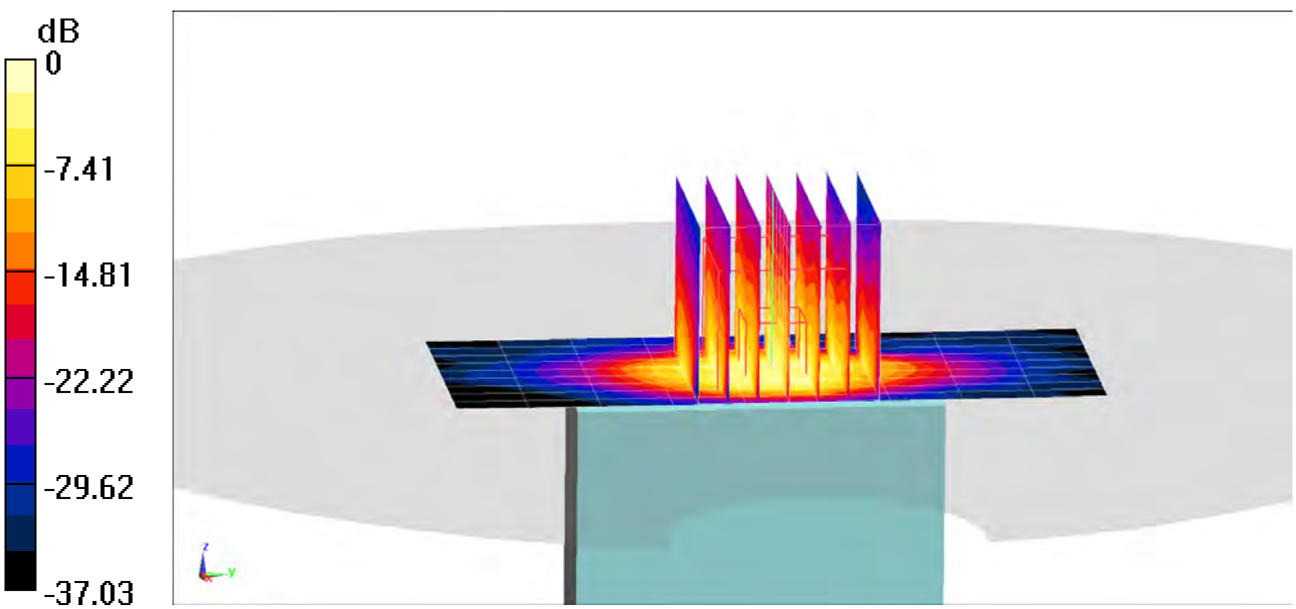
Communication System: UID 0, _LTE Band 38; Frequency: 2595 MHz; Duty Cycle: 1:1.58
Medium: 2450 MHz Body Medium parameters used (interpolated):
f = 2595 MHz; σ = 2.167 S/m; ε_r = 52.891; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-26-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7308; ConvF(7.4, 7.4, 7.4) @ 2595 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 38, Phablet SAR, Bottom Edge, Mid.ch,
20 MHz Bandwidth, QPSK, 50 RB, 25 RB Offset

Area Scan (10x10x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 48.77 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(10 g) = 1.98 W/kg



0 dB = 10.9 W/kg = 10.37 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54509

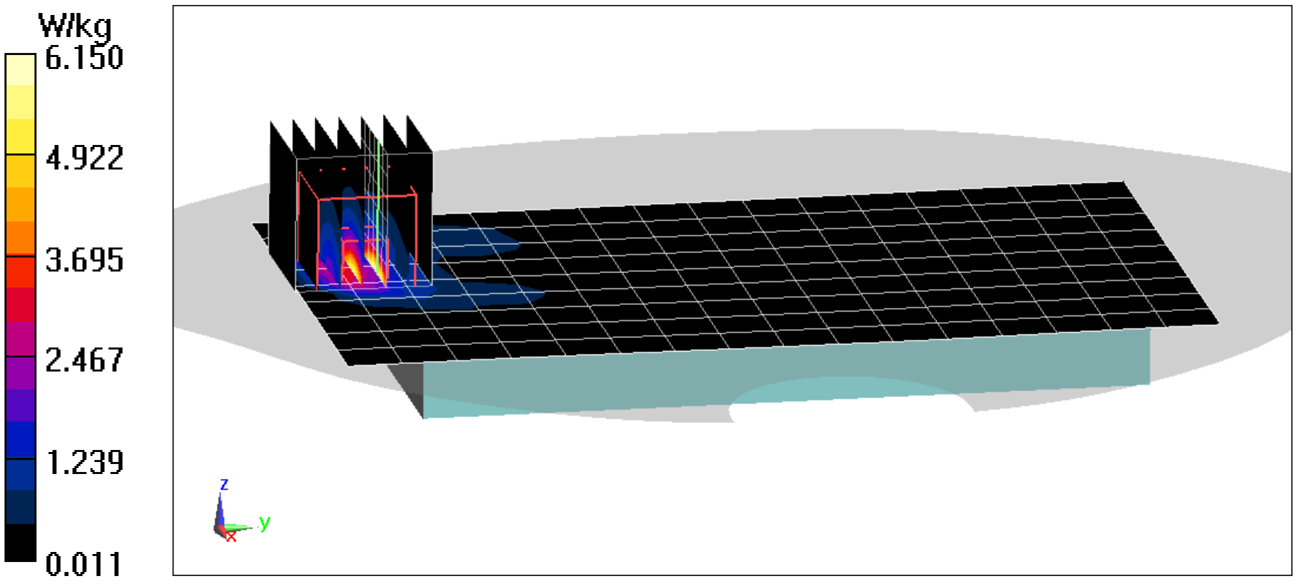
Communication System: UID 0, _LTE Band 41; Frequency: 2506 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body Medium parameters used (interpolated):
f = 2506 MHz; σ = 2.082 S/m; ε_r = 51.107; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 07-24-2019; Ambient Temp: 22.5°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2506 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41, Phablet SAR, Front side, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 44.21 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 10.2 W/kg
SAR(10 g) = 1.25 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 53592

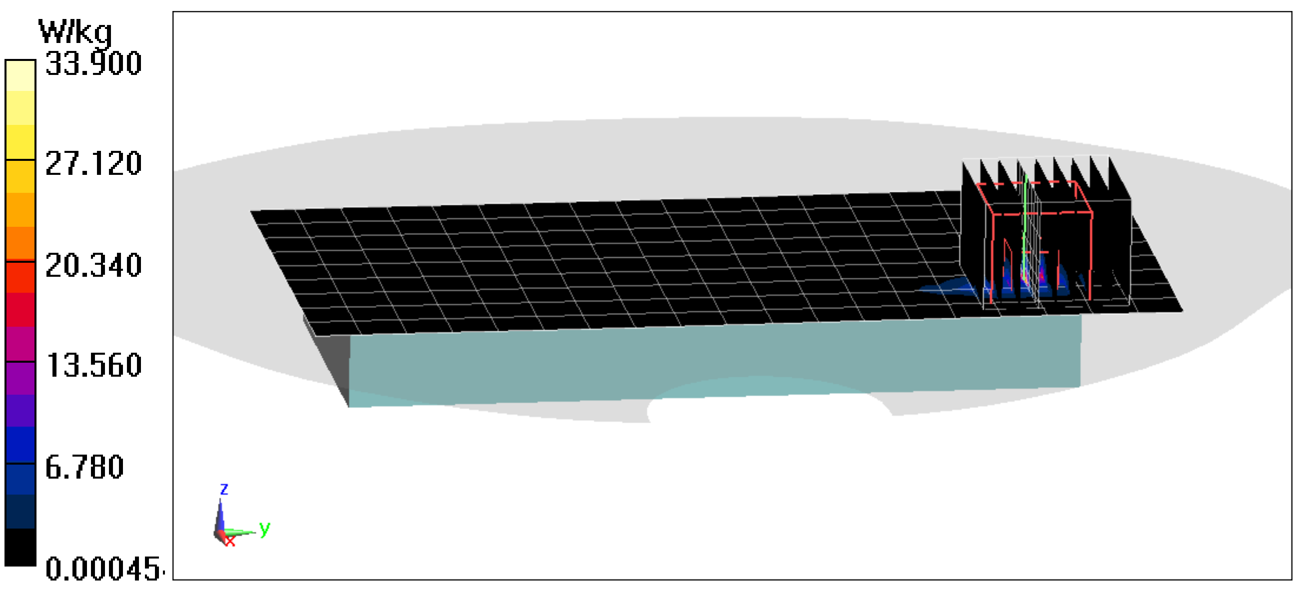
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5500 MHz; Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5500 MHz; σ = 5.813 S/m; ε_r = 48.901; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 07-08-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7308; ConvF(4, 4, 4) @ 5500 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11a, U-NII-2C, Antenna 2, 20 MHz Bandwidth, Phablet SAR, Ch 100, 6 Mbps, Back Side

Area Scan (10x20x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 37.09 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 83.2 W/kg
SAR(10 g) = 1.72 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 55399

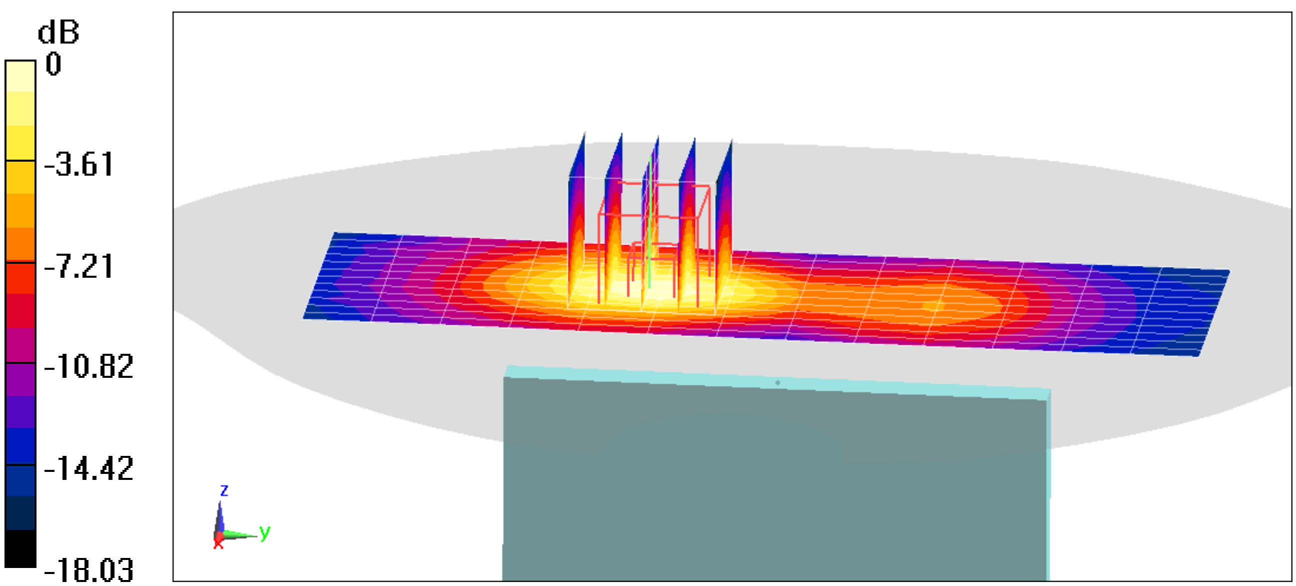
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.553 S/m; ε_r = 53.697; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.6 cm

Test Date: 07-15-2019; Ambient Temp: 19.3°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1880 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 1900, UMPC Body SAR, Bottom Edge, Mid.ch, 2 Tx Slots

Area Scan (13x14x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.56 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.653 W/kg
SAR(1 g) = 0.380 W/kg



0 dB = 0.560 W/kg = -2.52 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 55399

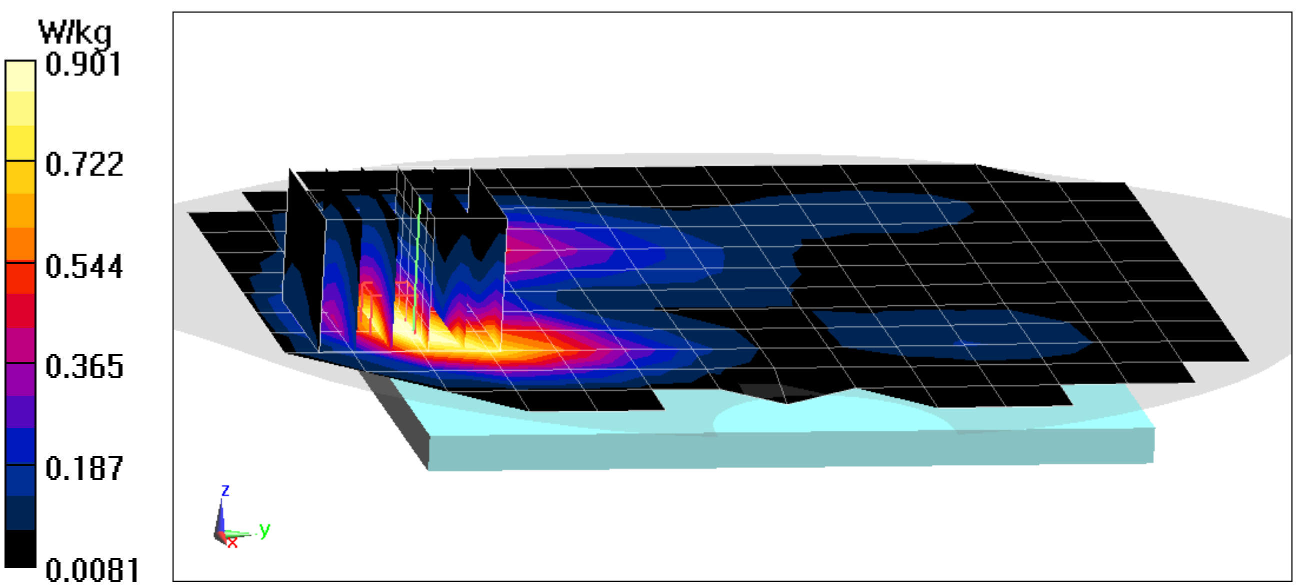
Communication System: UID 0, UMTS; Frequency: 1752.6 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1752.6 MHz; σ = 1.546 S/m; ε_r = 51.748; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.1 cm

Test Date: 07-03-2019; Ambient Temp: 23.9°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1752.6 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1750, UMPC Body SAR, Front side, High.ch

Area Scan (13x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.82 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.670 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54657

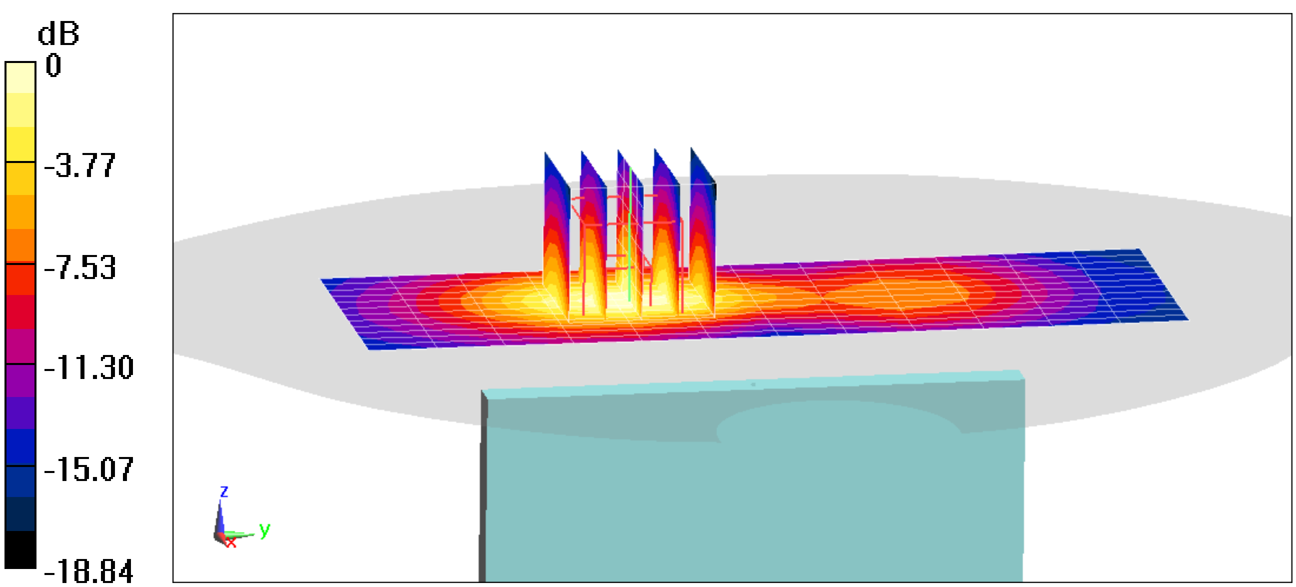
Communication System: UID 0, _UMTS; Frequency: 1852.4 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1852.4 MHz; σ = 1.499 S/m; ε_r = 52.928; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.6 cm

Test Date: 07-05-2019; Ambient Temp: 21.3°C; Tissue Temp: 24.8°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1852.4 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1900, UMPC Body SAR, Bottom Edge, Low.ch

Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.20 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.664 W/kg



0 dB = 1.01 W/kg = 0.04 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54509

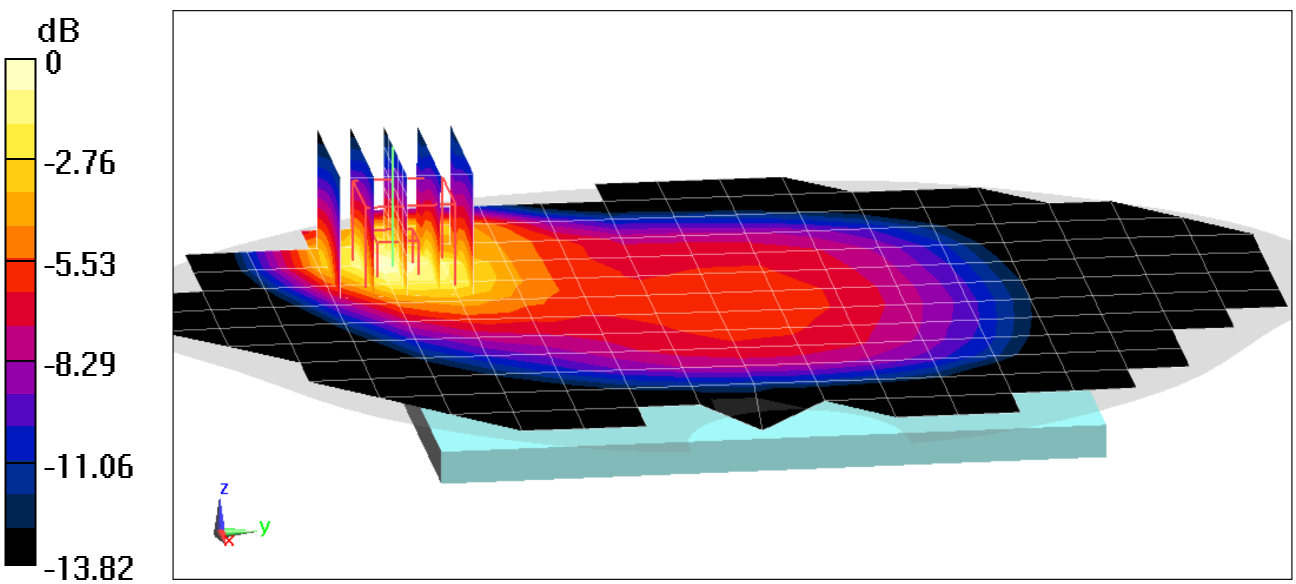
Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 831.5$ MHz; $\sigma = 0.962$ S/m; $\varepsilon_r = 54.533$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-26-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(9.63, 9.63, 9.63) @ 831.5 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 26 (Cell.), UMPC Body SAR, Back side, Mid.ch, 15 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (15x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.42 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.620 W/kg



0 dB = 0.889 W/kg = -0.51 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 55399

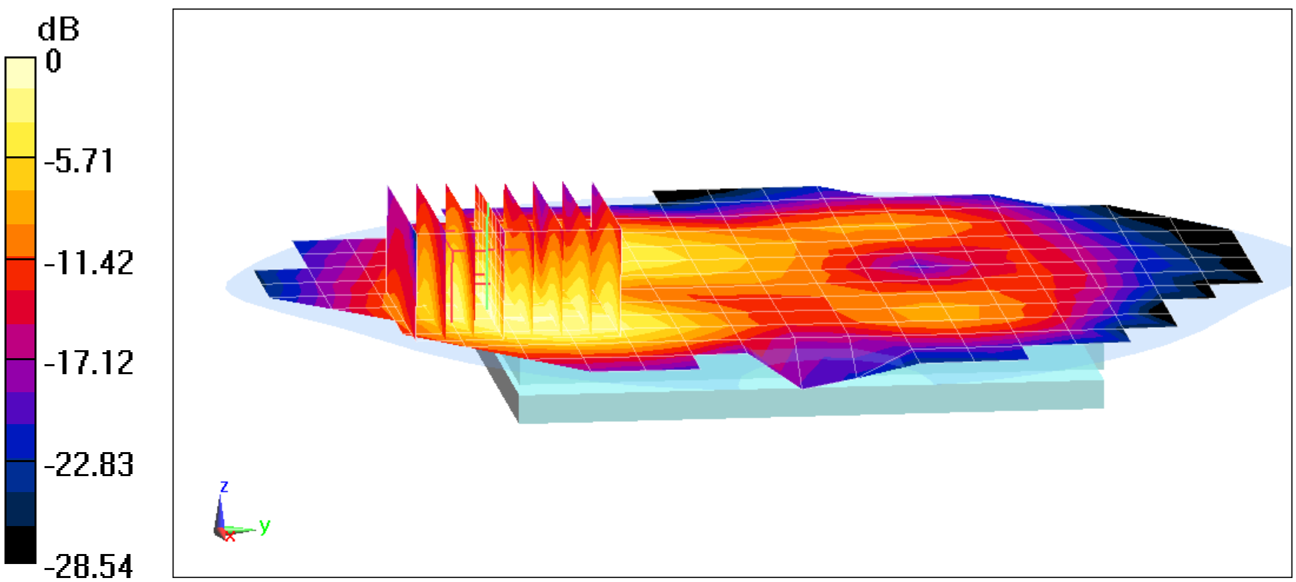
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1775 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1775 MHz; σ = 1.446 S/m; ε_r = 53.453; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.1 cm

Test Date: 07-15-2019; Ambient Temp: 21.9°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7409; ConvF(7.85, 7.85, 7.85) @ 1775 MHz; Calibrated: 6/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/20/2019
Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

**Mode: LTE Band 66 (AWS), 66B ULCA, UMPC Body SAR, Front side, High ch.,
PCC: 10 MHz Bandwidth, QPSK, Ch. 132622, 1 RB, 0 RB Offset
SCC: 10 MHz Bandwidth, QPSK, Ch. 132523, 1 RB, 49 RB Offset**

Area Scan (15x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.01 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 1.27 W/kg
SAR(1 g) = 0.730 W/kg



0 dB = 1.09 W/kg = 0.37 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54657

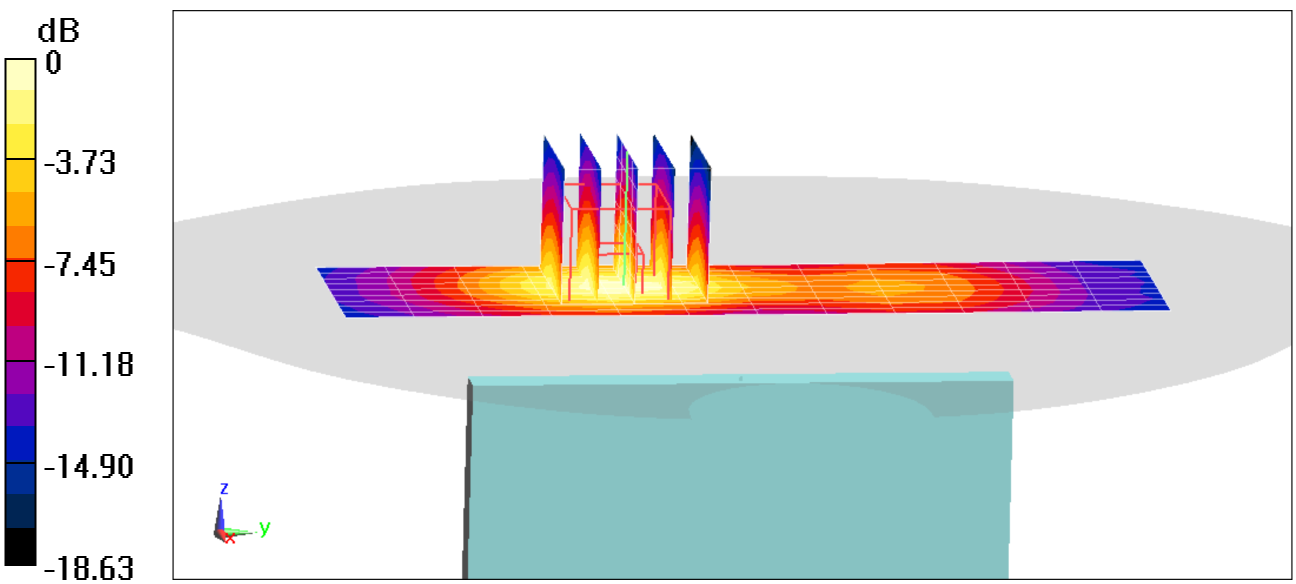
Communication System: UID 0, _LTE Band 25 (PCS); Frequency: 1905 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1905 MHz; σ = 1.59 S/m; ε_r = 51.789; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.6 cm

Test Date: 07-10-2019; Ambient Temp: 22.9°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1905 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 25 (PCS), UMPC Body SAR, Bottom Edge, High.ch, 20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset

Area Scan (10x13x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.23 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.578 W/kg



0 dB = 0.853 W/kg = -0.69 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54509

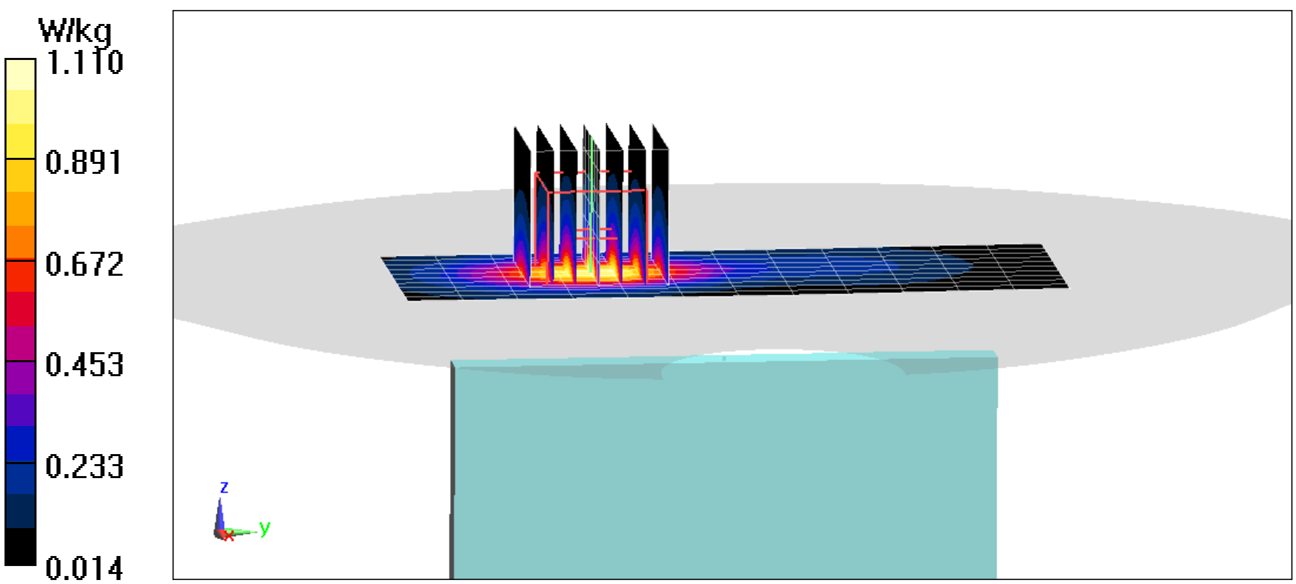
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2310 MHz; σ = 1.875 S/m; ε_r = 52.758; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.6 cm

Test Date: 07-11-2019; Ambient Temp: 22.2°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN7308; ConvF(7.73, 7.73, 7.73) @ 2310 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 30, UMPC Body SAR, Bottom Edge, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (11x13x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.90 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.25 W/kg
SAR(1 g) = 0.674 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54608

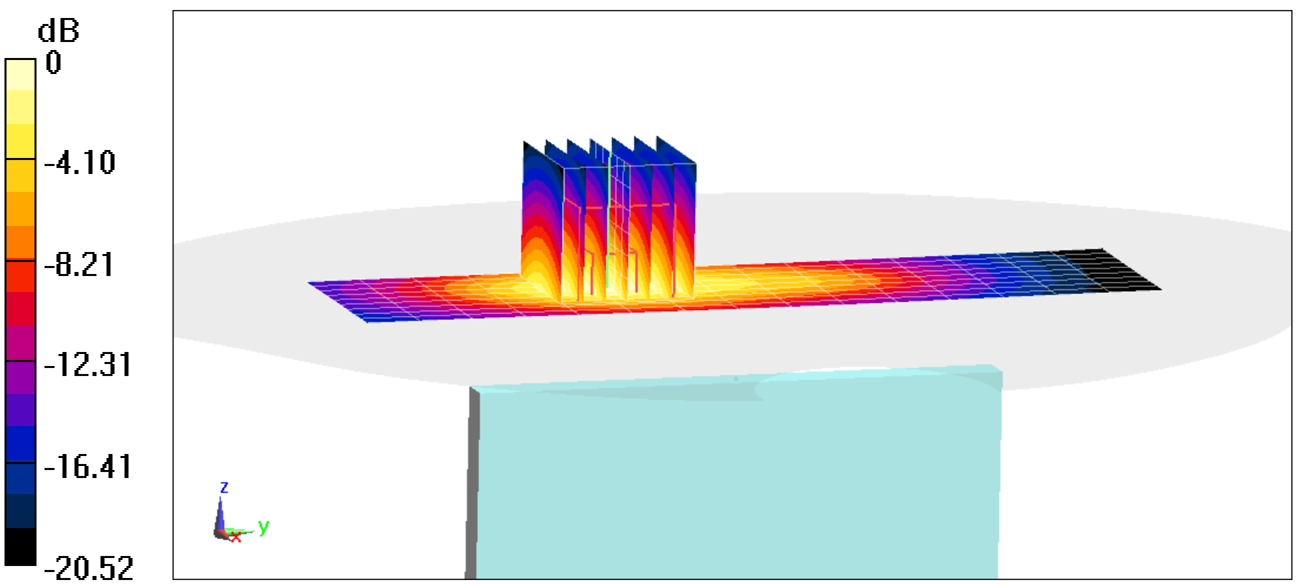
Communication System: UID 0, _LTE Band 7; Frequency: 2510 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2510 MHz; σ = 2.117 S/m; ε_r = 51.952; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.6 cm

Test Date: 07-15-2019; Ambient Temp: 22.2°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2510 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

**Mode: LTE Band 7, UMPC Body SAR, Bottom Edge,
Low.ch, 20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset**

Area Scan (10x16x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.87 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.79 W/kg
SAR(1 g) = 0.913 W/kg



0 dB = 1.46 W/kg = 1.64 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54608

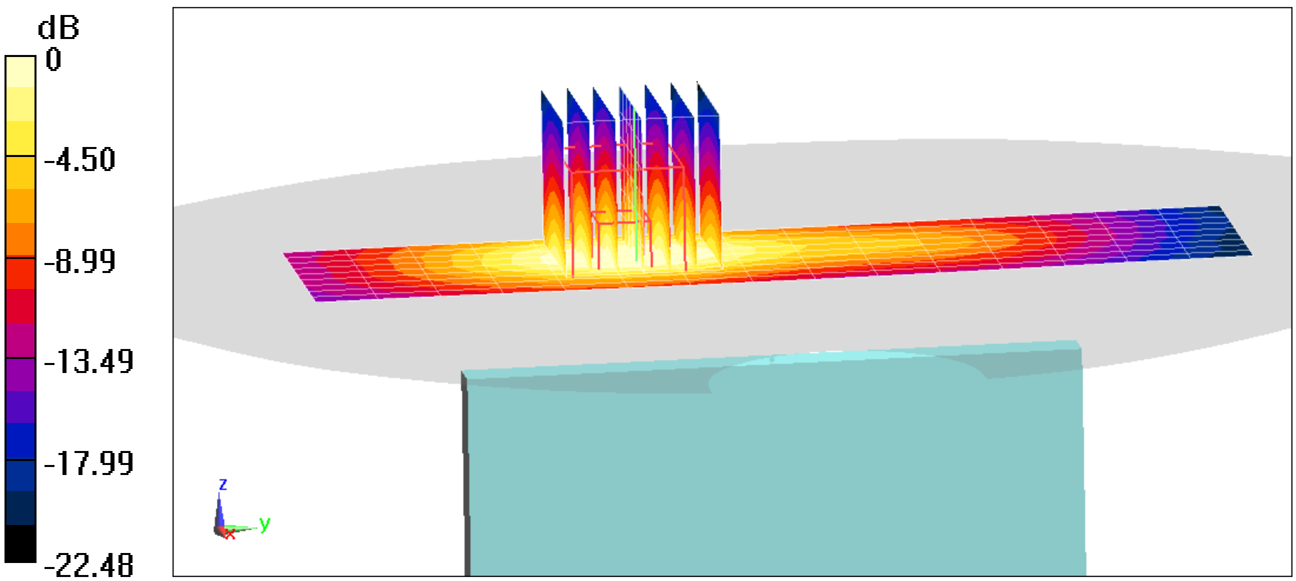
Communication System: UID 0, _LTE Band 38; Frequency: 2595 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body Medium parameters used (interpolated):
f = 2595 MHz; σ = 2.222 S/m; ε_r = 51.678; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.6 cm

Test Date: 07-15-2019; Ambient Temp: 22.2°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2595 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 38, UMPC Body SAR, Bottom Edge,
Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x16x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.68 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 0.734 W/kg



0 dB = 1.15 W/kg = 0.61 dBW/kg

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54608

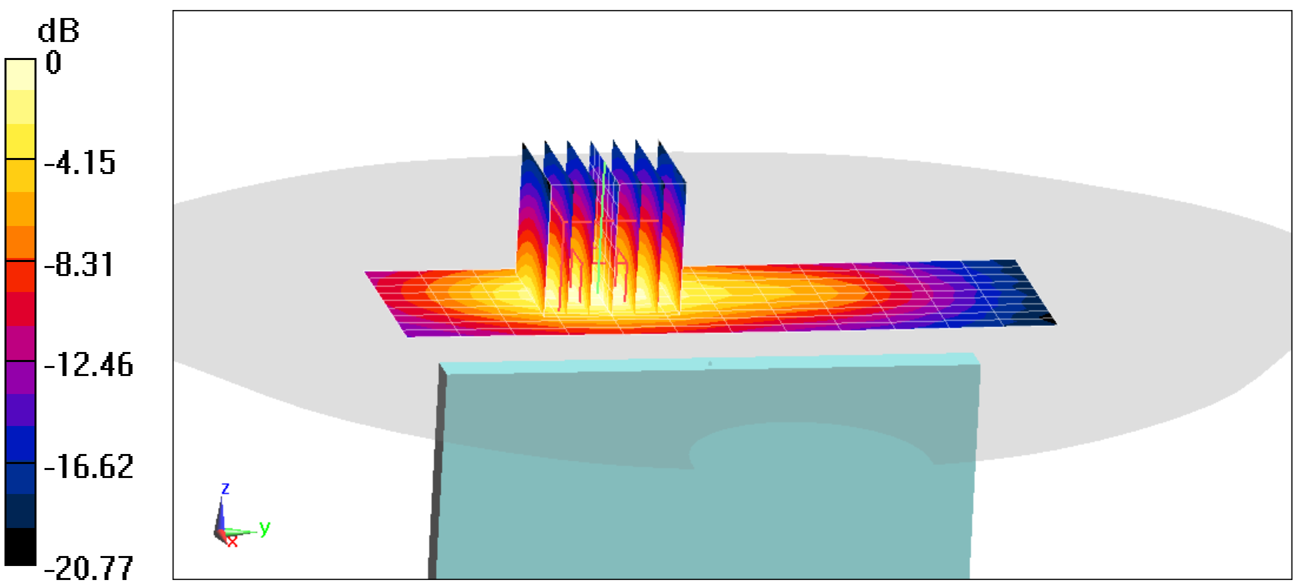
Communication System: UID 0, _LTE Band 41; Frequency: 2506 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body Medium parameters used (interpolated):
f = 2506 MHz; σ = 2.112 S/m; ε_r = 51.965; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.6 cm

Test Date: 07-15-2019; Ambient Temp: 22.2°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2506 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41, UMPC Body SAR, Bottom Edge, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

Area Scan (10x13x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.78 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.536 W/kg



0 dB = 0.857 W/kg = -0.67 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54574

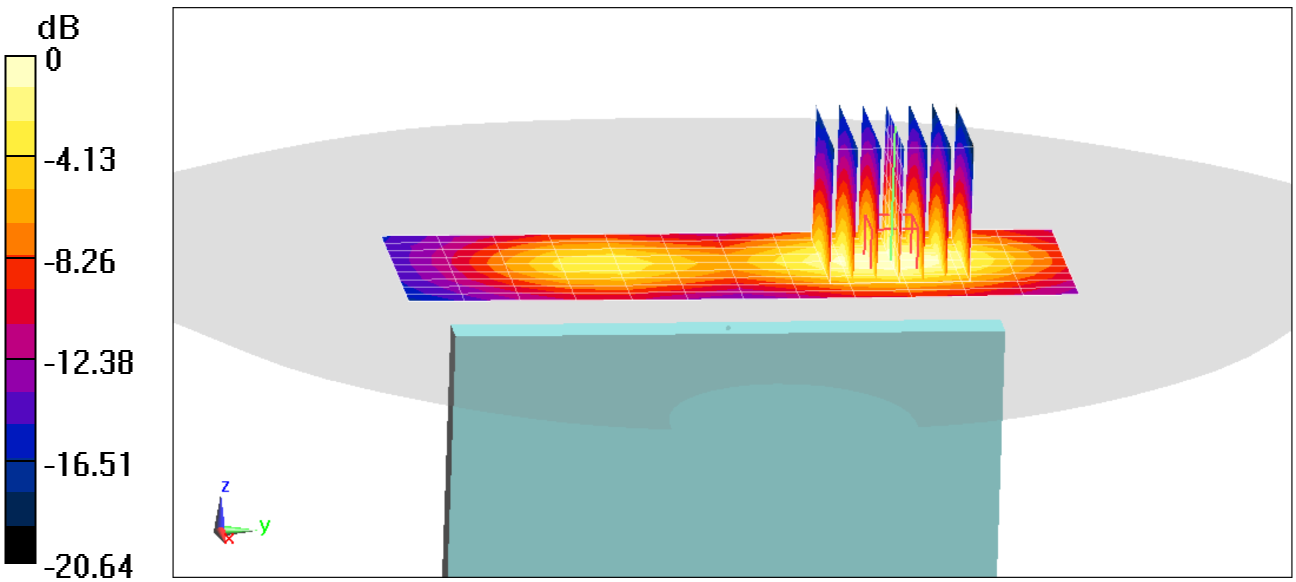
Communication System: UID 0, _IEEE 802.11n; Frequency: 2452 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2452 MHz; σ = 2.024 S/m; ε_r = 51.798; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-29-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2452 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11n, 20 MHz Bandwidth, UMPC Body SAR, Ch 9, MIMO, 13 Mbps, Top Edge

Area Scan (10x13x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.524 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.513 W/kg
SAR(1 g) = 0.264 W/kg



0 dB = 0.418 W/kg = -3.79 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 53592

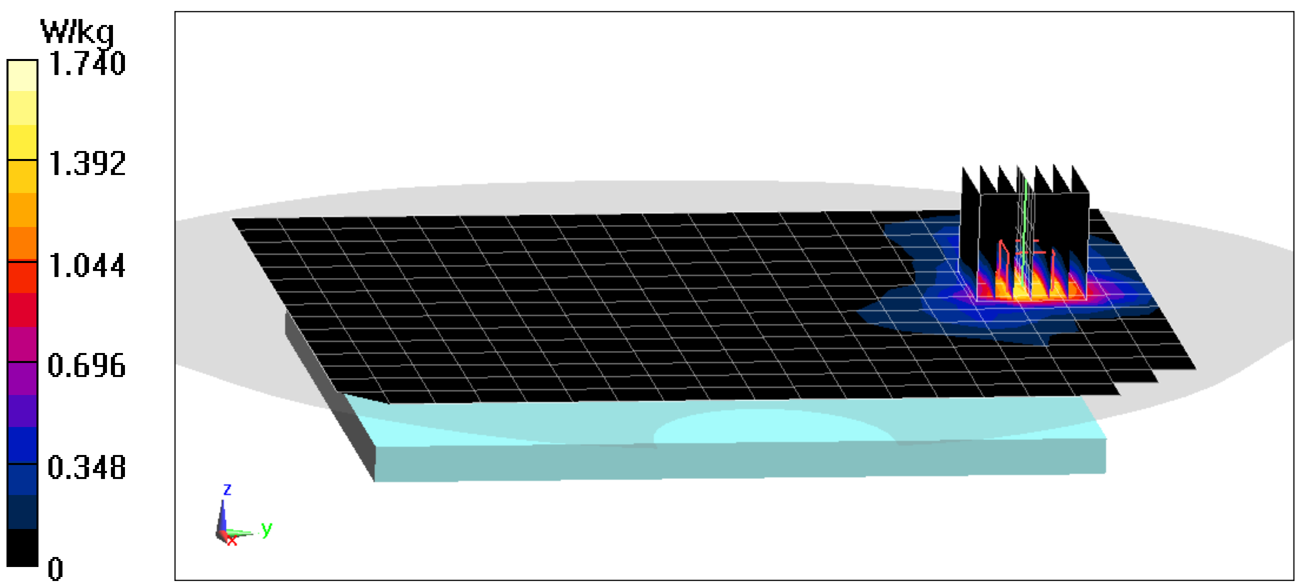
Communication System: UID 0, 802.11n 5.2-5.8 GHz Band; Frequency: 5825 MHz; Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
$f = 5825$ MHz; $\sigma = 6.318$ S/m; $\varepsilon_r = 48.289$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-08-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7308; ConvF(4.18, 4.18, 4.18) @ 5825 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

**Mode: IEEE 802.11n, U-NII-3, MIMO, 20 MHz Bandwidth,
UMPC Body SAR, Ch 165, 13 Mbps, Back Side**

Area Scan (15x20x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 11.95 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 3.66 W/kg
SAR(1 g) = 0.846 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 55399

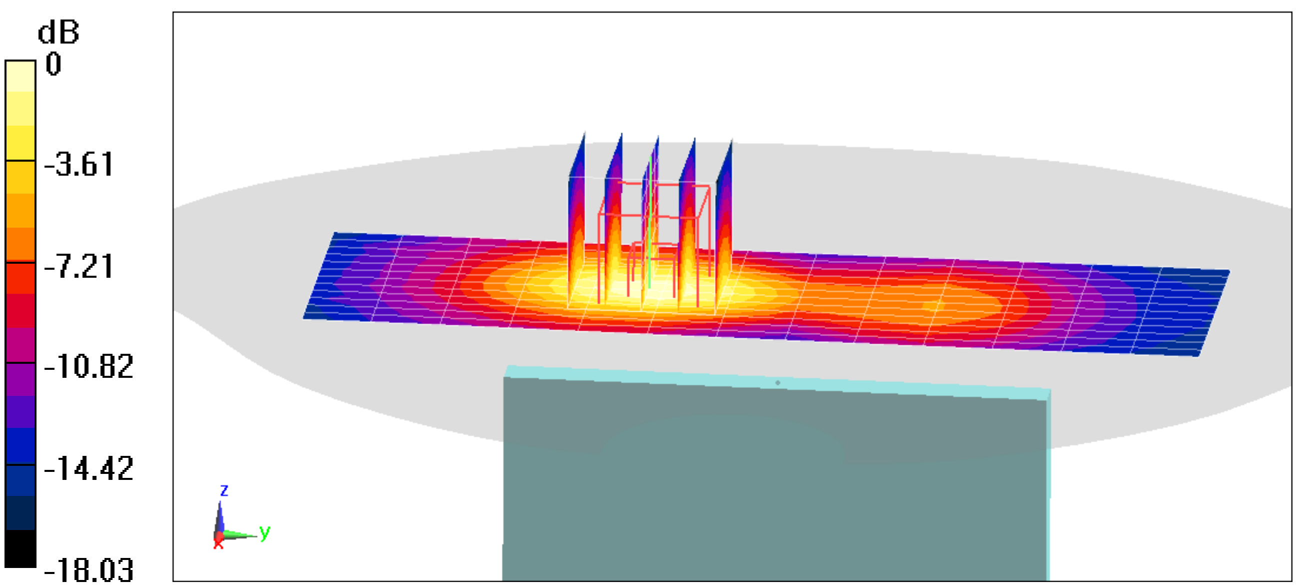
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; $\sigma = 1.553$ S/m; $\varepsilon_r = 53.697$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.6 cm

Test Date: 07-15-2019; Ambient Temp: 19.3°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1880 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 1900, UMPC Extremity SAR, Bottom Edge, Mid.ch, 2 Tx Slots

Area Scan (13x14x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.56 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.653 W/kg
SAR(10 g) = 0.210 W/kg



0 dB = 0.560 W/kg = -2.52 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 55399

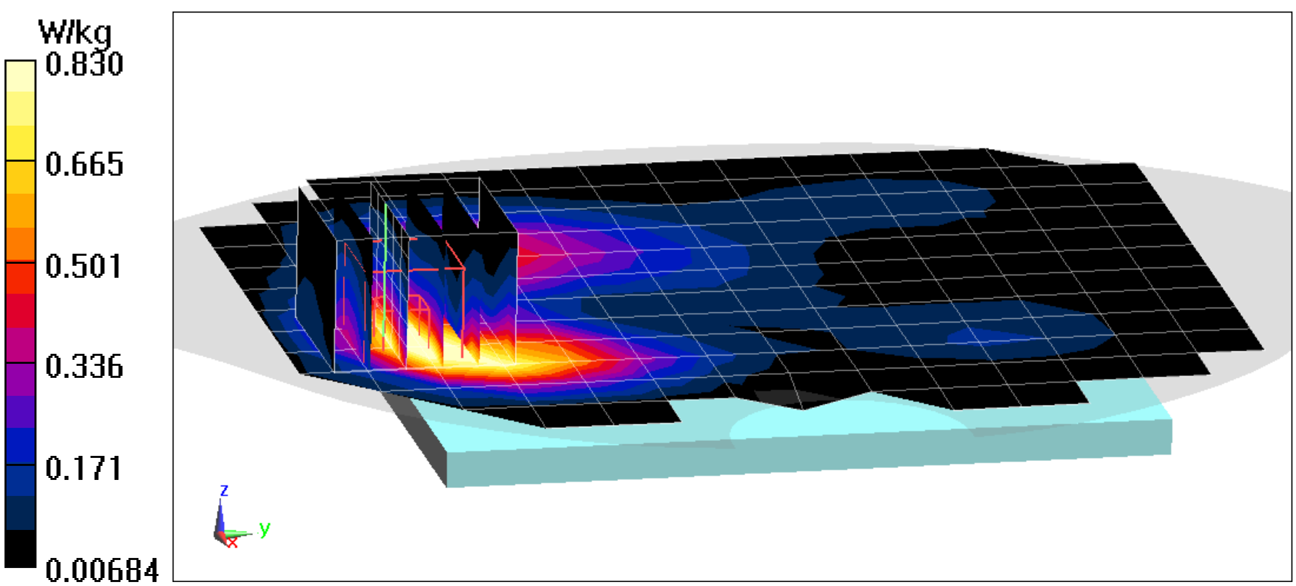
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.523 S/m; ε_r = 51.84; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.1 cm

Test Date: 07-03-2019; Ambient Temp: 23.9°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7357;ConvF(8.26, 8.26, 8.26) @ 1732.4 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1750, UMPC Extremity SAR, Front side, Mid.ch

Area Scan (13x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.96 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(10 g) = 0.327 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54657

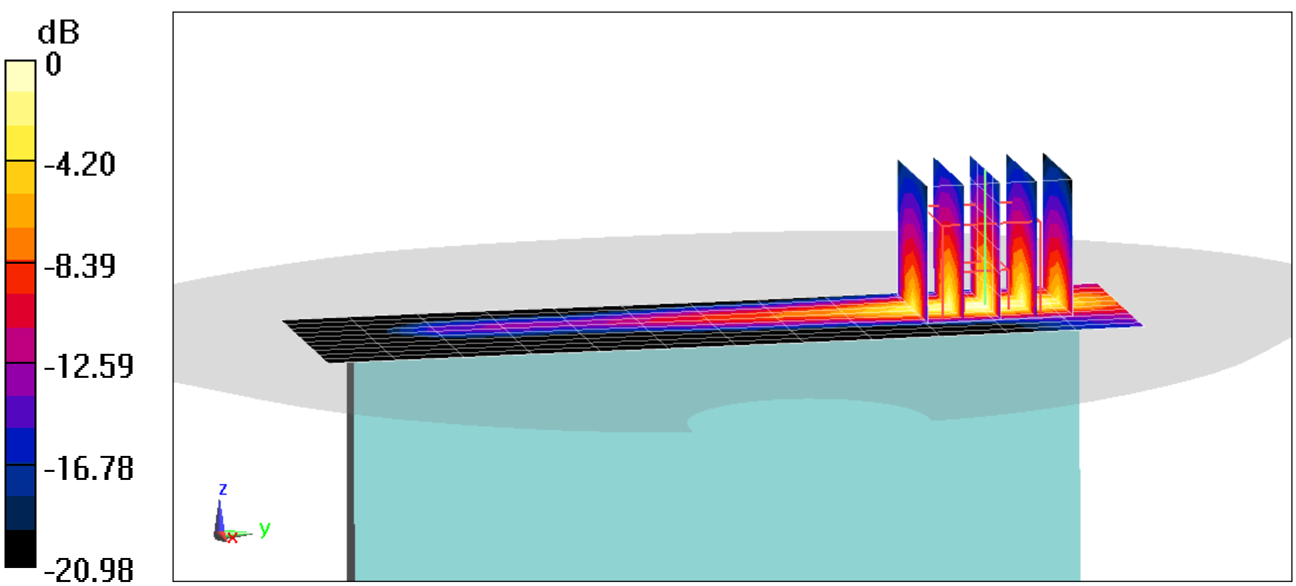
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; $\sigma = 1.563$ S/m; $\varepsilon_r = 55.129$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-23-2019; Ambient Temp: 20.1°C; Tissue Temp: 20.3°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1880 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1900, UMPC Extremity SAR, Right Edge, Mid.ch

Area Scan (11x13x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.07 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 3.33 W/kg
SAR(10 g) = 0.640 W/kg



0 dB = 2.76 W/kg = 4.41 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 55399

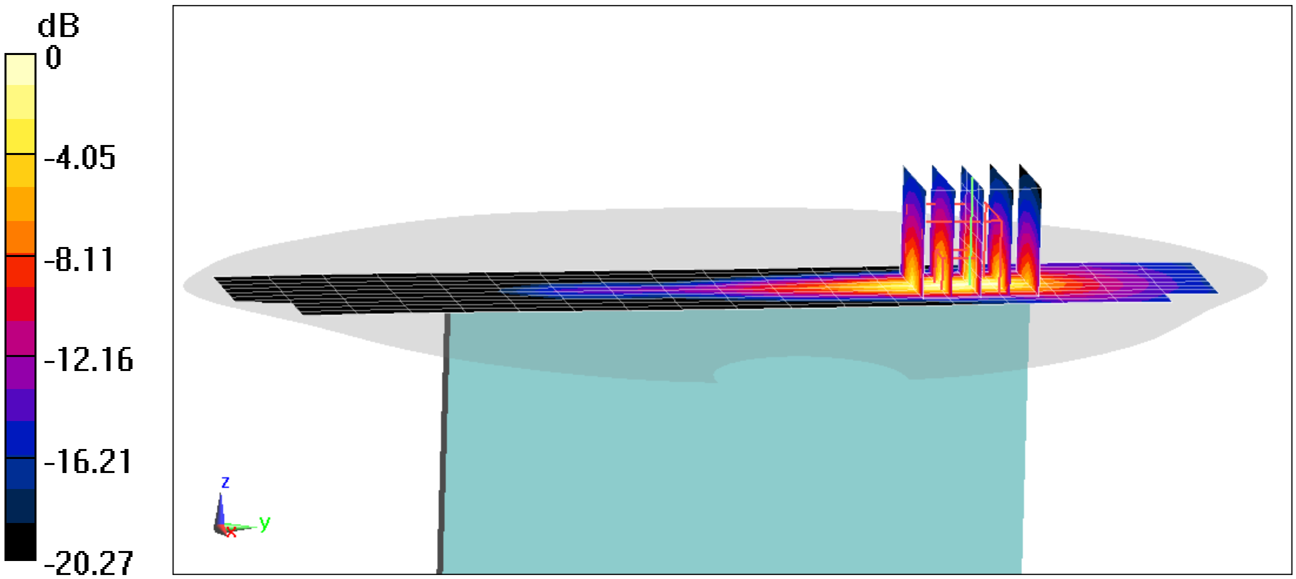
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1720 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1720 MHz; σ = 1.466 S/m; ε_r = 51.204; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-23-2019; Ambient Temp: 19.5°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1720 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V5.0 Back Right; Type: QD 000 P40 CD; Serial: 1692
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 66 (AWS), UMPC Extremity SAR, Right Edge, Low.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (11x19x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.28 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.11 W/kg
SAR(10 g) = 0.543 W/kg



0 dB = 2.53 W/kg = 4.03 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54657

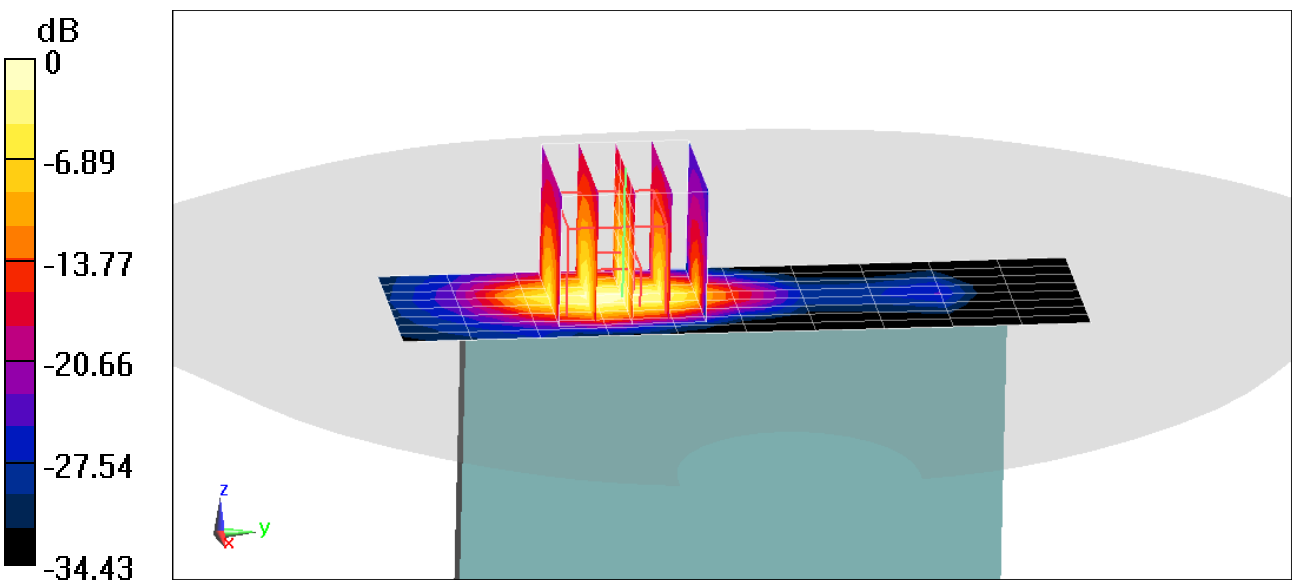
Communication System: UID 0, LTE Band 25 (PCS), Frequency: 1882.5 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1882.5 MHz; σ = 1.565 S/m; ε_r = 55.126; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-23-2019; Ambient Temp: 20.1°C; Tissue Temp: 20.3°C

Probe: EX3DV4 - SN7488;ConvF(8.37, 8.37, 8.37) @ 1882.5 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 25 (PCS), UMPC Extremity SAR, Bottom Edge, Mid.ch, 20 MHz Bandwidth, QPSK, 50 RB, 25 RB Offset

Area Scan (9x11x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 68.80 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 14.9 W/kg
SAR(10 g) = 2.4 W/kg



0 dB = 12.2 W/kg = 10.86 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54608

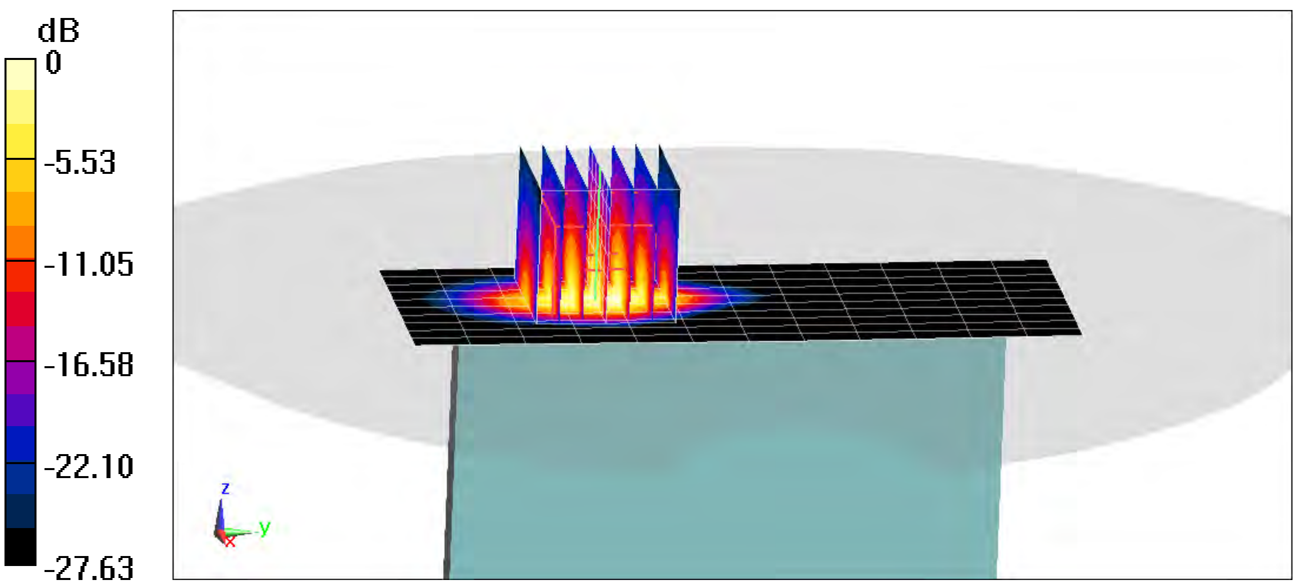
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2310 MHz; $\sigma = 1.869$ S/m; $\varepsilon_r = 52.188$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-23-2019; Ambient Temp: 21.6°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7417; ConvF(7.64, 7.64, 7.64) @ 2310 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 30, UMPC Extremity SAR, Bottom Edge, Mid.ch, 10 MHz Bandwidth, QPSK, 25 RB, 0 RB Offset

Area Scan (11x13x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 67.54 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 19.3 W/kg
SAR(10 g) = 2.39 W/kg



0 dB = 14.3 W/kg = 11.55 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54608

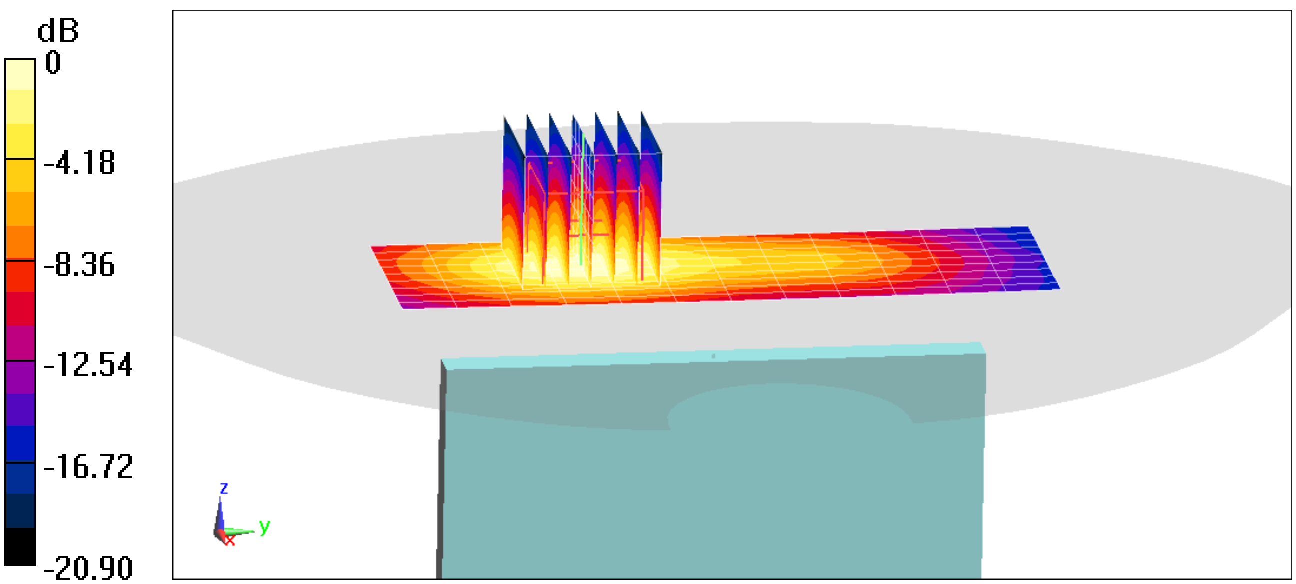
Communication System: UID 0, _LTE Band 7; Frequency: 2560 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2560 MHz; σ = 2.17 S/m; ε_r = 51.344; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.6 cm

Test Date: 07-10-2019; Ambient Temp: 22.7°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2560 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 7, UMPC Extremity SAR, Bottom Edge, High.ch, 20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

Area Scan (10x13x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.52 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(10 g) = 0.308 W/kg



0 dB = 0.977 W/kg = -0.10 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54608

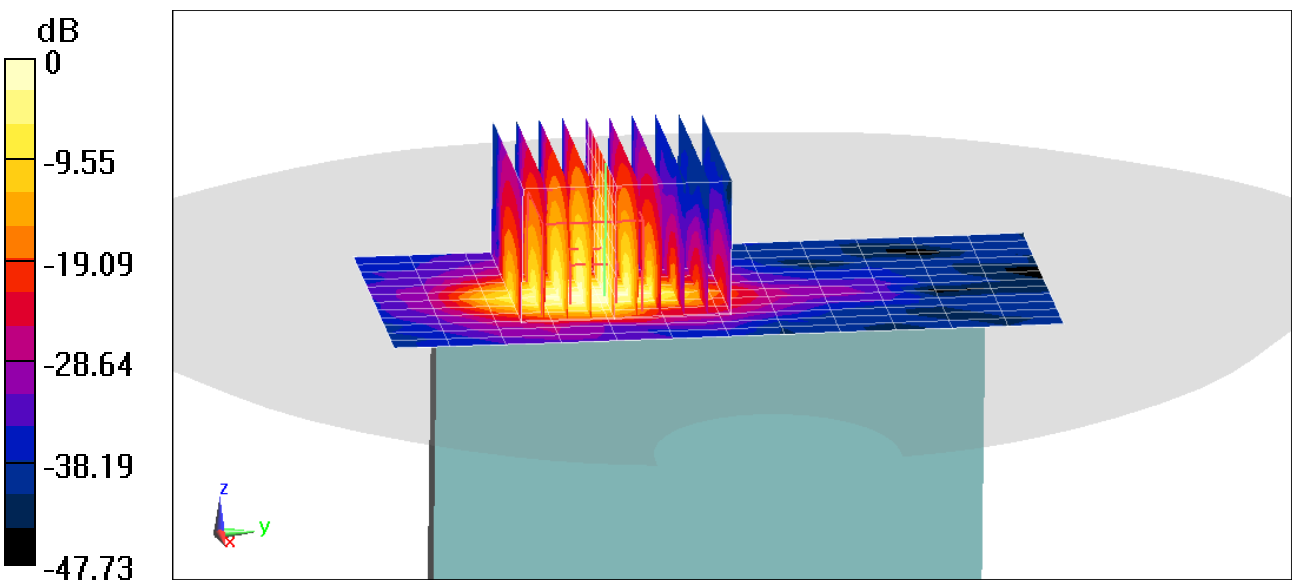
Communication System: UID 0, _LTE Band 38; Frequency: 2595 MHz; Duty Cycle: 1:1.58
Medium: 2450 MHz Body Medium parameters used (interpolated):
f = 2595 MHz; σ = 2.167 S/m; ε_r = 52.891; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-26-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7308; ConvF(7.4, 7.4, 7.4) @ 2595 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 38, UMPC Extremity SAR, Bottom Edge, Mid.ch, 20 MHz Bandwidth, QPSK, 50 RB, 25 RB Offset

Area Scan (13x13x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (10x10x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 64.99 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 22.7 W/kg
SAR(10 g) = 2.51 W/kg



0 dB = 16.4 W/kg = 12.15 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54608

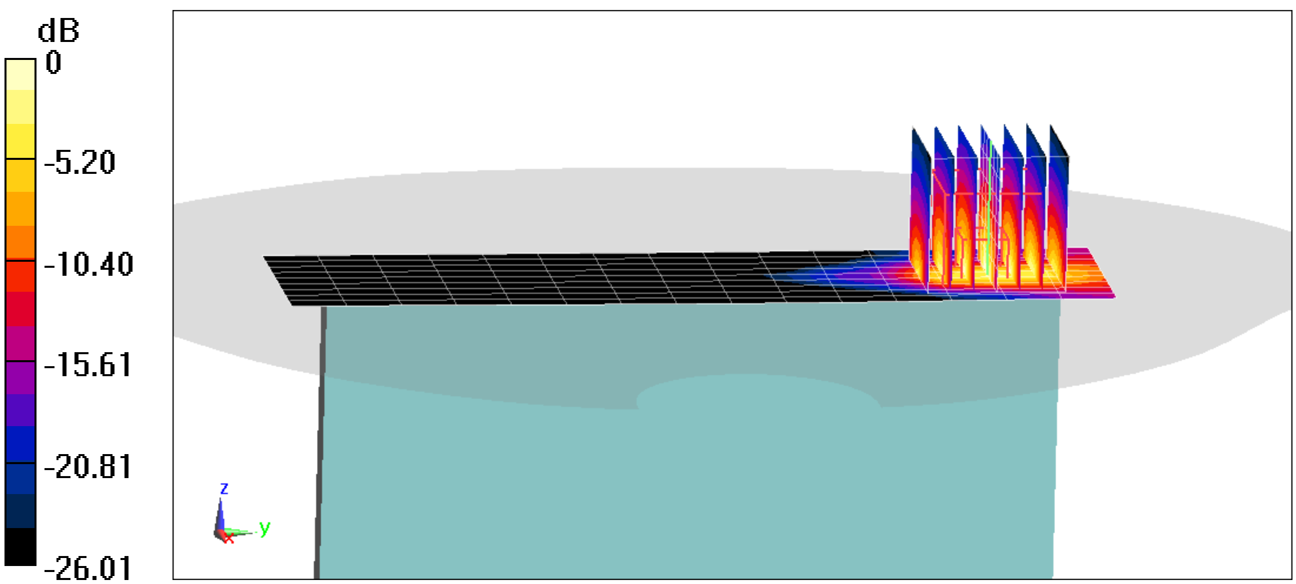
Communication System: UID 0, _LTE Band 41; Frequency: 2506 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body Medium parameters used (interpolated):
f = 2506 MHz; σ = 2.103 S/m; ε_r = 50.822; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-17-2019; Ambient Temp: 23.9°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2506 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41, UMPC Extremity SAR, Right Edge, Low.ch, 20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

Area Scan (10x16x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.98 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 4.51 W/kg
SAR(10 g) = 0.568 W/kg



0 dB = 2.80 W/kg = 4.47 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 54574

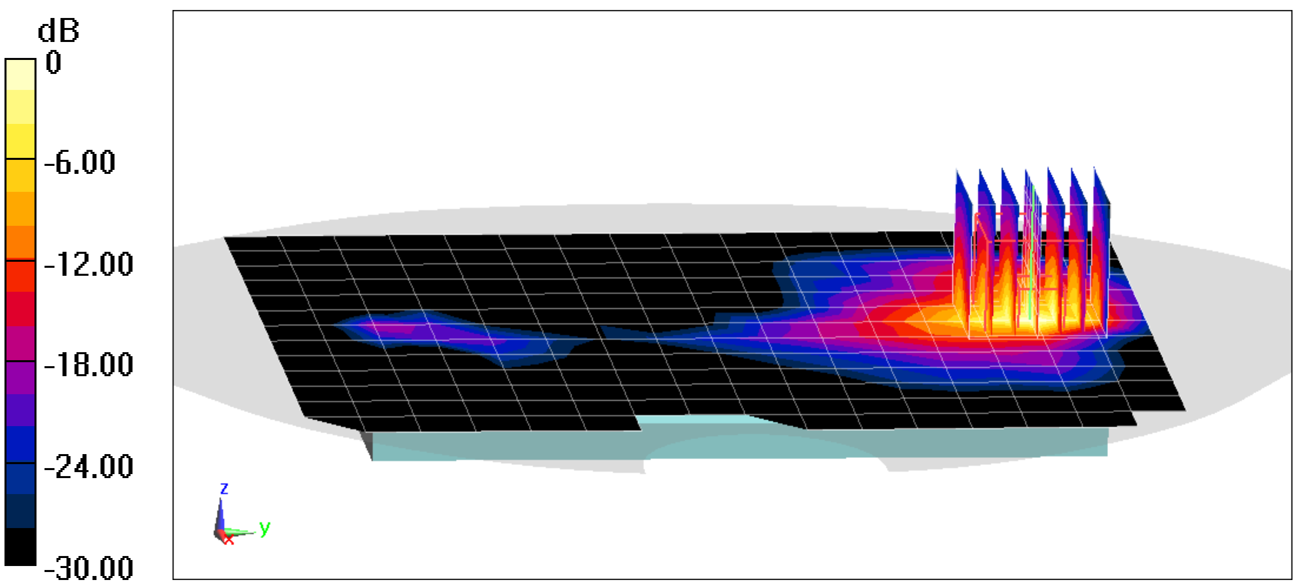
Communication System: UID 0, _IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2412 MHz; σ = 1.979 S/m; ε_r = 51.905; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-29-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2412 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

**Mode: IEEE 802.11b, Antenna 2, 22 MHz Bandwidth,
UMPC Extremity SAR, Ch 01, 1 Mbps, Back Side**

Area Scan (14x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.05 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 16.6 W/kg
SAR(10 g) = 1.47 W/kg



0 dB = 9.53 W/kg = 9.79 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMF900F; Type: Portable Handset; Serial: 53592

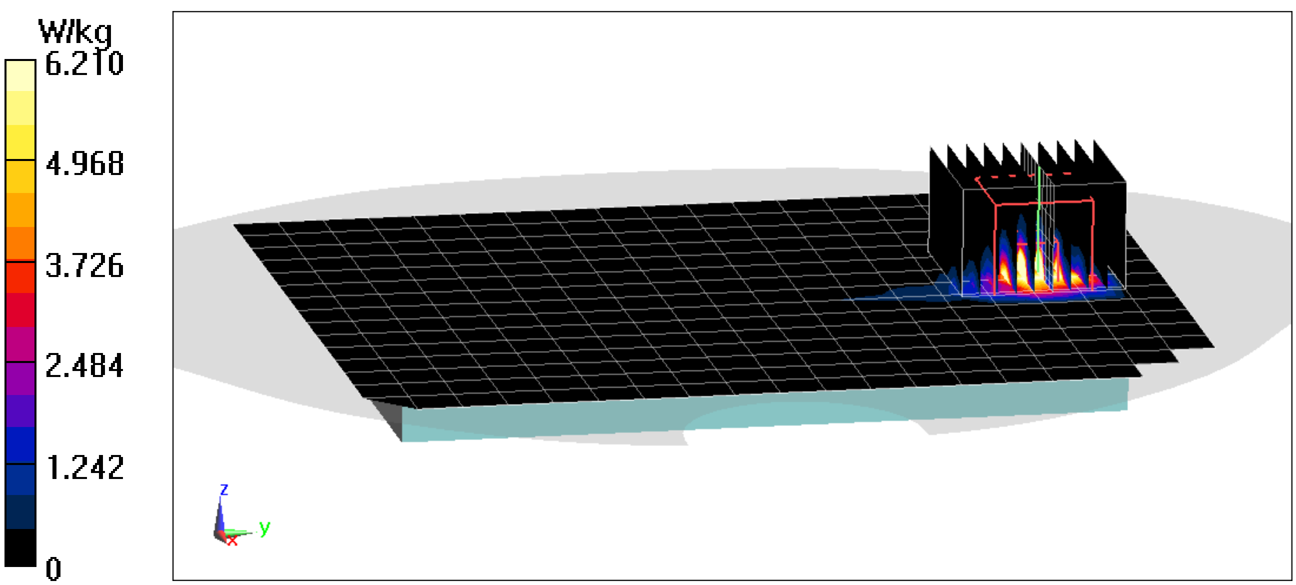
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5280 MHz; Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5280 MHz; σ = 5.497 S/m; ε_r = 49.307; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 07-08-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7308; ConvF(4.48, 4.48, 4.48) @ 5280 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

**Mode: IEEE 802.11a, U-NII-2A, Antenna 2, 20 MHz Bandwidth,
UMPC Extremity SAR, Ch 56, 6 Mbps, Back Side**

Area Scan (16x20x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (10x10x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 42.18 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 71.6 W/kg
SAR(10 g) = 1.42 W/kg



APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

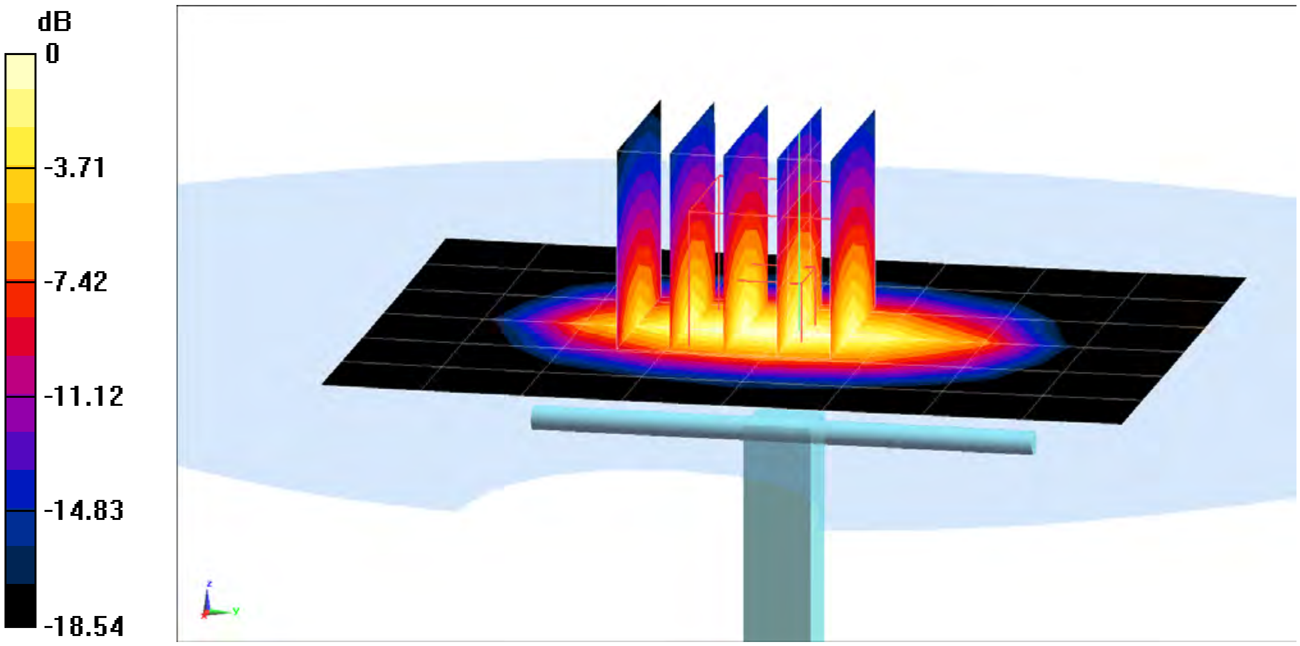
DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used:
f = 1750 MHz; $\sigma = 1.362$ S/m; $\varepsilon_r = 39.781$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-19-2019; Ambient Temp: 21.9°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7406; ConvF(8.57, 8.57, 8.57) @ 1750 MHz; Calibrated: 5/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/8/2019
Phantom: SAM 30 with CRP v5.0 right; Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1750 MHz System Verification at 20.0 dBm (100 mW)
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.11 W/kg
SAR(1 g) = 3.86 W/kg;
Deviation(1 g) = 6.63%;



0 dB = 5.87 W/kg = 7.69 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

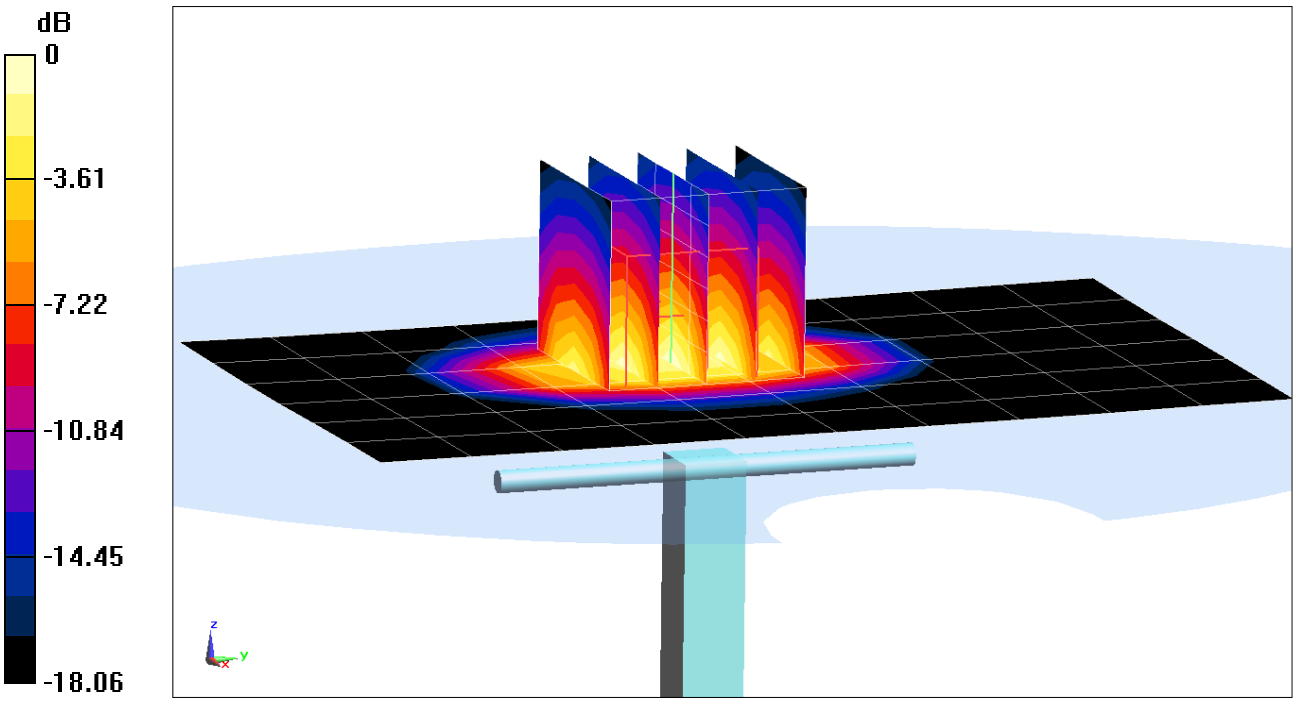
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.421 S/m; ε_r = 38.877; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-21-2019; Ambient Temp: 22.6°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7410; ConvF(8.16, 8.16, 8.16) @ 1900 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.98 W/kg
SAR(1 g) = 3.89 W/kg
Deviation(1 g) = -1.02%



0 dB = 5.98 W/kg = 7.77 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

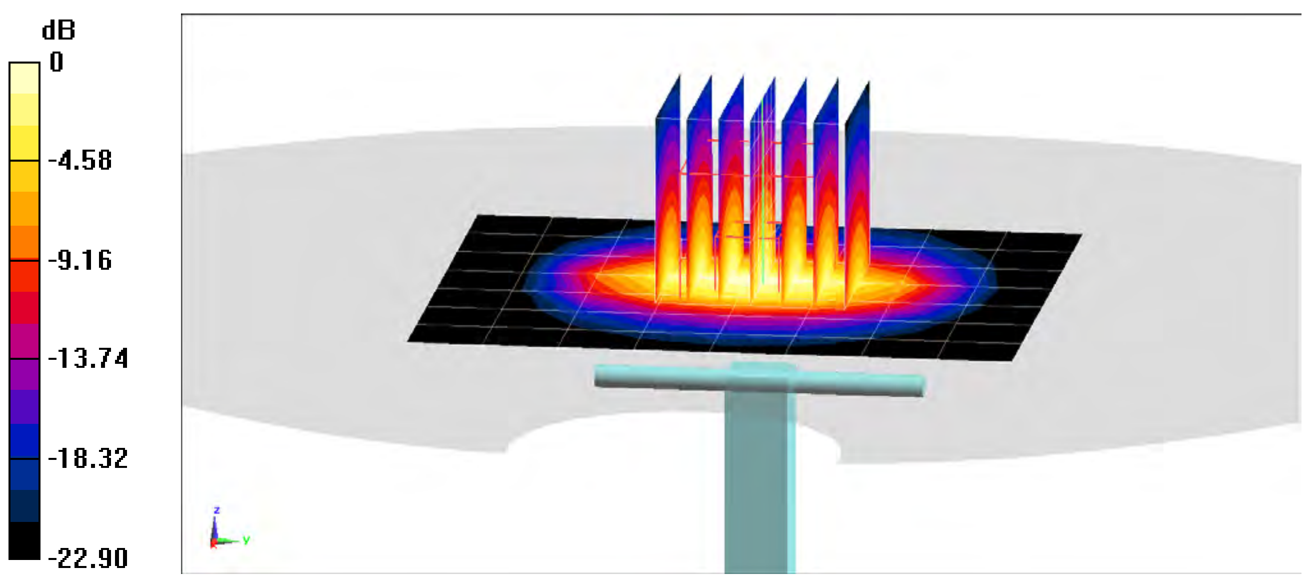
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.813 S/m; ε_r = 39.236; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-19-2019; Ambient Temp: 24.0°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN3589; ConvF(6.46, 6.46, 6.46) @ 2450 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.4 W/kg
SAR(1 g) = 5.25 W/kg
Deviation(1 g) = -0.38%



0 dB = 8.96 W/kg = 9.52 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

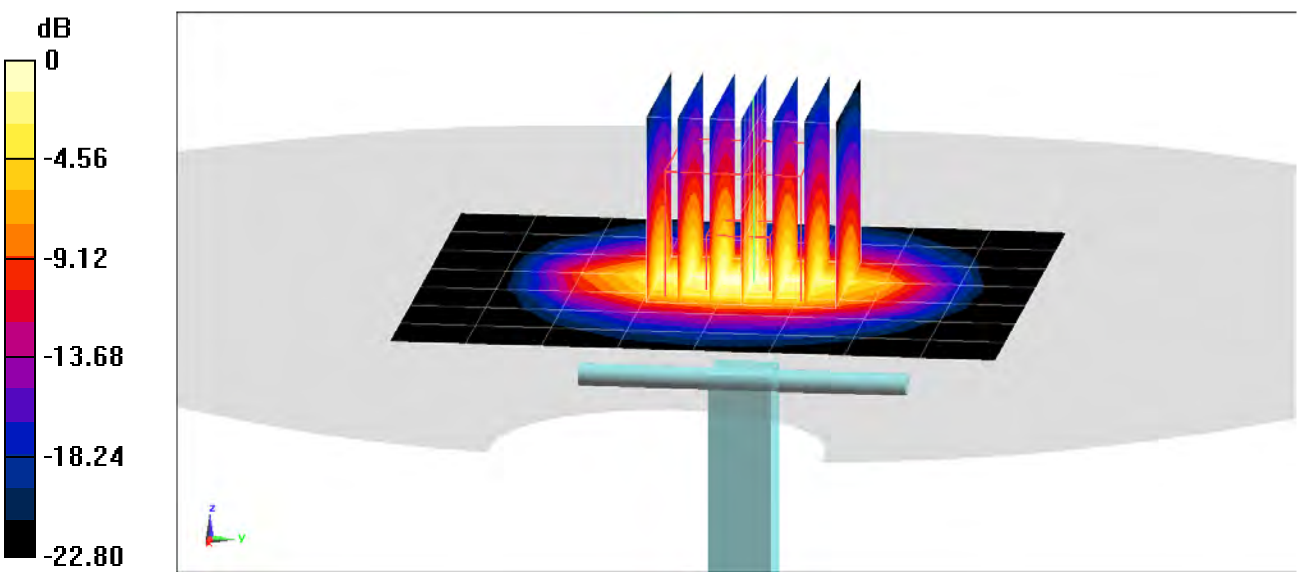
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.808 S/m; ε_r = 39.401; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-01-2019; Ambient Temp: 22.1°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3589; ConvF(6.46, 6.46, 6.46) @ 2450 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.4 W/kg
SAR(1 g) = 5.32 W/kg
Deviation(1 g) = 0.95%



0 dB = 9.00 W/kg = 9.54 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1071

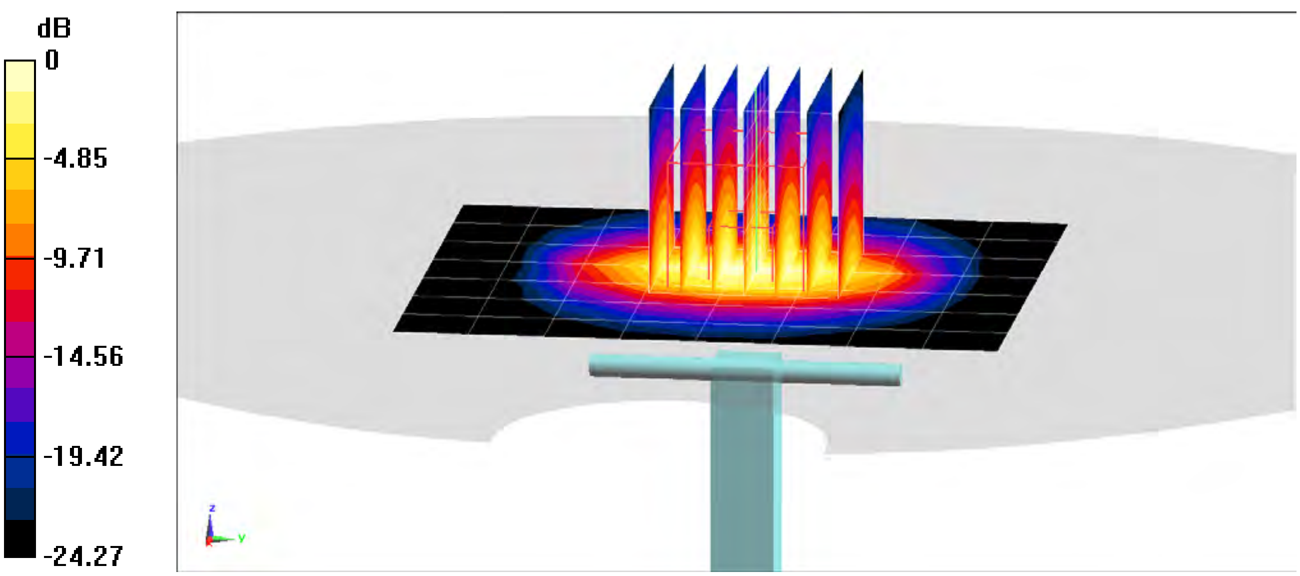
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2600 MHz; σ = 1.933 S/m; ε_r = 38.985; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-19-2019; Ambient Temp: 24.0°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN3589; ConvF(6.25, 6.25, 6.25) @ 2600 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 12.8 W/kg
SAR(1 g) = 5.84 W/kg
Deviation(1 g) = 3.73%



0 dB = 10.1 W/kg = 10.04 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1126

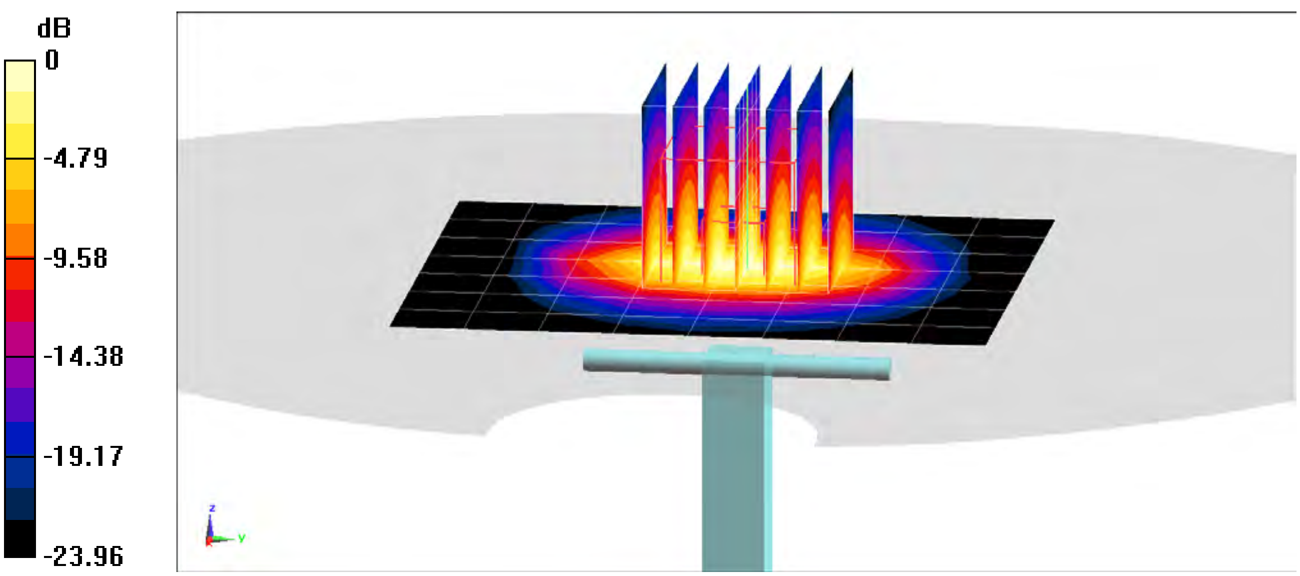
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2600 MHz; σ = 1.981 S/m; ε_r = 40.418; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-26-2019; Ambient Temp: 22.1°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN3589; ConvF(6.25, 6.25, 6.25) @ 2600 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 12.8 W/kg
SAR(1 g) = 5.83 W/kg
Deviation(1 g) = 6.97%



0 dB = 10.0 W/kg = 10.00 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

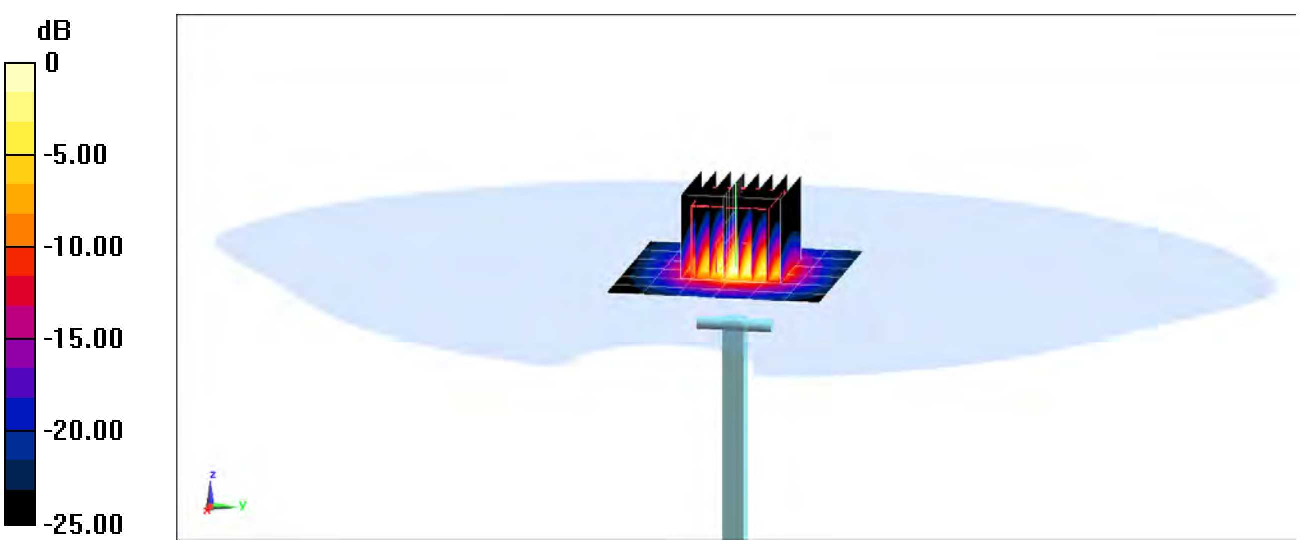
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5GHz Head Medium parameters used (interpolated):
f = 5250 MHz; σ = 4.541 S/m; ε_r = 34.74; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-01-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7406; ConvF(5.54, 5.54, 5.54) @ 5250 MHz; Calibrated: 5/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/8/2019
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 16.1 W/kg
SAR(1 g) = 4.00 W/kg
Deviation(1 g) = 1.39%



0 dB = 9.70 W/kg = 9.87 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

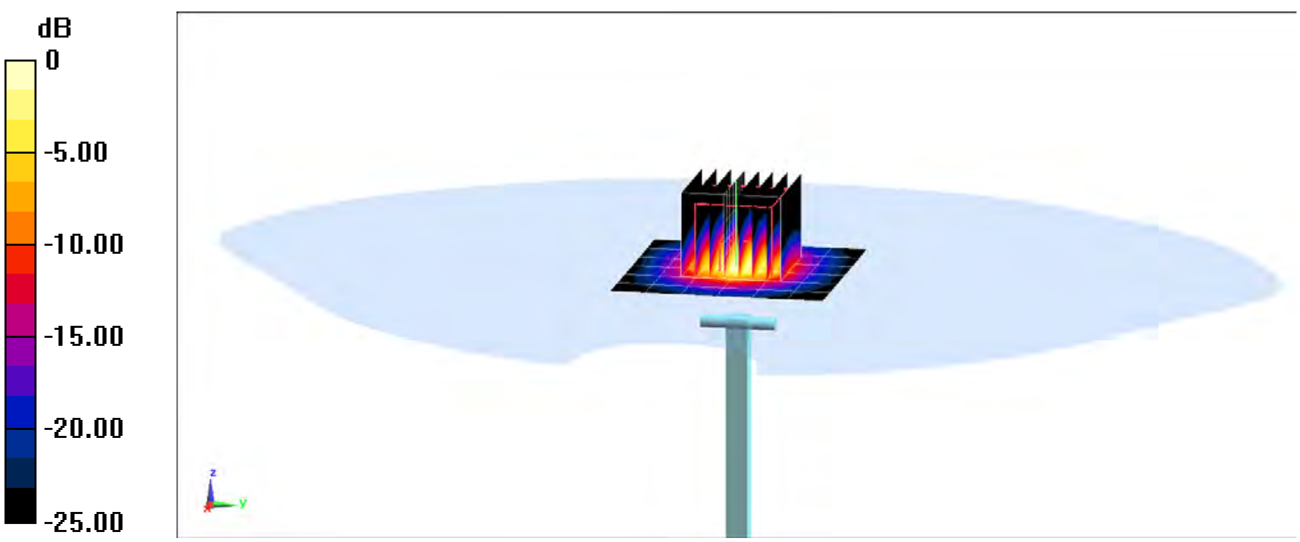
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5GHz Head Medium parameters used:
f = 5600 MHz; σ = 4.928 S/m; ε_r = 34.134; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-01-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7406; ConvF(4.94, 4.94, 4.94) @ 5600 MHz; Calibrated: 5/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/8/2019
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 18.7 W/kg
SAR(1 g) = 4.22 W/kg
Deviation(1 g) = 0.96%



0 dB = 10.3 W/kg = 10.13 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

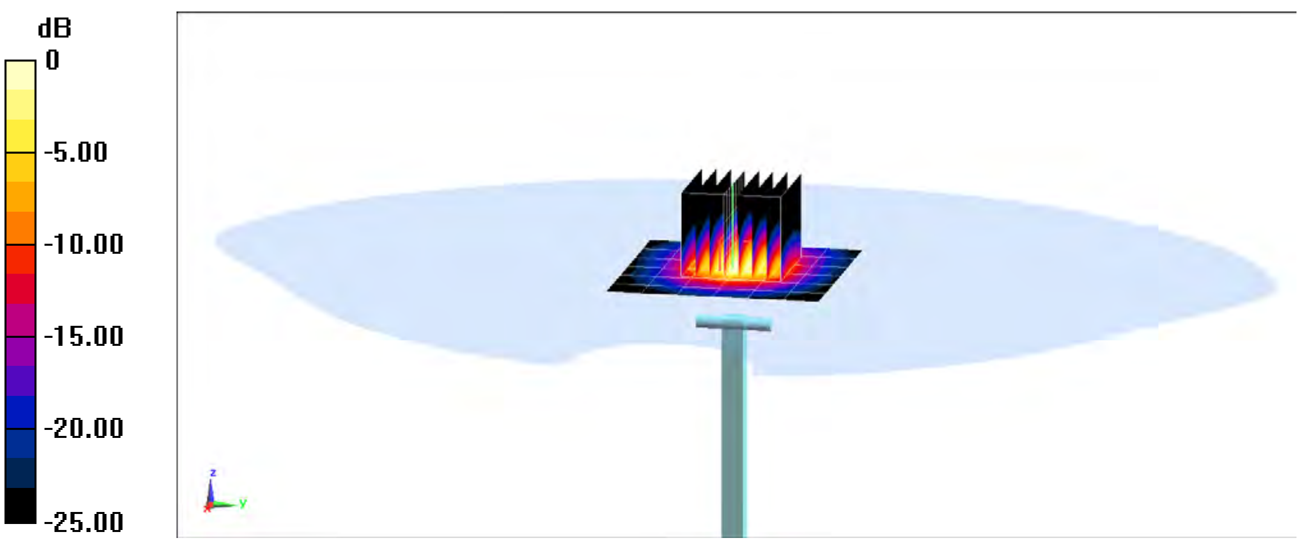
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5GHz Head Medium parameters used (interpolated):
f = 5750 MHz; σ = 5.099 S/m; ε_r = 33.868; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-01-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7406; ConvF(5.23, 5.23, 5.23) @ 5750 MHz; Calibrated: 5/16/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/8/2019
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 18.3 W/kg
SAR(1 g) = 4.05 W/kg
Deviation(1 g) = 2.40%



0 dB = 9.75 W/kg = 9.89 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d132

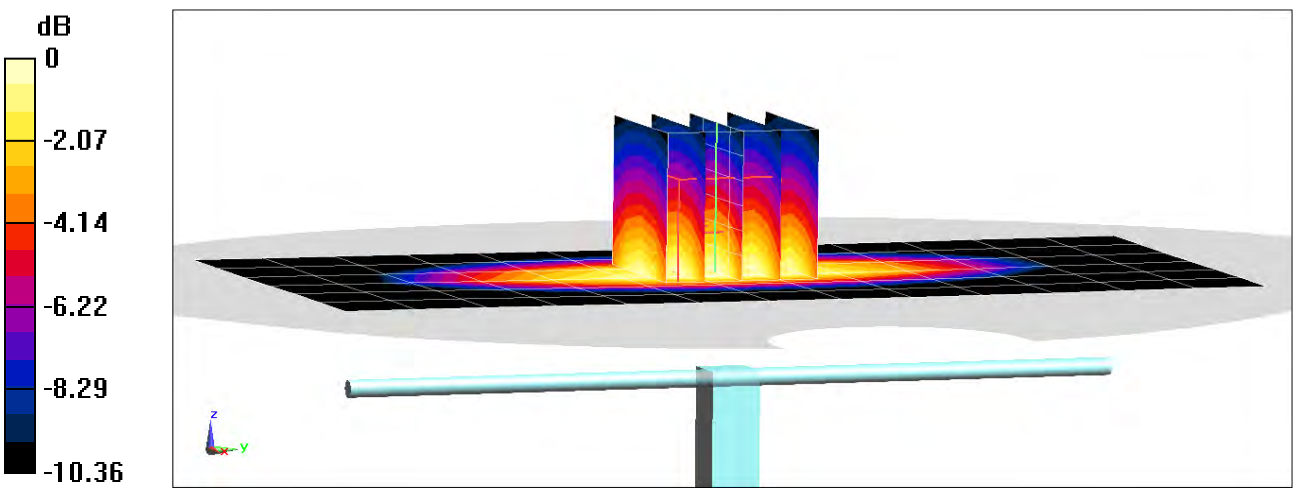
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.965 S/m; ε_r = 54.499; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-26-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(9.63, 9.63, 9.63) @ 835 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.99 W/kg
SAR(1 g) = 2.01 W/kg
Deviation(1 g) = 3.93%



0 dB = 2.67 W/kg = 4.27 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1150

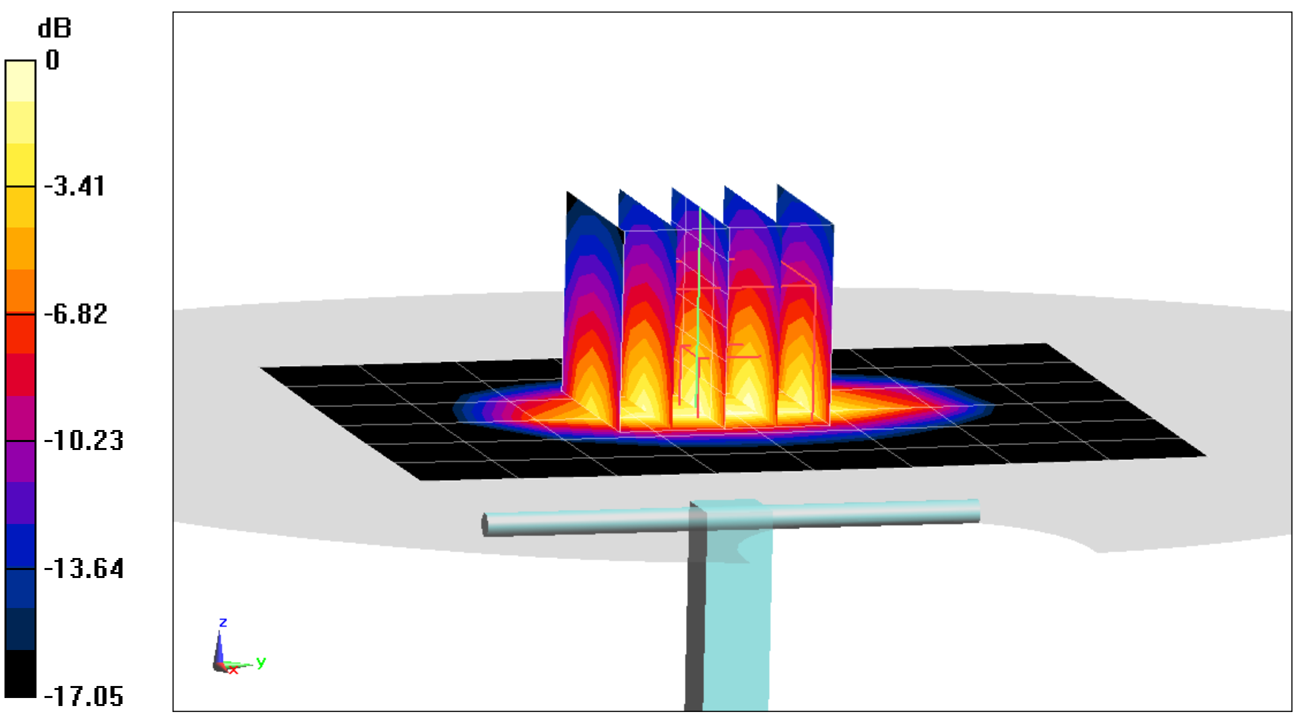
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used:
f = 1750 MHz; σ = 1.42 S/m; ε_r = 55.258; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-19-2019; Ambient Temp: 22.2°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1750 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.85 W/kg
SAR(10 g) = 2.06 W/kg
Deviation(10 g) = 6.19%



0 dB = 5.72 W/kg = 7.57 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1150

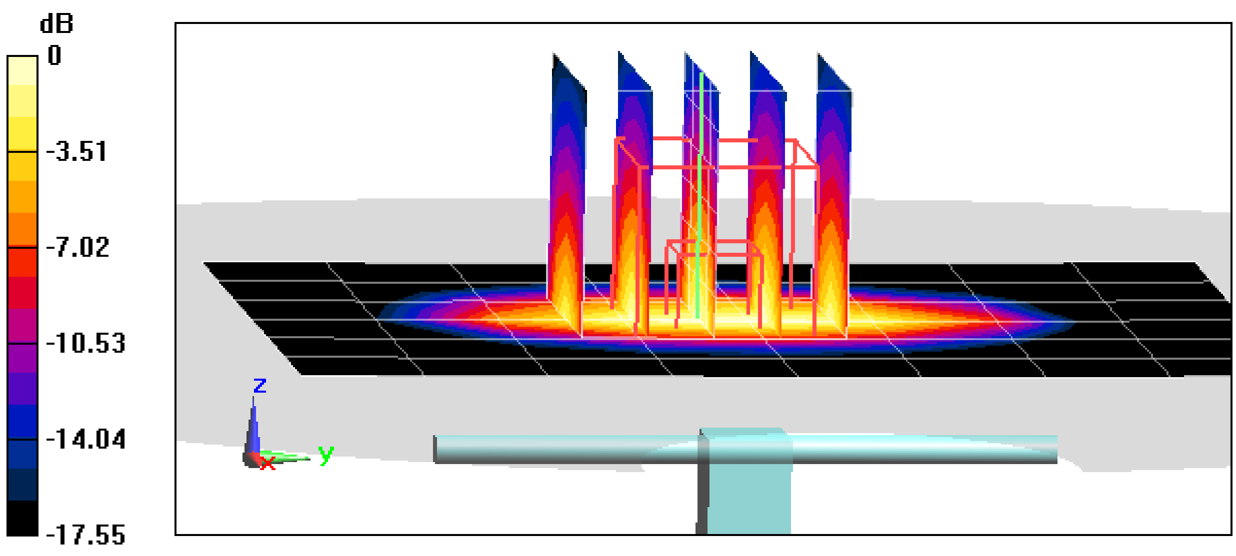
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used:
f = 1750 MHz; σ = 1.5 S/m; ε_r = 51.102; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-23-2019; Ambient Temp: 19.5°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1750 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V5.0 Back Right; Type: QD 000 P40 CD; Serial: 1692
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.09 W/kg
SAR(1 g) = 3.88 W/kg; SAR(10 g) = 2.04 W/kg
Deviation(1 g) = 6.01%; Deviation(10 g) = 5.15%



0 dB = 5.90 W/kg = 7.71 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1150

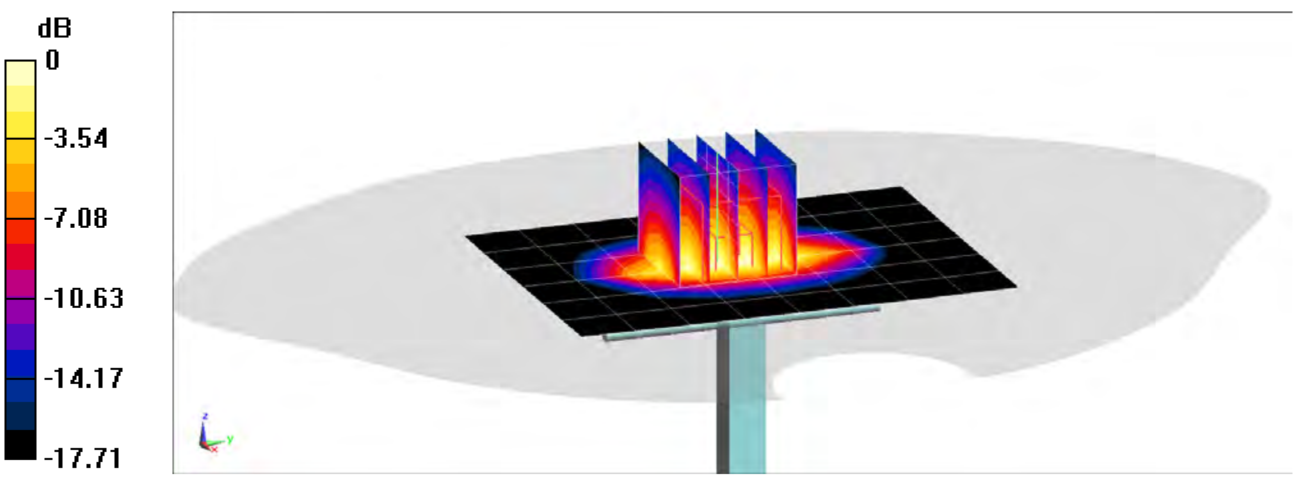
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used:
f = 1750 MHz; σ = 1.497 S/m; ε_r = 52.681; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-26-2019; Ambient Temp: 21.2°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1750 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V5.0 Back Right; Type: QD 000 P40 CD; Serial: 1692
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.23 W/kg
SAR(1 g) = 3.96 W/kg
Deviation(1 g) = 8.20%



0 dB = 6.04 W/kg = 7.81 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1150

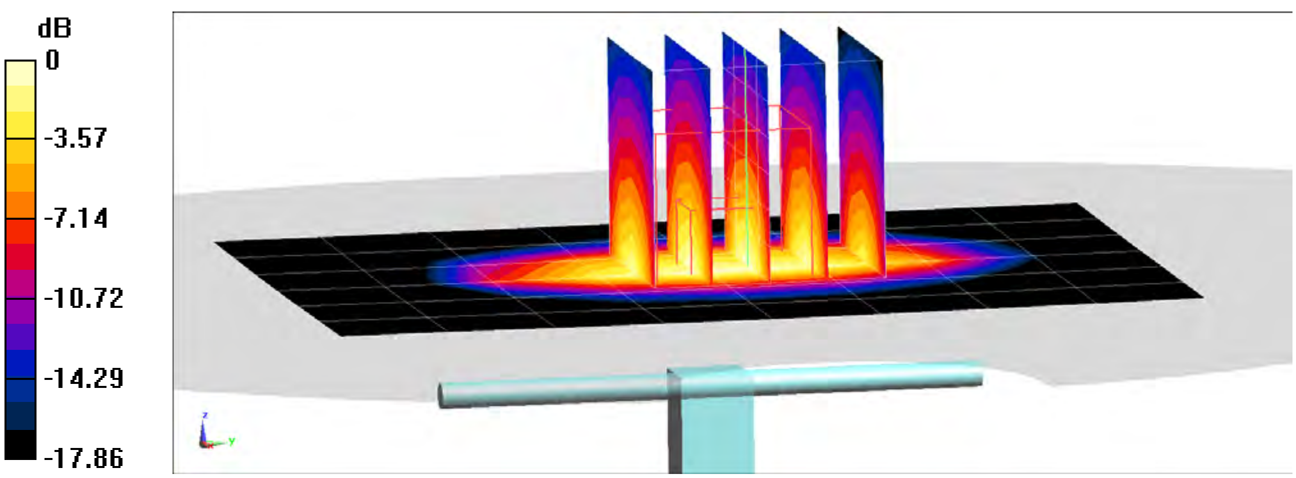
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used:
f = 1750 MHz; σ = 1.543 S/m; ε_r = 51.76; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-03-2019; Ambient Temp: 23.9°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1750 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.89 W/kg
SAR(1 g) = 3.78 W/kg; SAR(10 g) = 1.98 W/kg
Deviation(1 g) = 3.28%; Deviation(10 g) = 2.06%



0 dB = 5.72 W/kg = 7.57 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1150

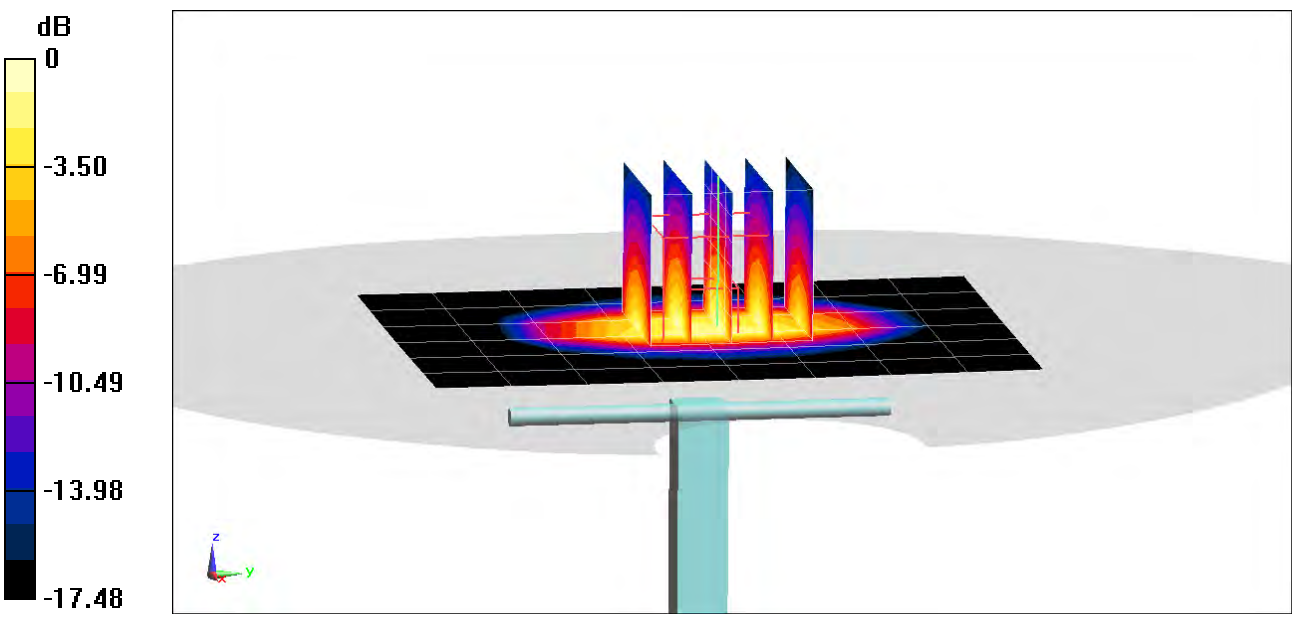
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used:
f = 1750 MHz; σ = 1.467 S/m; ε_r = 52.748; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-08-2019; Ambient Temp: 22.3°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7357; ConvF(8.26, 8.26, 8.26) @ 1750 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.17 W/kg
SAR(10 g) = 2.01 W/kg
Deviation(10 g) = 3.61%



0 dB = 5.92 W/kg = 7.72 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1150

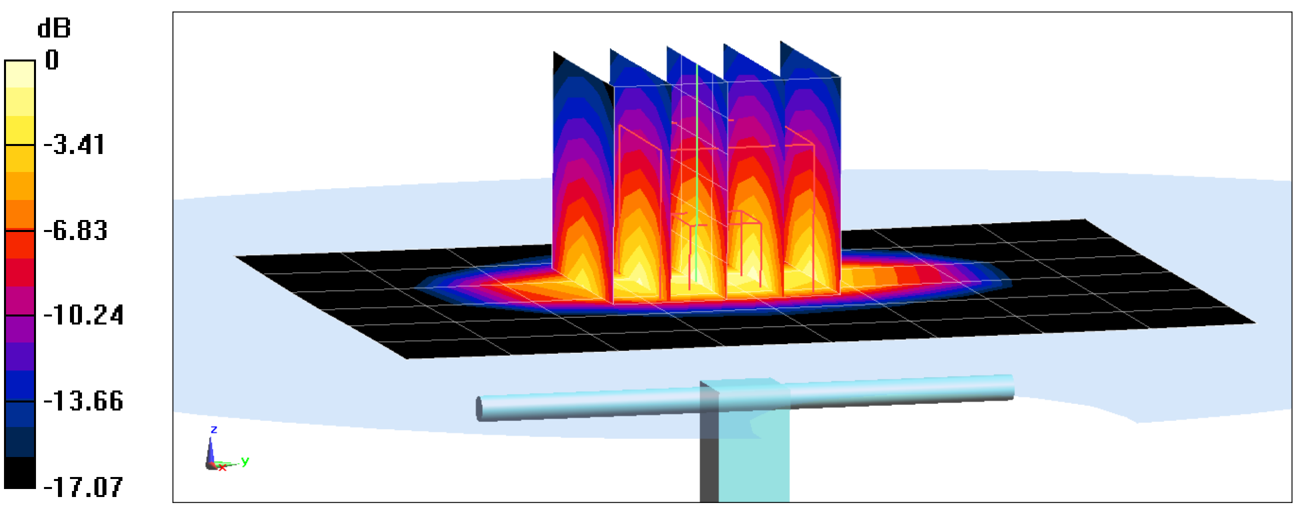
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used:
$f = 1750$ MHz; $\sigma = 1.429$ S/m; $\varepsilon_r = 53.479$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-15-2019; Ambient Temp: 21.9°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7409; ConvF(7.85, 7.85, 7.85) @ 1750 MHz; Calibrated: 6/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/20/2019
Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.02 W/kg
SAR(1 g) = 3.81 W/kg
Deviation(1 g) = 4.10%



0 dB = 5.85 W/kg = 7.67 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

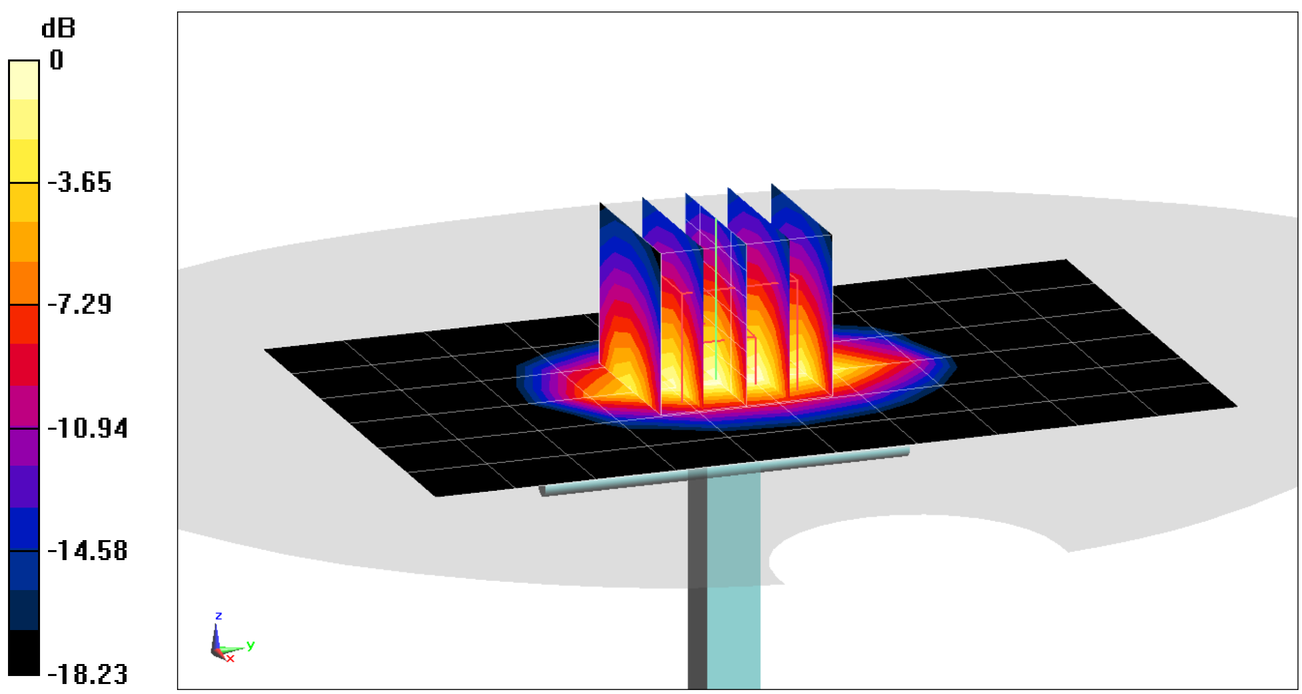
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.566 S/m; ε_r = 54.511; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-19-2019; Ambient Temp: 21.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1900 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.59 W/kg
SAR(1 g) = 4.12 W/kg; SAR (10 g) = 2.14 W/kg
Deviation(1 g) = 5.37%; Deviation (10g) = 4.39%



0 dB = 6.35 W/kg = 8.03 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

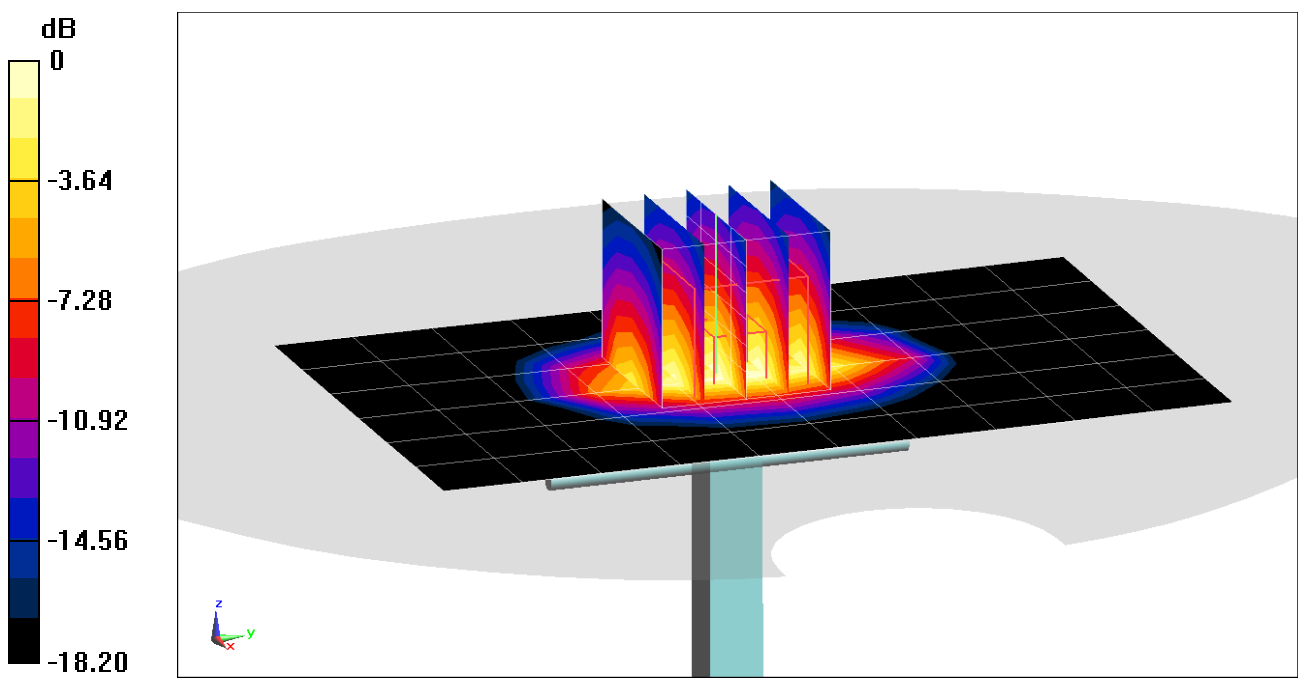
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.568 S/m; ε_r = 55.105; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-21-2019; Ambient Temp: 21.1°C; Tissue Temp: 19.4°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1900 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.50 W/kg
SAR(1 g) = 4.09 W/kg; SAR(10 g) = 2.14 W/kg
Deviation(1 g) = 3.81%; Deviation(10 g) = 3.38%



0 dB = 6.22 W/kg = 7.94 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

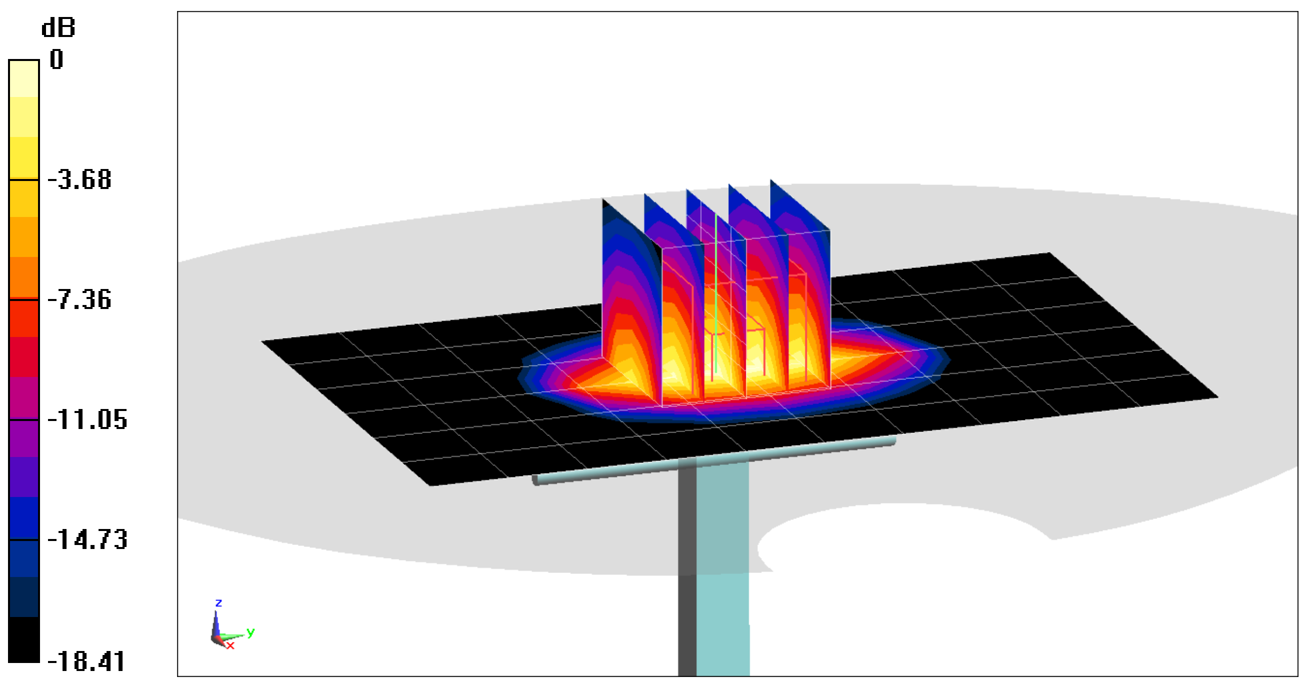
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
$f = 1900$ MHz; $\sigma = 1.579$ S/m; $\varepsilon_r = 55.104$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-23-2019; Ambient Temp: 20.1°C; Tissue Temp: 20.3°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1900 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.51 W/kg
SAR(10 g) = 2.15 W/kg
Deviation(10 g) = 3.86%



0 dB = 6.31 W/kg = 8.00 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

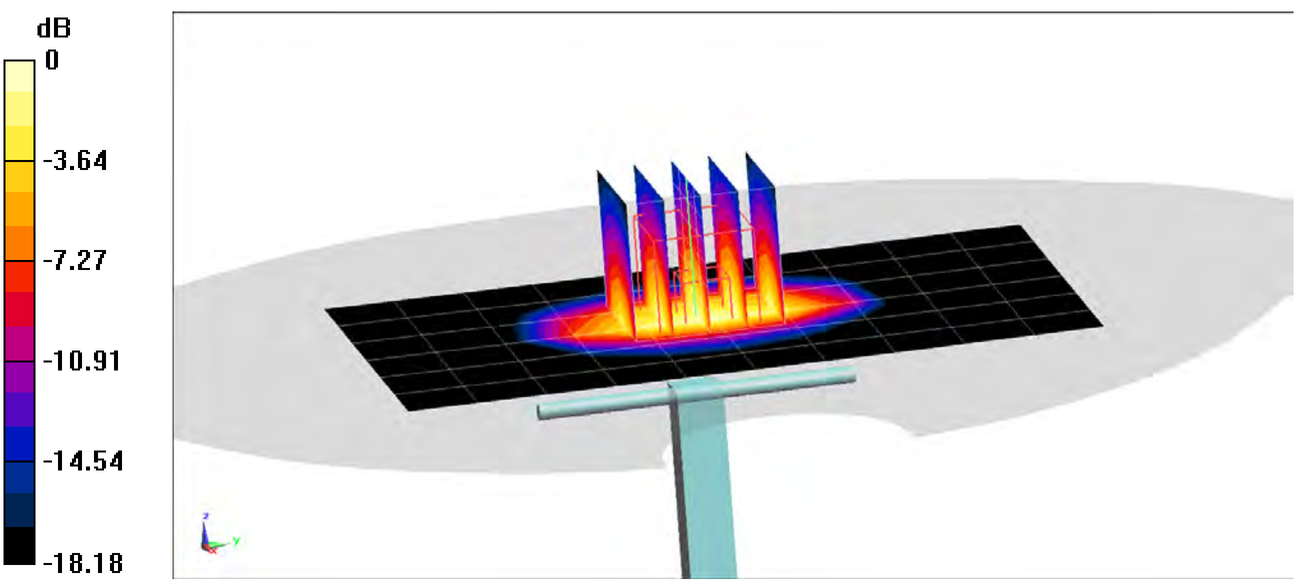
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.551 S/m; ε_r = 52.766; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-05-2019; Ambient Temp: 21.3°C; Tissue Temp: 24.8°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1900 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.84 W/kg
SAR(1 g) = 4.17 W/kg
Deviation(1 g) = 6.38%



0 dB = 6.55 W/kg = 8.16 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

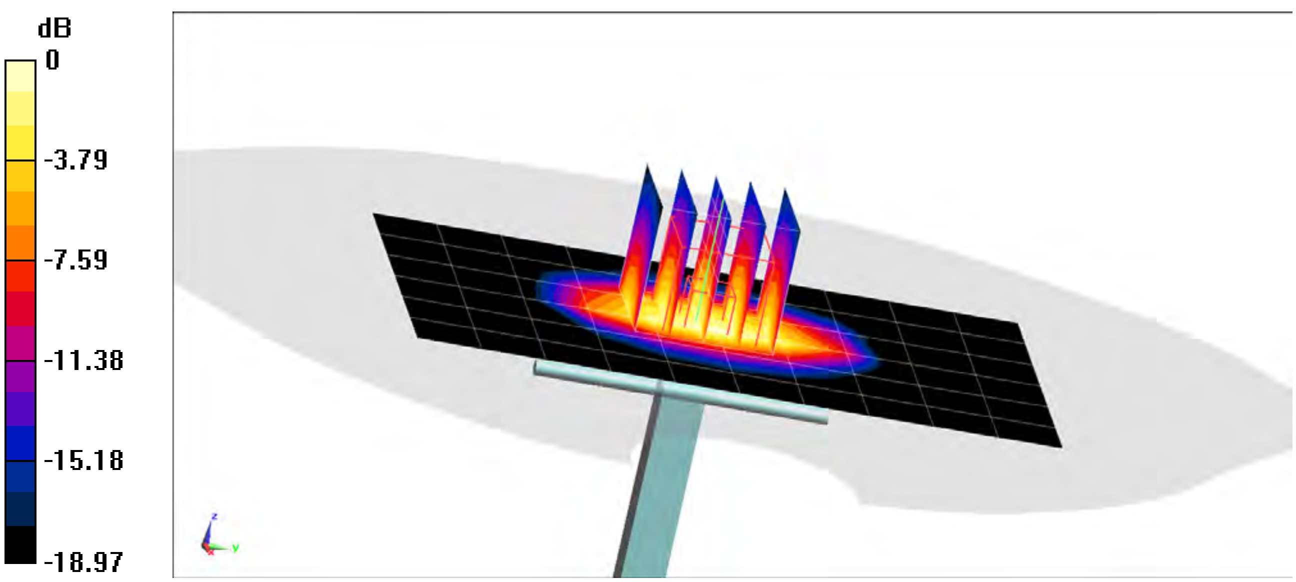
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.584 S/m; ε_r = 51.803; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-10-2019; Ambient Temp: 22.9°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1900 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.81 W/kg
SAR(1 g) = 4.09 W/kg
Deviation(1 g) = 4.34%



0 dB = 6.43 W/kg = 8.08 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

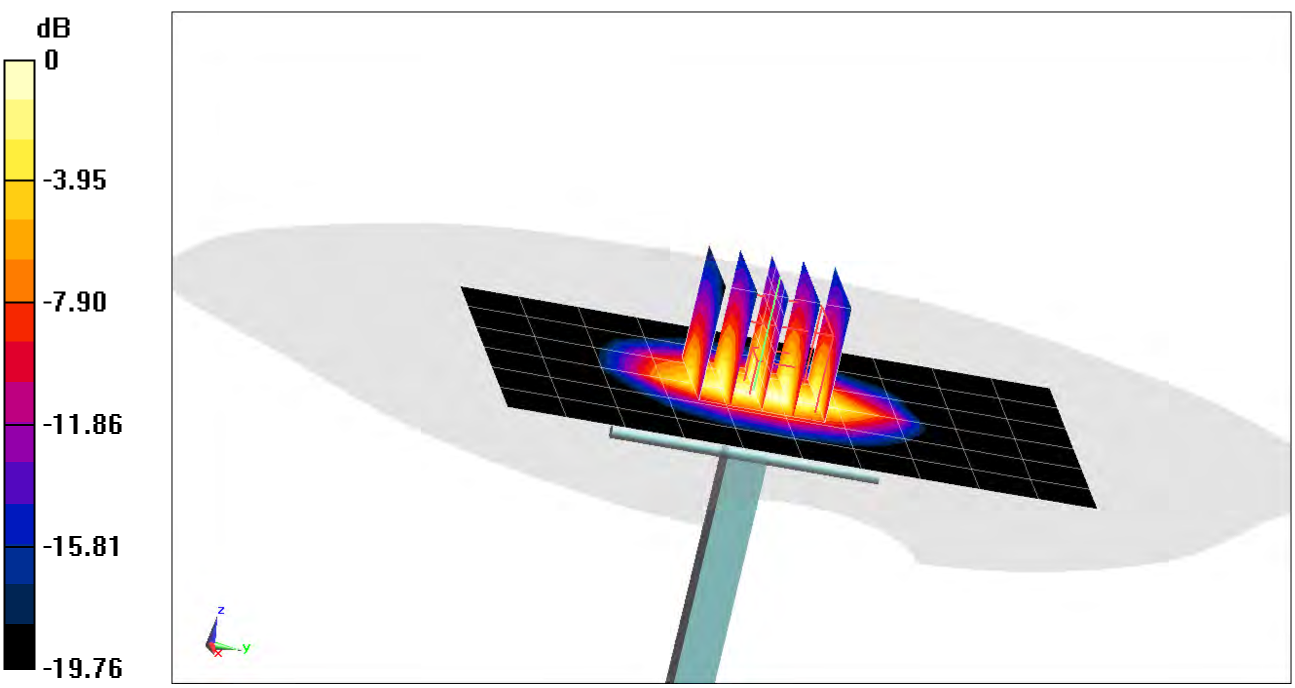
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.576 S/m; ε_r = 53.642; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-15-2019; Ambient Temp: 19.3°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7488; ConvF(8.37, 8.37, 8.37) @ 1900 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.89 W/kg
SAR(1 g) = 4.14 W/kg; SAR(10 g) = 2.11 W/kg
Deviation(1 g) = 5.61%; Deviation(10 g) = 2.43%



0 dB = 6.22 W/kg = 7.94 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1073

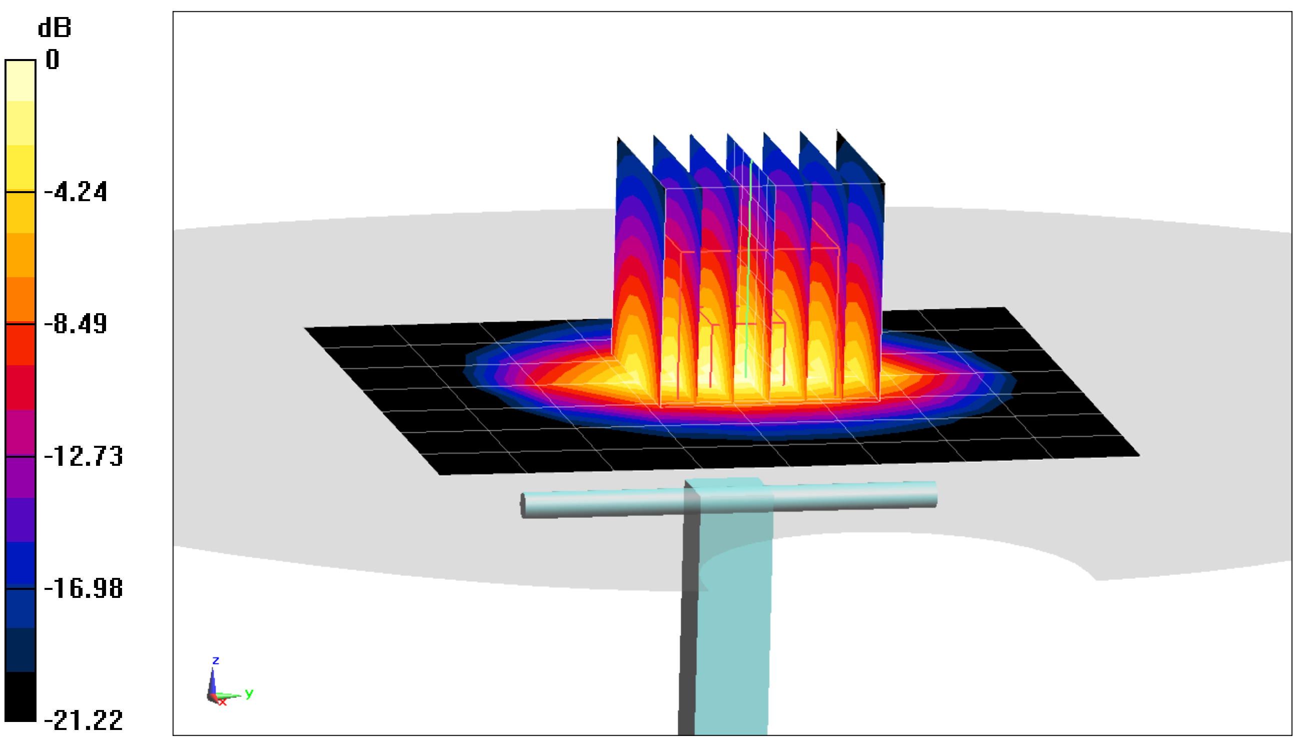
Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2300 MHz; σ = 1.858 S/m; ε_r = 52.233; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-23-2019; Ambient Temp: 21.6°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7417; ConvF(7.64, 7.64, 7.64) @ 2300 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2300 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.1 W/kg
SAR(10 g) = 2.38 W/kg
Deviation(10 g) = 2.59%



0 dB = 8.27 W/kg = 9.18 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1073

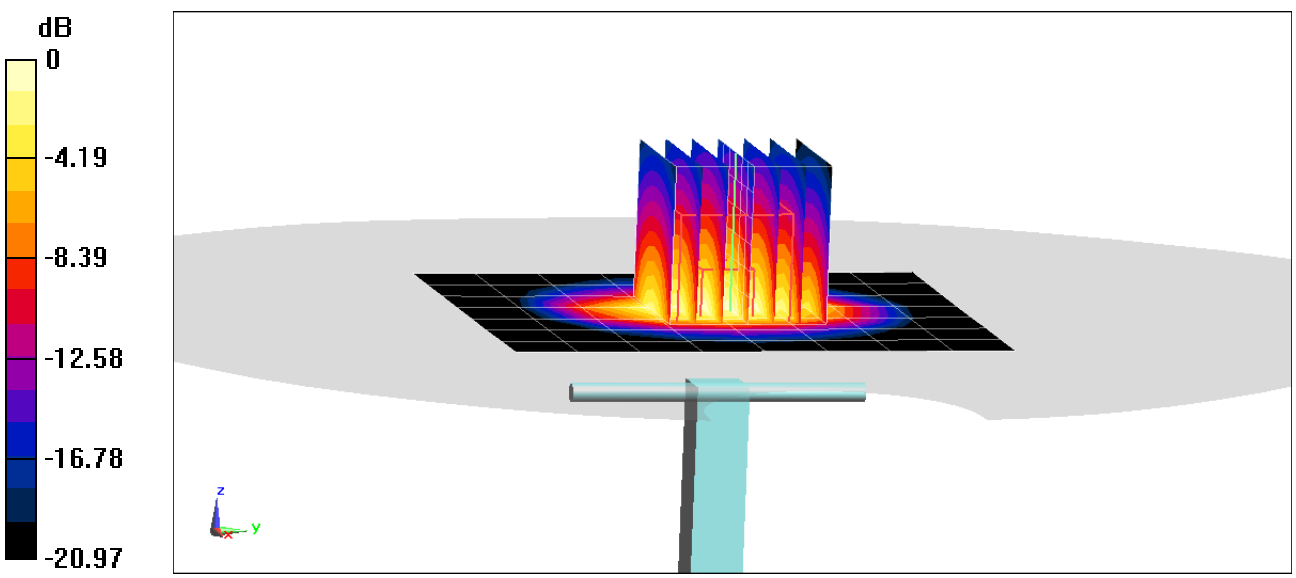
Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2300 MHz; σ = 1.865 S/m; ε_r = 52.774; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2019; Ambient Temp: 22.2°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN7308; ConvF(7.73, 7.73, 7.73) @ 2300 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2300 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.4 W/kg
SAR(1 g) = 5.04 W/kg
Deviation(1 g) = 5.66%



0 dB = 8.29 W/kg = 9.19 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

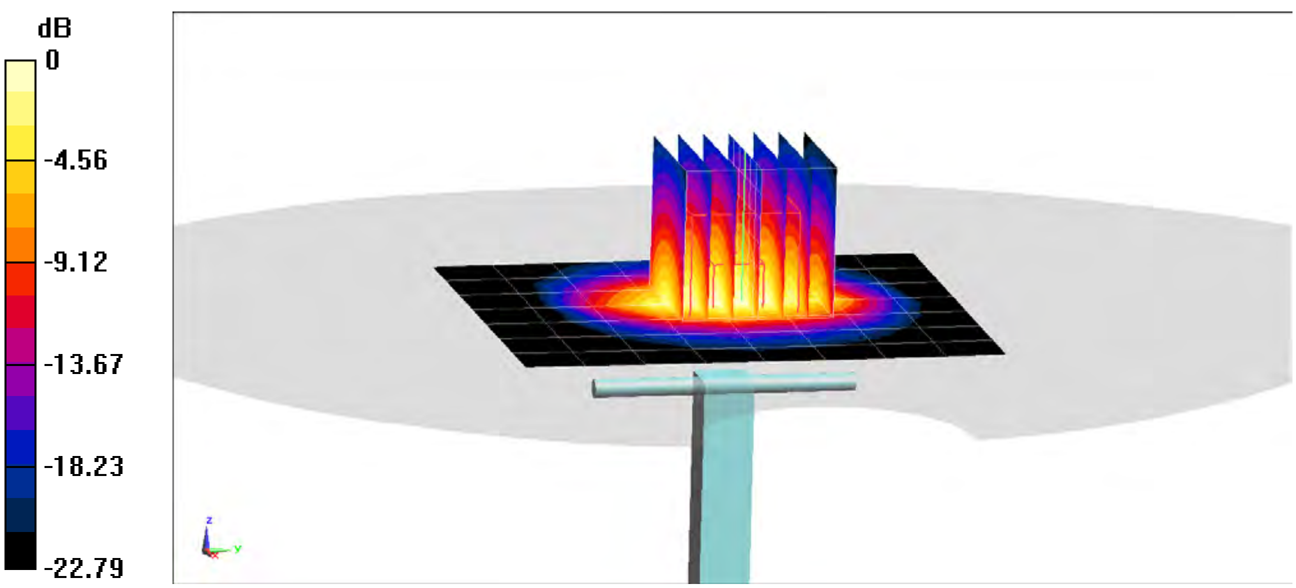
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; σ = 2.035 S/m; ε_r = 50.996; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-17-2019; Ambient Temp: 23.9°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2450 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.8 W/kg
SAR(1 g) = 5.13 W/kg; SAR(10 g) = 2.34 W/kg
Deviation(1 g) = 2.40%; Deviation(10 g) = -1.27%



0 dB = 8.60 W/kg = 9.34 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

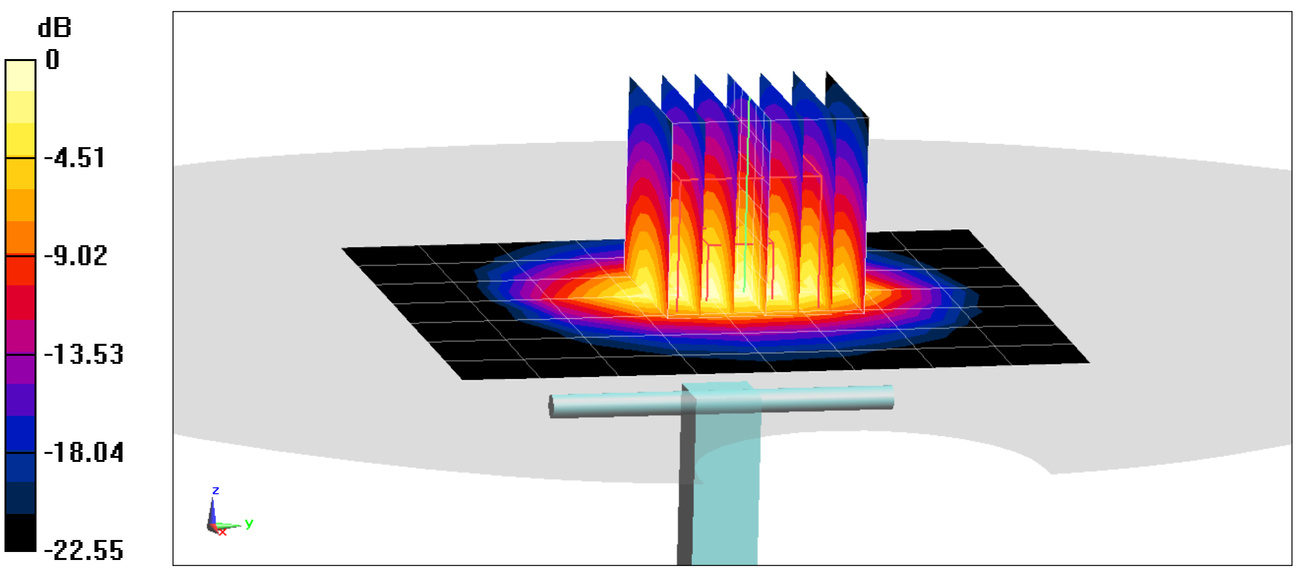
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; σ = 2.035 S/m; ε_r = 50.873; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-25-2019; Ambient Temp: 23.2°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2450 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.5 W/kg
SAR(1 g) = 5.06 W/kg
Deviation(1 g) = 1.00%



0 dB = 8.39 W/kg = 9.24 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

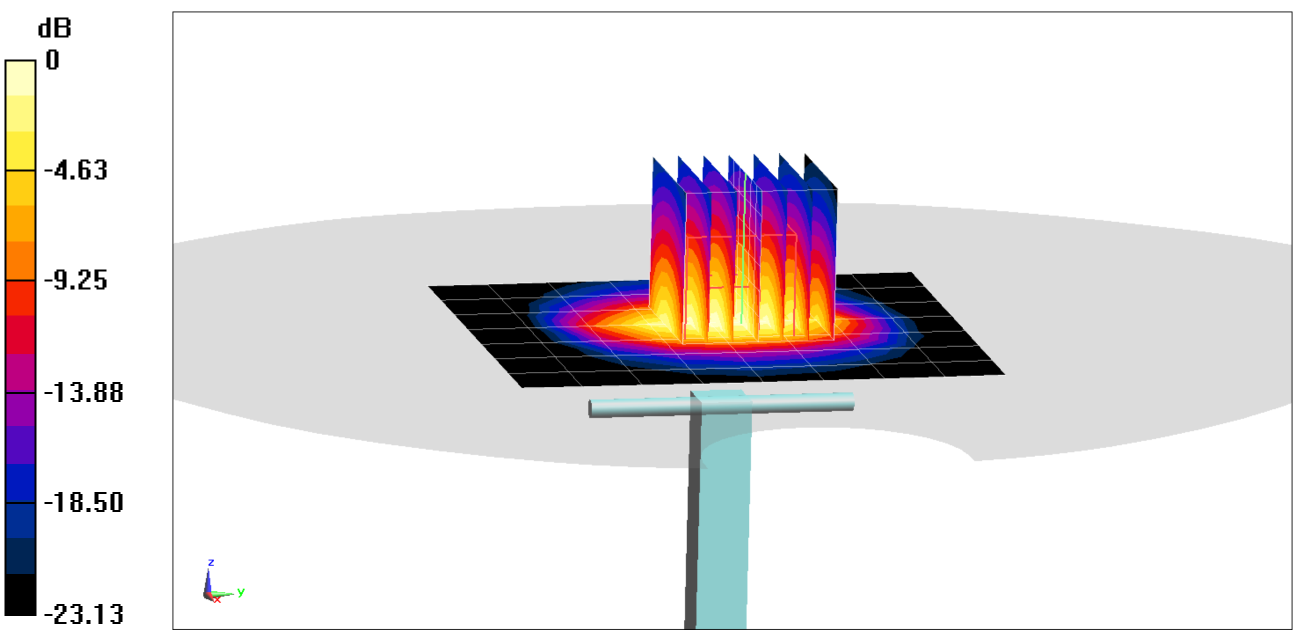
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; σ = 2.022 S/m; ε_r = 51.804; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-29-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2450 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.5 W/kg
SAR(1 g) = 5.06 W/kg; SAR(10 g) = 2.32 W/kg
Deviation(1 g) = 1.00%; Deviation(10 g) = -2.11%



0 dB = 8.38 W/kg = 9.23 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

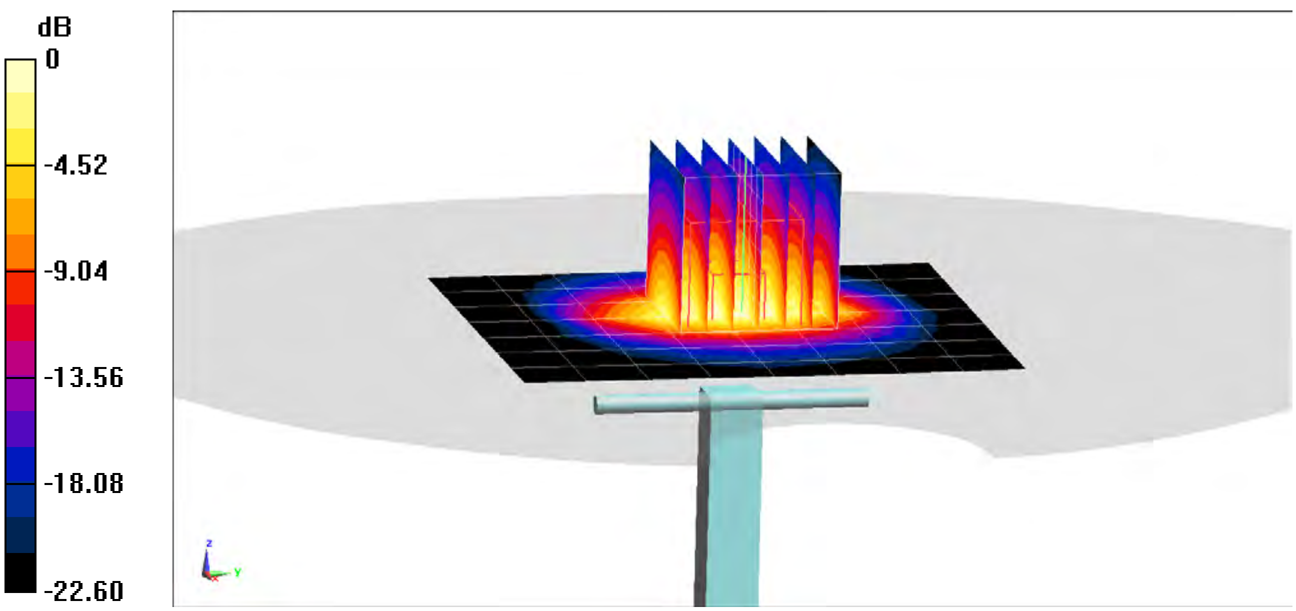
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; $\sigma = 2.035$ S/m; $\varepsilon_r = 51.648$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-10-2019; Ambient Temp: 22.7°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2450 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.7 W/kg
SAR(10 g) = 2.35 W/kg
Deviation(10 g) = -0.84%



0 dB = 8.63 W/kg = 9.36 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

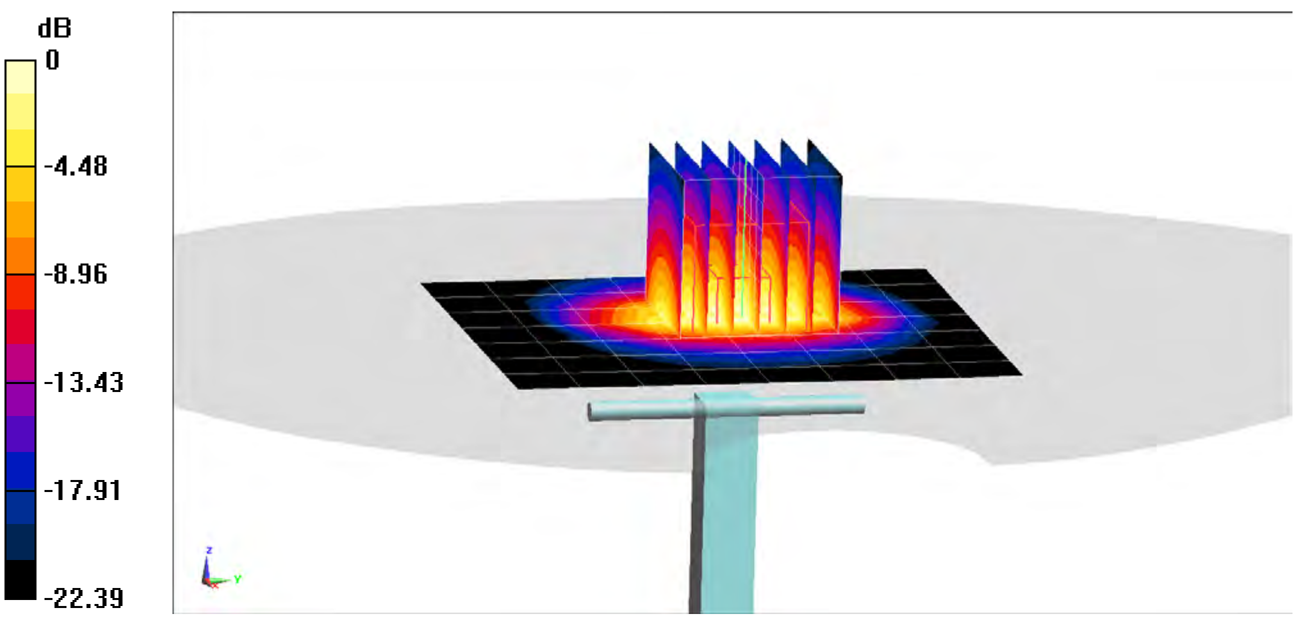
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; σ = 2.042 S/m; ε_r = 52.138; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-15-2019; Ambient Temp: 22.2°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2450 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.6 W/kg
SAR(1 g) = 5.13 W/kg; SAR(10 g) = 2.34 W/kg
Deviation(1 g) = 2.40%; Deviation(10 g) = -1.27%



0 dB = 8.63 W/kg = 9.36 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

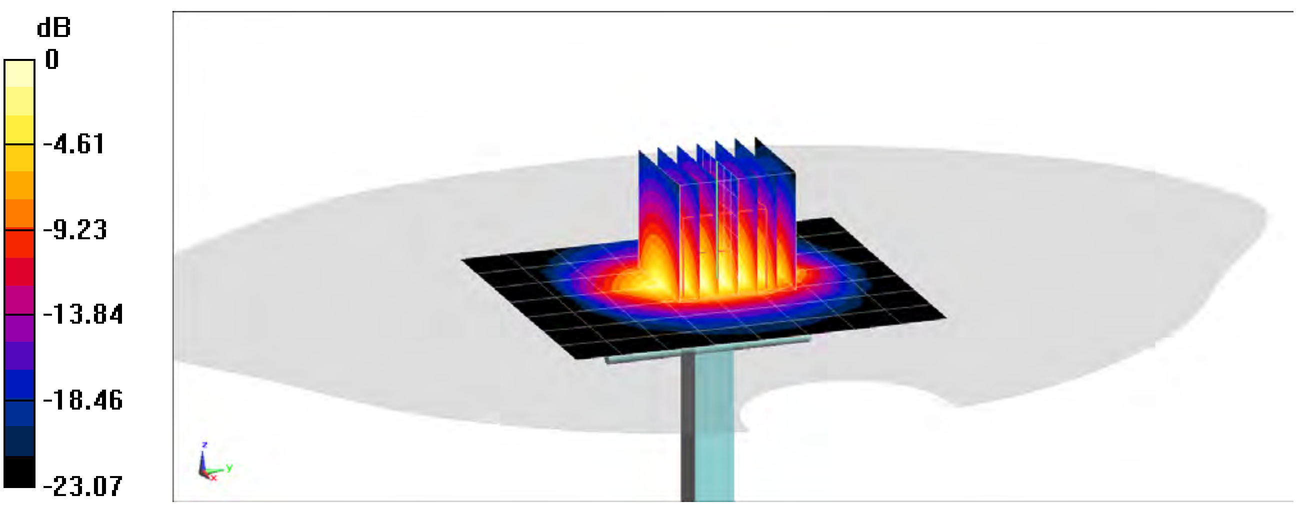
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; σ = 2.02 S/m; ε_r = 51.266; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-24-2019; Ambient Temp: 22.5°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2450 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.4 W/kg
SAR(1 g) = 5.27 W/kg; SAR(10 g) = 2.4 W/kg
Deviation(1 g) = 5.19%; Deviation(10 g) = 1.27%



0 dB = 8.95 W/kg = 9.52 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1004

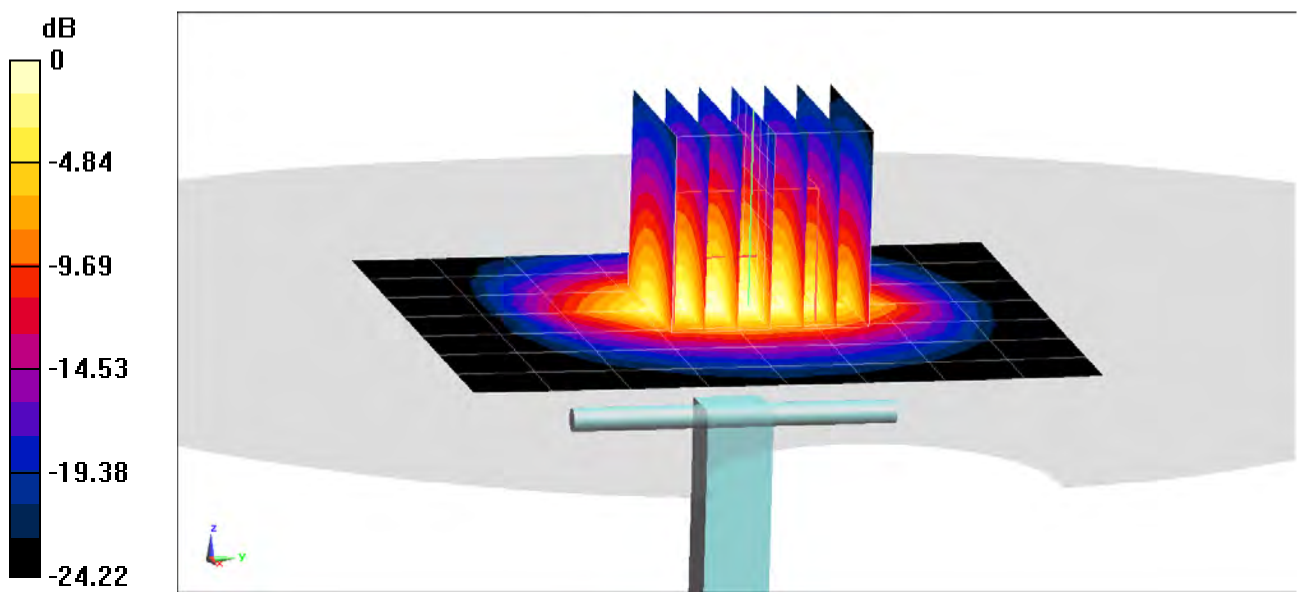
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2600 MHz; σ = 2.215 S/m; ε_r = 50.516; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-17-2019; Ambient Temp: 23.9°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2600 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.5 W/kg
SAR(1 g) = 5.25 W/kg; SAR(10 g) = 2.31 W/kg
Deviation(1 g) = -4.20%; Deviation(10 g) = -6.48%



0 dB = 8.96 W/kg = 9.52 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1004

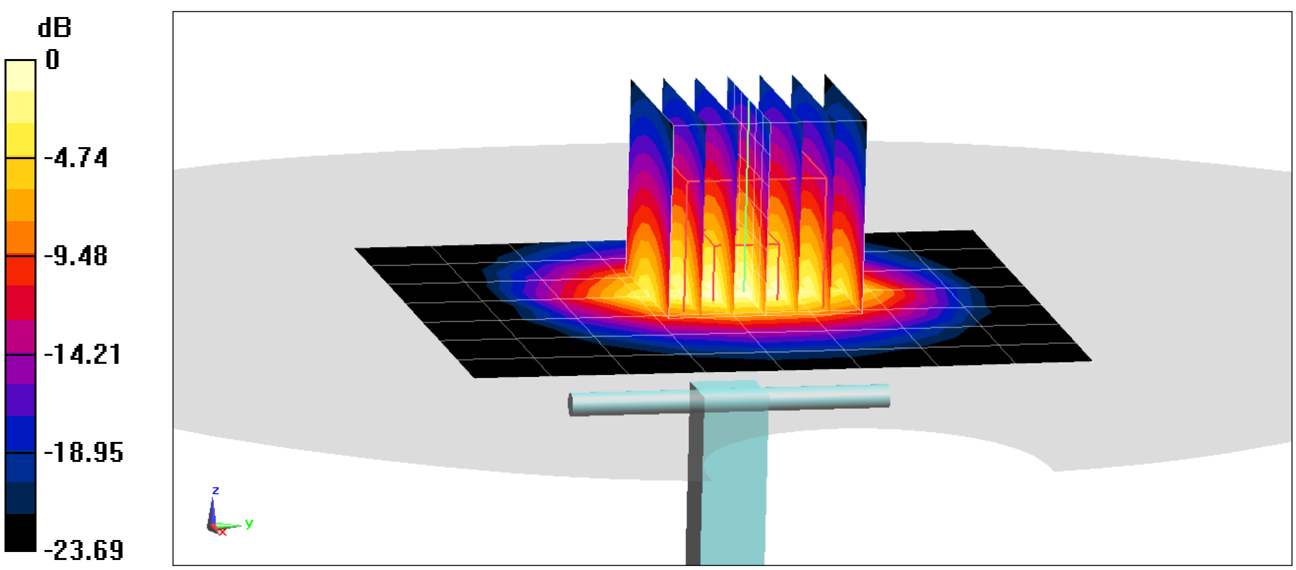
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2600 Body; Medium parameters used:
f = 2600 MHz; σ = 2.221 S/m; ε_r = 50.392; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-25-2019; Ambient Temp: 23.2°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2600 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.8 W/kg
SAR(1 g) = 5.48 W/kg
Deviation(1 g) = 0.00%



0 dB = 9.40 W/kg = 9.73 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1071

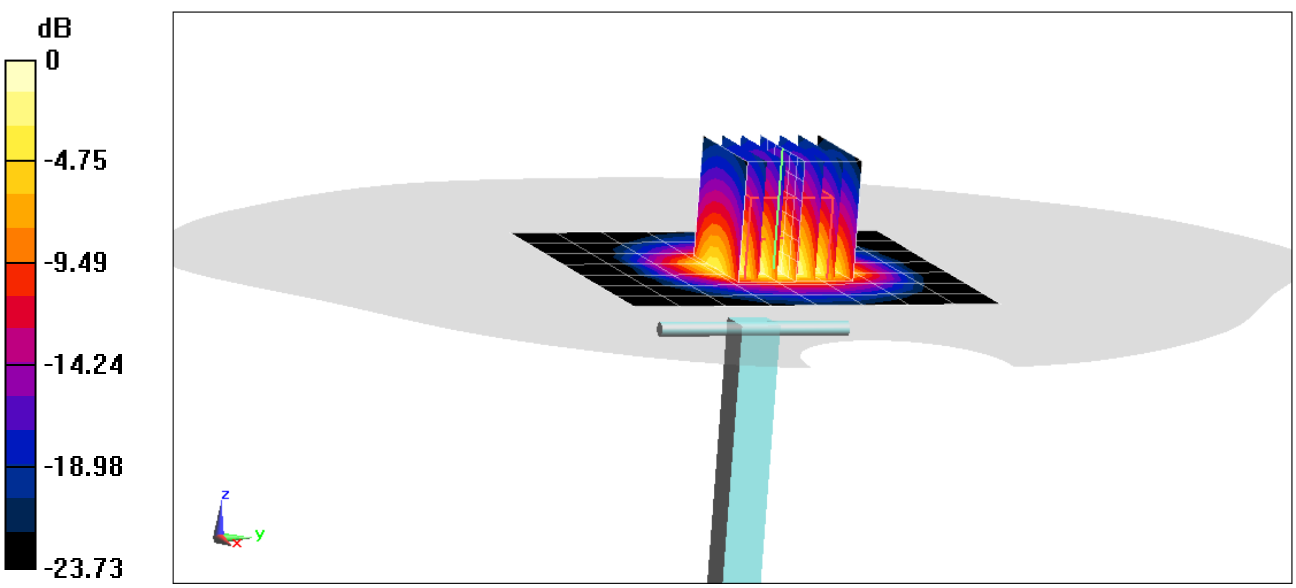
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body; Medium parameters used:
f = 2600 MHz; σ = 2.172 S/m; ε_r = 52.884; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-26-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7308; ConvF(7.4, 7.4, 7.4) @ 2600 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.9 W/kg
SAR(1 g) = 5.45 W/kg; SAR(10 g) = 2.42 W/kg
Deviation(1 g) = 0.55%; Deviation(10 g) = -1.22%



0 dB = 9.50 W/kg = 9.78 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1004

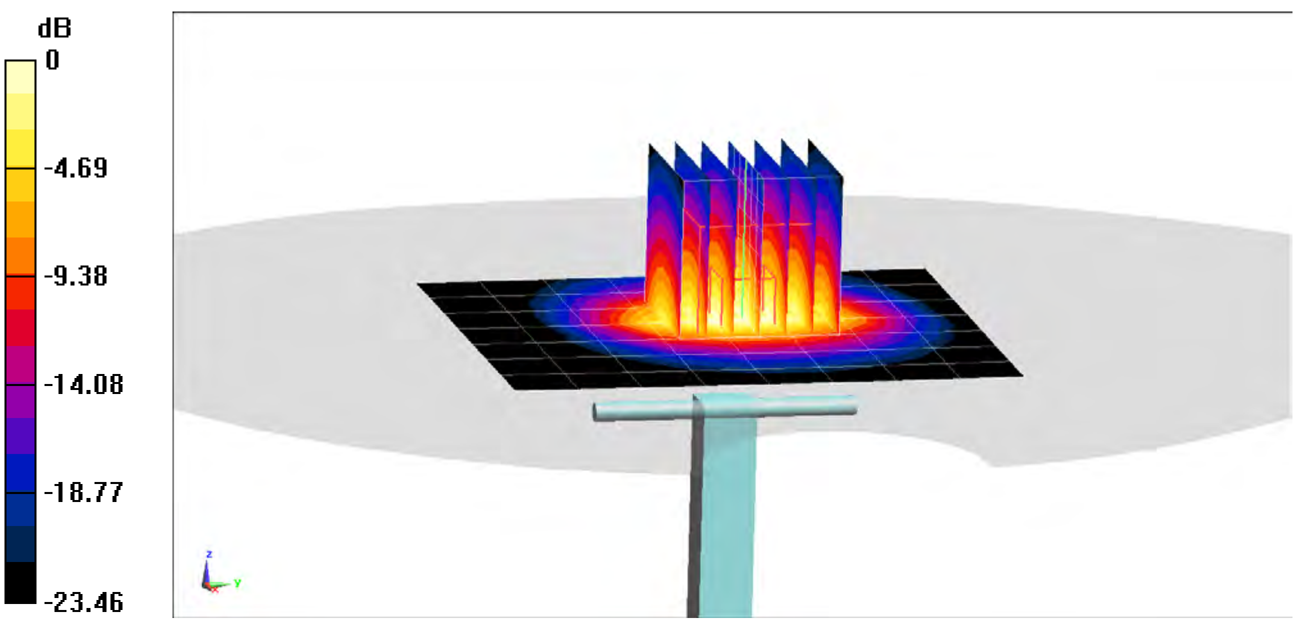
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2600 MHz; $\sigma = 2.218$ S/m; $\varepsilon_r = 51.237$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-10-2019; Ambient Temp: 22.7°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2600 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.6 W/kg
SAR(10 g) = 2.36 W/kg
Deviation(10 g) = -4.45%



0 dB = 9.29 W/kg = 9.68 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1004

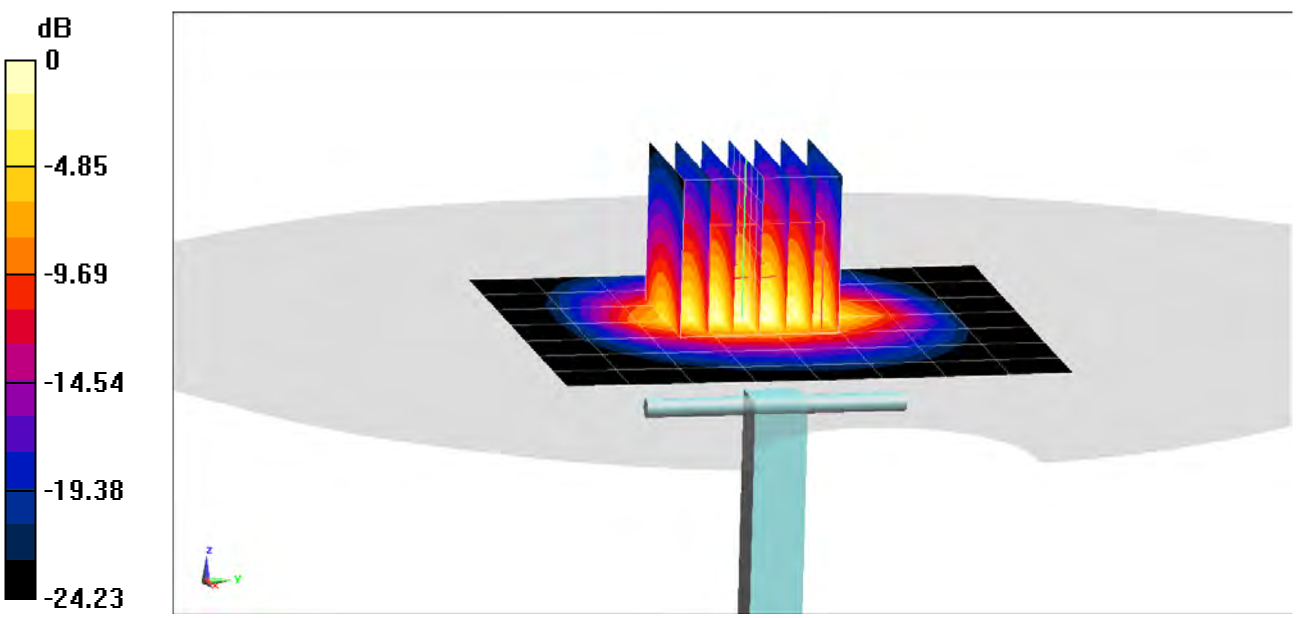
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2600 MHz; $\sigma = 2.228$ S/m; $\varepsilon_r = 51.661$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-15-2019; Ambient Temp: 22.2°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2600 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 12.3 W/kg
SAR(1 g) = 5.62 W/kg; SAR(10 g) = 2.47 W/kg
Deviation(1 g) = 2.55%; Deviation(10 g) = 0.00%



0 dB = 9.67 W/kg = 9.85 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1004

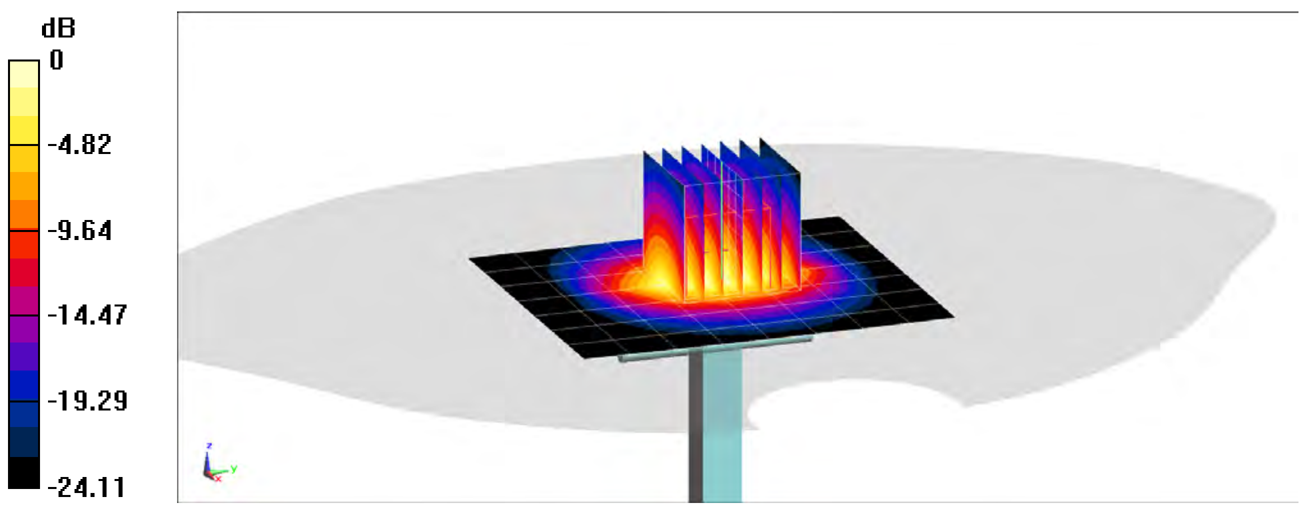
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2600 MHz; σ = 2.19 S/m; ε_r = 50.86; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-24-2019; Ambient Temp: 22.5°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2600 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.6 W/kg
SAR(1 g) = 5.38 W/kg; SAR(10 g) = 2.38 W/kg
Deviation(1 g) = -1.82%; Deviation(10 g) = -3.64%



0 dB = 9.15 W/kg = 9.61 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

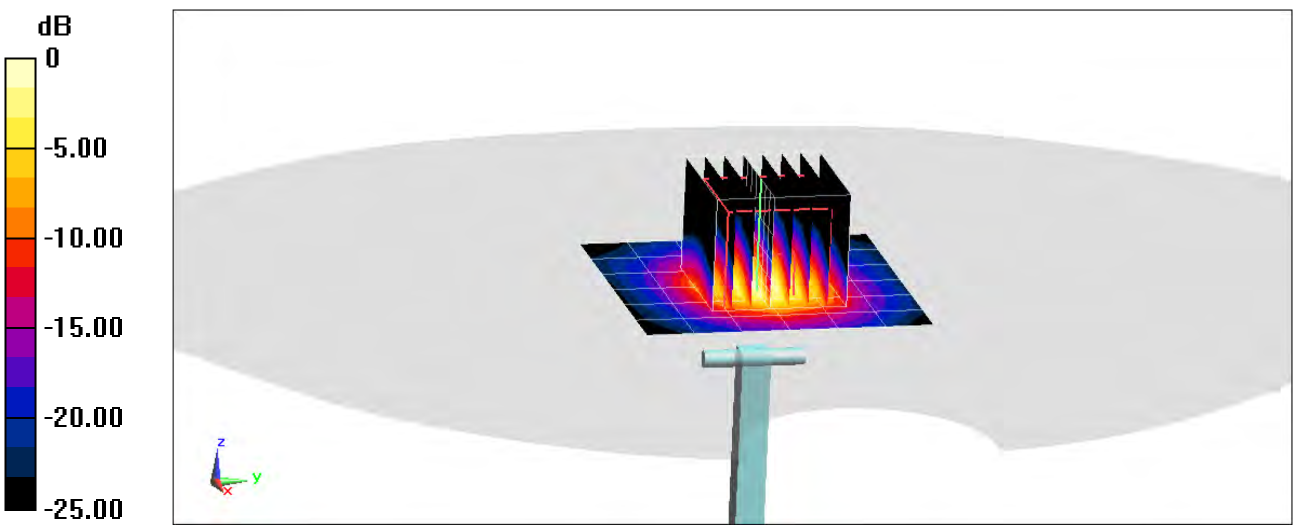
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5GHz Body; Medium parameters used (interpolated):
f = 5250 MHz; σ = 5.456 S/m; ε_r = 49.353; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-08-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7308; ConvF(4.48, 4.48, 4.48) @ 5250 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 14.6 W/kg
SAR(1 g) = 3.67 W/kg; SAR(10 g) = 1.02 W/kg
Deviation(1 g) = -3.29%; Deviation(10 g) = -3.32%



0 dB = 8.52 W/kg = 9.30 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

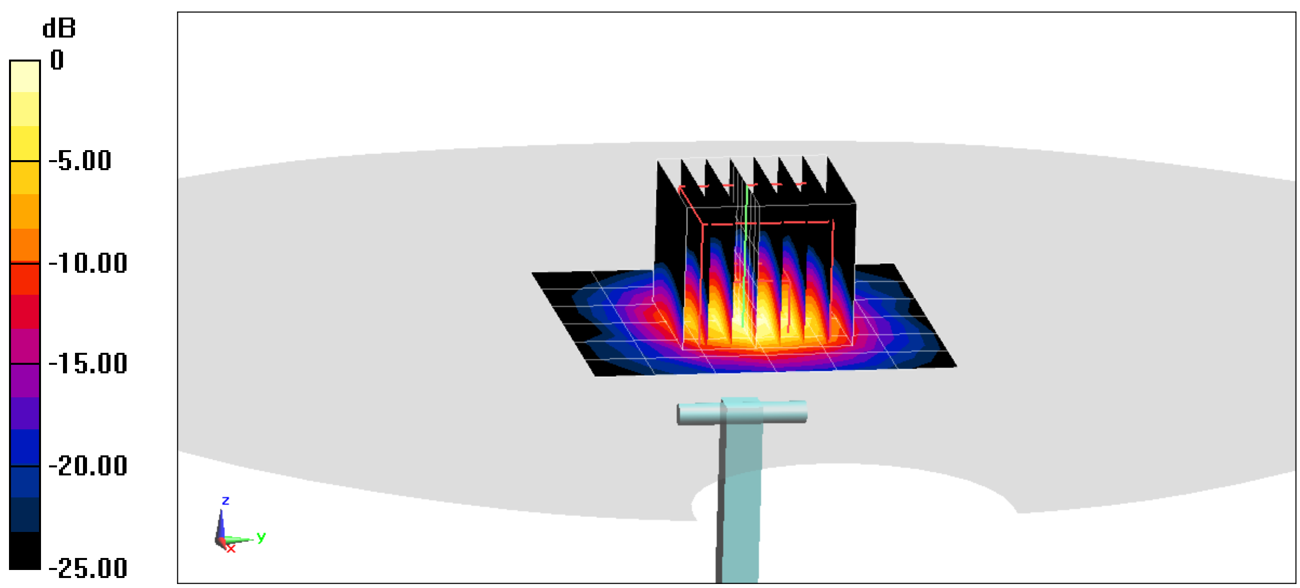
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5GHz Body; Medium parameters used:
f = 5600 MHz; σ = 5.968 S/m; ε_r = 48.695; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-08-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7308; ConvF(4, 4, 4) @ 5600 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 18.7 W/kg
SAR(1 g) = 4.24 W/kg; SAR(10 g) = 1.16 W/kg
Deviation(1 g) = 6.13%; Deviation(10 g) = 4.04%



0 dB = 10.2 W/kg = 10.09 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

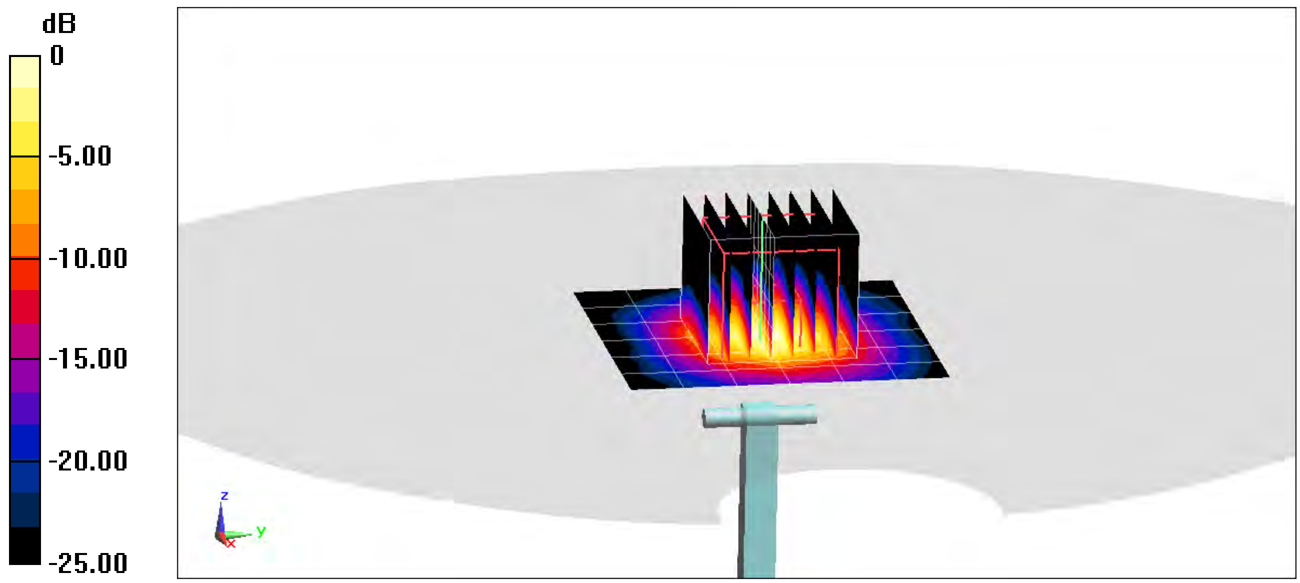
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5GHz Body; Medium parameters used (interpolated):
f = 5750 MHz; $\sigma = 6.204$ S/m; $\varepsilon_r = 48.417$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-08-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7308; ConvF(4.18, 4.18, 4.18) @ 5750 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 16.8 W/kg
SAR(1 g) = 3.68 W/kg; SAR(10 g) = 1.03 W/kg
Deviation(1 g) = -4.04%; Deviation(10 g) = -2.83%



0 dB = 8.97 W/kg = 9.53 dBW/kg

APPENDIX C: PROBE CALIBRATION

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: **D5GHzV2-1057_Jan18**

CALIBRATION CERTIFICATE

Object D5GHzV2 - SN:1057

Calibration procedure(s) QA CAL-22.v2
Calibration procedure for dipole validation kits between 3-6 GHz

BN
01-25-2018

Calibration date: January 16, 2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

BN
02/06/2019

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 3503	30-Dec-17 (No. EX3-3503_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 18, 2018

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	36.2 ± 6 %	4.55 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.91 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**79.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.8 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.8 ± 6 %	4.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**84.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.0 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.5 ± 6 %	5.06 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.0 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.3 ± 6 %	5.41 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.36 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**73.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.06 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.4 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.2 ± 6 %	5.48 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.64 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**75.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.13 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.1 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.6 ± 6 %	5.94 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.05 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**79.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.3 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.3 ± 6 %	6.15 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.72 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**76.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.2 ± 6 %	6.22 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.68 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**76.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.13 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.1 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	50.0 Ω - 5.5 jΩ
Return Loss	- 25.2 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	54.7 Ω - 2.1 jΩ
Return Loss	- 26.2 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	52.7 Ω + 0.0 jΩ
Return Loss	- 31.5 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	49.3 Ω - 6.7 jΩ
Return Loss	- 23.4 dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	48.4 Ω - 3.9 jΩ
Return Loss	- 27.4 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	55.3 Ω - 1.6 jΩ
Return Loss	- 25.6 dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	52.6 Ω + 1.1 jΩ
Return Loss	- 31.2 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	51.8 Ω - 0.4 jΩ
Return Loss	- 34.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 27, 2006

Appendix (Additional assessments outside the scope of SCS 0108)

Measurement Conditions (f=5200 MHz)

DASY system configuration, as far as not given on page 1 and 3.

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L

SAR result with SAM Head (Top)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.24 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**82.6 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.6 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.54 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**85.6 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.7 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Neck)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.6 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.7 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Ear)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	5.16 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**51.7 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	1.76 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**17.7 W/kg ± 19.9 % (k=2)**

Measurement Conditions (f=5800 MHz)

DASY system configuration, as far as not given on page 1 and 3.

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L

SAR result with SAM Head (Top)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.62 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**86.3 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.1 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.88 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**88.9 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Neck)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.4 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.5 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Ear)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	5.68 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**56.8 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	1.89 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**18.9 W/kg ± 19.9 % (k=2)**

DASY5 Validation Report for Head TSL

Date: 11.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1057

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 4.55 S/m; ε_r = 36.2; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 4.9 S/m; ε_r = 35.8; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 5.06 S/m; ε_r = 35.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

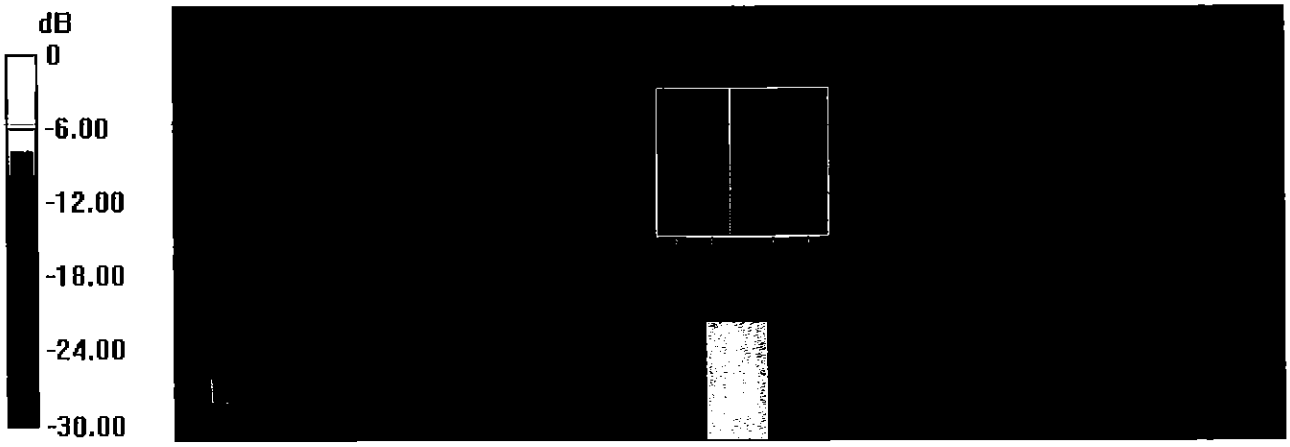
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.51, 5.51, 5.51); Calibrated: 30.12.2017, ConvF(5.05, 5.05, 5.05); Calibrated: 30.12.2017, ConvF(4.98, 4.98, 4.98); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601 - modified; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.54 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 27.5 W/kg
SAR(1 g) = 7.91 W/kg; SAR(10 g) = 2.28 W/kg
Maximum value of SAR (measured) = 17.7 W/kg

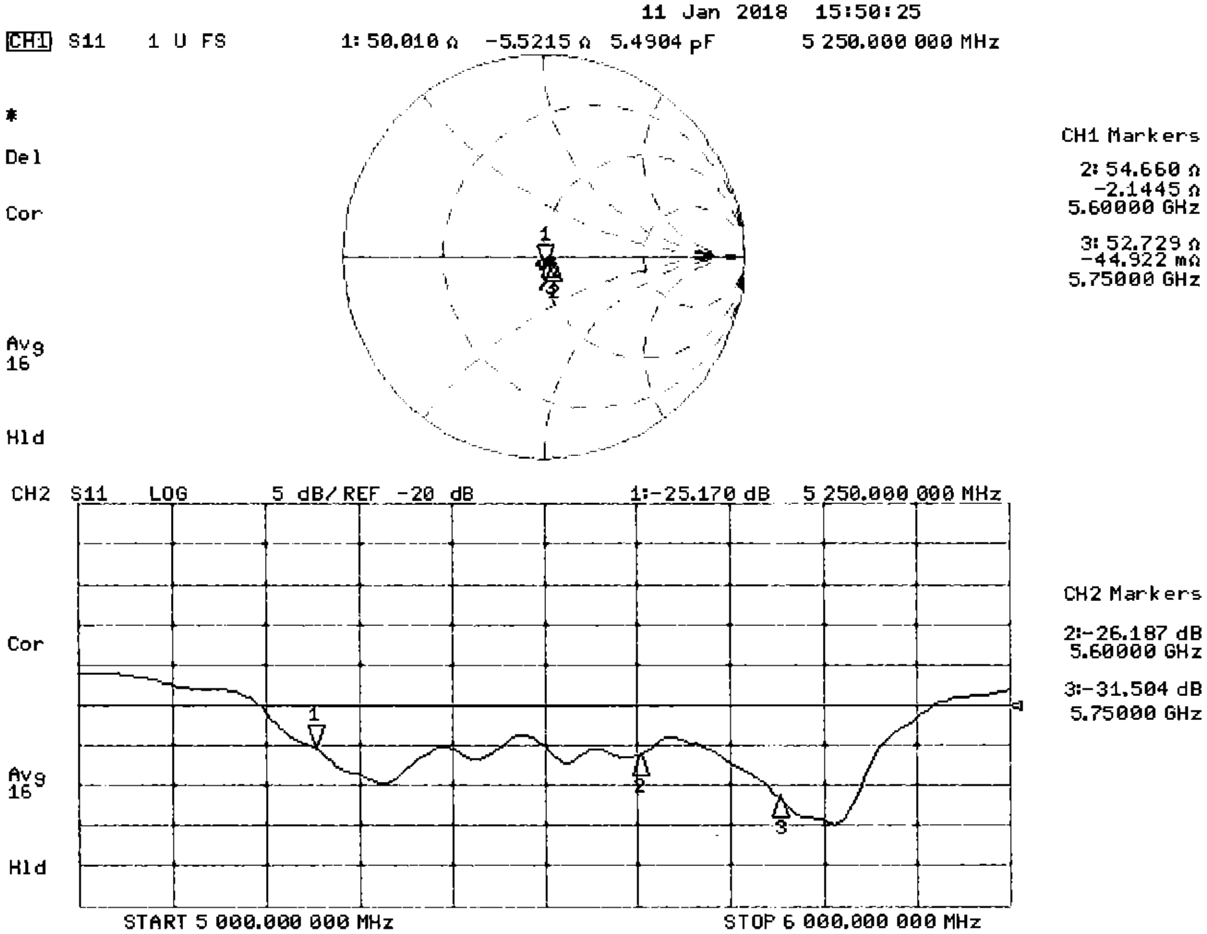
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.77 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 32.2 W/kg
SAR(1 g) = 8.41 W/kg; SAR(10 g) = 2.4 W/kg
Maximum value of SAR (measured) = 19.7 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 70.93 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 31.4 W/kg
SAR(1 g) = 8.06 W/kg; SAR(10 g) = 2.3 W/kg
Maximum value of SAR (measured) = 18.9 W/kg



0 dB = 18.9 W/kg = 12.76 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 10.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1057

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz, Frequency: 5800 MHz
Medium parameters used:f = 5200 MHz; σ = 5.41 S/m; ε_r = 47.3; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5250 MHz; σ = 5.48 S/m; ε_r = 47.2; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 5.94 S/m; ε_r = 46.6; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 6.15 S/m; ε_r = 46.3; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5800 MHz; σ = 6.22 S/m; ε_r = 46.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.35, 5.35, 5.35); Calibrated: 30.12.2017, ConvF(5.26, 5.26, 5.26); Calibrated: 30.12.2017, ConvF(4.65, 4.65, 4.65); Calibrated: 30.12.2017, ConvF(4.57, 4.57, 4.57); Calibrated: 30.12.2017, ConvF(4.53, 4.53, 4.53); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

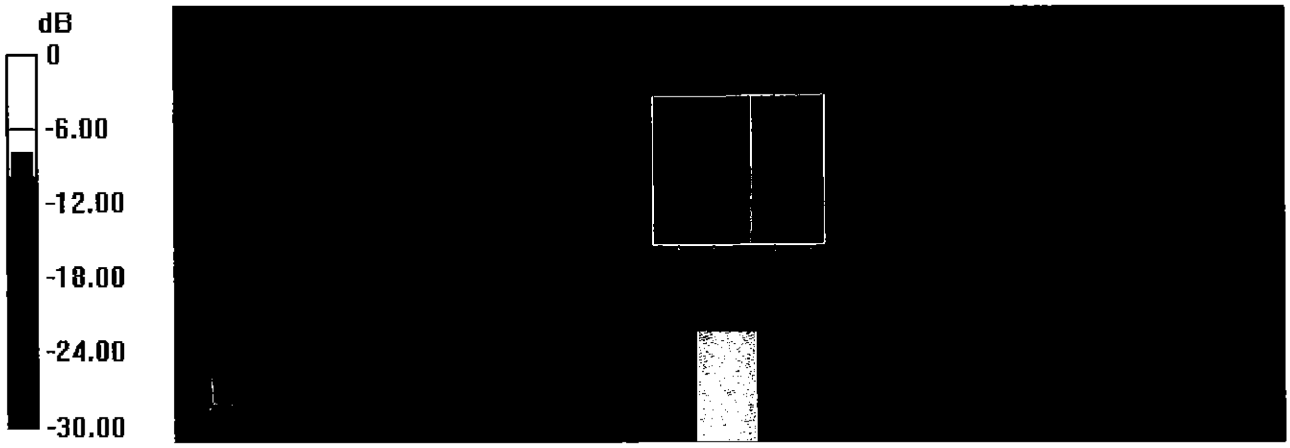
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.05 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 27.6 W/kg
SAR(1 g) = 7.36 W/kg; SAR(10 g) = 2.06 W/kg
Maximum value of SAR (measured) = 17.1 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.53 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 29.4 W/kg
SAR(1 g) = 7.64 W/kg; SAR(10 g) = 2.13 W/kg
Maximum value of SAR (measured) = 17.9 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.09 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 34.0 W/kg
SAR(1 g) = 8.05 W/kg; SAR(10 g) = 2.25 W/kg
Maximum value of SAR (measured) = 19.5 W/kg

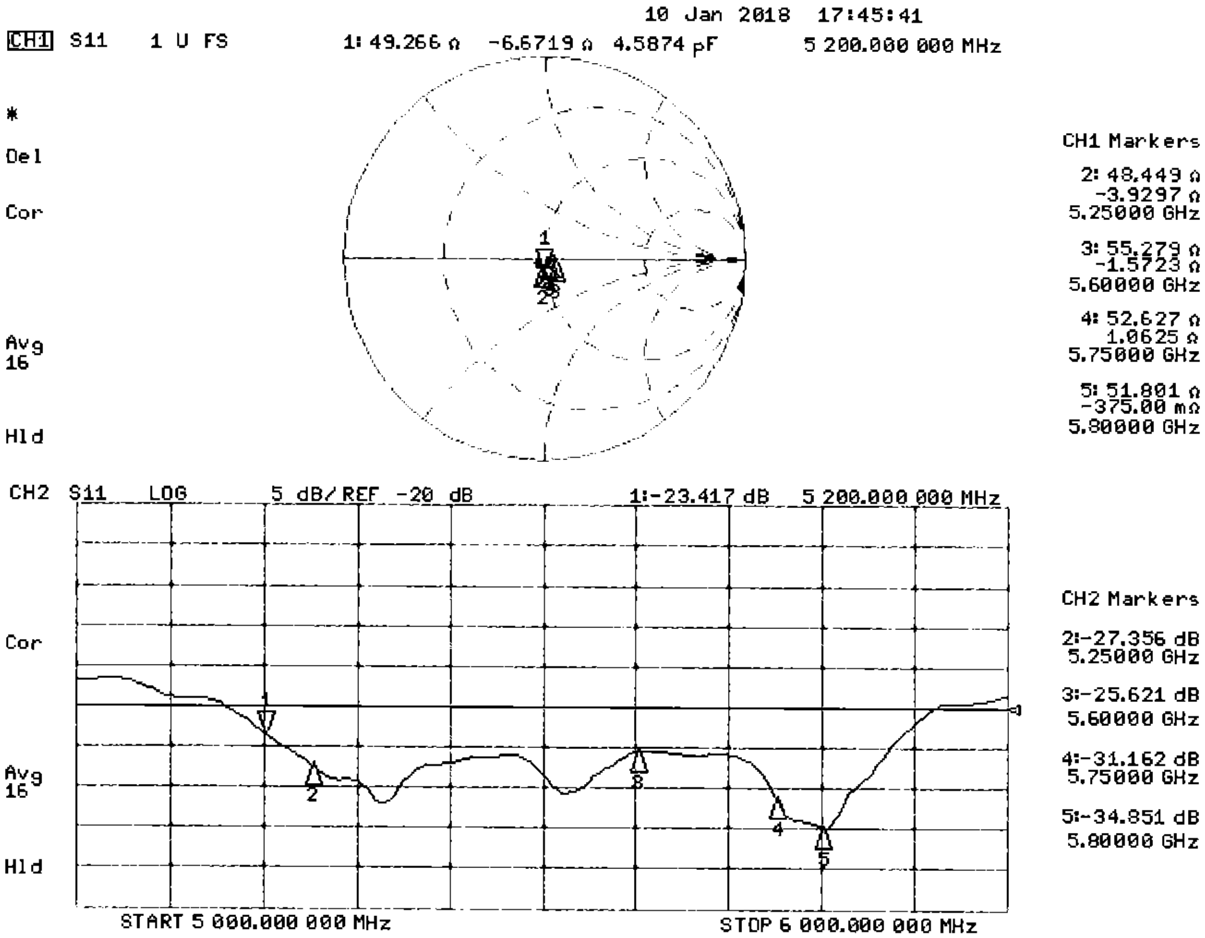
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.45 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 32.9 W/kg
SAR(1 g) = 7.72 W/kg; SAR(10 g) = 2.14 W/kg
Maximum value of SAR (measured) = 18.9 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.14 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 33.3 W/kg
SAR(1 g) = 7.68 W/kg; SAR(10 g) = 2.13 W/kg



0 dB = 18.9 W/kg = 12.76 dBW/kg

Impedance Measurement Plot for Body TSL



DASY5 Validation Report for SAM Head

Date: 16.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1057

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 4.59 S/m; ε_r = 36.5; ρ = 1000 kg/m3 ,
Medium parameters used: f = 5800 MHz; σ = 5.28 S/m; ε_r = 35.4; ρ = 1000 kg/m3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.75, 5.75, 5.75); Calibrated: 30.12.2017, ConvF(4.96, 4.96, 4.96); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: SAM Head
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

SAM Head/Top - 5200/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.99 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 30.6 W/kg
SAR(1 g) = 8.24 W/kg; SAR(10 g) = 2.35 W/kg
Maximum value of SAR (measured) = 19.7 W/kg

SAM Head/Top - 5800/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 73.00 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 36.5 W/kg
SAR(1 g) = 8.62 W/kg; SAR(10 g) = 2.41 W/kg
Maximum value of SAR (measured) = 21.9 W/kg

SAM Head/Mouth - 5200/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.79 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 29.5 W/kg
SAR(1 g) = 8.54 W/kg; SAR(10 g) = 2.37 W/kg
Maximum value of SAR (measured) = 20.7 W/kg

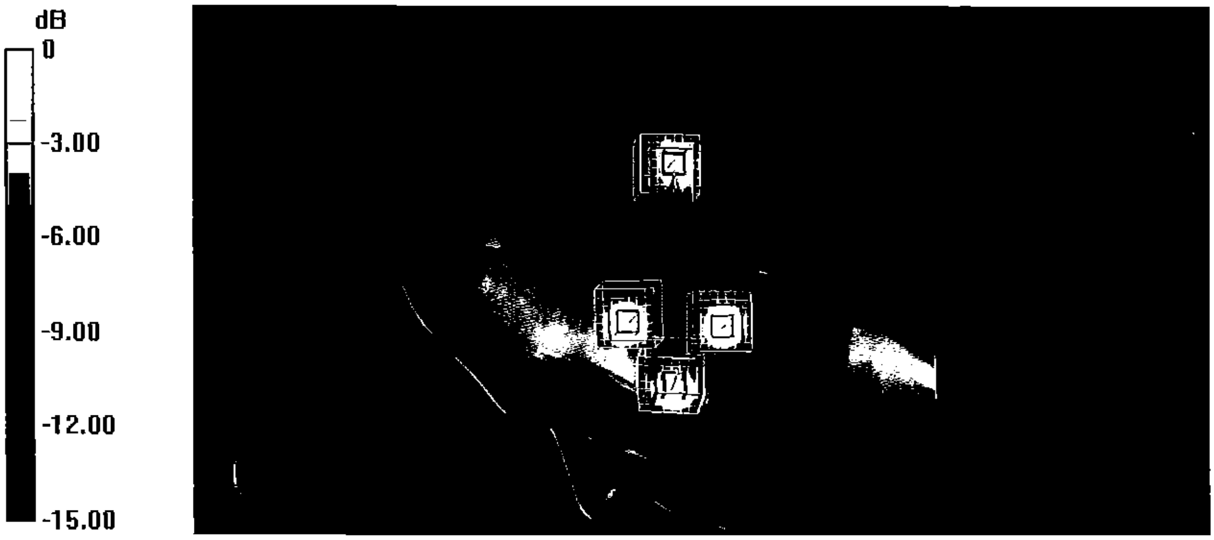
SAM Head/Mouth - 5800/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 71.69 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 34.9 W/kg
SAR(1 g) = 8.88 W/kg; SAR(10 g) = 2.44 W/kg
Maximum value of SAR (measured) = 23.0 W/kg

SAM Head/Neck - 5200/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.48 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 27.9 W/kg
SAR(1 g) = 8.14 W/kg; SAR(10 g) = 2.37 W/kg
Maximum value of SAR (measured) = 19.3 W/kg

SAM Head/Neck - 5800/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.90 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 33.4 W/kg
SAR(1 g) = 8.33 W/kg; SAR(10 g) = 2.35 W/kg
Maximum value of SAR (measured) = 21.8 W/kg

SAM Head/Ear - 5200/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 54.68 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 16.3 W/kg
SAR(1 g) = 5.16 W/kg; SAR(10 g) = 1.76 W/kg
Maximum value of SAR (measured) = 11.1 W/kg

SAM Head/Ear - 5800/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 56.96 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 21.2 W/kg
SAR(1 g) = 5.68 W/kg; SAR(10 g) = 1.89 W/kg
Maximum value of SAR (measured) = 13.8 W/kg



0 dB = 13.8 W/kg = 11.40 dBW/kg

Certification of Calibration

Object D5GHzV2 – SN: 1057

Calibration procedure(s) Procedure for Calibration Extension for SAR Dipoles.

Extension Calibration date: 1/16/2019

Description: SAR Validation Dipole at 5250, 5600, and 5750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	2/8/2018	Annual	2/8/2019	US39170122
Agilent	N5182A	MXG Vector Signal Generator	4/18/2018	Annual	4/18/2019	MY47420800
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1207364
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1339018
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Seekonk	NC-100	Torque Wrench	7/11/2018	Annual	7/11/2019	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/3/2018	Annual	10/3/2019	1558
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2018	Annual	6/18/2019	1334
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/11/2018	Annual	9/11/2019	1091
SPEAG	EX3DV4	SAR Probe	8/23/2018	Annual	8/23/2019	7308
SPEAG	EX3DV4	SAR Probe	6/25/2018	Annual	6/25/2019	7409

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Test Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O’Keefe	Senior Technical Manager	KOK

DIPOLE CALIBRATION EXTENSION

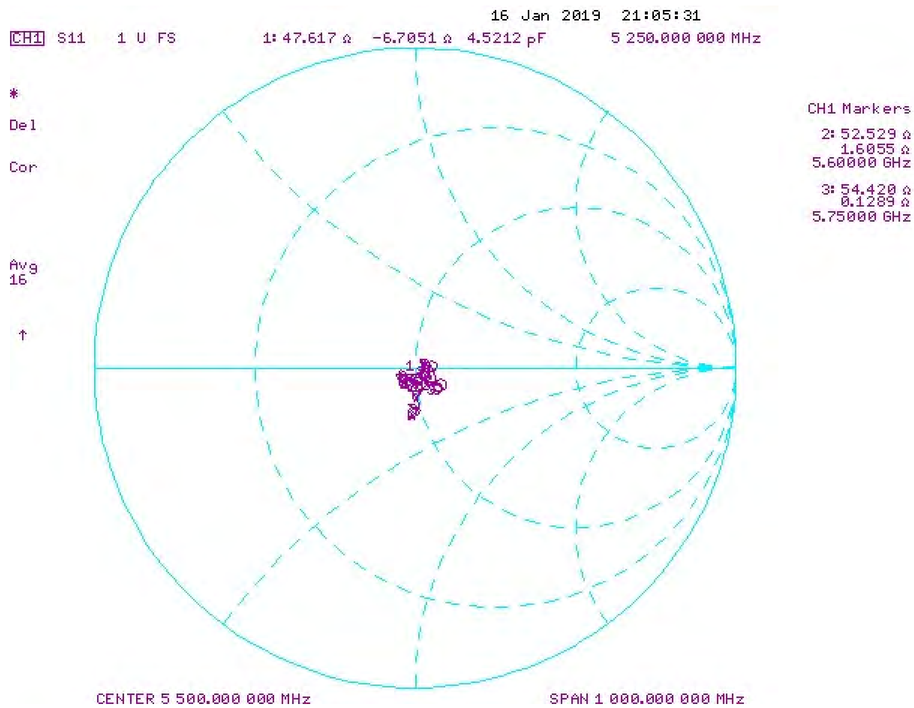
Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

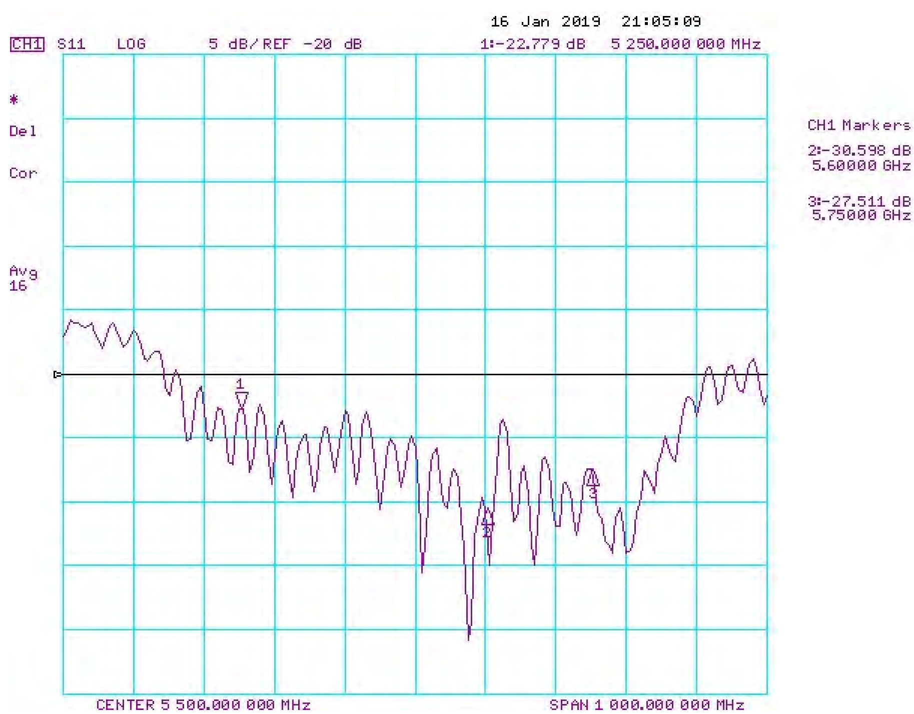
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

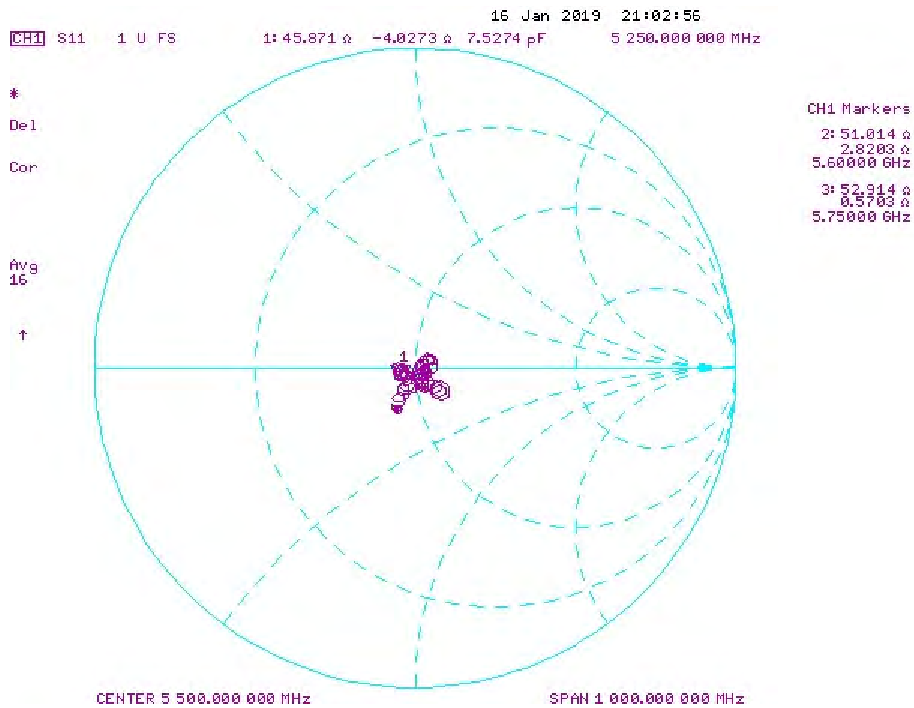
Frequency (MHz)	Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 17.0 dBm	Measured Head SAR (1g) W/kg @ 17.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 17.0 dBm	Measured Head SAR (10g) W/kg @ 17.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
5250	1/16/2018	1/16/2019	1.203	3.96	3.63	-8.33%	1.14	1.04	-8.77%	50	47.6	2.4	-5.5	-6.7	1.2	-25.2	-22.8	9.60%	PASS
5600	1/16/2018	1/16/2019	1.203	4.205	3.84	-8.68%	1.2	1.09	-9.17%	54.7	52.5	2.2	-2.1	1.6	3.7	-26.2	-30.6	-16.80%	PASS
5750	1/16/2018	1/16/2019	1.203	4.025	3.76	-6.58%	1.15	1.07	-6.96%	52.7	54.4	1.7	0	0.1	0.1	-31.5	-27.5	12.70%	PASS
Frequency (MHz)	Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 17.0 dBm	Measured Body SAR (1g) W/kg @ 17.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 17.0 dBm	Measured Body SAR (10g) W/kg @ 17.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
5250	1/16/2018	1/16/2019	1.203	3.795	3.73	-1.71%	1.06	1.03	-2.37%	48.4	45.9	2.5	-3.9	-4	0.1	-27.4	-24.5	10.50%	PASS
5600	1/16/2018	1/16/2019	1.203	3.995	4.06	1.63%	1.12	1.12	0.45%	55.3	51	4.3	-1.6	2.8	4.4	-25.6	-30.7	-20.00%	PASS
5750	1/16/2018	1/16/2019	1.203	3.835	3.65	-4.82%	1.06	1.02	-3.77%	52.6	52.9	0.3	1.1	0.6	0.5	-31.2	-30.7	1.60%	PASS

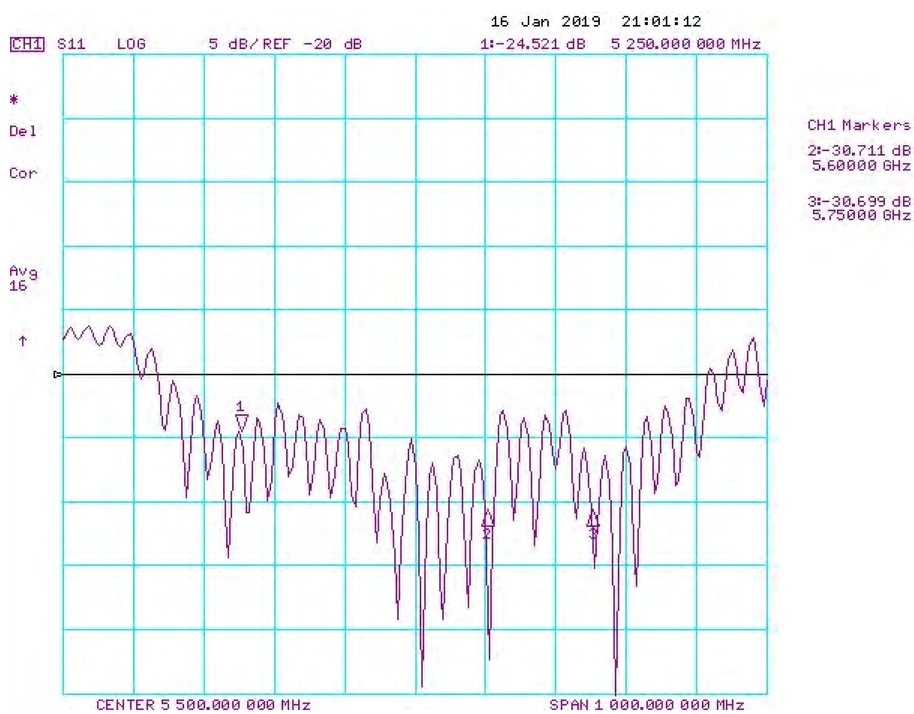
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
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Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D5GHzV2-1191_Sep16**

CALIBRATION CERTIFICATE

Object D5GHzV2 - SN:1191

BN✓
09-28-2016

Calibration procedure(s) QA CAL-22.v2
Calibration procedure for dipole validation kits between 3-6 GHz

Extended PM✓
9/20/2018

Calibration date: September 21, 2016

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 3503	30-Jun-16 (No. EX3-3503_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	Leif Klysner
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 22, 2016

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.5 ± 6 %	4.59 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.96 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**78.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.29 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.6 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.0 ± 6 %	4.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.45 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.6 W / kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	33.8 ± 6 %	5.08 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.99 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**79.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.27 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.4 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.4 ± 6 %	5.52 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.74 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**77.0 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.6 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.8 ± 6 %	6.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.96 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**79.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.24 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.2 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.5 ± 6 %	6.21 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.65 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**76.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	55.7 Ω - 4.3 jΩ
Return Loss	- 23.4 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	58.3 Ω - 3.2 jΩ
Return Loss	- 21.8 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	58.1 Ω + 4.8 jΩ
Return Loss	- 21.2 dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	56.1 Ω - 3.7 jΩ
Return Loss	- 23.4 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	58.9 Ω - 1.7 jΩ
Return Loss	- 21.7 dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	59.5 Ω + 6.9 jΩ
Return Loss	- 19.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.204 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 28, 2003

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DASY5 Validation Report for Head TSL

Date: 21.09.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1191

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; $\sigma = 4.59$ S/m; $\varepsilon_r = 34.5$; $\rho = 1000$ kg/m^3 , Medium parameters used: f = 5600 MHz; $\sigma = 4.93$ S/m; $\varepsilon_r = 34$; $\rho = 1000$ kg/m^3 , Medium parameters used: f = 5750 MHz; $\sigma = 5.08$ S/m; $\varepsilon_r = 33.8$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

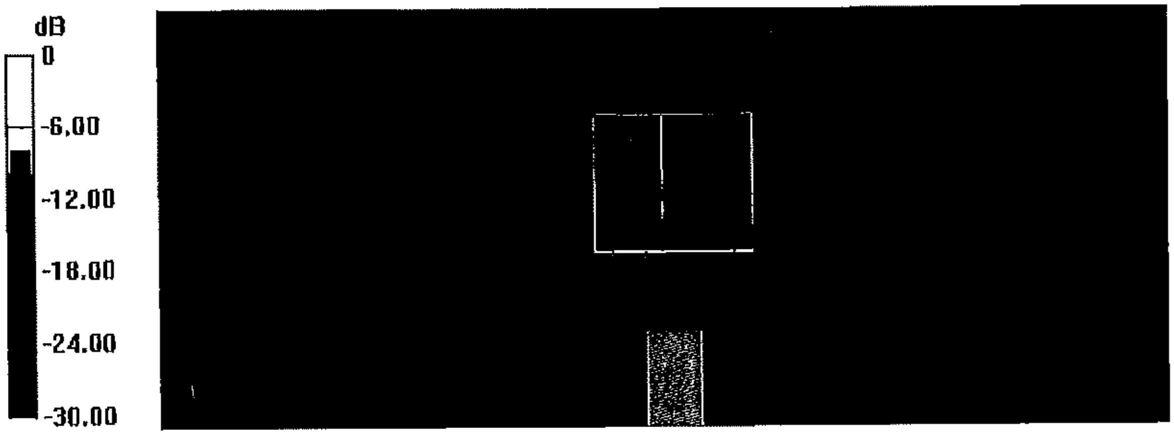
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.42, 5.42, 5.42); Calibrated: 30.06.2016, ConvF(4.89, 4.89, 4.89); Calibrated: 30.06.2016, ConvF(4.85, 4.85, 4.85); Calibrated: 30.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 68.49 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 28.6 W/kg
SAR(1 g) = 7.96 W/kg; SAR(10 g) = 2.29 W/kg
Maximum value of SAR (measured) = 18.2 W/kg

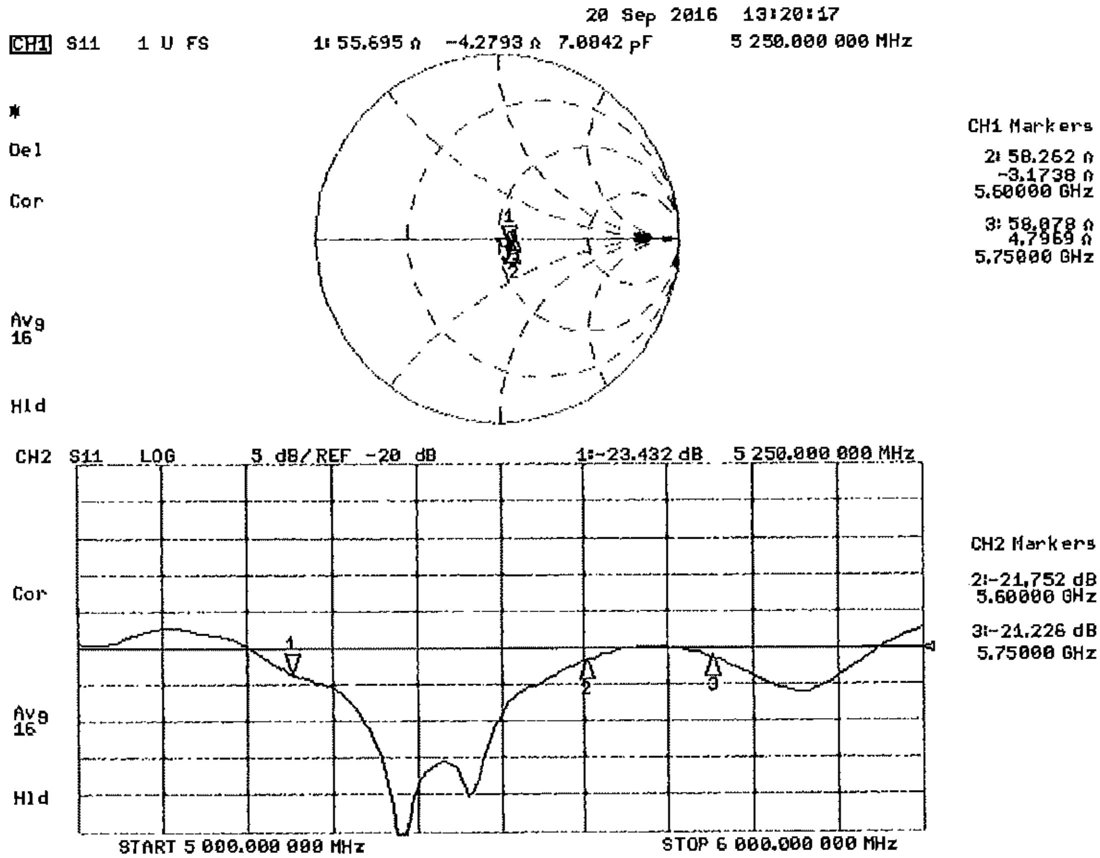
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 69.34 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 32.9 W/kg
SAR(1 g) = 8.45 W/kg; SAR(10 g) = 2.41 W/kg
Maximum value of SAR (measured) = 20.0 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.15 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 32.3 W/kg
SAR(1 g) = 7.99 W/kg; SAR(10 g) = 2.27 W/kg
Maximum value of SAR (measured) = 19.3 W/kg



0 dB = 18.2 W/kg = 12.60 dBW/kg

Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 20.09.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1191

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 5.52 S/m; ε_r = 47.4; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 6 S/m; ε_r = 46.8; ρ = 1000 kg/m^3 , Medium parameters used: f = 5750 MHz; σ = 6.21 S/m; ε_r = 46.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

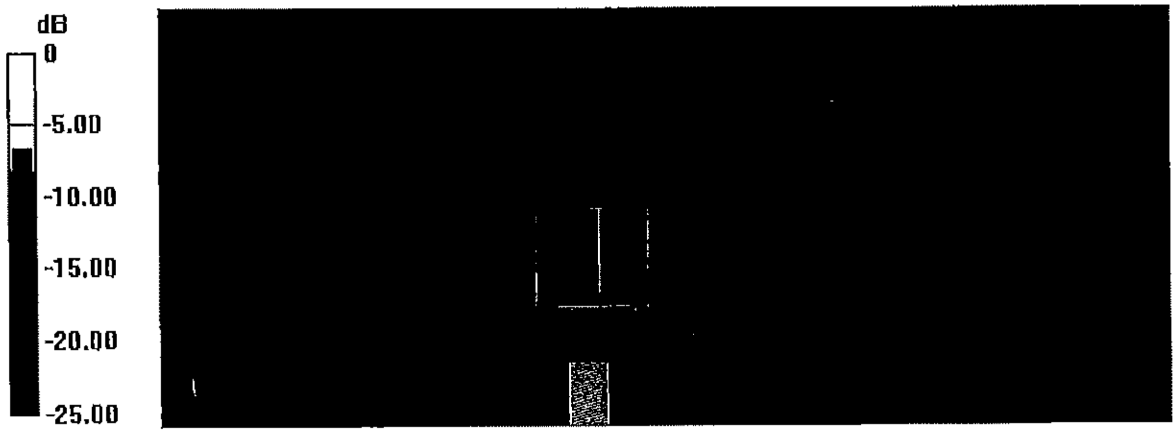
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.85, 4.85, 4.85); Calibrated: 30.06.2016, ConvF(4.35, 4.35, 4.35); Calibrated: 30.06.2016, ConvF(4.3, 4.3, 4.3); Calibrated: 30.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5250MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 66.49 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 29.1 W/kg
SAR(1 g) = 7.74 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 17.7 W/kg

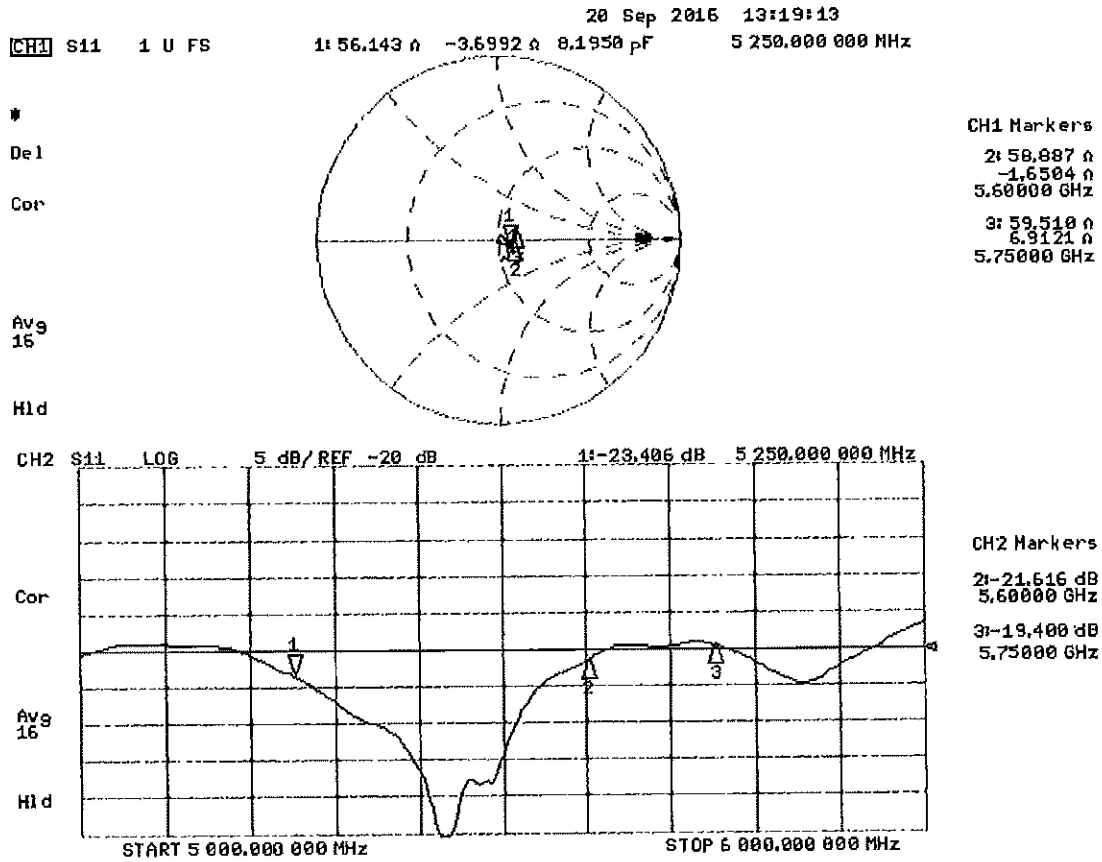
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.85 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 32.5 W/kg
SAR(1 g) = 7.96 W/kg; SAR(10 g) = 2.24 W/kg
Maximum value of SAR (measured) = 18.8 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.21 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 32.7 W/kg
SAR(1 g) = 7.65 W/kg; SAR(10 g) = 2.14 W/kg
Maximum value of SAR (measured) = 18.5 W/kg



0 dB = 17.7 W/kg = 12.48 dBW/kg

Impedance Measurement Plot for Body TSL



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http://www.pctest.com

Certification of Calibration

Object	D5GHzV2 – SN: 1191
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extension Calibration date:	9/19/2017
Description:	SAR Validation Dipole at 5250, 5600, and 5750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/1/2017	Annual	6/1/2018	MY53401181
Agilent	8753ES	S-Parameter Network Analyzer	10/26/2016	Annual	10/26/2017	US39170118
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/10/2017	Annual	5/10/2018	1070
SPEAG	EX3DV4	SAR Probe	1/13/2017	Annual	1/13/2018	3589
SPEAG	EX3DV4	SAR Probe	2/13/2017	Annual	2/13/2018	3914
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/16/2017	Annual	1/16/2018	1466
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/9/2017	Annual	2/9/2018	665
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1207364
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1339018
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	941001
Agilent	N5182A	MXG Vector Signal Generator	2/28/2017	Annual	2/28/2018	MY47420800
Seekonk	NC-100	Torque Wrench	11/6/2015	Biennial	11/6/2017	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Test Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	KOK

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

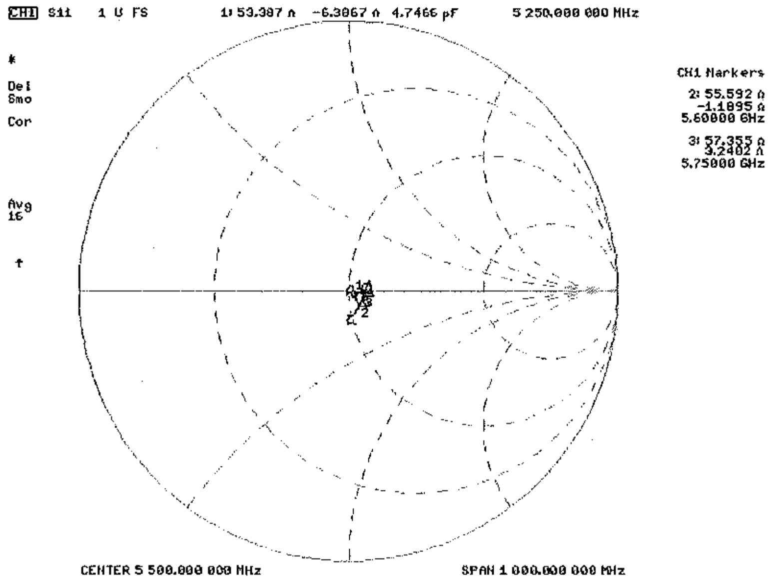
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

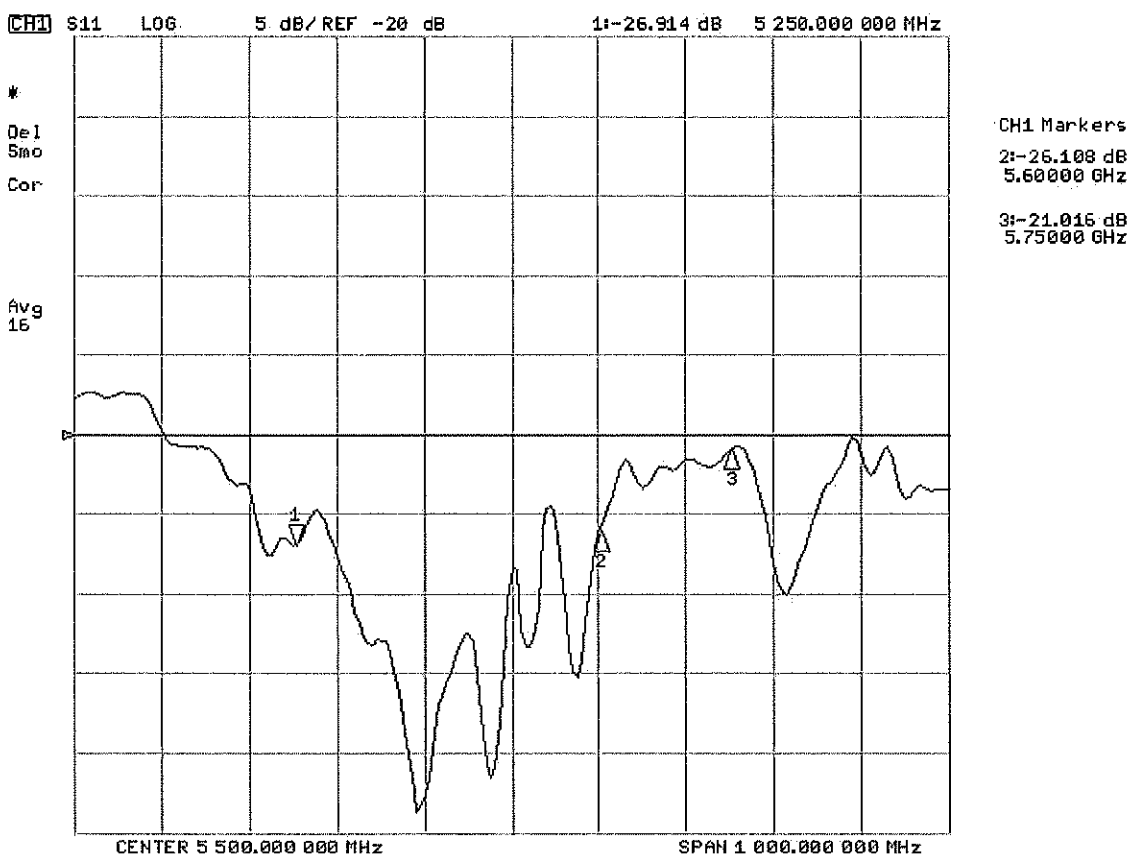
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Frequency (MHz)	Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 17.0 dBm	Measured Head SAR (1g) W/kg @ 17.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 17.0 dBm	Measured Head SAR (10g) W/kg @ 17.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
5250	9/21/2016	9/19/2017	1.204	3.95	3.70	-6.21%	1.13	1.05	-7.08%	55.7	53.4	2.3	-4.3	-6.4	2.1	-23.4	-26.9	-15.00%	PASS
5600	9/21/2016	9/19/2017	1.204	4.18	4.03	-3.59%	1.19	1.13	-5.04%	58.3	55.6	2.7	-3.2	-1.2	2.0	-21.8	-26.1	-19.80%	PASS
5750	9/21/2016	9/19/2017	1.204	3.96	3.94	-0.38%	1.12	1.10	-1.79%	58.1	57.4	0.7	4.8	3.2	1.6	-21.2	-21.0	0.90%	PASS

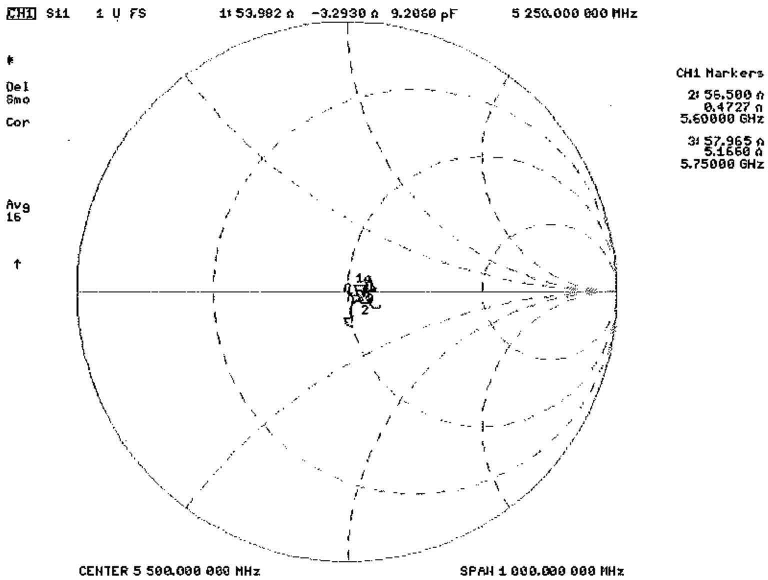
Frequency (MHz)	Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 17.0 dBm	Measured Body SAR (1g) W/kg @ 17.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 17.0 dBm	Measured Body SAR (10g) W/kg @ 17.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
5250	9/21/2016	9/19/2017	1.204	3.85	3.80	-1.30%	1.08	1.06	-1.85%	56.1	54.0	2.1	-3.7	-3.3	0.4	-23.4	-26.0	-11.10%	PASS
5600	9/21/2016	9/19/2017	1.204	3.96	4.06	2.53%	1.11	1.13	1.80%	58.9	56.5	2.4	-1.7	0.5	2.2	-21.7	-24.5	-12.80%	PASS
5750	9/21/2016	9/19/2017	1.204	3.81	3.66	-3.81%	1.06	1.02	-3.77%	59.5	58.0	1.5	6.9	5.2	1.7	-19.4	-21.1	-8.70%	PASS

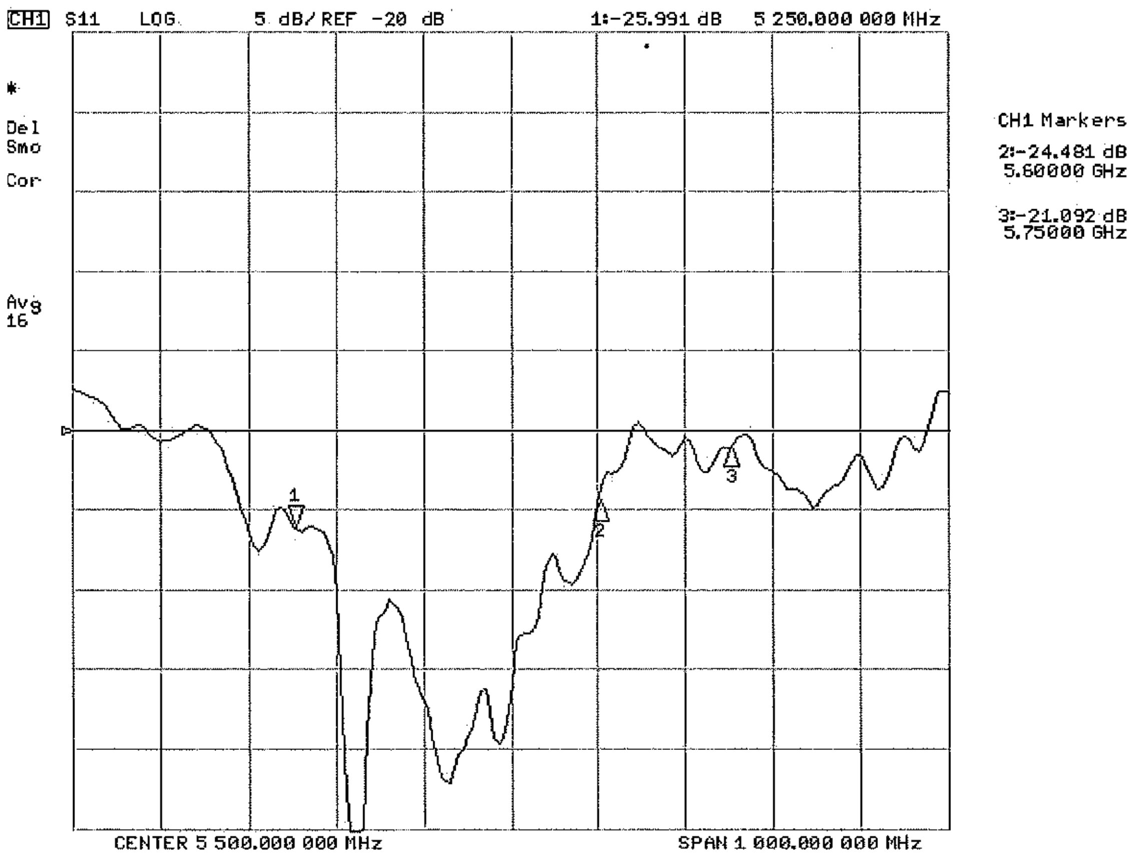
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Object:	Date Issued:	Page 4 of 4
D5GHzV2 – SN: 1191	09/19/2017	

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Certification of Calibration

Object	D5GHzV2 – SN: 1191
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extension Calibration date:	9/11/2018
Description:	SAR Validation Dipole at 5250, 5600, and 5750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
Agilent	8753ES	S-Parameter Vector Network Analyzer	8/30/2018	Annual	8/30/2019	MY40003841
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/15/2018	Annual	5/15/2019	1070
SPEAG	EX3DV4	SAR Probe	6/25/2018	Annual	6/25/2019	7409
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2018	Annual	6/18/2019	1334
SPEAG	EX3DV4	SAR Probe	4/18/2018	Annual	4/18/2019	7357
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/11/2018	Annual	4/11/2019	1407
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1207364
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1339018
Anritsu	ML2495A	Power Meter	10/22/2017	Annual	10/22/2018	1328004
Agilent	N5182A	MXG Vector Signal Generator	4/18/2018	Annual	4/18/2019	MY47420800
Seekonk	NC-100	Torque Wrench	7/11/2018	Annual	7/11/2019	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path.

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Test Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	KOK

DIPOLE CALIBRATION EXTENSION

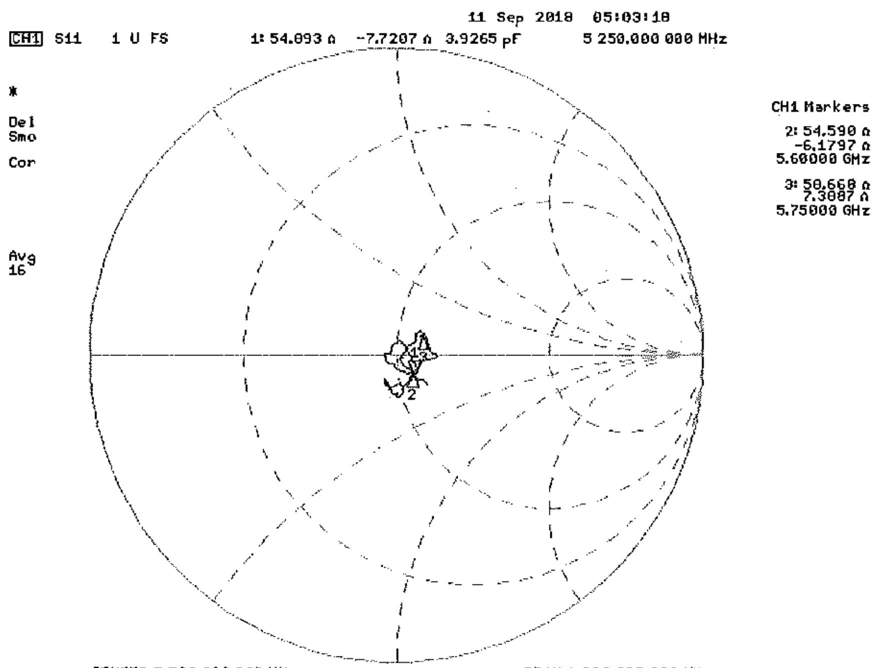
Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

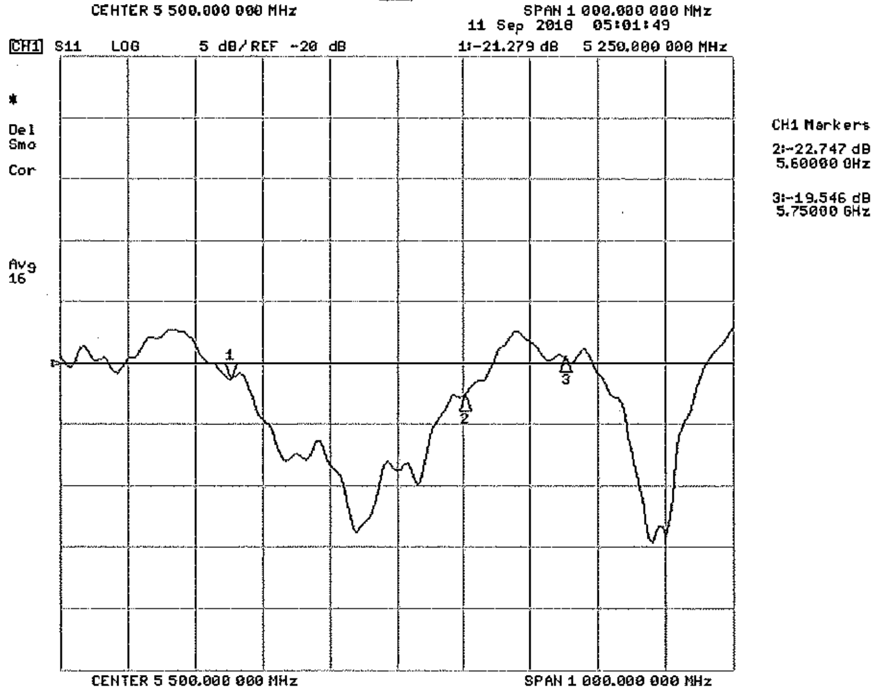
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 3-year calibration period from the calibration date:

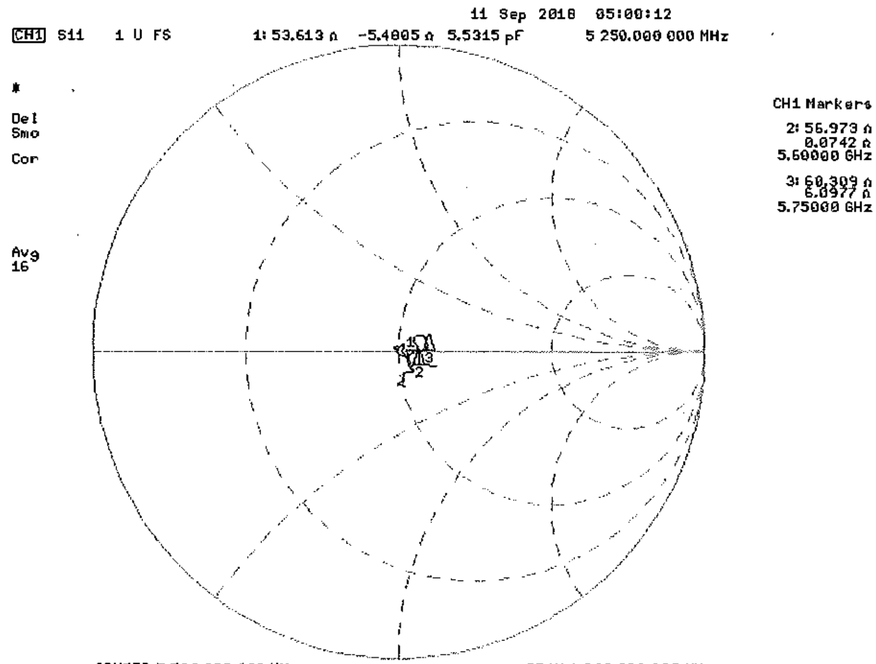
Frequency (MHz)	Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 17.0 dBm	Measured Head SAR (1g) W/kg @ 17.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 17.0 dBm	Measured Head SAR (10g) W/kg @ 17.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
5250	9/21/2016	9/11/2018	1.204	3.945	3.9	-1.14%	1.13	1.11	-1.77%	55.7	54.9	0.8	-4.3	-7.7	3.4	-23.4	-21.3	9.10%	PASS
5600	9/21/2016	9/11/2018	1.204	4.18	4.19	0.24%	1.19	1.18	-0.84%	58.3	54.6	3.7	-3.2	-6.2	3	-21.8	-22.7	-4.30%	PASS
5750	9/21/2016	9/11/2018	1.204	3.955	3.82	-3.41%	1.12	1.08	-3.57%	58.1	58.7	0.6	4.8	7.4	2.6	-21.2	-19.5	7.80%	PASS
Frequency (MHz)	Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 17.0 dBm	Measured Body SAR (1g) W/kg @ 17.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 17.0 dBm	Measured Body SAR (10g) W/kg @ 17.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
5250	9/21/2016	9/11/2018	1.204	3.85	3.6	-6.49%	1.08	1.01	-6.48%	56.1	53.6	2.5	-3.7	-5.5	1.8	-23.4	-24	-2.40%	PASS
5600	9/21/2016	9/11/2018	1.204	3.96	4.01	1.26%	1.11	1.1	-0.90%	58.9	57	1.9	-1.7	0.1	1.8	-21.7	-23.8	-9.70%	PASS
5750	9/21/2016	9/11/2018	1.204	3.805	3.88	1.97%	1.06	1.06	0.00%	59.5	60.3	0.8	6.9	6.1	0.8	-19.4	-19.2	1.00%	PASS

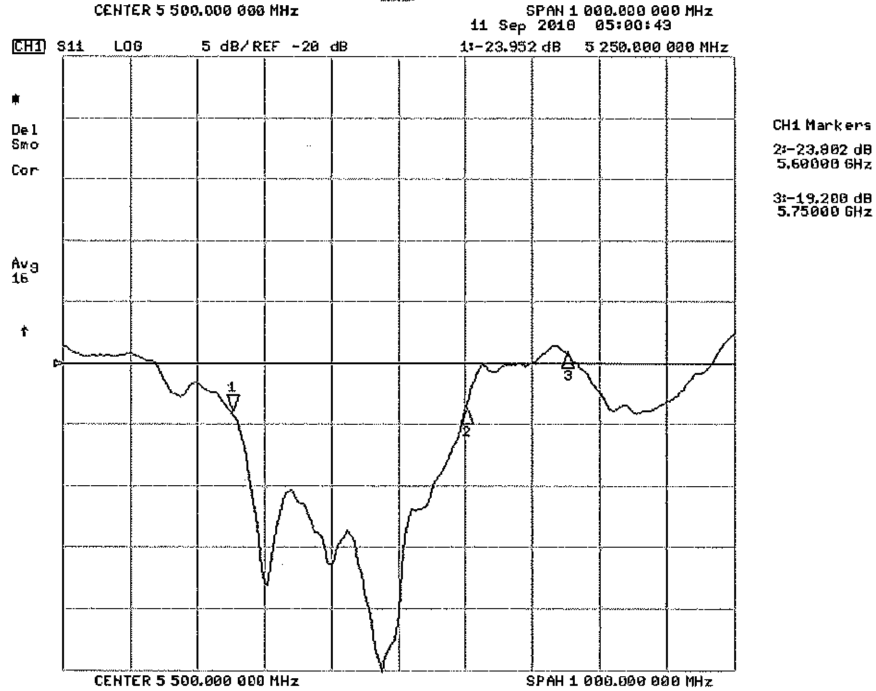
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D835V2-4d132_Jan19

CALIBRATION CERTIFICATE

Object	D835V2 - SN:4d132
Calibration procedure(s)	QA CAL-05.v11 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz
Calibration date:	January 22, 2019

BN ✓
02/06/2019

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	31-Dec-18 (No. EX3-7349_Dec18)	Dec-19
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 22, 2019

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5.0 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.3 ± 6 %	0.92 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.59 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.23 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.6 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.46 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.67 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.61 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.35 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.6 Ω - 3.6 jΩ
Return Loss	- 28.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.4 Ω - 6.2 jΩ
Return Loss	- 23.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.387 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

Appendix (Additional assessments outside the scope of SCS 0108)

Measurement Conditions

DASY system configuration, as far as not given on page 1 and 3.

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L

SAR result with SAM Head (Top)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.38 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.57 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.26 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.86 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.65 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.58 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Neck)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.42 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.60 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.38 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Ear)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.02 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.06 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.42 W/kg ± 16.9 % (k=2)**

DASY5 Validation Report for Head TSL

Date: 17.01.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d132

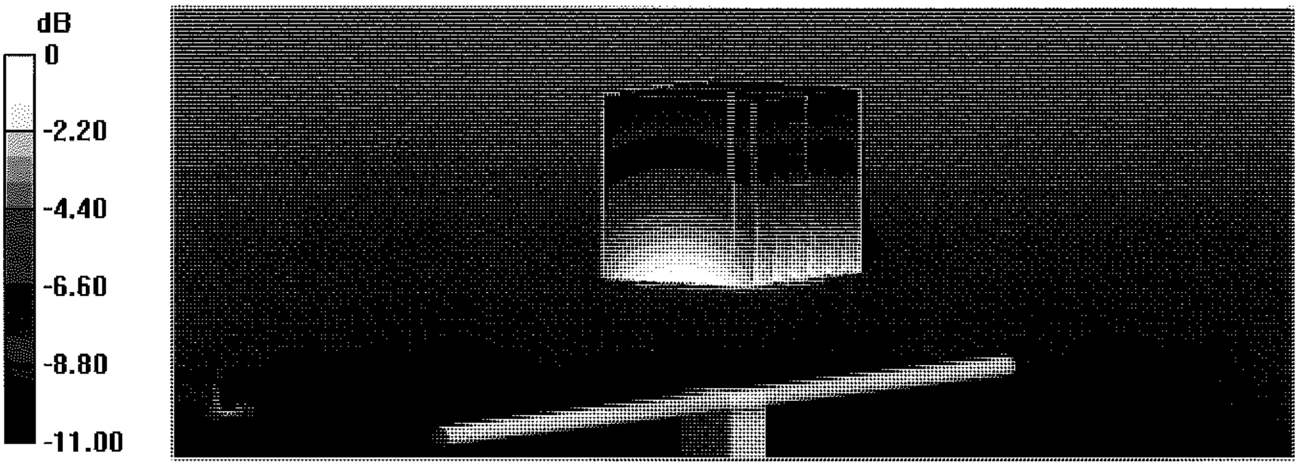
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; $\sigma = 0.92$ S/m; $\varepsilon_r = 41.3$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10, 10, 10) @ 835 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

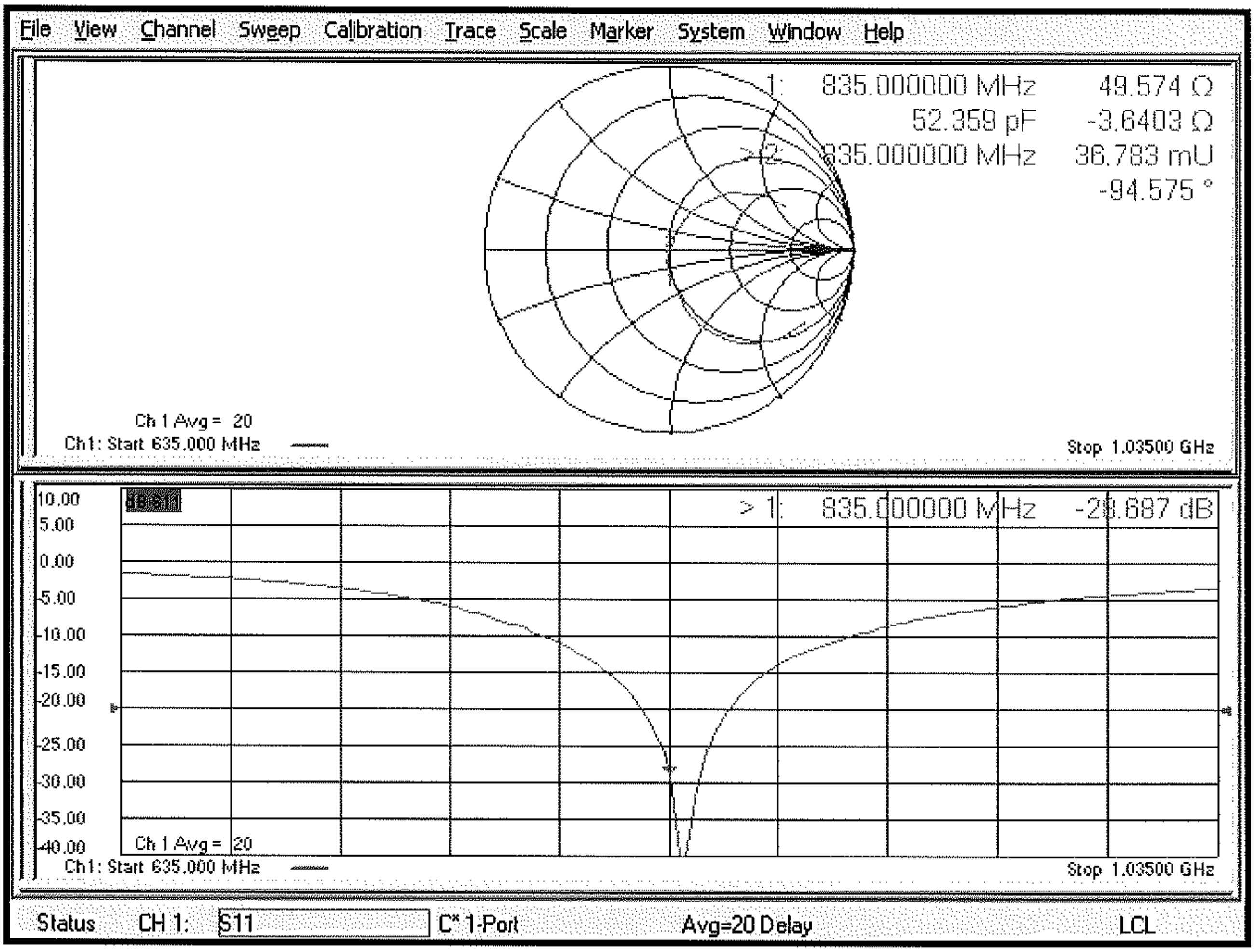
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 34.24 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 3.73 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.58 W/kg
Maximum value of SAR (measured) = 3.28 W/kg



0 dB = 3.28 W/kg = 5.16 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 17.01.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d132

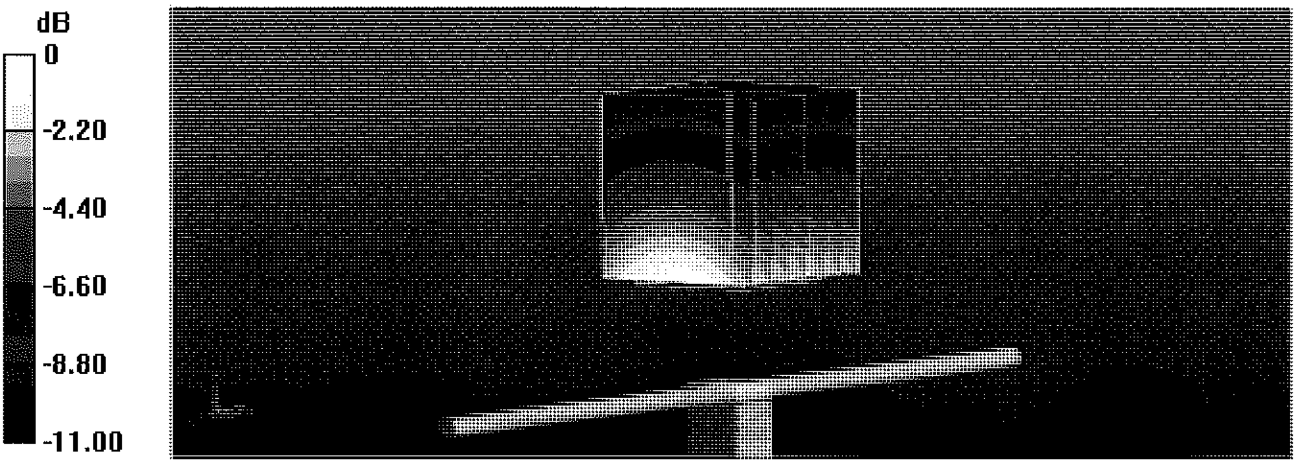
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.99 S/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.15, 10.15, 10.15) @ 835 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

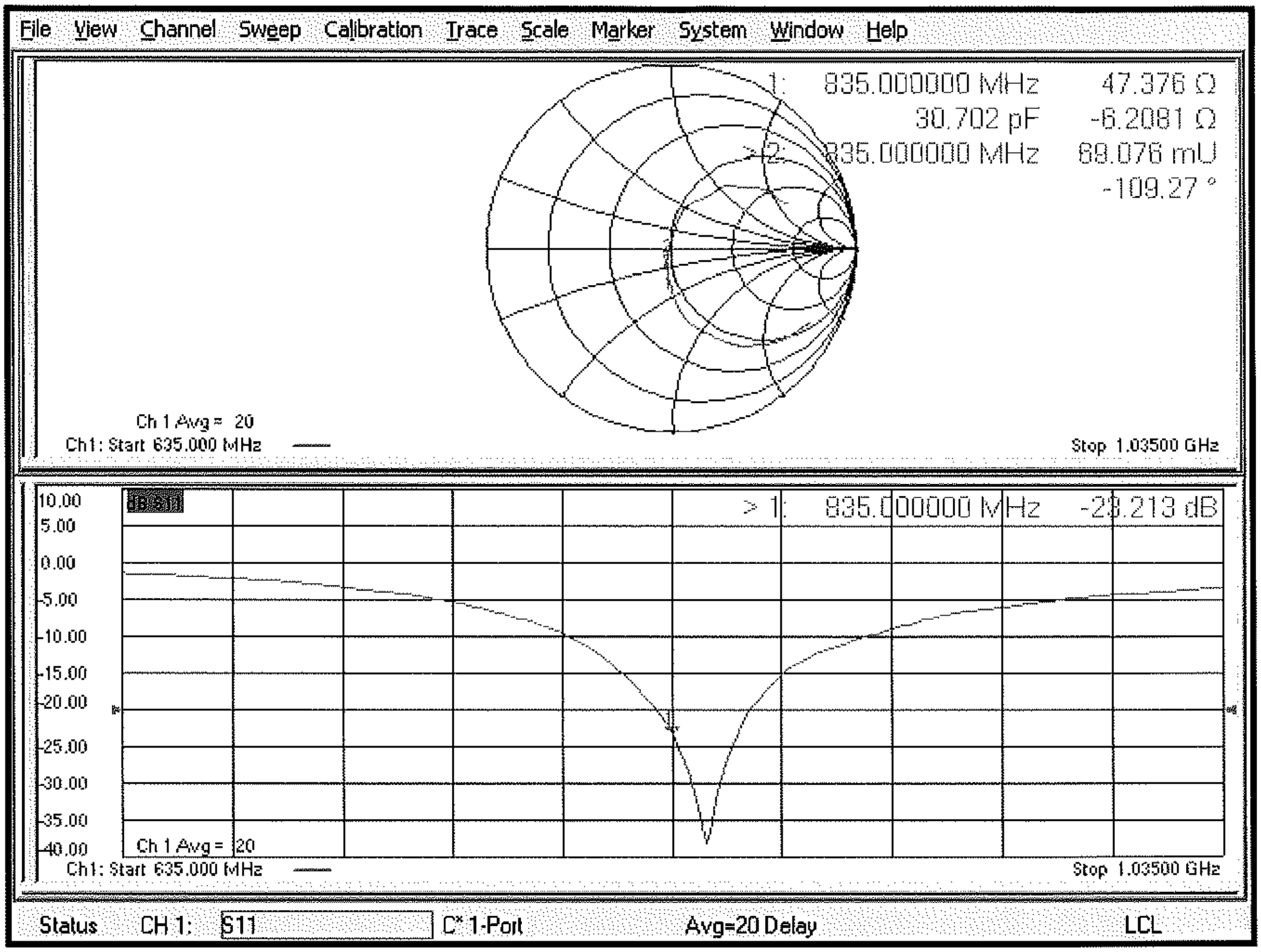
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 63.32 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 3.64 W/kg
SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.61 W/kg
Maximum value of SAR (measured) = 3.26 W/kg



0 dB = 3.26 W/kg = 5.13 dBW/kg

Impedance Measurement Plot for Body TSL



DASY5 Validation Report for SAM Head

Date: 22.01.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d132

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.92 S/m; ε_r = 44.4; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

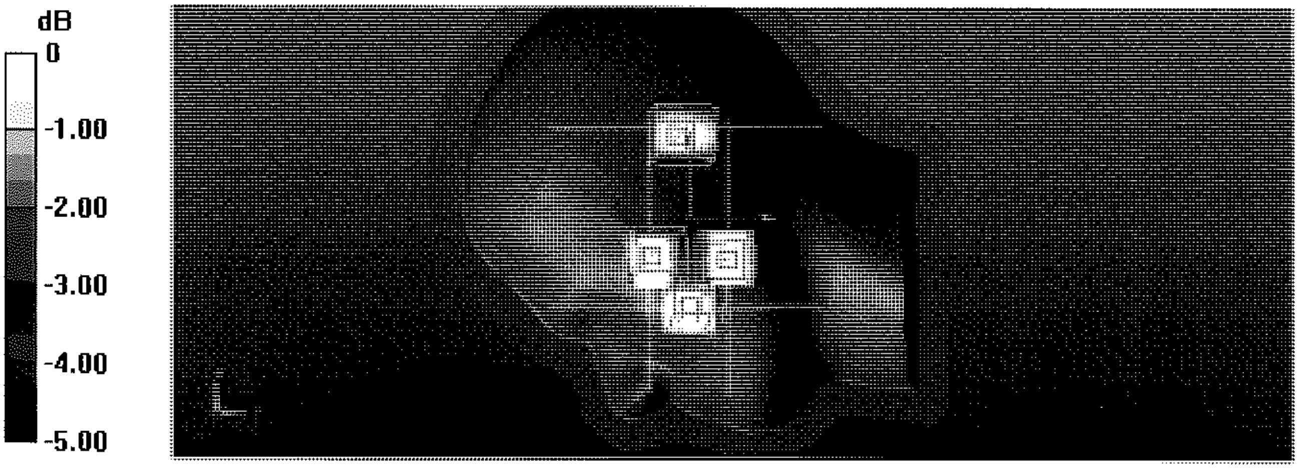
- Probe: EX3DV4 - SN7349; ConvF(10, 10, 10) @ 835 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: SAM Head
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

SAM/Head/Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.32 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.51 W/kg
SAR(1 g) = 2.35 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 3.12 W/kg

SAM/Head/Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 62.25 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.67 W/kg
SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.65 W/kg
Maximum value of SAR (measured) = 3.24 W/kg

SAM/Head/Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.69 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 3.43 W/kg
SAR(1 g) = 2.36 W/kg; SAR(10 g) = 1.6 W/kg
Maximum value of SAR (measured) = 3.08 W/kg

SAM/Head/Ear/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.79 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.94 W/kg
SAR(1 g) = 2.02 W/kg; SAR(10 g) = 1.36 W/kg
Maximum value of SAR (measured) = 2.62 W/kg



0 dB = 2.62 W/kg = 4.18 dBW/kg

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S **Schweizerischer Kalibrierdienst**
C **Service suisse d'étalonnage**
S **Servizio svizzero di taratura**
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D1750V2-1150_Oct18

CALIBRATION CERTIFICATE

Object: D1750V2 - SN:1150

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

BN
10/30/2018

Calibration date: October 22, 2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 22, 2018

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.8 ± 6 %	1.33 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.02 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**36.5 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.76 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.2 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.5 ± 6 %	1.46 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.04 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**36.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.82 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**19.4 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.9 Ω - 0.4 jΩ
Return Loss	- 40.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.6 Ω - 0.1 jΩ
Return Loss	- 29.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.217 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	April 10, 2015

DASY5 Validation Report for Head TSL

Date: 22.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1150

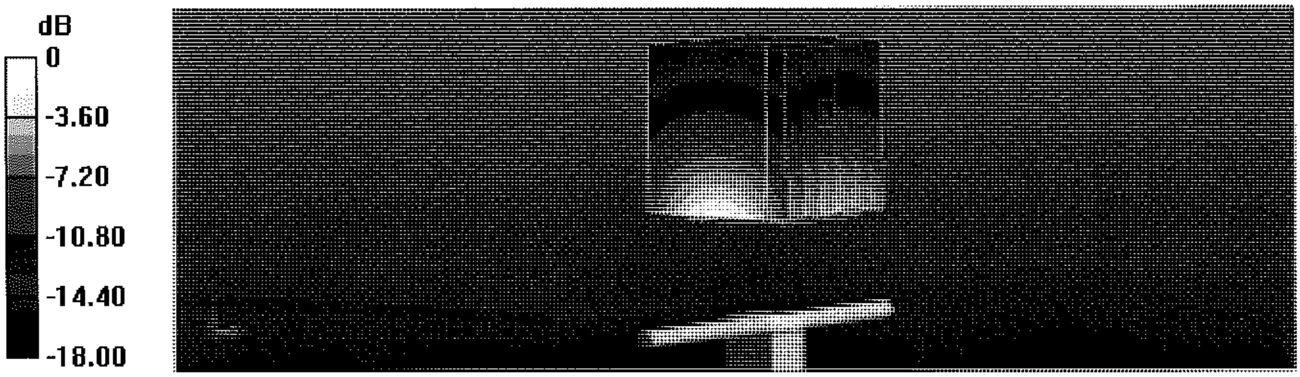
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; $\sigma = 1.33$ S/m; $\varepsilon_r = 38.8$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.5, 8.5, 8.5) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

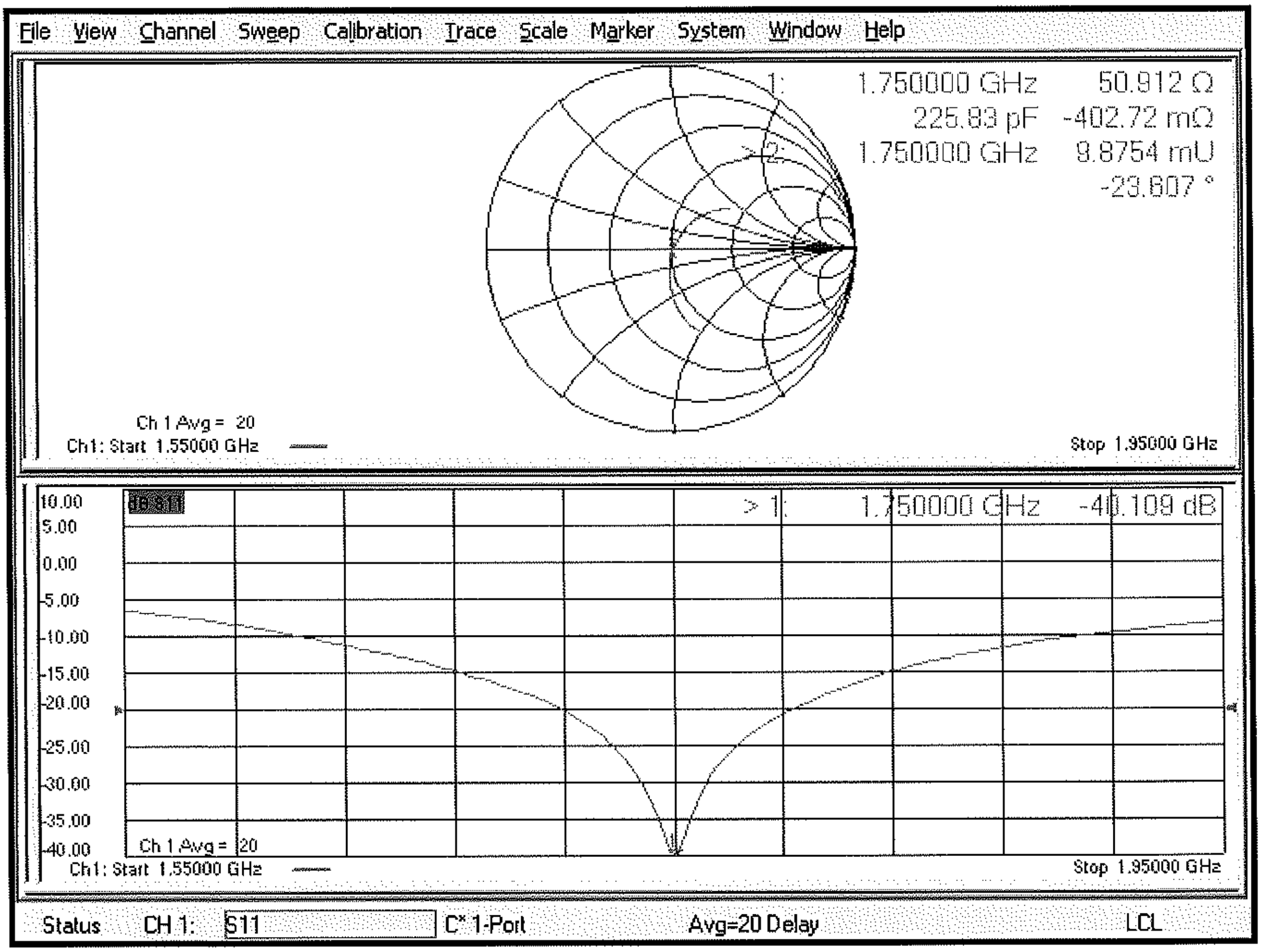
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 108.1 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 16.7 W/kg
SAR(1 g) = 9.02 W/kg; SAR(10 g) = 4.76 W/kg
Maximum value of SAR (measured) = 14.0 W/kg



0 dB = 14.0 W/kg = 11.46 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1150

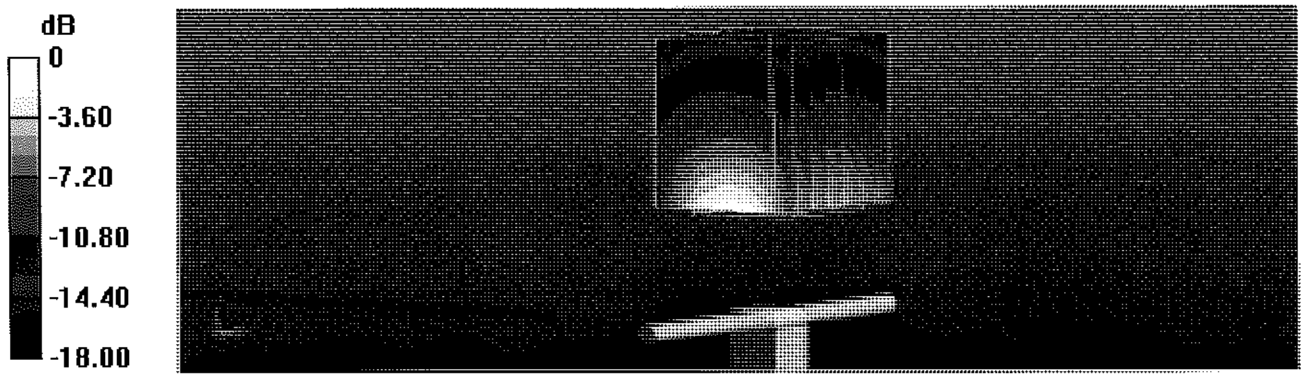
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.46 S/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.35, 8.35, 8.35) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

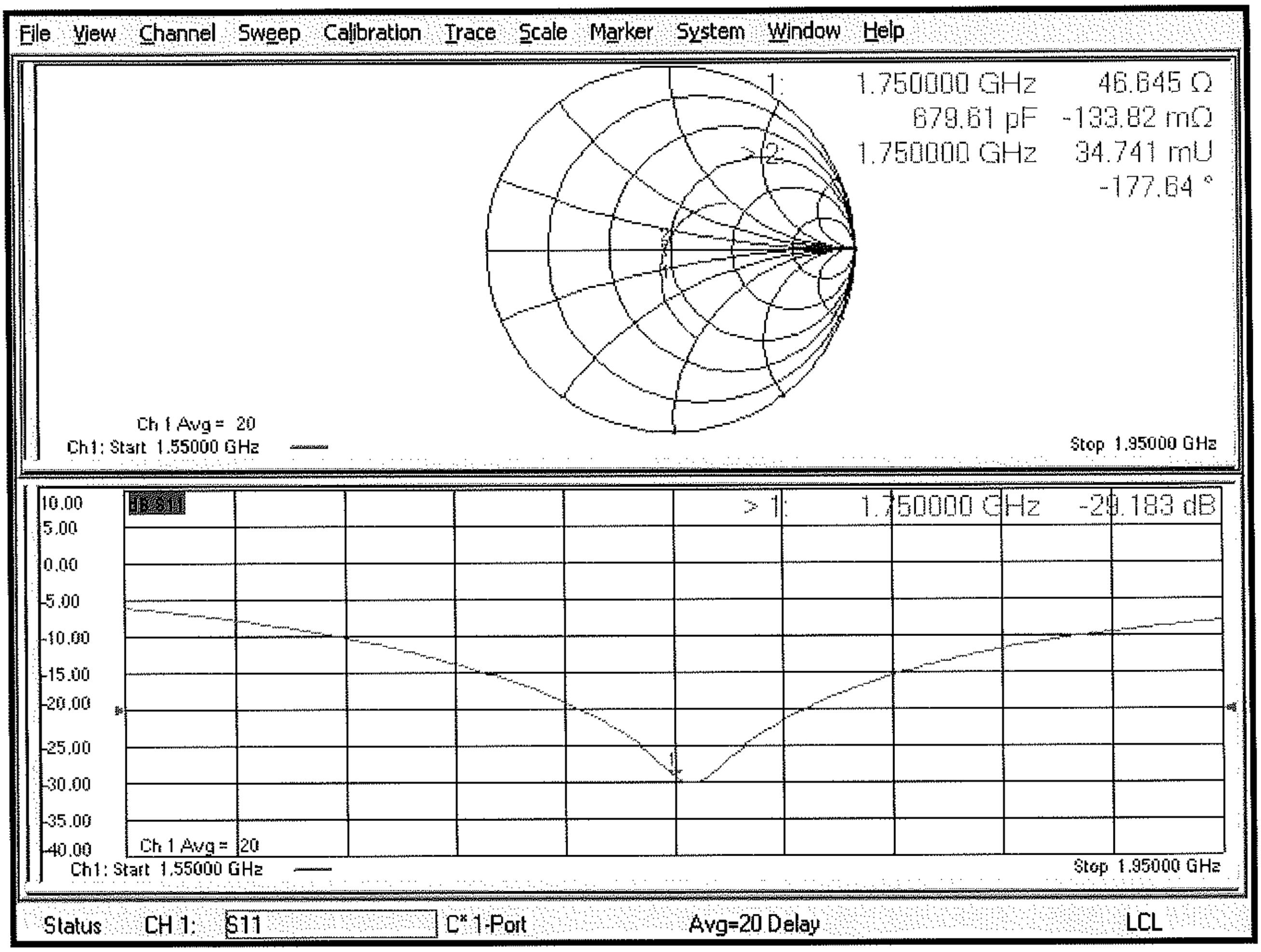
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.1 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 16.0 W/kg
SAR(1 g) = 9.04 W/kg; SAR(10 g) = 4.82 W/kg
Maximum value of SAR (measured) = 13.6 W/kg



0 dB = 13.6 W/kg = 11.34 dBW/kg

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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S Swiss Calibration Service

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D1765V2-1008_May18**

CALIBRATION CERTIFICATE

Object	D1765V2 - SN:1008
Calibration procedure(s)	QA CAL-05.v10 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	May 23, 2018

BN ✓
7/16/2018
BN ✓
05/20/2019

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Manu Seitz	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 23, 2018

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Calibration Laboratory of
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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5.0 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.0 ± 6 %	1.34 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	8.94 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**36.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.71 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.0 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.2 ± 6 %	1.46 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.21 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**37.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.92 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**19.9 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.7 Ω - 6.5 jΩ
Return Loss	- 23.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	43.3 Ω - 6.0 jΩ
Return Loss	- 20.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.210 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 06, 2005

Appendix (Additional assessments outside the scope of SCS 0108)

Measurement Conditions

DASY system configuration, as far as not given on page 1 and 3.

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L

SAR result with SAM Head (Top)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**37.4 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.9 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**38.2 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.4 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Neck)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**37.4 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.02 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.2 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Ear)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	7.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**28.7 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.01 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**16.1 W/kg ± 16.9 % (k=2)**

DASY5 Validation Report for Head TSL

Date: 15.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1765 MHz; Type: D1765V2; Serial: D1765V2 - SN:1008

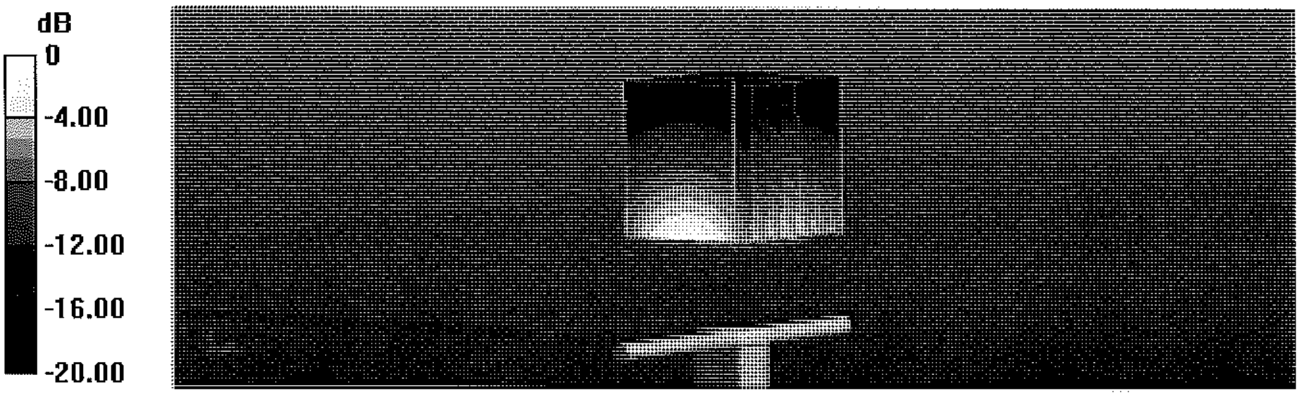
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; $\sigma = 1.34$ S/m; $\varepsilon_r = 39$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.5, 8.5, 8.5) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

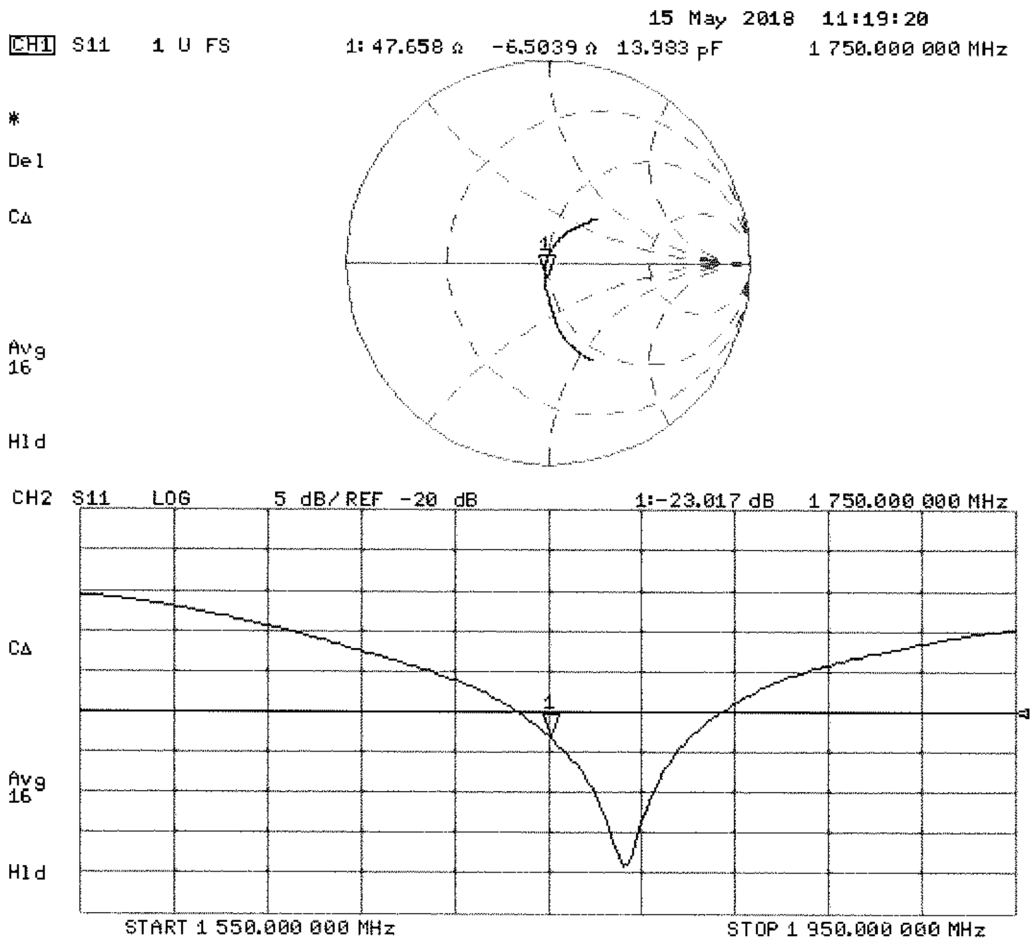
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 106.6 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 16.4 W/kg
SAR(1 g) = 8.94 W/kg; SAR(10 g) = 4.71 W/kg
Maximum value of SAR (measured) = 13.8 W/kg



0 dB = 13.8 W/kg = 11.40 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 15.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1765 MHz; Type: D1765V2; Serial: D1765V2 - SN:1008

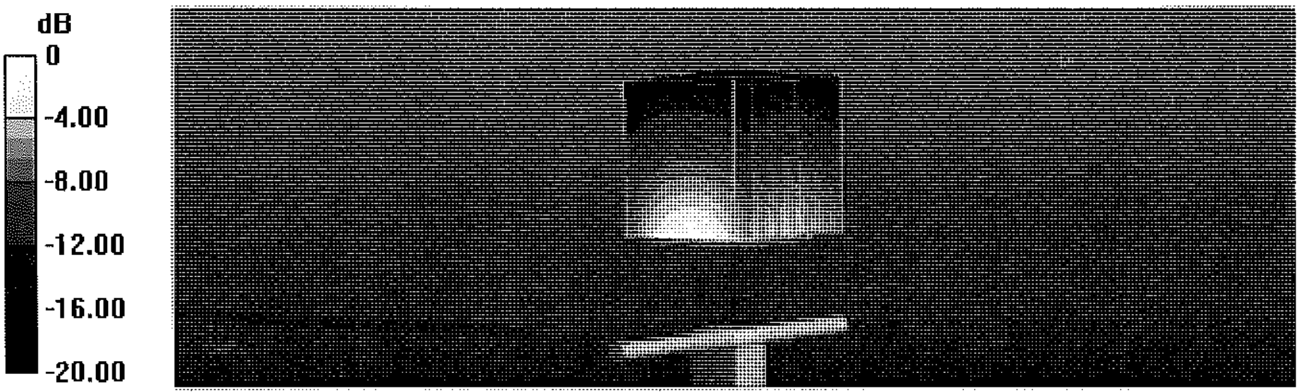
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; $\sigma = 1.46$ S/m; $\varepsilon_r = 53.2$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.35, 8.35, 8.35) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

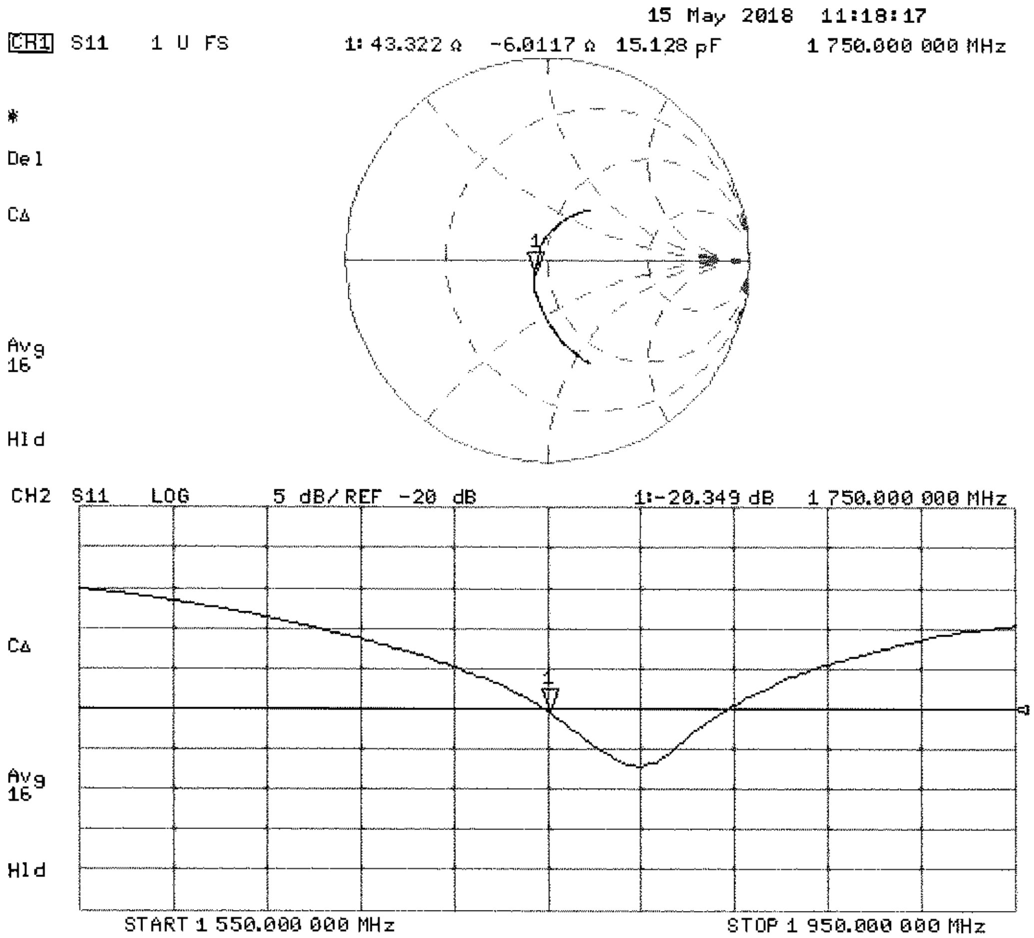
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.4 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 16.1 W/kg
SAR(1 g) = 9.21 W/kg; SAR(10 g) = 4.92 W/kg
Maximum value of SAR (measured) = 13.7 W/kg



0 dB = 13.7 W/kg = 11.37 dBW/kg

Impedance Measurement Plot for Body TSL



DASY5 Validation Report for SAM Head

Date: 23.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1765 MHz; Type: D1765V2; Serial: D1765V2 - SN:1008

Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.37 S/m; ε_r = 41.8; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

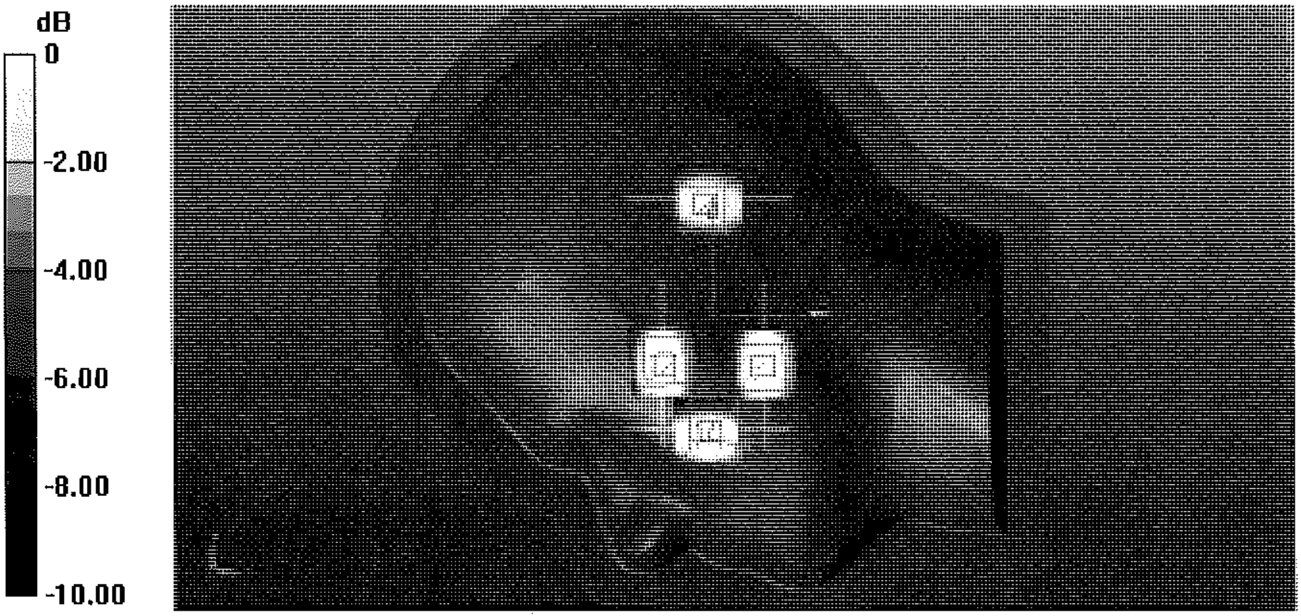
- Probe: EX3DV4 - SN7349; ConvF(8.5, 8.5, 8.5) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: SAM Head
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

SAM/Head/Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.8 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 16.4 W/kg
SAR(1 g) = 9.26 W/kg; SAR(10 g) = 4.95 W/kg
Maximum value of SAR (measured) = 13.9 W/kg

SAM/Head/Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.2 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 16.6 W/kg
SAR(1 g) = 9.47 W/kg; SAR(10 g) = 5.06 W/kg
Maximum value of SAR (measured) = 13.7 W/kg

SAM/Head/Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.7 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 15.8 W/kg
SAR(1 g) = 9.26 W/kg; SAR(10 g) = 5.02 W/kg
Maximum value of SAR (measured) = 13.8 W/kg

SAM/Head/Ear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.46 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 11.8 W/kg
SAR(1 g) = 7.12 W/kg; SAR(10 g) = 4.01 W/kg
Maximum value of SAR (measured) = 10.3 W/kg



0 dB = 10.3 W/kg = 10.13 dBW/kg

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http://www.pctest.com

Certification of Calibration

Object	D1765V2 – SN: 1008
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extension Calibration date:	5/17/2019
Description:	SAR Validation Dipole at 1750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	3/11/2019	Annual	3/11/2020	US39170122
Agilent	N5182A	MXG Vector Signal Generator	11/28/2018	Annual	11/28/2019	MY47420603
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1027293
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1126066
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Control Company	4040	Therm./ Clock/ Humidity Monitor	10/9/2018	Biennial	10/9/2020	181647811
Control Company	4352	Ultra Long Stem Thermometer	6/6/2018	Biennial	6/6/2020	181334678
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Seekonk	NC-100	Torque Wrench	7/11/2018	Annual	7/11/2019	N/A
SPEAG	EX3DV4	SAR Probe	6/25/2018	Annual	6/25/2019	7409
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2018	Annual	6/18/2019	1334
SPEAG	EX3DV4	SAR Probe	2/19/2019	Annual	2/19/2020	3914
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/14/2019	Annual	2/14/2020	1272
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/11/2018	Annual	9/11/2019	1091

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Test Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	KOK

DIPOLE CALIBRATION EXTENSION

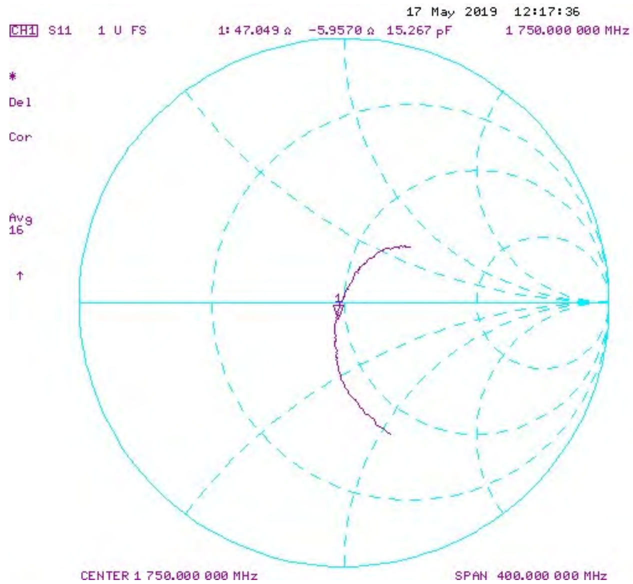
Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

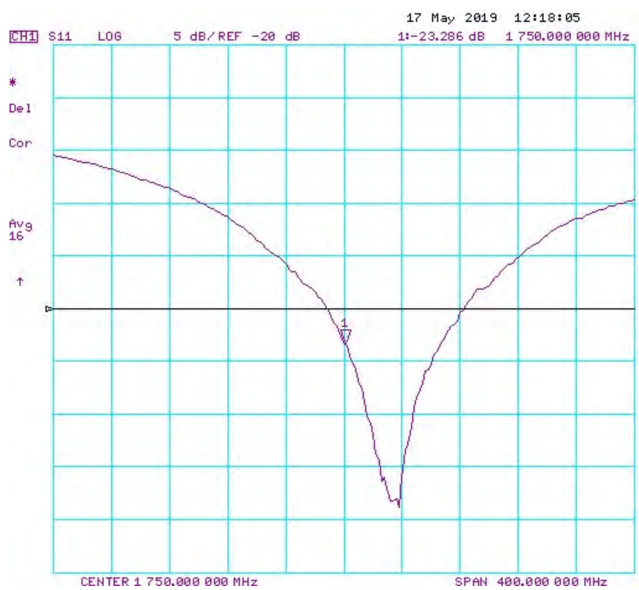
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

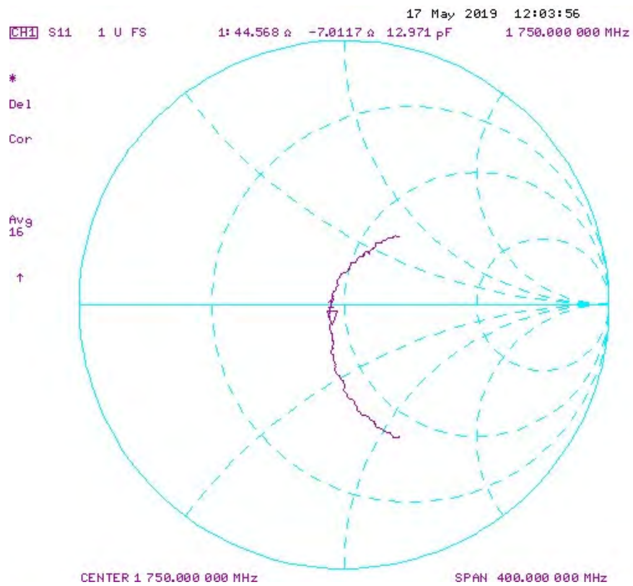
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
5/23/2019	5/17/2019	1.21	3.62	3.63	0.28%	1.9	1.92	1.05%	47.7	47	0.7	-6.5	-6	0.5	-23	-23.3	-1.20%	PASS
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
5/23/2019	5/17/2019	1.21	3.74	3.95	5.61%	1.99	2.08	4.52%	43.3	44.6	1.3	-6	-7	1	-20.3	-20.5	-0.90%	PASS

Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL



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Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D1900V2-5d080_Oct18

CALIBRATION CERTIFICATE

Object	D1900V2 - SN:5d080
Calibration procedure(s)	QA CAL-05.v10 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	October 23, 2018

BN✓
10-30-2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 23, 2018

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, June 2013
b) IEC 62209-1, “Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)”, July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, “SAR Measurement Requirements for 100 MHz to 6 GHz”

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.3 ± 6 %	1.40 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.93 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**39.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.18 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.7 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.9 ± 6 %	1.47 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.62 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**39.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.6 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.5 Ω + 7.9 jΩ
Return Loss	- 21.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.1 Ω + 8.1 jΩ
Return Loss	- 21.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.193 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	June 28, 2006

DASY5 Validation Report for Head TSL

Date: 23.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d080

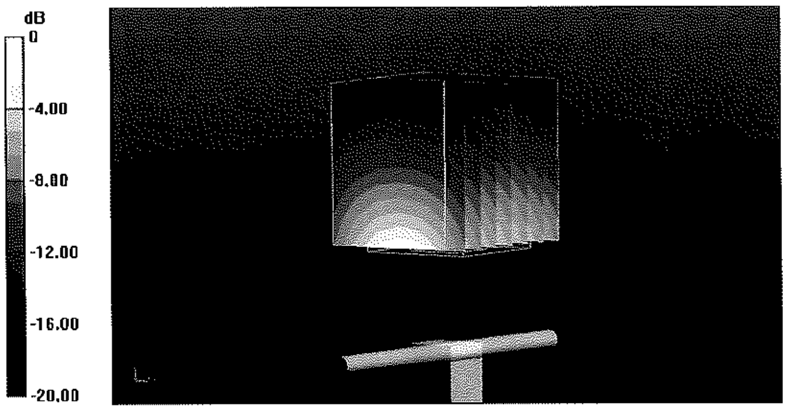
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.4 S/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.18, 8.18, 8.18) @ 1900 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

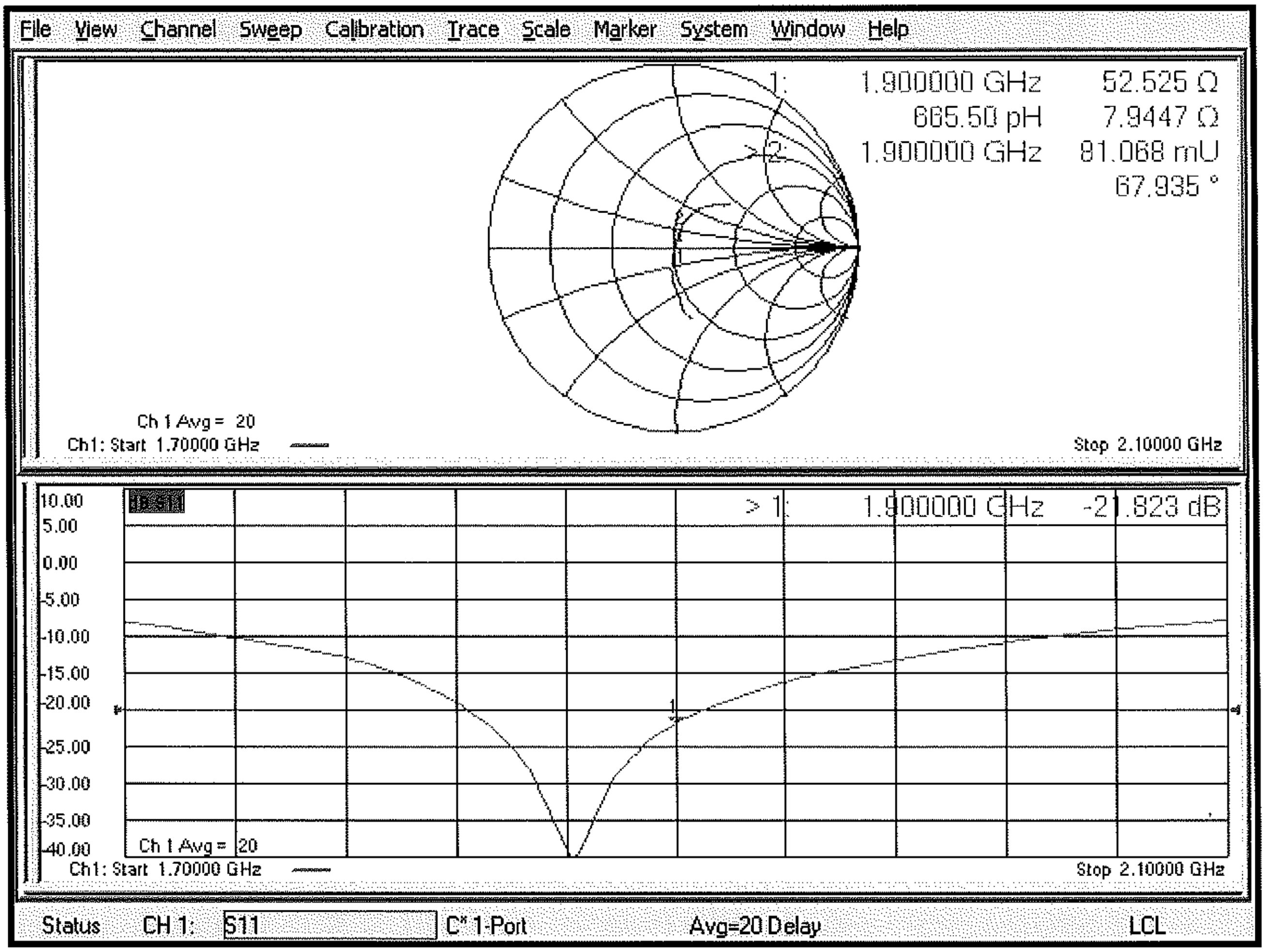
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 110.0 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 18.7 W/kg
SAR(1 g) = 9.93 W/kg; SAR(10 g) = 5.18 W/kg
Maximum value of SAR (measured) = 15.6 W/kg



0 dB = 15.6 W/kg = 11.93 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 23.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d080

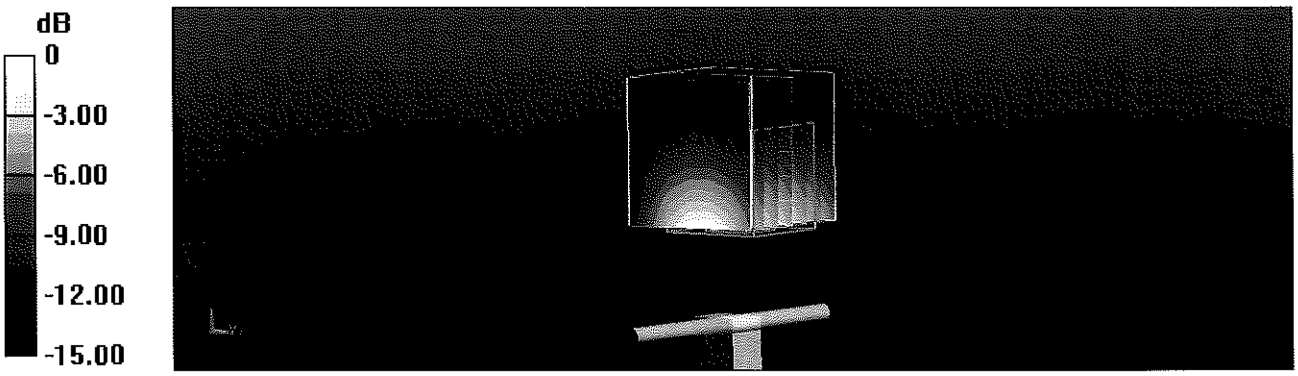
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.47 S/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.15, 8.15, 8.15) @ 1900 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

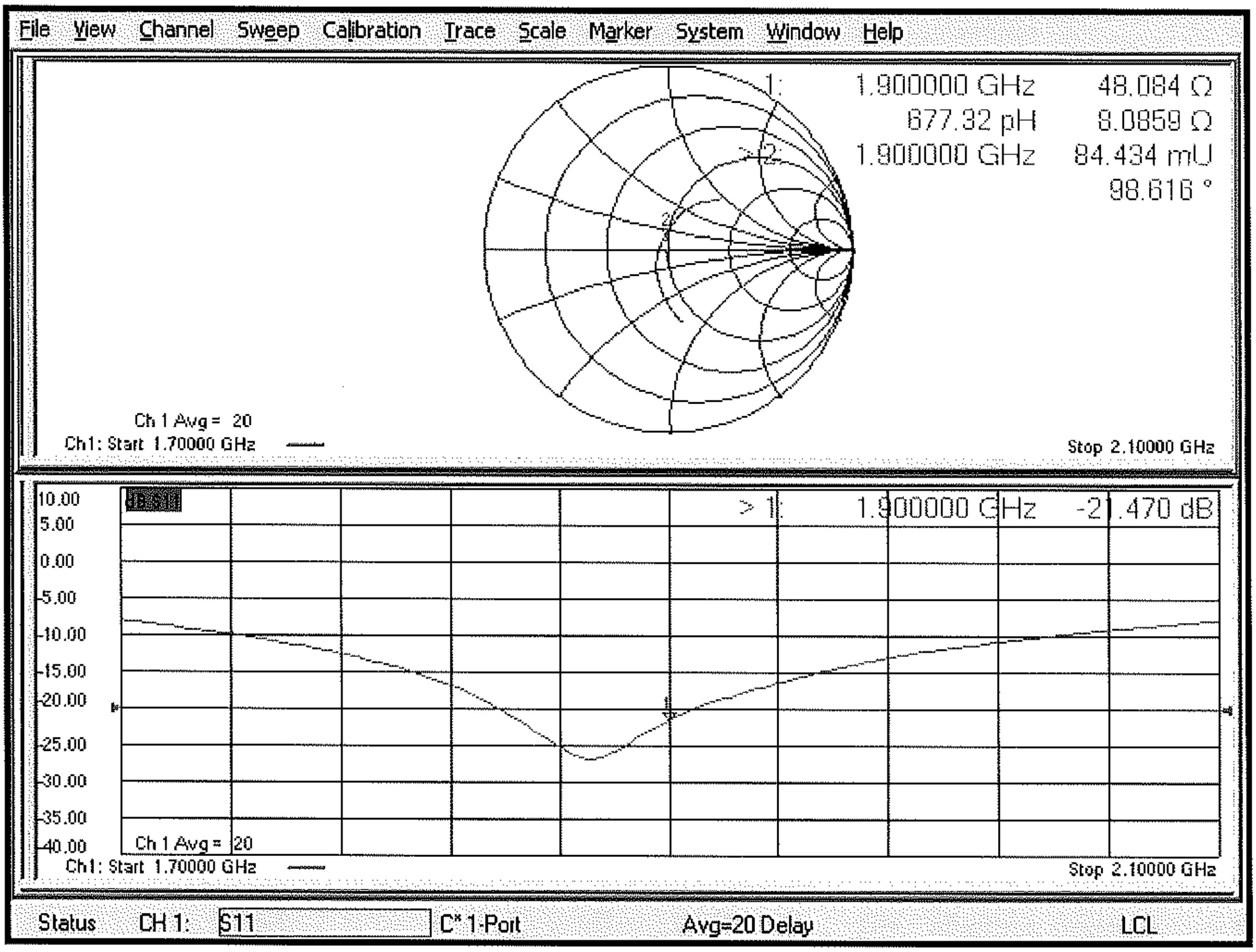
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.86 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 17.3 W/kg
SAR(1 g) = 9.62 W/kg; SAR(10 g) = 5.09 W/kg
Maximum value of SAR (measured) = 14.1 W/kg



0 dB = 14.1 W/kg = 11.49 dBW/kg

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client PC Test

Certificate No: D1900V2-5d148_Feb19

CALIBRATION CERTIFICATE

Object	D1900V2 - SN:5d148
Calibration procedure(s)	QA CAL-05.v11 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz
Calibration date:	February 21, 2019

BN ✓
03-01-19

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	31-Dec-18 (No. EX3-7349_Dec18)	Dec-19
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	07-Oct-15 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Manu Seitz	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 21, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.9 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.65 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**39.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.4 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.6 ± 6 %	1.47 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.56 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**39.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.05 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.5 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.8 Ω + 6.8 jΩ
Return Loss	- 23.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.4 Ω + 7.8 jΩ
Return Loss	- 21.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.170 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 21.02.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d148

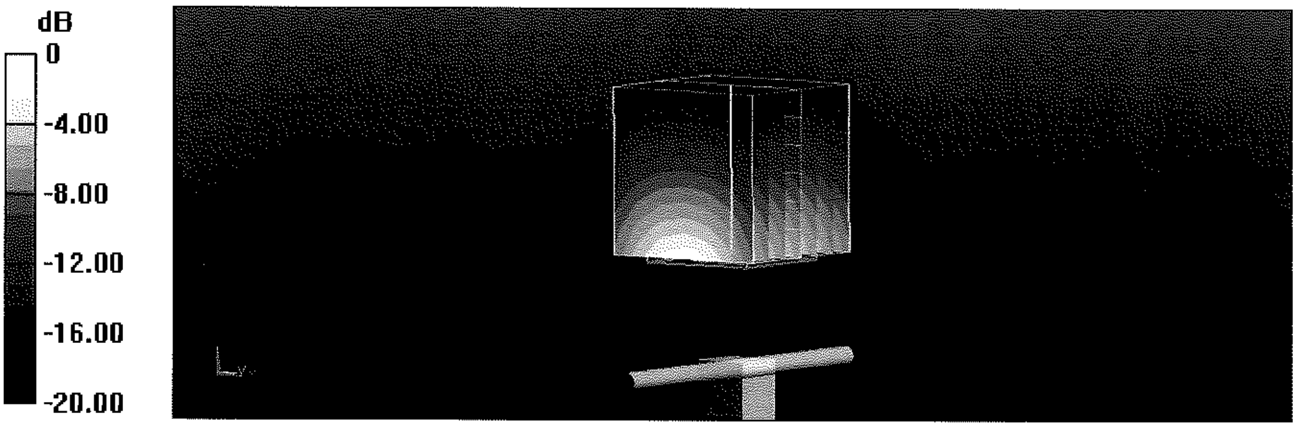
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.38 S/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.26, 8.26, 8.26) @ 1900 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

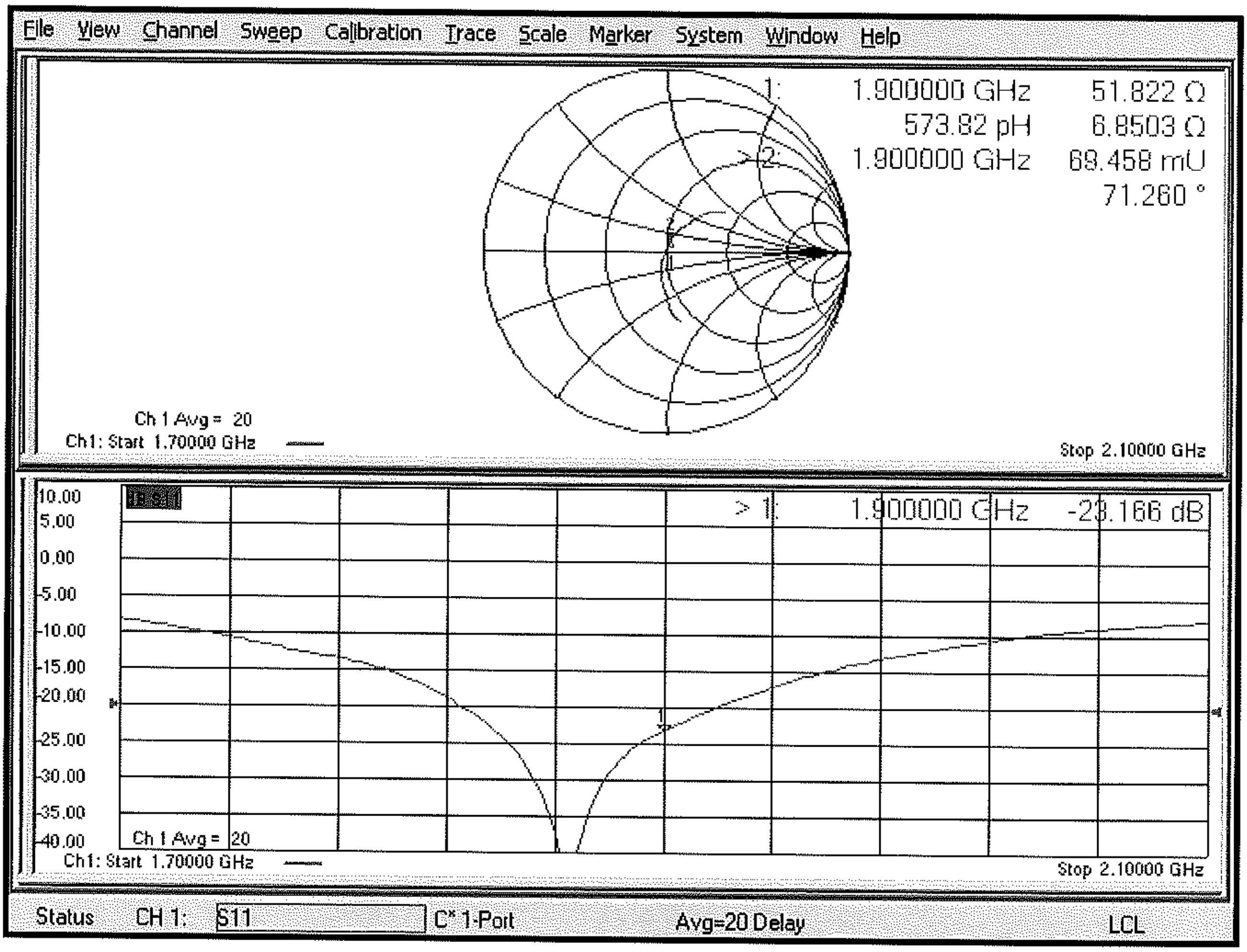
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 109.4 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 17.8 W/kg
SAR(1 g) = 9.65 W/kg; SAR(10 g) = 5.05 W/kg
Maximum value of SAR (measured) = 15.0 W/kg



0 dB = 15.0 W/kg = 11.76 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 21.02.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d148

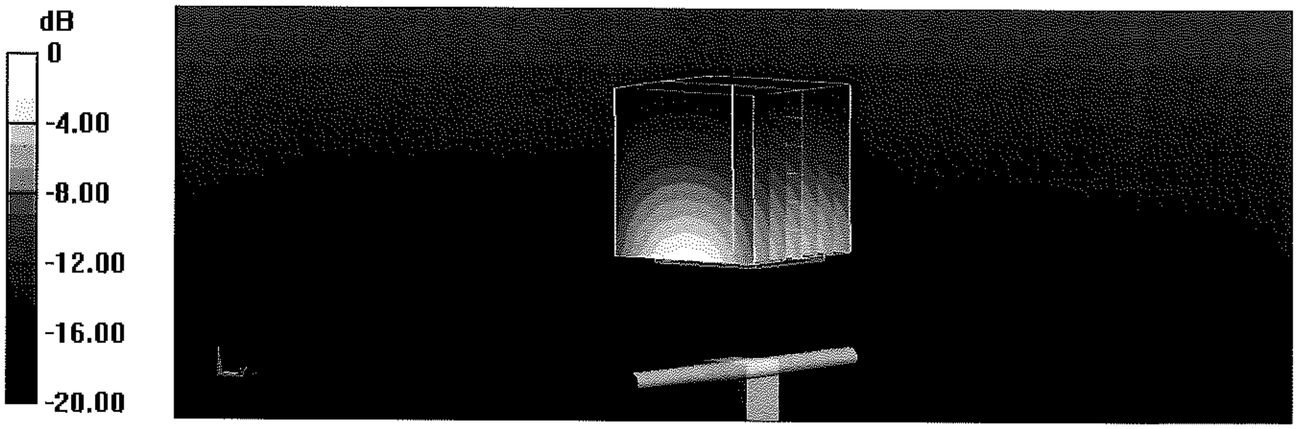
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.47 S/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.23, 8.23, 8.23) @ 1900 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 103.7 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 9.56 W/kg; SAR(10 g) = 5.05 W/kg
Maximum value of SAR (measured) = 14.4 W/kg



0 dB = 14.4 W/kg = 11.58 dBW/kg

Impedance Measurement Plot for Body TSL