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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:
12/05/18 - 01/09/19
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M1812260233-01-R1.A3L

FCC ID: **A3LSMG9750**

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

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model: SM-G9750

Equipment Class	Band & Mode	Tx Frequency	SAR			
			1g Head (W/kg)	1g Body-Worn (W/kg)	1g Hotspot (W/kg)	10g Phablet (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.18	0.22	0.52	N/A
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	< 0.1	0.27	1.03	2.46
PCE	UMTS 850	826.40 - 846.60 MHz	0.28	0.33	0.72	N/A
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.16	0.54	0.88	3.04
PCE	LTE Band 12	699.7 - 715.3 MHz	0.25	0.33	0.47	N/A
PCE	LTE Band 13	779.5 - 784.5 MHz	0.17	0.28	0.54	N/A
PCE	LTE Band 26 (Cell)	814.7 - 848.3 MHz	0.30	0.36	0.75	N/A
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.30	0.41	0.87	N/A
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	0.17	0.49	0.59	2.42
PCE	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.20	0.79	0.95	3.16
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 41	2498.5 - 2687.5 MHz	< 0.1	0.35	0.82	2.59
DTS	2.4 GHz WLAN	2412 - 2472 MHz	0.21	< 0.1	0.21	N/A
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	N/A	N/A
NII	U-NII-2A	5260 - 5320 MHz	0.25	0.30	N/A	2.24
NII	U-NII-2C	5500 - 5720 MHz	0.23	0.35	N/A	2.70
NII	U-NII-3	5745 - 5825 MHz	0.20	0.40	0.74	N/A
DSS/DTS	Bluetooth	2402 - 2480 MHz	1.07	0.12	0.27	N/A
Simultaneous SAR per KDB 690783 D01v01r03:			1.59	1.48	1.58	3.67

Note: This test report addresses compliance data for material 2. Please see test report ID 1M1811120202-01-R1.A3L for compliance data for material 1.

Note: This revised Test Report (S/N: 1M1812260233-01-R1.A3L) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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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T A B L E   O F   C O N T E N T S

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 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 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 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 41	Voice/Data	2498.5 - 2687.5 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. 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 was used as a guideline for selecting SAR test distances for this device when being used in phablet 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	**33.5**	**33.5**	**32.5**	**30.5**	**28.5**	**28.0**	**26.0**	**24.0**	**23.0**
	Nominal	**32.5**	**32.5**	**31.5**	**29.5**	**27.5**	**27.0**	**25.0**	**23.0**	**22.0**
GSM/GPRS/EDGE 1900	Maximum	**30.5**	**30.5**	**29.5**	**27.5**	**25.5**	**27.0**	**25.0**	**23.0**	**22.0**
	Nominal	**29.5**	**29.5**	**28.5**	**26.5**	**24.5**	**26.0**	**24.0**	**22.0**	**21.0**

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*	*3GPP DC-HSDPA*
UMTS Band 5 (850 MHz)	Maximum	**25.0**	**24.0**	**24.0**	**24.0**
	Nominal	**24.0**	**23.0**	**23.0**	**23.0**
UMTS Band 2 (1900 MHz)	Maximum	**24.5**	**23.5**	**23.5**	**23.5**
	Nominal	**23.5**	**22.5**	**22.5**	**22.5**

Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	**25.0**
	Nominal	**24.0**
LTE Band 13	Maximum	**25.0**
	Nominal	**24.0**
LTE Band 26 (Cell)	Maximum	**25.0**
	Nominal	**24.0**
LTE Band 5 (Cell)	Maximum	**25.5**
	Nominal	**24.5**
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 41	Maximum	**25.0**
	Nominal	**24.0**

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*
GSM/GPRS/EDGE 1900	Maximum	**28.5**	**27.5**	**25.5**	**23.5**	**27.0**	**25.0**	**23.0**	**22.0**
	Nominal	**27.5**	**26.5**	**24.5**	**22.5**	**26.0**	**24.0**	**22.0**	**21.0**

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

Mode / Band		Modulated Average (dBm)
LTE Band 4 (AWS)	Maximum	**21.0**
	Nominal	**20.0**
LTE Band 25 (PCS)	Maximum	**20.5**
	Nominal	**19.5**
LTE Band 2 (PCS)	Maximum	**20.5**
	Nominal	**19.5**
LTE Band 41	Maximum	**23.0**
	Nominal	**22.0**

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

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**	**25.5**	**23.5**	**27.0**	**25.0**	**23.0**	**22.0**
	Nominal	**27.5**	**27.5**	**26.5**	**24.5**	**22.5**	**26.0**	**24.0**	**22.0**	**21.0**

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*	*3GPP DC-HSDPA*
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 4 (AWS)	Maximum	**21.5**
	Nominal	**20.5**
LTE Band 25 (PCS)	Maximum	**21.5**
	Nominal	**20.5**
LTE Band 2 (PCS)	Maximum	**21.5**
	Nominal	**20.5**
LTE Band 41	Maximum	**23.0**
	Nominal	**22.0**

1.3.4 Maximum Bluetooth and SISO/MIMO WLAN Output Power

Note: IEEE 802.11ax RU targets can be found in test report 1M1811120202-01-R1.A3L Appendix I.

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Ant 1				
Channels		1	2-10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum	**20.0**			**11.0**	**5.5**
	Nominal	**19.0**			**10.0**	**4.5**
IEEE 802.11g (2.4 GHz)	Maximum	**18.0**		**17.0**	**11.0**	**5.5**
	Nominal	**17.0**		**16.0**	**10.0**	**4.5**
IEEE 802.11n (2.4 GHz)	Maximum	**18.0**		**17.0**	**11.0**	**5.5**
	Nominal	**17.0**		**16.0**	**10.0**	**4.5**
IEEE 802.11ax SU (2.4 GHz)	Maximum	**16.0**	**17.0**	**15.0**	**11.0**	**5.5**
	Nominal	**15.0**	**16.0**	**14.0**	**10.0**	**4.5**

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Ant 2				
Channels		1	2-10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum	**19.0**			**11.0**	**5.5**
	Nominal	**18.0**			**10.0**	**4.5**
IEEE 802.11g (2.4 GHz)	Maximum	**18.0**			**11.0**	**5.5**
	Nominal	**17.0**			**10.0**	**4.5**
IEEE 802.11n (2.4 GHz)	Maximum	**18.0**			**11.0**	**5.5**
	Nominal	**17.0**			**10.0**	**4.5**
IEEE 802.11ax SU (2.4 GHz)	Maximum	**16.0**	**17.0**	**15.0**	**11.0**	**5.5**
	Nominal	**15.0**	**16.0**	**14.0**	**10.0**	**4.5**

Mode / Band		Modulated Average - Single Tx Chain - Ant 1 (dBm)						
		20 MHz Bandwidth			40 MHz Bandwidth		80 MHz Bandwidth	
	Channel	36	64	40-60, 100-165	38, 62	46-54, 102-159	42-106	122-155
IEEE 802.11a (5 GHz)	Maximum	**15.5**	**16.5**	**18.0**				
	Nominal	**14.5**	**15.5**	**17.0**				
IEEE 802.11n (5 GHz)	Maximum	**15.5**	**16.5**	**18.0**	**13.0**	**17.0**		
	Nominal	**14.5**	**15.5**	**17.0**	**12.0**	**16.0**		
IEEE 802.11ac (5 GHz)	Maximum	**15.5**	**16.5**	**18.0**	**13.0**	**17.0**	**13.0**	**16.0**
	Nominal	**14.5**	**15.5**	**17.0**	**12.0**	**16.0**	**12.0**	**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 - Single Tx Chain - Ant 2 (dBm)						
		20 MHz Bandwidth			40 MHz Bandwidth		80 MHz Bandwidth	
	Channel	36	64	40-60, 100-165	38, 62	46-54, 102-159	42-106	122-155
IEEE 802.11a (5 GHz)	Maximum	15.5	16.5	18.0				
	Nominal	14.5	15.5	17.0				
IEEE 802.11n (5 GHz)	Maximum	15.5	17.0	18.0	13.0	17.0		
	Nominal	14.5	16.0	17.0	12.0	16.0		
IEEE 802.11ac (5 GHz)	Maximum	15.5	17.0	18.0	13.0	17.0	13.0	16.0
	Nominal	14.5	16.0	17.0	12.0	16.0	12.0	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)				
Channels		1	2-10	11	12	13
IEEE 802.11g (2.4 GHz)	Maximum	21.0		20.5	14.0	8.5
	Nominal	20.0		19.5	13.0	7.5
IEEE 802.11n (2.4 GHz)	Maximum	21.0		20.0	14.0	8.5
	Nominal	20.0		19.0	13.0	7.5
IEEE 802.11ax SU (2.4 GHz)	Maximum	16.0	17.0	15.0	14.0	8.5
	Nominal	15.0	16.0	14.0	13.0	7.5

Mode / Band		Modulated Average - MIMO (dBm)						
		20 MHz Bandwidth			40 MHz Bandwidth		80 MHz Bandwidth	
	Channel	36	64	40-60, 100-165	38, 62	46-54, 102-159	42-106	122-155
IEEE 802.11a (5 GHz)	Maximum	15.5	16.5	21.0				
	Nominal	14.5	15.5	20.0				
IEEE 802.11n (5 GHz)	Maximum	15.5	16.5	21.0	13.0	20.0		
	Nominal	14.5	15.5	20.0	12.0	19.0		
IEEE 802.11ac (5 GHz)	Maximum	15.5	16.5	21.0	13.0	20.0	13.0	19.0
	Nominal	14.5	15.5	20.0	12.0	19.0	12.0	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 - Single Tx Chain (dBm)
Bluetooth	Maximum	**18.5**
	Nominal	**17.5**
Bluetooth LE	Maximum	**11.5**
	Nominal	**10.5**
Bluetooth EDR	Maximum	**12.5**
	Nominal	**11.5**

1.3.5 Reduced SISO and MIMO WLAN Output Power

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Ant 1				
Channels		1	2-10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum		17.0		11.0	5.5
	Nominal		16.0		10.0	4.5
IEEE 802.11g (2.4 GHz)	Maximum		17.0		11.0	5.5
	Nominal		16.0		10.0	4.5
IEEE 802.11n (2.4 GHz)	Maximum		17.0		11.0	5.5
	Nominal		16.0		10.0	4.5
IEEE 802.11ax SU (2.4 GHz)	Maximum	16.0	17.0	15.0	11.0	5.5
	Nominal	15.0	16.0	14.0	10.0	4.5

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Ant 2				
Channels		1	2-10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum		17.0		11.0	5.5
	Nominal		16.0		10.0	4.5
IEEE 802.11g (2.4 GHz)	Maximum		17.0		11.0	5.5
	Nominal		16.0		10.0	4.5
IEEE 802.11n (2.4 GHz)	Maximum		17.0		11.0	5.5
	Nominal		16.0		10.0	4.5
IEEE 802.11ax SU (2.4 GHz)	Maximum	16.0	17.0	15.0	11.0	5.5
	Nominal	15.0	16.0	14.0	10.0	4.5

Mode / Band		Modulated Average - MIMO (dBm)				
Channels		1	2-10	11	12	13
IEEE 802.11g (2.4 GHz)	Maximum		20.0		14.0	8.5
	Nominal		19.0		13.0	7.5
IEEE 802.11n (2.4 GHz)	Maximum		20.0		14.0	8.5
	Nominal		19.0		13.0	7.5
IEEE 802.11ax SU (2.4 GHz)	Maximum	16.0	17.0	15.0	14.0	8.5
	Nominal	15.0	16.0	14.0	13.0	7.5

Mode / Band		Modulated Average - Single Tx Chain (dBm)				
		20 MHz Bandwidth	40 MHz Bandwidth		80 MHz Bandwidth	
	Channel	36-165	38, 62	46-54, 102-159	42-106	122-155
IEEE 802.11a (5 GHz)	Maximum	**14.0**				
	Nominal	**13.0**				
IEEE 802.11n (5 GHz)	Maximum	**14.0**	**13.0**	**14.0**		
	Nominal	**13.0**	**12.0**	**13.0**		
IEEE 802.11ac (5 GHz)	Maximum	**14.0**	**13.0**	**14.0**	**13.0**	**14.0**
	Nominal	**13.0**	**12.0**	**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	64	40-60, 100-165	38, 62	46-54, 102 - 159	42-106	122-155
IEEE 802.11a (5 GHz)	Maximum	**15.5**	**16.5**	**17.0**				
	Nominal	**14.5**	**15.5**	**16.0**				
IEEE 802.11n (5 GHz)	Maximum	**15.5**	**16.5**	**17.0**	**13.0**	**17.0**		
	Nominal	**14.5**	**15.5**	**16.0**	**12.0**	**16.0**		
IEEE 802.11ac (5 GHz)	Maximum	**15.5**	**16.5**	**17.0**	**13.0**	**17.0**	**13.0**	**17.0**
	Nominal	**14.5**	**15.5**	**16.0**	**12.0**	**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**	

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

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Ant 1				
Channels		1	2-10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum		**17.0**		**11.0**	**5.5**
	Nominal		**16.0**		**10.0**	**4.5**
IEEE 802.11g (2.4 GHz)	Maximum		**17.0**		**11.0**	**5.5**
	Nominal		**16.0**		**10.0**	**4.5**
IEEE 802.11n (2.4 GHz)	Maximum		**17.0**		**11.0**	**5.5**
	Nominal		**16.0**		**10.0**	**4.5**
IEEE 802.11ax SU (2.4 GHz)	Maximum	**16.0**	**17.0**	**15.0**	**11.0**	**5.5**
	Nominal	**15.0**	**16.0**	**14.0**	**10.0**	**4.5**

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Ant 2				
Channels		1	2-10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum		**17.0**		**11.0**	**5.5**
	Nominal		**16.0**		**10.0**	**4.5**
IEEE 802.11g (2.4 GHz)	Maximum		**17.0**		**11.0**	**5.5**
	Nominal		**16.0**		**10.0**	**4.5**
IEEE 802.11n (2.4 GHz)	Maximum		**17.0**		**11.0**	**5.5**
	Nominal		**16.0**		**10.0**	**4.5**
IEEE 802.11ax SU (2.4 GHz)	Maximum	**16.0**	**17.0**	**15.0**	**11.0**	**5.5**
	Nominal	**15.0**	**16.0**	**14.0**	**10.0**	**4.5**

Mode / Band		Modulated Average - MIMO (dBm)				
Channels		1	2-10	11	12	13
IEEE 802.11g (2.4 GHz)	Maximum		**20.0**		**14.0**	**8.5**
	Nominal		**19.0**		**13.0**	**7.5**
IEEE 802.11n (2.4 GHz)	Maximum		**20.0**		**14.0**	**8.5**
	Nominal		**19.0**		**13.0**	**7.5**
IEEE 802.11ax SU (2.4 GHz)	Maximum	**16.0**	**17.0**	**15.0**	**14.0**	**8.5**
	Nominal	**15.0**	**16.0**	**14.0**	**13.0**	**7.5**

Mode / Band		Modulated Average - Single Tx Chain (dBm)						
		20 MHz Bandwidth			40 MHz Bandwidth		80 MHz Bandwidth	
	Channel	36	64	40-60, 100-165	38, 62	46-54, 102-159	42-106	122-155
IEEE 802.11a (5 GHz)	Maximum	14.0						
	Nominal	13.0						
IEEE 802.11n (5 GHz)	Maximum	14.0			13.0	14.0		
	Nominal	13.0			12.0	13.0		
IEEE 802.11ac (5 GHz)	Maximum	14.0			13.0	14.0	13.0	14.0
	Nominal	13.0			12.0	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	64	40-60, 100-165	38, 62	46-54, 102 - 159	42-106	122-155
IEEE 802.11a (5 GHz)	Maximum	15.5	16.5	17.0				
	Nominal	14.5	15.5	16.0				
IEEE 802.11n (5 GHz)	Maximum	15.5	16.5	17.0	13.0	17.0		
	Nominal	14.5	15.5	16.0	12.0	16.0		
IEEE 802.11ac (5 GHz)	Maximum	15.5	16.5	17.0	13.0	17.0	13.0	17.0
	Nominal	14.5	15.5	16.0	12.0	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	

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

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Ant 1		
Channels		1-11	12	13
IEEE 802.11b (2.4 GHz)	Maximum	14.0	11.0	5.5
	Nominal	13.0	10.0	4.5
IEEE 802.11g (2.4 GHz)	Maximum	14.0	11.0	5.5
	Nominal	13.0	10.0	4.5
IEEE 802.11n (2.4 GHz)	Maximum	14.0	11.0	5.5
	Nominal	13.0	10.0	4.5
IEEE 802.11ax SU (2.4 GHz)	Maximum	14.0	11.0	5.5
	Nominal	13.0	10.0	4.5

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Ant 2		
Channels		1-11	12	13
IEEE 802.11b (2.4 GHz)	Maximum	**14.0**	**11.0**	**5.5**
	Nominal	**13.0**	**10.0**	**4.5**
IEEE 802.11g (2.4 GHz)	Maximum	**14.0**	**11.0**	**5.5**
	Nominal	**13.0**	**10.0**	**4.5**
IEEE 802.11n (2.4 GHz)	Maximum	**14.0**	**11.0**	**5.5**
	Nominal	**13.0**	**10.0**	**4.5**
IEEE 802.11ax SU (2.4 GHz)	Maximum	**14.0**	**11.0**	**5.5**
	Nominal	**13.0**	**10.0**	**4.5**

Mode / Band		Modulated Average - MIMO (dBm)				
Channels		1	2-10	11	12	13
IEEE 802.11g (2.4 GHz)	Maximum	**17.0**			**14.0**	**8.5**
	Nominal	**16.0**			**13.0**	**7.5**
IEEE 802.11n (2.4 GHz)	Maximum	**17.0**			**14.0**	**8.5**
	Nominal	**16.0**			**13.0**	**7.5**
IEEE 802.11ax SU (2.4 GHz)	Maximum	**16.0**	**17.0**	**15.0**	**14.0**	**8.5**
	Nominal	**15.0**	**16.0**	**14.0**	**13.0**	**7.5**

Mode / Band		Modulated Average - Single Tx Chain (dBm)				
		20 MHz Bandwidth	40 MHz Bandwidth		80 MHz Bandwidth	
	Channel	36-165	38, 62	46-54, 102-159	42-106	122-155
IEEE 802.11a (5 GHz)	Maximum	**14.0**				
	Nominal	**13.0**				
IEEE 802.11n (5 GHz)	Maximum	**14.0**	**13.0**	**14.0**		
	Nominal	**13.0**	**12.0**	**13.0**		
IEEE 802.11ac (5 GHz)	Maximum	**14.0**	**13.0**	**14.0**	**13.0**	**14.0**
	Nominal	**13.0**	**12.0**	**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	64	40-60, 100-165	38, 62	46-54, 102 - 159	42-106	122-155
IEEE 802.11a (5 GHz)	Maximum	**15.5**	**16.5**	**17.0**				
	Nominal	**14.5**	**15.5**	**16.0**				
IEEE 802.11n (5 GHz)	Maximum	**15.5**	**16.5**	**17.0**	**13.0**	**17.0**		
	Nominal	**14.5**	**15.5**	**16.0**	**12.0**	**16.0**		
IEEE 802.11ac (5 GHz)	Maximum	**15.5**	**16.5**	**17.0**	**13.0**	**17.0**	**13.0**	**17.0**
	Nominal	**14.5**	**15.5**	**16.0**	**12.0**	**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**	

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 dimension of this device is > 160 mm and <200 mm, it is considered a "phablet."

Table 1-1
Device Edges/Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850	Yes	Yes	No	Yes	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	Yes	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	Yes
UMTS 1900	Yes	Yes	No	Yes	Yes	Yes
LTE Band 12	Yes	Yes	No	Yes	Yes	Yes
LTE Band 13	Yes	Yes	No	Yes	Yes	Yes
LTE Band 26 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 5 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 4 (AWS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 25 (PCS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 41	Yes	Yes	No	Yes	No	Yes
2.4 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
2.4 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
Bluetooth	Yes	Yes	Yes	No	No	Yes

Note: Particular DUT edges were not required to be evaluated for wireless router SAR or phablet SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v02r01 Section III 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.

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 1-2
Simultaneous Transmission Scenarios

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

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-NII-2A, and U-NII-2C 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

(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.

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.

This device supports IEEE 802.11ax with the following features:

a) Up to 80 MHz Bandwidth only for 5GHz
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 5GHz
g) 802.11ax 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 and U-NII-3 WLAN operations since wireless router 1g SAR was < 1.2 W/kg.

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.

Per FCC Guidance, 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.

(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 only. All uplink communications are identical to Release 8 specifications. Per FCC KDB Publication 941225 D05A v01r02, SAR for 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. The downlink carrier aggregation exclusion analysis can be found in test report 1M1811120202-01-R1.A3L Appendix H.

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.

This device supports downlink 4x4 MIMO operations for some LTE Bands. Per May 2017 TCB Workshop Guidance, SAR for downlink 4x4 MIMO was not needed since the maximum average output power in 4x4 downlink MIMO mode was not > 0.25 dB higher than the maximum output power with downlink 4x4 MIMO inactive.

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 41 with two component carriers in the uplink. SAR Measurements and conducted powers were evaluated per 2017 Fall TCB Workshop Notes.

This device supports 64QAM on the uplink and 256QAM on the downlink for LTE Operations. Conducted powers for 64QAM uplink configurations were measured per Section 5.1 of FCC KDB Publication 941225 D05v02r05. SAR was not required for 64QAM since the highest maximum output power for 64 QAM is ≤ ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg, per Section 5.2.4 of FCC KDB Publication 941225 D05v02r05.

1.8 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 941225 D01v03r01, D05v02r04, D05Av01r02, D06v02r01 (2G/3G/4G and Hotspot)
- 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)
- May 2017 TCB Workshop Notes (LTE 4x4 Downlink MIMO)
- April 2018 TCB Workshop Notes (LTE Carrier Aggregation)

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 12 (699.7 - 715.3 MHz)				
	LTE Band 13 (779.5 - 784.5 MHz)				
	LTE Band 26 (Cell) (814.7 - 848.3 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 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 41 (2498.5 - 2687.5 MHz)				
Channel Bandwidths	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 13: 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 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 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
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 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 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 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 20 (QPSK, 16QAM, 64QAM, 256QAM), UL UE Cat 18 (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, downlink MIMO features as shown in Section 9 and test report 1M1811120202-01-R1.A3L 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: Wifi Offloading, Relay, HetNet, Enhanced eICIC, MDH, 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:

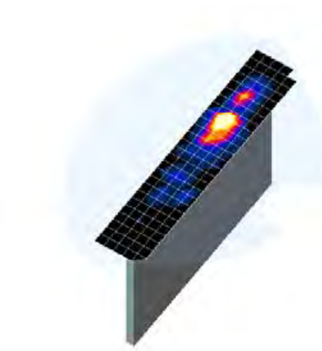

Figure 4-1
Sample SAR Area Scan

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].

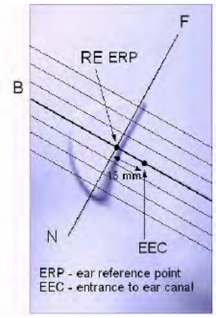

Figure 5-1
Close-Up Side view of ERP

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

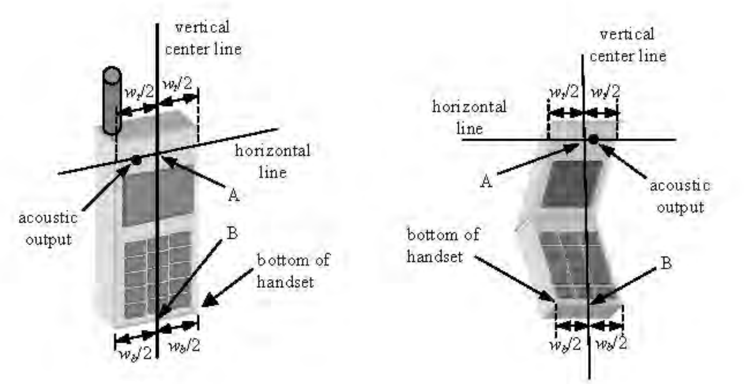

Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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.

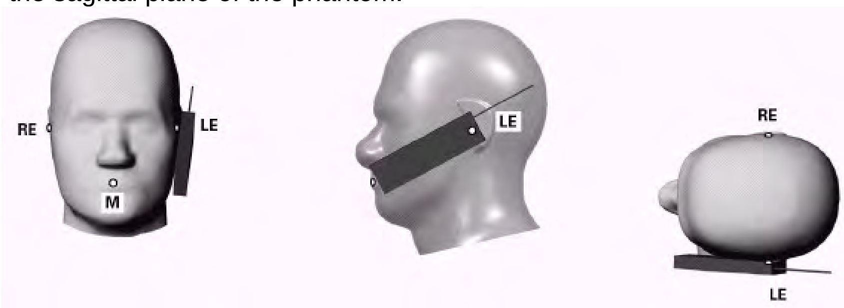

Figure 6-1 Front, Side and Top View of Cheek Position

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).

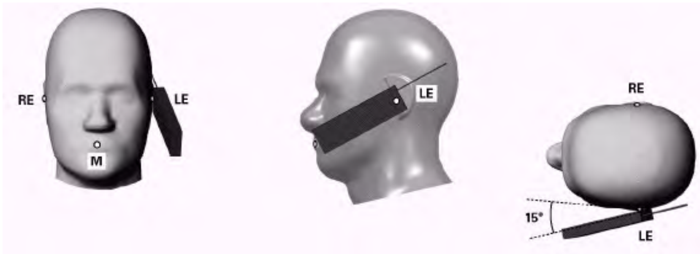

Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

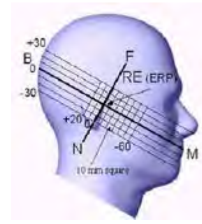

Figure 6-3
Side view w/ relevant markings

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

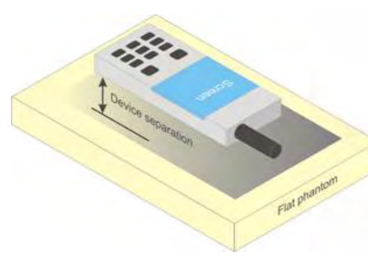

Figure 6-4
Sample Body-Worn Diagram

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 mini-tablets or UMPC mini-tablets 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 mini-tablet 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 mini-tablet 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.

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 mini-tablet, 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 850	128	33.10	33.11	32.01	**29.80**	27.47	27.28	25.60	23.65	22.03
	190	33.17	33.20	32.16	**30.04**	27.86	27.33	25.77	23.74	22.31
	251	33.21	33.22	31.88	**29.86**	27.35	27.32	25.72	23.76	22.21
GSM 1900	512	29.91	30.15	28.98	**26.86**	24.67	26.20	24.32	22.27	20.95
	661	29.88	30.07	28.92	**26.85**	24.65	26.14	24.13	22.33	20.99
	810	29.50	29.89	28.42	**26.26**	24.32	25.58	23.97	21.72	20.81

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 850	128	24.07	24.08	25.99	**25.54**	24.46	18.25	19.58	19.39	19.02
	190	24.14	24.17	26.14	**25.78**	24.85	18.30	19.75	19.48	19.30
	251	24.18	24.19	25.86	**25.60**	24.34	18.29	19.70	19.50	19.20
GSM 1900	512	20.88	21.12	22.96	**22.60**	21.66	17.17	18.30	18.01	17.94
	661	20.85	21.04	22.90	**22.59**	21.64	17.11	18.11	18.07	17.98
	810	20.47	20.86	22.40	**22.00**	21.31	16.55	17.95	17.46	17.80
GSM 850	**Frame Avg.Targets:**	23.47	23.47	25.48	**25.24**	24.49	17.97	18.98	18.74	18.99
GSM 1900		20.47	20.47	22.48	**22.24**	21.49	16.97	17.98	17.74	17.99

Table 9-2
Reduced Conducted Power - Hotspot/Grip Sensor

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	28.10	28.17	27.00	**24.93**	22.74	25.94	24.25	22.20	20.97
	661	28.05	28.08	26.51	**24.92**	22.62	26.09	24.71	22.17	21.12
	810	27.66	27.71	26.45	**24.21**	22.32	25.56	24.31	22.07	20.89
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	19.07	19.14	20.98	**20.67**	19.73	16.91	18.23	17.94	17.96
	661	19.02	19.05	20.49	**20.66**	19.61	17.06	18.69	17.91	18.11
	810	18.63	18.68	20.43	**19.95**	19.31	16.53	18.29	17.81	17.88

GSM 1900	**Frame Avg.Targets:**	18.47	18.47	20.48	**20.24**	19.49	16.97	17.98	17.74	17.99

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

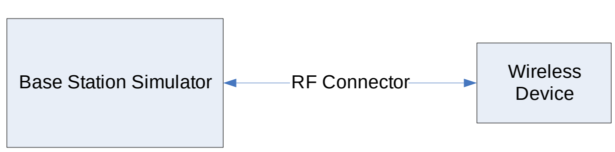

Figure 9-1
Power Measurement Setup

9.2 UMTS Conducted Powers

Table 9-3
Maximum Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	24.71	24.84	24.67	24.15	24.11	23.77	-
99		12.2 kbps AMR	24.70	24.78	24.64	24.19	24.23	23.83	-
6	HSDPA	Subtest 1	23.63	23.78	23.66	23.03	23.11	22.84	0
6		Subtest 2	23.59	23.79	23.74	23.14	23.12	22.81	0
6		Subtest 3	23.12	23.23	23.13	22.69	22.63	22.34	0.5
6		Subtest 4	23.07	23.30	23.11	22.53	22.62	22.34	0.5
6	HSUPA	Subtest 1	23.58	23.81	23.69	23.14	23.11	22.79	0
6		Subtest 2	21.15	21.29	21.20	21.08	21.06	20.76	2
6		Subtest 3	22.11	22.26	22.11	22.11	22.07	21.84	1
6		Subtest 4	21.14	21.24	21.18	21.09	21.06	20.79	2
6		Subtest 5	23.15	23.33	23.21	23.13	23.12	22.81	0
8	DC-HSDPA	Subtest 1	23.59	23.75	23.30	22.93	22.99	22.69	0
8		Subtest 2	23.61	23.77	23.65	22.79	23.01	22.72	0
8		Subtest 3	23.20	23.27	23.26	22.48	22.52	22.24	0.5
8		Subtest 4	23.19	23.29	23.22	22.51	22.50	22.21	0.5

Table 9-4
Reduced Conducted Power – Hotspot Mode Active

3GPP Release Version	Mode	3GPP 34.121 Subtest	PCS Band [dBm]			3GPP MPR [dB]
			9262	9400	9538	
99	WCDMA	12.2 kbps RMC	20.08	20.13	19.78	-
99		12.2 kbps AMR	20.13	20.11	19.84	-
6	HSDPA	Subtest 1	19.07	19.06	18.80	0
6		Subtest 2	19.12	19.07	18.84	0
6		Subtest 3	18.53	18.54	18.18	0.5
6		Subtest 4	18.49	18.53	18.26	0.5
6	HSUPA	Subtest 1	19.13	19.10	18.82	0
6		Subtest 2	17.09	17.11	16.83	2
6		Subtest 3	18.11	18.10	17.82	1
6		Subtest 4	17.08	17.11	16.80	2
6		Subtest 5	19.11	19.12	18.79	0
8	DC-HSDPA	Subtest 1	18.97	18.99	18.73	0
8		Subtest 2	19.01	18.99	18.69	0
8		Subtest 3	18.48	18.48	18.21	0.5
8		Subtest 4	18.52	18.51	18.19	0.5

Table 9-5
Reduced Conducted Powers - Grip Sensor

3GPP Release Version	Mode	3GPP 34.121 Subtest	PCS Band [dBm]			3GPP MPR [dB]
			9262	9400	9538	
99	WCDMA	12.2 kbps RMC	21.78	21.70	21.37	-
99		12.2 kbps AMR	21.55	21.59	21.35	-
6	HSDPA	Subtest 1	20.63	20.60	20.34	0
6		Subtest 2	20.53	20.63	20.36	0
6		Subtest 3	20.12	20.11	19.86	0.5
6		Subtest 4	20.05	20.13	19.81	0.5
6	HSUPA	Subtest 1	20.55	20.56	20.26	0
6		Subtest 2	18.59	18.62	18.34	2
6		Subtest 3	19.57	19.62	19.33	1
6		Subtest 4	18.58	18.61	18.33	2
6		Subtest 5	20.63	20.56	20.33	0
8	DC-HSDPA	Subtest 1	20.52	20.49	20.24	0
8		Subtest 2	20.48	20.52	20.19	0
8		Subtest 3	20.01	20.02	19.69	0.5
8		Subtest 4	19.98	20.01	19.67	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.

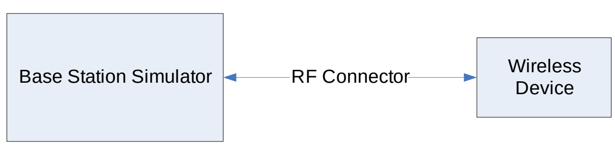

Figure 9-2
Power Measurement Setup

9.3 LTE Conducted Powers

9.3.1 LTE Band 12

Table 9-6
LTE Band 12 Conducted Powers - 10 MHz Bandwidth

LTE Band 12 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23095 (707.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**24.01**	0	0
	1	25	23.41		0
	1	49	23.88		0
	25	0	**23.05**	0-1	1
	25	12	22.98		1
	25	25	22.89		1
	50	0	23.00		1
16QAM	1	0	23.16	0-1	1
	1	25	22.80		1
	1	49	23.00		1
	25	0	22.00	0-2	2
	25	12	21.95		2
	25	25	21.86		2
	50	0	21.94		2
64QAM	1	0	22.22	0-2	2
	1	25	21.72		2
	1	49	22.02		2
	25	0	21.01	0-3	3
	25	12	20.95		3
	25	25	20.88		3
	50	0	20.91		3

Note: LTE Band 12 at 10 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 9-7
LTE Band 12 Conducted Powers - 5 MHz Bandwidth

LTE Band 12 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23035 (701.5 MHz)	23095 (707.5 MHz)	23155 (713.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.93	23.99	23.80	0	0
	1	12	24.00	24.04	23.86		0
	1	24	23.89	24.02	23.74		0
	12	0	23.13	23.28	22.94	0-1	1
	12	6	23.20	23.28	22.98		1
	12	13	23.12	23.24	22.93		1
	25	0	23.16	23.27	22.93		1
16QAM	1	0	23.25	23.18	23.07	0-1	1
	1	12	23.30	23.26	23.13		1
	1	24	23.17	23.15	22.97		1
	12	0	22.15	22.25	21.96	0-2	2
	12	6	22.22	22.18	21.99		2
	12	13	22.14	22.14	21.98		2
	25	0	22.14	22.10	21.91		2
64QAM	1	0	22.23	22.15	22.08	0-2	2
	1	12	22.21	22.25	22.10		2
	1	24	22.15	22.13	22.05		2
	12	0	21.19	21.19	20.97	0-3	3
	12	6	21.27	21.19	21.00		3
	12	13	21.18	21.11	20.96		3
	25	0	21.20	21.11	20.94		3

Table 9-8
LTE Band 12 Conducted Powers - 3 MHz Bandwidth

LTE Band 12 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23025 (700.5 MHz)	23095 (707.5 MHz)	23165 (714.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.97	23.89	23.85	0	0
	1	7	23.95	23.88	23.79		0
	1	14	23.96	23.88	23.75		0
	8	0	23.10	23.05	22.94	0-1	1
	8	4	23.14	23.08	22.95		1
	8	7	23.12	23.02	22.89		1
	15	0	23.19	23.09	23.00		1
16QAM	1	0	23.14	23.13	23.13	0-1	1
	1	7	23.14	23.16	23.07		1
	1	14	23.21	23.06	23.05		1
	8	0	22.09	22.08	22.00	0-2	2
	8	4	22.17	22.11	21.97		2
	8	7	22.16	22.06	21.94		2
	15	0	22.13	22.03	21.94		2
64QAM	1	0	22.17	22.12	22.12	0-2	2
	1	7	22.18	22.13	22.10		2
	1	14	22.21	22.14	22.08		2
	8	0	21.10	21.10	21.00	0-3	3
	8	4	21.18	21.11	20.98		3
	8	7	21.13	21.03	20.96		3
	15	0	21.15	21.07	20.94		3

Table 9-9
LTE Band 12 Conducted Powers -1.4 MHz Bandwidth

LTE Band 12 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23017 (699.7 MHz)	23095 (707.5 MHz)	23173 (715.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.91	23.89	23.64	0	0
	1	2	23.98	23.96	23.77		0
	1	5	23.93	23.89	23.66		0
	3	0	23.93	23.86	23.68		0
	3	2	23.99	23.95	23.78		0
	3	3	23.91	23.90	23.69		0
	6	0	23.06	23.03	22.84	0-1	1
16QAM	1	0	23.17	23.20	23.01	0-1	1
	1	2	23.23	23.24	23.11		1
	1	5	23.14	23.19	23.01		1
	3	0	23.09	23.04	22.86		1
	3	2	23.13	23.13	22.92		1
	3	3	23.04	23.08	22.90		1
	6	0	22.12	22.08	21.84	0-2	2
64QAM	1	0	22.13	22.16	21.92	0-2	2
	1	2	22.22	22.16	22.06		2
	1	5	22.15	22.11	22.02		2
	3	0	22.12	22.05	21.87		2
	3	2	22.17	22.11	22.03		2
	3	3	22.10	22.06	21.96		2
	6	0	21.06	20.97	20.81	0-3	3

9.3.2 LTE Band 13

Table 9-10
LTE Band 13 Conducted Powers - 10 MHz Bandwidth

LTE Band 13 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**23.79**	0	0
	1	25	23.20		0
	1	49	23.76		0
	25	0	22.78	0-1	1
	25	12	**22.81**		1
	25	25	22.76		1
	50	0	22.75		1
16QAM	1	0	22.89	0-1	1
	1	25	22.53		1
	1	49	22.97		1
	25	0	21.72	0-2	2
	25	12	21.70		2
	25	25	21.72		2
	50	0	21.71		2
64QAM	1	0	21.98	0-2	2
	1	25	21.35		2
	1	49	21.93		2
	25	0	20.80	0-3	3
	25	12	20.98		3
	25	25	20.75		3
	50	0	20.75		3

Table 9-11
LTE Band 13 Conducted Powers - 5 MHz Bandwidth

LTE Band 13 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	23.78	0	0
	1	12	23.80		0
	1	24	23.80		0
	12	0	22.92	0-1	1
	12	6	22.80		1
	12	13	22.71		1
	25	0	22.95		1
16QAM	1	0	23.01	0-1	1
	1	12	23.04		1
	1	24	22.98		1
	12	0	22.17	0-2	2
	12	6	22.20		2
	12	13	21.88		2
	25	0	21.94		2
64QAM	1	0	21.97	0-2	2
	1	12	22.02		2
	1	24	21.96		2
	12	0	20.94	0-3	3
	12	6	21.06		3
	12	13	20.98		3
	25	0	20.84		3

Note: LTE Band 13 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.

9.3.3 LTE Band 26 (Cell)

Table 9-12
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	24.20	0	0
	1	36	**24.21**		0
	1	74	24.16		0
	36	0	**23.41**	0-1	1
	36	18	23.36		1
	36	37	23.30		1
	75	0	23.40		1
16QAM	1	0	23.50	0-1	1
	1	36	23.50		1
	1	74	23.49		1
	36	0	22.33	0-2	2
	36	18	22.35		2
	36	37	22.31		2
	75	0	22.33		2
64QAM	1	0	22.47	0-2	2
	1	36	22.49		2
	1	74	22.41		2
	36	0	21.34	0-3	3
	36	18	21.40		3
	36	37	21.29		3
	75	0	21.32		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 9-13
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	24.11	24.18	24.24	0	0
	1	25	23.84	24.08	24.01		0
	1	49	24.08	24.11	24.10		0
	25	0	23.26	23.37	23.36	0-1	1
	25	12	23.21	23.37	23.27		1
	25	25	23.15	23.29	23.18		1
	50	0	23.21	23.39	23.27		1
16QAM	1	0	23.30	23.45	23.37	0-1	1
	1	25	23.02	23.12	22.91		1
	1	49	23.32	23.34	23.36		1
	25	0	22.25	22.37	22.32	0-2	2
	25	12	22.19	22.34	22.26		2
	25	25	22.13	22.27	22.19		2
	50	0	22.17	22.34	22.25		2
64QAM	1	0	22.42	22.49	22.40	0-2	2
	1	25	21.70	22.20	22.18		2
	1	49	22.31	22.34	22.30		2
	25	0	21.32	21.40	21.36	0-3	3
	25	12	21.20	21.39	21.31		3
	25	25	21.14	21.27	21.19		3
	50	0	21.22	21.33	21.27		3

Table 9-14
LTE Band 26 (Cell) Conducted Powers - 5 MHz Bandwidth

LTE Band 26 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26715 (816.5 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27015 (846.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.04	24.20	24.10	0	0
	1	12	24.10	24.21	24.18		0
	1	24	24.08	24.17	24.04		0
	12	0	23.18	23.30	23.31	0-1	1
	12	6	23.27	23.40	23.30		1
	12	13	23.23	23.38	23.20		1
	25	0	23.23	23.32	23.22		1
16QAM	1	0	23.27	23.50	23.30	0-1	1
	1	12	23.38	23.49	23.33		1
	1	24	23.32	23.46	23.32		1
	12	0	22.22	22.35	22.21	0-2	2
	12	6	22.35	22.41	22.36		2
	12	13	22.10	22.39	22.23		2
	25	0	22.19	22.31	22.17		2
64QAM	1	0	22.27	22.49	22.39	0-2	2
	1	12	22.45	22.50	22.36		2
	1	24	22.23	22.47	22.29		2
	12	0	21.19	21.39	21.24	0-3	3
	12	6	21.25	21.42	21.33		3
	12	13	21.24	21.41	21.24		3
	25	0	21.22	21.34	21.18		3

Table 9-15
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	24.01	24.21	24.16	0	0
	1	7	24.07	24.25	24.08		0
	1	14	24.09	24.26	24.06		0
	8	0	23.15	23.32	23.28	0-1	1
	8	4	23.20	23.33	23.27		1
	8	7	23.17	23.38	23.23		1
	15	0	23.24	23.40	23.29		1
16QAM	1	0	23.30	23.48	23.27	0-1	1
	1	7	23.43	23.50	23.39		1
	1	14	23.42	23.46	23.22		1
	8	0	22.16	22.32	22.35	0-2	2
	8	4	22.20	22.34	22.28		2
	8	7	22.27	22.37	22.26		2
	15	0	22.19	22.30	22.21		2
64QAM	1	0	22.32	22.43	22.41	0-2	2
	1	7	22.30	22.46	22.33		2
	1	14	22.43	22.49	22.36		2
	8	0	21.19	21.40	21.35	0-3	3
	8	4	21.24	21.29	21.32		3
	8	7	21.20	21.40	21.27		3
	15	0	21.21	21.29	21.19		3

Table 9-16
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	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26697 (814.7 MHz)	26865 (831.5 MHz)	27033 (848.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.98	24.07	24.04	0	0
	1	2	24.17	24.21	24.06		0
	1	5	24.08	24.16	24.02		0
	3	0	24.03	24.11	24.04		0
	3	2	24.05	24.23	24.07		0
	3	3	24.00	24.20	24.04		0
	6	0	23.17	23.27	23.19	0-1	1
16QAM	1	0	23.30	23.43	23.25	0-1	1
	1	2	23.45	23.50	23.39		1
	1	5	23.50	23.48	23.28		1
	3	0	23.20	23.30	23.18		1
	3	2	23.32	23.32	23.20		1
	3	3	23.20	23.25	23.19		1
	6	0	22.21	22.31	22.21	0-2	2
64QAM	1	0	22.26	22.41	22.36	0-2	2
	1	2	22.41	22.50	22.23		2
	1	5	22.36	22.46	22.15		2
	3	0	22.26	22.37	22.23		2
	3	2	22.34	22.48	22.25		2
	3	3	22.27	22.41	22.25		2
	6	0	21.11	21.24	21.07	0-3	3

9.3.4 LTE Band 5 (Cell)

Table 9-17
LTE Band 5 (Cell) Conducted Powers - 10 MHz Bandwidth

LTE Band 5 (Cell) 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20525 (836.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**24.89**	0	0
	1	25	24.75		0
	1	49	24.82		0
	25	0	**23.95**	0-1	1
	25	12	23.88		1
	25	25	23.78		1
	50	0	23.87		1
16QAM	1	0	24.17	0-1	1
	1	25	24.03		1
	1	49	24.05		1
	25	0	23.00	0-2	2
	25	12	22.92		2
	25	25	22.81		2
	50	0	22.82		2
64QAM	1	0	22.95	0-2	2
	1	25	22.94		2
	1	49	23.05		2
	25	0	22.01	0-3	3
	25	12	21.93		3
	25	25	21.78		3
	50	0	21.93		3

Note: LTE Band 5 (Cell) at 10 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 9-18
LTE Band 5 (Cell) Conducted Powers - 5 MHz Bandwidth

LTE Band 5 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20425 (826.5 MHz)	20525 (836.5 MHz)	20625 (846.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.50	24.67	24.59	0	0
	1	12	24.66	24.70	24.57		0
	1	24	24.62	24.61	24.41		0
	12	0	23.70	23.78	23.72	0-1	1
	12	6	23.80	23.79	23.76		1
	12	13	23.76	23.83	23.71		1
	25	0	23.76	23.77	23.72		1
16QAM	1	0	23.76	23.86	23.85	0-1	1
	1	12	23.94	24.00	23.99		1
	1	24	23.92	23.98	23.72		1
	12	0	22.74	22.80	22.76	0-2	2
	12	6	22.81	22.79	22.73		2
	12	13	22.79	22.84	22.77		2
	25	0	22.74	22.72	22.69		2
64QAM	1	0	22.80	22.86	22.87	0-2	2
	1	12	22.86	23.00	23.02		2
	1	24	22.89	22.84	22.71		2
	12	0	21.77	21.82	21.78	0-3	3
	12	6	21.81	21.84	21.80		3
	12	13	21.80	21.83	21.77		3
	25	0	21.82	21.75	21.70		3

Table 9-19
LTE Band 5 (Cell) Conducted Powers - 3 MHz Bandwidth

LTE Band 5 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20415 (825.5 MHz)	20525 (836.5 MHz)	20635 (847.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.60	24.64	24.51	0	0
	1	7	24.63	24.79	24.50		0
	1	14	24.65	24.74	24.21		0
	8	0	23.67	23.65	23.75	0-1	1
	8	4	23.81	23.73	23.77		1
	8	7	23.80	23.78	23.66		1
	15	0	23.82	23.83	23.77		1
16QAM	1	0	23.97	23.91	23.78	0-1	1
	1	7	23.93	24.06	23.71		1
	1	14	23.90	24.08	23.65		1
	8	0	22.81	22.86	22.79	0-2	2
	8	4	22.85	22.86	22.83		2
	8	7	22.83	22.85	22.79		2
	15	0	22.80	22.78	22.77		2
64QAM	1	0	22.92	22.95	22.90	0-2	2
	1	7	22.81	22.94	22.84		2
	1	14	22.99	22.50	22.50		2
	8	0	21.78	21.81	21.75	0-3	3
	8	4	21.87	21.88	21.83		3
	8	7	21.87	21.81	21.81		3
	15	0	21.79	21.80	21.80		3

Table 9-20
LTE Band 5 (Cell) Conducted Powers -1.4 MHz Bandwidth

LTE Band 5 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20407 (824.7 MHz)	20525 (836.5 MHz)	20643 (848.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.48	24.59	24.47	0	0
	1	2	24.62	24.71	24.48		0
	1	5	24.55	24.63	24.23		0
	3	0	24.52	24.62	24.43		0
	3	2	24.58	24.72	24.38		0
	3	3	24.54	24.64	24.28		0
	6	0	23.67	23.79	23.76	0-1	1
16QAM	1	0	23.77	23.94	23.71	0-1	1
	1	2	23.91	23.95	23.49		1
	1	5	23.79	23.93	23.56		1
	3	0	23.73	23.77	23.66		1
	3	2	23.74	23.79	23.63		1
	3	3	23.70	23.83	23.55		1
	6	0	22.70	22.81	22.67	0-2	2
64QAM	1	0	22.77	22.85	22.82	0-2	2
	1	2	22.84	22.96	22.91		2
	1	5	22.83	22.92	22.64		2
	3	0	22.75	22.79	22.79		2
	3	2	22.80	22.95	22.76		2
	3	3	22.75	22.87	22.66		2
	6	0	21.54	21.72	21.63	0-3	3

9.3.5 LTE Band 4 (AWS)

Table 9-21
LTE Band 4 (AWS) Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 4 (AWS) 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20175 (1732.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**24.93**	0	0
	1	50	24.90		0
	1	99	24.92		0
	50	0	**23.89**	0-1	1
	50	25	23.86		1
	50	50	23.82		1
	100	0	23.86		1
16QAM	1	0	23.96	0-1	1
	1	50	23.86		1
	1	99	23.84		1
	50	0	22.93	0-2	2
	50	25	22.94		2
	50	50	22.88		2
	100	0	22.89		2
64QAM	1	0	22.79	0-2	2
	1	50	22.76		2
	1	99	22.74		2
	50	0	21.91	0-3	3
	50	25	21.91		3
	50	50	21.87		3
	100	0	21.85		3

Note: LTE Band 4 (AWS) at 20 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 9-22
LTE Band 4 (AWS) Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 4 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20025 (1717.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20325 (1747.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.65	24.85	24.66	0	0
	1	36	24.56	24.72	24.51		0
	1	74	24.57	24.64	24.49		0
	36	0	23.65	23.66	23.60	0-1	1
	36	18	23.65	23.63	23.63		1
	36	37	23.56	23.64	23.60		1
	75	0	23.63	23.68	23.64		1
16QAM	1	0	24.00	23.96	23.70	0-1	1
	1	36	23.98	23.83	23.66		1
	1	74	23.99	23.82	23.80		1
	36	0	22.65	22.73	22.63	0-2	2
	36	18	22.64	22.63	22.60		2
	36	37	22.61	22.65	22.51		2
	75	0	22.62	22.63	22.67		2
64QAM	1	0	22.27	22.52	22.51	0-2	2
	1	36	22.20	22.41	22.45		2
	1	74	22.41	22.47	22.45		2
	36	0	21.28	21.47	21.19	0-3	3
	36	18	21.25	21.32	21.42		3
	36	37	21.24	21.41	21.39		3
	75	0	21.23	21.43	21.37		3

Table 9-23
LTE Band 4 (AWS) Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 4 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20000 (1715.0 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20350 (1750.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.28	24.35	24.20	0	0
	1	25	24.22	24.28	24.13		0
	1	49	24.20	24.31	24.12		0
	25	0	23.41	23.46	23.40	0-1	1
	25	12	23.39	23.50	23.38		1
	25	25	23.38	23.47	23.37		1
	50	0	23.38	23.45	23.40		1
16QAM	1	0	23.44	24.00	23.56	0-1	1
	1	25	23.40	23.86	23.52		1
	1	49	23.31	23.91	23.50		1
	25	0	22.40	22.55	22.47	0-2	2
	25	12	22.40	22.51	22.46		2
	25	25	22.38	22.50	22.43		2
	50	0	22.35	22.48	22.43		2
64QAM	1	0	22.16	22.42	22.33	0-2	2
	1	25	22.19	22.29	22.37		2
	1	49	22.13	22.23	22.31		2
	25	0	21.10	21.21	21.18	0-3	3
	25	12	21.10	21.23	21.22		3
	25	25	21.11	21.22	21.12		3
	50	0	21.09	21.33	21.23		3

Table 9-24
LTE Band 4 (AWS) Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 4 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 19975 (1712.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20375 (1752.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.30	24.28	24.38	0	0
	1	12	24.40	24.38	24.42		0
	1	24	24.33	24.34	24.34		0
	12	0	23.43	23.50	23.45	0-1	1
	12	6	23.48	23.54	23.47		1
	12	13	23.47	23.50	23.46		1
	25	0	23.46	23.45	23.47		1
16QAM	1	0	23.60	23.51	23.64	0-1	1
	1	12	23.71	23.56	23.65		1
	1	24	23.68	23.57	23.59		1
	12	0	22.37	22.46	22.48	0-2	2
	12	6	22.46	22.50	22.50		2
	12	13	22.42	22.51	22.47		2
	25	0	22.41	22.47	22.51		2
64QAM	1	0	22.06	22.30	22.32	0-2	2
	1	12	22.18	22.37	22.34		2
	1	24	22.17	22.35	22.31		2
	12	0	21.09	21.30	21.34	0-3	3
	12	6	21.20	21.36	21.36		3
	12	13	21.23	21.35	21.31		3
	25	0	21.11	21.21	21.28		3

Table 9-25
LTE Band 4 (AWS) Maximum Conducted Powers - 3 MHz Bandwidth

LTE Band 4 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 19965 (1711.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20385 (1753.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.35	24.40	24.26	0	0
	1	7	24.31	24.41	24.31		0
	1	14	24.38	24.41	24.21		0
	8	0	23.46	23.55	23.44	0-1	1
	8	4	23.47	23.54	23.43		1
	8	7	23.42	23.52	23.42		1
	15	0	23.46	23.48	23.44		1
16QAM	1	0	23.45	23.95	23.61	0-1	1
	1	7	23.46	23.91	23.62		1
	1	14	23.45	23.96	23.55		1
	8	0	22.42	22.62	22.61	0-2	2
	8	4	22.43	22.65	22.48		2
	8	7	22.39	22.63	22.45		2
	15	0	22.46	22.58	22.85		2
64QAM	1	0	22.15	22.38	22.39	0-2	2
	1	7	22.17	22.40	22.35		2
	1	14	22.18	22.35	22.37		2
	8	0	20.62	21.32	21.30	0-3	3
	8	4	21.15	21.37	21.29		3
	8	7	21.10	21.30	21.25		3
	15	0	21.07	21.26	21.24		3

Table 9-26
LTE Band 4 (AWS) Maximum Conducted Powers -1.4 MHz Bandwidth

LTE Band 4 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 19957 (1710.7 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20393 (1754.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.22	24.43	24.14	0	0
	1	2	24.34	24.52	24.22		0
	1	5	24.26	24.47	24.12		0
	3	0	24.31	24.41	24.31		0
	3	2	24.39	24.47	24.39		0
	3	3	24.31	24.40	24.32		0
	6	0	23.41	23.40	23.69	0-1	1
16QAM	1	0	23.36	23.31	23.51	0-1	1
	1	2	23.49	23.38	23.57		1
	1	5	23.41	23.32	23.50		1
	3	0	23.34	23.46	23.21		1
	3	2	23.37	23.53	23.26		1
	3	3	23.33	23.50	23.24		1
	6	0	22.40	22.59	22.46	0-2	2
64QAM	1	0	21.99	22.13	22.22	0-2	2
	1	2	22.13	22.27	22.34		2
	1	5	22.09	22.24	22.25		2
	3	0	22.00	22.16	22.16		2
	3	2	22.05	22.23	22.21		2
	3	3	21.97	22.14	22.22		2
	6	0	20.96	21.18	21.13	0-3	3

Table 9-27
LTE Band 4 (AWS) Hotspot Reduced Conducted Powers - 20 MHz Bandwidth

LTE Band 4 (AWS) 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20175 (1732.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**20.97**	0	0
	1	50	20.88		0
	1	99	20.76		0
	50	0	20.79	0-1	0
	50	25	**20.80**		0
	50	50	20.75		0
	100	0	20.77		0
16QAM	1	0	20.95	0-1	0
	1	50	20.71		0
	1	99	20.75		0
	50	0	20.86	0-2	0
	50	25	20.84		0
	50	50	20.85		0
	100	0	20.81		0
64QAM	1	0	20.95	0-2	0
	1	50	20.74		0
	1	99	20.75		0
	50	0	20.89	0-3	0
	50	25	20.89		0
	50	50	20.85		0
	100	0	20.87		0

Note: LTE Band 4 (AWS) at 20 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 9-28
LTE Band 4 (AWS) Hotspot Reduced Conducted Powers - 15 MHz Bandwidth

LTE Band 4 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20025 (1717.5 MHz)	20175 (1732.5 MHz)	20325 (1747.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.32	20.95	20.63	0	0
	1	36	20.69	20.87	20.84		0
	1	74	20.14	20.76	20.52		0
	36	0	20.51	20.85	20.87	0-1	0
	36	18	20.65	20.94	20.94		0
	36	37	20.52	20.86	20.54		0
	75	0	20.55	20.81	20.61		0
16QAM	1	0	20.59	20.76	20.85	0-1	0
	1	36	20.79	20.79	20.90		0
	1	74	20.70	20.73	20.74		0
	36	0	20.53	20.76	20.51	0-2	0
	36	18	20.68	20.84	20.62		0
	36	37	20.55	20.72	20.54		0
	75	0	20.56	20.70	20.50		0
64QAM	1	0	20.63	20.90	20.57	0-2	0
	1	36	20.64	20.87	20.87		0
	1	74	20.55	20.72	20.65		0
	36	0	20.52	20.68	20.87	0-3	0
	36	18	20.61	20.81	20.91		0
	36	37	20.50	20.69	20.50		0
	75	0	20.50	20.68	20.51		0

Table 9-29
LTE Band 4 (AWS) Hotspot Reduced Conducted Powers - 10 MHz Bandwidth

LTE Band 4 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20000 (1715.0 MHz)	20175 (1732.5 MHz)	20350 (1750.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.36	20.77	20.64	0	0
	1	25	20.71	20.43	20.85		0
	1	49	20.34	20.70	20.72		0
	25	0	20.96	20.76	20.92	0-1	0
	25	12	20.58	20.78	20.82		0
	25	25	20.77	20.76	20.88		0
	50	0	20.78	20.78	20.91		0
16QAM	1	0	20.65	20.94	20.69	0-1	0
	1	25	20.47	20.74	20.69		0
	1	49	20.70	20.89	20.59		0
	25	0	20.77	20.61	20.93	0-2	0
	25	12	20.39	20.64	20.82		0
	25	25	20.32	20.63	20.89		0
	50	0	20.46	20.62	20.90		0
64QAM	1	0	20.61	20.88	20.57	0-2	0
	1	25	20.69	20.69	20.85		0
	1	49	20.66	20.87	20.52		0
	25	0	20.92	20.66	20.91	0-3	0
	25	12	20.89	20.62	20.82		0
	25	25	20.65	20.61	20.88		0
	50	0	20.69	20.64	20.92		0

Table 9-30
LTE Band 4 (AWS) Hotspot Reduced Conducted Powers - 5 MHz Bandwidth

LTE Band 4 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 19975 (1712.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20375 (1752.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.62	20.89	20.93	0	0
	1	12	20.90	20.86	20.82		0
	1	24	20.71	20.88	20.86		0
	12	0	20.88	20.86	20.87	0-1	0
	12	6	20.92	20.88	20.84		0
	12	13	20.95	20.83	20.84		0
	25	0	20.95	20.72	20.92		0
16QAM	1	0	20.89	20.82	20.91	0-1	0
	1	12	20.83	20.98	20.94		0
	1	24	20.97	20.81	20.85		0
	12	0	20.97	20.79	20.82	0-2	0
	12	6	20.90	20.86	20.99		0
	12	13	20.94	20.75	20.97		0
	25	0	20.95	20.62	20.95		0
64QAM	1	0	20.83	20.76	20.92	0-2	0
	1	12	20.88	20.95	20.96		0
	1	24	20.90	20.77	20.91		0
	12	0	20.94	20.78	20.96	0-3	0
	12	6	20.87	20.82	20.93		0
	12	13	20.98	20.71	20.95		0
	25	0	20.92	20.65	20.93		0

Table 9-31
LTE Band 4 (AWS) Hotspot Reduced Conducted Powers - 3 MHz Bandwidth

LTE Band 4 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 19965 (1711.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20385 (1753.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.49	20.92	20.74	0	0
	1	7	20.60	20.93	20.92		0
	1	14	20.54	20.95	20.65		0
	8	0	20.62	20.97	20.77	0-1	0
	8	4	20.72	20.91	20.80		0
	8	7	20.71	20.98	20.76		0
	15	0	20.70	20.90	20.80		0
16QAM	1	0	20.74	20.96	20.94	0-1	0
	1	7	20.90	20.98	20.88		0
	1	14	20.87	20.94	20.85		0
	8	0	20.79	20.97	20.93	0-2	0
	8	4	20.87	20.89	20.92		0
	8	7	20.85	20.85	20.91		0
	15	0	20.80	20.81	20.90		0
64QAM	1	0	20.81	20.88	20.94	0-2	0
	1	7	20.92	20.92	20.88		0
	1	14	20.85	20.87	20.95		0
	8	0	20.73	20.87	20.98	0-3	0
	8	4	20.84	20.93	20.93		0
	8	7	20.80	20.95	20.90		0
	15	0	20.82	20.98	20.90		0

Table 9-32
LTE Band 4 (AWS) Hotspot Reduced Conducted Powers -1.4 MHz Bandwidth

LTE Band 4 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			19957 (1710.7 MHz)	20175 (1732.5 MHz)	20393 (1754.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.62	20.73	20.71	0	0
	1	2	20.54	20.72	20.42		0
	1	5	20.41	20.64	20.59		0
	3	0	20.49	20.69	20.62		0
	3	2	20.47	20.74	20.76		0
	3	3	20.35	20.66	20.71		0
	6	0	20.46	20.79	20.87	0-1	0
16QAM	1	0	20.63	20.93	20.95	0-1	0
	1	2	20.76	20.92	20.84		0
	1	5	20.66	20.86	20.86		0
	3	0	20.55	20.92	20.91		0
	3	2	20.57	20.90	20.96		0
	3	3	20.50	20.84	20.89		0
	6	0	20.55	20.92	20.91	0-2	0
64QAM	1	0	20.68	20.92	20.82	0-2	0
	1	2	20.80	20.89	20.95		0
	1	5	20.69	20.92	20.97		0
	3	0	20.62	20.94	20.93		0
	3	2	20.65	20.88	20.95		0
	3	3	20.63	20.94	20.88		0
	6	0	20.56	20.93	20.86	0-3	0

Table 9-33
LTE Band 4 (AWS) Grip Sensor Conducted Powers - 20 MHz Bandwidth

LTE Band 4 (AWS) 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20175 (1732.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**21.42**	0	0
	1	50	21.27		0
	1	99	21.24		0
	50	0	**21.31**	0-1	0
	50	25	21.29		0
	50	50	21.30		0
	100	0	21.27		0
16QAM	1	0	21.47	0-1	0
	1	50	21.29		0
	1	99	21.26		0
	50	0	21.37	0-2	0
	50	25	21.36		0
	50	50	21.31		0
	100	0	21.32		0
64QAM	1	0	21.45	0-2	0
	1	50	21.30		0
	1	99	21.26		0
	50	0	21.44	0-3	0
	50	25	21.43		0
	50	50	21.38		0
	100	0	21.37		0

Note: LTE Band 4 (AWS) at 20 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 9-34
LTE Band 4 (AWS) Grip Sensor Conducted Powers - 15 MHz Bandwidth

LTE Band 4 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20025 (1717.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20325 (1747.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	21.41	21.45	21.35	0	0
	1	36	21.30	21.35	21.21		0
	1	74	21.41	21.33	21.32		0
	36	0	21.46	21.48	21.41	0-1	0
	36	18	21.48	21.46	21.39		0
	36	37	21.47	21.50	21.36		0
	75	0	21.46	21.44	21.41		0
16QAM	1	0	21.49	21.49	21.45	0-1	0
	1	36	21.45	21.47	21.29		0
	1	74	21.43	21.45	21.34		0
	36	0	21.50	21.49	21.21	0-2	0
	36	18	21.46	21.48	21.43		0
	36	37	21.44	21.48	21.35		0
	75	0	21.49	21.50	21.40		0
64QAM	1	0	21.49	21.50	21.48	0-2	0
	1	36	21.45	21.49	21.38		0
	1	74	21.47	21.46	21.47		0
	36	0	21.47	21.49	21.36	0-3	0
	36	18	21.44	21.48	21.43		0
	36	37	21.41	21.43	21.40		0
	75	0	21.41	21.48	21.37		0

Table 9-35
LTE Band 4 (AWS) Grip Sensor Conducted Powers - 10 MHz Bandwidth

LTE Band 4 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20000 (1715.0 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20350 (1750.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	21.15	21.21	21.21	0	0
	1	25	21.13	21.22	21.10		0
	1	49	21.05	21.20	21.14		0
	25	0	21.23	21.32	21.21	0-1	0
	25	12	21.25	21.32	21.23		0
	25	25	21.20	21.26	21.20		0
	50	0	21.25	21.31	21.21		0
16QAM	1	0	21.22	21.33	21.17	0-1	0
	1	25	21.19	21.32	21.23		0
	1	49	21.15	21.22	21.14		0
	25	0	21.23	21.28	21.23	0-2	0
	25	12	21.23	21.31	21.18		0
	25	25	21.20	21.25	21.16		0
	50	0	21.20	21.29	21.16		0
64QAM	1	0	21.36	21.49	21.37	0-2	0
	1	25	21.36	21.41	21.37		0
	1	49	21.32	21.39	21.32		0
	25	0	21.22	21.30	21.26	0-3	0
	25	12	21.25	21.30	21.33		0
	25	25	21.24	21.27	21.23		0
	50	0	21.24	21.30	21.20		0

Table 9-36
LTE Band 4 (AWS) Grip Sensor Conducted Powers - 5 MHz Bandwidth

LTE Band 4 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 19975 (1712.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20375 (1752.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	21.25	21.35	21.34	0	0
	1	12	21.37	21.46	21.36		0
	1	24	21.33	21.32	21.31		0
	12	0	21.36	21.42	21.36	0-1	0
	12	6	21.43	21.50	21.37		0
	12	13	21.42	21.46	21.33		0
	25	0	21.39	21.40	21.38		0
16QAM	1	0	21.28	21.42	21.24	0-1	0
	1	12	21.41	21.48	21.31		0
	1	24	21.35	21.42	21.28		0
	12	0	21.34	21.40	21.32	0-2	0
	12	6	21.43	21.50	21.35		0
	12	13	21.39	21.47	21.28		0
	25	0	21.38	21.40	21.32		0
64QAM	1	0	21.40	21.49	21.47	0-2	0
	1	12	21.48	21.50	21.47		0
	1	24	21.48	21.47	21.46		0
	12	0	21.40	21.49	21.44	0-3	0
	12	6	21.50	21.50	21.47		0
	12	13	21.45	21.49	21.43		0
	25	0	21.45	21.40	21.41		0

Table 9-37
LTE Band 4 (AWS) Grip Sensor Conducted Powers - 3 MHz Bandwidth

LTE Band 4 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 19965 (1711.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20385 (1753.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	21.42	21.47	21.40	0	0
	1	7	21.38	21.39	21.35		0
	1	14	21.41	21.39	21.47		0
	8	0	21.33	21.43	21.38	0-1	0
	8	4	21.43	21.47	21.42		0
	8	7	21.46	21.42	21.39		0
	15	0	21.47	21.48	21.43		0
16QAM	1	0	21.38	21.42	21.45	0-1	0
	1	7	21.45	21.44	21.39		0
	1	14	21.37	21.48	21.44		0
	8	0	21.42	21.45	21.42	0-2	0
	8	4	21.47	21.49	21.45		0
	8	7	21.46	21.49	21.41		0
	15	0	21.42	21.45	21.41		0
64QAM	1	0	21.49	21.50	21.45	0-2	0
	1	7	21.49	21.47	21.43		0
	1	14	21.50	21.49	21.47		0
	8	0	21.41	21.46	21.46	0-3	0
	8	4	21.50	21.47	21.50		0
	8	7	21.48	21.50	21.42		0
	15	0	21.50	21.44	21.45		0

Table 9-38
LTE Band 4 (AWS) Grip Sensor Conducted Powers -1.4 MHz Bandwidth

LTE Band 4 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			19957 (1710.7 MHz)	20175 (1732.5 MHz)	20393 (1754.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	21.24	21.41	21.28	0	0
	1	2	21.38	21.42	21.33		0
	1	5	21.31	21.40	21.25		0
	3	0	21.29	21.42	21.29		0
	3	2	21.35	21.45	21.31		0
	3	3	21.32	21.38	21.27		0
	6	0	21.41	21.48	21.39	0-1	0
16QAM	1	0	21.30	21.44	21.41	0-1	0
	1	2	21.46	21.49	21.37		0
	1	5	21.41	21.43	21.36		0
	3	0	21.44	21.45	21.37		0
	3	2	21.40	21.49	21.41		0
	3	3	21.47	21.50	21.33		0
	6	0	21.40	21.47	21.40	0-2	0
64QAM	1	0	21.47	21.49	21.46	0-2	0
	1	2	21.50	21.50	21.50		0
	1	5	21.48	21.49	21.44		0
	3	0	21.50	21.48	21.50		0
	3	2	21.49	21.45	21.45		0
	3	3	21.45	21.46	21.45		0
	6	0	21.48	21.47	21.42	0-3	0

9.3.6 LTE Band 25 (PCS)

Table 9-39
LTE Band 25 (PCS) Maximum 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	**24.16**	24.12	24.10	0	0
	1	50	23.83	23.64	23.62		0
	1	99	24.09	23.75	23.55		0
	50	0	**23.30**	23.24	23.07	0-1	1
	50	25	23.24	23.19	22.98		1
	50	50	23.23	22.64	22.86		1
	100	0	23.24	23.22	23.02		1
16QAM	1	0	23.42	23.35	23.15	0-1	1
	1	50	23.02	23.01	22.87		1
	1	99	23.33	23.07	22.89		1
	50	0	22.26	22.23	21.99	0-2	2
	50	25	22.23	22.22	22.01		2
	50	50	22.22	21.56	21.74		2
	100	0	22.25	22.21	22.00		2
64QAM	1	0	22.36	22.35	22.17	0-2	2
	1	50	21.78	22.02	21.60		2
	1	99	22.31	22.08	21.90		2
	50	0	21.29	21.25	21.06	0-3	3
	50	25	21.22	21.13	20.99		3
	50	50	21.20	20.69	20.87		3
	100	0	21.20	21.23	21.00		3

Table 9-40
LTE Band 25 (PCS) Maximum 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	24.35	24.26	24.06	0	0
	1	36	24.20	23.88	23.79		0
	1	74	24.19	23.50	23.88		0
	36	0	23.34	23.35	23.13	0-1	1
	36	18	23.31	22.97	23.06		1
	36	37	23.23	22.49	22.86		1
	75	0	23.30	23.02	23.10		1
16QAM	1	0	23.50	23.33	23.32	0-1	1
	1	36	23.39	23.26	23.24		1
	1	74	23.31	22.76	23.26		1
	36	0	22.33	22.20	22.10	0-2	2
	36	18	22.31	21.93	22.10		2
	36	37	22.24	21.42	21.81		2
	75	0	22.29	22.07	22.10		2
64QAM	1	0	22.50	22.33	22.28	0-2	2
	1	36	22.29	22.17	22.20		2
	1	74	22.26	21.71	22.21		2
	36	0	21.28	21.22	21.13	0-3	3
	36	18	21.23	21.02	21.11		3
	36	37	21.17	20.48	20.93		3
	75	0	21.22	21.01	21.08		3

Table 9-41
LTE Band 25 (PCS) Maximum Conducted Powers - 10 MHz Bandwidth

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	24.23	24.11	23.88	0	0
	1	25	24.16	23.63	23.50		0
	1	49	24.11	23.40	23.84		0
	25	0	23.22	23.12	22.93	0-1	1
	25	12	23.22	22.75	22.78		1
	25	25	23.13	22.55	22.94		1
	50	0	23.21	22.87	22.95		1
16QAM	1	0	23.48	23.36	23.12	0-1	1
	1	25	23.38	23.07	22.76		1
	1	49	23.37	22.70	23.10		1
	25	0	22.22	22.12	21.95	0-2	2
	25	12	22.21	21.78	21.80		2
	25	25	22.13	21.55	21.87		2
	50	0	22.20	21.79	21.90		2
64QAM	1	0	22.42	22.30	22.08	0-2	2
	1	25	22.31	22.08	21.61		2
	1	49	22.27	21.68	22.10		2
	25	0	21.20	21.10	20.95	0-3	3
	25	12	21.20	20.87	20.88		3
	25	25	21.14	20.55	20.89		3
	50	0	21.18	20.88	20.92		3

Table 9-42
LTE Band 25 (PCS) Maximum Conducted Powers - 5 MHz Bandwidth

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	24.22	23.97	23.69	0	0
	1	12	24.21	23.66	23.81		0
	1	24	24.13	23.50	23.86		0
	12	0	23.31	22.99	22.71	0-1	1
	12	6	23.35	22.79	22.87		1
	12	13	23.28	22.56	22.99		1
	25	0	23.30	22.61	22.81		1
16QAM	1	0	23.44	23.28	22.99	0-1	1
	1	12	23.45	23.06	23.07		1
	1	24	23.38	22.76	23.14		1
	12	0	22.26	21.98	21.88	0-2	2
	12	6	22.29	21.80	21.94		2
	12	13	22.21	21.58	21.87		2
	25	0	22.24	21.63	21.85		2
64QAM	1	0	22.36	22.22	22.00	0-2	2
	1	12	22.50	22.12	22.00		2
	1	24	22.28	21.82	21.99		2
	12	0	21.30	21.09	20.90	0-3	3
	12	6	21.30	20.91	20.93		3
	12	13	21.23	20.66	20.86		3
	25	0	21.25	20.77	20.85		3

Table 9-43
LTE Band 25 (PCS) Maximum 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	24.14	23.98	23.86	0	0
	1	7	24.09	23.95	23.84		0
	1	14	24.09	23.76	23.85		0
	8	0	23.24	23.05	22.91	0-1	1
	8	4	23.22	23.02	22.91		1
	8	7	23.18	22.87	22.92		1
	15	0	23.27	22.93	22.92		1
16QAM	1	0	23.34	23.28	23.14	0-1	1
	1	7	23.36	23.26	23.11		1
	1	14	23.34	23.11	23.16		1
	8	0	22.24	22.12	21.97	0-2	2
	8	4	22.23	22.05	21.97		2
	8	7	22.19	21.90	21.95		2
	15	0	22.16	21.88	21.90		2
64QAM	1	0	22.34	22.23	22.05	0-2	2
	1	7	22.29	22.19	21.98		2
	1	14	22.25	22.21	22.05		2
	8	0	21.22	21.11	20.94	0-3	3
	8	4	21.23	21.12	20.97		3
	8	7	21.19	20.95	20.92		3
	15	0	21.22	21.05	20.88		3

Table 9-44
LTE Band 25 (PCS) Maximum 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	24.12	23.88	23.76	0	0
	1	2	24.19	23.88	23.87		0
	1	5	24.06	23.71	23.77		0
	3	0	24.06	23.93	23.82		0
	3	2	24.16	23.88	23.85		0
	3	3	24.06	23.79	23.80		0
	6	0	23.21	22.95	22.89	0-1	1
16QAM	1	0	23.36	23.22	23.12	0-1	1
	1	2	23.41	23.22	23.18		1
	1	5	23.33	23.05	23.11		1
	3	0	23.29	23.13	22.98		1
	3	2	23.32	23.09	23.04		1
	3	3	23.23	23.01	22.99		1
	6	0	22.25	21.88	21.95	0-2	2
64QAM	1	0	22.34	22.17	22.01	0-2	2
	1	2	22.37	22.26	22.09		2
	1	5	22.29	22.11	22.02		2
	3	0	22.30	22.19	21.99		2
	3	2	22.32	22.21	22.06		2
	3	3	22.32	22.09	22.01		2
	6	0	21.17	20.88	20.86	0-3	3

Table 9-45
LTE Band 25 (PCS) Hotspot Reduced 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	20.14	**20.34**	20.17	0	0
	1	50	19.70	20.00	19.75		0
	1	99	20.10	20.27	20.02		0
	50	0	20.32	**20.35**	20.19	0-1	0
	50	25	20.34	20.33	20.15		0
	50	50	20.30	20.26	20.10		0
	100	0	20.33	20.29	20.16		0
16QAM	1	0	20.50	20.43	20.35	0-1	0
	1	50	19.91	19.91	19.85		0
	1	99	20.42	20.38	20.33		0
	50	0	20.32	20.24	20.10	0-2	0
	50	25	20.30	20.25	20.09		0
	50	50	20.23	20.20	20.11		0
	100	0	20.28	20.24	20.14		0
64QAM	1	0	20.50	20.39	20.47	0-2	0
	1	50	20.07	19.90	19.90		0
	1	99	20.48	20.34	20.47		0
	50	0	20.30	20.33	20.19	0-3	0
	50	25	20.27	20.32	20.16		0
	50	50	20.24	20.28	20.13		0
	100	0	20.26	20.24	20.09		0

Table 9-46
LTE Band 25 (PCS) Hotspot Reduced 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	20.36	20.31	20.29	0	0
	1	36	20.21	20.28	20.13		0
	1	74	20.25	20.29	20.24		0
	36	0	20.47	20.50	20.42	0-1	0
	36	18	20.47	20.49	20.38		0
	36	37	20.38	20.41	20.39		0
	75	0	20.41	20.47	20.41		0
16QAM	1	0	20.49	20.50	20.46	0-1	0
	1	36	20.46	20.49	20.38		0
	1	74	20.44	20.47	20.38		0
	36	0	20.34	20.45	20.48	0-2	0
	36	18	20.31	20.43	20.30		0
	36	37	20.33	20.38	20.31		0
	75	0	20.32	20.40	20.35		0
64QAM	1	0	20.39	20.50	20.41	0-2	0
	1	36	20.42	20.48	20.20		0
	1	74	20.40	20.47	20.42		0
	36	0	20.27	20.50	20.39	0-3	0
	36	18	20.43	20.47	20.34		0
	36	37	20.48	20.48	20.33		0
	75	0	20.36	20.48	20.32		0

Table 9-47
LTE Band 25 (PCS) Hotspot Reduced Conducted Powers - 10 MHz Bandwidth

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	20.27	20.26	20.09	0	0
	1	25	20.24	20.29	20.20		0
	1	49	20.11	20.22	20.04		0
	25	0	19.70	20.41	20.21	0-1	0
	25	12	20.35	20.43	20.27		0
	25	25	20.26	20.37	20.28		0
	50	0	20.30	20.40	20.21		0
16QAM	1	0	20.44	20.47	20.33	0-1	0
	1	25	20.39	20.50	20.02		0
	1	49	20.37	20.31	20.25		0
	25	0	20.22	20.32	20.18	0-2	0
	25	12	20.23	20.29	20.19		0
	25	25	20.17	20.23	20.13		0
	50	0	20.22	20.40	20.21		0
64QAM	1	0	20.41	20.43	20.32	0-2	0
	1	25	20.30	20.38	20.23		0
	1	49	20.31	20.40	20.21		0
	25	0	20.37	20.37	20.18	0-3	0
	25	12	20.14	20.35	20.18		0
	25	25	20.25	20.29	20.10		0
	50	0	20.25	20.36	20.15		0

Table 9-48
LTE Band 25 (PCS) Hotspot Reduced Conducted Powers - 5 MHz Bandwidth

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	20.22	20.23	20.20	0	0
	1	12	20.30	20.29	20.22		0
	1	24	20.22	20.25	20.18		0
	12	0	20.49	20.37	20.29	0-1	0
	12	6	20.43	20.50	20.30		0
	12	13	20.41	20.40	20.28		0
	25	0	20.39	20.38	20.34		0
16QAM	1	0	20.40	20.44	20.29	0-1	0
	1	12	20.43	20.42	20.28		0
	1	24	20.35	20.41	20.30		0
	12	0	20.37	20.35	20.46	0-2	0
	12	6	20.39	20.50	20.37		0
	12	13	20.38	20.42	20.22		0
	25	0	20.27	20.27	20.19		0
64QAM	1	0	20.42	20.46	20.35	0-2	0
	1	12	20.39	20.48	20.33		0
	1	24	20.33	20.45	20.41		0
	12	0	20.39	20.36	20.36	0-3	0
	12	6	20.45	20.48	20.28		0
	12	13	20.34	20.37	20.17		0
	25	0	20.33	20.29	20.33		0

Table 9-49
LTE Band 25 (PCS) Hotspot Reduced Conducted Powers - 3 MHz Bandwidth

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26055 (1851.5 MHz)	26365 (1882.5 MHz)	26675 (1913.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.35	20.40	20.22	0	0
	1	7	20.25	20.32	20.14		0
	1	14	20.27	20.26	20.13		0
	8	0	20.33	20.44	20.28	0-1	0
	8	4	20.37	20.34	20.34		0
	8	7	20.39	20.41	20.24		0
	15	0	20.41	20.50	20.30		0
16QAM	1	0	20.45	20.40	20.45	0-1	0
	1	7	20.42	20.49	20.35		0
	1	14	20.48	20.46	20.45		0
	8	0	20.38	20.45	20.50	0-2	0
	8	4	20.44	20.33	20.09		0
	8	7	20.32	20.43	20.31		0
	15	0	20.38	20.46	20.25		0
64QAM	1	0	20.46	20.48	20.37	0-2	0
	1	7	20.35	20.45	20.29		0
	1	14	20.42	20.48	20.38		0
	8	0	20.45	20.46	20.50	0-3	0
	8	4	20.39	20.43	20.32		0
	8	7	20.34	20.47	20.26		0
	15	0	20.37	20.48	20.36		0

Table 9-50
LTE Band 25 (PCS) Hotspot Reduced Conducted Powers -1.4 MHz Bandwidth

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26047 (1850.7 MHz)	26365 (1882.5 MHz)	26683 (1914.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.21	20.27	20.11	0	0
	1	2	20.27	20.33	20.13		0
	1	5	20.19	20.25	20.10		0
	3	0	20.26	20.29	20.13		0
	3	2	20.24	20.37	20.18		0
	3	3	20.22	20.23	20.11		0
	6	0	20.33	20.33	20.21	0-1	0
16QAM	1	0	20.47	20.45	20.33	0-1	0
	1	2	20.38	20.49	20.25		0
	1	5	20.39	20.37	20.26		0
	3	0	20.20	20.33	20.12		0
	3	2	20.31	20.15	20.22		0
	3	3	20.21	20.22	20.29		0
	6	0	20.26	20.20	20.18	0-2	0
64QAM	1	0	20.35	20.46	20.35	0-2	0
	1	2	20.40	20.23	20.27		0
	1	5	20.07	20.45	20.35		0
	3	0	20.35	20.37	20.25		0
	3	2	20.34	20.39	20.11		0
	3	3	20.32	20.20	20.19		0
	6	0	20.25	20.30	20.16	0-3	0

Table 9-51
LTE Band 25 (PCS) Grip Sensor 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	21.32	**21.40**	21.32	0	0
	1	50	20.85	20.91	20.78		0
	1	99	21.31	21.37	21.31		0
	50	0	21.46	**21.47**	21.34	0-1	0
	50	25	21.44	21.43	21.32		0
	50	50	21.41	21.40	21.27		0
	100	0	21.39	21.39	21.28		0
16QAM	1	0	21.50	21.50	21.50	0-1	0
	1	50	21.05	20.94	21.02		0
	1	99	21.50	21.49	21.45		0
	50	0	21.49	21.46	21.35	0-2	0
	50	25	21.47	21.48	21.32		0
	50	50	21.48	21.49	21.28		0
	100	0	21.47	21.40	21.32		0
64QAM	1	0	21.45	21.46	21.20	0-2	0
	1	50	20.78	21.00	20.51		0
	1	99	21.39	21.49	21.22		0
	50	0	21.16	21.17	20.99	0-3	0
	50	25	21.12	21.14	20.96		0
	50	50	21.08	20.51	20.86		0
	100	0	21.10	21.07	20.94		0

Table 9-52
LTE Band 25 (PCS) Grip Sensor 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	21.27	21.27	21.24	0	0
	1	36	21.10	21.31	21.27		0
	1	74	21.14	21.19	21.15		0
	36	0	21.36	21.45	21.42	0-1	0
	36	18	21.39	21.49	21.37		0
	36	37	21.32	21.46	21.30		0
	75	0	21.33	21.48	21.36		0
16QAM	1	0	21.32	21.46	21.44	0-1	0
	1	36	21.50	21.43	21.50		0
	1	74	21.30	21.46	21.30		0
	36	0	21.39	21.41	21.41	0-2	0
	36	18	21.35	21.50	21.34		0
	36	37	21.34	21.49	21.40		0
	75	0	21.46	21.45	21.33		0
64QAM	1	0	21.05	21.24	21.13	0-2	0
	1	36	21.05	21.24	21.25		0
	1	74	20.88	21.12	21.12		0
	36	0	21.03	21.22	21.22	0-3	0
	36	18	21.07	21.13	21.14		0
	36	37	21.05	20.65	21.05		0
	75	0	21.07	21.14	21.13		0

Table 9-53
LTE Band 25 (PCS) Grip Sensor Conducted Powers - 10 MHz Bandwidth

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	21.31	21.38	21.15	0	0
	1	25	21.35	21.33	21.02		0
	1	49	21.11	21.26	21.12		0
	25	0	21.43	21.42	21.27	0-1	0
	25	12	21.44	21.40	21.27		0
	25	25	21.33	21.34	21.20		0
	50	0	21.37	21.47	21.31		0
16QAM	1	0	21.46	21.50	21.44	0-1	0
	1	25	21.42	21.48	21.40		0
	1	49	21.41	21.44	21.33		0
	25	0	21.43	21.44	21.26	0-2	0
	25	12	21.06	21.48	21.32		0
	25	25	21.33	21.37	21.30		0
	50	0	21.41	21.39	21.24		0
64QAM	1	0	20.73	21.25	21.25	0-2	0
	1	25	21.26	21.17	20.75		0
	1	49	21.21	21.12	21.04		0
	25	0	21.26	21.15	21.01	0-3	0
	25	12	21.22	20.93	20.92		0
	25	25	21.15	20.62	20.92		0
	50	0	21.18	20.97	20.91		0

Table 9-54
LTE Band 25 (PCS) Grip Sensor Conducted Powers - 5 MHz Bandwidth

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	21.27	21.15	21.11	0	0
	1	12	21.34	21.20	21.21		0
	1	24	21.17	21.24	21.08		0
	12	0	21.41	21.39	21.24	0-1	0
	12	6	21.39	21.43	21.23		0
	12	13	21.45	21.36	21.21		0
	25	0	21.42	21.38	21.23		0
16QAM	1	0	21.50	21.50	21.47	0-1	0
	1	12	21.48	21.48	21.50		0
	1	24	21.35	21.42	21.47		0
	12	0	21.36	21.45	21.32	0-2	0
	12	6	21.44	21.34	21.34		0
	12	13	21.42	21.50	21.37		0
	25	0	21.37	21.40	21.23		0
64QAM	1	0	21.21	21.23	21.19	0-2	0
	1	12	21.29	21.21	21.24		0
	1	24	21.22	21.16	21.11		0
	12	0	21.24	21.05	20.98	0-3	0
	12	6	21.20	21.22	21.15		0
	12	13	21.16	21.03	20.92		0
	25	0	21.22	20.98	20.93		0

Table 9-55
LTE Band 25 (PCS) Grip Sensor 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	21.28	21.33	21.14	0	0
	1	7	21.25	21.34	21.12		0
	1	14	21.13	21.36	21.23		0
	8	0	21.33	21.37	21.24	0-1	0
	8	4	21.34	21.42	21.25		0
	8	7	21.29	21.38	21.23		0
	15	0	21.44	21.45	21.26		0
16QAM	1	0	21.45	21.50	21.26	0-1	0
	1	7	21.44	21.49	21.25		0
	1	14	21.39	21.48	21.33		0
	8	0	21.37	21.42	21.32	0-2	0
	8	4	21.43	21.44	21.35		0
	8	7	21.40	21.43	21.27		0
	15	0	21.41	21.35	21.25		0
64QAM	1	0	21.36	21.27	21.03	0-2	0
	1	7	21.25	21.12	20.98		0
	1	14	21.27	21.25	20.97		0
	8	0	21.18	21.16	21.03	0-3	0
	8	4	21.08	21.10	20.93		0
	8	7	21.02	21.06	20.95		0
	15	0	21.20	21.06	20.96		0

Table 9-56
LTE Band 25 (PCS) Grip Sensor 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	21.25	21.17	21.15	0	0
	1	2	21.28	21.32	21.20		0
	1	5	21.20	21.15	21.10		0
	3	0	21.19	21.22	21.01		0
	3	2	21.21	21.23	21.10		0
	3	3	21.15	21.16	21.07		0
	6	0	21.33	21.30	21.15	0-1	0
16QAM	1	0	21.37	21.36	21.21	0-1	0
	1	2	21.36	21.35	21.45		0
	1	5	21.38	21.45	21.20		0
	3	0	21.35	21.34	21.29		0
	3	2	21.33	21.42	21.26		0
	3	3	21.31	21.17	21.27		0
	6	0	20.88	21.33	21.15	0-2	0
64QAM	1	0	21.16	21.10	21.05	0-2	0
	1	2	21.18	21.22	21.13		0
	1	5	21.22	21.13	21.00		0
	3	0	21.20	21.06	20.88		0
	3	2	21.15	21.14	20.94		0
	3	3	21.27	21.10	20.87		0
	6	0	21.24	21.00	20.87	0-3	0

9.3.7 LTE Band 41

Table 9-57
LTE Band 41 Maximum 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	24.37	**24.45**	24.11	24.14	24.12	0	0
	1	50	24.18	24.14	23.86	23.88	23.97		0
	1	99	24.42	24.29	23.84	23.84	23.98		0
	50	0	23.67	**23.72**	23.28	23.35	23.37	0-1	1
	50	25	23.66	23.65	23.19	23.22	23.29		1
	50	50	23.63	23.59	23.11	23.15	23.22		1
	100	0	23.63	23.64	23.20	23.23	23.26		1
16QAM	1	0	23.53	23.54	23.18	23.15	23.18	0-1	1
	1	50	23.28	23.21	22.93	22.91	23.04		1
	1	99	23.46	23.41	22.86	22.83	23.03		1
	50	0	22.66	22.68	22.26	22.34	22.32	0-2	2
	50	25	22.66	22.65	22.20	22.19	22.26		2
	50	50	22.65	22.58	22.11	22.12	22.20		2
	100	0	22.67	22.65	22.18	22.21	22.27		2
64QAM	1	0	22.25	22.29	21.88	21.87	21.92	0-2	2
	1	50	21.95	21.99	21.64	21.56	21.78		2
	1	99	22.18	22.10	21.56	21.54	21.72		2
	50	0	21.71	21.73	21.29	21.32	21.33	0-3	3
	50	25	21.69	21.67	21.17	21.20	21.30		3
	50	50	21.65	21.57	21.15	21.12	21.22		3
	100	0	21.65	21.63	21.15	21.16	21.25		3

Table 9-58
LTE Band 41 Maximum 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	24.48	24.57	24.45	24.23	24.36	0	0
	1	36	24.37	24.43	24.17	24.12	24.26		0
	1	74	24.49	24.55	24.29	24.13	24.17		0
	36	0	23.71	23.75	23.31	23.33	23.37	0-1	1
	36	18	23.65	23.74	23.24	23.27	23.36		1
	36	37	23.70	23.69	23.33	23.33	23.30		1
	75	0	23.76	23.65	23.29	23.27	23.37		1
16QAM	1	0	23.68	23.56	23.25	23.19	23.13	0-1	1
	1	36	23.56	23.44	23.10	23.01	23.15		1
	1	74	23.47	23.46	23.13	22.86	23.27		1
	36	0	22.62	22.62	22.23	22.25	22.32	0-2	2
	36	18	22.65	22.65	22.22	22.27	22.26		2
	36	37	22.55	22.52	22.22	22.20	22.19		2
	75	0	22.62	22.57	22.27	22.25	22.33		2
64QAM	1	0	22.54	22.43	22.02	22.07	22.12	0-2	2
	1	36	22.42	22.32	21.85	21.88	22.04		2
	1	74	22.43	22.33	21.90	21.81	22.01		2
	36	0	21.72	21.72	21.23	21.20	21.34	0-3	3
	36	18	21.69	21.69	21.33	21.20	21.28		3
	36	37	21.59	21.64	21.26	21.28	21.27		3
	75	0	21.71	21.60	21.29	21.24	21.28		3

Table 9-59
LTE Band 41 Maximum 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	24.50	24.42	24.02	24.14	24.05	0	0
	1	25	24.32	24.41	24.09	24.19	24.11		0
	1	49	24.47	24.51	24.07	24.12	23.95		0
	25	0	23.76	23.57	23.25	23.17	23.27	0-1	1
	25	12	23.61	23.52	23.28	23.12	23.22		1
	25	25	23.67	23.56	23.17	23.22	23.25		1
	50	0	23.71	23.51	23.14	23.20	23.16		1
16QAM	1	0	23.35	23.49	23.13	23.06	23.06	0-1	1
	1	25	23.46	23.33	22.89	23.08	23.17		1
	1	49	23.34	23.33	22.95	22.93	23.02		1
	25	0	22.67	22.62	22.05	22.18	22.26	0-2	2
	25	12	22.63	22.57	22.10	22.17	22.21		2
	25	25	22.67	22.51	22.16	22.18	22.15		2
	50	0	22.64	22.54	22.15	22.24	22.23		2
64QAM	1	0	22.42	22.35	21.85	21.88	21.98	0-2	2
	1	25	21.88	22.21	21.75	21.87	21.94		2
	1	49	22.23	22.30	21.79	21.70	21.85		2
	25	0	21.61	21.51	21.07	21.09	21.15	0-3	3
	25	12	21.57	21.52	21.11	21.10	21.22		3
	25	25	21.52	21.47	21.05	21.10	21.16		3
	50	0	21.66	21.56	21.17	21.24	21.22		3

Table 9-60
LTE Band 41 Maximum 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	24.58	24.57	24.06	24.03	24.08	0	0
	1	12	24.57	24.55	24.05	24.09	24.15		0
	1	24	24.62	24.51	24.04	24.08	24.07		0
	12	0	23.67	23.63	23.65	23.15	23.24	0-1	1
	12	6	23.69	23.64	23.20	23.25	23.25		1
	12	13	23.68	23.63	23.15	23.17	23.27		1
	25	0	23.73	23.52	23.20	23.12	23.22		1
16QAM	1	0	23.65	23.49	23.09	22.97	23.14	0-1	1
	1	12	23.59	23.14	23.13	23.05	23.22		1
	1	24	23.56	23.46	23.04	23.06	23.16		1
	12	0	22.62	22.45	22.13	22.08	22.07	0-2	2
	12	6	22.64	22.53	22.09	22.13	22.18		2
	12	13	22.62	22.47	22.02	22.07	22.21		2
	25	0	22.74	22.64	22.19	22.23	22.23		2
64QAM	1	0	22.52	22.34	21.91	21.81	21.97	0-2	2
	1	12	22.39	22.35	21.90	21.93	22.00		2
	1	24	22.45	22.24	21.91	21.84	21.93		2
	12	0	21.58	21.56	21.12	21.05	21.12	0-3	3
	12	6	21.65	21.53	21.12	21.17	21.13		3
	12	13	21.62	21.47	21.16	21.12	21.19		3
	25	0	21.63	21.51	21.15	21.18	21.18		3

Table 9-61
LTE Band 41 Hotspot/Grip Sensor 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	22.48	22.43	22.13	22.13	22.11	0	0
	1	50	22.23	22.07	21.91	21.87	21.97		0
	1	99	**22.54**	22.28	21.81	21.83	21.95		0
	50	0	22.71	22.67	22.24	22.33	22.33	0-1	0
	50	25	22.66	22.57	22.19	22.20	22.28		0
	50	50	**22.73**	22.53	22.12	22.13	22.22		0
	100	0	22.53	22.42	22.16	22.21	22.28		0
16QAM	1	0	22.49	22.49	22.20	22.14	22.15	0-1	0
	1	50	22.17	22.15	21.92	21.88	22.05		0
	1	99	22.40	22.34	21.87	21.89	21.99		0
	50	0	22.65	22.65	22.26	22.31	22.32	0-2	0
	50	25	22.64	22.61	22.18	22.19	22.27		0
	50	50	22.63	22.57	22.12	22.14	22.21		0
	100	0	22.66	22.59	22.19	22.22	22.28		0
64QAM	1	0	22.25	22.21	21.92	21.90	21.90	0-2	0
	1	50	21.93	21.93	21.67	21.62	21.78		0
	1	99	22.14	22.07	21.54	21.56	21.73		0
	50	0	21.71	21.67	21.29	21.36	21.35	0-3	1
	50	25	21.68	21.71	21.21	21.23	21.30		1
	50	50	21.64	21.57	21.13	21.29	21.24		1
	100	0	21.64	21.58	21.17	21.19	21.27		1

Table 9-62
LTE Band 41 Hotspot/Grip Sensor 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	22.35	22.42	21.91	21.88	21.79	0	0
	1	36	22.29	22.25	21.77	21.73	21.73		0
	1	74	22.36	22.32	21.84	21.79	22.06		0
	36	0	22.54	22.43	22.05	21.97	22.15	0-1	0
	36	18	22.56	22.44	22.04	22.01	22.10		0
	36	37	22.54	22.40	22.00	21.98	22.12		0
	75	0	22.57	22.48	22.05	22.02	22.04		0
16QAM	1	0	22.41	22.40	21.96	21.91	22.11	0-1	0
	1	36	22.31	22.21	21.78	21.74	22.24		0
	1	74	22.32	22.27	21.84	21.77	22.10		0
	36	0	22.51	22.38	21.95	21.93	22.15	0-2	0
	36	18	22.49	22.39	21.96	21.94	22.09		0
	36	37	22.48	22.38	21.97	21.91	22.06		0
	75	0	22.57	22.45	22.20	22.01	22.11		0
64QAM	1	0	22.33	22.29	21.84	21.78	22.08	0-2	0
	1	36	22.25	22.17	21.68	21.62	21.98		0
	1	74	22.26	22.20	21.72	21.64	22.00		0
	36	0	21.55	21.47	21.04	21.02	21.16	0-3	1
	36	18	21.55	21.45	21.07	21.01	21.15		1
	36	37	21.53	21.41	21.02	20.97	21.08		1
	75	0	21.56	21.48	21.04	21.01	21.14		1

Table 9-63
LTE Band 41 Hotspot/Grip Sensor 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	22.28	22.25	21.74	21.68	21.80	0	0
	1	25	21.97	22.26	21.74	21.75	21.78		0
	1	49	22.25	22.27	21.71	21.62	21.67		0
	25	0	22.41	22.33	21.89	21.84	21.96	0-1	0
	25	12	22.41	22.35	21.90	21.88	21.93		0
	25	25	22.37	22.30	21.89	21.86	21.88		0
	50	0	22.45	22.37	21.94	21.92	21.97		0
16QAM	1	0	22.21	22.19	21.72	21.66	22.08	0-1	0
	1	25	22.02	22.16	21.77	21.72	21.93		0
	1	49	22.30	22.17	21.65	21.59	21.97		0
	25	0	22.41	22.34	21.93	21.89	21.98	0-2	0
	25	12	22.45	22.34	21.93	21.90	21.89		0
	25	25	22.43	22.33	21.93	21.88	21.92		0
	50	0	22.43	22.35	21.93	21.90	21.95		0
64QAM	1	0	22.13	21.99	21.72	21.62	21.89	0-2	0
	1	25	22.93	22.07	21.66	21.52	21.88		0
	1	49	22.04	21.98	21.64	21.50	21.90		0
	25	0	21.38	21.34	20.83	20.91	20.94	0-3	1
	25	12	21.34	21.35	20.86	20.90	20.90		1
	25	25	21.33	21.31	20.81	20.86	20.92		1
	50	0	21.47	21.34	20.93	20.89	21.01		1

Table 9-64
LTE Band 41 Hotspot/Grip Sensor 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	22.30	22.30	21.70	21.79	21.74	0	0
	1	12	22.31	22.29	21.83	21.84	21.86		0
	1	24	22.39	22.24	21.72	21.81	21.82		0
	12	0	22.42	22.31	21.95	21.81	21.95	0-1	0
	12	6	22.46	22.37	21.99	21.93	21.96		0
	12	13	22.42	22.32	21.86	21.87	21.99		0
	25	0	22.45	22.33	21.87	21.91	21.90		0
16QAM	1	0	22.35	22.18	21.87	21.69	22.01	0-1	0
	1	12	22.30	22.23	21.84	21.72	22.09		0
	1	24	22.28	22.16	21.73	21.71	22.06		0
	12	0	22.34	22.26	21.86	21.73	21.85	0-2	0
	12	6	22.37	22.28	21.88	21.84	21.92		0
	12	13	22.34	22.23	21.79	21.78	21.92		0
	25	0	22.46	22.39	21.98	21.94	21.95		0
64QAM	1	0	22.24	22.07	21.73	21.56	21.78	0-2	0
	1	12	22.21	22.13	21.75	21.64	21.90		0
	1	24	22.18	22.04	21.63	21.62	21.92		0
	12	0	21.40	21.27	20.89	20.76	20.89	0-3	1
	12	6	21.40	21.30	20.93	20.83	20.92		1
	12	13	21.34	21.26	20.81	20.80	20.93		1
	25	0	21.38	21.30	20.90	20.86	20.90		1

9.3.8 LTE Uplink Carrier Aggregation Conducted Powers

Table 9-65
LTE Uplink Carrier Aggregation Maximum Conducted Powers

Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL/DL) Channel	PCC (UL/DL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL/DL) Channel	SCC (UL/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_41C (1)	LTE B41	20	40185	2549.5	QPSK	1	0	LTE B41	20	39987	2529.7	QPSK	1	99	24.65	24.45

Table 9-66
LTE Uplink Carrier Aggregation Hotspot Reduced Conducted Powers

	PCC							SCC							Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL/DL) Channel	PCC (UL/DL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL/DL) Channel	SCC (UL/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_41C (1)	LTE B41	20	39750	2506	QPSK	100	0	LTE B41	20	39948	2525.8	QPSK	100	0	22.39	22.53

Table 9-67
LTE Uplink Carrier Aggregation Grip Reduced Conducted Powers

	PCC							SCC							Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL/DL) Channel	PCC (UL/DL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL/DL) Channel	SCC (UL/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_41C (1)	LTE B41	20	41490	2680.0	QPSK	50	0	LTE B41	20	41292	2660.2	QPSK	50	50	22.91	22.33

Notes:

1. This device supports uplink carrier aggregation for LTE CA_41C (1) with a maximum of two 20 MHz 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.

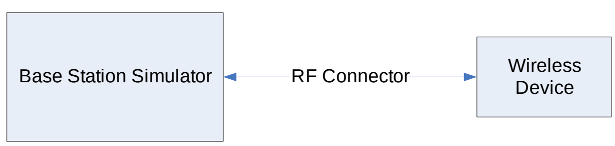

Figure 9-3
Power Measurement Setup

9.4 WLAN Conducted Powers

Table 9-68
2.4 GHz WLAN Maximum Average RF Power – Ant 1

2.4GHz Conducted Power [dBm]					
Freq [MHz]	Channel	IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ax
		Average	Average	Average	Average
2412	1	19.47	17.91	17.81	15.82
2437	6	**19.65**	17.51	17.36	16.97
2462	11	19.63	16.71	16.74	14.70

Table 9-69
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
		Average	Average	Average	Average
2412	1	18.85	17.82	17.76	15.67
2437	6	**18.89**	17.56	17.65	16.91
2462	11	18.79	17.55	17.46	14.68

Table 9-70
5 GHz WLAN Maximum Average RF Power – Ant 1

5GHz (20MHz) Conducted Power [dBm]					
Freq [MHz]	Channel	IEEE Transmission Mode			
		802.11a	802.11n	802.11ac	802.11ax
		Average	Average	Average	Average
5180	36	15.21	15.47	15.45	15.75
5200	40	17.59	17.84	17.83	15.79
5220	44	17.56	17.79	17.80	15.69
5240	48	17.61	17.76	17.91	15.77
5260	52	17.67	17.56	17.53	15.61
5280	56	17.81	17.61	17.63	15.75
5300	60	**17.97**	17.74	17.67	15.87
5320	64	16.20	16.39	16.37	15.83
5500	100	17.57	17.73	17.93	15.81
5600	120	17.65	17.94	17.89	15.96
5620	124	**17.89**	17.88	17.86	15.98
5720	144	17.82	17.98	17.98	15.99
5745	149	**17.93**	17.84	17.89	15.89
5785	157	17.52	17.97	17.97	15.97
5825	165	17.84	17.84	17.81	15.78

Table 9-71
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
		Average	Average	Average	Average
5180	36	15.24	15.24	15.30	15.56
5200	40	17.46	17.57	17.56	15.78
5220	44	17.63	17.70	17.68	15.95
5240	48	17.70	17.76	17.70	15.51
5260	52	17.64	17.68	17.77	15.62
5280	56	**17.91**	17.64	17.64	15.60
5300	60	17.90	17.60	17.61	15.90
5320	64	16.10	16.41	16.58	15.81
5500	100	17.56	17.61	17.68	15.98
5600	120	17.78	17.81	17.81	15.96
5620	124	17.67	17.78	17.72	15.99
5720	144	**17.79**	17.75	17.88	15.60
5745	149	**17.77**	17.76	17.71	15.58
5785	157	17.42	17.84	17.75	15.84
5825	165	17.40	17.35	17.89	15.71

Table 9-72
5 GHz WLAN Maximum Average RF Power – MIMO

5GHz (20MHz) 802.11n Conducted Power [dBm]				
Freq [MHz]	**Channel**	**ANT1**	**ANT2**	**MIMO**
5180	36	12.06	11.84	14.96
5200	40	17.84	17.57	20.72
5220	44	17.79	17.70	20.76
5240	48	17.76	17.76	20.77
5260	52	17.56	17.68	20.63
5280	56	17.61	17.64	20.64
5300	60	**17.74**	**17.60**	**20.68**
5320	64	13.11	12.58	15.86
5500	100	17.73	17.61	20.68
5600	120	**17.94**	**17.81**	**20.89**
5620	124	17.88	17.78	20.84
5720	144	17.98	17.75	20.88
5745	149	17.84	17.76	20.81
5785	157	**17.97**	**17.84**	**20.92**
5825	165	17.84	17.35	20.61

Table 9-73
Maximum Output Powers During Conditions with 2.4 GHz and 5 GHz WLAN

5GHz (80MHz) 802.11ac Conducted Power [dBm]			
Freq [MHz]	Channel	ANT1	ANT2
5210	42	9.85	9.85
5290	58	9.96	9.81
5530	106	9.90	9.53
5610	122	**13.92**	**13.99**
5690	138	13.89	13.79
5775	155	**13.97**	**13.44**

Table 9-74
2.4 GHz WLAN Reduced Average RF Power – Ant 1

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
		Average	Average	Average
2412	1	**16.96**	16.85	16.70
2437	6	16.81	16.95	16.66
2462	11	16.69	16.97	16.65

Table 9-75
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
		Average	Average	Average
2412	1	16.50	16.75	16.60
2437	6	16.57	16.53	16.48
2462	11	**16.92**	16.65	16.50

Table 9-76
5 GHz WLAN Reduced Average RF Power – Ant 1

5GHz (40MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11n	802.11ac	802.11ax
		Average	Average	Average
5190	38	12.61	12.64	13.81
5230	46	13.51	13.63	13.91
5270	54	**13.90**	13.57	13.58
5310	62	12.92	12.91	13.61
5510	102	13.66	13.55	13.86
5590	118	13.58	13.62	13.88
5630	126	13.72	13.76	13.96
5710	142	13.80	13.81	13.60
5755	151	13.78	13.85	13.67
5795	159	13.74	13.68	13.51

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
		Average
5210	42	12.90
5290	58	12.71
5530	106	12.83
5610	122	**13.92**
5690	138	13.89
5775	155	**13.97**

Table 9-77
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
		Average	Average	Average
5190	38	12.72	12.54	13.54
5230	46	13.74	13.96	13.56
5270	54	**13.61**	13.70	13.43
5310	62	12.70	12.83	13.51
5510	102	13.69	13.93	13.81
5590	118	13.76	13.48	13.76
5630	126	13.81	13.59	13.88
5710	142	13.70	13.40	13.66
5755	151	13.62	13.61	13.90
5795	159	13.55	13.26	13.45

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
		Average
5210	42	12.64
5290	58	12.62
5530	106	12.98
5610	122	**13.99**
5690	138	13.79
5775	155	**13.44**

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

5GHz (40MHz) 802.11n Conducted Power [dBm]				
Freq [MHz]	**Channel**	**ANT1**	**ANT2**	**MIMO**
5190	38	9.95	9.59	12.78
5230	46	13.51	13.74	16.64
5270	54	**13.90**	**13.61**	**16.77**
5310	62	9.94	9.83	12.90
5510	102	13.66	13.69	16.69
5590	118	13.58	13.76	16.68
5630	126	13.72	13.81	16.78
5710	142	13.80	13.70	16.76
5755	151	13.78	13.62	16.71
5795	159	13.74	13.55	16.66
5GHz (80MHz) 802.11ac Conducted Power [dBm]				
Freq [MHz]	**Channel**	**ANT1**	**ANT2**	**MIMO**
5210	42	9.85	9.85	12.86
5290	58	9.96	9.81	12.90
5530	106	9.90	9.53	12.73
5610	122	**13.92**	**13.99**	**16.97**
5690	138	13.89	13.79	16.85
5775	155	**13.97**	**13.44**	**16.72**

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.

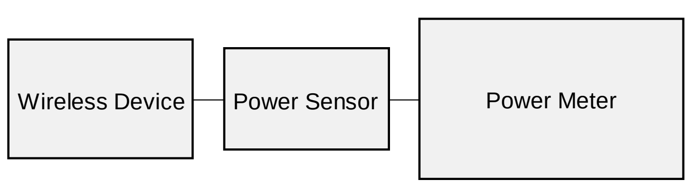

Figure 9-4
Power Measurement Setup

9.5 Bluetooth Conducted Powers

Table 9-79
Bluetooth Average RF Power

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
			[dBm]	[mW]
2402	1.0	0	17.69	58.700
2441	1.0	39	**18.37**	68.701
2480	1.0	78	17.48	55.928
2402	2.0	0	11.17	13.081
2441	2.0	39	11.98	15.762
2480	2.0	78	10.10	10.231
2402	3.0	0	11.30	13.493
2441	3.0	39	12.15	16.417
2480	3.0	78	10.20	10.466

Note: The bolded data rates and channel above were tested for SAR.

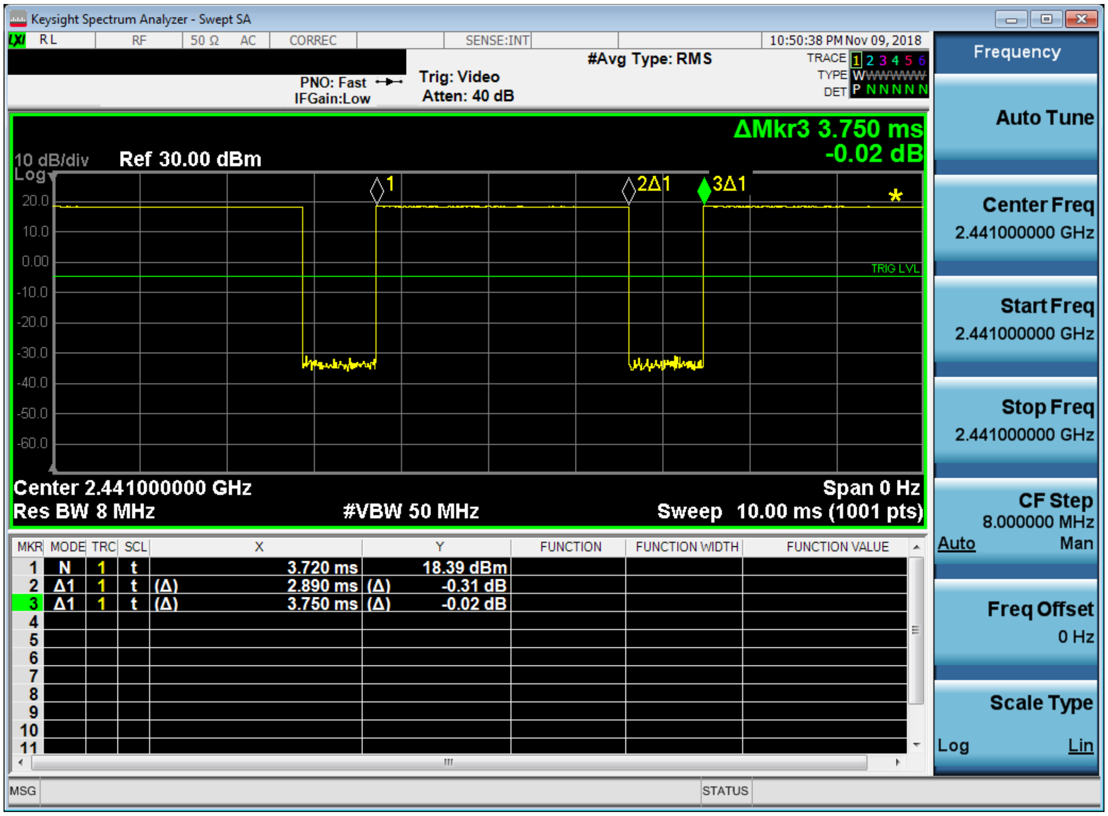

Figure 9-5
Bluetooth Transmission Plot

Equation 9-1
Bluetooth Duty Cycle Calculation

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.89ms}{3.75ms} * 100\% = 77.1\%$$

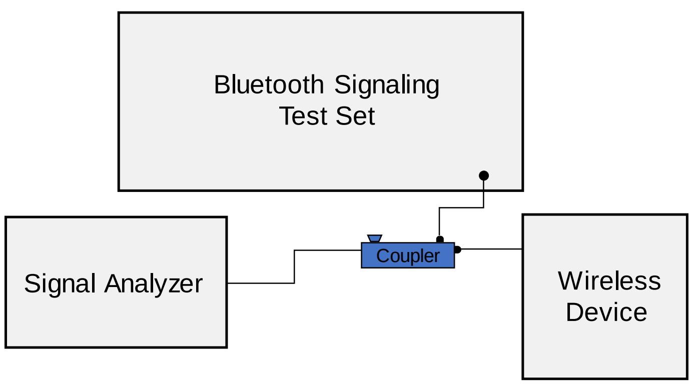

Figure 9-6
Power Measurement Setup

10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Tissue Properties – Head

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
12/26/2018	750H	20.8	700	0.889	41.338	0.889	42.201	0.00%	-2.04%
			710	0.893	41.296	0.890	42.149	0.34%	-2.02%
			740	0.903	41.205	0.893	41.994	1.12%	-1.88%
			755	0.908	41.156	0.894	41.916	1.57%	-1.81%
			770	0.914	41.103	0.895	41.838	2.12%	-1.76%
			785	0.920	41.048	0.896	41.760	2.68%	-1.70%
12/19/2018	835H	21.9	820	0.914	43.153	0.899	41.578	1.67%	3.79%
			835	0.929	42.966	0.900	41.500	3.22%	3.53%
			850	0.944	42.786	0.916	41.500	3.06%	3.10%
12/25/2018	1750H	20.8	1710	1.356	39.031	1.348	40.142	0.59%	-2.77%
			1750	1.382	38.985	1.371	40.079	0.80%	-2.73%
			1790	1.405	38.885	1.394	40.016	0.79%	-2.83%
12/19/2018	1900H	21.5	1850	1.389	40.286	1.400	40.000	-0.79%	0.72%
			1880	1.419	40.172	1.400	40.000	1.36%	0.43%
			1910	1.450	40.036	1.400	40.000	3.57%	0.09%
12/17/2018	2450H	22.7	2400	1.805	38.467	1.756	39.289	2.79%	-2.09%
			2450	1.862	38.272	1.800	39.200	3.44%	-2.37%
			2500	1.914	38.094	1.855	39.136	3.18%	-2.66%
			2550	1.971	37.894	1.909	39.073	3.25%	-3.02%
			2600	2.027	37.718	1.964	39.009	3.21%	-3.31%
12/05/2018	5200H-5800H	21.1	5240	4.484	34.826	4.696	35.940	-4.51%	-3.10%
			5260	4.502	34.779	4.717	35.917	-4.56%	-3.17%
			5280	4.515	34.752	4.737	35.894	-4.69%	-3.18%
			5600	4.837	34.313	5.065	35.529	-4.50%	-3.42%
			5620	4.848	34.270	5.086	35.506	-4.68%	-3.48%
			5745	4.982	34.130	5.214	35.363	-4.45%	-3.49%
			5765	5.017	34.108	5.234	35.340	-4.15%	-3.49%
			5785	5.031	34.068	5.255	35.317	-4.26%	-3.54%

Table 10-2
Measured Tissue Properties – Body

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
12/17/2018	750B	20.5	700	0.925	54.652	0.959	55.726	-3.55%	-1.93%
			710	0.928	54.624	0.960	55.687	-3.33%	-1.91%
			740	0.940	54.506	0.963	55.570	-2.39%	-1.91%
			755	0.946	54.462	0.964	55.512	-1.87%	-1.89%
			770	0.952	54.432	0.965	55.453	-1.35%	-1.84%
			785	0.958	54.398	0.966	55.395	-0.83%	-1.80%
12/20/2018	835B	19.6	820	0.967	53.154	0.969	55.258	-0.21%	-3.81%
			835	0.973	53.112	0.970	55.200	0.31%	-3.78%
			850	0.980	53.068	0.988	55.154	-0.81%	-3.78%
12/22/2018	835B	19.2	820	0.960	54.854	0.969	55.258	-0.93%	-0.73%
			835	0.966	54.820	0.970	55.200	-0.41%	-0.69%
			850	0.973	54.791	0.988	55.154	-1.52%	-0.66%
12/24/2018	1750B	20.1	1710	1.458	52.179	1.463	53.537	-0.34%	-2.54%
			1750	1.501	51.963	1.488	53.432	0.87%	-2.75%
			1790	1.548	51.840	1.514	53.326	2.25%	-2.79%
12/26/2018	1750B	21.1	1710	1.483	52.686	1.463	53.537	1.37%	-1.59%
			1750	1.531	52.512	1.488	53.432	2.89%	-1.72%
			1790	1.574	52.325	1.514	53.326	3.96%	-1.88%
12/19/2018	1900B	22.3	1850	1.518	53.708	1.520	53.300	-0.13%	0.77%
			1880	1.551	53.602	1.520	53.300	2.04%	0.57%
			1910	1.584	53.462	1.520	53.300	4.21%	0.30%
12/24/2018	1900B	22.0	1850	1.445	50.903	1.520	53.300	-4.93%	-4.50%
			1880	1.478	50.794	1.520	53.300	-2.76%	-4.70%
			1910	1.509	50.721	1.520	53.300	-0.72%	-4.84%
12/26/2018	1900B	21.9	1850	1.502	51.500	1.520	53.300	-1.18%	-3.38%
			1880	1.536	51.379	1.520	53.300	1.05%	-3.60%
			1910	1.572	51.264	1.520	53.300	3.42%	-3.82%
12/31/2018	1900B	22.0	1850	1.522	53.166	1.520	53.300	0.13%	-0.25%
			1880	1.555	53.074	1.520	53.300	2.30%	-0.42%
			1910	1.589	52.976	1.520	53.300	4.54%	-0.61%
12/20/2018	2450B	24.5	2400	1.994	50.921	1.902	52.767	4.84%	-3.50%
			2450	2.040	50.852	1.950	52.700	4.62%	-3.51%
			2500	2.080	50.774	2.021	52.636	2.92%	-3.54%
12/26/2018	2450B	22.7	2400	1.982	51.672	1.902	52.767	4.21%	-2.08%
			2450	2.041	51.540	1.950	52.700	4.67%	-2.20%
			2500	2.096	51.398	2.021	52.636	3.71%	-2.35%
			2550	2.159	51.266	2.092	52.573	3.20%	-2.49%
			2600	2.216	51.124	2.163	52.509	2.45%	-2.64%
			2650	2.279	50.996	2.234	52.445	2.01%	-2.76%
			2700	2.339	50.818	2.305	52.382	1.48%	-2.99%
01/09/2019	2450B	22.9	2400	1.988	52.322	1.902	52.767	4.52%	-0.84%
			2450	2.033	52.283	1.950	52.700	4.26%	-0.79%
			2500	2.082	52.153	2.021	52.636	3.02%	-0.92%

Table 10-3
Measured Tissue Properties – Body

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
12/26/2018	5200B-5800B	21.9	5240	5.403	47.944	5.346	48.960	1.07%	-2.08%
			5260	5.439	47.943	5.369	48.933	1.30%	-2.02%
			5280	5.466	47.832	5.393	48.906	1.35%	-2.20%
			5300	5.490	47.824	5.416	48.879	1.37%	-2.16%
			5600	5.939	47.285	5.766	48.471	3.00%	-2.45%
			5620	5.959	47.254	5.790	48.444	2.92%	-2.46%
			5700	6.085	47.116	5.883	48.336	3.43%	-2.52%
			5745	6.147	47.016	5.936	48.275	3.55%	-2.61%
			5765	6.176	46.990	5.959	48.248	3.64%	-2.61%
01/03/2019	5200B-5800B	21.7	5240	5.377	47.382	5.346	48.960	0.58%	-3.22%
			5260	5.427	47.316	5.369	48.933	1.08%	-3.30%
			5280	5.466	47.288	5.393	48.906	1.35%	-3.31%
			5300	5.477	47.257	5.416	48.879	1.13%	-3.32%
			5500	5.752	46.860	5.650	48.607	1.81%	-3.59%
			5600	5.888	46.674	5.766	48.471	2.12%	-3.71%
			5620	5.927	46.624	5.790	48.444	2.37%	-3.76%
			5700	6.052	46.454	5.883	48.336	2.87%	-3.89%
			5745	6.132	46.377	5.936	48.275	3.30%	-3.93%
			5765	6.157	46.380	5.959	48.248	3.32%	-3.87%
			5785	6.173	46.358	5.982	48.220	3.19%	-3.86%
			5825	6.235	46.256	6.029	48.166	3.42%	-3.97%
01/08/2019	5200B-5800B	22.8	5745	6.073	46.860	5.936	48.275	2.31%	-2.93%
			5765	6.102	46.863	5.959	48.248	2.40%	-2.87%
			5785	6.133	46.811	5.982	48.220	2.52%	-2.92%

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)	$Deviation_{1g}$ (%)
M	750	HEAD	12/26/2018	22.5	19.8	0.200	1003	3287	1.670	8.280	8.350	0.85%
G	835	HEAD	12/19/2018	23.0	22.1	0.200	4d047	7410	2.040	9.470	10.200	7.71%
M	1750	HEAD	12/25/2018	19.8	19.8	0.100	1148	3287	3.660	36.400	36.600	0.55%
H	1900	HEAD	12/19/2018	21.6	21.5	0.100	5d080	7409	4.110	39.800	41.100	3.27%
G	2450	HEAD	12/17/2018	21.9	22.0	0.100	981	7410	5.250	52.300	52.500	0.38%
G	2600	HEAD	12/17/2018	21.9	22.0	0.100	1004	7410	5.880	55.900	58.800	5.19%
H	5250	HEAD	12/05/2018	21.8	21.1	0.050	1191	7409	3.750	78.900	75.000	-4.94%
H	5600	HEAD	12/05/2018	21.8	21.1	0.050	1191	7409	3.960	83.600	79.200	-5.26%
H	5750	HEAD	12/05/2018	21.8	21.1	0.050	1191	7409	3.780	79.100	75.600	-4.42%
I	750	BODY	12/17/2018	20.1	20.1	0.200	1054	7406	1.780	8.610	8.900	3.37%
J	835	BODY	12/20/2018	19.7	19.6	0.200	4d133	3347	2.090	9.750	10.450	7.18%
J	835	BODY	12/22/2018	19.9	19.8	0.200	4d047	3347	1.970	9.710	9.850	1.44%
D	1750	BODY	12/24/2018	21.0	20.1	0.100	1150	7357	3.830	36.600	38.300	4.64%
E	1900	BODY	12/19/2018	21.6	22.3	0.100	5d148	3332	3.860	39.600	38.600	-2.53%
E	1900	BODY	12/24/2018	21.3	22.0	0.100	5d149	3332	4.050	39.400	40.500	2.79%
E	1900	BODY	12/31/2018	21.1	22.0	0.100	5d148	3332	4.130	39.600	41.300	4.29%
J	2450	BODY	12/20/2018	19.7	22.6	0.100	719	3347	5.230	50.100	52.300	4.39%
K	2450	BODY	12/26/2018	23.2	22.7	0.100	797	3319	5.320	51.100	53.200	4.11%
I	2450	BODY	01/09/2019	23.4	21.0	0.100	797	7406	5.270	51.100	52.700	3.13%
K	2600	BODY	12/26/2018	23.2	22.7	0.100	1071	3319	5.490	54.200	54.900	1.29%
L	5250	BODY	12/26/2018	21.3	21.5	0.050	1191	7308	3.600	77.000	72.000	-6.49%
L	5600	BODY	12/26/2018	21.3	21.5	0.050	1191	7308	3.890	79.200	77.800	-1.77%
L	5750	BODY	12/26/2018	21.3	21.5	0.050	1191	7308	3.470	76.100	69.400	-8.80%
L	5750	BODY	01/03/2019	21.5	21.0	0.050	1191	7308	3.500	76.100	70.000	-8.02%
D	5750	BODY	01/08/2019	23.0	22.8	0.050	1191	7357	3.600	76.100	72.000	-5.39%

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)	$Deviation_{10g}$ (%)
D	1750	BODY	12/26/2018	22.8	21.1	0.100	1148	7357	2.050	19.800	20.500	3.54%
E	1900	BODY	12/24/2018	21.3	22.0	0.100	5d149	3332	2.100	20.700	21.000	1.45%
E	1900	BODY	12/26/2018	22.3	21.9	0.100	5d149	3332	2.110	20.700	21.100	1.93%
K	2450	BODY	12/26/2018	23.2	22.7	0.100	797	3319	2.430	24.200	24.300	0.41%
K	2600	BODY	12/26/2018	23.2	22.7	0.100	1071	3319	2.420	24.500	24.200	-1.22%
L	5250	BODY	01/03/2019	21.5	21.0	0.050	1191	7308	0.999	21.600	19.980	-7.50%
L	5600	BODY	01/03/2019	21.5	21.0	0.050	1191	7308	1.080	22.200	21.600	-2.70%
L	5750	BODY	01/03/2019	21.5	21.0	0.050	1191	7308	0.979	21.200	19.580	-7.64%

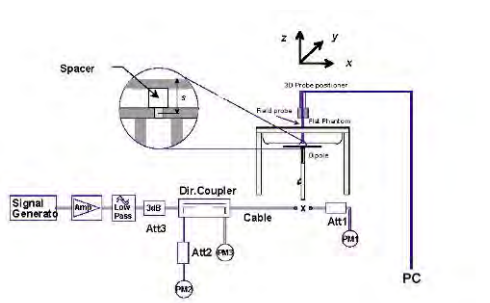

Figure 10-1
System Verification Setup Diagram

Figure 10-2
System Verification Setup Photo

11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
GSM 850 Head SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/Band	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)	
836.60	190	GSM 850	GSM	33.5	33.17	-0.04	Right	Cheek	2248M	1:8.3	0.166	1.079	0.179	A1
836.60	190	GSM 850	GSM	33.5	33.17	0.04	Right	Tilt	2248M	1:8.3	0.082	1.079	0.088	
836.60	190	GSM 850	GSM	33.5	33.17	0.13	Left	Cheek	2248M	1:8.3	0.146	1.079	0.158	
836.60	190	GSM 850	GSM	33.5	33.17	-0.03	Left	Tilt	2248M	1:8.3	0.081	1.079	0.087	
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
GSM 1900 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	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	661	GSM 1900	GSM	30.5	29.88	-0.04	Right	Cheek	2247M	1:8.3	0.042	1.153	0.048	
1880.00	661	GSM 1900	GSM	30.5	29.88	0.06	Right	Tilt	2247M	1:8.3	0.039	1.153	0.045	
1880.00	661	GSM 1900	GSM	30.5	29.88	0.06	Left	Cheek	2247M	1:8.3	0.070	1.153	0.081	A2
1880.00	661	GSM 1900	GSM	30.5	29.88	-0.03	Left	Tilt	2247M	1:8.3	0.021	1.153	0.024	
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
UMTS 850 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Ant State	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	25.0	24.84	-0.01	Right	Cheek	2	2248M	1:1	0.271	1.038	0.281	A3
836.60	4183	UMTS 850	RMC	25.0	24.84	0.03	Right	Tilt	2	2248M	1:1	0.131	1.038	0.136	
836.60	4183	UMTS 850	RMC	25.0	24.84	0.07	Left	Cheek	2	2248M	1:1	0.204	1.038	0.212	
836.60	4183	UMTS 850	RMC	25.0	24.84	0.12	Left	Tilt	2	2248M	1:1	0.122	1.038	0.127	
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
UMTS 1900 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Ant State	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	24.5	24.11	0.05	Right	Cheek	1	2247M	1:1	0.098	1.094	0.107	
1880.00	9400	UMTS 1900	RMC	24.5	24.11	-0.02	Right	Tilt	1	2247M	1:1	0.076	1.094	0.083	
1880.00	9400	UMTS 1900	RMC	24.5	24.11	0.10	Left	Cheek	1	2247M	1:1	0.144	1.094	0.158	A4
1880.00	9400	UMTS 1900	RMC	24.5	24.11	0.00	Left	Tilt	1	2247M	1:1	0.038	1.094	0.042	
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 12 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Ant State	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.0	24.01	0.04	0	Right	Cheek	76	QPSK	1	0	2249M	1:1	0.196	1.256	0.246	A5
707.50	23095	Mid	LTE Band 12	10	24.0	23.05	0.03	1	Right	Cheek	76	QPSK	25	0	2249M	1:1	0.157	1.245	0.195	
707.50	23095	Mid	LTE Band 12	10	25.0	24.01	0.04	0	Right	Tilt	76	QPSK	1	0	2249M	1:1	0.096	1.256	0.121	
707.50	23095	Mid	LTE Band 12	10	24.0	23.05	-0.08	1	Right	Tilt	76	QPSK	25	0	2249M	1:1	0.074	1.245	0.092	
707.50	23095	Mid	LTE Band 12	10	25.0	24.01	0.17	0	Left	Cheek	76	QPSK	1	0	2249M	1:1	0.149	1.256	0.187	
707.50	23095	Mid	LTE Band 12	10	24.0	23.05	0.01	1	Left	Cheek	76	QPSK	25	0	2249M	1:1	0.121	1.245	0.151	
707.50	23095	Mid	LTE Band 12	10	25.0	24.01	-0.12	0	Left	Tilt	76	QPSK	1	0	2249M	1:1	0.078	1.256	0.098	
707.50	23095	Mid	LTE Band 12	10	24.0	23.05	-0.19	1	Left	Tilt	76	QPSK	25	0	2249M	1:1	0.060	1.245	0.075	
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
LTE Band 13 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Ant State	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	
782.00	23230	Mid	LTE Band 13	10	25.0	23.79	0.10	0	Right	Cheek	2	QPSK	1	0	2249M	1:1	0.131	1.321	0.173	A6
782.00	23230	Mid	LTE Band 13	10	24.0	22.81	-0.01	1	Right	Cheek	2	QPSK	25	12	2249M	1:1	0.109	1.315	0.143	
782.00	23230	Mid	LTE Band 13	10	25.0	23.79	0.17	0	Right	Tilt	2	QPSK	1	0	2249M	1:1	0.059	1.321	0.078	
782.00	23230	Mid	LTE Band 13	10	24.0	22.81	0.09	1	Right	Tilt	2	QPSK	25	12	2249M	1:1	0.052	1.315	0.068	
782.00	23230	Mid	LTE Band 13	10	25.0	23.79	0.16	0	Left	Cheek	2	QPSK	1	0	2249M	1:1	0.103	1.321	0.136	
782.00	23230	Mid	LTE Band 13	10	24.0	22.81	-0.06	1	Left	Cheek	2	QPSK	25	12	2249M	1:1	0.084	1.315	0.110	
782.00	23230	Mid	LTE Band 13	10	25.0	23.79	0.09	0	Left	Tilt	2	QPSK	1	0	2249M	1:1	0.050	1.321	0.066	
782.00	23230	Mid	LTE Band 13	10	24.0	22.81	0.00	1	Left	Tilt	2	QPSK	25	12	2249M	1:1	0.044	1.315	0.058	
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
LTE Band 26 (Cell) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Ant State	Modulation	RB Size	RB Offset	Device Serial Number	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	25.0	24.21	-0.11	0	Right	Cheek	2	QPSK	1	36	2244M	1:1	0.251	1.199	0.301	A7
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.41	-0.01	1	Right	Cheek	2	QPSK	36	0	2244M	1:1	0.204	1.146	0.234	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.21	0.04	0	Right	Tilt	2	QPSK	1	36	2244M	1:1	0.108	1.199	0.129	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.41	0.01	1	Right	Tilt	2	QPSK	36	0	2244M	1:1	0.092	1.146	0.105	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.21	0.19	0	Left	Cheek	2	QPSK	1	36	2244M	1:1	0.165	1.199	0.198	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.41	0.11	1	Left	Cheek	2	QPSK	36	0	2244M	1:1	0.134	1.146	0.154	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.21	0.06	0	Left	Tilt	2	QPSK	1	36	2244M	1:1	0.103	1.199	0.123	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.41	0.05	1	Left	Tilt	2	QPSK	36	0	2244M	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 11-8
LTE Band 5 (Cell) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Ant State	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	24.89	0.15	0	Right	Cheek	2	QPSK	1	0	2244M	1:1	0.259	1.151	0.298	A8
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.95	-0.04	1	Right	Cheek	2	QPSK	25	0	2244M	1:1	0.199	1.135	0.226	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	24.89	0.03	0	Right	Tilt	2	QPSK	1	0	2244M	1:1	0.132	1.151	0.152	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.95	0.00	1	Right	Tilt	2	QPSK	25	0	2244M	1:1	0.108	1.135	0.123	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	24.89	-0.18	0	Left	Cheek	2	QPSK	1	0	2244M	1:1	0.177	1.151	0.204	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.95	0.06	1	Left	Cheek	2	QPSK	25	0	2244M	1:1	0.152	1.135	0.173	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	24.89	0.08	0	Left	Tilt	2	QPSK	1	0	2244M	1:1	0.117	1.151	0.135	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.95	0.03	1	Left	Tilt	2	QPSK	25	0	2244M	1:1	0.095	1.135	0.108	
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 11-9
LTE Band 4 (AWS) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Ant State	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.93	0.04	0	Right	Cheek	0	QPSK	1	0	2249M	1:1	0.080	1.016	0.081	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.89	0.12	1	Right	Cheek	0	QPSK	50	0	2249M	1:1	0.079	1.026	0.081	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.93	0.12	0	Right	Tilt	0	QPSK	1	0	2249M	1:1	0.088	1.016	0.089	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.89	0.07	1	Right	Tilt	0	QPSK	50	0	2249M	1:1	0.087	1.026	0.089	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.93	0.02	0	Left	Cheek	0	QPSK	1	0	2249M	1:1	0.165	1.016	0.168	A9
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.89	0.02	1	Left	Cheek	0	QPSK	50	0	2249M	1:1	0.121	1.026	0.124	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.93	0.10	0	Left	Tilt	0	QPSK	1	0	2249M	1:1	0.094	1.016	0.096	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.89	0.02	1	Left	Tilt	0	QPSK	50	0	2249M	1:1	0.068	1.026	0.070	
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 11-10
LTE Band 25 (PCS) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Ant State	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	24.16	0.21	0	Right	Cheek	0	QPSK	1	0	2247M	1:1	0.096	1.213	0.116	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.30	0.06	1	Right	Cheek	0	QPSK	50	0	2247M	1:1	0.073	1.175	0.086	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.16	0.10	0	Right	Tilt	0	QPSK	1	0	2247M	1:1	0.096	1.213	0.116	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.30	0.20	1	Right	Tilt	0	QPSK	50	0	2247M	1:1	0.072	1.175	0.085	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.16	0.02	0	Left	Cheek	0	QPSK	1	0	2247M	1:1	0.168	1.213	0.204	A10
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.30	0.04	1	Left	Cheek	0	QPSK	50	0	2247M	1:1	0.138	1.175	0.162	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.16	0.11	0	Left	Tilt	0	QPSK	1	0	2247M	1:1	0.055	1.213	0.067	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.30	0.14	1	Left	Tilt	0	QPSK	50	0	2247M	1:1	0.049	1.175	0.058	
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 11-11
LTE Band 41 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	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.45	0.12	0	Right	Cheek	QPSK	1	0	2244M	1:1.58	0.026	1.135	0.030	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.72	0.18	1	Right	Cheek	QPSK	50	0	2244M	1:1.58	0.021	1.067	0.022	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.45	-0.04	0	Right	Tilt	QPSK	1	0	2244M	1:1.58	0.042	1.135	0.048	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.72	0.16	1	Right	Tilt	QPSK	50	0	2244M	1:1.58	0.030	1.067	0.032	
2 CC Uplink	PCC	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.65	0.11	0	Right	Tilt	QPSK	1	0	2244M	1:1.58	0.043	1.084	0.047	A11
	SCC	2529.70	39987	Low-Mid		20								1	99						
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.45	0.11	0	Left	Cheek	QPSK	1	0	2244M	1:1.58	0.031	1.135	0.035	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.72	0.14	1	Left	Cheek	QPSK	50	0	2244M	1:1.58	0.022	1.067	0.023	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.45	0.12	0	Left	Tilt	QPSK	1	0	2244M	1:1.58	0.021	1.135	0.024	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.72	0.11	1	Left	Tilt	QPSK	50	0	2244M	1:1.58	0.016	1.067	0.017	
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 11-12
DTS 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)	
2412	1	802.11b	DSSS	22	17.0	16.96	-0.19	Right	Cheek	1	2245M	1	99.9	0.281	0.204	1.009	1.001	0.206	A12
2412	1	802.11b	DSSS	22	17.0	16.96	0.20	Right	Tilt	1	2245M	1	99.9	0.246	-	1.009	1.001	-	
2412	1	802.11b	DSSS	22	17.0	16.96	0.00	Left	Cheek	1	2245M	1	99.9	0.089	-	1.009	1.001	-	
2412	1	802.11b	DSSS	22	17.0	16.96	0.12	Left	Tilt	1	2245M	1	99.9	0.084	-	1.009	1.001	-	
2462	11	802.11b	DSSS	22	17.0	16.92	0.12	Right	Cheek	2	2245M	1	99.9	0.240	0.179	1.019	1.001	0.183	
2462	11	802.11b	DSSS	22	17.0	16.92	0.14	Right	Tilt	2	2245M	1	99.9	0.233	-	1.019	1.001	-	
2462	11	802.11b	DSSS	22	17.0	16.92	0.06	Left	Cheek	2	2245M	1	99.9	0.090	-	1.019	1.001	-	
2462	11	802.11b	DSSS	22	17.0	16.92	0.14	Left	Tilt	2	2245M	1	99.9	0.150	-	1.019	1.001	-	
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 11-13
NII 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)	
5270	54	802.11n	OFDM	40	14.0	13.90	-0.15	Right	Cheek	1	2245M	13.5	97.4	0.499	0.188	1.023	1.027	0.198	
5270	54	802.11n	OFDM	40	14.0	13.90	0.17	Right	Tilt	1	2245M	13.5	97.4	0.529	0.235	1.023	1.027	0.247	A13
5270	54	802.11n	OFDM	40	14.0	13.90	-0.13	Left	Cheek	1	2245M	13.5	97.4	0.274	-	1.023	1.027	-	
5270	54	802.11n	OFDM	40	14.0	13.90	0.15	Left	Tilt	1	2245M	13.5	97.4	0.340	-	1.023	1.027	-	
5270	54	802.11n	OFDM	40	14.0	13.61	-0.16	Right	Cheek	2	2245M	13.5	97.3	0.126	0.044	1.094	1.028	0.049	
5270	54	802.11n	OFDM	40	14.0	13.61	0.19	Right	Tilt	2	2245M	13.5	97.3	0.102	-	1.094	1.028	-	
5270	54	802.11n	OFDM	40	14.0	13.61	-0.20	Left	Cheek	2	2245M	13.5	97.3	0.055	-	1.094	1.028	-	
5270	54	802.11n	OFDM	40	14.0	13.61	0.20	Left	Tilt	2	2245M	13.5	97.3	0.059	-	1.094	1.028	-	
5610	122	802.11ac	OFDM	80	14.0	13.92	0.14	Right	Cheek	1	2245M	29.3	94.4	0.479	0.178	1.019	1.059	0.192	
5610	122	802.11ac	OFDM	80	14.0	13.92	-0.13	Right	Tilt	1	2245M	29.3	94.4	0.527	0.211	1.019	1.059	0.228	
5610	122	802.11ac	OFDM	80	14.0	13.92	0.20	Left	Cheek	1	2245M	29.3	94.4	0.186	-	1.019	1.059	-	
5610	122	802.11ac	OFDM	80	14.0	13.92	0.16	Left	Tilt	1	2245M	29.3	94.4	0.237	-	1.019	1.059	-	
5610	122	802.11ac	OFDM	80	14.0	13.99	0.20	Right	Cheek	2	2245M	29.3	94.5	0.048	-	1.002	1.058	-	
5610	122	802.11ac	OFDM	80	14.0	13.99	0.19	Right	Tilt	2	2245M	29.3	94.5	0.066	0.016	1.002	1.058	0.017	
5610	122	802.11ac	OFDM	80	14.0	13.99	0.16	Left	Cheek	2	2245M	29.3	94.5	0.027	-	1.002	1.058	-	
5610	122	802.11ac	OFDM	80	14.0	13.99	0.13	Left	Tilt	2	2245M	29.3	94.5	0.026	-	1.002	1.058	-	
5775	155	802.11ac	OFDM	80	14.0	13.97	-0.16	Right	Cheek	1	2245M	29.3	94.4	0.406	0.191	1.007	1.059	0.204	
5775	155	802.11ac	OFDM	80	14.0	13.97	0.16	Right	Tilt	1	2245M	29.3	94.4	0.408	0.163	1.007	1.059	0.174	
5775	155	802.11ac	OFDM	80	14.0	13.97	0.21	Left	Cheek	1	2245M	29.3	94.4	0.179	-	1.007	1.059	-	
5775	155	802.11ac	OFDM	80	14.0	13.97	0.19	Left	Tilt	1	2245M	29.3	94.4	0.229	-	1.007	1.059	-	
5775	155	802.11ac	OFDM	80	14.0	13.44	0.20	Right	Cheek	2	2245M	29.3	94.5	0.027	-	1.138	1.058	-	
5775	155	802.11ac	OFDM	80	14.0	13.44	0.20	Right	Tilt	2	2245M	29.3	94.5	0.019	-	1.138	1.058	-	
5775	155	802.11ac	OFDM	80	14.0	13.44	0.19	Left	Cheek	2	2245M	29.3	94.5	0.029	0.001	1.138	1.058	0.001	
5775	155	802.11ac	OFDM	80	14.0	13.44	0.20	Left	Tilt	2	2245M	29.3	94.5	0.019	-	1.138	1.058	-	
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 11-14
MIMO NII Head 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]	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)	
5270	54	802.11n	OFDM	40	14.0	13.90	14.0	13.61	-0.15	Right	Cheek	MIMO	2245M	27	98.1	0.509	0.198	1.094	1.019	0.221	
5270	54	802.11n	OFDM	40	14.0	13.90	14.0	13.61	0.17	Right	Tilt	MIMO	2245M	27	98.1	0.534	0.200	1.094	1.019	0.223	
5270	54	802.11n	OFDM	40	14.0	13.90	14.0	13.61	0.13	Left	Cheek	MIMO	2245M	27	98.1	0.351	-	1.094	1.019	-	
5270	54	802.11n	OFDM	40	14.0	13.90	14.0	13.61	0.19	Left	Tilt	MIMO	2245M	27	98.1	0.363	-	1.094	1.019	-	
5610	122	802.11ac	OFDM	80	14.0	13.92	14.0	13.99	0.16	Right	Cheek	MIMO	2245M	58.5	98.0	0.515	0.195	1.019	1.020	0.203	
5610	122	802.11ac	OFDM	80	14.0	13.92	14.0	13.99	0.12	Right	Tilt	MIMO	2245M	58.5	98.0	0.522	0.221	1.019	1.020	0.230	
5610	122	802.11ac	OFDM	80	14.0	13.92	14.0	13.99	0.20	Left	Cheek	MIMO	2245M	58.5	98.0	0.281	-	1.019	1.020	-	
5610	122	802.11ac	OFDM	80	14.0	13.92	14.0	13.99	0.14	Left	Tilt	MIMO	2245M	58.5	98.0	0.279	-	1.019	1.020	-	
5775	155	802.11ac	OFDM	80	14.0	13.97	14.0	13.44	0.15	Right	Cheek	MIMO	2245M	58.5	98.0	0.479	0.174	1.138	1.020	0.202	
5775	155	802.11ac	OFDM	80	14.0	13.97	14.0	13.44	0.17	Right	Tilt	MIMO	2245M	58.5	98.0	0.561	0.192	1.138	1.020	0.223	
5775	155	802.11ac	OFDM	80	14.0	13.97	14.0	13.44	0.11	Left	Cheek	MIMO	2245M	58.5	98.0	0.240	-	1.138	1.020	-	
5775	155	802.11ac	OFDM	80	14.0	13.97	14.0	13.44	0.19	Left	Tilt	MIMO	2245M	58.5	98.0	0.228	-	1.138	1.020	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram											

To achieve the 17 dBm maximum allowed MIMO power shown in the documentation, each antenna transmits at a maximum allowed power of 14 dBm.

Table 11-15
DSS Head SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2402.00	0	Bluetooth	FHSS	18.5	17.69	-0.05	Right	Cheek	2245M	1	77.1	0.474	1.205	1.297	0.741	
2441.00	39	Bluetooth	FHSS	18.5	18.37	-0.05	Right	Cheek	2245M	1	77.1	0.759	1.030	1.297	1.014	
2480.00	78	Bluetooth	FHSS	18.5	17.48	0.05	Right	Cheek	2245M	1	77.1	0.653	1.265	1.297	**1.071**	
2402.00	0	Bluetooth	FHSS	18.5	17.69	-0.01	Right	Tilt	2245M	1	77.1	0.522	1.205	1.297	0.816	
2441.00	39	Bluetooth	FHSS	18.5	18.37	0.04	Right	Tilt	2245M	1	77.1	0.774	1.030	1.297	1.034	A14
2480.00	78	Bluetooth	FHSS	18.5	17.48	-0.08	Right	Tilt	2245M	1	77.1	0.586	1.265	1.297	0.961	
2441.00	39	Bluetooth	FHSS	18.5	18.37	0.05	Left	Cheek	2245M	1	77.1	0.247	1.030	1.297	0.330	
2441.00	39	Bluetooth	FHSS	18.5	18.37	-0.12	Left	Tilt	2245M	1	77.1	0.279	1.030	1.297	0.373	
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 11-16
GSM/UMTS Body-Worn SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Ant State	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.5	33.17	-0.15	15 mm	N/A	2325M	1	1:8.3	back	0.200	1.079	0.216	A15
1880.00	661	GSM 1900	GSM	30.5	29.88	-0.08	15 mm	N/A	2247M	1	1:8.3	back	0.238	1.153	0.274	A17
836.60	4183	UMTS 850	RMC	25.0	24.84	-0.02	15 mm	2	2325M	N/A	1:1	back	0.316	1.038	0.328	A19
1880.00	9400	UMTS 1900	RMC	24.5	24.11	-0.08	15 mm	1	2247M	N/A	1:1	back	0.493	1.094	0.539	A21
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 11-17
LTE FDD Body-Worn SAR

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)	
707.50	23095	Mid	LTE Band 12	10	25.0	24.01	-0.01	0	10	2249M	QPSK	1	0	15 mm	back	1:1	0.266	1.256	0.334	A23
707.50	23095	Mid	LTE Band 12	10	24.0	23.05	0.00	1	10	2249M	QPSK	25	0	15 mm	back	1:1	0.223	1.245	0.278	
782.00	23230	Mid	LTE Band 13	10	25.0	23.79	0.03	0	76	2249M	QPSK	1	0	15 mm	back	1:1	0.213	1.321	0.281	A25
782.00	23230	Mid	LTE Band 13	10	24.0	22.81	0.02	1	76	2249M	QPSK	25	12	15 mm	back	1:1	0.175	1.315	0.230	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.21	-0.05	0	18	2249M	QPSK	1	36	15 mm	back	1:1	0.300	1.199	0.360	A27
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.41	0.01	1	18	2249M	QPSK	36	0	15 mm	back	1:1	0.241	1.146	0.276	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	24.89	-0.06	0	2	2249M	QPSK	1	0	15 mm	back	1:1	0.354	1.151	0.407	A29
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.95	-0.02	1	2	2249M	QPSK	25	0	15 mm	back	1:1	0.291	1.135	0.330	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.93	0.01	0	0	2244M	QPSK	1	0	15 mm	back	1:1	0.486	1.016	0.494	A31
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.89	-0.02	1	0	2244M	QPSK	50	0	15 mm	back	1:1	0.401	1.026	0.411	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.16	0.01	0	1	2247M	QPSK	1	0	15 mm	back	1:1	0.534	1.213	0.648	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.0	24.12	0.02	0	1	2247M	QPSK	1	0	15 mm	back	1:1	0.595	1.225	0.729	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.0	24.10	0.00	0	1	2247M	QPSK	1	0	15 mm	back	1:1	0.639	1.230	**0.786**	A33
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.30	-0.01	1	1	2247M	QPSK	50	0	15 mm	back	1:1	0.436	1.175	0.512	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.24	-0.03	1	1	2247M	QPSK	100	0	15 mm	back	1:1	0.440	1.191	0.524	
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 11-18
LTE TDD Body-Worn 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]	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	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.45	-0.03	0	2244M	QPSK	1	0	15 mm	back	1:1.58	0.284	1.135	0.322	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.72	0.03	1	2244M	QPSK	50	0	15 mm	back	1:1.58	0.220	1.067	0.235	
2 CC Uplink	PCC	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.65	0.03	0	2244M	QPSK	1	0	15 mm	back	1:1.58	0.325	1.084	0.352	A35
	SCC	2529.70	39987	Low-Mid		20							1	99							
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 11-19
DTS 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)	
2437	6	802.11b	DSSS	22	20.0	19.65	0.12	15 mm	1	2317M	1	back	99.9	0.102	0.084	1.084	1.001	**0.091**	A37
2437	6	802.11b	DSSS	22	19.0	18.89	0.12	15 mm	2	2317M	1	back	99.9	0.024	0.020	1.026	1.001	0.021	
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 11-20
NII 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)	
5300	60	802.11a	OFDM	20	18.0	17.97	-0.05	15 mm	1	2245M	6	back	98.8	0.263	0.119	1.007	1.012	0.121	
5280	56	802.11a	OFDM	20	18.0	17.91	0.01	15 mm	2	2245M	6	back	98.9	0.660	0.293	1.021	1.011	0.302	
5620	124	802.11a	OFDM	20	18.0	17.89	0.06	15 mm	1	2245M	6	back	98.8	0.347	0.164	1.026	1.012	0.170	
5720	144	802.11a	OFDM	20	18.0	17.79	-0.05	15 mm	2	2245M	6	back	98.9	0.746	0.326	1.050	1.011	0.346	
5745	149	802.11a	OFDM	20	18.0	17.93	-0.08	15 mm	1	2245M	6	back	98.8	0.325	0.138	1.016	1.012	0.142	
5745	149	802.11a	OFDM	20	18.0	17.77	0.02	15 mm	2	2245M	6	back	98.9	0.864	0.375	1.054	1.011	**0.400**	A39
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 11-21
DSS Body-Worn SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	18.5	18.37	-0.01	15 mm	2245M	1	back	77.1	0.091	1.030	1.297	**0.122**	A41
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 11-22
GPRS/UMTS Hotspot SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Ant State	Device Serial Number	# of GPRS Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
836.60	190	GSM 850	GPRS	30.5	30.04	-0.07	10 mm	N/A	2325M	3	1:2.76	back	0.468	1.112	0.520	A16
836.60	190	GSM 850	GPRS	30.5	30.04	-0.09	10 mm	N/A	2325M	3	1:2.76	front	0.365	1.112	0.406	
836.60	190	GSM 850	GPRS	30.5	30.04	-0.02	10 mm	N/A	2325M	3	1:2.76	bottom	0.349	1.112	0.388	
836.60	190	GSM 850	GPRS	30.5	30.04	-0.07	10 mm	N/A	2325M	3	1:2.76	right	0.297	1.112	0.330	
836.60	190	GSM 850	GPRS	30.5	30.04	-0.04	10 mm	N/A	2325M	3	1:2.76	left	0.106	1.112	0.118	
1850.20	512	GSM 1900	GPRS	25.5	24.93	0.01	10 mm	N/A	2247M	3	1:2.76	back	0.365	1.140	0.416	
1850.20	512	GSM 1900	GPRS	25.5	24.93	0.00	10 mm	N/A	2247M	3	1:2.76	front	0.483	1.140	0.551	
1850.20	512	GSM 1900	GPRS	25.5	24.93	-0.10	10 mm	N/A	2247M	3	1:2.76	bottom	0.683	1.140	0.779	
1880.00	661	GSM 1900	GPRS	25.5	24.92	0.16	10 mm	N/A	2247M	3	1:2.76	bottom	0.679	1.143	0.776	
1909.80	810	GSM 1900	GPRS	25.5	24.21	-0.03	10 mm	N/A	2247M	3	1:2.76	bottom	0.768	1.346	**1.034**	A18
1850.20	512	GSM 1900	GPRS	25.5	24.93	-0.05	10 mm	N/A	2247M	3	1:2.76	right	0.055	1.140	0.063	
1850.20	512	GSM 1900	GPRS	25.5	24.93	-0.11	10 mm	N/A	2247M	3	1:2.76	left	0.094	1.140	0.107	
826.40	4132	UMTS 850	RMC	25.0	24.71	0.00	10 mm	2	2325M	N/A	1:1	back	0.623	1.069	0.666	
836.60	4183	UMTS 850	RMC	25.0	24.84	0.01	10 mm	2	2325M	N/A	1:1	back	0.691	1.038	0.717	A20
846.60	4233	UMTS 850	RMC	25.0	24.67	-0.02	10 mm	2	2325M	N/A	1:1	back	0.630	1.079	0.680	
836.60	4183	UMTS 850	RMC	25.0	24.84	-0.06	10 mm	2	2325M	N/A	1:1	front	0.482	1.038	0.500	
836.60	4183	UMTS 850	RMC	25.0	24.84	-0.04	10 mm	2	2325M	N/A	1:1	bottom	0.385	1.038	0.400	
836.60	4183	UMTS 850	RMC	25.0	24.84	-0.04	10 mm	2	2325M	N/A	1:1	right	0.348	1.038	0.361	
836.60	4183	UMTS 850	RMC	25.0	24.84	-0.06	10 mm	2	2325M	N/A	1:1	left	0.101	1.038	0.105	
1880.00	9400	UMTS 1900	RMC	20.5	20.13	-0.04	10 mm	1	2247M	N/A	1:1	back	0.343	1.089	0.374	
1880.00	9400	UMTS 1900	RMC	20.5	20.13	0.01	10 mm	1	2247M	N/A	1:1	front	0.304	1.089	0.331	
1852.40	9262	UMTS 1900	RMC	20.5	20.08	-0.04	10 mm	1	2247M	N/A	1:1	bottom	0.626	1.102	0.690	
1880.00	9400	UMTS 1900	RMC	20.5	20.13	-0.12	10 mm	1	2247M	N/A	1:1	bottom	0.628	1.089	0.684	
1907.60	9538	UMTS 1900	RMC	20.5	19.78	-0.03	10 mm	1	2247M	N/A	1:1	bottom	0.742	1.180	0.876	A22
1880.00	9400	UMTS 1900	RMC	20.5	20.13	-0.03	10 mm	1	2247M	N/A	1:1	right	0.051	1.089	0.056	
1880.00	9400	UMTS 1900	RMC	20.5	20.13	0.04	10 mm	1	2247M	N/A	1:1	left	0.071	1.089	0.077	
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 11-23
LTE Band 12 Hotspot SAR

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)	
707.50	23095	Mid	LTE Band 12	10	25.0	24.01	-0.02	0	10	2249M	QPSK	1	0	10 mm	back	1:1	0.370	1.256	0.465	A24
707.50	23095	Mid	LTE Band 12	10	24.0	23.05	0.01	1	10	2249M	QPSK	25	0	10 mm	back	1:1	0.316	1.245	0.393	
707.50	23095	Mid	LTE Band 12	10	25.0	24.01	-0.07	0	10	2249M	QPSK	1	0	10 mm	front	1:1	0.288	1.256	0.362	
707.50	23095	Mid	LTE Band 12	10	24.0	23.05	0.00	1	10	2249M	QPSK	25	0	10 mm	front	1:1	0.244	1.245	0.304	
707.50	23095	Mid	LTE Band 12	10	25.0	24.01	-0.03	0	10	2249M	QPSK	1	0	10 mm	bottom	1:1	0.229	1.256	0.288	
707.50	23095	Mid	LTE Band 12	10	24.0	23.05	-0.04	1	10	2249M	QPSK	25	0	10 mm	bottom	1:1	0.191	1.245	0.238	
707.50	23095	Mid	LTE Band 12	10	25.0	24.01	-0.07	0	10	2249M	QPSK	1	0	10 mm	right	1:1	0.248	1.256	0.311	
707.50	23095	Mid	LTE Band 12	10	24.0	23.05	-0.02	1	10	2249M	QPSK	25	0	10 mm	right	1:1	0.204	1.245	0.254	
707.50	23095	Mid	LTE Band 12	10	25.0	24.01	0.00	0	10	2249M	QPSK	1	0	10 mm	left	1:1	0.173	1.256	0.217	
707.50	23095	Mid	LTE Band 12	10	24.0	23.05	0.01	1	10	2249M	QPSK	25	0	10 mm	left	1:1	0.136	1.245	0.169	
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 11-24
LTE Band 13 Hotspot SAR

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)	
782.00	23230	Mid	LTE Band 13	10	25.0	23.79	-0.01	0	76	2249M	QPSK	1	0	10 mm	back	1:1	0.407	1.321	0.538	A26
782.00	23230	Mid	LTE Band 13	10	24.0	22.81	-0.07	1	76	2249M	QPSK	25	12	10 mm	back	1:1	0.325	1.315	0.427	
782.00	23230	Mid	LTE Band 13	10	25.0	23.79	0.03	0	76	2249M	QPSK	1	0	10 mm	front	1:1	0.328	1.321	0.433	
782.00	23230	Mid	LTE Band 13	10	24.0	22.81	0.00	1	76	2249M	QPSK	25	12	10 mm	front	1:1	0.257	1.315	0.338	
782.00	23230	Mid	LTE Band 13	10	25.0	23.79	-0.05	0	76	2249M	QPSK	1	0	10 mm	bottom	1:1	0.254	1.321	0.336	
782.00	23230	Mid	LTE Band 13	10	24.0	22.81	-0.06	1	76	2249M	QPSK	25	12	10 mm	bottom	1:1	0.212	1.315	0.279	
782.00	23230	Mid	LTE Band 13	10	25.0	23.79	-0.07	0	76	2249M	QPSK	1	0	10 mm	right	1:1	0.194	1.321	0.256	
782.00	23230	Mid	LTE Band 13	10	24.0	22.81	-0.02	1	76	2249M	QPSK	25	12	10 mm	right	1:1	0.179	1.315	0.235	
782.00	23230	Mid	LTE Band 13	10	25.0	23.79	0.02	0	76	2249M	QPSK	1	0	10 mm	left	1:1	0.102	1.321	0.135	
782.00	23230	Mid	LTE Band 13	10	24.0	22.81	-0.02	1	76	2249M	QPSK	25	12	10 mm	left	1:1	0.084	1.315	0.110	
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 11-25
LTE Band 26 (Cell) Hotspot SAR

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	25.0	24.21	0.00	0	18	2249M	QPSK	1	36	10 mm	back	1:1	0.623	1.199	0.747	A28
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.41	0.01	1	18	2249M	QPSK	36	0	10 mm	back	1:1	0.496	1.146	0.568	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.21	-0.08	0	18	2249M	QPSK	1	36	10 mm	front	1:1	0.503	1.199	0.603	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.41	-0.09	1	18	2249M	QPSK	36	0	10 mm	front	1:1	0.403	1.146	0.462	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.21	-0.05	0	18	2249M	QPSK	1	36	10 mm	bottom	1:1	0.360	1.199	0.432	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.41	-0.05	1	18	2249M	QPSK	36	0	10 mm	bottom	1:1	0.298	1.146	0.342	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.21	-0.12	0	18	2249M	QPSK	1	36	10 mm	right	1:1	0.293	1.199	0.351	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.41	-0.04	1	18	2249M	QPSK	36	0	10 mm	right	1:1	0.247	1.146	0.283	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.21	-0.03	0	18	2249M	QPSK	1	36	10 mm	left	1:1	0.106	1.199	0.127	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.41	0.00	1	18	2249M	QPSK	36	0	10 mm	left	1:1	0.092	1.146	0.105	
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 11-26
LTE Band 5 (Cell) Hotspot SAR

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)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	24.89	-0.03	0	2	2249M	QPSK	1	0	10 mm	back	1:1	0.754	1.151	0.868	A30
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.95	0.05	1	2	2249M	QPSK	25	0	10 mm	back	1:1	0.632	1.135	0.717	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.87	-0.03	1	2	2249M	QPSK	50	0	10 mm	back	1:1	0.648	1.156	0.749	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	24.89	-0.08	0	2	2249M	QPSK	1	0	10 mm	front	1:1	0.587	1.151	0.676	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.95	-0.06	1	2	2249M	QPSK	25	0	10 mm	front	1:1	0.488	1.135	0.554	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	24.89	0.06	0	2	2249M	QPSK	1	0	10 mm	bottom	1:1	0.409	1.151	0.471	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.95	-0.08	1	2	2249M	QPSK	25	0	10 mm	bottom	1:1	0.349	1.135	0.396	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	24.89	-0.09	0	2	2249M	QPSK	1	0	10 mm	right	1:1	0.379	1.151	0.436	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.95	-0.05	1	2	2249M	QPSK	25	0	10 mm	right	1:1	0.296	1.135	0.336	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	24.89	0.07	0	2	2249M	QPSK	1	0	10 mm	left	1:1	0.153	1.151	0.176	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	23.95	-0.02	1	2	2249M	QPSK	25	0	10 mm	left	1:1	0.109	1.135	0.124	
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 11-27
LTE Band 4 (AWS) Hotspot SAR

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)	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.97	-0.03	0	0	2244M	QPSK	1	0	10 mm	back	1:1	0.358	1.007	0.361	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.80	-0.03	0	0	2244M	QPSK	50	25	10 mm	back	1:1	0.372	1.047	0.389	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.97	0.08	0	0	2244M	QPSK	1	0	10 mm	front	1:1	0.272	1.007	0.274	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.80	-0.01	0	0	2244M	QPSK	50	25	10 mm	front	1:1	0.285	1.047	0.298	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.97	-0.02	0	0	2244M	QPSK	1	0	10 mm	bottom	1:1	0.545	1.007	0.549	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.80	-0.02	0	0	2244M	QPSK	50	25	10 mm	bottom	1:1	0.562	1.047	0.588	A32
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.97	0.16	0	0	2244M	QPSK	1	0	10 mm	right	1:1	0.039	1.007	0.039	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.80	0.12	0	0	2244M	QPSK	50	25	10 mm	right	1:1	0.048	1.047	0.050	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.97	0.14	0	0	2244M	QPSK	1	0	10 mm	left	1:1	0.095	1.007	0.096	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.80	0.03	0	0	2244M	QPSK	50	25	10 mm	left	1:1	0.100	1.047	0.105	
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 11-28
LTE Band 25 (PCS) Hotspot SAR

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)	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	20.5	20.34	-0.04	0	1	2247M	QPSK	1	0	10 mm	back	1:1	0.426	1.038	0.442	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	20.5	20.35	-0.04	0	1	2247M	QPSK	50	0	10 mm	back	1:1	0.442	1.035	0.457	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	20.5	20.34	0.02	0	1	2247M	QPSK	1	0	10 mm	front	1:1	0.351	1.038	0.364	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	20.5	20.35	-0.03	0	1	2247M	QPSK	50	0	10 mm	front	1:1	0.362	1.035	0.375	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	20.5	20.34	-0.06	0	1	2247M	QPSK	1	0	10 mm	bottom	1:1	0.748	1.038	0.776	
1860.00	26140	Low	LTE Band 25 (PCS)	20	20.5	20.34	-0.06	0	1	2247M	QPSK	50	25	10 mm	bottom	1:1	0.739	1.038	0.767	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	20.5	20.35	-0.04	0	1	2247M	QPSK	50	0	10 mm	bottom	1:1	0.796	1.035	0.824	
1905.00	26590	High	LTE Band 25 (PCS)	20	20.5	20.19	-0.05	0	1	2247M	QPSK	50	0	10 mm	bottom	1:1	0.852	1.074	0.915	
1860.00	26140	Low	LTE Band 25 (PCS)	20	20.5	20.33	-0.05	0	1	2247M	QPSK	100	0	10 mm	bottom	1:1	0.731	1.040	0.760	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	20.5	20.34	0.05	0	1	2247M	QPSK	1	0	10 mm	right	1:1	0.052	1.038	0.054	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	20.5	20.35	0.06	0	1	2247M	QPSK	50	0	10 mm	right	1:1	0.059	1.035	0.061	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	20.5	20.34	-0.04	0	1	2247M	QPSK	1	0	10 mm	left	1:1	0.101	1.038	0.105	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	20.5	20.35	-0.07	0	1	2247M	QPSK	50	0	10 mm	left	1:1	0.106	1.035	0.110	
1905.00	26590	High	LTE Band 25 (PCS)	20	20.5	20.19	-0.04	0	1	2247M	QPSK	50	0	10 mm	bottom	1:1	0.884	1.074	0.949	A34
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: Blue entries represent variability measurements.

Table 11-29
LTE Band 41 Hotspot 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]	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	2506.00	39750	Low	LTE Band 41	20	23.0	22.54	0.00	0	2244M	QPSK	1	99	10 mm	back	1:1.58	0.466	1.112	0.518	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.73	-0.02	0	2244M	QPSK	50	50	10 mm	back	1:1.58	0.491	1.064	0.522	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.54	0.06	0	2244M	QPSK	1	99	10 mm	front	1:1.58	0.258	1.112	0.287	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.73	0.02	0	2244M	QPSK	50	50	10 mm	front	1:1.58	0.276	1.064	0.294	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.54	-0.01	0	2244M	QPSK	1	99	10 mm	bottom	1:1.58	0.633	1.112	0.704	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	23.0	22.43	0.00	0	2244M	QPSK	1	0	10 mm	bottom	1:1.58	0.530	1.140	0.604	
1 CC Uplink	N/A	2593.00	40620	Mid	LTE Band 41	20	23.0	22.13	-0.01	0	2244M	QPSK	1	0	10 mm	bottom	1:1.58	0.422	1.222	0.516	
1 CC Uplink	N/A	2636.50	41055	Mid-High	LTE Band 41	20	23.0	22.13	-0.04	0	2244M	QPSK	1	0	10 mm	bottom	1:1.58	0.495	1.222	0.605	
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	23.0	22.11	-0.17	0	2244M	QPSK	1	0	10 mm	bottom	1:1.58	0.515	1.227	0.632	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.73	-0.01	0	2244M	QPSK	50	50	10 mm	bottom	1:1.58	0.689	1.064	0.733	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	23.0	22.67	-0.12	0	2244M	QPSK	50	0	10 mm	bottom	1:1.58	0.526	1.079	0.568	
1 CC Uplink	N/A	2593.00	40620	Mid	LTE Band 41	20	23.0	22.24	0.04	0	2244M	QPSK	50	0	10 mm	bottom	1:1.58	0.432	1.191	0.515	
1 CC Uplink	N/A	2636.50	41055	Mid-High	LTE Band 41	20	23.0	22.33	-0.10	0	2244M	QPSK	50	0	10 mm	bottom	1:1.58	0.503	1.167	0.587	
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	23.0	22.33	-0.19	0	2244M	QPSK	50	0	10 mm	bottom	1:1.58	0.532	1.167	0.621	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.53	0.05	0	2244M	QPSK	100	0	10 mm	bottom	1:1.58	0.702	1.114	0.782	
2 CC Uplink	PCC	2506.00	39750	Low	LTE Band 41	20	23.0	22.39	0.00	0	2244M	QPSK	100	0	10 mm	bottom	1:1.58	0.710	1.151	0.817	A36
	SCC	2525.80	39948	Low		20							100	0							
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.54	-0.04	0	2244M	QPSK	1	99	10 mm	left	1:1.58	0.084	1.112	0.093	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.73	-0.07	0	2244M	QPSK	50	50	10 mm	left	1:1.58	0.083	1.064	0.088	
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 11-30
WLAN SISO Hotspot SAR

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)	
2437	6	802.11b	DSSS	22	20.0	19.65	0.19	10 mm	1	2317M	1	back	99.9	0.202	0.183	1.084	1.001	0.199	
2437	6	802.11b	DSSS	22	20.0	19.65	0.20	10 mm	1	2317M	1	front	99.9	0.138	-	1.084	1.001	-	
2437	6	802.11b	DSSS	22	20.0	19.65	0.11	10 mm	1	2317M	1	top	99.9	0.163	-	1.084	1.001	-	
2437	6	802.11b	DSSS	22	20.0	19.65	0.19	10 mm	1	2317M	1	left	99.9	0.244	0.193	1.084	1.001	0.209	A38
2437	6	802.11b	DSSS	22	19.0	18.89	0.16	10 mm	2	2317M	1	back	99.9	0.057	0.057	1.026	1.001	0.059	
2437	6	802.11b	DSSS	22	19.0	18.89	0.18	10 mm	2	2317M	1	front	99.9	0.033	-	1.026	1.001	-	
2437	6	802.11b	DSSS	22	19.0	18.89	0.13	10 mm	2	2317M	1	top	99.9	0.064	0.052	1.026	1.001	0.053	
2437	6	802.11b	DSSS	22	19.0	18.89	0.18	10 mm	2	2317M	1	left	99.9	0.005	-	1.026	1.001	-	
5745	149	802.11a	OFDM	20	18.0	17.93	-0.19	10 mm	1	2245M	6	back	98.8	0.617	0.288	1.016	1.012	0.296	
5745	149	802.11a	OFDM	20	18.0	17.93	-0.12	10 mm	1	2245M	6	front	98.8	0.110	-	1.016	1.012	-	
5745	149	802.11a	OFDM	20	18.0	17.93	0.14	10 mm	1	2245M	6	top	98.8	0.383	-	1.016	1.012	-	
5745	149	802.11a	OFDM	20	18.0	17.93	0.19	10 mm	1	2245M	6	left	98.8	0.507	-	1.016	1.012	-	
5745	149	802.11a	OFDM	20	18.0	17.77	0.06	10 mm	2	2245M	6	back	98.9	1.349	0.588	1.054	1.011	0.627	
5785	157	802.11a	OFDM	20	18.0	17.42	-0.11	10 mm	2	2245M	6	back	98.9	1.437	0.642	1.143	1.011	0.742	
5825	165	802.11a	OFDM	20	18.0	17.40	0.09	10 mm	2	2245M	6	back	98.9	0.914	0.522	1.148	1.011	0.606	
5745	149	802.11a	OFDM	20	18.0	17.77	0.20	10 mm	2	2245M	6	front	98.9	0.028	0.015	1.054	1.011	0.016	
5745	149	802.11a	OFDM	20	18.0	17.77	0.20	10 mm	2	2245M	6	top	98.9	0.222	-	1.054	1.011	-	
5745	149	802.11a	OFDM	20	18.0	17.77	0.20	10 mm	2	2245M	6	left	98.9	0.337	0.133	1.054	1.011	0.142	
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 11-31
WLAN MIMO Hotspot SAR

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)	
5745	149	802.11n	OFDM	20	18.0	17.84	18.0	17.76	0.10	10 mm	MIMO	2245M	13	back	98.7	1.648	0.711	1.057	1.013	0.761	A40
5785	157	802.11n	OFDM	20	18.0	17.97	18.0	17.84	-0.07	10 mm	MIMO	2245M	13	back	98.7	1.451	0.699	1.038	1.013	0.735	
5825	165	802.11n	OFDM	20	18.0	17.84	18.0	17.35	-0.05	10 mm	MIMO	2245M	13	back	98.7	1.327	0.629	1.161	1.013	0.740	
5785	157	802.11n	OFDM	20	18.0	17.97	18.0	17.84	-0.14	10 mm	MIMO	2245M	13	front	98.7	0.135	0.045	1.038	1.013	0.047	
5785	157	802.11n	OFDM	20	18.0	17.97	18.0	17.84	0.17	10 mm	MIMO	2245M	13	top	98.7	0.405	-	1.038	1.013	-	
5785	157	802.11n	OFDM	20	18.0	17.97	18.0	17.84	0.12	10 mm	MIMO	2245M	13	left	98.7	0.660	0.279	1.038	1.013	0.293	
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 dBm maximum allowed MIMO power shown in the documentation, each antenna transmits at a maximum allowed power of 18 dBm.

Table 11-32
WLAN MIMO Hotspot SAR for Conditions with 2.4 GHz and 5 GHz WLAN SAR

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)	
5775	155	802.11ac	OFDM	80	14.0	13.97	14.0	13.44	0.07	10 mm	MIMO	2245M	58.5	back	98.0	0.557	0.260	1.138	1.020	0.302	
5775	155	802.11ac	OFDM	80	14.0	13.97	14.0	13.44	0.20	10 mm	MIMO	2245M	58.5	front	98.0	0.038	0.013	1.138	1.020	0.015	
5775	155	802.11ac	OFDM	80	14.0	13.97	14.0	13.44	-0.12	10 mm	MIMO	2245M	58.5	top	98.0	0.144	-	1.138	1.020	-	
5775	155	802.11ac	OFDM	80	14.0	13.97	14.0	13.44	0.18	10 mm	MIMO	2245M	58.5	left	98.0	0.243	-	1.138	1.020	-	
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 were 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 NII MIMO.

Table 11-33
DSS Hotspot SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	18.5	18.37	-0.08	10 mm	2245M	1	back	77.1	0.199	1.030	1.297	0.266	A42
2441	39	Bluetooth	FHSS	18.5	18.37	-0.05	10 mm	2245M	1	front	77.1	0.136	1.030	1.297	0.182	
2441	39	Bluetooth	FHSS	18.5	18.37	-0.10	10 mm	2245M	1	top	77.1	0.133	1.030	1.297	0.178	
2441	39	Bluetooth	FHSS	18.5	18.37	0.02	10 mm	2245M	1	left	77.1	0.188	1.030	1.297	0.251	
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 11-34
GPRS/UMTS Phablet SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Ant State	Device Serial Number	# of GPRS Slots	Duty Cycle	Side	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
1850.20	512	GSM 1900	GPRS	27.5	26.86	-0.13	7 mm	N/A	2248M	3	1:2.76	back	0.426	1.159	0.494	
1850.20	512	GSM 1900	GPRS	27.5	26.86	-0.02	5 mm	N/A	2248M	3	1:2.76	front	0.534	1.159	0.619	
1850.20	512	GSM 1900	GPRS	27.5	26.86	0.06	9 mm	N/A	2248M	3	1:2.76	bottom	0.559	1.159	0.648	
1850.20	512	GSM 1900	GPRS	27.5	26.86	0.02	0 mm	N/A	2248M	3	1:2.76	right	0.151	1.159	0.175	
1850.20	512	GSM 1900	GPRS	27.5	26.86	-0.09	0 mm	N/A	2248M	3	1:2.76	left	0.275	1.159	0.319	
1850.20	512	GSM 1900	GPRS	25.5	24.93	0.12	0 mm	N/A	2248M	3	1:2.76	back	1.330	1.140	1.516	
1850.20	512	GSM 1900	GPRS	25.5	24.93	-0.01	0 mm	N/A	2248M	3	1:2.76	front	1.020	1.140	1.163	
1850.20	512	GSM 1900	GPRS	25.5	24.93	-0.05	0 mm	N/A	2248M	3	1:2.76	bottom	2.110	1.140	2.405	A43
1880.00	661	GSM 1900	GPRS	25.5	24.92	0.06	0 mm	N/A	2248M	3	1:2.76	bottom	2.010	1.143	2.297	
1909.80	810	GSM 1900	GPRS	25.5	24.21	0.03	0 mm	N/A	2248M	3	1:2.76	bottom	1.830	1.346	2.463	
1880.00	9400	UMTS 1900	RMC	24.5	24.11	-0.07	7 mm	1	2247M	N/A	1:1	back	0.766	1.094	0.838	
1880.00	9400	UMTS 1900	RMC	24.5	24.11	0.06	5 mm	1	2247M	N/A	1:1	front	0.862	1.094	0.943	
1880.00	9400	UMTS 1900	RMC	24.5	24.11	-0.04	9 mm	1	2247M	N/A	1:1	bottom	1.130	1.094	1.236	
1880.00	9400	UMTS 1900	RMC	24.5	24.11	-0.13	0 mm	1	2247M	N/A	1:1	right	0.165	1.094	0.181	
1880.00	9400	UMTS 1900	RMC	24.5	24.11	-0.08	0 mm	1	2247M	N/A	1:1	left	0.587	1.094	0.642	
1852.40	9262	UMTS 1900	RMC	22.0	21.78	-0.05	0 mm	1	2247M	N/A	1:1	back	2.050	1.052	2.157	
1880.00	9400	UMTS 1900	RMC	22.0	21.70	0.01	0 mm	1	2247M	N/A	1:1	back	2.190	1.072	2.348	
1907.60	9538	UMTS 1900	RMC	22.0	21.37	0.06	0 mm	1	2247M	N/A	1:1	back	2.230	1.156	2.578	
1880.00	9400	UMTS 1900	RMC	22.0	21.70	0.07	0 mm	1	2247M	N/A	1:1	front	1.390	1.072	1.490	
1852.40	9262	UMTS 1900	RMC	22.0	21.78	-0.04	0 mm	1	2247M	N/A	1:1	bottom	2.680	1.052	2.819	
1880.00	9400	UMTS 1900	RMC	22.0	21.70	-0.04	0 mm	1	2247M	N/A	1:1	bottom	2.840	1.072	3.044	A44
1907.60	9538	UMTS 1900	RMC	22.0	21.37	-0.03	0 mm	1	2247M	N/A	1:1	bottom	2.490	1.156	2.878	
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 11-35
LTE FDD Phablet SAR

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 (10g) (W/kg)	Scaling Factor	Reported SAR (10g) (W/kg)	Plot #
MHz	Ch.																			
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.93	-0.05	0	0	2244M	QPSK	1	0	7 mm	back	1:1	0.798	1.016	0.811	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.89	-0.04	1	0	2244M	QPSK	50	0	7 mm	back	1:1	0.664	1.026	0.681	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.93	0.13	0	0	2244M	QPSK	1	0	5 mm	front	1:1	0.822	1.016	0.835	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.89	0.09	1	0	2244M	QPSK	50	0	5 mm	front	1:1	0.682	1.026	0.700	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.93	-0.05	0	0	2244M	QPSK	1	0	9 mm	bottom	1:1	0.965	1.016	0.980	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.89	-0.05	1	0	2244M	QPSK	50	0	9 mm	bottom	1:1	0.792	1.026	0.813	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.93	0.13	0	0	2244M	QPSK	1	0	0 mm	right	1:1	0.198	1.016	0.201	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.89	0.02	1	0	2244M	QPSK	50	0	0 mm	right	1:1	0.168	1.026	0.172	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	25.0	24.93	0.01	0	0	2244M	QPSK	1	0	0 mm	left	1:1	0.510	1.016	0.518	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.89	-0.07	1	0	2244M	QPSK	50	0	0 mm	left	1:1	0.426	1.026	0.437	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	21.42	-0.08	0	0	2244M	QPSK	1	0	0 mm	back	1:1	1.320	1.019	1.345	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	21.31	-0.06	0	0	2244M	QPSK	50	0	0 mm	back	1:1	1.360	1.045	1.421	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	21.42	0.10	0	0	2244M	QPSK	1	0	0 mm	front	1:1	0.963	1.019	0.981	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	21.31	0.11	0	0	2244M	QPSK	50	0	0 mm	front	1:1	0.990	1.045	1.035	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	21.42	-0.03	0	0	2244M	QPSK	1	0	0 mm	bottom	1:1	2.230	1.019	2.272	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	21.31	-0.03	0	0	2244M	QPSK	50	0	0 mm	bottom	1:1	2.320	1.045	2.424	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	21.27	-0.04	0	0	2244M	QPSK	100	0	0 mm	bottom	1:1	2.300	1.054	2.424	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.5	21.31	0.02	0	0	2244M	QPSK	50	0	0 mm	bottom	1:1	2.320	1.045	2.424	A45
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.16	0.03	0	1	2249M	QPSK	1	0	7 mm	back	1:1	0.874	1.213	1.060	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.30	-0.03	1	1	2249M	QPSK	50	0	7 mm	back	1:1	0.702	1.175	0.825	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.16	0.02	0	1	2249M	QPSK	1	0	5 mm	front	1:1	1.020	1.213	1.237	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.30	0.00	1	1	2249M	QPSK	50	0	5 mm	front	1:1	0.821	1.175	0.965	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.16	-0.03	0	1	2249M	QPSK	1	0	9 mm	bottom	1:1	1.290	1.213	1.565	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.30	-0.04	1	1	2249M	QPSK	50	0	9 mm	bottom	1:1	1.020	1.175	1.199	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.16	-0.02	0	1	2249M	QPSK	1	0	0 mm	right	1:1	0.354	1.213	0.429	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.30	-0.04	1	1	2249M	QPSK	50	0	0 mm	right	1:1	0.287	1.175	0.337	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.16	-0.21	0	1	2249M	QPSK	1	0	0 mm	left	1:1	0.631	1.213	0.765	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.30	-0.19	1	1	2249M	QPSK	50	0	0 mm	left	1:1	0.517	1.175	0.607	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.5	21.32	-0.01	0	1	2249M	QPSK	1	0	0 mm	back	1:1	1.910	1.042	1.990	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.5	21.40	0.01	0	1	2249M	QPSK	1	0	0 mm	back	1:1	2.050	1.023	2.097	
1905.00	26590	High	LTE Band 25 (PCS)	20	21.5	21.32	0.10	0	1	2249M	QPSK	1	0	0 mm	back	1:1	2.210	1.042	2.303	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.5	21.46	0.08	0	1	2249M	QPSK	50	0	0 mm	back	1:1	1.930	1.009	1.947	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.5	21.47	-0.02	0	1	2249M	QPSK	50	0	0 mm	back	1:1	2.130	1.007	2.145	
1905.00	26590	High	LTE Band 25 (PCS)	20	21.5	21.34	0.14	0	1	2249M	QPSK	50	0	0 mm	back	1:1	2.250	1.038	2.336	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.5	21.39	0.11	0	1	2249M	QPSK	100	0	0 mm	back	1:1	2.150	1.026	2.206	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.5	21.40	0.00	0	1	2249M	QPSK	1	0	0 mm	front	1:1	1.710	1.023	1.749	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.5	21.47	0.01	0	1	2249M	QPSK	50	0	0 mm	front	1:1	1.760	1.007	1.772	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.5	21.32	0.00	0	1	2249M	QPSK	1	0	0 mm	bottom	1:1	2.710	1.042	2.824	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.5	21.40	0.04	0	1	2249M	QPSK	1	0	0 mm	bottom	1:1	2.910	1.023	2.977	
1905.00	26590	High	LTE Band 25 (PCS)	20	21.5	21.32	0.12	0	1	2249M	QPSK	1	0	0 mm	bottom	1:1	2.970	1.042	3.095	
1860.00	26140	Low	LTE Band 25 (PCS)	20	21.5	21.46	0.13	0	1	2249M	QPSK	50	0	0 mm	bottom	1:1	2.760	1.009	2.785	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.5	21.47	-0.01	0	1	2249M	QPSK	50	0	0 mm	bottom	1:1	3.000	1.007	3.021	
1905.00	26590	High	LTE Band 25 (PCS)	20	21.5	21.34	0.11	0	1	2249M	QPSK	50	0	0 mm	bottom	1:1	3.040	1.038	3.156	A46
1882.50	26365	Mid	LTE Band 25 (PCS)	20	21.5	21.39	0.14	0	1	2249M	QPSK	100	0	0 mm	bottom	1:1	2.840	1.026	2.914	
1905.00	26590	High	LTE Band 25 (PCS)	20	21.5	21.34	0.04	0	1	2249M	QPSK	50	0	0 mm	bottom	1:1	3.030	1.038	3.145	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population											Phablet 4.0 W/kg (mW/g) averaged over 10 grams									

Note: Blue entries represent variability measurements.

Table 11-36
LTE TDD 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]	Device 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	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.45	-0.03	0	2244M	QPSK	1	0	7 mm	back	1:1.58	0.250	1.135	0.284	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.72	-0.01	1	2244M	QPSK	50	0	7 mm	back	1:1.58	0.197	1.067	0.210	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.45	0.08	0	2244M	QPSK	1	0	5 mm	front	1:1.58	0.203	1.135	0.230	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.72	-0.03	1	2244M	QPSK	50	0	5 mm	front	1:1.58	0.162	1.067	0.173	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.45	-0.11	0	2244M	QPSK	1	0	9 mm	bottom	1:1.58	0.256	1.135	0.291	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.72	-0.06	1	2244M	QPSK	50	0	9 mm	bottom	1:1.58	0.206	1.067	0.220	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.45	-0.12	0	2244M	QPSK	1	0	0 mm	left	1:1.58	0.336	1.135	0.381	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.72	-0.12	1	2244M	QPSK	50	0	0 mm	left	1:1.58	0.281	1.067	0.300	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.54	-0.13	0	2244M	QPSK	1	99	0 mm	back	1:1.58	1.560	1.112	1.735	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	23.0	22.43	-0.16	0	2244M	QPSK	1	0	0 mm	back	1:1.58	1.820	1.140	2.075	
1 CC Uplink	N/A	2593.00	40620	Mid	LTE Band 41	20	23.0	22.13	-0.16	0	2244M	QPSK	1	0	0 mm	back	1:1.58	1.740	1.222	2.126	
1 CC Uplink	N/A	2636.50	41055	Mid-High	LTE Band 41	20	23.0	22.13	-0.11	0	2244M	QPSK	1	0	0 mm	back	1:1.58	2.010	1.222	2.456	
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	23.0	22.11	0.10	0	2244M	QPSK	1	0	0 mm	back	1:1.58	2.000	1.227	2.454	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.73	-0.11	0	2244M	QPSK	50	50	0 mm	back	1:1.58	1.640	1.064	1.745	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	23.0	22.67	-0.15	0	2244M	QPSK	50	0	0 mm	back	1:1.58	1.860	1.079	2.007	
1 CC Uplink	N/A	2593.00	40620	Mid	LTE Band 41	20	23.0	22.24	-0.11	0	2244M	QPSK	50	0	0 mm	back	1:1.58	1.790	1.191	2.132	
1 CC Uplink	N/A	2636.50	41055	Mid-High	LTE Band 41	20	23.0	22.33	0.02	0	2244M	QPSK	50	0	0 mm	back	1:1.58	2.090	1.167	2.439	
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	23.0	22.33	0.17	0	2244M	QPSK	50	0	0 mm	back	1:1.58	2.130	1.167	2.486	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.53	0.10	0	2244M	QPSK	100	0	0 mm	back	1:1.58	1.880	1.114	2.094	
2 CC Uplink	PCC	2680.00	41490	High	LTE Band 41	20	23.0	22.91	-0.17	0	2244M	QPSK	50	0	0 mm	back	1:1.58	2.540	1.021	2.593	A47
	SCC	2660.20	41292	High		20							50	50							
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.54	0.17	0	2244M	QPSK	1	99	0 mm	front	1:1.58	0.826	1.112	0.919	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.73	0.14	0	2244M	QPSK	50	50	0 mm	front	1:1.58	0.863	1.064	0.918	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.54	-0.16	0	2244M	QPSK	1	99	0 mm	bottom	1:1.58	1.360	1.112	1.512	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	23.0	22.43	-0.19	0	2244M	QPSK	1	0	0 mm	bottom	1:1.58	1.360	1.140	1.550	
1 CC Uplink	N/A	2593.00	40620	Mid	LTE Band 41	20	23.0	22.13	0.12	0	2244M	QPSK	1	0	0 mm	bottom	1:1.58	1.310	1.222	1.601	
1 CC Uplink	N/A	2636.50	41055	Mid-High	LTE Band 41	20	23.0	22.13	-0.10	0	2244M	QPSK	1	0	0 mm	bottom	1:1.58	1.650	1.222	2.016	
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	23.0	22.11	-0.04	0	2244M	QPSK	1	0	0 mm	bottom	1:1.58	1.640	1.227	2.012	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.73	-0.10	0	2244M	QPSK	50	50	0 mm	bottom	1:1.58	1.440	1.064	1.532	
1 CC Uplink	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	23.0	22.67	-0.12	0	2244M	QPSK	50	0	0 mm	bottom	1:1.58	1.400	1.079	1.511	
1 CC Uplink	N/A	2593.00	40620	Mid	LTE Band 41	20	23.0	22.24	0.14	0	2244M	QPSK	50	0	0 mm	bottom	1:1.58	1.370	1.191	1.632	
1 CC Uplink	N/A	2636.50	41055	Mid-High	LTE Band 41	20	23.0	22.33	-0.02	0	2244M	QPSK	50	0	0 mm	bottom	1:1.58	1.720	1.167	2.007	
1 CC Uplink	N/A	2680.00	41490	High	LTE Band 41	20	23.0	22.33	-0.14	0	2244M	QPSK	50	0	0 mm	bottom	1:1.58	1.710	1.167	1.996	
1 CC Uplink	N/A	2506.00	39750	Low	LTE Band 41	20	23.0	22.53	-0.14	0	2244M	QPSK	100	0	0 mm	bottom	1:1.58	1.480	1.114	1.649	
2 CC Uplink	PCC	2680.00	41490	High	LTE Band 41	20	23.0	22.91	0.01	0	2244M	QPSK	50	0	0 mm	back	1:1.58	2.420	1.021	2.471	
	SCC	2660.20	41292	High		20							50	50							

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Note: Blue entries represent variability measurements.

Table 11-37
WLAN SISO 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)	
5300	60	802.11a	OFDM	20	18.0	17.97	0.10	0 mm	1	2245M	6	back	98.8	9.750	0.778	1.007	1.012	0.793	
5300	60	802.11a	OFDM	20	18.0	17.97	0.18	0 mm	1	2245M	6	front	98.8	3.883	-	1.007	1.012	-	
5300	60	802.11a	OFDM	20	18.0	17.97	-0.10	0 mm	1	2245M	6	top	98.8	6.381	-	1.007	1.012	-	
5300	60	802.11a	OFDM	20	18.0	17.97	0.05	0 mm	1	2245M	6	left	98.8	11.408	0.947	1.007	1.012	0.965	
5280	56	802.11a	OFDM	20	18.0	17.91	0.16	0 mm	2	2245M	6	back	98.9	9.746	1.920	1.021	1.011	1.982	
5300	60	802.11a	OFDM	20	18.0	17.90	-0.12	0 mm	2	2245M	6	back	98.9	17.599	2.170	1.023	1.011	2.244	
5280	56	802.11a	OFDM	20	18.0	17.91	0.20	0 mm	2	2245M	6	front	98.9	0.211	0.019	1.021	1.011	0.020	
5280	56	802.11a	OFDM	20	18.0	17.91	0.16	0 mm	2	2245M	6	top	98.9	0.437	-	1.021	1.011	-	
5280	56	802.11a	OFDM	20	18.0	17.91	-0.11	0 mm	2	2245M	6	left	98.9	1.701	0.160	1.021	1.011	0.165	
5620	124	802.11a	OFDM	20	18.0	17.89	0.16	0 mm	1	2245M	6	back	98.8	18.650	1.040	1.026	1.012	1.080	
5620	124	802.11a	OFDM	20	18.0	17.89	0.20	0 mm	1	2245M	6	front	98.8	3.704	-	1.026	1.012	-	
5620	124	802.11a	OFDM	20	18.0	17.89	0.10	0 mm	1	2245M	6	top	98.8	6.714	-	1.026	1.012	-	
5620	124	802.11a	OFDM	20	18.0	17.89	-0.05	0 mm	1	2245M	6	left	98.8	10.912	0.986	1.026	1.012	1.024	
5500	100	802.11a	OFDM	20	18.0	17.56	0.20	0 mm	2	2245M	6	back	98.9	11.139	1.860	1.107	1.011	2.082	
5600	120	802.11a	OFDM	20	18.0	17.78	0.17	0 mm	2	2245M	6	back	98.9	14.017	2.300	1.052	1.011	2.446	
5720	144	802.11a	OFDM	20	18.0	17.79	0.15	0 mm	2	2245M	6	back	98.9	13.466	2.540	1.050	1.011	**2.696**	
5720	144	802.11a	OFDM	20	18.0	17.79	0.00	0 mm	2	2245M	6	front	98.9	0.283	0.034	1.050	1.011	0.036	
5720	144	802.11a	OFDM	20	18.0	17.79	0.03	0 mm	2	2245M	6	top	98.9	0.767	-	1.050	1.011	-	
5720	144	802.11a	OFDM	20	18.0	17.79	0.02	0 mm	2	2245M	6	left	98.9	2.432	0.232	1.050	1.011	0.246	
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Table 11-38
WLAN MIMO Phablet 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)	
5280	56	802.11n	OFDM	20	18.0	17.61	18.0	17.64	0.13	0 mm	MIMO	2245M	13	back	98.7	45.422	2.450	1.094	1.013	2.715	
5300	60	802.11n	OFDM	20	18.0	17.74	18.0	17.60	0.06	0 mm	MIMO	2245M	13	back	98.7	21.683	2.410	1.096	1.013	2.676	
5300	60	802.11n	OFDM	20	18.0	17.74	18.0	17.60	-0.02	0 mm	MIMO	2245M	13	front	98.7	2.462	0.401	1.096	1.013	0.445	
5300	60	802.11n	OFDM	20	18.0	17.74	18.0	17.60	-0.06	0 mm	MIMO	2245M	13	top	98.7	5.593	-	1.096	1.013	-	
5300	60	802.11n	OFDM	20	18.0	17.74	18.0	17.60	0.15	0 mm	MIMO	2245M	13	left	98.7	9.642	0.878	1.096	1.013	0.975	
5500	100	802.11n	OFDM	20	18.0	17.73	18.0	17.61	-0.14	0 mm	MIMO	2245M	13	back	98.7	42.429	2.280	1.094	1.013	2.527	
5600	120	802.11n	OFDM	20	18.0	17.94	18.0	17.81	0.06	0 mm	MIIMO	2245M	13	back	98.7	42.991	2.450	1.045	1.013	2.594	
5720	144	802.11n	OFDM	20	18.0	17.98	18.0	17.75	0.03	0 mm	MIMO	2245M	13	back	98.7	57.116	2.560	1.059	1.013	2.746	A48
5600	120	802.11n	OFDM	20	18.0	17.94	18.0	17.81	-0.05	0 mm	MIMO	2245M	13	front	98.7	1.728	0.360	1.045	1.013	0.381	
5600	120	802.11n	OFDM	20	18.0	17.94	18.0	17.81	0.21	0 mm	MIMO	2245M	13	top	98.7	4.943	-	1.045	1.013	-	
5600	120	802.11n	OFDM	20	18.0	17.94	18.0	17.81	0.14	0 mm	MIMO	2245M	13	left	98.7	9.514	0.902	1.045	1.013	0.955	
5280	56	802.11n	OFDM	20	18.0	17.61	18.0	17.64	0.17	0 mm	MIMO	2245M	13	back	98.7	39.086	2.380	1.094	1.013	2.638	
5600	120	802.11n	OFDM	20	18.0	17.94	18.0	17.81	-0.17	0 mm	MIIMO	2245M	13	back	98.7	44.836	2.410	1.045	1.013	2.551	
5720	144	802.11n	OFDM	20	18.0	17.98	18.0	17.75	0.03	0 mm	MIMO	2245M	13	back	98.7	31.284	2.510	1.059	1.013	2.693	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Phablet 4.0 W/kg (mW/g) averaged over 10 grams											

Notes:

1. To achieve the 21 dBm maximum allowed MIMO power shown in the documentation, each antenna transmits at a maximum allowed power of 18 dBm.
2. Blue entries represent variability measurements.

11.5 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 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.
8. 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. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 13 for variability analysis.
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).

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 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 41, 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, hotspot, and phablet 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. Please see Section 12 for complete analysis.
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.

Bluetooth Notes

1. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation and Tx Tests test mode type. Per October 2016 TCB Workshop Notes, the reported SAR was scaled to the 100% transmission duty factor to determine compliance. See Section 9.5 for the time domain plot and calculation for the duty factor of the device.
2. Head and hotspot Bluetooth SAR were evaluated for BT BR tethering applications.

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.

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

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

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	1+2+3
Head SAR	GSM 850	0.179	0.206	0.183	0.385	0.362	0.568
	GSM 1900	0.081	0.206	0.183	0.287	0.264	0.470
	UMTS 850	0.281	0.206	0.183	0.487	0.464	0.670
	UMTS 1900	0.158	0.206	0.183	0.364	0.341	0.547
	LTE Band 12	0.246	0.206	0.183	0.452	0.429	0.635
	LTE Band 13	0.173	0.206	0.183	0.379	0.356	0.562
	LTE Band 26 (Cell)	0.301	0.206	0.183	0.507	0.484	**0.690**
	LTE Band 5 (Cell)	0.298	0.206	0.183	0.504	0.481	0.687
	LTE Band 4 (AWS)	0.168	0.206	0.183	0.374	0.351	0.557
	LTE Band 25 (PCS)	0.204	0.206	0.183	0.410	0.387	0.593
	LTE Band 41	0.048	0.206	0.183	0.254	0.231	0.437

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

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
Head SAR	GSM 850	0.179	0.247	0.049	0.426	0.228	0.475
	GSM 1900	0.081	0.247	0.049	0.328	0.130	0.377
	UMTS 850	0.281	0.247	0.049	0.528	0.330	0.577
	UMTS 1900	0.158	0.247	0.049	0.405	0.207	0.454
	LTE Band 12	0.246	0.247	0.049	0.493	0.295	0.542
	LTE Band 13	0.173	0.247	0.049	0.420	0.222	0.469
	LTE Band 26 (Cell)	0.301	0.247	0.049	0.548	0.350	**0.597**
	LTE Band 5 (Cell)	0.298	0.247	0.049	0.545	0.347	0.594
	LTE Band 4 (AWS)	0.168	0.247	0.049	0.415	0.217	0.464
	LTE Band 25 (PCS)	0.204	0.247	0.049	0.451	0.253	0.500
	LTE Band 41	0.048	0.247	0.049	0.295	0.097	0.344

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

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)	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	GSM 850	0.179	0.206	0.183	0.247	0.049	0.864
	GSM 1900	0.081	0.206	0.183	0.247	0.049	0.766
	UMTS 850	0.281	0.206	0.183	0.247	0.049	0.966
	UMTS 1900	0.158	0.206	0.183	0.247	0.049	0.843
	LTE Band 12	0.246	0.206	0.183	0.247	0.049	0.931
	LTE Band 13	0.173	0.206	0.183	0.247	0.049	0.858
	LTE Band 26 (Cell)	0.301	0.206	0.183	0.247	0.049	**0.986**
	LTE Band 5 (Cell)	0.298	0.206	0.183	0.247	0.049	0.983
	LTE Band 4 (AWS)	0.168	0.206	0.183	0.247	0.049	0.853
	LTE Band 25 (PCS)	0.204	0.206	0.183	0.247	0.049	0.889
	LTE Band 41	0.048	0.206	0.183	0.247	0.049	0.733

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM 850	0.179	1.071	1.250
	GSM 1900	0.081	1.071	1.152
	UMTS 850	0.281	1.071	1.352
	UMTS 1900	0.158	1.071	1.229
	LTE Band 12	0.246	1.071	1.317
	LTE Band 13	0.173	1.071	1.244
	LTE Band 26 (Cell)	0.301	1.071	**1.372**
	LTE Band 5 (Cell)	0.298	1.071	1.369
	LTE Band 4 (AWS)	0.168	1.071	1.239
	LTE Band 25 (PCS)	0.204	1.071	1.275
	LTE Band 41	0.048	1.071	1.119

12.4 Head SAR Simultaneous Transmission Analysis for Main Band, Bluetooth, and 5GHz WLAN

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

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
Head SAR	GSM 850	0.179	1.071	0.247	1.497
	GSM 1900	0.081	1.071	0.247	1.399
	UMTS 850	0.281	1.071	0.247	See Table Below
	UMTS 1900	0.158	1.071	0.247	1.476
	LTE Band 12	0.246	1.071	0.247	**1.564**
	LTE Band 13	0.173	1.071	0.247	1.491
	LTE Band 26 (Cell)	0.301	1.071	0.247	See Table Below
	LTE Band 5 (Cell)	0.298	1.071	0.247	See Table Below
	LTE Band 4 (AWS)	0.168	1.071	0.247	1.486
	LTE Band 25 (PCS)	0.204	1.071	0.247	1.522
	LTE Band 41	0.048	1.071	0.247	1.366

Simult Tx	Configuration	UMTS 850 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	Right Cheek	0.281	1.071	0.204	**1.556**
	Right Tilt	0.136	1.034	0.247	1.417
	Left Cheek	0.212	0.330	0.247*	0.789
	Left Tilt	0.127	0.373	0.247*	0.747

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)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.301	1.071	0.204	**1.576**
	Right Tilt	0.129	1.034	0.247	1.410
	Left Cheek	0.198	0.330	0.247*	0.775
	Left Tilt	0.123	0.373	0.247*	0.743

Simult Tx	Configuration	LTE Band 5 (Cell) 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	Right Cheek	0.298	1.071	0.204	**1.573**
	Right Tilt	0.152	1.034	0.247	1.433
	Left Cheek	0.204	0.330	0.247*	0.781
	Left Tilt	0.135	0.373	0.247*	0.755

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
Head SAR	GSM 850	0.179	1.071	0.049	1.299
	GSM 1900	0.081	1.071	0.049	1.201
	UMTS 850	0.281	1.071	0.049	1.401
	UMTS 1900	0.158	1.071	0.049	1.278
	LTE Band 12	0.246	1.071	0.049	1.366
	LTE Band 13	0.173	1.071	0.049	1.293
	LTE Band 26 (Cell)	0.301	1.071	0.049	**1.421**
	LTE Band 5 (Cell)	0.298	1.071	0.049	1.418
	LTE Band 4 (AWS)	0.168	1.071	0.049	1.288
	LTE Band 25 (PCS)	0.204	1.071	0.049	1.324
	LTE Band 41	0.048	1.071	0.049	1.168

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
Head SAR	GSM 850	0.179	1.071	0.230	1.480
	GSM 1900	0.081	1.071	0.230	1.382
	UMTS 850	0.281	1.071	0.230	**1.582**
	UMTS 1900	0.158	1.071	0.230	1.459
	LTE Band 12	0.246	1.071	0.230	1.547
	LTE Band 13	0.173	1.071	0.230	1.474
	LTE Band 26 (Cell)	0.301	1.071	0.230	See Table Below
	LTE Band 5 (Cell)	0.298	1.071	0.230	See Table Below
	LTE Band 4 (AWS)	0.168	1.071	0.230	1.469
	LTE Band 25 (PCS)	0.204	1.071	0.230	1.505
	LTE Band 41	0.048	1.071	0.230	1.349

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)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.301	1.071	0.221	1.593
	Right Tilt	0.129	1.034	0.230	1.393
	Left Cheek	0.198	0.330	0.230*	0.758
	Left Tilt	0.123	0.373	0.230*	0.726

Simult Tx	Configuration	LTE Band 5 (Cell) SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.298	1.071	0.221	1.590
	Right Tilt	0.152	1.034	0.230	1.416
	Left Cheek	0.204	0.330	0.230*	0.764
	Left Tilt	0.135	0.373	0.230*	0.738

12.5 Body-Worn Simultaneous Transmission Analysis

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

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	1+2+3
Body-Worn	GSM 850	0.216	0.091	0.021	0.307	0.237	0.328
	GSM 1900	0.274	0.091	0.021	0.365	0.295	0.386
	UMTS 850	0.328	0.091	0.021	0.419	0.349	0.440
	UMTS 1900	0.539	0.091	0.021	0.630	0.560	0.651
	LTE Band 12	0.334	0.091	0.021	0.425	0.355	0.446
	LTE Band 13	0.281	0.091	0.021	0.372	0.302	0.393
	LTE Band 26 (Cell)	0.360	0.091	0.021	0.451	0.381	0.472
	LTE Band 5 (Cell)	0.407	0.091	0.021	0.498	0.428	0.519
	LTE Band 4 (AWS)	0.494	0.091	0.021	0.585	0.515	0.606
	LTE Band 25 (PCS)	0.786	0.091	0.021	0.877	0.807	**0.898**
	LTE Band 41	0.352	0.091	0.021	0.443	0.373	0.464

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

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
Body-Worn	GSM 850	0.216	0.170	0.400	0.386	0.616	0.786
	GSM 1900	0.274	0.170	0.400	0.444	0.674	0.844
	UMTS 850	0.328	0.170	0.400	0.498	0.728	0.898
	UMTS 1900	0.539	0.170	0.400	0.709	0.939	1.109
	LTE Band 12	0.334	0.170	0.400	0.504	0.734	0.904
	LTE Band 13	0.281	0.170	0.400	0.451	0.681	0.851
	LTE Band 26 (Cell)	0.360	0.170	0.400	0.530	0.760	0.930
	LTE Band 5 (Cell)	0.407	0.170	0.400	0.577	0.807	0.977
	LTE Band 4 (AWS)	0.494	0.170	0.400	0.664	0.894	1.064
	LTE Band 25 (PCS)	0.786	0.170	0.400	0.956	1.186	**1.356**
	LTE Band 41	0.352	0.170	0.400	0.522	0.752	0.922

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	2G/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
Body-Worn	GSM 850	0.216	0.091	0.021	0.170	0.400	0.898
	GSM 1900	0.274	0.091	0.021	0.170	0.400	0.956
	UMTS 850	0.328	0.091	0.021	0.170	0.400	1.010
	UMTS 1900	0.539	0.091	0.021	0.170	0.400	1.221
	LTE Band 12	0.334	0.091	0.021	0.170	0.400	1.016
	LTE Band 13	0.281	0.091	0.021	0.170	0.400	0.963
	LTE Band 26 (Cell)	0.360	0.091	0.021	0.170	0.400	1.042
	LTE Band 5 (Cell)	0.407	0.091	0.021	0.170	0.400	1.089
	LTE Band 4 (AWS)	0.494	0.091	0.021	0.170	0.400	1.176
	LTE Band 25 (PCS)	0.786	0.091	0.021	0.170	0.400	**1.468**
	LTE Band 41	0.352	0.091	0.021	0.170	0.400	1.034

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM 850	0.216	0.122	0.338
	GSM 1900	0.274	0.122	0.396
	UMTS 850	0.328	0.122	0.450
	UMTS 1900	0.539	0.122	0.661
	LTE Band 12	0.334	0.122	0.456
	LTE Band 13	0.281	0.122	0.403
	LTE Band 26 (Cell)	0.360	0.122	0.482
	LTE Band 5 (Cell)	0.407	0.122	0.529
	LTE Band 4 (AWS)	0.494	0.122	0.616
	LTE Band 25 (PCS)	0.786	0.122	**0.908**
	LTE Band 41	0.352	0.122	0.474

12.6 Body-worn SAR Simultaneous Transmission Analysis for Main Band, Bluetooth, and 5GHz WLAN

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

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	1+2+4	1+2+3+4
Body-Worn	GSM 850	0.216	0.122	0.170	0.400	0.508	0.738	0.908
	GSM 1900	0.274	0.122	0.170	0.400	0.566	0.796	0.966
	UMTS 850	0.328	0.122	0.170	0.400	0.620	0.850	1.020
	UMTS 1900	0.539	0.122	0.170	0.400	0.831	1.061	1.231
	LTE Band 12	0.334	0.122	0.170	0.400	0.626	0.856	1.026
	LTE Band 13	0.281	0.122	0.170	0.400	0.573	0.803	0.973
	LTE Band 26 (Cell)	0.360	0.122	0.170	0.400	0.652	0.882	1.052
	LTE Band 5 (Cell)	0.407	0.122	0.170	0.400	0.699	0.929	1.099
	LTE Band 4 (AWS)	0.494	0.122	0.170	0.400	0.786	1.016	1.186
	LTE Band 25 (PCS)	0.786	0.122	0.170	0.400	1.078	1.308	**1.478**
	LTE Band 41	0.352	0.122	0.170	0.400	0.644	0.874	1.044

12.7 Hotspot SAR Simultaneous Transmission Analysis

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

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	1+2+3
Hotspot SAR	GPRS 850	0.520	0.209	0.059	0.729	0.579	0.788
	GPRS 1900	1.034	0.209	0.059	1.243	1.093	**1.302**
	UMTS 850	0.717	0.209	0.059	0.926	0.776	0.985
	UMTS 1900	0.876	0.209	0.059	1.085	0.935	1.144
	LTE Band 12	0.465	0.209	0.059	0.674	0.524	0.733
	LTE Band 13	0.538	0.209	0.059	0.747	0.597	0.806
	LTE Band 26 (Cell)	0.747	0.209	0.059	0.956	0.806	1.015
	LTE Band 5 (Cell)	0.868	0.209	0.059	1.077	0.927	1.136
	LTE Band 4 (AWS)	0.588	0.209	0.059	0.797	0.647	0.856
	LTE Band 25 (PCS)	0.949	0.209	0.059	1.158	1.008	1.217
	LTE Band 41	0.817	0.209	0.059	1.026	0.876	1.085

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

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
Hotspot SAR	GPRS 850	0.520	0.296	0.742	0.816	1.262
	GPRS 1900	1.034	0.296	0.742	**1.330**	See Table Below
	UMTS 850	0.717	0.296	0.742	1.013	1.459
	UMTS 1900	0.876	0.296	0.742	1.172	See Table Below
	LTE Band 12	0.465	0.296	0.742	0.761	1.207
	LTE Band 13	0.538	0.296	0.742	0.834	1.280
	LTE Band 26 (Cell)	0.747	0.296	0.742	1.043	1.489
	LTE Band 5 (Cell)	0.868	0.296	0.742	1.164	See Table Below
	LTE Band 4 (AWS)	0.588	0.296	0.742	0.884	1.330
	LTE Band 25 (PCS)	0.949	0.296	0.742	1.245	See Table Below
	LTE Band 41	0.817	0.296	0.742	1.113	1.559

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.416	0.742	**1.158**
	Front	0.551	0.016	0.567
	Top	-	0.742*	0.742
	Bottom	1.034	-	1.034
	Right	0.063	-	0.063
	Left	0.107	0.142	0.249

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.374	0.742	**1.116**
	Front	0.331	0.016	0.347
	Top	-	0.742*	0.742
	Bottom	0.876	-	0.876
	Right	0.056	-	0.056
	Left	0.077	0.142	0.219

Simult Tx	Configuration	LTE Band 5 (Cell) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Hotspot SAR	Back	0.868	0.742	See Note 1	0.01
	Front	0.676	0.016	0.692	N/A
	Top	-	0.742*	**0.742**	N/A
	Bottom	0.471	-	0.471	N/A
	Right	0.436	-	0.436	N/A
	Left	0.176	0.142	0.318	N/A

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.457	0.742	**1.199**
	Front	0.375	0.016	0.391
	Top	-	0.742*	0.742
	Bottom	0.949	-	0.949
	Right	0.061	-	0.061
	Left	0.110	0.142	0.252

Note 1 - No additional 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 12.10 for detailed SPLS ratio analysis.

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.520	0.761	1.281
	GPRS 1900	1.034	0.761	See Table Below
	UMTS 850	0.717	0.761	1.478
	UMTS 1900	0.876	0.761	See Table Below
	LTE Band 12	0.465	0.761	1.226
	LTE Band 13	0.538	0.761	1.299
	LTE Band 26 (Cell)	0.747	0.761	1.508
	LTE Band 5 (Cell)	0.868	0.761	See Table Below
	LTE Band 4 (AWS)	0.588	0.761	1.349
	LTE Band 25 (PCS)	0.949	0.761	See Table Below
	LTE Band 41	0.817	0.761	**1.578**

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.416	0.761	**1.177**
	Front	0.551	0.047	0.598
	Top	-	0.761*	0.761
	Bottom	1.034	-	1.034
	Right	0.063	-	0.063
	Left	0.107	0.293	0.400

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.374	0.761	**1.135**
	Front	0.331	0.047	0.378
	Top	-	0.761*	0.761
	Bottom	0.876	-	0.876
	Right	0.056	-	0.056
	Left	0.077	0.293	0.370

Simult Tx	Configuration	LTE Band 5 (Cell) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Hotspot SAR	Back	0.868	0.761	See Note 1	0.02
	Front	0.676	0.047	0.723	N/A
	Top	-	0.761*	**0.761**	N/A
	Bottom	0.471	-	0.471	N/A
	Right	0.436	-	0.436	N/A
	Left	0.176	0.293	0.469	N/A

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.457	0.761	**1.218**
	Front	0.375	0.047	0.422
	Top	-	0.761*	0.761
	Bottom	0.949	-	0.949
	Right	0.061	-	0.061
	Left	0.110	0.293	0.403

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	2G/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 MIMO at 16 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
Hotspot SAR	GPRS 850	0.520	0.209	0.059	0.302	1.090
	GPRS 1900	1.034	0.209	0.059	0.302	See Table Below
	UMTS 850	0.717	0.209	0.059	0.302	1.287
	UMTS 1900	0.876	0.209	0.059	0.302	1.446
	LTE Band 12	0.465	0.209	0.059	0.302	1.035
	LTE Band 13	0.538	0.209	0.059	0.302	1.108
	LTE Band 26 (Cell)	0.747	0.209	0.059	0.302	1.317
	LTE Band 5 (Cell)	0.868	0.209	0.059	0.302	1.438
	LTE Band 4 (AWS)	0.588	0.209	0.059	0.302	1.158
	LTE Band 25 (PCS)	0.949	0.209	0.059	0.302	**1.519**
	LTE Band 41	0.817	0.209	0.059	0.302	1.387

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN MIMO at 16 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
Hotspot SAR	Back	0.416	0.199	0.059	0.302	0.976
	Front	0.551	0.209*	0.059*	0.015	0.834
	Top	-	0.209*	0.053	0.302*	0.564
	Bottom	1.034	-	-	-	**1.034**
	Right	0.063	-	-	-	0.063
	Left	0.107	0.209	0.059*	0.302*	0.677

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.520	0.266	0.786
	GPRS 1900	1.034	0.266	**1.300**
	UMTS 850	0.717	0.266	0.983
	UMTS 1900	0.876	0.266	1.142
	LTE Band 12	0.465	0.266	0.731
	LTE Band 13	0.538	0.266	0.804
	LTE Band 26 (Cell)	0.747	0.266	1.013
	LTE Band 5 (Cell)	0.868	0.266	1.134
	LTE Band 4 (AWS)	0.588	0.266	0.854
	LTE Band 25 (PCS)	0.949	0.266	1.215
	LTE Band 41	0.817	0.266	1.083

12.8 Hotspot SAR Simultaneous Transmission Analysis for Main Band, Bluetooth, and 5GHz WLAN

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

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
Hotspot SAR	GPRS 850	0.520	0.266	0.296	1.082
	GPRS 1900	1.034	0.266	0.296	See Table Below
	UMTS 850	0.717	0.266	0.296	1.279
	UMTS 1900	0.876	0.266	0.296	1.438
	LTE Band 12	0.465	0.266	0.296	1.027
	LTE Band 13	0.538	0.266	0.296	1.100
	LTE Band 26 (Cell)	0.747	0.266	0.296	1.309
	LTE Band 5 (Cell)	0.868	0.266	0.296	1.430
	LTE Band 4 (AWS)	0.588	0.266	0.296	1.150
	LTE Band 25 (PCS)	0.949	0.266	0.296	**1.511**
	LTE Band 41	0.817	0.266	0.296	1.379

Simult Tx	Configuration	GPRS 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
Hotspot SAR	Back	0.416	0.266	0.296	0.978
	Front	0.551	0.182	0.296*	1.029
	Top	-	0.178	0.296*	0.474
	Bottom	1.034	-	-	**1.034**
	Right	0.063	-	-	0.063
	Left	0.107	0.251	0.296*	0.654

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
Hotspot SAR	GPRS 850	0.520	0.266	0.742	1.528
	GPRS 1900	1.034	0.266	0.742	See Table Below
	UMTS 850	0.717	0.266	0.742	See Table Below
	UMTS 1900	0.876	0.266	0.742	See Table Below
	LTE Band 12	0.465	0.266	0.742	1.473
	LTE Band 13	0.538	0.266	0.742	**1.546**
	LTE Band 26 (Cell)	0.747	0.266	0.742	See Table Below
	LTE Band 5 (Cell)	0.868	0.266	0.742	See Table Below
	LTE Band 4 (AWS)	0.588	0.266	0.742	See Table Below
	LTE Band 25 (PCS)	0.949	0.266	0.742	See Table Below
	LTE Band 41	0.817	0.266	0.742	See Table Below

Simult Tx	Configuration	GPRS 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
Hotspot SAR	Back	0.416	0.266	0.742	**1.424**
	Front	0.551	0.182	0.016	0.749
	Top	-	0.178	0.742*	0.920
	Bottom	1.034	-	-	1.034
	Right	0.063	-	-	0.063
	Left	0.107	0.251	0.142	0.500

Simult Tx	Configuration	UMTS 850 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	Back	0.717	0.266	0.742	See Note 1
	Front	0.500	0.182	0.016	0.698
	Top	-	0.178	0.742*	0.920
	Bottom	0.400	-	-	0.400
	Right	0.361	-	-	0.361
	Left	0.105	0.251	0.142	0.498

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
Hotspot SAR	Back	0.374	0.266	0.742	**1.382**
	Front	0.331	0.182	0.016	0.529
	Top	-	0.178	0.742*	0.920
	Bottom	0.876	-	-	0.876
	Right	0.056	-	-	0.056
	Left	0.077	0.251	0.142	0.470

Simult Tx	Configuration	LTE Band 26 (Cell) 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	Back	0.747	0.266	0.742	See Note 1
	Front	0.603	0.182	0.016	0.801
	Top	-	0.178	0.742*	0.920
	Bottom	0.432	-	-	0.432
	Right	0.351	-	-	0.351
	Left	0.127	0.251	0.142	0.520

Simult Tx	Configuration	LTE Band 5 (Cell) 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	Back	0.868	0.266	0.742	See Note 1
	Front	0.676	0.182	0.016	0.874
	Top	-	0.178	0.742*	0.920
	Bottom	0.471	-	-	0.471
	Right	0.436	-	-	0.436
	Left	0.176	0.251	0.142	0.569

Simult Tx	Configuration	LTE Band 4 (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
Hotspot SAR	Back	0.389	0.266	0.742	**1.397**
	Front	0.298	0.182	0.016	0.496
	Top	-	0.178	0.742*	0.920
	Bottom	0.588	-	-	0.588
	Right	0.050	-	-	0.050
	Left	0.105	0.251	0.142	0.498

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
Hotspot SAR	Back	0.457	0.266	0.742	**1.465**
	Front	0.375	0.182	0.016	0.573
	Top	-	0.178	0.742*	0.920
	Bottom	0.949	-	-	0.949
	Right	0.061	-	-	0.061
	Left	0.110	0.251	0.142	0.503

Simult Tx	Configuration	LTE Band 41 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	Back	0.522	0.266	0.742	**1.530**
	Front	0.294	0.182	0.016	0.492
	Top	-	0.178	0.742*	0.920
	Bottom	0.817	-	-	0.817
	Right	-	-	-	-
	Left	0.093	0.251	0.142	0.486

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
Hotspot SAR	GPRS 850	0.520	0.266	0.761	1.547
	GPRS 1900	1.034	0.266	0.761	See Table Below
	UMTS 850	0.717	0.266	0.761	See Table Below
	UMTS 1900	0.876	0.266	0.761	See Table Below
	LTE Band 12	0.465	0.266	0.761	1.492
	LTE Band 13	0.538	0.266	0.761	**1.565**
	LTE Band 26 (Cell)	0.747	0.266	0.761	See Table Below
	LTE Band 5 (Cell)	0.868	0.266	0.761	See Table Below
	LTE Band 4 (AWS)	0.588	0.266	0.761	See Table Below
	LTE Band 25 (PCS)	0.949	0.266	0.761	See Table Below
	LTE Band 41	0.817	0.266	0.761	See Table Below

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	Back	0.416	0.266	0.761	**1.443**
	Front	0.551	0.182	0.047	0.780
	Top	-	0.178	0.761*	0.939
	Bottom	1.034	-	-	1.034
	Right	0.063	-	-	0.063
	Left	0.107	0.251	0.293	0.651

Simult Tx	Configuration	UMTS 850 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	Back	0.717	0.266	0.761	See Note 1
	Front	0.500	0.182	0.047	0.729
	Top	-	0.178	0.761*	0.939
	Bottom	0.400	-	-	0.400
	Right	0.361	-	-	0.361
	Left	0.105	0.251	0.293	0.649

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	Back	0.374	0.266	0.761	**1.401**
	Front	0.331	0.182	0.047	0.560
	Top	-	0.178	0.761*	0.939
	Bottom	0.876	-	-	0.876
	Right	0.056	-	-	0.056
	Left	0.077	0.251	0.293	0.621

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)
		1	2	3	1+2+3
Hotspot SAR	Back	0.747	0.266	0.761	See Note 1
	Front	0.603	0.182	0.047	0.832
	Top	-	0.178	0.761*	0.939
	Bottom	0.432	-	-	0.432
	Right	0.351	-	-	0.351
	Left	0.127	0.251	0.293	0.671

Simult Tx	Configuration	LTE Band 5 (Cell) SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	Back	0.868	0.266	0.761	See Note 1
	Front	0.676	0.182	0.047	0.905
	Top	-	0.178	0.761*	0.939
	Bottom	0.471	-	-	0.471
	Right	0.436	-	-	0.436
	Left	0.176	0.251	0.293	0.720

Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	Back	0.389	0.266	0.761	**1.416**
	Front	0.298	0.182	0.047	0.527
	Top	-	0.178	0.761*	0.939
	Bottom	0.588	-	-	0.588
	Right	0.050	-	-	0.050
	Left	0.105	0.251	0.293	0.649

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)
		1	2	3	1+2+3
Hotspot SAR	Back	0.457	0.266	0.761	**1.484**
	Front	0.375	0.182	0.047	0.604
	Top	-	0.178	0.761*	0.939
	Bottom	0.949	-	-	0.949
	Right	0.061	-	-	0.061
	Left	0.110	0.251	0.293	0.654

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
Hotspot SAR	Back	0.522	0.266	0.761	**1.549**
	Front	0.294	0.182	0.047	0.523
	Top	-	0.178	0.761*	0.939
	Bottom	0.817	-	-	0.817
	Right	-	-	-	-
	Left	0.093	0.251	0.293	0.637

Note 1 - No evaluation was performed to determine the aggregate 1g SAR for these configurations as the SPLS ratio between the distribution pairs was not greater than 0.04 per FCC KDB 447498 D01v06. See Section 12.11 for detailed SPLS ratio analysis.

12.9 Phablet Simultaneous Transmission Analysis

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)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	GPRS 1900	2.463	1.080	3.543
	UMTS 1900	3.044	1.080	See Table Below
	LTE Band 4 (AWS)	2.424	1.080	3.504
	LTE Band 25 (PCS)	3.156	1.080	See Table Below
	LTE Band 41	2.593	1.080	**3.673**

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	2.578	1.080	**3.658**
	Front	1.490	1.080*	2.570
	Top	-	1.080*	1.080
	Bottom	3.044	-	3.044
	Right	0.181	-	0.181
	Left	0.642	1.024	1.666

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	2.336	1.080	**3.416**
	Front	1.772	1.080*	2.852
	Top	-	1.080*	1.080
	Bottom	3.156	-	3.156
	Right	0.429	-	0.429
	Left	0.765	1.024	1.789

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Phablet SAR	Back	1.516	2.696	See Note 1	0.06
	Front	1.163	0.036	1.199	N/A
	Top	-	2.696*	**2.696**	N/A
	Bottom	2.463	-	2.463	N/A
	Right	0.175	-	0.175	N/A
	Left	0.319	0.246	0.565	N/A

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Phablet SAR	Back	2.578	2.696	See Note 1	0.09
	Front	1.490	0.036	1.526	N/A
	Top	-	2.696*	2.696	N/A
	Bottom	3.044	-	**3.044**	N/A
	Right	0.181	-	0.181	N/A
	Left	0.642	0.246	0.888	N/A

Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Phablet SAR	Back	1.421	2.696	See Note 1	0.06
	Front	1.035	0.036	1.071	N/A
	Top	-	2.696*	**2.696**	N/A
	Bottom	2.424	-	2.424	N/A
	Right	0.201	-	0.201	N/A
	Left	0.518	0.246	0.764	N/A

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Phablet SAR	Back	2.336	2.696	See Note 1	0.08
	Front	1.772	0.036	1.808	N/A
	Top	-	2.696*	2.696	N/A
	Bottom	3.156	-	**3.156**	N/A
	Right	0.429	-	0.429	N/A
	Left	0.765	0.246	1.011	N/A

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Phablet SAR	Back	2.593	2.696	See Note 1	0.09
	Front	0.919	0.036	0.955	N/A
	Top	-	2.696*	**2.696**	N/A
	Bottom	2.016	-	2.016	N/A
	Right	-	-	-	N/A
	Left	0.381	0.246	0.627	N/A

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Phablet SAR	Back	1.516	2.746	See Note 1	0.07
	Front	1.163	0.445	1.608	N/A
	Top	-	2.746*	**2.746**	N/A
	Bottom	2.463	-	2.463	N/A
	Right	0.175	-	0.175	N/A
	Left	0.319	0.975	1.294	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
Phablet SAR	Back	2.578	2.746	See Note 1	0.09
	Front	1.490	0.445	1.935	N/A
	Top	-	2.746*	2.746	N/A
	Bottom	3.044	-	**3.044**	N/A
	Right	0.181	-	0.181	N/A
	Left	0.642	0.975	1.617	N/A

Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Phablet SAR	Back	1.421	2.746	See Note 1	0.06
	Front	1.035	0.445	1.480	N/A
	Top	-	2.746*	**2.746**	N/A
	Bottom	2.424	-	2.424	N/A
	Right	0.201	-	0.201	N/A
	Left	0.518	0.975	1.493	N/A

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
Phablet SAR	Back	2.336	2.746	See Note 1	0.09
	Front	1.772	0.445	2.217	N/A
	Top	-	2.746*	2.746	N/A
	Bottom	3.156	-	**3.156**	N/A
	Right	0.429	-	0.429	N/A
	Left	0.765	0.975	1.740	N/A

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Phablet SAR	Back	2.593	2.746	See Note 1	0.10
	Front	0.919	0.445	1.364	N/A
	Top	-	2.746*	**2.746**	N/A
	Bottom	2.016	-	2.016	N/A
	Right	-	-	-	N/A
	Left	0.381	0.975	1.356	N/A

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 12.10 for detailed SPLS ratio analysis.

12.10 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.

$$\text{Distance}_{\text{Tx1 – Tx2}} = R_i = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} \text{ (Hotspot, Phablet)}$$

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

12.10.1 Hotspot Back Side SPLSR Evaluation and Analysis

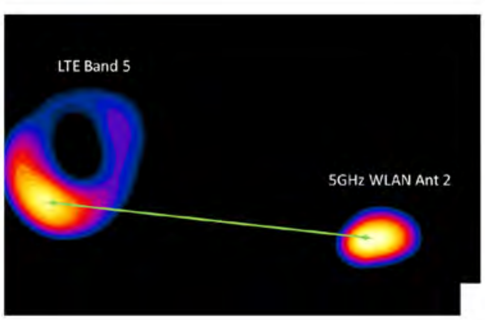
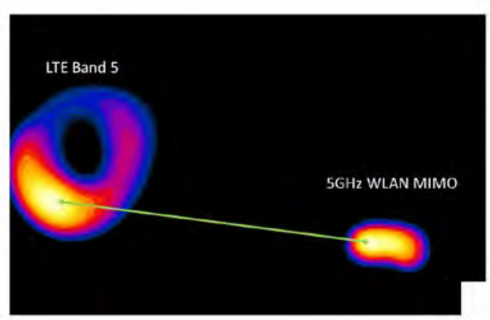
Table 12-17
Peak SAR Locations for Hotspot Body Back Side

Mode/Band	x (mm)	y (mm)	Reported SAR (W/kg)
5 GHz WLAN Ant 2	6.00	56.00	0.742
5 GHz WLAN MIMO	6.00	53.00	0.761
LTE Band 5 (Cell)	-19.50	-81.50	0.868

Table 12-18
Hotspot 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}	$(a+b)^{1.5}/D_{a-b}$	
LTE Band 5 (Cell)	5 GHz WLAN Ant 2	0.868	0.742	1.610	139.84	0.01	1
LTE Band 5 (Cell)	5 GHz WLAN MIMO	0.868	0.761	1.629	136.90	0.02	2

Table 12-19
Hotspot Back Side SAR to Peak Location Separation Ratio Plots

	
1	2

12.10.2Phablet Back Side SPLSR Evaluation and Analysis

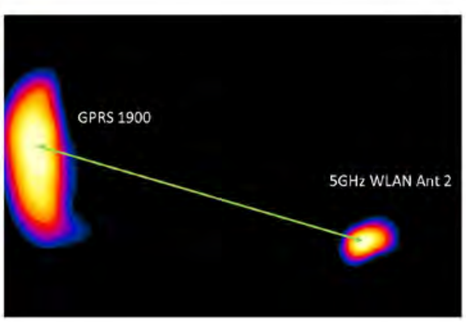
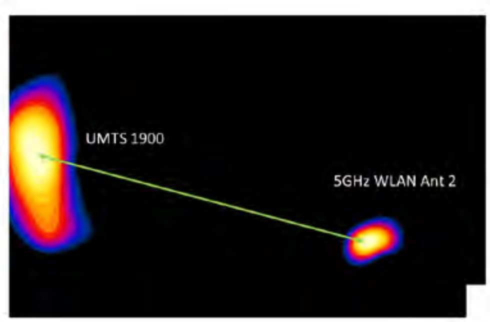
Table 12-20
Peak SAR Locations for Body Phablet Back Side

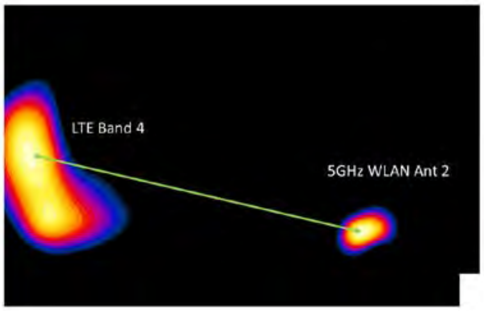
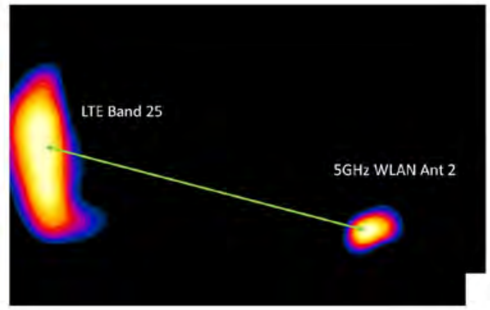
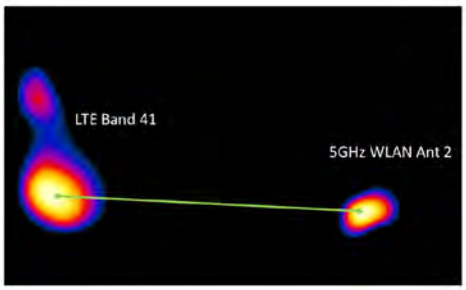
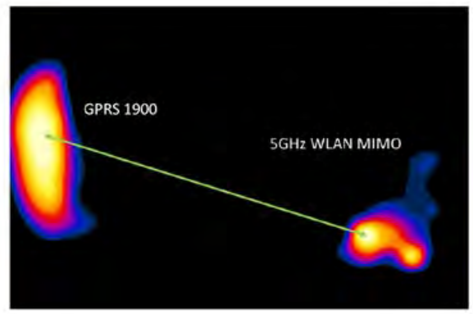
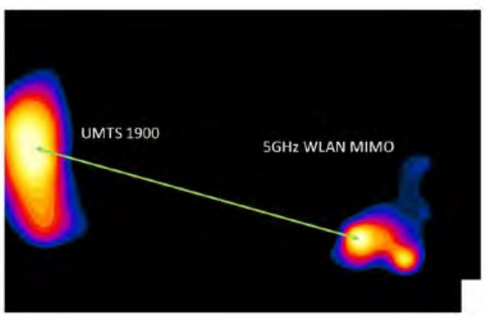
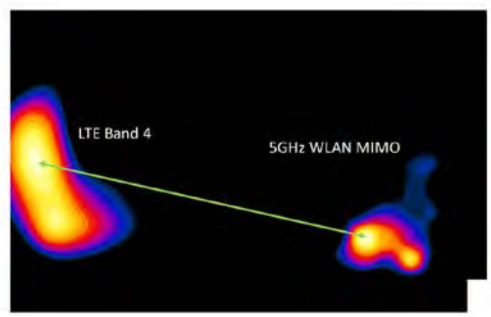
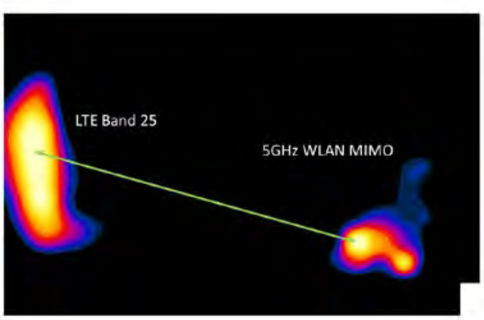
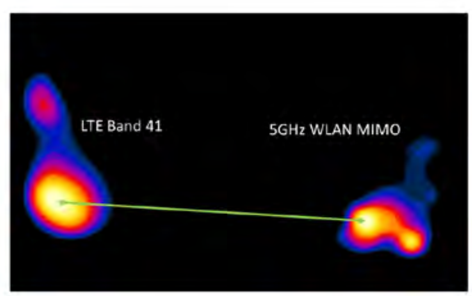
Mode/Band	x (mm)	y (mm)	Reported SAR (W/kg)
5 GHz WLAN Ant 2	6.00	56.00	2.696
5 GHz WLAN MIMO	7.00	52.00	2.746
GPRS 1900	-26.00	-78.00	1.516
UMTS 1900	-31.00	-79.50	2.578
LTE Band 4 (AWS)	-20.00	-81.00	1.421
LTE Band 25 (PCS)	-26.00	-78.00	2.336
LTE Band 41	-3.50	-74.40	2.593

Table 12-21
Phablet 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}	$(a+b)^{1.5}/D_{a-b}$	
GPRS 1900	5 GHz WLAN Ant 2	1.516	2.696	4.212	137.77	0.06	1
UMTS 1900	5 GHz WLAN Ant 2	2.578	2.696	5.274	140.46	0.09	2
LTE Band 4 (AWS)	5 GHz WLAN Ant 2	1.421	2.696	4.117	139.45	0.06	3
LTE Band 25 (PCS)	5 GHz WLAN Ant 2	2.336	2.696	5.032	137.77	0.08	4
LTE Band 41	5 GHz WLAN Ant 2	2.593	2.696	5.289	130.75	0.09	5
GPRS 1900	5 GHz WLAN MIMO	1.516	2.746	4.262	134.12	0.07	6
UMTS 1900	5 GHz WLAN MIMO	2.578	2.746	5.324	136.88	0.09	7
LTE Band 4 (AWS)	5 GHz WLAN MIMO	1.421	2.746	4.167	135.71	0.06	8
LTE Band 25 (PCS)	5 GHz WLAN MIMO	2.336	2.746	5.082	134.12	0.09	9
LTE Band 41	5 GHz WLAN MIMO	2.593	2.746	5.339	126.84	0.10	10

Table 12-22
Phablet Back Side SAR to Peak Location Separation Ratio Plots

	
1	2

LTE Band 4 5GHz WLAN Ant 2	LTE Band 25 5GHz WLAN Ant 2
3	**4**
LTE Band 41 5GHz WLAN Ant 2	GPRS 1900 5GHz WLAN MIMO
5	**6**
UMTS 1900 5GHz WLAN MIMO	LTE Band 4 5GHz WLAN MIMO
7	**8**
LTE Band 25 5GHz WLAN MIMO	LTE Band 41 5GHz WLAN MIMO
9	**10**

12.11 Additional Simultaneous SAR Evaluation and Analysis for Main Band, Bluetooth and 5 GHz WLAN Operations

Per KDB Publication 865664, when the sum of the transmitters potentially operating simultaneously is greater than the 1.6 W/kg or 4.0 W/kg and the sum to peak SAR location separation ratio between any pair of transmitters is more than 0.04 for 1g or 0.1 for 10g, SAR tests are required for simultaneous transmission to determine the aggregate 1g or 10g SAR. When required, each transmitter is tested for simultaneous transmission in the configuration, channel and operating mode that resulted in the highest SAR during the stand-alone evaluation.

The Bluetooth and 5 GHz WLAN transmitters are spatially separated from the 2G/3G/4G antenna. Therefore, simultaneous transmission SAR evaluations (Volumetric SAR Evaluations) were performed for the transmitters with the overlapping distributions - Bluetooth and 5 GHz WIFI. The SPLSR procedures in FCC KDB Publication 447498 was applied to the 2G/3G/4G transmitter and the aggregate Bluetooth and 5 GHz WLAN distribution to determine simultaneous SAR compliance.

12.11.1 Hotspot Back Side Volumetric SAR Evaluation and Analysis for Bluetooth, and 5GHz WLAN Simultaneous Transmission

Table 12-23
Simultaneous Transmission SAR Analysis

Band/ Mode	Configuration	Frequency [MHz]	Measured Standalone 1g SAR [W/kg]	Maximum Allowed Power [dBm]	Conducted Power (Ant 1) [dBm]	Conducted Power (Ant 2) [dBm]	Duty Cycle (%)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Volumetric 1g SAR [W/kg]	Scaled Volumetric 1g SAR [W/kg]	Volumetric SAR Plot Number
Bluetooth	Back side, Ch. 39, 1 Mbps, 10 mm	2441	0.199	18.5	18.37	N/A	77.1	1.030	1.297	0.151	0.202	A51
5GHz WLAN Ant 2	Back side, 802.11a, 20 MHz, Ch. 157, 6 Mbps, 10 mm	5785	0.642	18.0	17.42	N/A	98.9	1.143	1.011	0.614	0.710	A49
5GHz WLAN MIMO	Back side, 802.11n, 20 MHz, Ch. 149, 13 Mbps, 10 mm	5745	0.711	18.0	17.84	17.76	98.7	1.057	1.013	0.655	0.701	A50

Simultaneous Transmission Bands/Modes		Scaled Multi-Band SAR (W/kg)	Simultaneous SAR Plot Number
Bluetooth	5GHz WLAN Ant 2	0.927	A52
Bluetooth	5GHz WLAN MIMO	0.903	A53

Note:

1. All volumetric zoom scans were performed with DASY52 SAR system version 52.10. Post processor SEMCAD X Versions 14.6.12 (7450) multiband combiner requires enlarged zoom scans to overlap but does not require measurement point resolutions within the volumes to be identical for interpolation and superposition.
2. Each antenna was evaluated independently using the channel/configuration that produced the highest measured SAR when the standalone SAR was tested.
3. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v05. The simultaneous transmission SAR results of the individual transmitters were scaled using SEMCAD X during processing.

12.11.2 Hotspot Back Side SPLSR Evaluation and Analysis for Main Band, Bluetooth, and 5GHz WLAN Simultaneous Transmission

Table 12-24
Peak SAR Locations for Hotspot Back Side

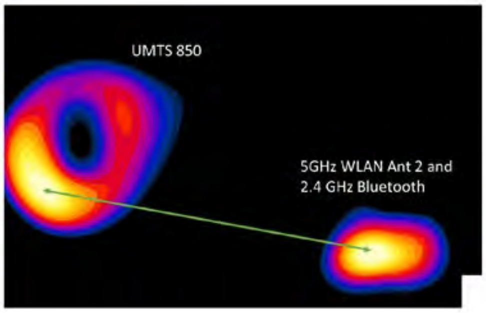
Mode/Band	x (mm)	y (mm)	Reported SAR (W/kg)
5 GHz WLAN Ant 2 and Bluetooth	15.00	56.00	0.927
5 GHz WLAN MIMO and Bluetooth	11.00	56.00	0.903
UMTS 850	-21.00	-81.50	0.717
LTE Band 26 (Cell)	-18.00	-81.50	0.747
LTE Band 5 (Cell)	-19.50	-81.50	0.868

The Bluetooth and 5 GHz WIFI SAR values above represent the aggregate distributions from the simultaneous transmission (volumetric) SAR evaluation.

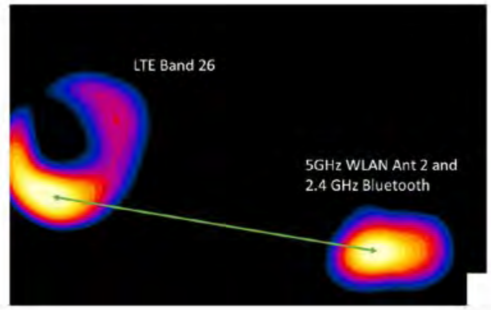
Table 12-25
Hotspot Back Side SAR to Peak Location Separation Ratio Calculations

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 Ant 2 and Bluetooth	UMTS 850	0.927	0.717	1.644	142.13	0.01	1
5 GHz WLAN Ant 2 and Bluetooth	LTE Band 26 (Cell)	0.927	0.747	1.674	141.40	0.02	2
5 GHz WLAN Ant 2 and Bluetooth	LTE Band 5 (Cell)	0.927	0.868	1.795	141.76	0.02	3
5 GHz WLAN MIMO and Bluetooth	UMTS 850	0.903	0.717	1.620	141.17	0.01	4
5 GHz WLAN MIMO and Bluetooth	LTE Band 26 (Cell)	0.903	0.747	1.650	140.52	0.02	5
5 GHz WLAN MIMO and Bluetooth	LTE Band 5 (Cell)	0.903	0.868	1.771	140.84	0.02	6

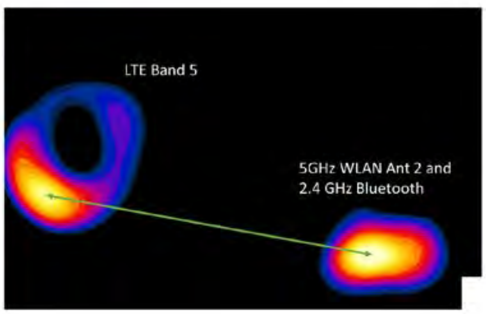
Table 12-26
Hotspot Back Side SAR to Peak Location Separation Ratio Plots



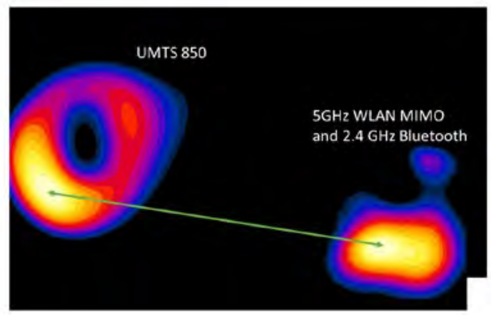
1



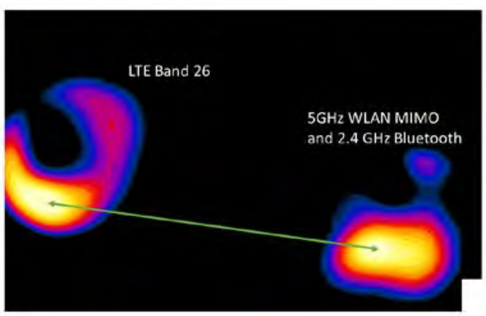
2



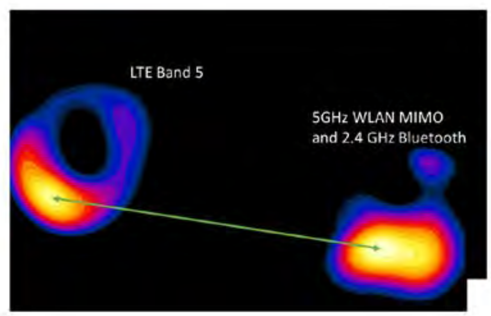
3



4



5



6

12.12 Simultaneous Transmission Conclusion

The above analysis for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013 Section 6.3.4.1.2.

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

BODY VARIABILITY RESULTS													
Band	FREQUENCY		Mode	Service	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)	
1900	1905.00	26590	LTE Band 25 (PCS), 20 MHz Bandwidth	QPSK, 50 RB, 0 RB Offset	bottom	10 mm	0.852	0.884	1.04	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
Phablet SAR Measurement Variability Results

PHABLET VARIABILITY RESULTS																
Band	Component Carrier	FREQUENCY		Mode	Service	Data Rate (Mbps)	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)	
1750	N/A	1732.50	20175	LTE Band 4 (AWS), 20 MHz Bandwidth	QPSK, 50 RB, 0 RB Offset	N/A	bottom	0 mm	2.320	2.320	1.00	N/A	N/A	N/A	N/A
1900	N/A	1905.00	26590	LTE Band 25 (PCS), 20 MHz Bandwidth	QPSK, 50 RB, 0 RB Offset	N/A	bottom	0 mm	3.040	3.030	1.00	N/A	N/A	N/A	N/A
2600	PCC	2680.00	41490	LTE Band 41, ULCA, 20 MHz Bandwidth	QPSK, 50 RB, 0 RB Offset	N/A	back	0 mm	2.540	2.420	1.05	N/A	N/A	N/A	N/A
	SCC	2660.20	41292		QPSK, 50 RB, 50 RB Offset										
5250	N/A	5280.00	56	802.11n, 20 MHz Bandwidth	OFDM, MIMO	13	back	0 mm	2.450	2.380	1.03	N/A	N/A	N/A	N/A
5600	N/A	5600.00	120	802.11n, 20 MHz Bandwidth	OFDM, MIMO	13	back	0 mm	2.450	2.410	1.02	N/A	N/A	N/A	N/A
5750	N/A	5720.00	144	802.11n, 20 MHz Bandwidth	OFDM, MIMO	13	back	0 mm	2.560	2.510	1.02	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Phablet 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.

To evaluate all the tuner states, the 80 tuner states were divided among the aggregate band, mode and exposure combinations so that each combination was evaluated for at least 20 tuner states and also so that at least 3 single point SAR measurements were made for every available tuner state. 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.

Per FCC Guidance, several bands/modes were combined to be treated as a single aggregate band. LTE bands 12 and 13 were considered as an aggregated band to select single point measurement configurations. The wireless configuration and exposure condition combinations were divided evenly among the two bands (i.e., the number of required single point measurements (at least 20) apply to the aggregated band). All other bands were treated independently.

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

Table 14-1
UMTS Supplemental Head SAR Data

Supplemental Head SAR Data			
UMTS Band 5		UMTS Band 2	
RMC		RMC	
Test Position	Right Cheek	Test Position	Left Cheek
Frequency (MHz)	836.6	Frequency (MHz)	1880
Channel	4183	Channel	9400
Measured 1g SAR (W/kg)	0.271	Measured 1g SAR (W/kg)	0.144
Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)	
Auto-tune (State 2)	0.301	Auto-tune (State 1)	0.232
Default (State 2)	0.298	Default (State 1)	0.224
State 1	0.276	State 1	0.224
State 2	0.298	State 4	0.195
State 5	0.277	State 6	0.181
State 16	0.272	State 9	0.071
State 18	0.289	State 17	0.210
State 21	0.268	State 24	0.160
State 22	0.241	State 26	0.130
State 25	0.180	State 29	0.077
State 27	0.115	State 32	0.038
State 28	0.082	State 42	0.020
State 32	0.240	State 44	0.011
State 35	0.203	State 47	0.001
State 40	0.153	State 52	0.025
State 43	0.076	State 54	0.022
State 49	0.237	State 57	0.019
State 58	0.092	State 62	0.004
State 63	0.018	State 66	0.030
State 68	0.277	State 70	0.040
State 71	0.235	State 72	0.203
State 74	0.239	State 75	0.028
State 76	0.275	State 78	0.041

Table 14-2
LTE Supplemental Head SAR Data

Supplemental Head SAR Data											
LTE Band 12		LTE Band 13		LTE Band 26		LTE Band 5		LTE Band 4		LTE Band 25	
QPSK, 10 MHz Bandwidth, 1 RB, 0 RB Offset		QPSK, 10 MHz Bandwidth, 1 RB, 0 RB Offset		QPSK, 15 MHz Bandwidth, 1 RB, 36 RB Offset		QPSK, 10 MHz Bandwidth, 1 RB, 0 RB Offset		QPSK, 20 MHz Bandwidth, 1 RB, 0 RB Offset		QPSK, 20 MHz Bandwidth, 1 RB, 0 RB Offset	
Test Position	Right Cheek	Test Position	Right Cheek	Test Position	Right Cheek	Test Position	Right Cheek	Test Position	Left Cheek	Test Position	Left Cheek
Frequency (MHz)	707.5	Frequency (MHz)	782	Frequency (MHz)	831.5	Frequency (MHz)	836.5	Frequency (MHz)	1732.5	Frequency (MHz)	1860
Channel	23095	Channel	23230	Channel	26865	Channel	20525	Channel	20175	Channel	26140
Measured 1g SAR (W/kg)	0.196	Measured 1g SAR (W/kg)	0.131	Measured 1g SAR (W/kg)	0.251	Measured 1g SAR (W/kg)	0.259	Measured 1g SAR (W/kg)	0.165	Measured 1g SAR (W/kg)	0.168
Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)	
Auto-tune (State 76)	0.216	Auto-tune (State 2)	0.158	Auto-tune (State 2)	0.282	Auto-tune (State 2)	0.318	Auto-tune (State 0)	0.188	Auto-tune (State 0)	0.205
Default (State 1)	0.216	Default (State 1)	0.150	Default (State 1)	0.272	Default (State 1)	0.316	Default (State 1)	0.181	Default (State 1)	0.203
State 0	0.211	State 0	0.150	State 0	0.270	State 1	0.316	State 0	0.183	State 0	0.206
State 1	0.216	State 1	0.150	State 1	0.272	State 2	0.323	State 1	0.181	State 1	0.203
State 2	0.182	State 2	0.161	State 2	0.276	State 3	0.319	State 4	0.150	State 3	0.175
State 10	0.106	State 12	0.031	State 7	0.241	State 6	0.302	State 5	0.153	State 10	0.135
State 14	0.042	State 18	0.157	State 8	0.232	State 10	0.225	State 11	0.097	State 12	0.099
State 22	0.155	State 24	0.120	State 9	0.203	State 13	0.108	State 15	0.043	State 14	0.063
State 25	0.116	State 33	0.144	State 12	0.094	State 19	0.309	State 16	0.161	State 17	0.195
State 34	0.101	State 34	0.145	State 14	0.054	State 23	0.282	State 19	0.131	State 20	0.163
State 40	0.068	State 40	0.105	State 17	0.276	State 26	0.211	State 20	0.128	State 28	0.086
State 62	0.012	State 49	0.143	State 21	0.253	State 30	0.071	State 21	0.128	State 35	0.036
State 64	0.211	State 50	0.144	State 30	0.050	State 31	0.046	State 25	0.101	State 38	0.031
State 68	0.213	State 55	0.107	State 31	0.032	State 37	0.223	State 31	0.031	State 41	0.027
State 70	0.165	State 67	0.137	State 34	0.180	State 38	0.201	State 37	0.021	State 46	0.006
State 76	0.216	State 75	0.140	State 37	0.164	State 41	0.148	State 43	0.010	State 51	0.032
State 79	0.160	State 76	0.155	State 43	0.062	State 44	0.061	State 45	0.005	State 55	0.025
				State 52	0.162	State 51	0.216	State 48	0.026	State 60	0.011
				State 57	0.099	State 55	0.170	State 53	0.019	State 62	0.005
				State 61	0.028	State 59	0.084	State 56	0.018	State 64	0.161
				State 67	0.202	State 65	0.309	State 65	0.139	State 66	0.032
				State 72	0.275	State 69	0.315	State 71	0.027	State 69	0.186
				State 75	0.207	State 79	0.249	State 77	0.159	State 74	0.034

Table 14-3
UMTS Supplemental Body SAR Data

Supplemental Body SAR Data			
UMTS Band 5		UMTS Band 2	
RMC		RMC	
Test Position	Back	Test Position	Bottom
Spacing	10 mm	Spacing	10 mm
Frequency (MHz)	836.5	Frequency (MHz)	1907.6
Channel	4183	Channel	9538
Measured 1g SAR (W/kg)	0.691	Measured 1g SAR (W/kg)	0.742
Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)	
Auto-tune (State 2)	0.872	Auto-tune (State 1)	1.039
Default (State 2)	0.869	Default (State 1)	1.038
State 2	0.869	State 0	1.039
State 4	0.859	State 1	1.038
State 7	0.810	State 5	0.930
State 14	0.209	State 7	0.869
State 19	0.851	State 10	0.758
State 24	0.780	State 15	0.316
State 27	0.458	State 16	0.973
State 31	0.135	State 18	0.879
State 34	0.698	State 21	0.840
State 37	0.633	State 25	0.719
State 38	0.568	State 33	0.168
State 42	0.346	State 36	0.130
State 45	0.156	State 39	0.108
State 48	0.698	State 42	0.095
State 50	0.661	State 49	0.150
State 52	0.613	State 51	0.121
State 59	0.256	State 53	0.117
State 62	0.108	State 58	0.084
State 65	0.810	State 60	0.052
State 70	0.726	State 67	0.110
State 77	0.819	State 72	0.958
State 78	0.727	State 73	0.867

Table 14-4
LTE Supplemental Body SAR Data

Supplemental Body SAR Data											
LTE Band 12		LTE Band 13		LTE Band 26		LTE Band 5		LTE Band 4		LTE Band 25	
QPSK, 10 MHz Bandwidth, 1 RB, 0 RB Offset		QPSK, 10 MHz Bandwidth, 1 RB, 0 RB Offset		QPSK, 15 MHz Bandwidth, 1 RB, 36 RB Offset		QPSK, 10 MHz Bandwidth, 1 RB, 0 RB Offset		QPSK, 20 MHz Bandwidth, 50 RB, 25 RB Offset		QPSK, 20 MHz Bandwidth, 50 RB, 0 RB Offset	
Test Position	Back	Test Position	Back	Test Position	Back	Test Position	Back	Test Position	Bottom	Test Position	Bottom
Spacing	10 mm	Spacing	10 mm	Spacing	10 mm	Spacing	10 mm	Spacing	10 mm	Spacing	10 mm
Frequency (MHz)	707.5	Frequency (MHz)	782	Frequency (MHz)	836.5	Frequency (MHz)	836.5	Frequency (MHz)	1732.5	Frequency (MHz)	1905
Channel	23095	Channel	23230	Channel	26865	Channel	20525	Channel	20175	Channel	26590
Measured 1g SAR (W/kg)	0.370	Measured 1g SAR (W/kg)	0.407	Measured 1g SAR (W/kg)	0.623	Measured 1g SAR (W/kg)	0.754	Measured 1g SAR (W/kg)	0.562	Measured 1g SAR (W/kg)	0.884
Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)	
Auto-tune (State 10)	0.400	Auto-tune (State 76)	0.698	Auto-tune (State 18)	0.817	Auto-tune (State 2)	0.923	Auto-tune (State 0)	0.770	Auto-tune (State 1)	1.094
Default (State 1)	0.306	Default (State 1)	0.677	Default (State 1)	0.779	Default (State 1)	0.889	Default (State 1)	0.757	Default (State 1)	1.099
State 0	0.304	State 1	0.677	State 1	0.779	State 1	0.889	State 0	0.762	State 0	1.096
State 1	0.306	State 6	0.533	State 3	0.807	State 2	0.927	State 1	0.757	State 1	1.099
State 10	0.422	State 13	0.125	State 7	0.751	State 8	0.860	State 2	0.683	State 6	0.940
State 15	0.144	State 19	0.587	State 13	0.247	State 9	0.773	State 8	0.617	State 11	0.719
State 23	0.385	State 21	0.560	State 17	0.786	State 15	0.172	State 11	0.483	State 13	0.529
State 27	0.366	State 26	0.298	State 18	0.809	State 16	0.886	State 14	0.321	State 17	1.019
State 39	0.033	State 41	0.317	State 22	0.735	State 18	0.913	State 17	0.647	State 19	0.907
State 45	0.004	State 44	0.123	State 23	0.710	State 20	0.900	State 19	0.556	State 26	0.695
State 47	0.001	State 61	0.093	State 29	0.230	State 29	0.325	State 20	0.548	State 30	0.361
State 50	0.047	State 73	0.640	State 35	0.546	State 33	0.781	State 22	0.523	State 32	0.163
State 59	0.009	State 76	0.698	State 42	0.275	State 36	0.693	State 28	0.312	State 36	0.138
State 77	0.321	State 78	0.354	State 43	0.209	State 46	0.120	State 37	0.087	State 37	0.138
				State 44	0.141	State 47	0.077	State 38	0.079	State 39	0.115
				State 53	0.485	State 50	0.670	State 46	0.026	State 48	0.145
				State 54	0.437	State 56	0.544	State 52	0.078	State 54	0.110
				State 66	0.658	State 57	0.445	State 56	0.071	State 58	0.089
				State 69	0.780	State 60	0.190	State 63	0.017	State 61	0.044
				State 70	0.665	State 64	0.861	State 68	0.744	State 63	0.022
				State 73	0.780	State 67	0.741	State 71	0.100	State 65	0.822
				State 74	0.667	State 75	0.746	State 74	0.097	State 72	1.015
				State 78	0.674	State 76	0.880	State 79	0.100	State 77	1.019

15 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	E5515C	8960 Series 10 Wireless Communications Test Set	12/18/2018	Annual	12/18/2019	GB42230325
Agilent	E4438C	ESG Vector Signal Generator	3/24/2017	Biennial	3/24/2019	MY42082385
Agilent	N9020A	MXA Signal Analyzer	1/24/2018	Annual	1/24/2019	US46470561
Agilent	N5182A	MXG Vector Signal Generator	11/28/2018	Annual	11/28/2019	MY47420603
Agilent	8753ES	S-Parameter Network Analyzer	7/30/2018	Annual	7/30/2019	MY40000670
Agilent	8753ES	S-Parameter Vector Network Analyzer	8/30/2018	Annual	8/30/2019	MY40003841
Agilent	E5515C	Wireless Communications Test Set	5/22/2018	Biennial	5/22/2020	GB43193563
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB44450273
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433972
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433974
Anritsu	ML2496A	Power Meter	6/19/2018	Annual	6/19/2019	1306009
Anritsu	ML2496A	Power Meter	5/21/2018	Annual	5/21/2019	1351001
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1126066
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1339008
Anritsu	MT8821C	Radio Communication Analyzer	11/6/2018	Annual	11/6/2019	6200901190
Anritsu	MT8821C	Radio Communication Analyzer	7/26/2018	Annual	7/26/2019	6201144418
Anritsu	MA24106A	USB Power Sensor	6/5/2018	Annual	6/5/2019	1231535
Anritsu	MA24106A	USB Power Sensor	6/5/2018	Annual	6/5/2019	1231538
Anritsu	MT8862A	Wireless Connectivity Test Set	7/3/2018	Annual	7/3/2019	6261782395
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1S5A00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Control Company	4040	Therm./ Clock/ Humidity Monitor	3/1/2017	Biennial	3/1/2019	170152009
Control Company	4352	Ultra Long Stem Thermometer	3/3/2017	Biennial	3/3/2019	170155534
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
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
Mini Circuits	PWR-4GHS	USB Power Sensor	1/22/2018	Annual	1/22/2019	11710030062
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
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
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
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	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	NC-100	Torque Wrench	4/18/2018	Annual	4/18/2019	1445
Rohde & Schwarz	CMW500	Radio Communication Tester	11/14/2018	Annual	11/14/2019	100976
Rohde & Schwarz	CMW500	Radio Communication Tester	6/9/2018	Annual	6/9/2019	108843
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	5/29/2018	Annual	5/29/2019	161662
Seekonk	NC-100	Torque Wrench	11/1/2017	Biennial	11/1/2019	22313
SPEAG	D750V3	750 MHz SAR Dipole	3/7/2017	Biennial	3/7/2019	1054
SPEAG	D750V3	750 MHz SAR Dipole	1/15/2018	Annual	1/15/2019	1003
SPEAG	D835V2	835 MHz SAR Dipole	10/19/2018	Annual	10/19/2019	4d047
SPEAG	D835V2	835 MHz SAR Dipole	10/19/2018	Annual	10/19/2019	4d133
SPEAG	D1750V2	1750 MHz SAR Dipole	5/9/2017	Biennial	5/9/2019	1148
SPEAG	D1750V2	1750 MHz SAR Dipole	10/22/2018	Annual	10/22/2019	1150
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Annual	10/23/2019	5d080
SPEAG	D1900V2	1900 MHz SAR Dipole	2/7/2018	Annual	2/7/2019	5d148
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Annual	10/23/2019	5d149
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	D2450V2	2450 MHz SAR Dipole	8/16/2018	Annual	8/16/2019	981
SPEAG	D2600V2	2600 MHz SAR Dipole	4/11/2018	Annual	4/11/2019	1004
SPEAG	D2600V2	2600 MHz SAR Dipole	9/13/2016	Triennial	9/13/2019	1071
SPEAG	D5GHzV2	5 GHz SAR Dipole	9/21/2016	Triennial	9/21/2019	1191
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/15/2018	Annual	2/15/2019	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/22/2018	Annual	5/22/2019	859
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/9/2018	Annual	2/9/2019	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2018	Annual	7/11/2019	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/18/2018	Annual	10/18/2019	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2018	Annual	6/18/2019	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/7/2018	Annual	3/7/2019	1368
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/11/2018	Annual	4/11/2019	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/3/2018	Annual	10/3/2019	1558
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/11/2018	Annual	9/11/2019	1091
SPEAG	ES3DV3	SAR Probe	10/22/2018	Annual	10/22/2019	3287
SPEAG	ES3DV3	SAR Probe	3/13/2018	Annual	3/13/2019	3319
SPEAG	ES3DV3	SAR Probe	8/22/2018	Annual	8/22/2019	3332
SPEAG	ES3DV3	SAR Probe	3/27/2018	Annual	3/27/2019	3347
SPEAG	EX3DV4	SAR Probe	8/23/2018	Annual	8/23/2019	7308
SPEAG	EX3DV4	SAR Probe	4/18/2018	Annual	4/18/2019	7357
SPEAG	EX3DV4	SAR Probe	5/22/2018	Annual	5/22/2019	7406
SPEAG	EX3DV4	SAR Probe	6/25/2018	Annual	6/25/2019	7409
SPEAG	EX3DV4	SAR Probe	7/20/2018	Annual	7/20/2019	7410

Note:
1. 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.
2. Each equipment was used solely within its calibration period.

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: A3LSMG9750; Type: Portable Handset; Serial: 2248M

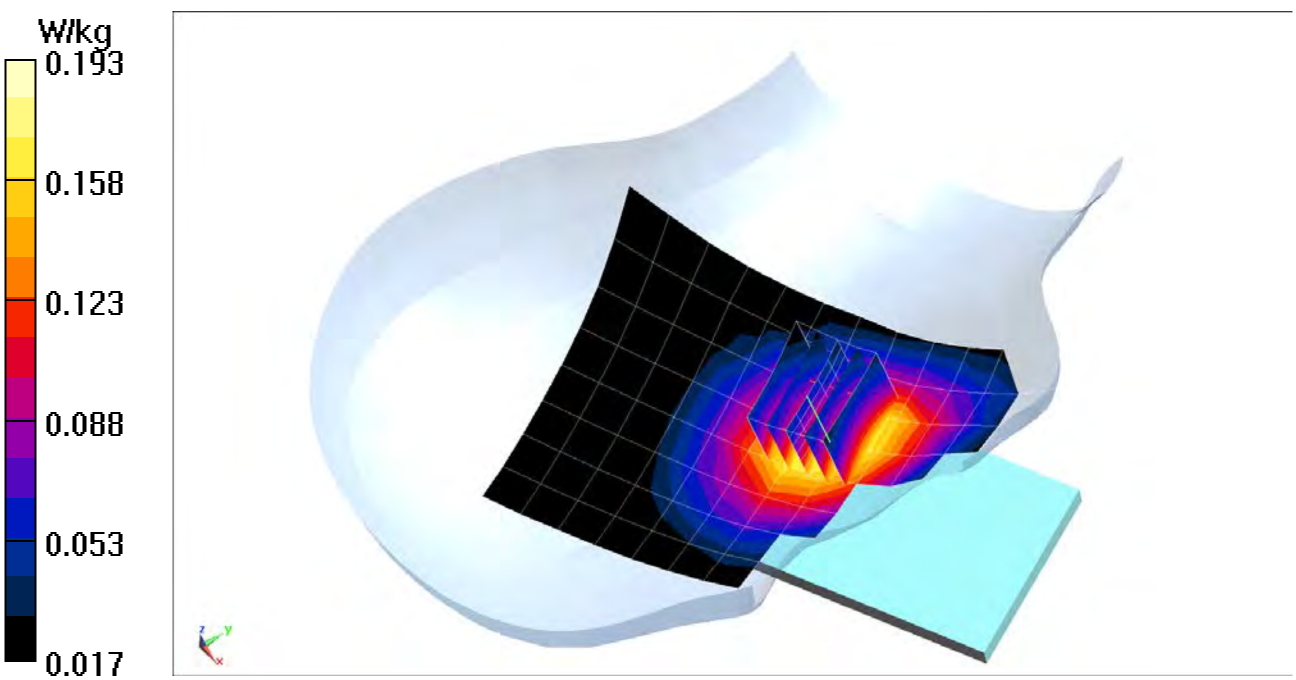
Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: 835 Head; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.931 S/m; ε_r = 42.947; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-19-2018; Ambient Temp: 23.0°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7410; ConvF(9.81, 9.81, 9.81); Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: GSM 850, Right Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.47 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.208 W/kg
SAR(1 g) = 0.166 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2247M

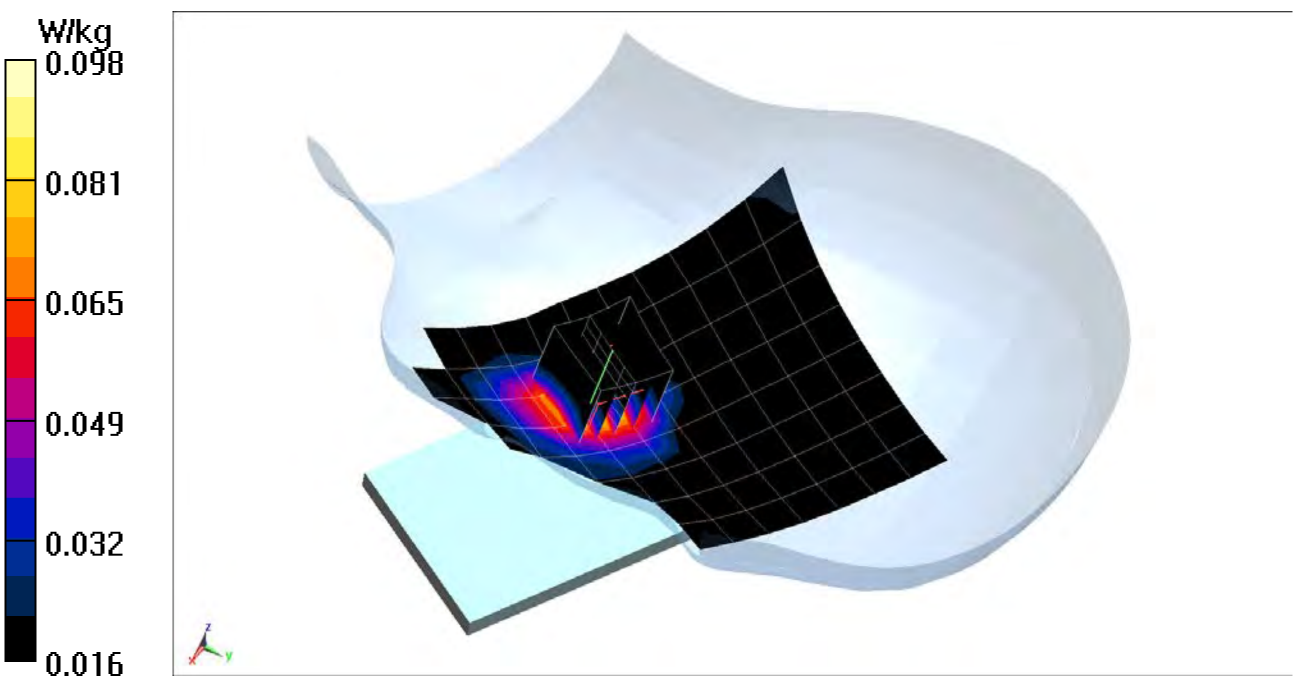
Communication System: UID 0, _GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Head; Medium parameters used:
f = 1880 MHz; σ = 1.419 S/m; ε_r = 40.172; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 12-19-2018; Ambient Temp: 21.6°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(8.05, 8.05, 8.05) z; Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: GSM 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 = 6.789 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.114 W/kg
SAR(1 g) = 0.0695 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2248M

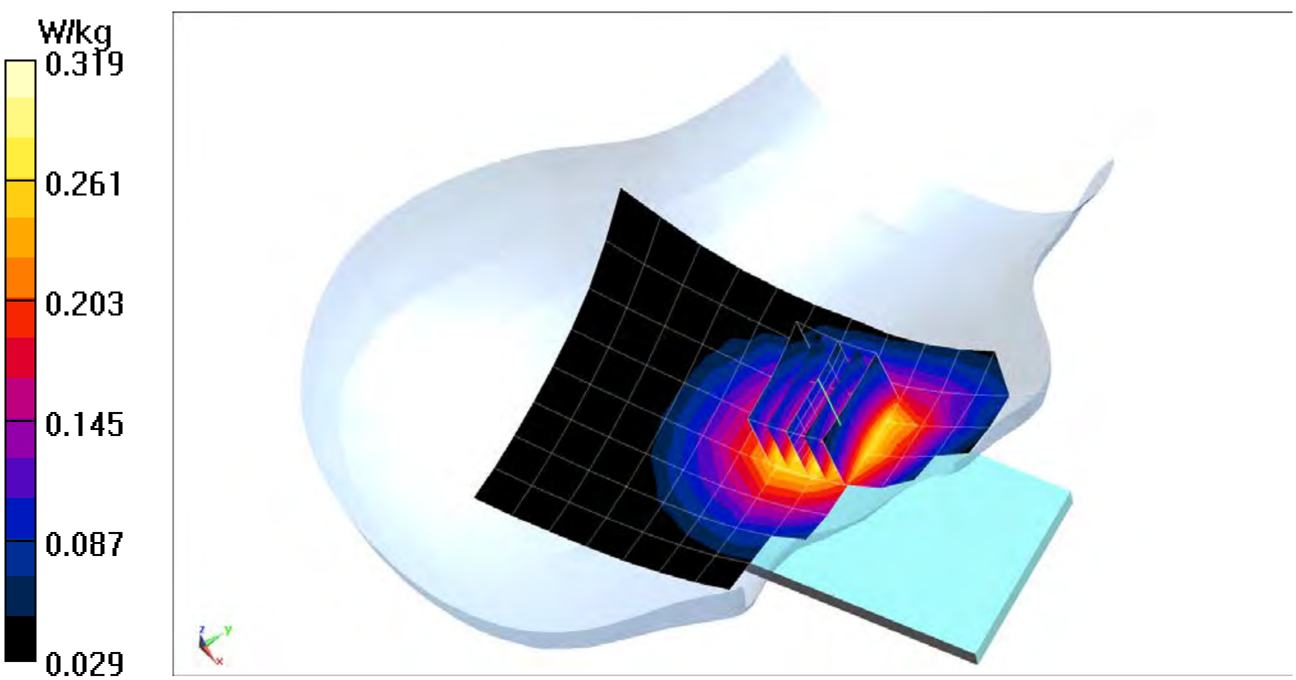
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.931 S/m; ε_r = 42.947; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-19-2018; Ambient Temp: 23.0°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7410; ConvF(9.81, 9.81, 9.81); Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 850, Right Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.51 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.344 W/kg
SAR(1 g) = 0.271 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2247M

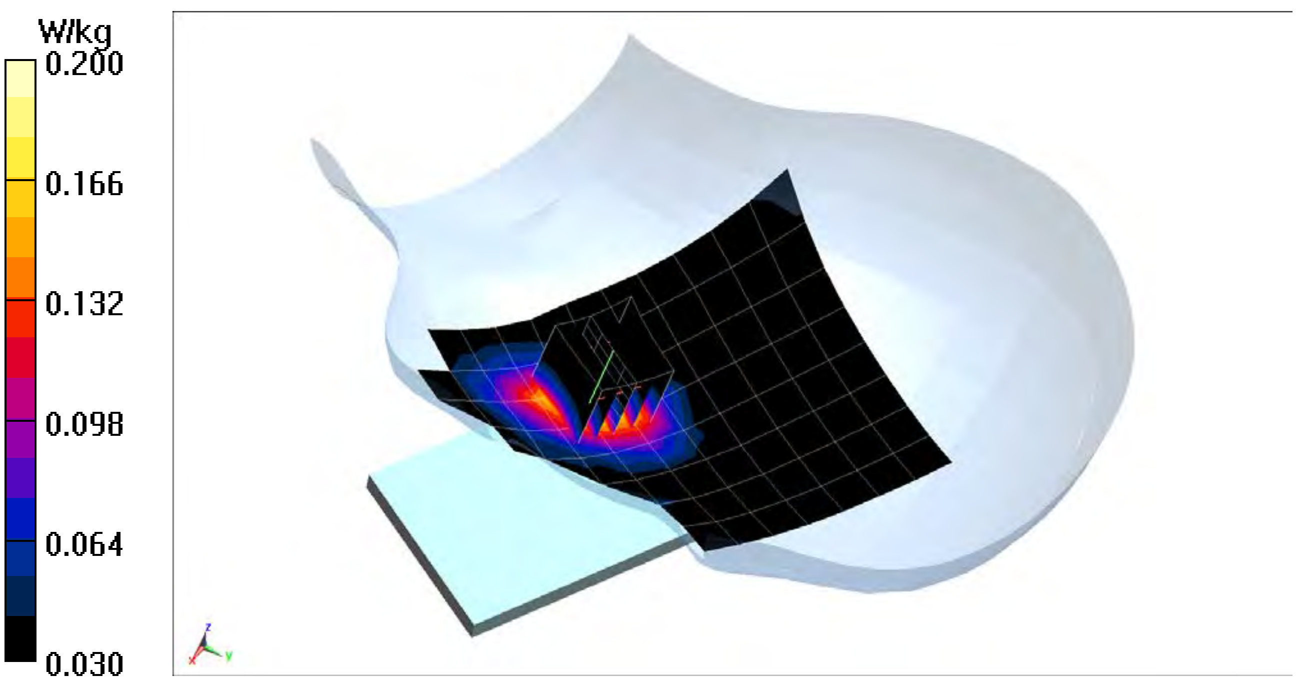
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Head; Medium parameters used:
f = 1880 MHz; σ = 1.419 S/m; ε_r = 40.172; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 12-19-2018; Ambient Temp: 21.6°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(8.05, 8.05, 8.05); Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.10; 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 = 10.42 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.233 W/kg
SAR(1 g) = 0.144 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2249M

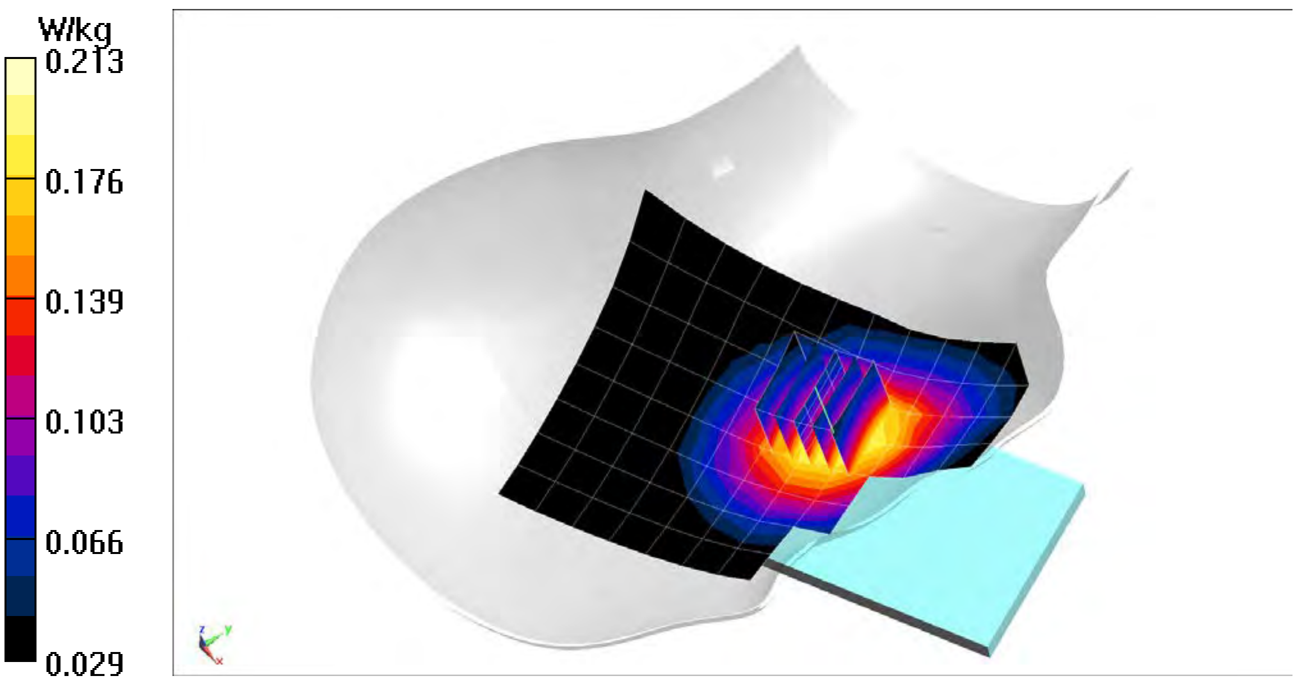
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Head; Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.892 S/m; ε_r = 41.306; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-26-2018; Ambient Temp: 22.5°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3287; ConvF(6.76, 6.76, 6.76); Calibrated: 10/22/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/18/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 12, Right Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.84 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.244 W/kg
SAR(1 g) = 0.196 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2249M

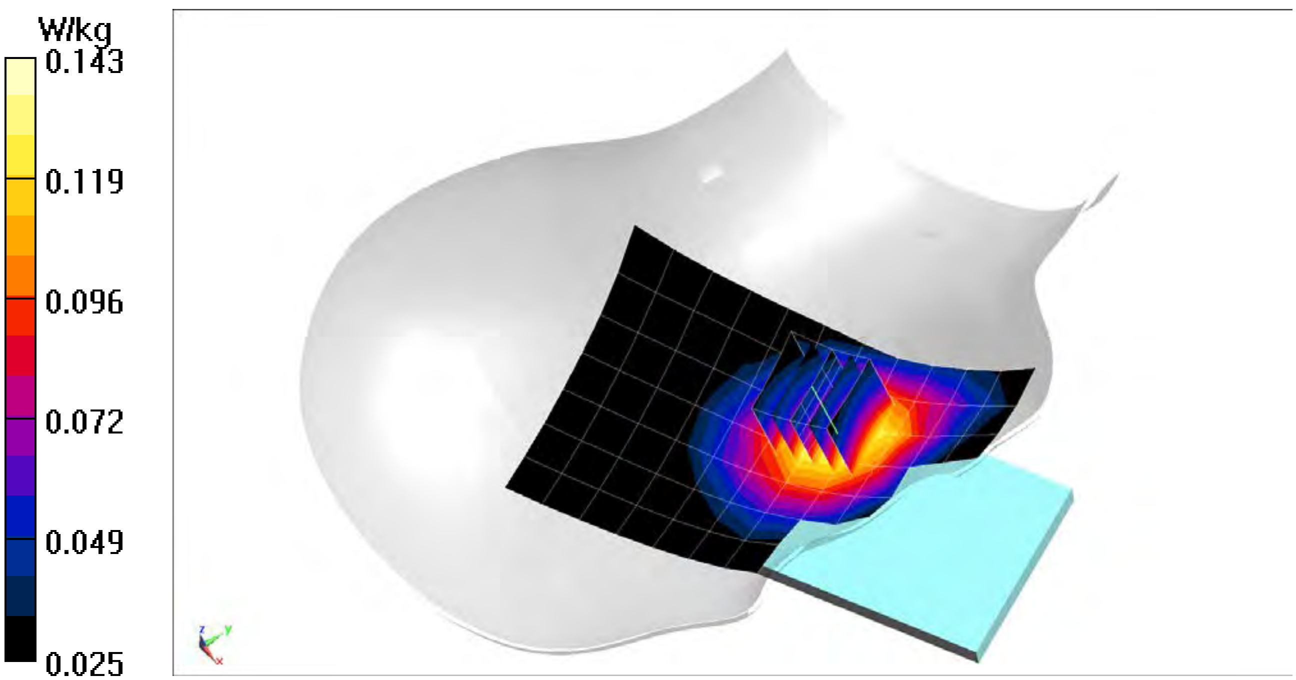
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Head; Medium parameters used (interpolated):
f = 782 MHz; σ = 0.919 S/m; ε_r = 41.059; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-26-2018; Ambient Temp: 22.5°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3287; ConvF(6.76, 6.76, 6.76); Calibrated: 10/22/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/18/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 13, Right Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.75 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.163 W/kg
SAR(1 g) = 0.131 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2244M

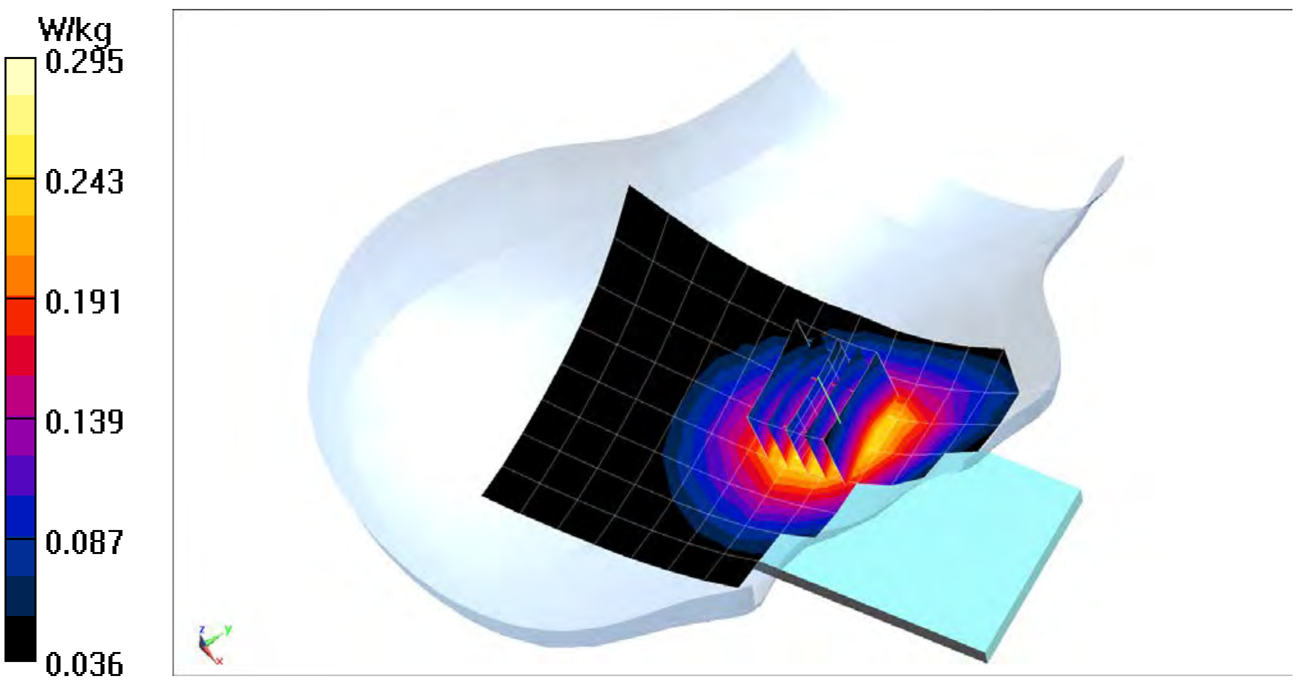
Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used (interpolated):
f = 831.5 MHz; σ = 0.925 S/m; ε_r = 43.01; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-19-2018; Ambient Temp: 23.0°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7410; ConvF(9.81, 9.81, 9.81); Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

**Mode: LTE Band 26 (Cell.), Right Head, Cheek, Mid.ch,
15 MHz Bandwidth, QPSK, 1 RB, 36 RB Offset**

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.42 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.317 W/kg
SAR(1 g) = 0.251 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2244M

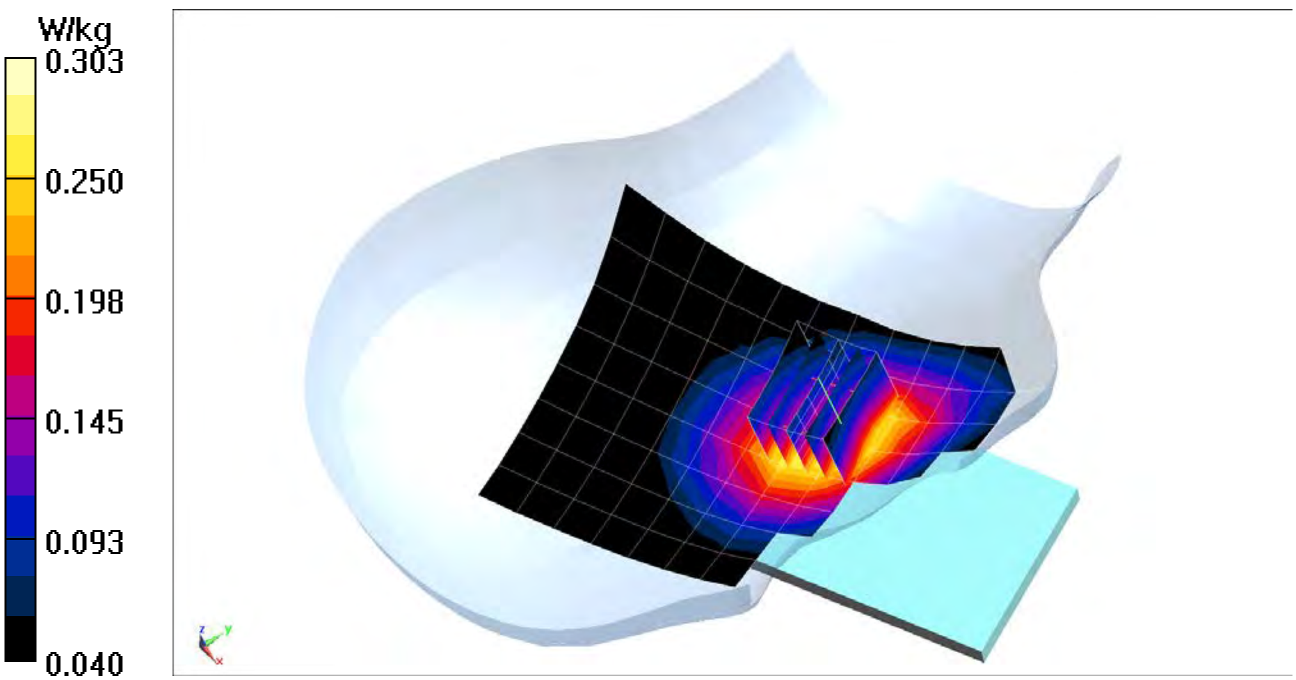
Communication System: UID 0, LTE Band 5 (Cell.); Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.931 S/m; ε_r = 42.948; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-19-2018; Ambient Temp: 23.0°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7410; ConvF(9.81, 9.81, 9.81); Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 5 (Cell.), Right Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.60 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.326 W/kg
SAR(1 g) = 0.259 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2249M

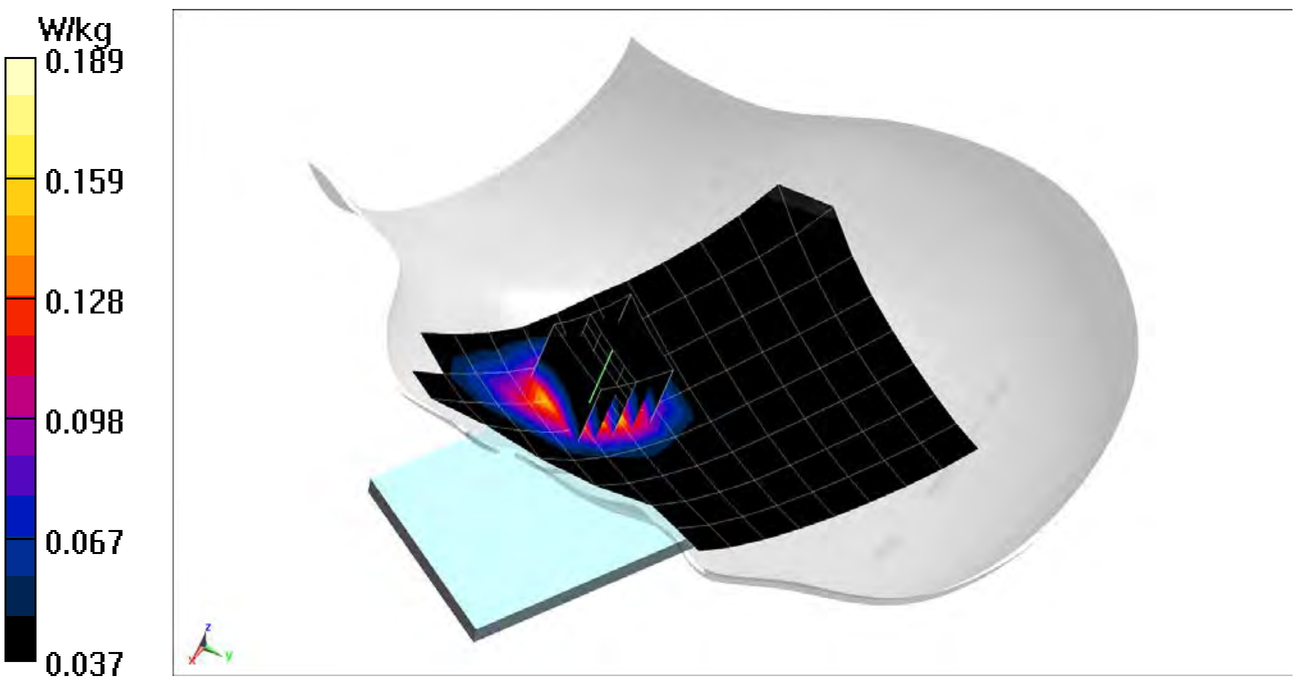
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Head; Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.371 S/m; ε_r = 39.005; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 12-25-2018; Ambient Temp: 19.8°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3287; ConvF(5.48, 5.48, 5.48); Calibrated: 10/22/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/18/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 4 (AWS), Left Head, Cheek, Mid.ch,
20 MHz Bandwidth, QPSK, 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 = 12.07 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.251 W/kg
SAR(1 g) = 0.165 W/kg



DUT: A3LSMG9750; Type: Portable Handset; Serial: 2247M

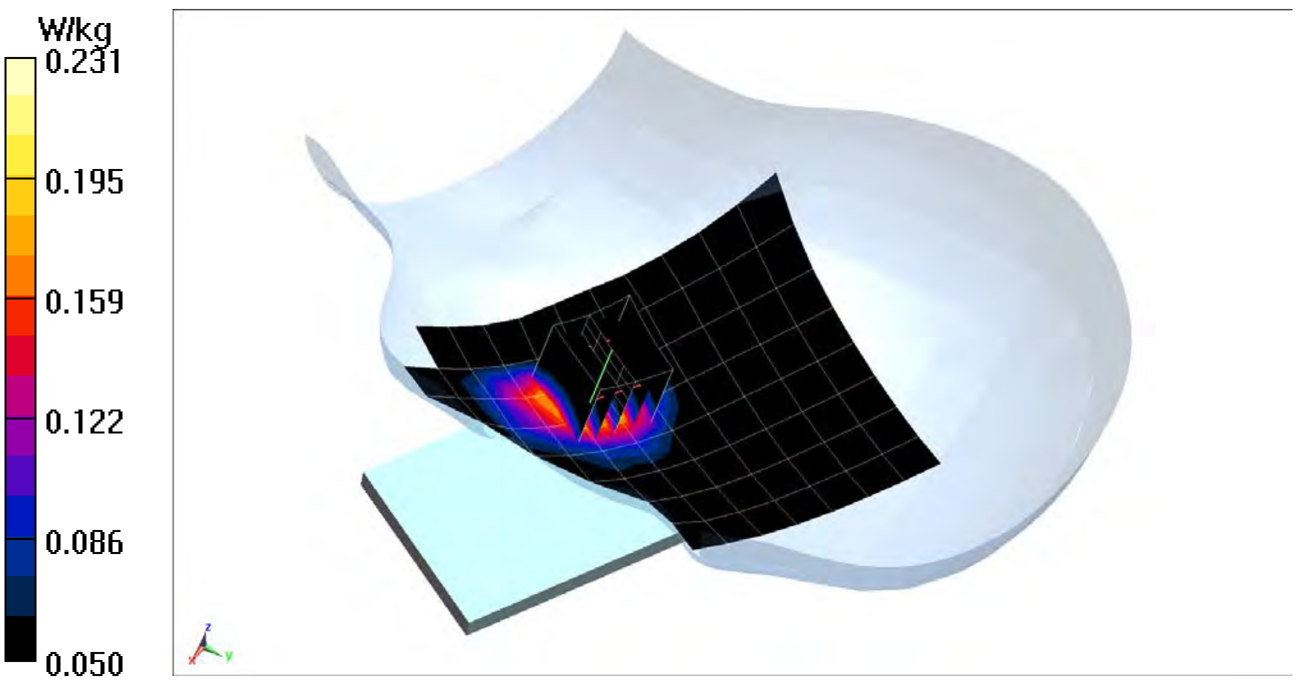
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1860 MHz; Duty Cycle: 1:1
Medium: 1900 Head; Medium parameters used (interpolated):
f = 1860 MHz; σ = 1.399 S/m; ε_r = 40.248; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 12-19-2018; Ambient Temp: 21.6°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(8.05, 8.05, 8.05); Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 25 (PCS), Left Head, Cheek, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.01 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.268 W/kg
SAR(1 g) = 0.168 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2244M

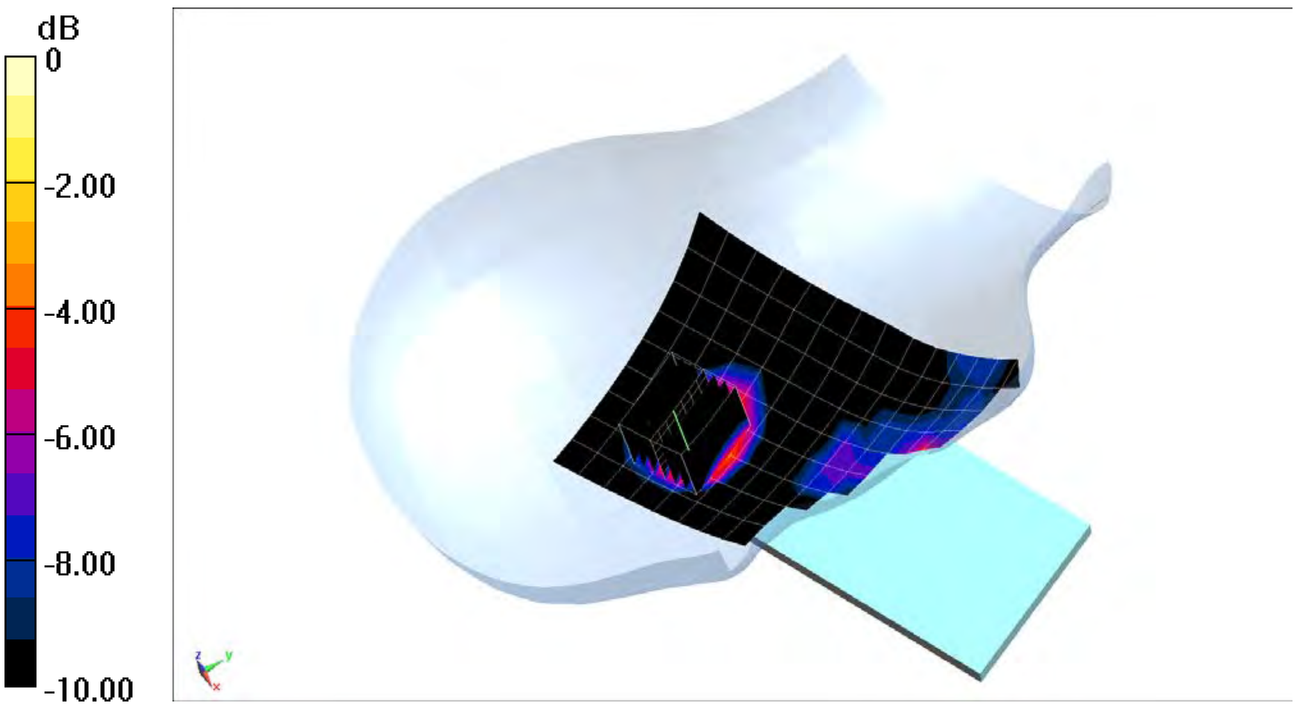
Communication System: UID 0, _LTE Band 41; Frequency: 2549.5 MHz; Duty Cycle: 1:1.58
Medium: 2450 Head; Medium parameters used:
f = 2550 MHz; σ = 1.971 S/m; ε_r = 37.894; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-17-2018; Ambient Temp: 21.9°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(7.24, 7.24, 7.24); Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41 ULCA, Right Head, Tilt,
PCC: 20 MHz Bandwidth, QPSK, Ch. 40185, 1 RB, 0 RB Offset
SCC: 20 MHz Bandwidth, QPSK, Ch. 39987, 1 RB, 99 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.252 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.0820 W/kg
SAR(1 g) = 0.043 W/kg



0 dB = 0.0675 W/kg = -11.71 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2245M

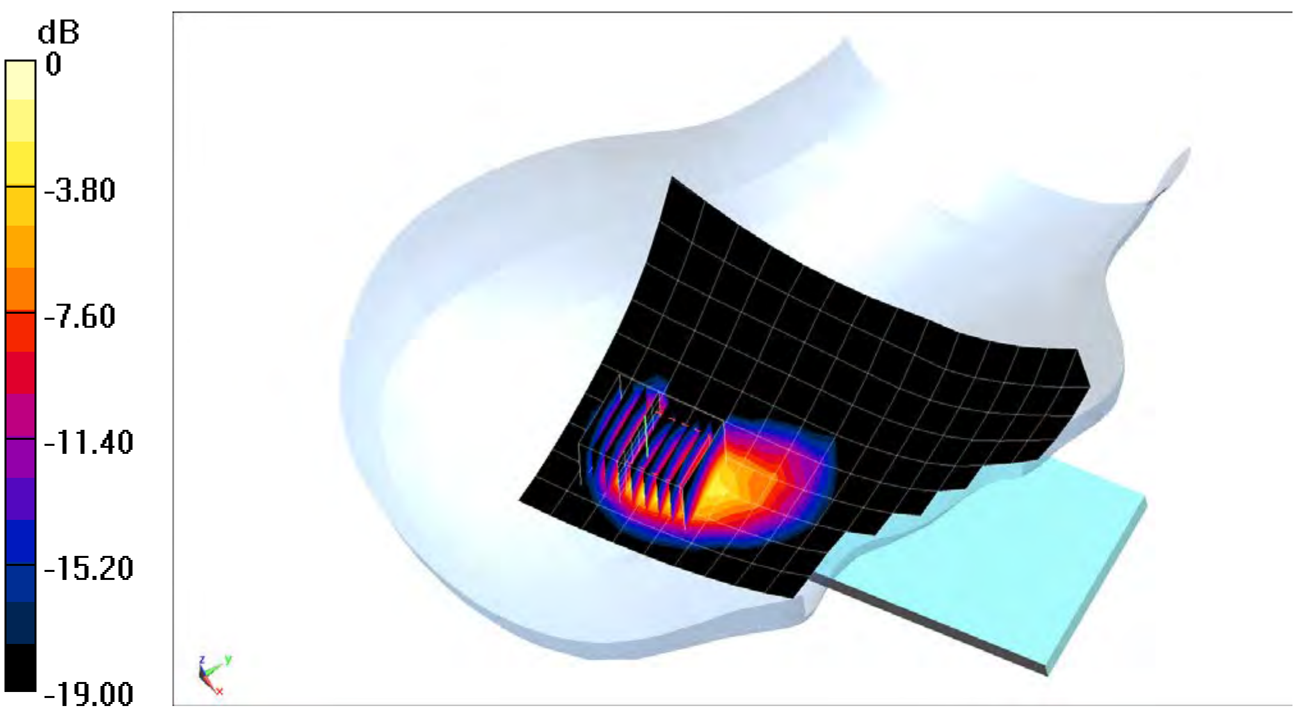
Communication System: UID 0, _IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Head; Medium parameters used (interpolated):
f = 2412 MHz; σ = 1.819 S/m; ε_r = 38.42; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-17-2018; Ambient Temp: 21.9°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(7.5, 7.5, 7.5); Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11b, Antenna 1, 22 MHz Bandwidth, Right Head, Cheek, Ch 1, 1 Mbps

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x9x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.261 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.503 W/kg
SAR(1 g) = 0.204 W/kg



0 dB = 0.360 W/kg = -4.44 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2245M

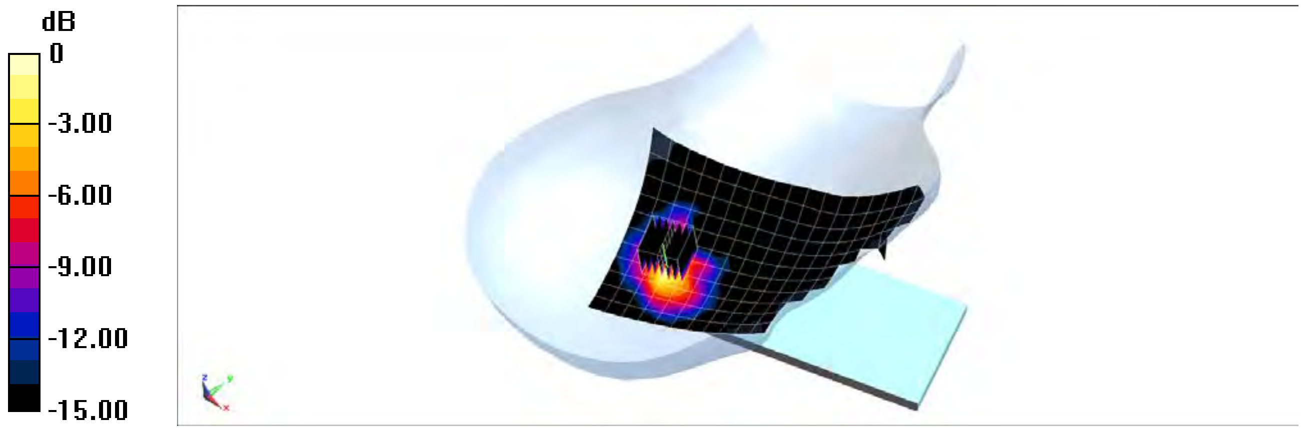
Communication System: UID 0, 802.11n 5.2-5.8 GHz Band; Frequency: 5270 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head; Medium parameters used (interpolated):
f = 5270 MHz; σ = 4.508 S/m; ε_r = 34.766; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-05-2018; Ambient Temp: 21.8°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7409; ConvF(5.2, 5.2, 5.2); Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11n, Antenna 1, U-NII-2A, 40 MHz Bandwidth, Right Head, Tilt, Ch 54, 13.5 Mbps

Area Scan (12x21x1): 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 = 2.700 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.235 W/kg



0 dB = 0.564 W/kg = -2.49 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2245M

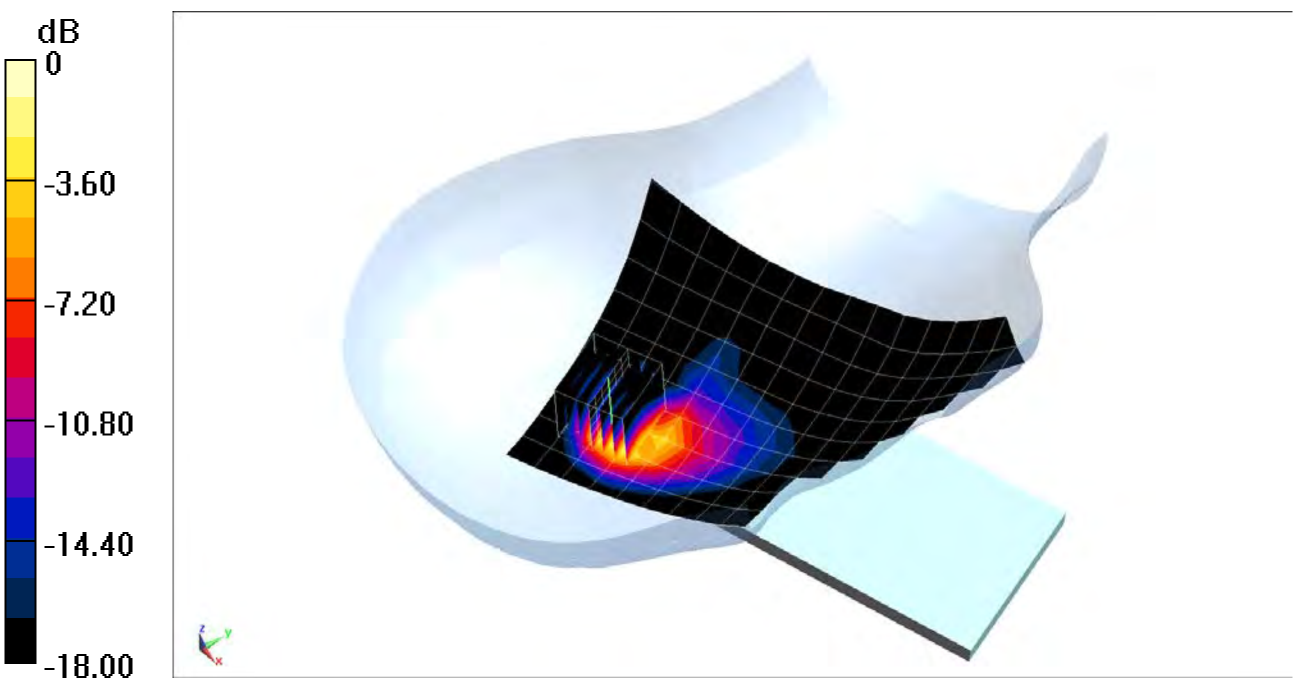
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.297
Medium: 2450 Head; Medium parameters used (interpolated):
f = 2441 MHz; σ = 1.852 S/m; ε_r = 38.307; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 12-17-2018; Ambient Temp: 21.9°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(7.5, 7.5, 7.5); Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: Bluetooth, Right Head, Tilt, Ch 39, 1 Mbps

Area Scan (11x19x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.68 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 2.18 W/kg
SAR(1 g) = 0.774 W/kg



0 dB = 1.54 W/kg = 1.88 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2325M

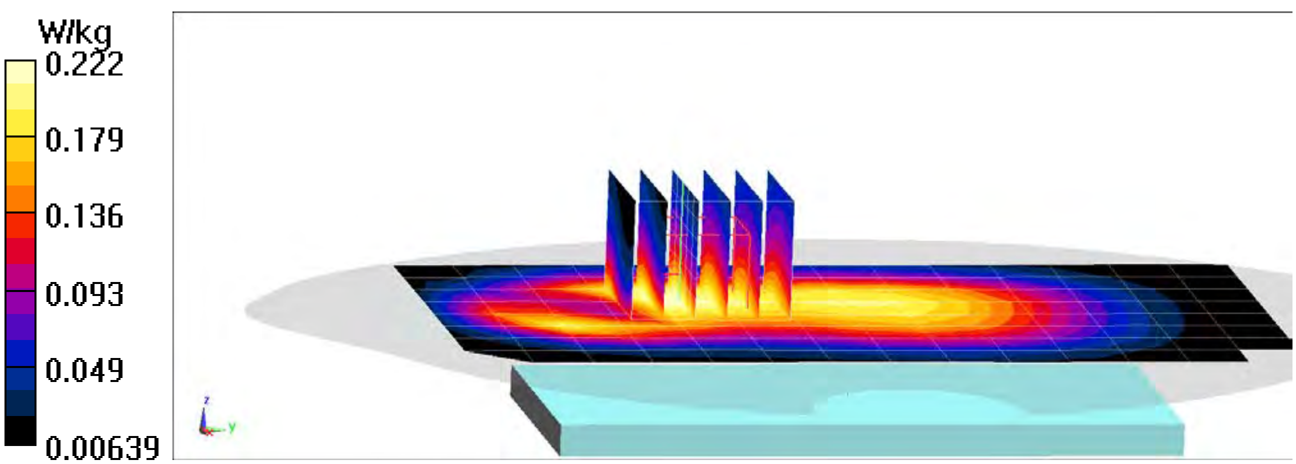
Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.967 S/m; ε_r = 54.817; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.5 cm

Test Date: 12-22-2018; Ambient Temp: 19.9°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3347; ConvF(6.37, 6.37, 6.37); Calibrated: 3/27/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/15/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: GSM 850, Body SAR, Back Side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.89 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.272 W/kg
SAR(1 g) = 0.200 W/kg



DUT: A3LSMG9750; Type: Portable Handset; Serial: 2325M

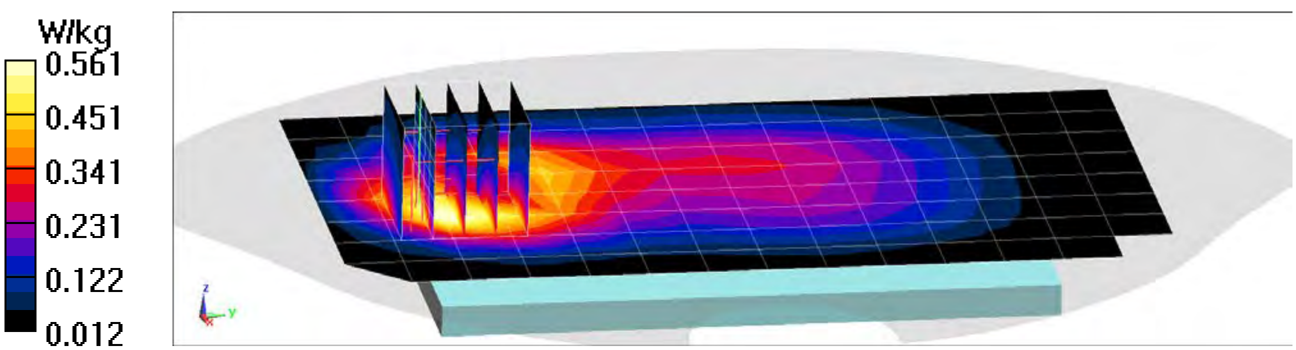
Communication System: UID 0, _GSM GPRS; 3 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.76
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.967 S/m; ε_r = 54.817; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 12-22-2018; Ambient Temp: 19.9°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3347; ConvF(6.37, 6.37, 6.37); Calibrated: 3/27/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/15/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 850, Body SAR, Back Side, Mid.ch, 3 Tx Slots

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.27 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.815 W/kg
SAR(1 g) = 0.468 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2247M

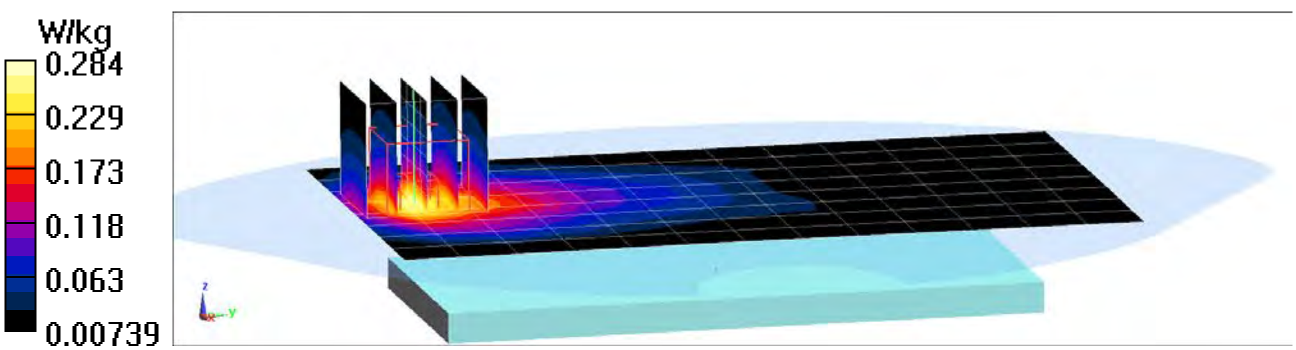
Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Body; Medium parameters used:
f = 1880 MHz; σ = 1.551 S/m; ε_r = 53.602; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-19-2018; Ambient Temp: 21.6°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3332; ConvF(4.77, 4.77, 4.77); Calibrated: 8/22/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: GSM 1900, Body SAR, Back Side, Mid.ch

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.30 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.371 W/kg
SAR(1 g) = 0.238 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2247M

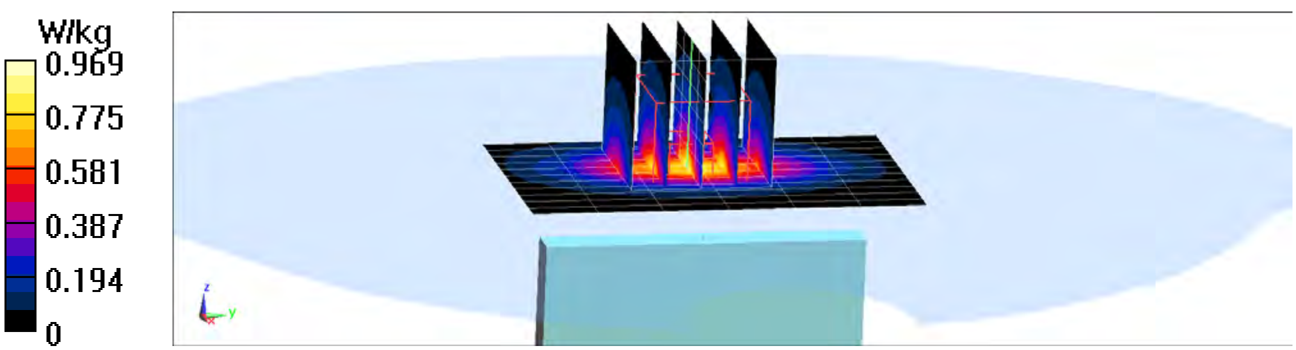
Communication System: UID 0, _GSM GPRS; 3 Tx slots; Frequency: 1909.8 MHz; Duty Cycle: 1:2.76
Medium: 1900 Body; Medium parameters used:
f = 1910 MHz; σ = 1.584 S/m; ε_r = 53.462; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-19-2018; Ambient Temp: 21.6°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3332; ConvF(4.77, 4.77, 4.77); Calibrated: 8/22/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 1900, Body SAR, Bottom Edge, High.ch, 3 Tx Slots

Area Scan (12x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.95 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.28 W/kg
SAR(1 g) = 0.768 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2325M

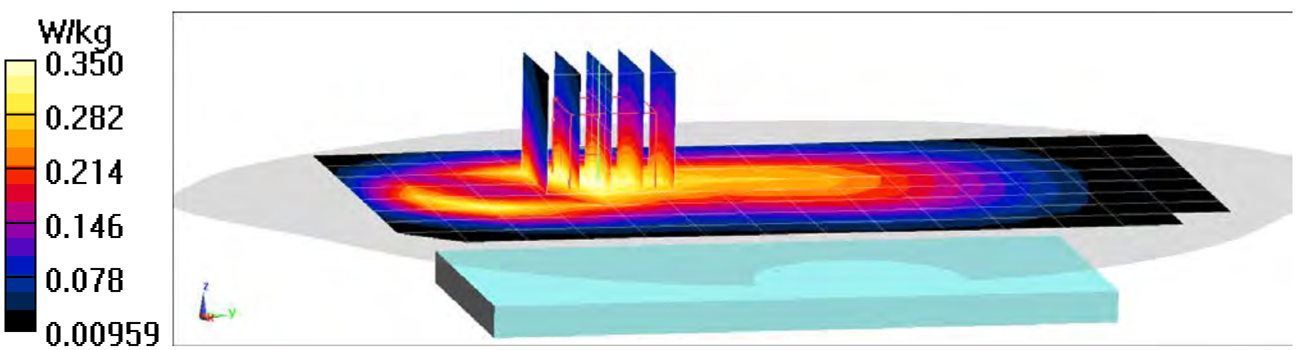
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.974 S/m; ε_r = 53.107; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.5 cm

Test Date: 12-20-2018; Ambient Temp: 19.7°C; Tissue Temp: 19.6°C

Probe: ES3DV3 - SN3347; ConvF(6.37, 6.37, 6.37); Calibrated: 3/27/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/15/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 850, 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 = 18.65 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.427 W/kg
SAR(1 g) = 0.316 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2325M

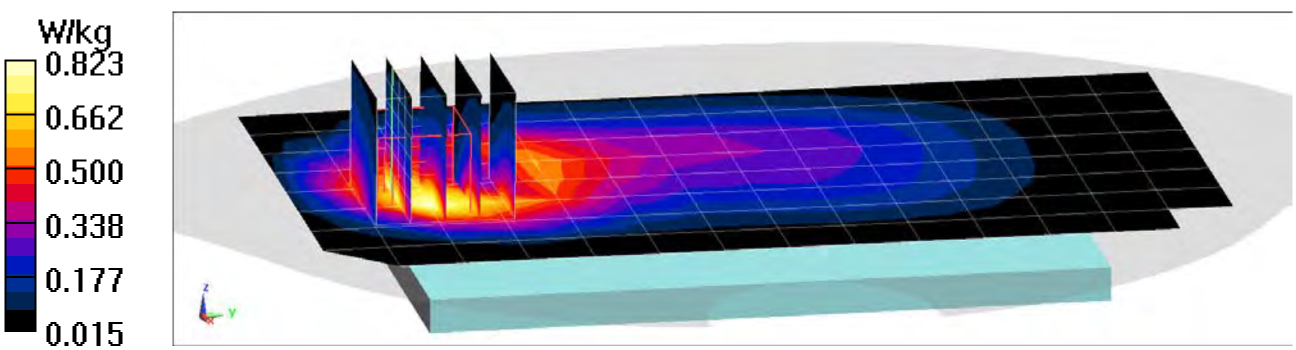
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.974 S/m; ε_r = 53.107; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 12-20-2018; Ambient Temp: 19.7°C; Tissue Temp: 19.6°C

Probe: ES3DV3 - SN3347; ConvF(6.37, 6.37, 6.37); Calibrated: 3/27/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/15/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 850, 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 = 27.81 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.691 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2247M

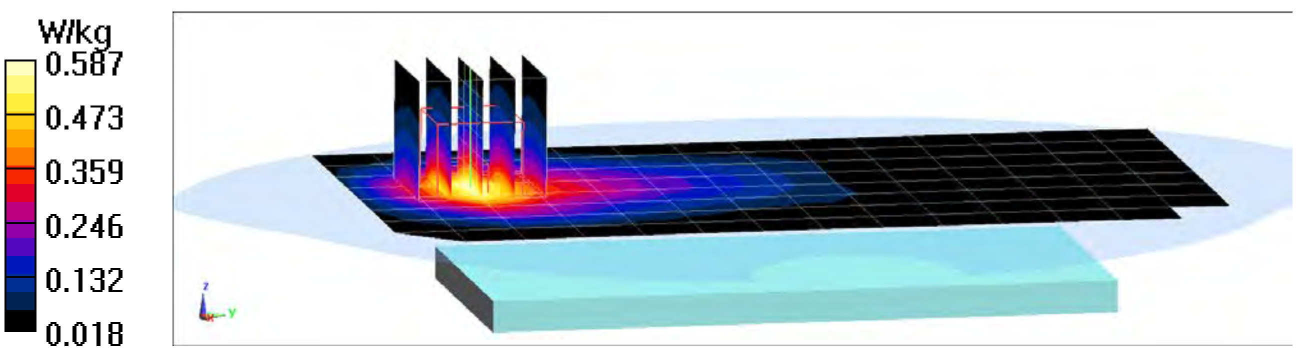
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used:
f = 1880 MHz; σ = 1.478 S/m; ε_r = 50.794; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.5 cm

Test Date: 12-24-2018; Ambient Temp: 21.3°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3332; ConvF(4.77, 4.77, 4.77); Calibrated: 8/22/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.10; 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 = 19.60 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.752 W/kg
SAR(1 g) = 0.493 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2247M

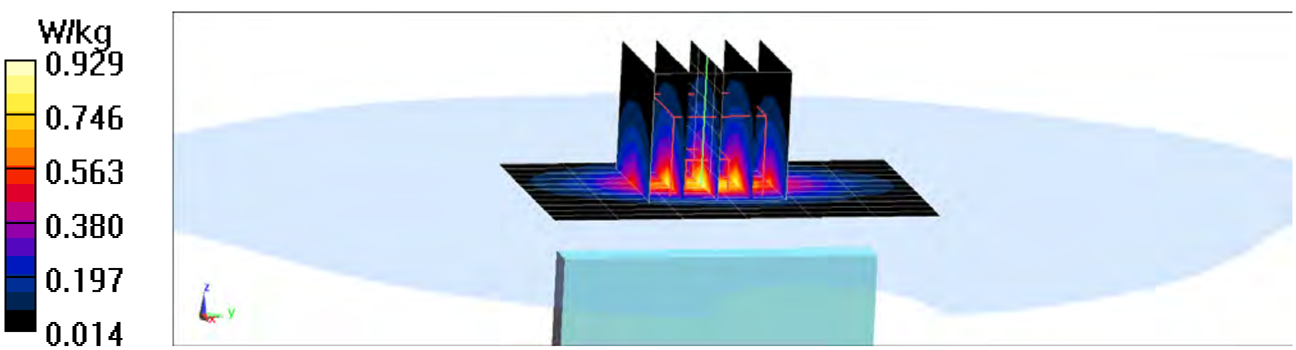
Communication System: UID 0, UMTS, Frequency: 1907.6 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1907.6 MHz; σ = 1.507 S/m; ε_r = 50.727; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 12-24-2018; Ambient Temp: 21.3°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3332; ConvF(4.77, 4.77, 4.77); Calibrated: 8/22/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1900, Body SAR, Bottom Edge, High.ch

Area Scan (12x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.08 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.742 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2249M

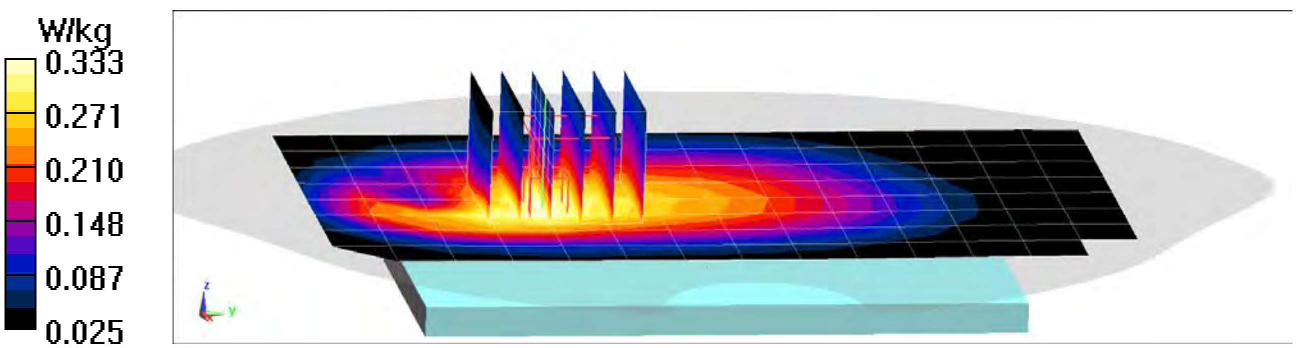
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body; Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.927 S/m; ε_r = 54.631; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.5 cm

Test Date: 12-17-2018; Ambient Temp: 20.1°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7406; ConvF(9.91, 9.91, 9.91); Calibrated: 5/22/2018;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/22/2018
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 12, Body SAR, Back Side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.25 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.374 W/kg
SAR(1 g) = 0.266 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2249M

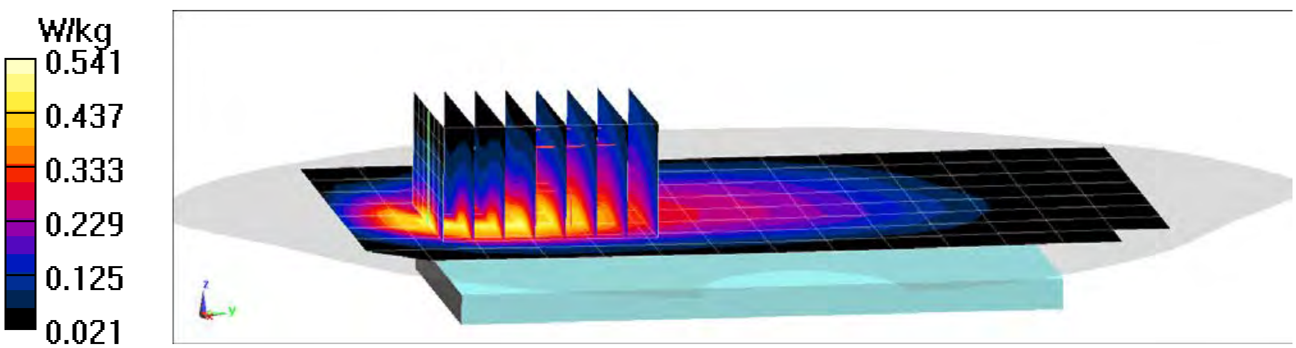
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body; Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.927 S/m; ε_r = 54.631; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 12-17-2018; Ambient Temp: 20.1°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7406; ConvF(9.91, 9.91, 9.91); Calibrated: 5/22/2018;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/22/2018
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 12, Body SAR, Back Side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.10 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.664 W/kg
SAR(1 g) = 0.370 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2249M

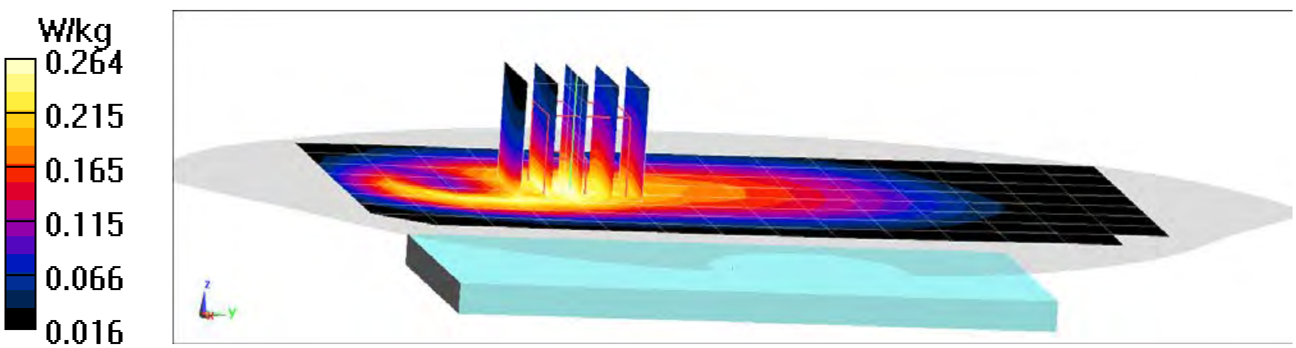
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Body; Medium parameters used (interpolated):
f = 782 MHz; σ = 0.957 S/m; ε_r = 54.405; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.5 cm

Test Date: 12-17-2018; Ambient Temp: 20.1°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7406; ConvF(9.91, 9.91, 9.91); Calibrated: 5/22/2018;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/22/2018
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 13, Body SAR, Back Side, Mid.ch,
10 MHz Bandwidth, QPSK, 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 = 15.13 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.301 W/kg
SAR(1 g) = 0.213 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2249M

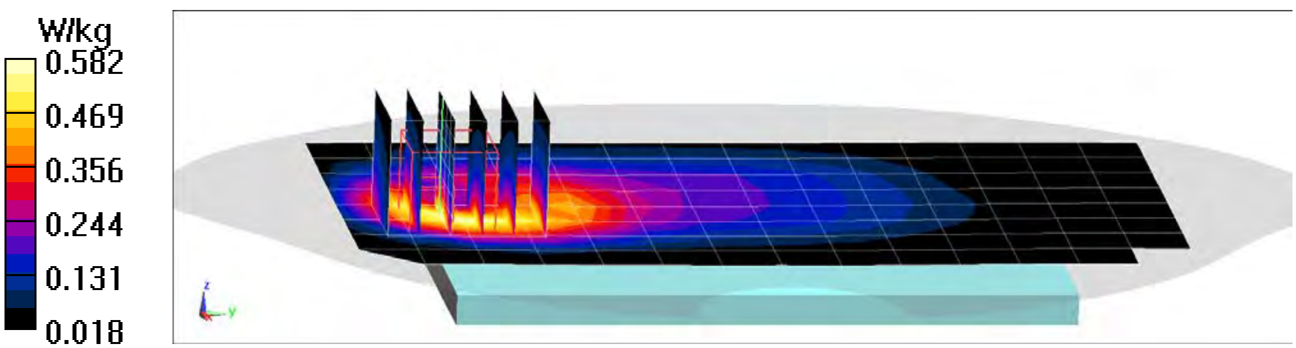
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Body; Medium parameters used (interpolated):
f = 782 MHz; σ = 0.957 S/m; ε_r = 54.405; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 12-17-2018; Ambient Temp: 20.1°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7406; ConvF(9.91, 9.91, 9.91); Calibrated: 5/22/2018;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/22/2018
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 13, Body SAR, Back Side, Mid.ch,
10 MHz Bandwidth, QPSK, 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 = 20.55 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.727 W/kg
SAR(1 g) = 0.407 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2249M

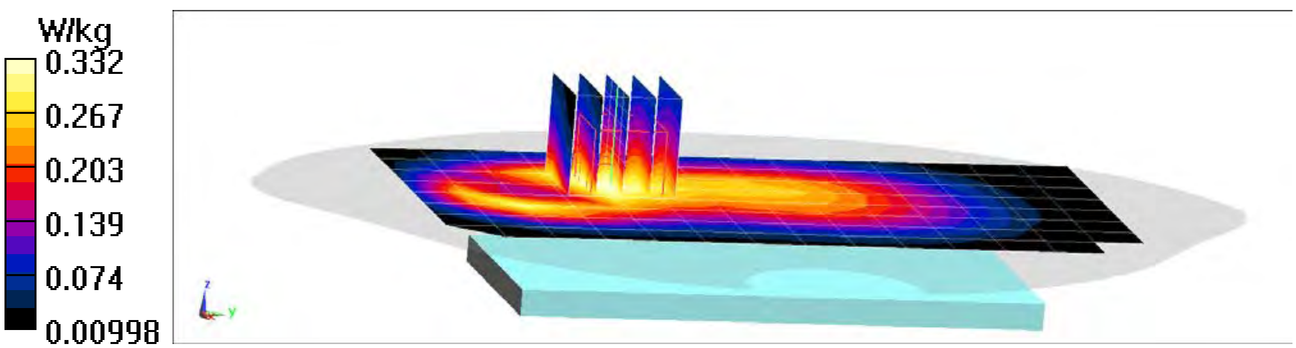
Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 831.5 MHz; σ = 0.965 S/m; ε_r = 54.828; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.5 cm

Test Date: 12-22-2018; Ambient Temp: 19.9°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3347; ConvF(6.37, 6.37, 6.37); Calibrated: 3/27/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/15/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 26 (Cell.), Body SAR, Back Side, Mid.ch,
15 MHz Bandwidth, QPSK, 1 RB, 36 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 = 18.37 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.403 W/kg
SAR(1 g) = 0.300 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2249M

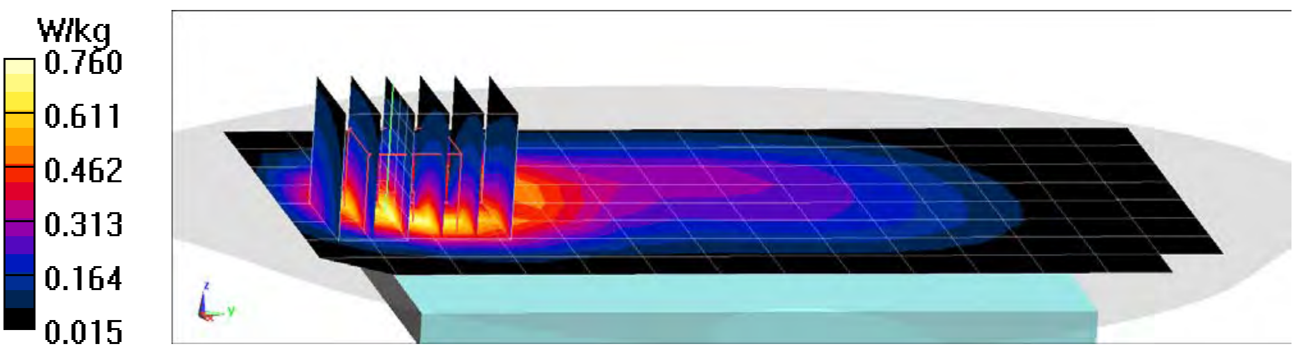
Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 831.5 MHz; σ = 0.965 S/m; ε_r = 54.828; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 12-22-2018; Ambient Temp: 19.9°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3347; ConvF(6.37, 6.37, 6.37); Calibrated: 3/27/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/15/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 26 (Cell.), Body SAR, Back Side, Mid.ch,
15 MHz Bandwidth, QPSK, 1 RB, 36 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 = 26.00 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.623 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2249M

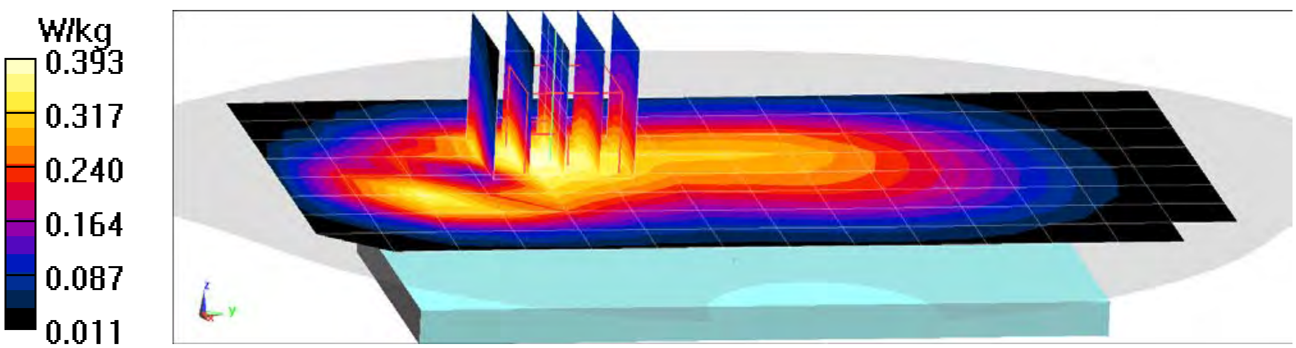
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.967 S/m; ε_r = 54.817; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.5 cm

Test Date: 12-22-2018; Ambient Temp: 19.9°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3347; ConvF(6.37, 6.37, 6.37); Calibrated: 3/27/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/15/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 5 (Cell.), Body SAR, Back Side, Mid.ch,
10 MHz Bandwidth, QPSK, 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 = 19.96 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.475 W/kg
SAR(1 g) = 0.354 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2249M

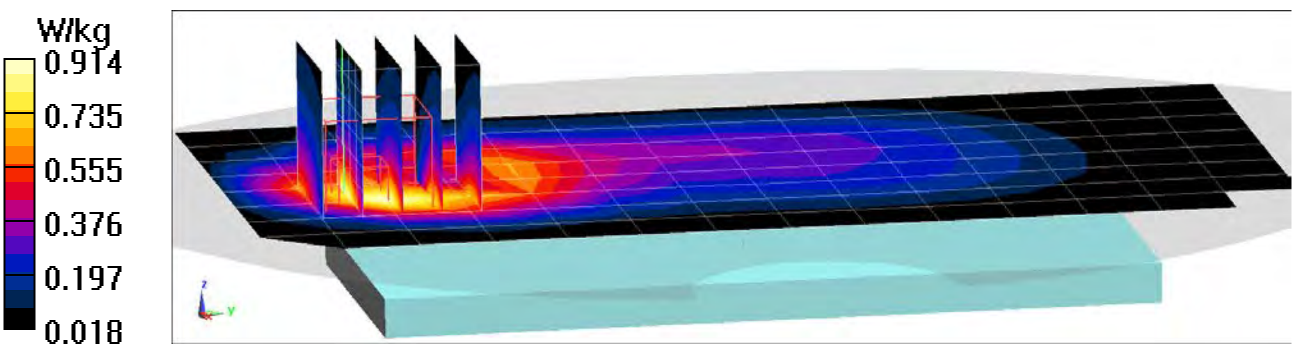
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.967 S/m; ε_r = 54.817; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 12-22-2018; Ambient Temp: 19.9°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3347; ConvF(6.37, 6.37, 6.37); Calibrated: 3/27/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/15/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 5 (Cell.), Body SAR, Back Side, Mid.ch,
10 MHz Bandwidth, QPSK, 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 = 29.20 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.30 W/kg
SAR(1 g) = 0.754 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2244M

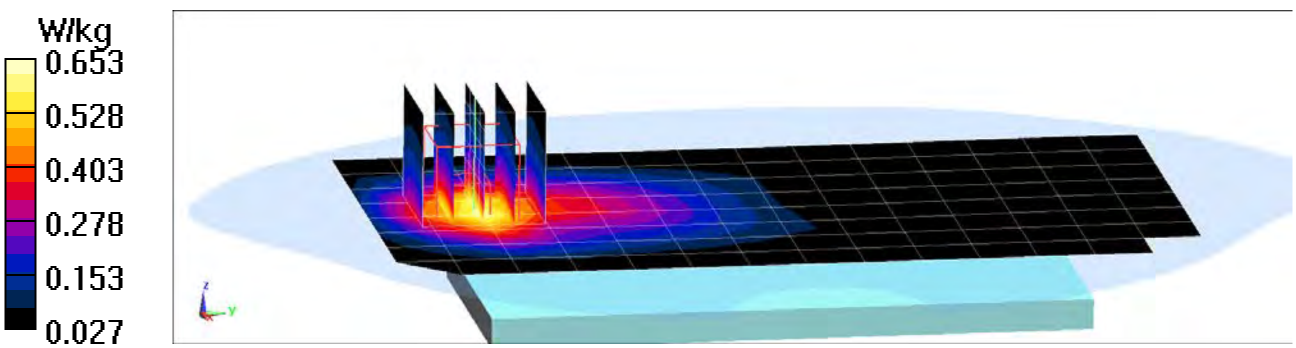
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.482 S/m; ε_r = 52.058; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.5 cm

Test Date: 12-24-2018; Ambient Temp: 21.0°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7357; ConvF(8.43, 8.43, 8.43); Calibrated: 4/18/2018;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2018
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 4 (AWS), Body SAR, Back Side, Mid.ch,
20 MHz Bandwidth, QPSK, 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 = 18.71 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.748 W/kg
SAR(1 g) = 0.486 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2244M

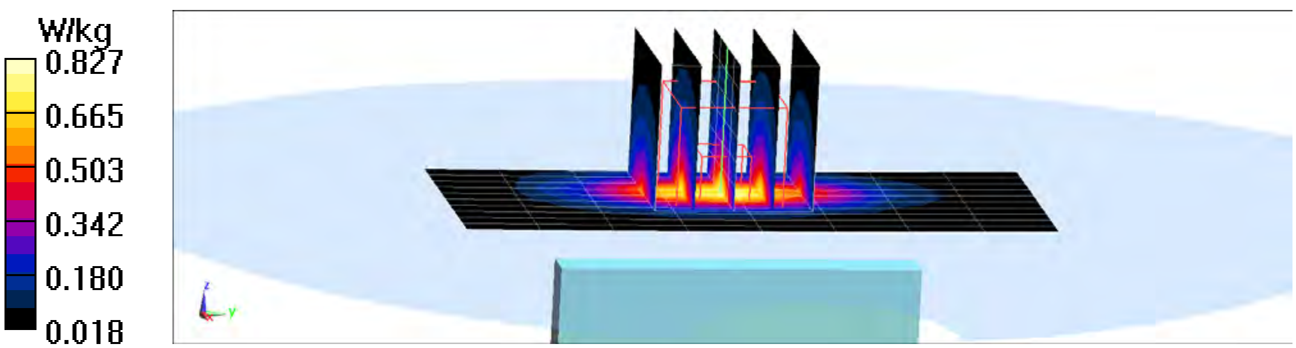
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.482 S/m; ε_r = 52.058; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 12-24-2018; Ambient Temp: 21.0°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7357; ConvF(8.43, 8.43, 8.43); Calibrated: 4/18/2018;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2018
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 4 (AWS), Body SAR, Bottom Edge, Mid.ch, 20 MHz Bandwidth, QPSK, 50 RB, 25 RB Offset

Area Scan (11x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.63 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.959 W/kg
SAR(1 g) = 0.562 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2247M

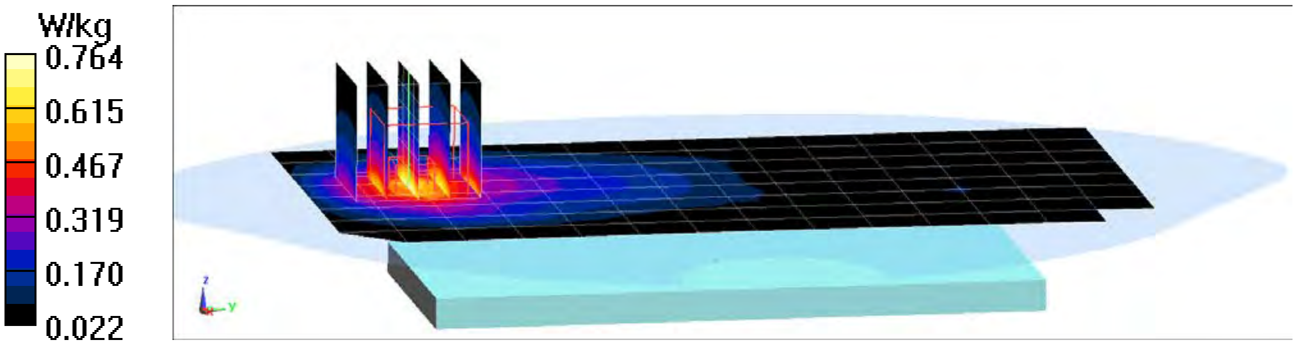
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1905 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1905 MHz; σ = 1.579 S/m; ε_r = 53.485; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.5 cm

Test Date: 12-19-2018; Ambient Temp: 21.6°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3332; ConvF(4.77, 4.77, 4.77); Calibrated: 8/22/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 25 (PCS), Body SAR, Back Side, High.ch,
20 MHz Bandwidth, QPSK, 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 = 21.53 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.985 W/kg
SAR(1 g) = 0.639 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2247M

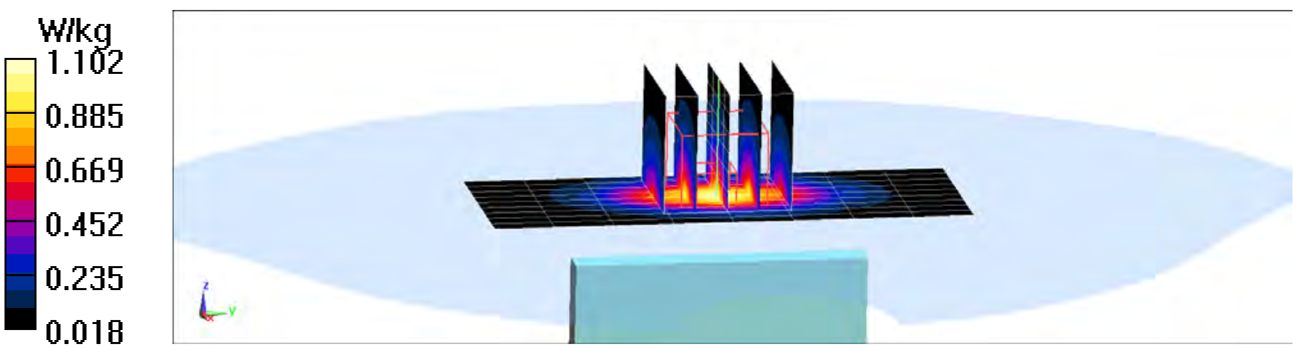
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1905 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1905 MHz; σ = 1.583 S/m; ε_r = 52.992; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 12-31-2018; Ambient Temp: 21.1°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3332; ConvF(4.77, 4.77, 4.77); Calibrated: 8/22/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 25 (PCS), Body SAR, Bottom Edge, High.ch,
20 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.65 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.49 W/kg
SAR(1 g) = 0.884 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2244M

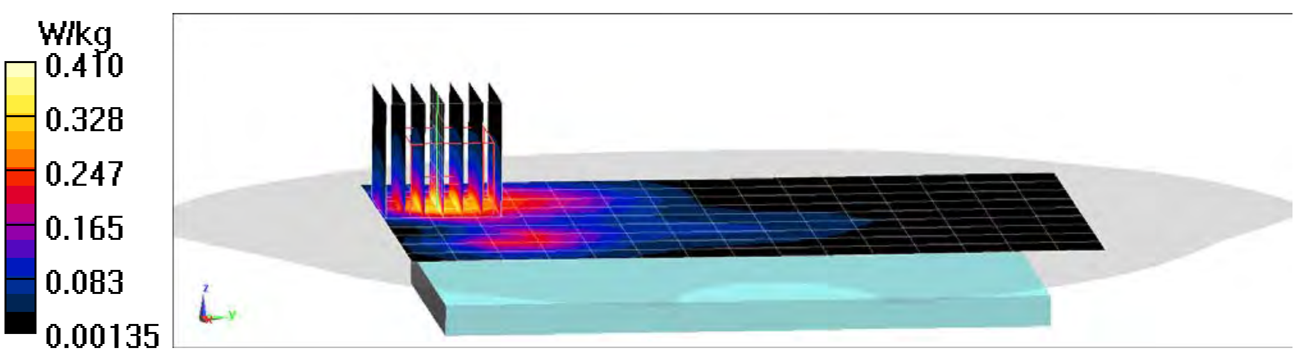
Communication System: UID 0, LTE Band 41; Frequency: 2549.5 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body; Medium parameters used:
f = 2550 MHz; σ = 2.159 S/m; ε_r = 51.266; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.5 cm

Test Date: 12-26-2018; Ambient Temp: 23.2°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3319; ConvF(4.33, 4.33, 4.33); Calibrated: 3/13/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/7/2018
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41 ULCA, Body SAR, Back Side,
PCC: 20 MHz Bandwidth, QPSK, Ch. 40185, 1 RB, 0 RB Offset
SCC: 20 MHz Bandwidth, QPSK, Ch. 39987, 1 RB, 99 RB Offset

Area Scan (10x16x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.11 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.620 W/kg
SAR(1 g) = 0.325 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2244M

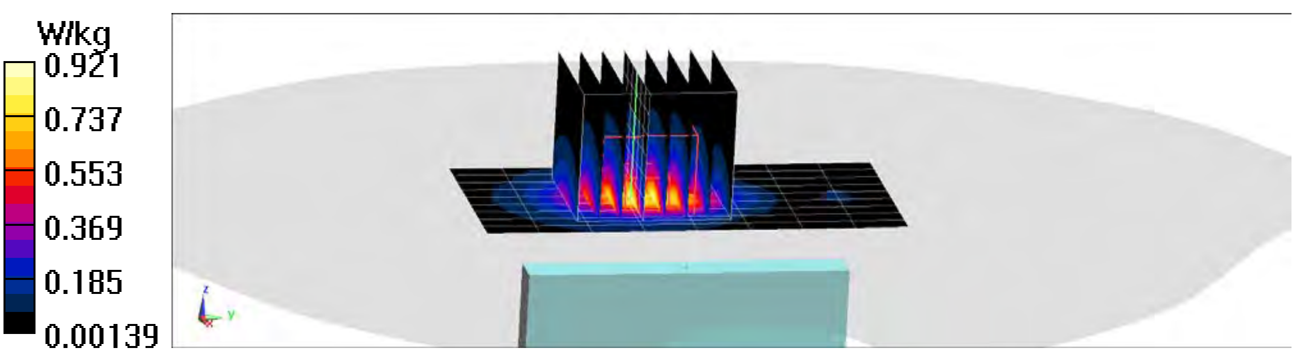
Communication System: UID 0, _LTE Band 41; Frequency: 2506 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2506 MHz; σ = 2.104 S/m; ε_r = 51.382; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 12-26-2018; Ambient Temp: 23.2°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3319; ConvF(4.51, 4.51, 4.51); Calibrated: 3/13/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/7/2018
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41 ULCA, Body SAR, Bottom Edge,
PCC: 20 MHz Bandwidth, QPSK, Ch. 39750, 100 RB, 0 RB Offset
SCC: 20 MHz Bandwidth, QPSK, Ch. 39948, 100 RB, 0 RB Offset

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.76 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.710 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2317M

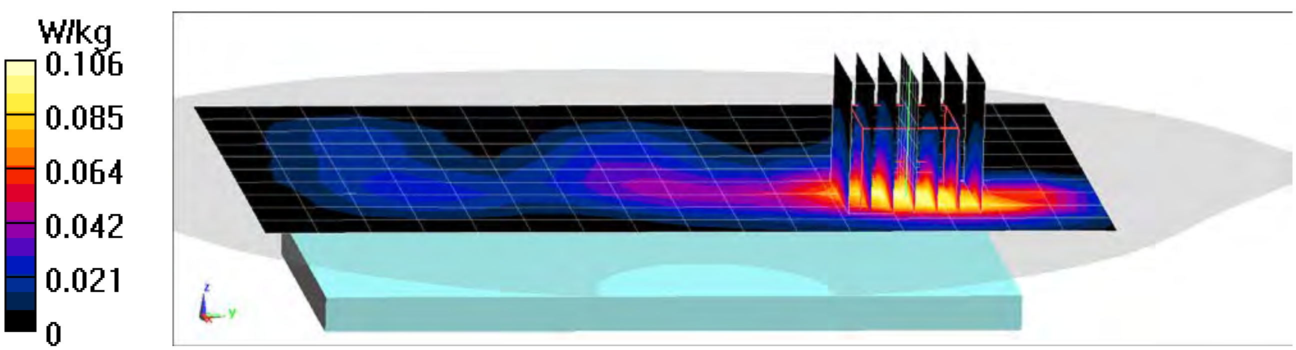
Communication System: UID 0, _IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2437 MHz; σ = 2.026 S/m; ε_r = 51.574; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.5 cm

Test Date: 12-26-2018; Ambient Temp: 23.2°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3319; ConvF(4.51, 4.51, 4.51); Calibrated: 3/13/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/7/2018
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11b, Antenna 1, 22 MHz Bandwidth, Body SAR, Ch 06, 1 Mbps, Back Side

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.937 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.162 W/kg
SAR(1 g) = 0.084 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2317M

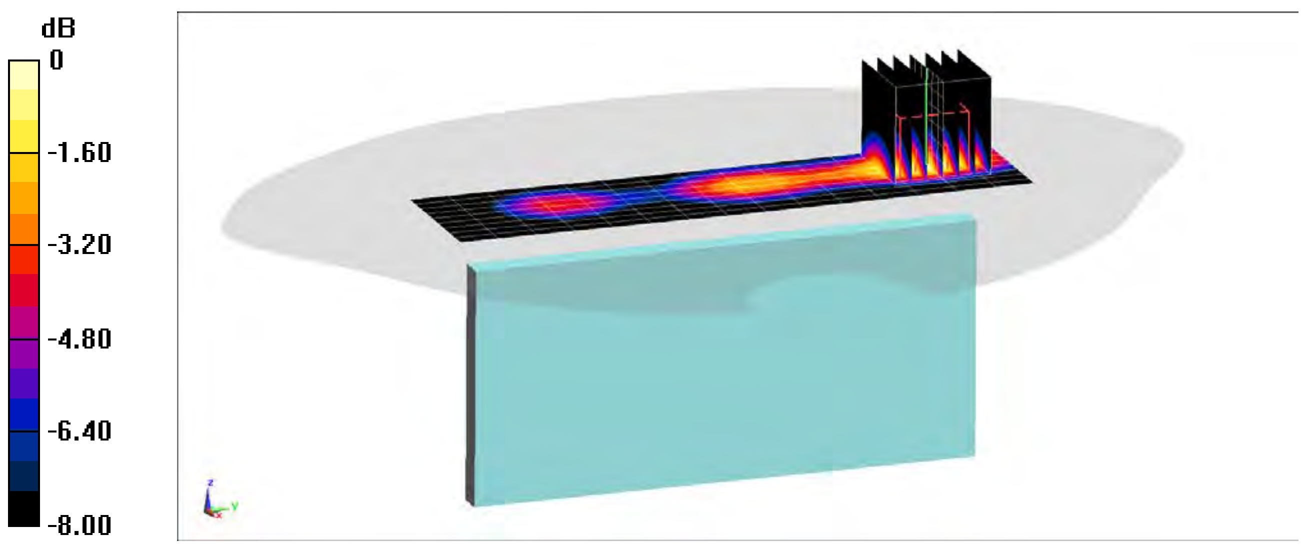
Communication System: UID 0, _IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2437 MHz; σ = 2.026 S/m; ε_r = 51.574; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 12-26-2018; Ambient Temp: 23.2°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3319; ConvF(4.51, 4.51, 4.51); Calibrated: 3/13/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/7/2018
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11b, Antenna 1, 22 MHz Bandwidth, Body SAR, Ch 06, 1 Mbps, Left Edge

Area Scan (10x16x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.476 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.386 W/kg
SAR(1 g) = 0.193 W/kg



0 dB = 0.248 W/kg = -6.06 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2245M

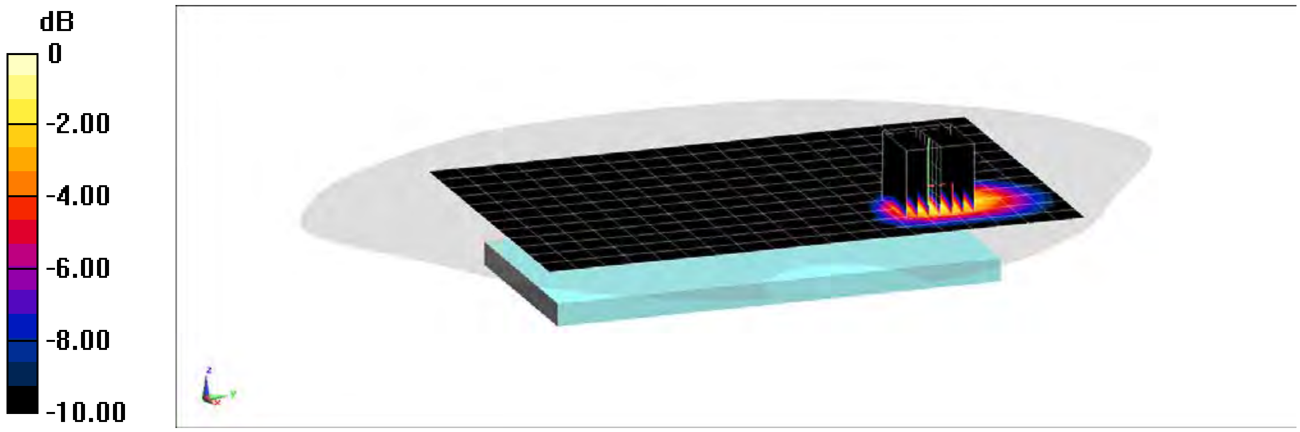
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5745 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:
f = 5745 MHz; σ = 6.147 S/m; ε_r = 47.016; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.5 cm

Test Date: 12-26-2018; Ambient Temp: 21.3°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7308; ConvF(4.18, 4.18, 4.18); 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; SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11a, Antenna 2, UNII-3, 20 MHz Bandwidth, Body SAR, Ch 149, 6 Mbps, Back Side

Area Scan (13x20x1): 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 = 7.911 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.54 W/kg
SAR(1 g) = 0.375 W/kg



0 dB = 0.899 W/kg = -0.46 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2245M

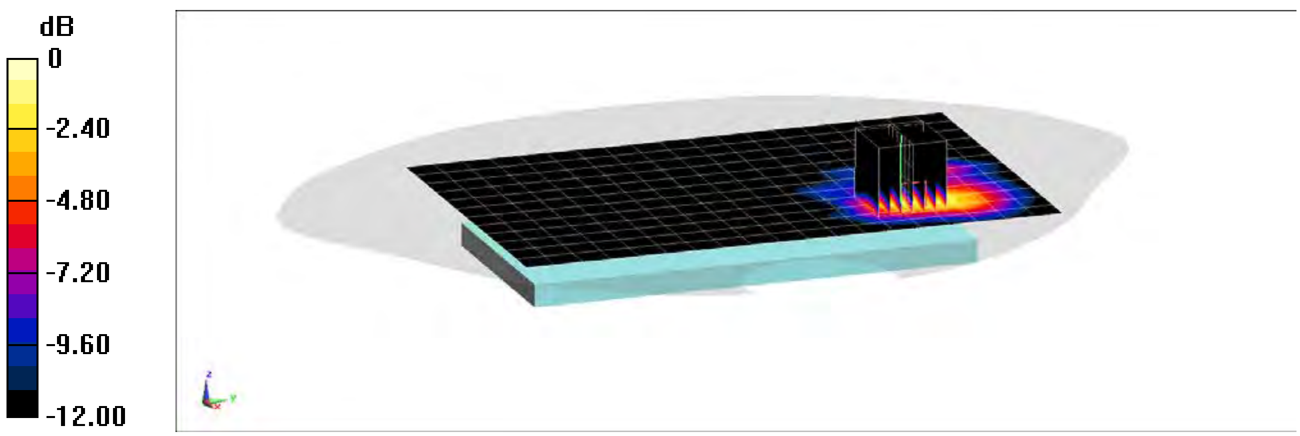
Communication System: UID 0, 802.11n 5.2-5.8 GHz Band; Frequency: 5745 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:
f = 5745 MHz; σ = 6.132 S/m; ε_r = 46.377; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 01-03-2019; Ambient Temp: 21.5°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7308; ConvF(4.18, 4.18, 4.18); 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; SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11n, MIMO, UNII-3, 20 MHz Bandwidth, Body SAR, Ch 149, 13 Mbps, Back Side

Area Scan (13x20x1): 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 = 11.26 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 3.18 W/kg
SAR(1 g) = 0.711 W/kg



0 dB = 1.79 W/kg = 2.53 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2245M

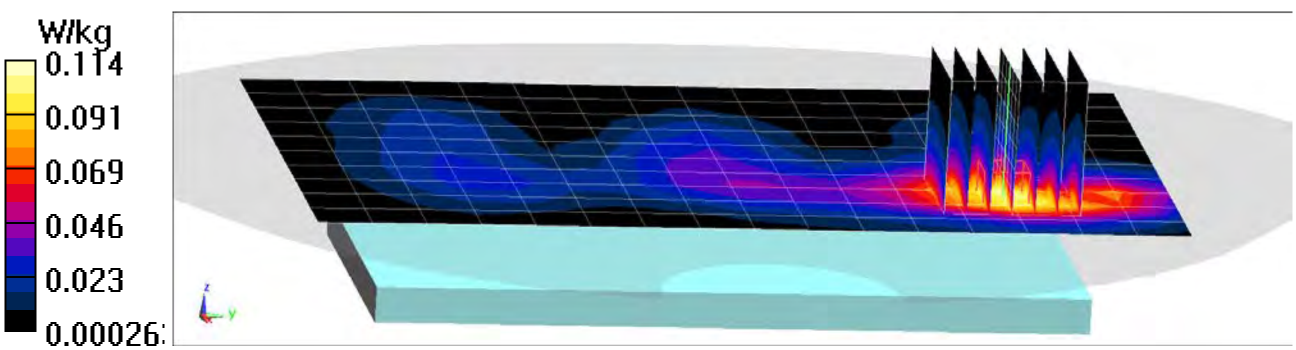
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.297
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2441 MHz; σ = 2.032 S/m; ε_r = 50.864; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.5 cm

Test Date: 12-20-2018; Ambient Temp: 19.7°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3347; ConvF(4.64, 4.64, 4.64); Calibrated: 3/27/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/15/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: Bluetooth, Body SAR, Ch 39, 1 Mbps, Back Side

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.207 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.173 W/kg
SAR(1 g) = 0.091 W/kg



DUT: A3LSMG9750; Type: Portable Handset; Serial: 2245M

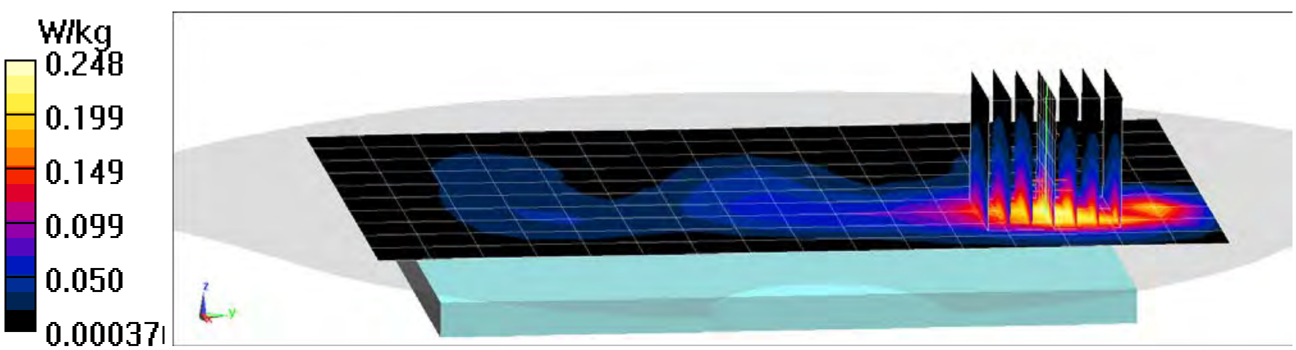
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.297
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2441 MHz; σ = 2.032 S/m; ε_r = 50.864; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 12-20-2018; Ambient Temp: 19.7°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3347; ConvF(4.64, 4.64, 4.64); Calibrated: 3/27/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/15/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: Bluetooth, Body SAR, Ch 39, 1 Mbps, Back Side

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.62 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.382 W/kg
SAR(1 g) = 0.199 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2248M

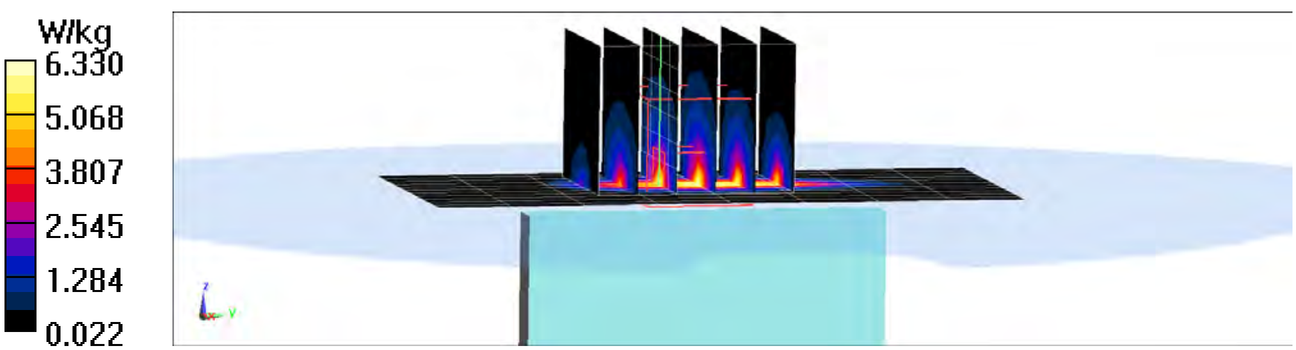
Communication System: UID 0, _GSM GPRS; 3 Tx slots; Frequency: 1850.2 MHz; Duty Cycle: 1:2.76
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1850.2 MHz; σ = 1.445 S/m; ε_r = 50.902; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 0.0 cm

Test Date: 12-24-2018; Ambient Temp: 21.3°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3332; ConvF(4.77, 4.77, 4.77); Calibrated: 8/22/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 1900, Phablet SAR, Bottom Edge, Low.ch, 3 Tx Slots

Area Scan (12x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 62.63 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 9.30 W/kg
SAR(10 g) = 2.11 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2247M

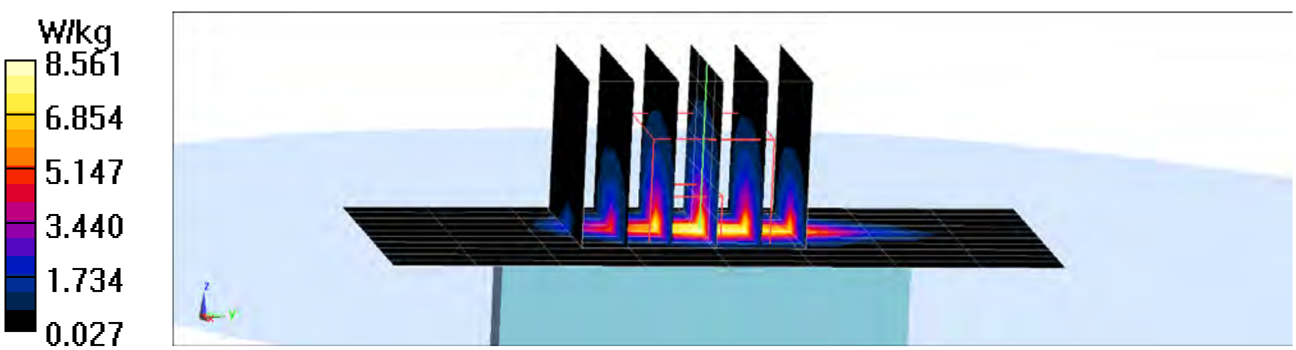
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used:
f = 1880 MHz; σ = 1.478 S/m; ε_r = 50.794; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 0.0 cm

Test Date: 12-24-2018; Ambient Temp: 21.3°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3332; ConvF(4.77, 4.77, 4.77); Calibrated: 8/22/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1900, Phablet SAR, Bottom Edge, Mid.ch

Area Scan (11x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 70.36 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 12.8 W/kg
SAR(10 g) = 2.84 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2244M

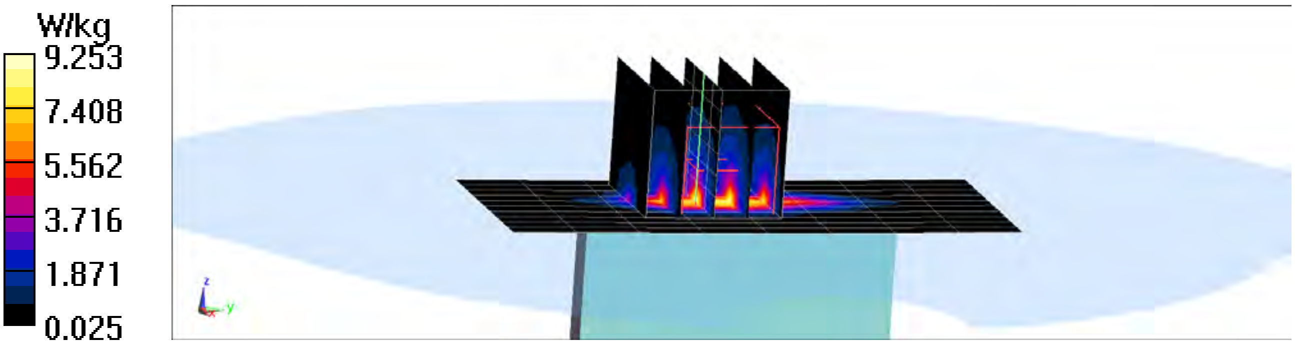
Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.51 S/m; ε_r = 52.588; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 0.0 cm

Test Date: 12-26-2018; Ambient Temp: 22.8°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7357; ConvF(8.43, 8.43, 8.43); Calibrated: 4/18/2018;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2018
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

**Mode: LTE Band 4 (AWS), Phablet SAR, Bottom Edge, Mid.ch,
20 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset**

Area Scan (11x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 62.88 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 11.3 W/kg
SAR(10 g) = 2.32 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2249M

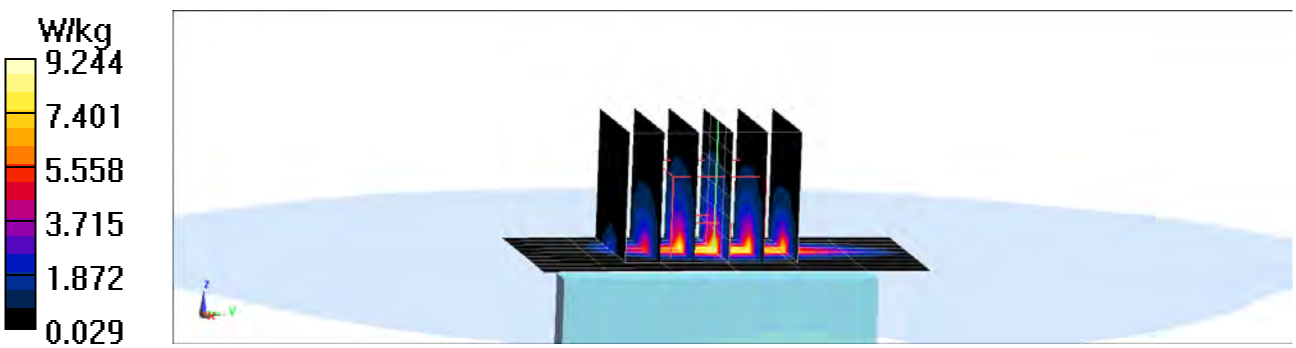
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1905 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1905 MHz; σ = 1.566 S/m; ε_r = 51.283; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 0.0 cm

Test Date: 12-26-2018; Ambient Temp: 22.3°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3332; ConvF(4.77, 4.77, 4.77); Calibrated: 8/22/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 25 (PCS), Phablet SAR, Bottom Edge, High.ch,
20 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset

Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 71.24 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 14.3 W/kg
SAR(10 g) = 3.04 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2244M

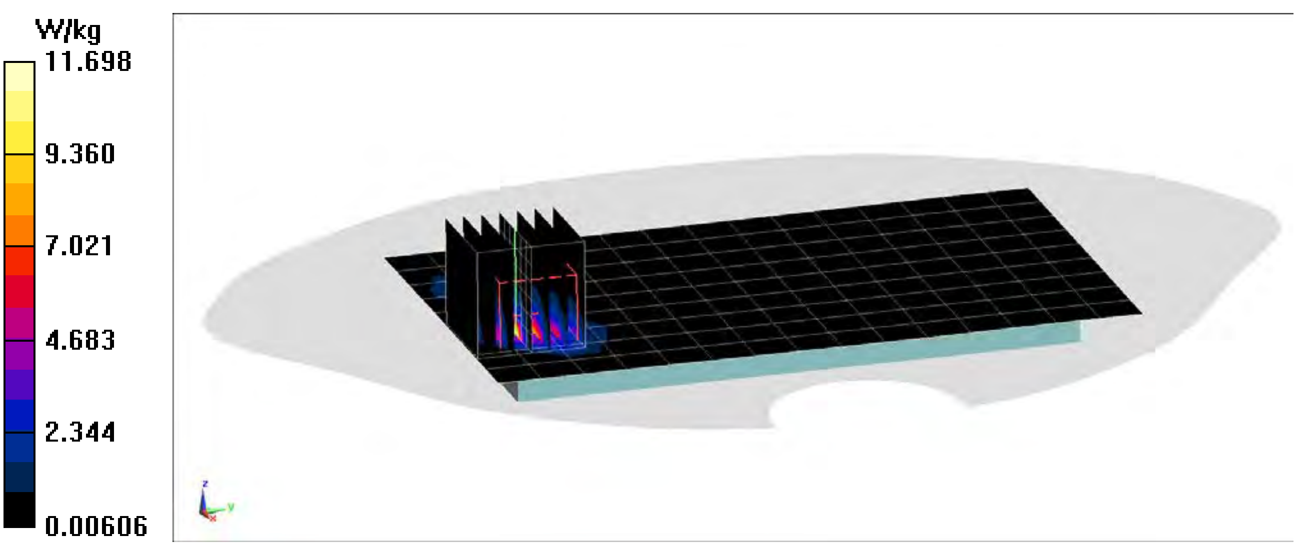
Communication System: UID 0, LTE Band 41; Frequency: 2680 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2680 MHz; σ = 2.315 S/m; ε_r = 50.889; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 0.0 cm

Test Date: 12-26-2018; Ambient Temp: 23.2°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3319; ConvF(4.33, 4.33, 4.33); Calibrated: 3/13/2018;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/7/2018
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41 ULCA, Phablet SAR, Back Side,
PCC: 20 MHz Bandwidth, QPSK, Ch, 41490, 50 RB, 0 RB Offset
SCC: 20 MHz Bandwidth, QPSK, Ch, 41292, 50 RB, 50 RB Offset

Area Scan (10x16x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 64.44 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 23.5 W/kg
SAR(10 g) = 2.54 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2245M

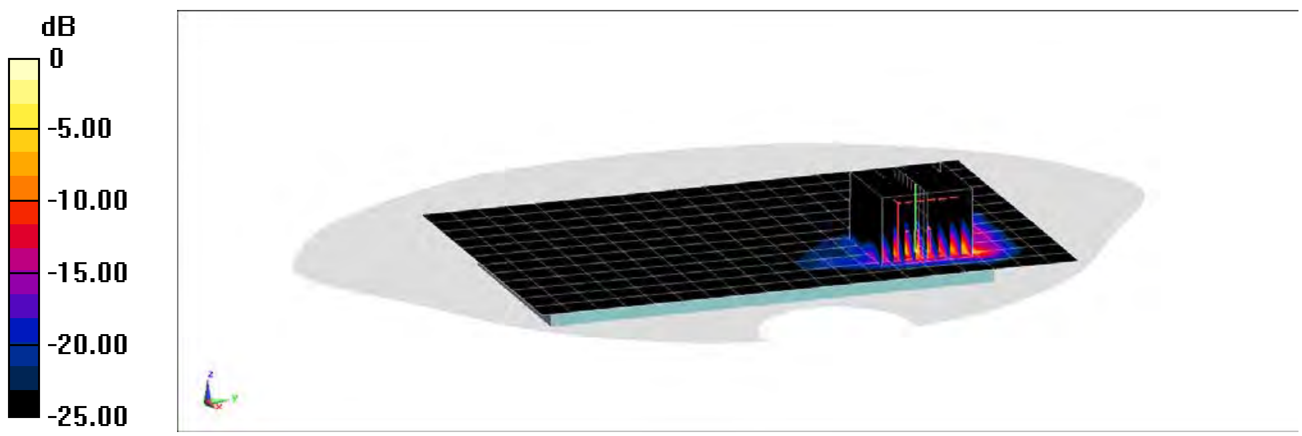
Communication System: UID 0, 802.11n 5.2-5.8 GHz Band; Frequency: 5720 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used (interpolated):
f = 5720 MHz; σ = 6.088 S/m; ε_r = 46.42; ρ = 1000 kg/m^3
Phantom section: Flat Section: Space: 0.0 cm

Test Date: 01-03-2019; Ambient Temp: 21.5°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7308; ConvF(4.18, 4.18, 4.18); 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; SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11n, MIMO, U-NII-2C, 20 MHz Bandwidth, Phablet SAR, Ch 144, 13 Mbps, Back Side

Area Scan (13x20x1): 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 = 6.393 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 141 W/kg
SAR(10 g) = 2.56 W/kg



0 dB = 57.4 W/kg = 17.59 dBW/kg

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2245M

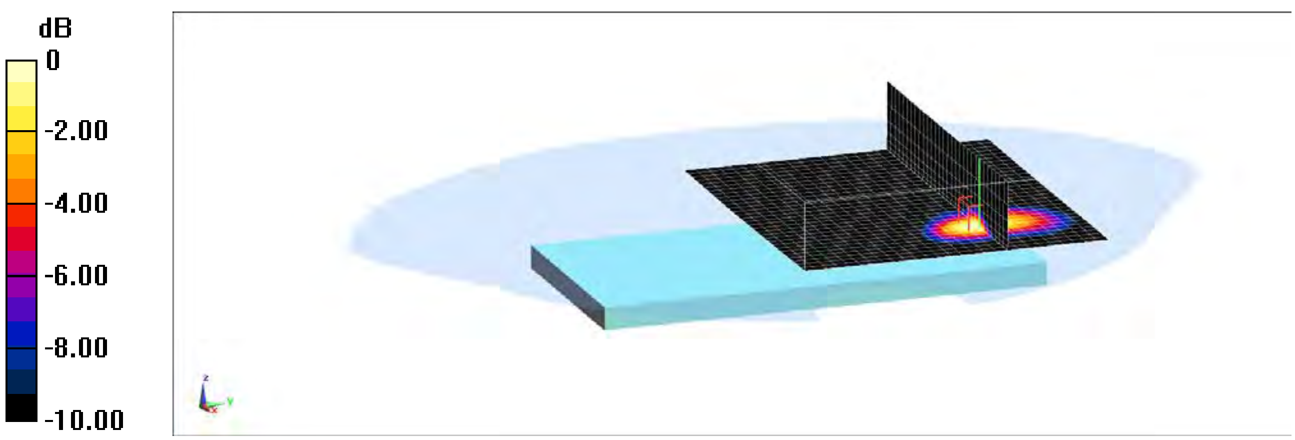
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:
f = 5785 MHz; σ = 6.133 S/m; ε_r = 46.811; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-08-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7357; ConvF(4.21, 4.21, 4.21); Calibrated: 4/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2018
Phantom: SAM with CRP v5.0 Left; Type: QD000P40CD; Serial: 1687
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.12 (7450)

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

Zoom Scan (31x28x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 2.438 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 2.63 W/kg
SAR(1 g) = 0.614 W/kg



0 dB = 1.49 W/kg = 1.73 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2245M

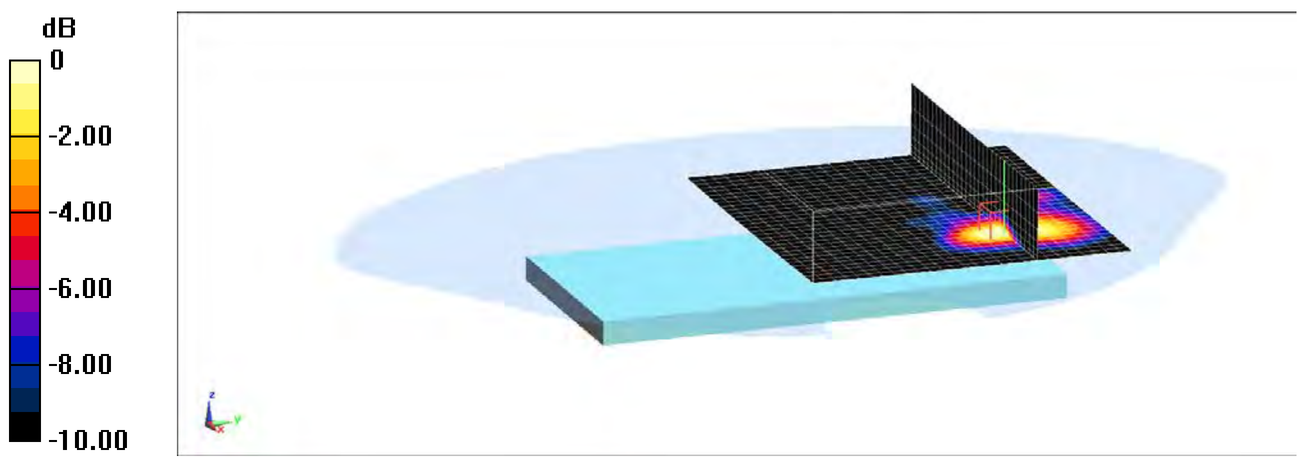
Communication System: UID 0, 802.11n 5.2-5.8 GHz Band; Frequency: 5745 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5745 MHz; σ = 6.073 S/m; ε_r = 46.86; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-08-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7357; ConvF(4.21, 4.21, 4.21); Calibrated: 4/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2018
Phantom: SAM with CRP v5.0 Left; Type: QD000P40CD; Serial: 1687
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11n, MIMO, UNII-3, 20 MHz Bandwidth, Body SAR, Ch 149, 13 Mbps, Back Side

Zoom Scan (31x28x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 4.507 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 3.14 W/kg
SAR(1 g) = 0.655 W/kg



0 dB = 1.54 W/kg = 1.88 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset; Serial: 2317M

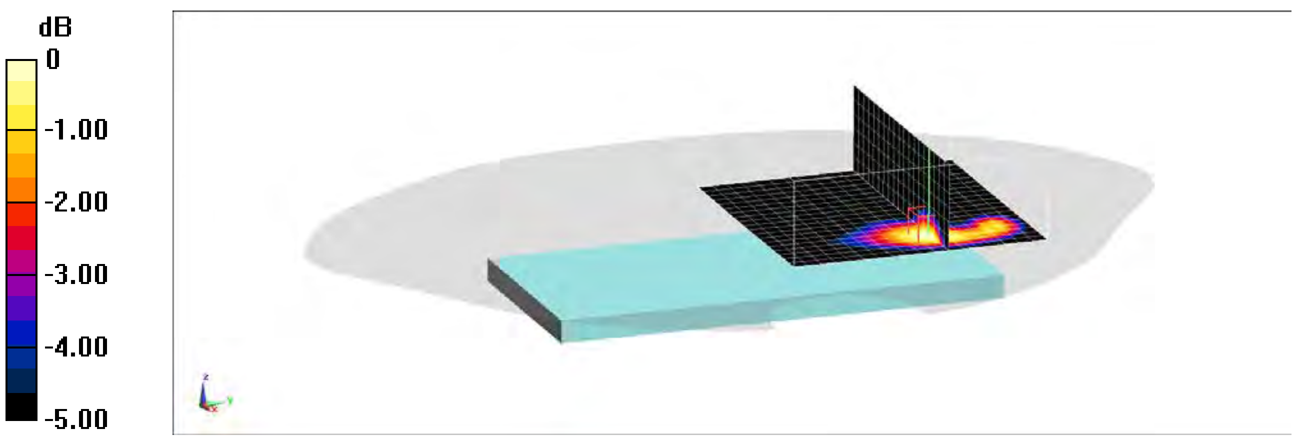
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.297
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2441 MHz; σ = 2.025 S/m; ε_r = 52.29; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-09-2019; Ambient Temp: 23.4°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7406; ConvF(7.3, 7.3, 7.3); Calibrated: 5/22/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/22/2018
Phantom: Twin-SAM V5.0 Back Right; Type: QD 000 P40 CD; Serial: 1692
Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.12 (7450)

Mode: Bluetooth, Body SAR, Ch 39, 1 Mbps, Back Side

Zoom Scan (20x19x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.829 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.285 W/kg
SAR(1 g) = 0.151 W/kg



0 dB = 0.230 W/kg = -6.38 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset

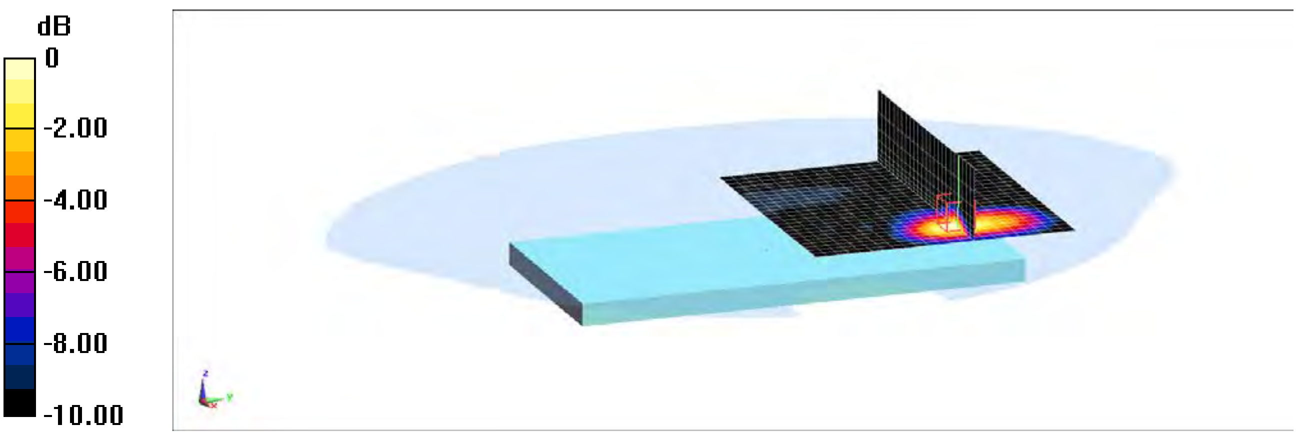
Mode: IEEE 802.11a, Antenna 2, UNII-3, 20 MHz Bandwidth, Body SAR, Ch 157, 6 Mbps, Back Side, Scaling Factor: 1.155573

Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:
f = 5785 MHz; $\sigma = 6.133$ S/m; $\varepsilon_r = 46.811$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Mode: Bluetooth, Body SAR, Ch 39, 1 Mbps, Back Side, Scaling Factor: 1.33591

Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.297
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2441 MHz; $\sigma = 2.025$ S/m; $\varepsilon_r = 52.29$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Multi Band Result:
SAR(1 g) = 0.927 W/kg



0 dB = 3.17 W/kg = 5.01 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMG9750; Type: Portable Handset

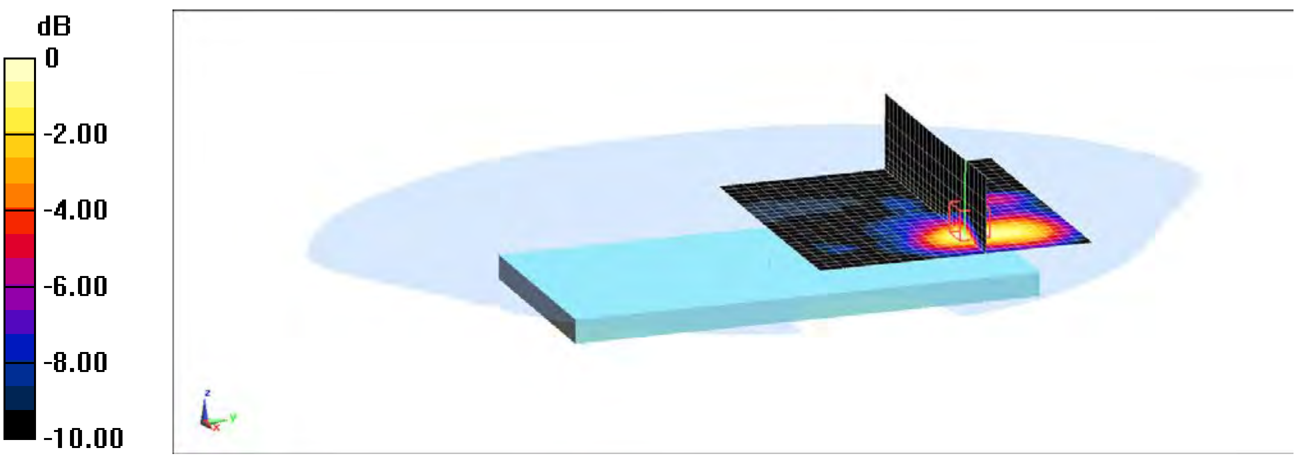
Mode: IEEE 802.11n, MIMO, UNII-3, 20 MHz Bandwidth, Body SAR,
Ch 149, 13 Mbps, Back Side, Scaling Factor: 1.070741

Communication System: UID 0, 802.11n 5.2-5.8 GHz Band; Frequency: 5745 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:
f = 5745 MHz; σ = 6.073 S/m; ε_r = 46.86; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Mode: Bluetooth, Body SAR, Ch 39, 1 Mbps, Back Side, Scaling Factor: 1.33591

Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.297
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2441 MHz; σ = 2.025 S/m; ε_r = 52.29; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Multi Band Result:
SAR(1 g) = 0.903 W/kg



0 dB = 3.01 W/kg = 4.79 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1003

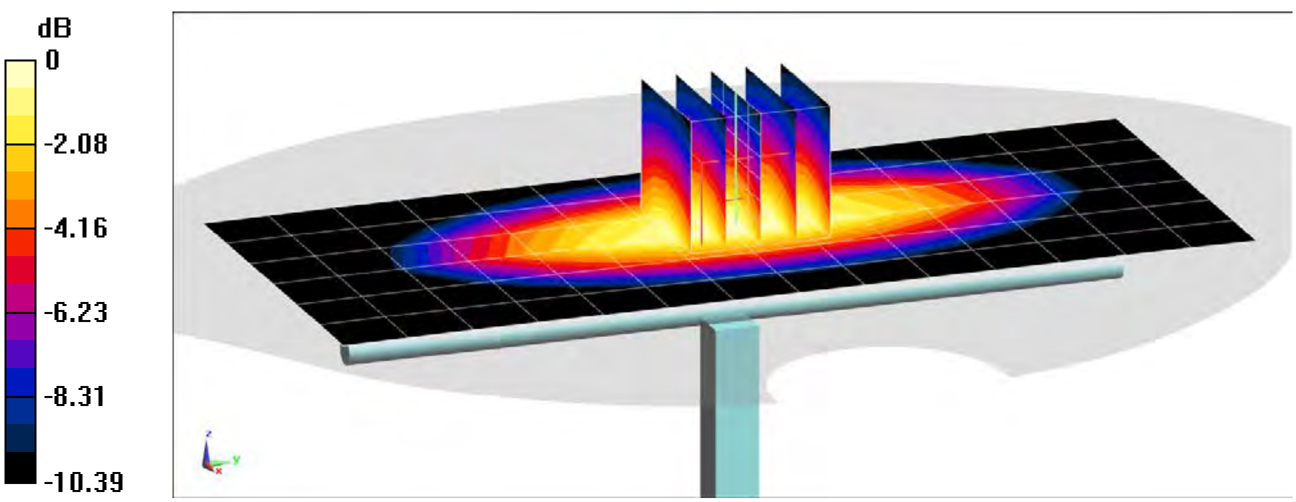
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Head; Medium parameters used (interpolated):
f = 750 MHz; σ = 0.906 S/m; ε_r = 41.172; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-26-2018; Ambient Temp: 22.5°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3287; ConvF(6.76, 6.76, 6.76); Calibrated: 10/22/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/18/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

750 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.52 W/kg
SAR(1 g) = 1.67 W/kg
Deviation(1 g) = 0.85%



0 dB = 1.96 W/kg = 2.92 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047

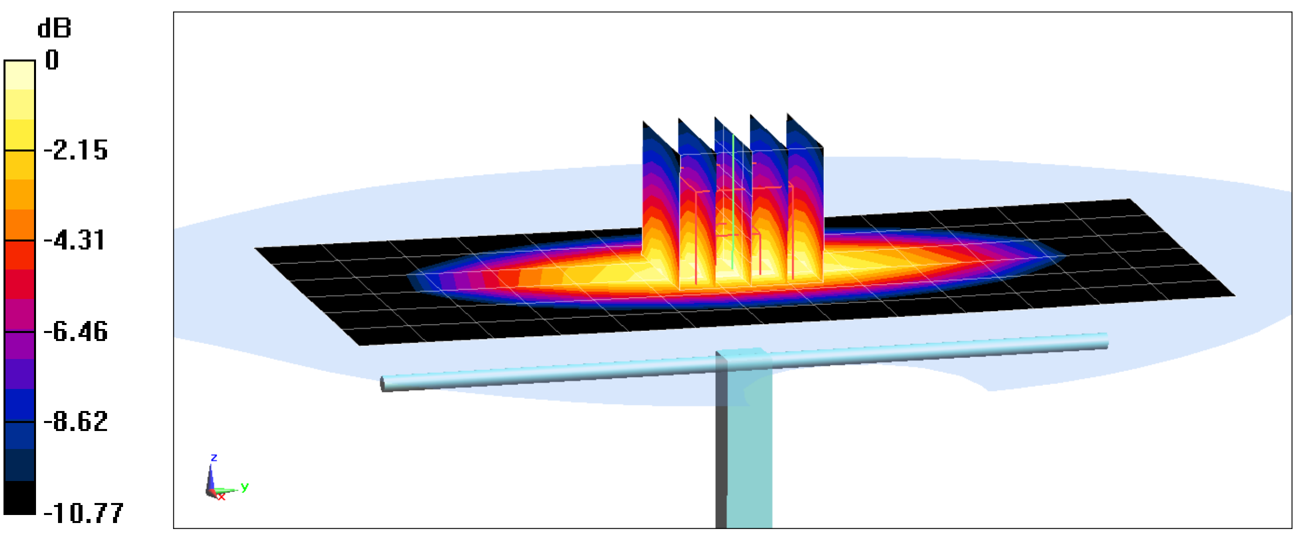
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used:
f = 835 MHz; σ = 0.929 S/m; ε_r = 42.966; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-19-2018; Ambient Temp: 23.0°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7410; ConvF(9.81, 9.81, 9.81); Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.10; 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) = 3.05 W/kg
SAR(1 g) = 2.04 W/kg
Deviation(1 g) = 7.71%



0 dB = 2.71 W/kg = 4.33 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1148

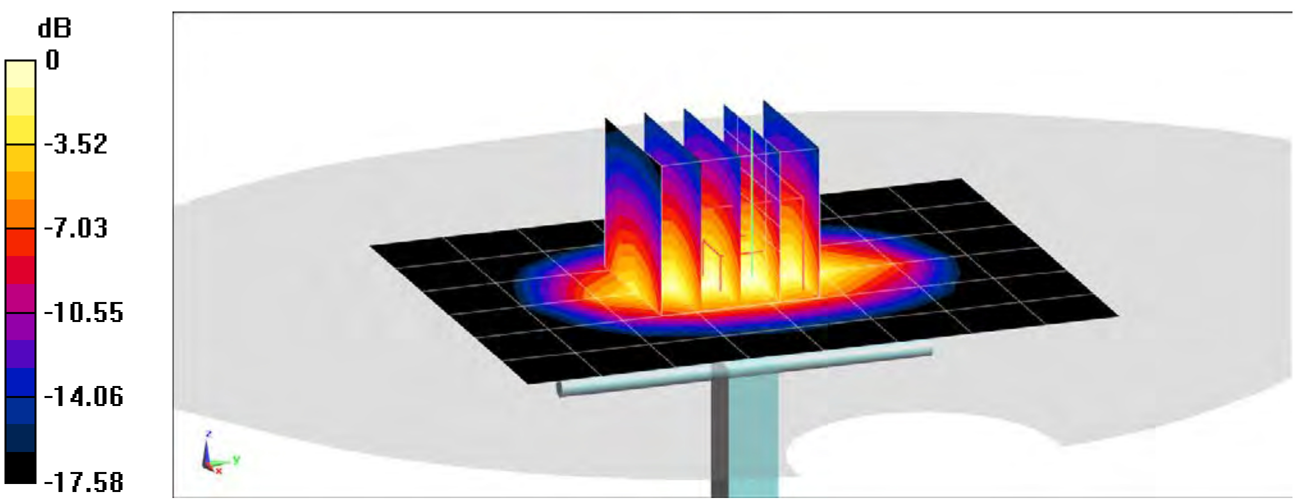
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Head; Medium parameters used:
$f = 1750$ MHz; $\sigma = 1.382$ S/m; $\varepsilon_r = 38.985$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-25-2018; Ambient Temp: 19.8°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3287; ConvF(5.48, 5.48, 5.48); Calibrated: 10/22/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/18/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1964
Measurement SW: DASY52, Version 52.10; 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) = 6.60 W/kg
SAR(1 g) = 3.66 W/kg
Deviation(1 g) = 0.55%



0 dB = 4.53 W/kg = 6.56 dBW/kg

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

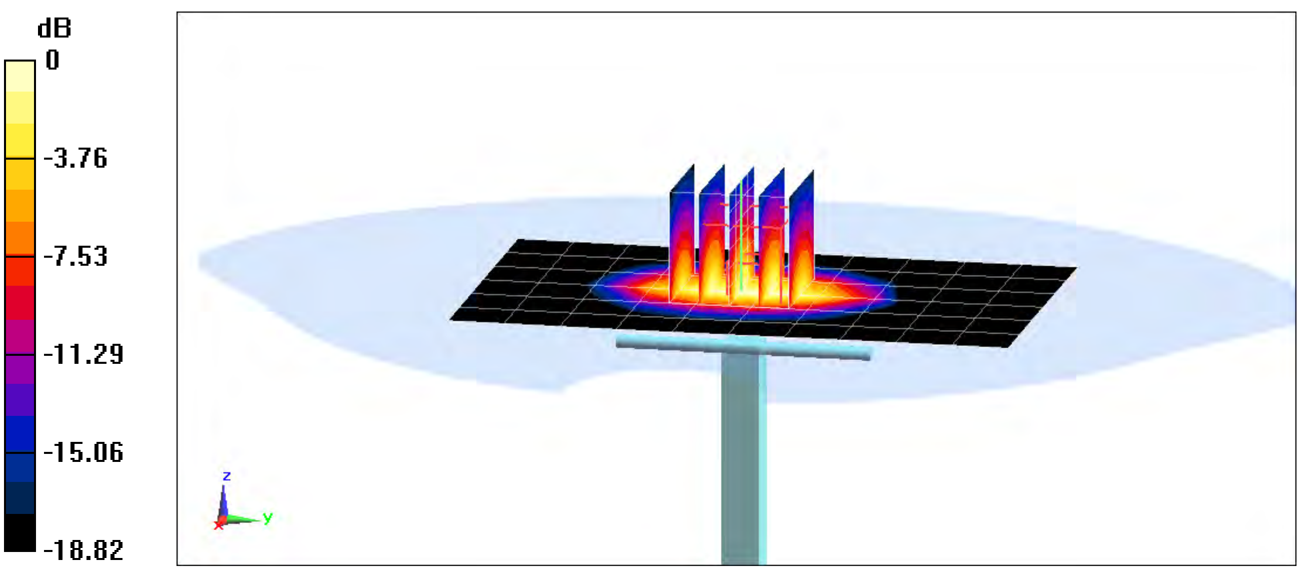
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head; Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.44 S/m; ε_r = 40.081; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-19-2018; Ambient Temp: 21.6°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(8.05, 8.05, 8.05); Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.10; 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) = 7.87 W/kg
SAR(1 g) = 4.11 W/kg
Deviation(1 g) = 3.27%



0 dB = 6.50 W/kg = 8.13 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 981

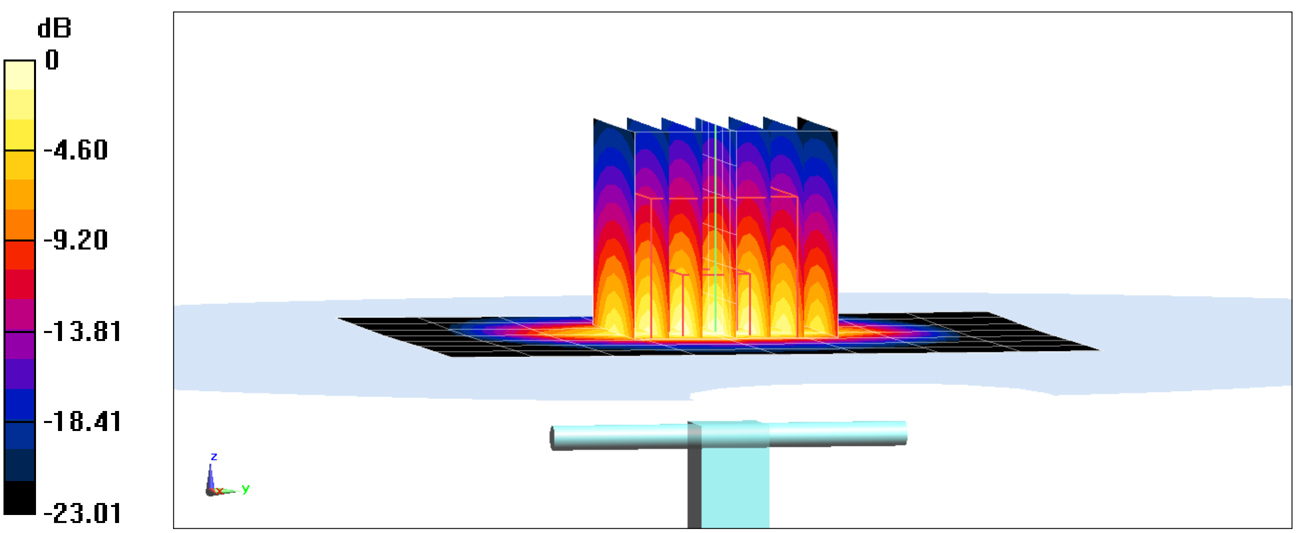
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head; Medium parameters used:
$f = 2450$ MHz; $\sigma = 1.862$ S/m; $\varepsilon_r = 38.272$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-17-2018; Ambient Temp: 21.9°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(7.5, 7.5, 7.5); Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.10; 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) = 11.2 W/kg
SAR(1 g) = 5.25 W/kg
Deviation(1 g) = 0.38%



0 dB = 8.96 W/kg = 9.52 dBW/kg

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1004

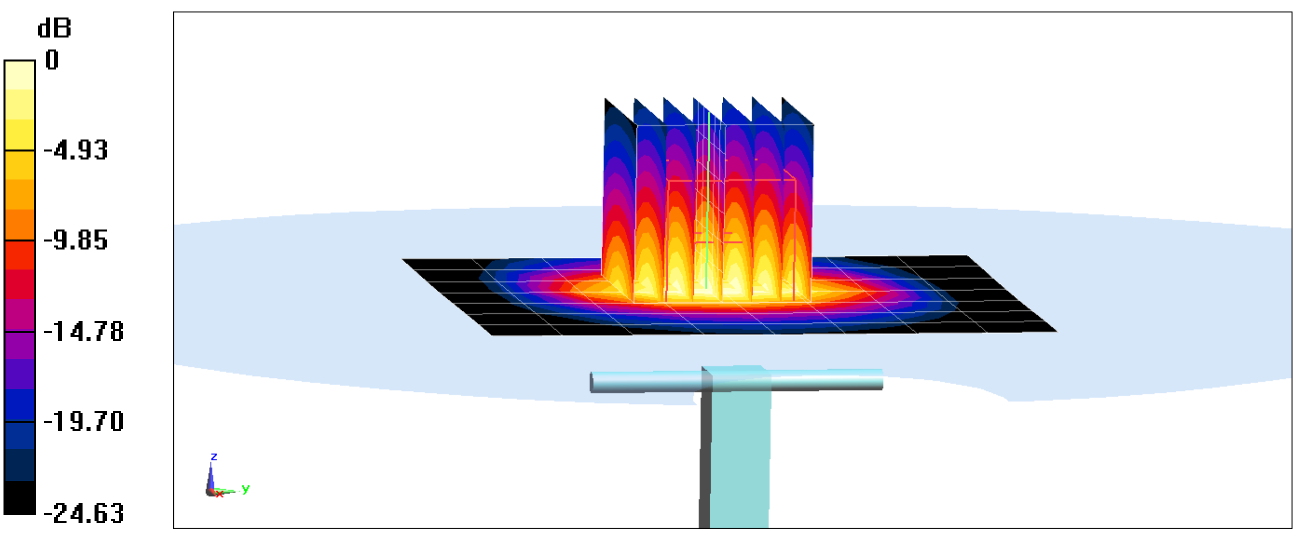
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Head; Medium parameters used:
f = 2600 MHz; σ = 2.027 S/m; ε_r = 37.718; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-17-2018; Ambient Temp: 21.9°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(7.24, 7.24, 7.24); Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.10; 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) = 13.1 W/kg
SAR(1 g) = 5.88 W/kg
Deviation(1 g) = 5.19%



0 dB = 10.3 W/kg = 10.13 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

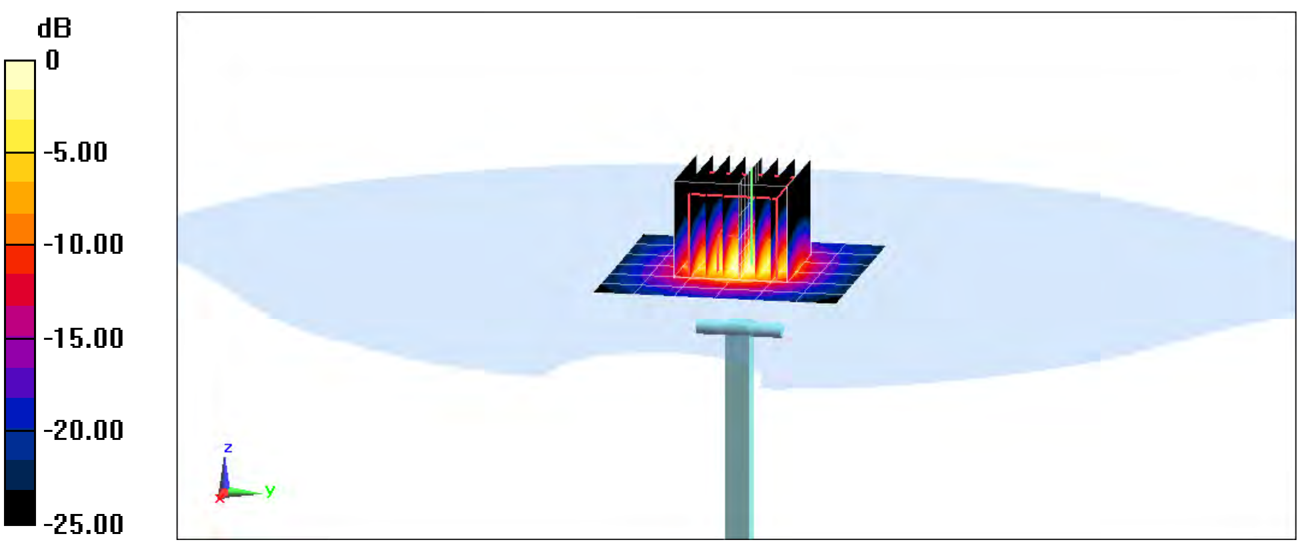
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head; Medium parameters used (interpolated):
f = 5250 MHz; σ = 4.493 S/m; ε_r = 34.802; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-05-2018; Ambient Temp: 21.8°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7409; ConvF(5.2, 5.2, 5.2; Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10; 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) = 15.4 W/kg
SAR(1 g) = 3.75 W/kg
Deviation(1 g) = -4.94%



0 dB = 8.85 W/kg = 9.47 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

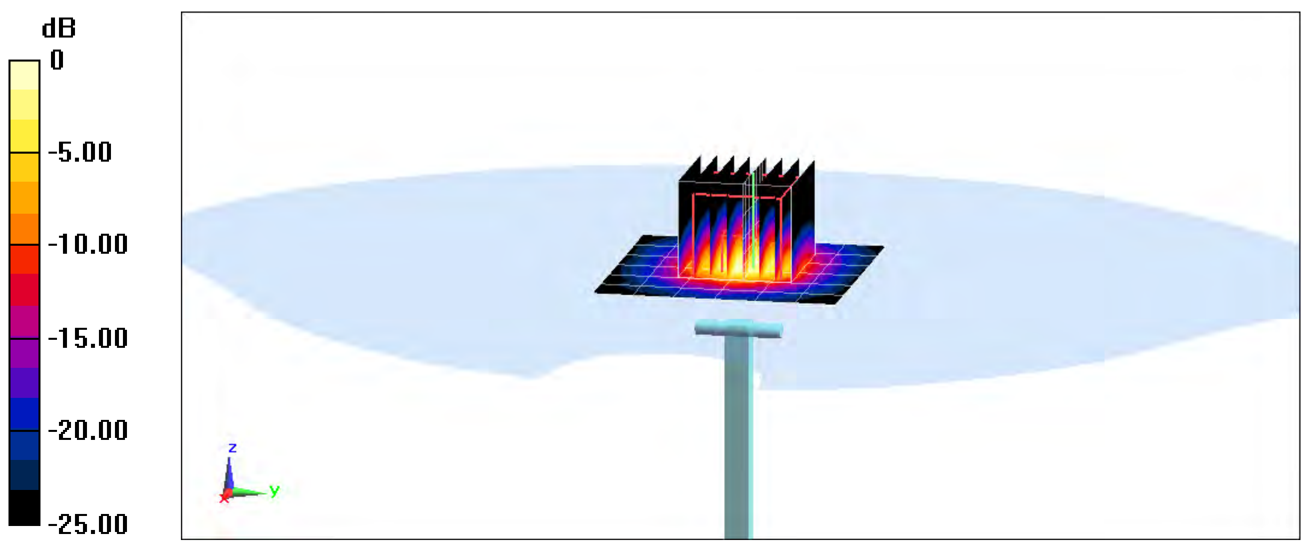
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head; Medium parameters used:
f = 5600 MHz; σ = 4.837 S/m; ε_r = 34.313; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-05-2018; Ambient Temp: 21.8°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7409; ConvF(4.77, 4.77, 4.77); Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10; 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) = 17.5 W/kg
SAR(1 g) = 3.96 W/kg
Deviation(1 g) = -5.26%



0 dB = 9.57 W/kg = 9.81 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

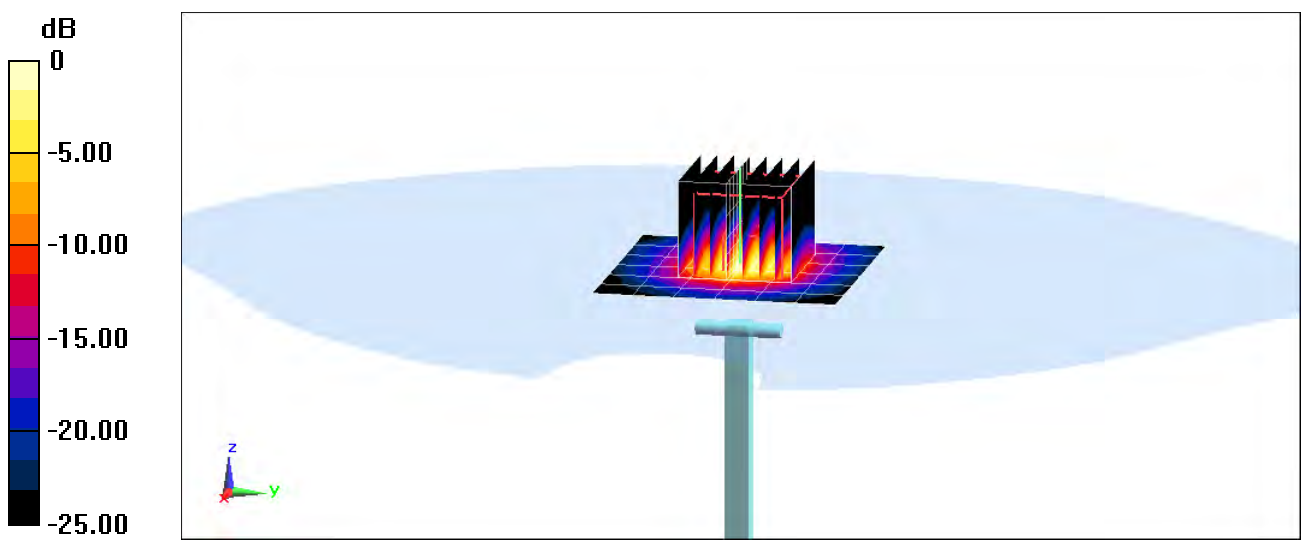
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Head; Medium parameters used (interpolated):
$f = 5750$ MHz; $\sigma = 4.991$ S/m; $\varepsilon_r = 34.124$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-05-2018; Ambient Temp: 21.8°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7409; ConvF(4.82, 4.82, 4.82); Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10; 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) = 17.4 W/kg
SAR(1 g) = 3.78 W/kg
Deviation(1 g) = -4.42%



0 dB = 9.46 W/kg = 9.76 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1054

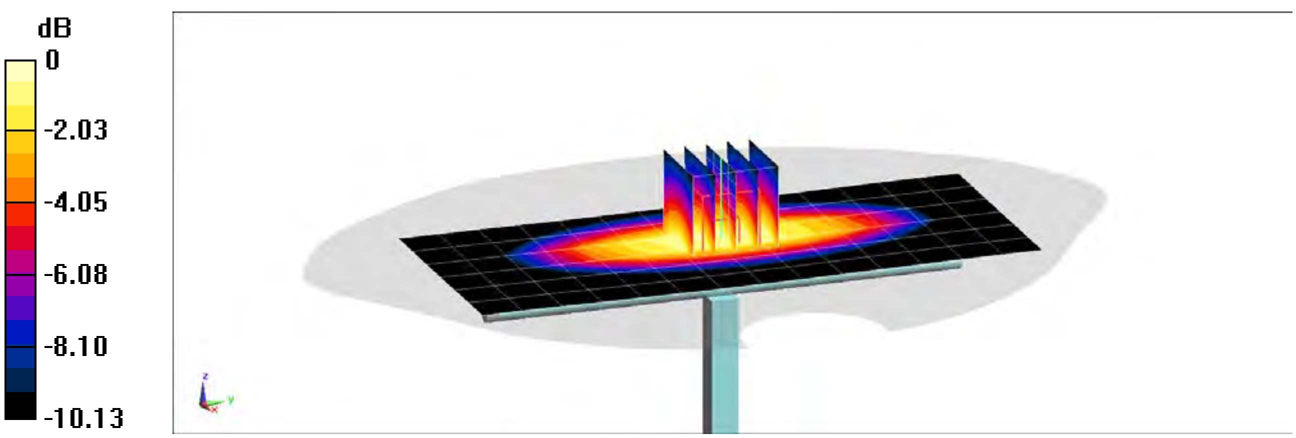
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Body; Medium parameters used (interpolated):
f = 750 MHz; σ = 0.944 S/m; ε_r = 54.477; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-17-2018; Ambient Temp: 20.1°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7406; ConvF(9.91, 9.91, 9.91); Calibrated: 5/22/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/22/2018
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

750 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.68 W/kg
SAR(1 g) = 1.78 W/kg
Deviation(1 g) = 3.37%



0 dB = 2.37 W/kg = 3.75 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d133

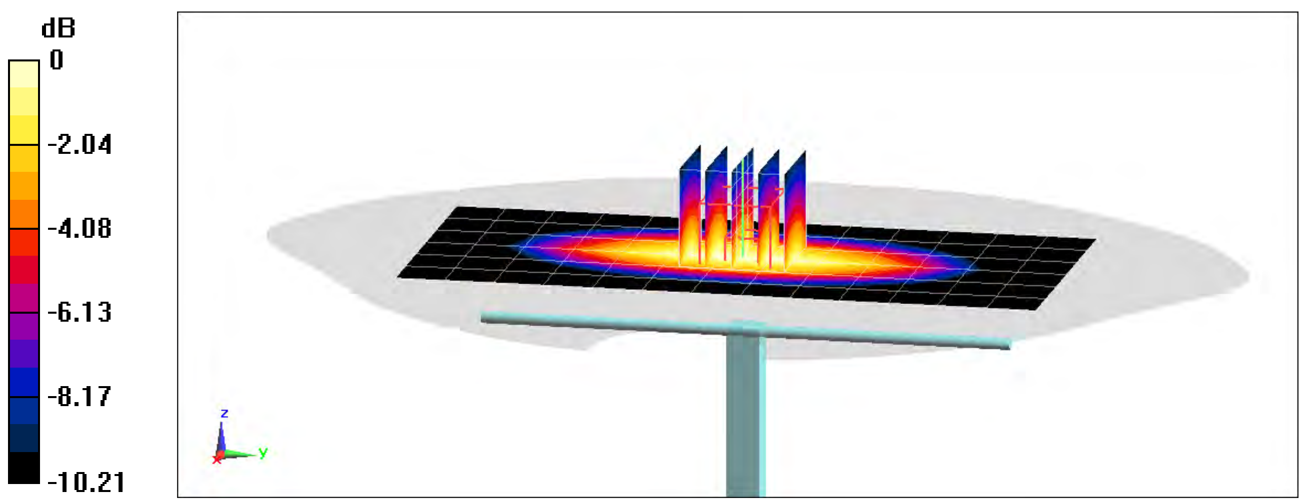
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used:
f = 835 MHz; $\sigma = 0.973$ S/m; $\varepsilon_r = 53.112$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-20-2018; Ambient Temp: 19.7°C; Tissue Temp: 19.6°C

Probe: ES3DV3 - SN3347; ConvF(6.37, 6.37, 6.37); Calibrated: 3/27/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/15/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; 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) = 3.06 W/kg
SAR(1 g) = 2.09 W/kg
Deviation(1 g) = 7.18%



0 dB = 2.44 W/kg = 3.87 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047

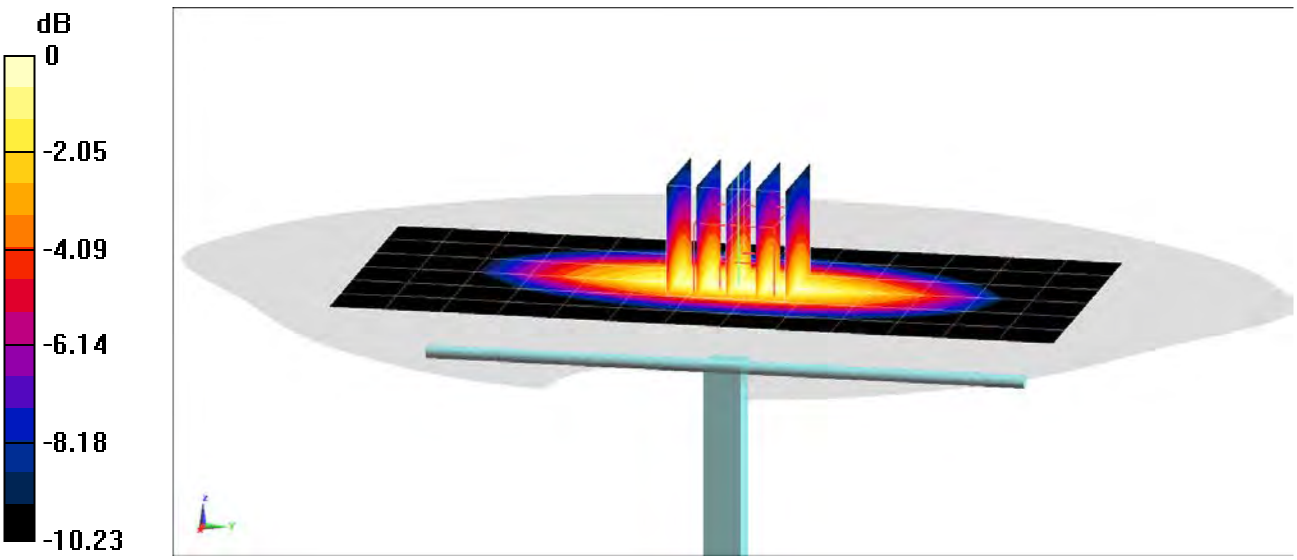
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used:
f = 835 MHz; σ = 0.966 S/m; ε_r = 54.82; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-22-2018; Ambient Temp: 19.9°C; Tissue Temp: 19.8°C

Probe: ES3DV3 - SN3347; ConvF(6.37, 6.37, 6.37); Calibrated: 3/27/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/15/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; 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) = 2.88 W/kg
SAR(1 g) = 1.97 W/kg
Deviation(1 g) = 1.44%



0 dB = 2.29 W/kg = 3.60 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1150

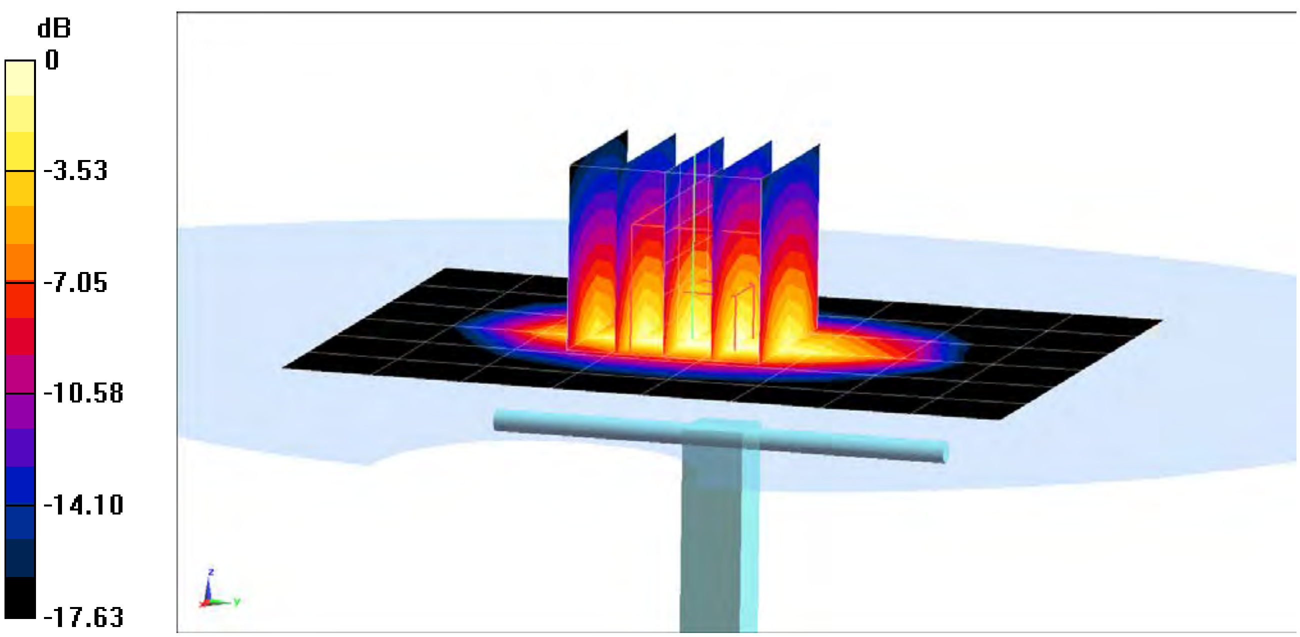
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used:
f = 1750 MHz; σ = 1.501 S/m; ε_r = 51.963; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-24-2018; Ambient Temp: 21.0°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7357; ConvF(8.43, 8.43, 8.43); Calibrated: 4/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2018
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10; 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) = 7.10 W/kg
SAR(1 g) = 3.83 W/kg
Deviation(1 g) = 4.64%



0 dB = 5.82 W/kg = 7.65 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1148

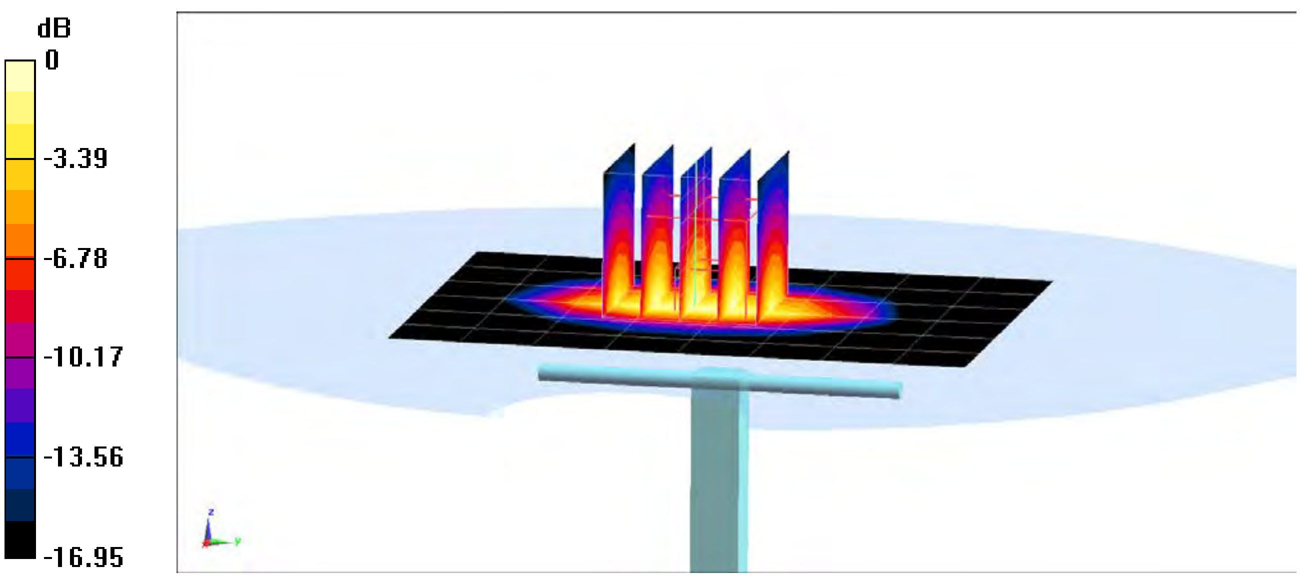
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used:
f = 1750 MHz; σ = 1.531 S/m; ε_r = 52.512; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-26-2018; Ambient Temp: 22.8°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7357; ConvF(8.43, 8.43, 8.43); Calibrated: 4/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2018
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10; 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) = 7.00 W/kg
SAR(10 g) = 2.05 W/kg
Deviation(10 g) = 3.54%



0 dB = 5.92 W/kg = 7.72 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

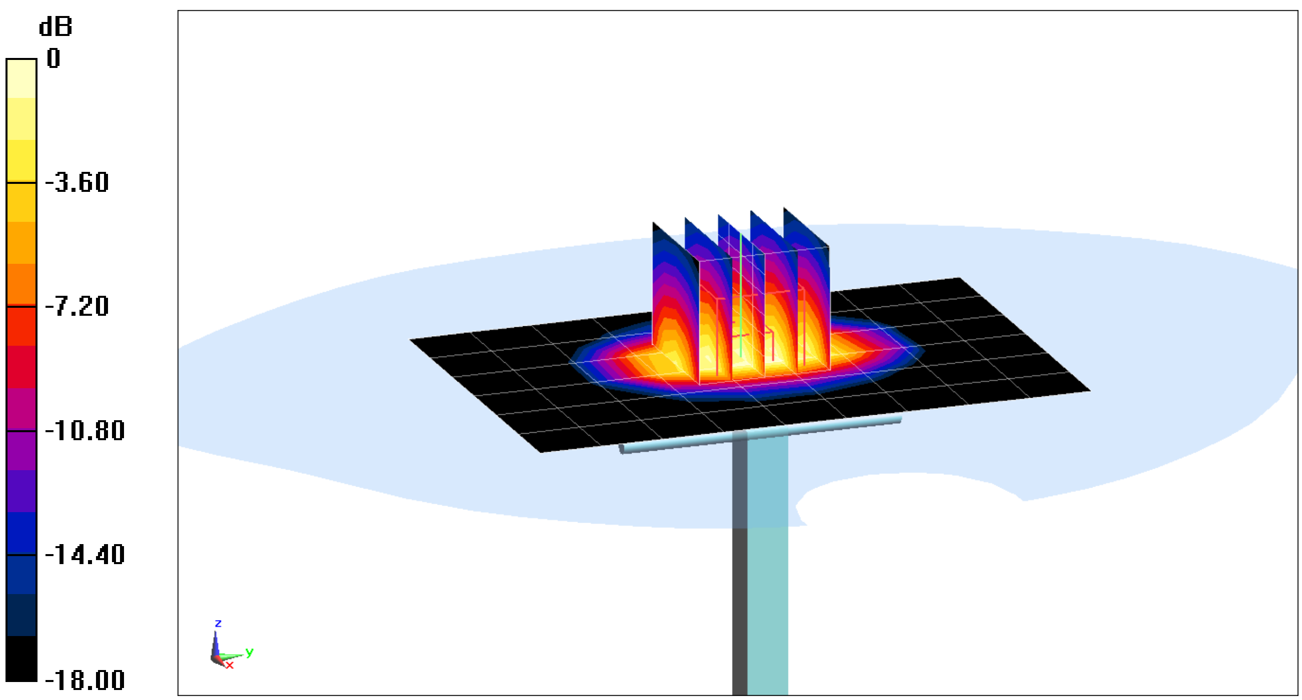
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.573 S/m; ε_r = 53.509; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-19-2018; Ambient Temp: 21.6°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3332; ConvF(4.77, 4.77, 4.77); Calibrated: 8/22/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.87 W/kg
SAR(1 g) = 3.86 W/kg
Deviation(1 g) = -2.53%



0 dB = 4.91 W/kg = 6.91 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

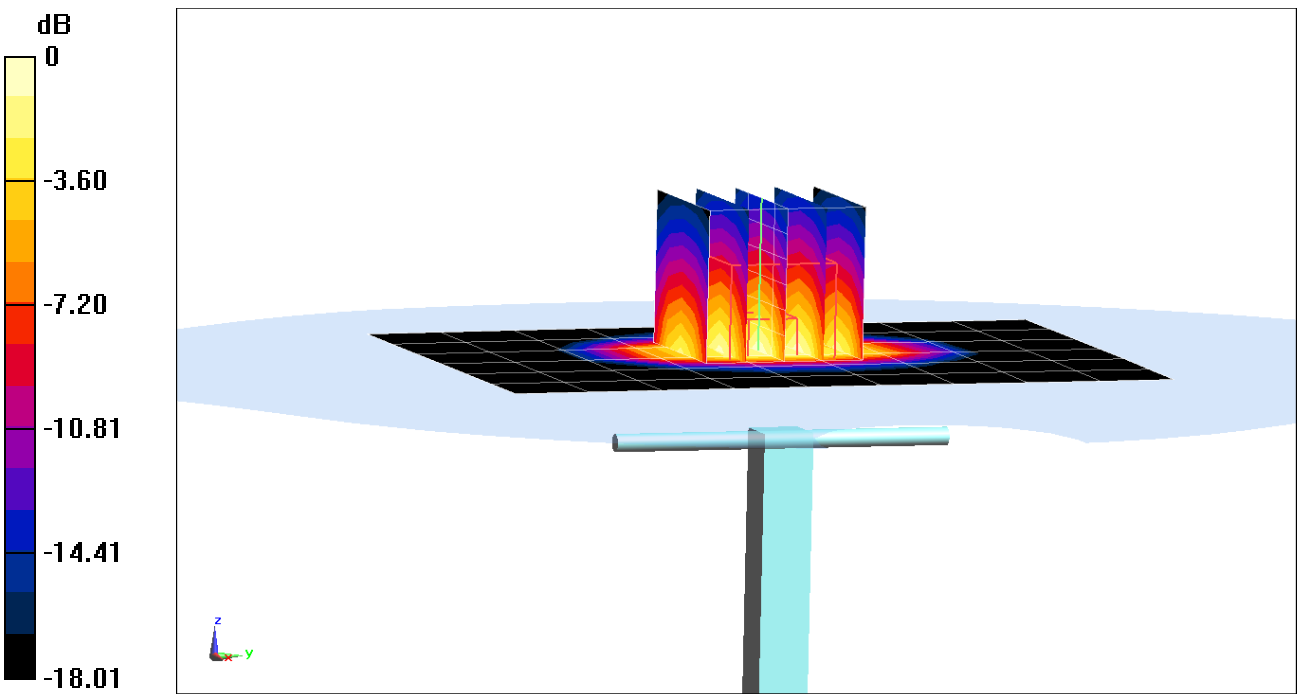
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
$f = 1900$ MHz; $\sigma = 1.499$ S/m; $\varepsilon_r = 50.745$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-24-2018; Ambient Temp: 21.3°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3332; ConvF(4.77, 4.77, 4.77); Calibrated: 8/22/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.25 W/kg
SAR(1 g) = 4.05 W/kg; SAR(10 g) = 2.1 W/kg
Deviation(1 g) = 2.79%; Deviation(10 g) = 1.45%



0 dB = 5.16 W/kg = 7.13 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

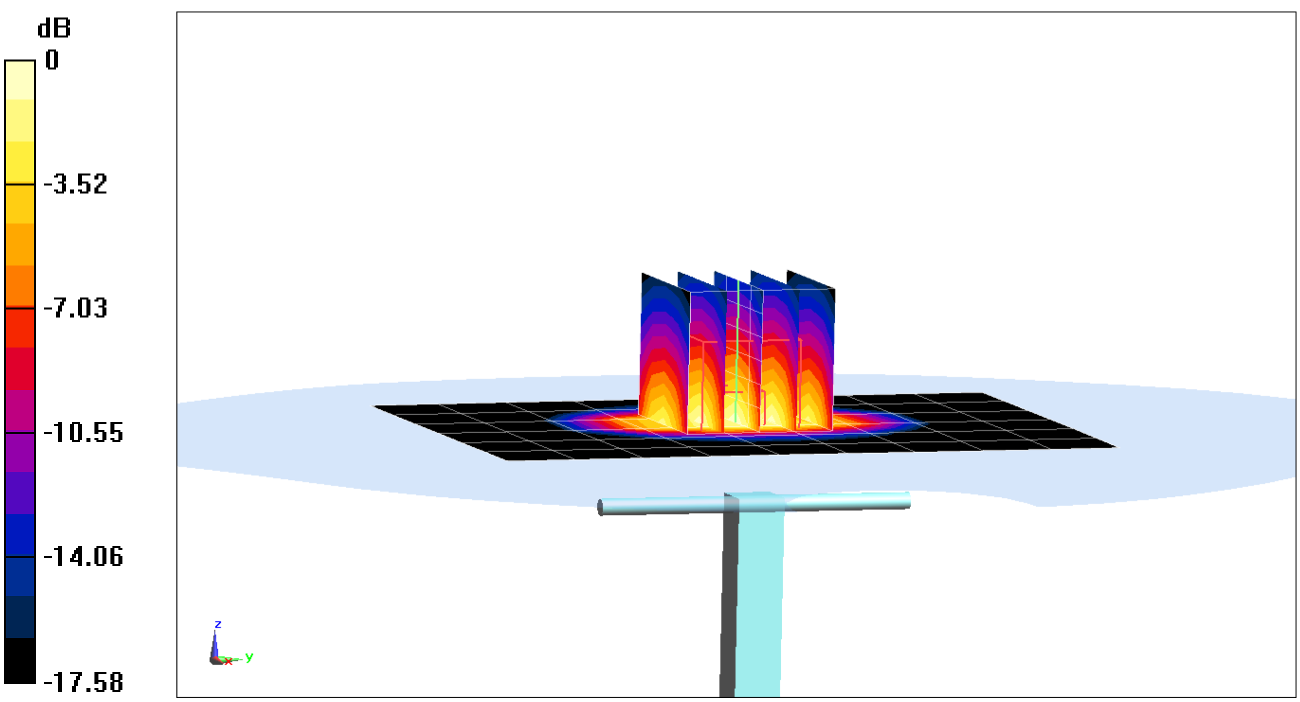
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.56 S/m; ε_r = 51.302; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-26-2018; Ambient Temp: 22.3°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3332; ConvF(4.77, 4.77, 4.77); Calibrated: 8/22/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.20 W/kg
SAR(10 g) = 2.11 W/kg
Deviation(10 g) = 1.93%



0 dB = 5.16 W/kg = 7.13 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

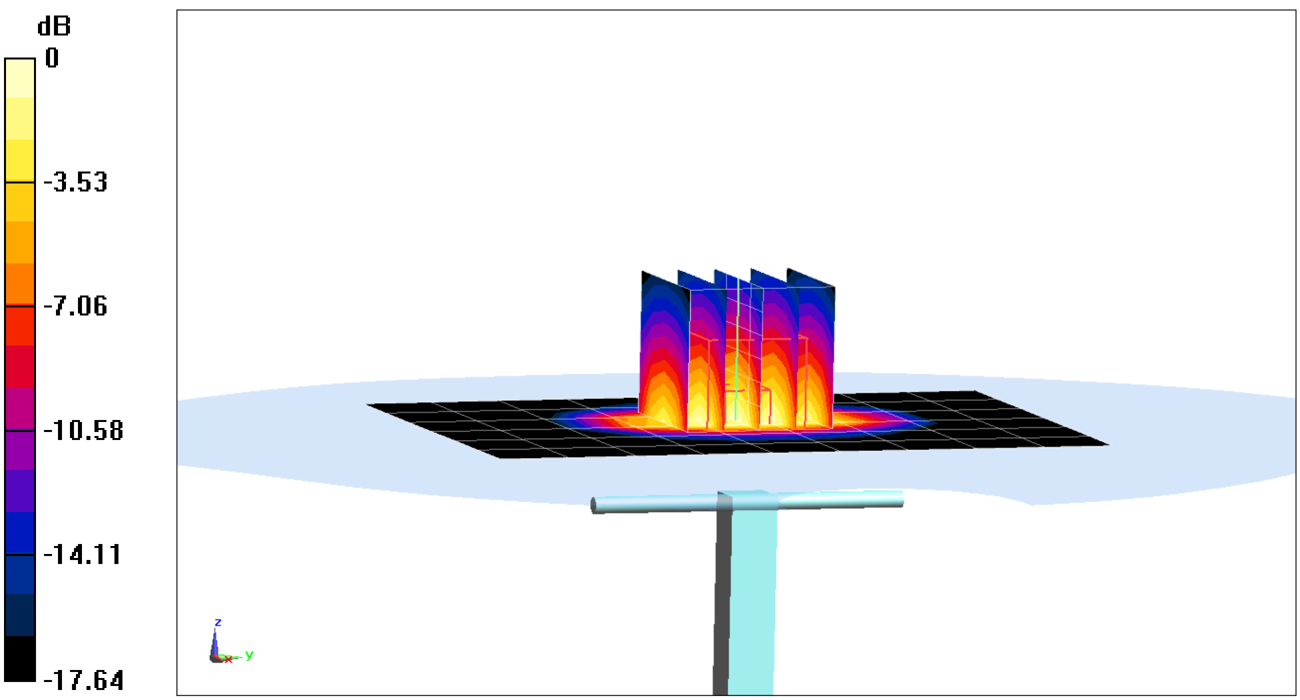
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.578 S/m; ε_r = 53.009; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-31-2018; Ambient Temp: 21.1°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3332; ConvF(4.77, 4.77, 4.77); Calibrated: 8/22/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.33 W/kg
SAR(1 g) = 4.13 W/kg
Deviation(1 g) = 4.29%



0 dB = 5.25 W/kg = 7.20 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

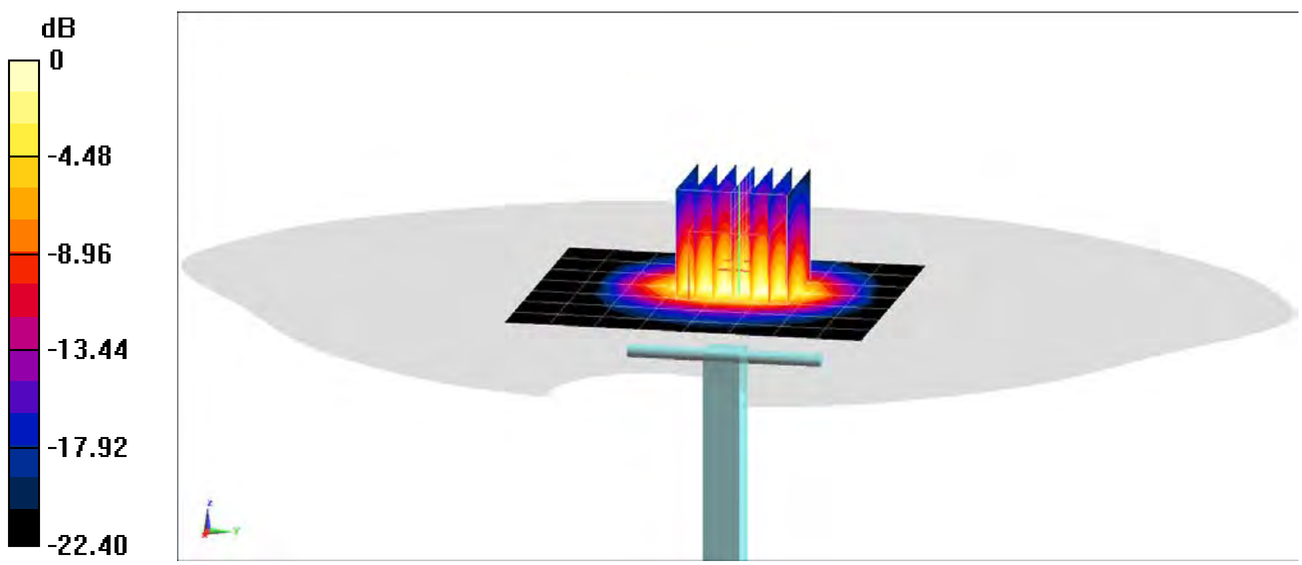
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; σ = 2.04 S/m; ε_r = 50.852; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-20-2018; Ambient Temp: 19.7°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3347; ConvF(4.64, 4.64, 4.64); Calibrated: 3/27/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/15/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10; 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) = 11.1 W/kg
SAR(1 g) = 5.23 W/kg
Deviation(1 g) = 4.39%



0 dB = 6.58 W/kg = 8.18 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

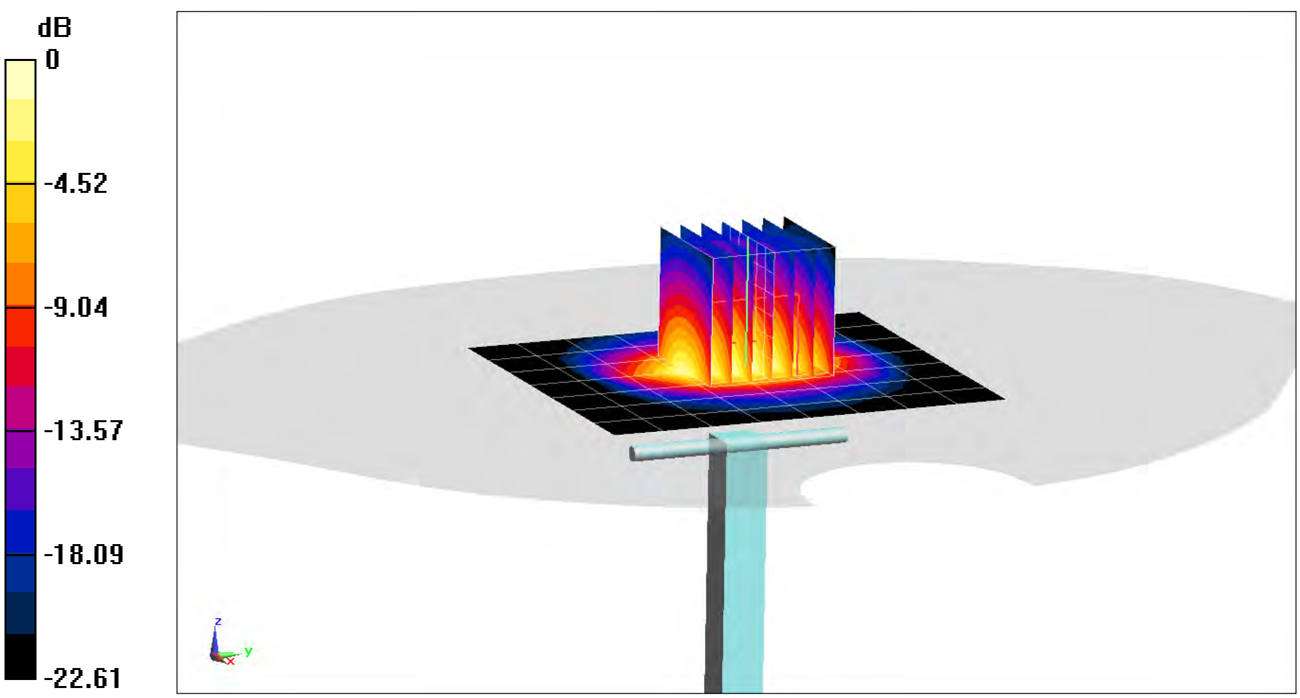
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; σ = 2.041 S/m; ε_r = 51.54; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-26-2018; Ambient Temp: 23.2°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3319; ConvF(4.51, 4.51, 4.51); Calibrated: 3/13/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/7/2018
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10; 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) = 11.2 W/kg
SAR(1 g) = 5.32 W/kg; SAR(10 g) = 2.43 W/kg
Deviation(1 g) = 4.11%; Deviation(10 g) = 0.41%



0 dB = 7.00 W/kg = 8.45 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

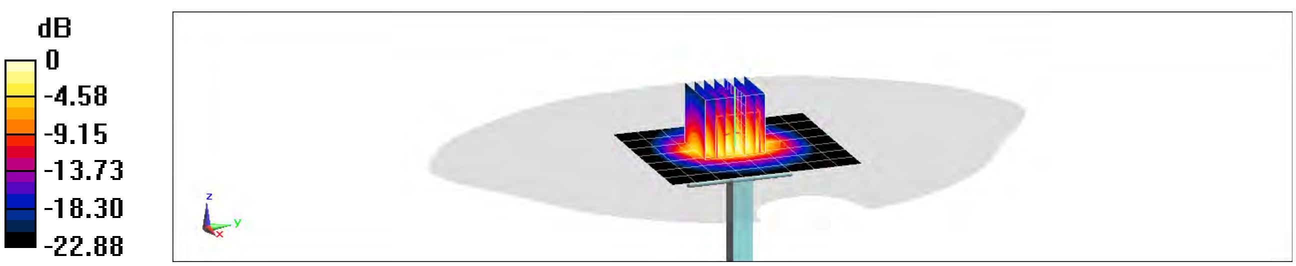
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
$f = 2450$ MHz; $\sigma = 2.033$ S/m; $\varepsilon_r = 52.283$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-09-2019; Ambient Temp: 23.4°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7406; ConvF(7.3, 7.3, 7.3); Calibrated: 5/22/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/22/2018
Phantom: Twin-SAM V5.0 Back Right; Type: QD 000 P40 CD; Serial: 1692
Measurement SW: DASY52, Version 52.10;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) = 5.27 W/kg
Deviation(1 g) = 3.13%



0 dB = 8.54 W/kg = 9.31 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1071

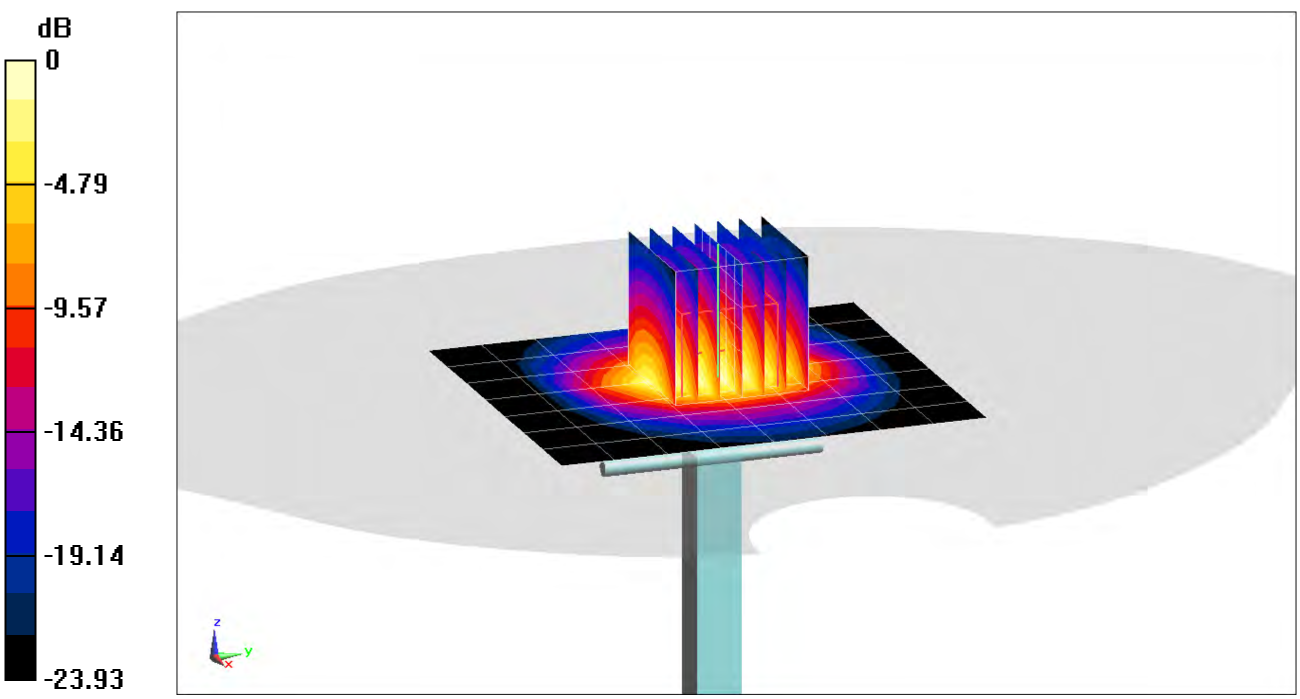
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2600 MHz; σ = 2.216 S/m; ε_r = 51.124; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-26-2018; Ambient Temp: 23.2°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3319; ConvF(4.33, 4.33, 4.33); Calibrated: 3/13/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/7/2018
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10; 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) = 12.1 W/kg
SAR(1 g) = 5.49 W/kg; SAR(10 g) = 2.42 W/kg
Deviation(1 g) = 1.29%; Deviation(10 g) = -1.22%



0 dB = 7.17 W/kg = 8.56 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

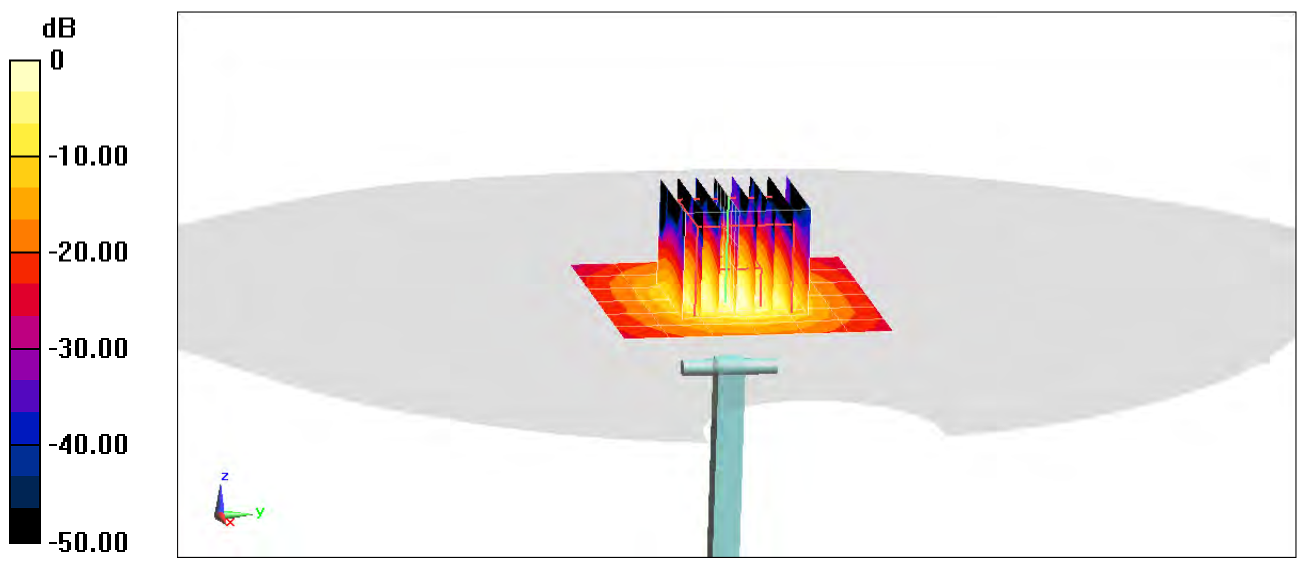
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used (interpolated):
f = 5250 MHz; σ = 5.421 S/m; ε_r = 47.944; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-26-2018; Ambient Temp: 21.3°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7308; ConvF(4.48, 4.48, 4.48); 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; 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) = 3.6 W/kg
Deviation(1 g) = -6.49%



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

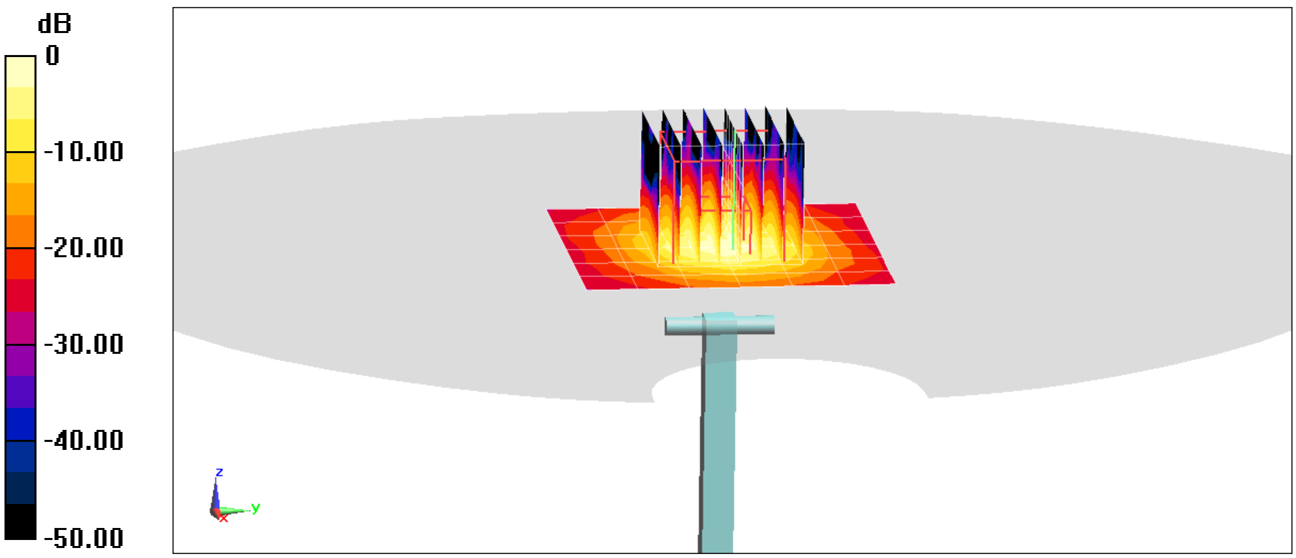
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:
f = 5600 MHz; σ = 5.939 S/m; ε_r = 47.285; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-26-2018; Ambient Temp: 21.3°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7308; ConvF(4, 4, 4); 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; 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) = 17.5 W/kg
SAR(1 g) = 3.89 W/kg
Deviation(1 g) = -1.77%



0 dB = 9.63 W/kg = 9.84 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

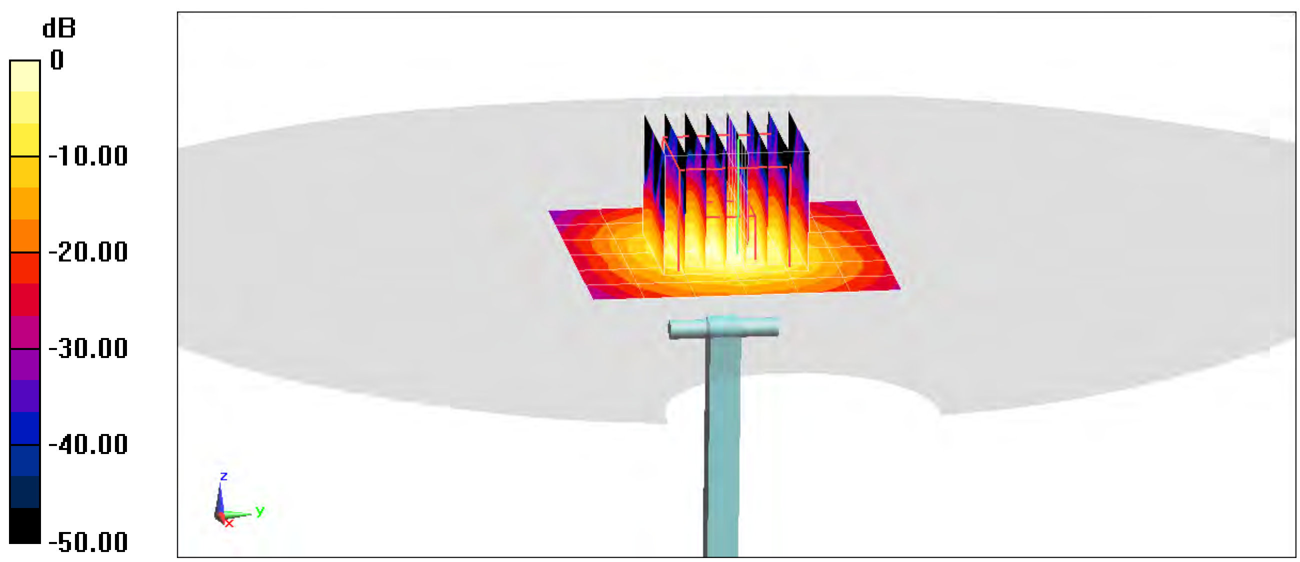
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used (interpolated):
f = 5750 MHz; σ = 6.154 S/m; ε_r = 47.01; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-26-2018; Ambient Temp: 21.3°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7308; ConvF(4.18, 4.18, 4.18); 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; 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) = 16.1 W/kg
SAR(1 g) = 3.47 W/kg
Deviation(1 g) = -8.80%



0 dB = 8.59 W/kg = 9.34 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

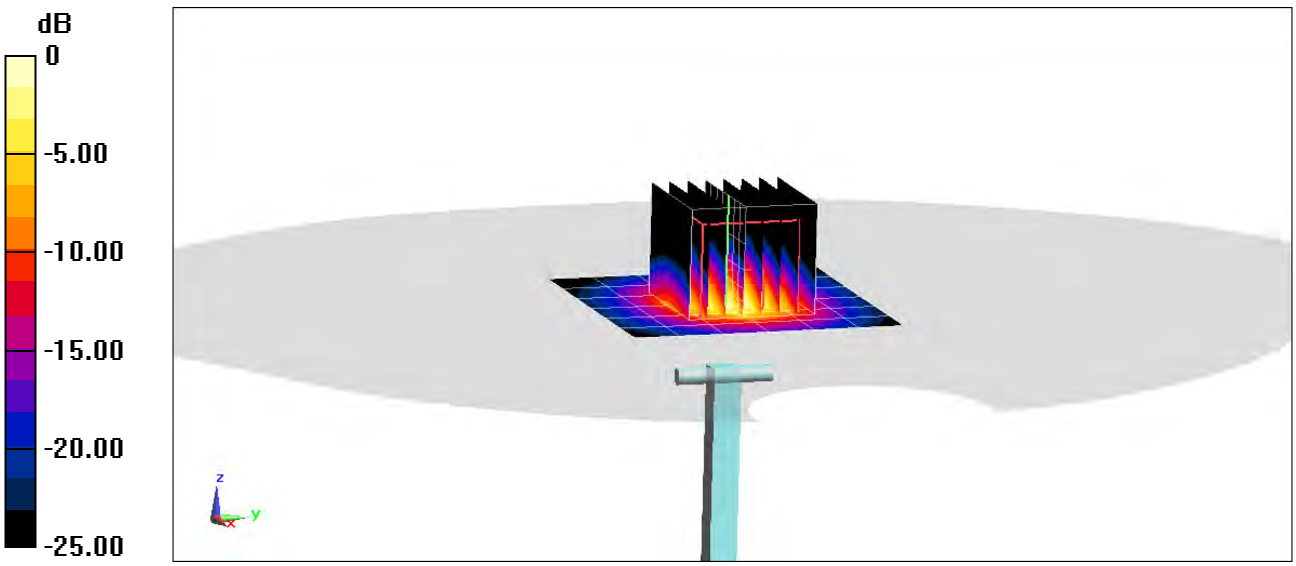
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used (interpolated):
f = 5250 MHz; σ = 5.402 S/m; ε_r = 47.349; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-03-2019; Ambient Temp: 21.5°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7308; ConvF(4.48, 4.48, 4.48); 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; 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) = 15.1 W/kg
SAR(10 g) = 0.999 W/kg
Deviation(10 g) = -7.50%



0 dB = 8.58 W/kg = 9.33 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

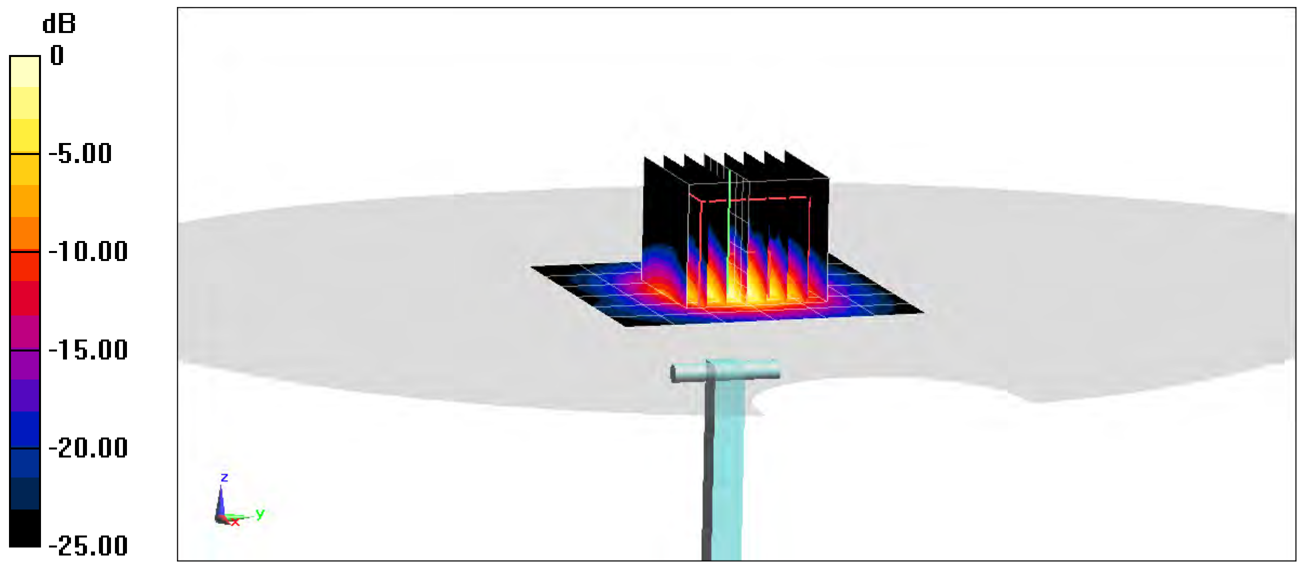
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:
$f = 5600$ MHz; $\sigma = 5.888$ S/m; $\varepsilon_r = 46.674$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-03-2019; Ambient Temp: 21.5°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7308; ConvF(4, 4, 4); 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; 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) = 18.5 W/kg
SAR(10 g) = 1.08 W/kg
Deviation(10 g) = -2.70%



0 dB = 9.75 W/kg = 9.89 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

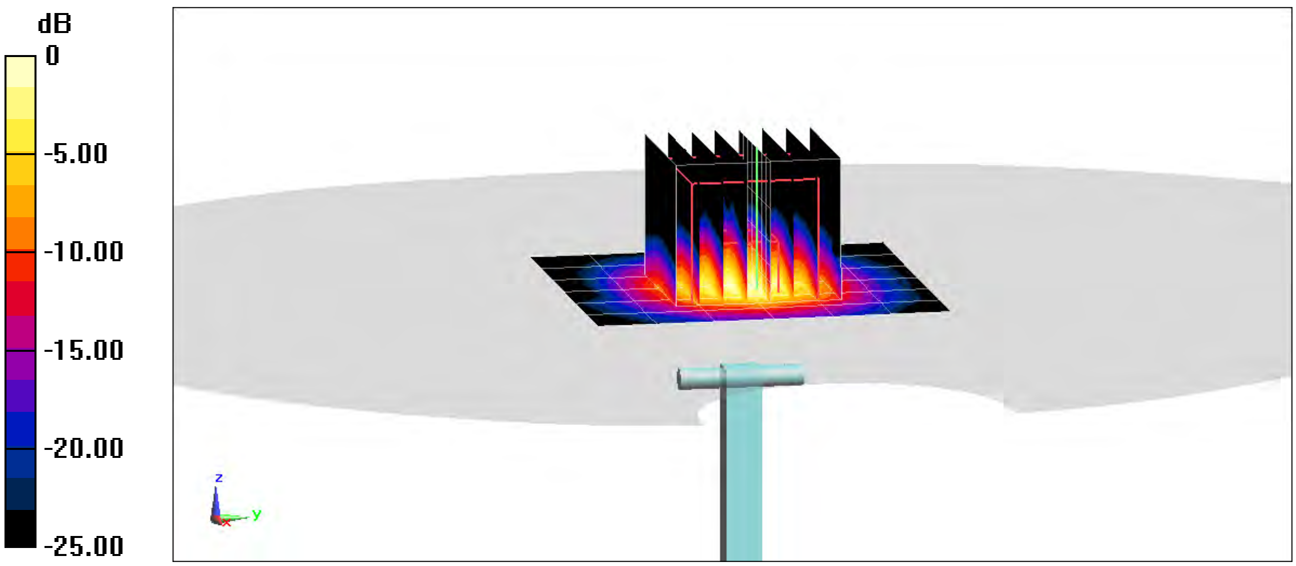
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used (interpolated):
f = 5750 MHz; σ = 6.138 S/m; ε_r = 46.378; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-03-2019; Ambient Temp: 21.5°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7308; ConvF(4.18, 4.18, 4.18); 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; 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) = 17.3 W/kg
SAR(1 g) = 3.5 W/kg; SAR(10 g) = 0.979 W/kg
Deviation(1 g) = -8.02%; Deviation(10 g) = -7.64%



0 dB = 8.81 W/kg = 9.45 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

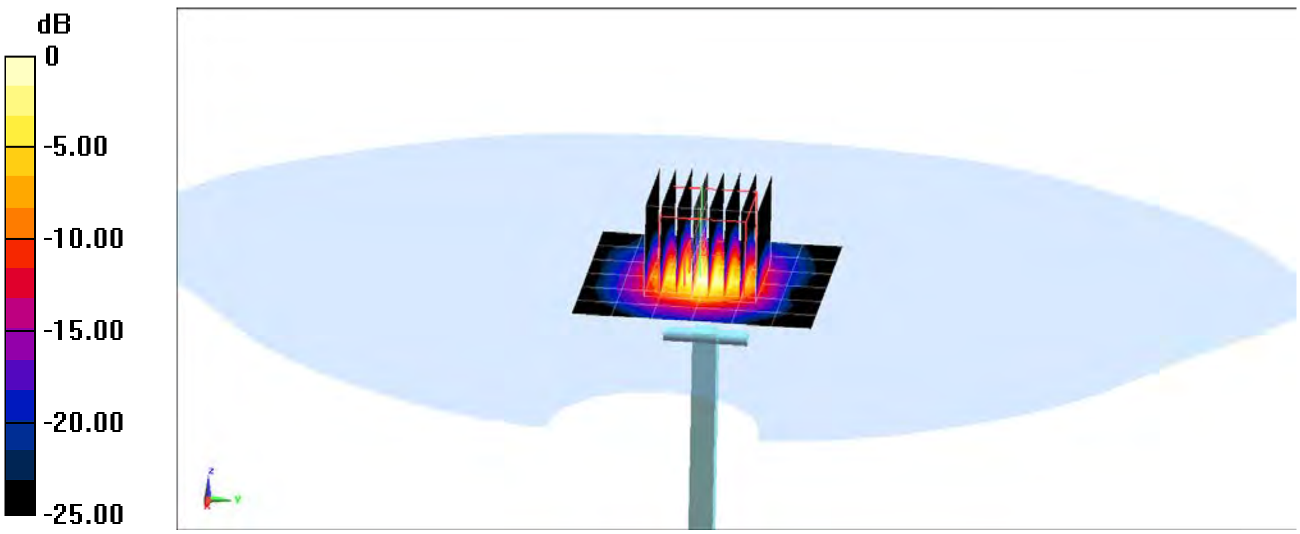
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5750 MHz; σ = 6.08 S/m; ε_r = 46.861; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-08-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7357; ConvF(4.21, 4.21, 4.21); Calibrated: 4/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2018
Phantom: SAM with CRP v5.0 Left; Type: QD000P40CD; Serial: 1687
Measurement SW: DASY52, Version 52.10;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) = 16.7 W/kg
SAR(1 g) = 3.6 W/kg
Deviation(1 g) = -5.39%



0 dB = 8.93 W/kg = 9.51 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: **D750V3-1003_Jan18**

CALIBRATION CERTIFICATE

Object D750V3 - SN:1003

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: January 15, 2018

BN
01-25-2018

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-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: 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:	Leif Klysner	Laboratory Technician	Leif Klysner
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 15, 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	V52.10.0
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	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.9 ± 6 %	0.90 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	2.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.28 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.42 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	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.0 ± 6 %	0.96 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	2.15 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.58 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.43 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.71 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	53.8 Ω - 2.1 jΩ
Return Loss	- 27.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.2 Ω - 6.2 jΩ
Return Loss	- 24.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.043 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	January 21, 2009

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	1.98 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**7.94 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.32 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	2.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.22 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.52 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	2.01 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	1.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.52 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	1.67 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.70 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.15 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**4.60 W/kg ± 16.9 % (k=2)**

DASY5 Validation Report for Head TSL

Date: 12.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1003

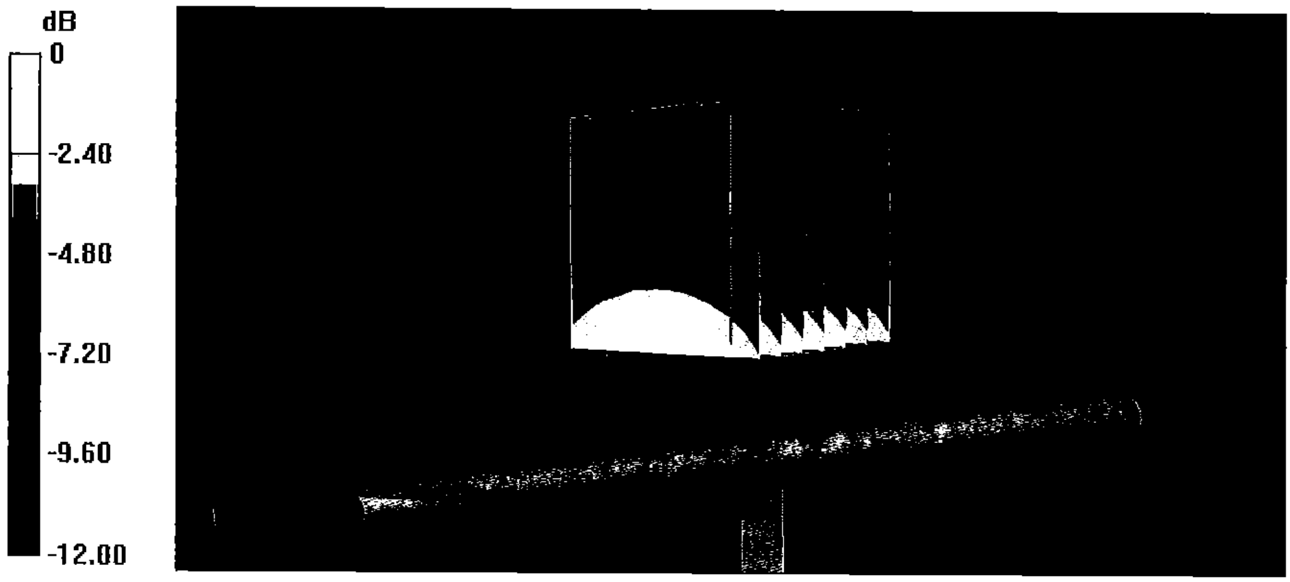
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; $\sigma = 0.9$ S/m; $\varepsilon_r = 40.9$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.22, 10.22, 10.22); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

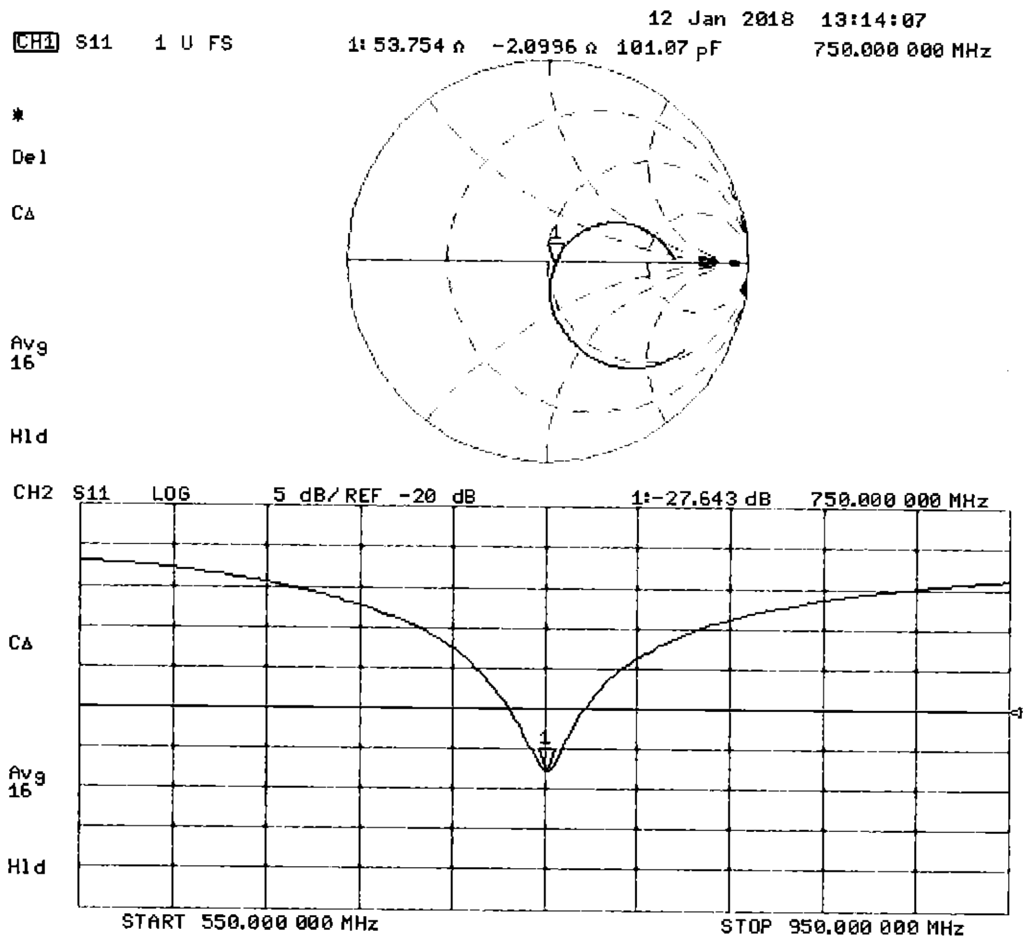
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.11 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.15 W/kg
SAR(1 g) = 2.1 W/kg; SAR(10 g) = 1.37 W/kg
Maximum value of SAR (measured) = 2.80 W/kg



0 dB = 2.80 W/kg = 4.47 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 12.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1003

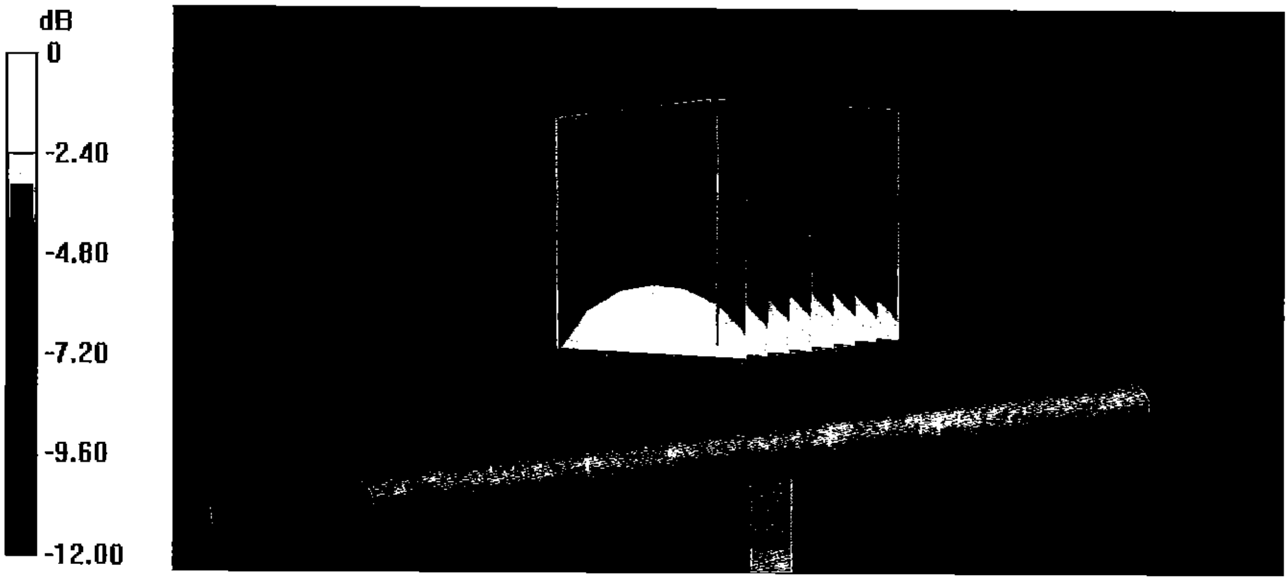
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; $\sigma = 0.96$ S/m; $\varepsilon_r = 55$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.19, 10.19, 10.19); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

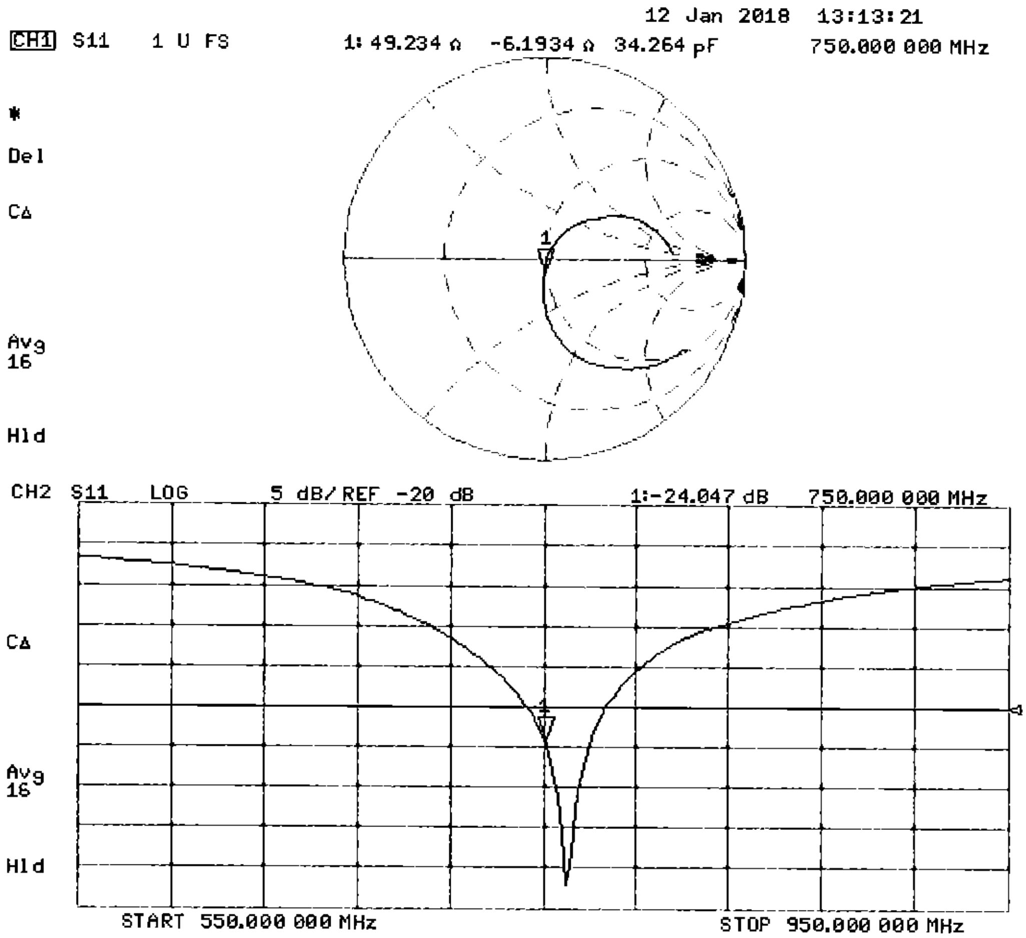
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x8x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.31 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.17 W/kg
SAR(1 g) = 2.15 W/kg; SAR(10 g) = 1.43 W/kg
Maximum value of SAR (measured) = 2.83 W/kg



0 dB = 2.83 W/kg = 4.52 dBW/kg

Impedance Measurement Plot for Body TSL



Date: 15.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1003

Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; $\sigma = 0.9$ S/m; $\varepsilon_r = 44.2$; $\rho = 1000$ kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

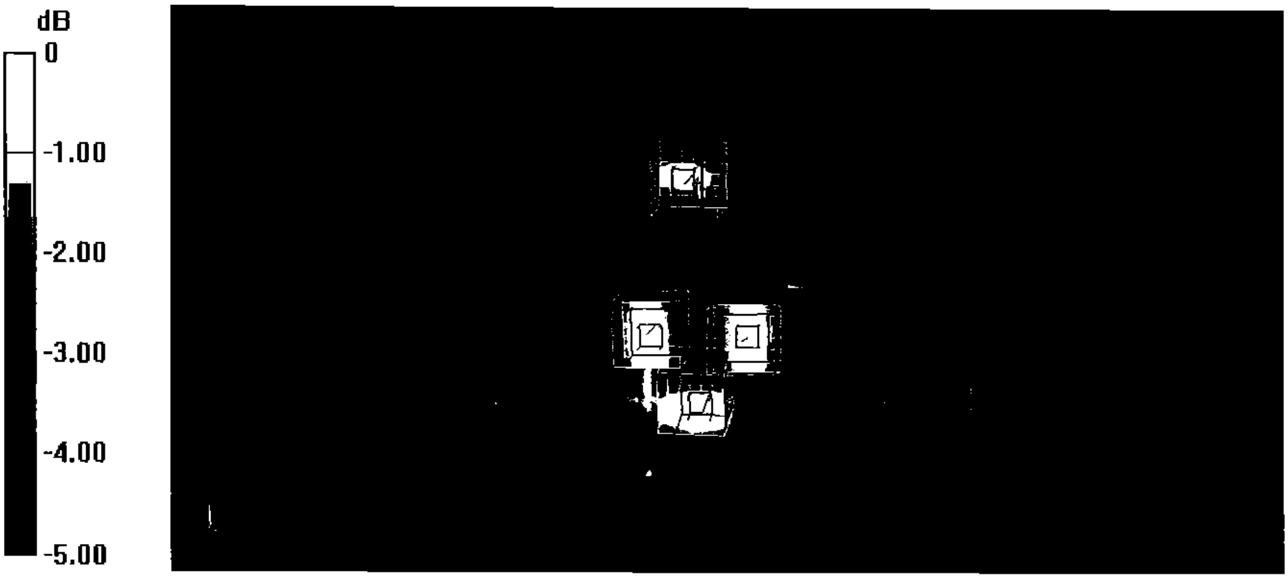
- Probe: EX3DV4 - SN7349; ConvF(10.22, 10.22, 10.22); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: SAM Head
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

SAM Head/Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.79 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 2.89 W/kg
SAR(1 g) = 1.98 W/kg; SAR(10 g) = 1.33 W/kg
Maximum value of SAR (measured) = 2.58 W/kg

SAM Head/Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.85 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 2.94 W/kg
SAR(1 g) = 2.05 W/kg; SAR(10 g) = 1.38 W/kg
Maximum value of SAR (measured) = 2.62 W/kg

SAM Head/Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.29 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 2.78 W/kg
SAR(1 g) = 2.01 W/kg; SAR(10 g) = 1.38 W/kg
Maximum value of SAR (measured) = 2.56 W/kg

SAM Head/Ear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.01 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 2.31 W/kg
SAR(1 g) = 1.67 W/kg; SAR(10 g) = 1.15 W/kg
Maximum value of SAR (measured) = 2.11 W/kg



0 dB = 2.58 W/kg = 4.12 dBW/kg

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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: D835V2-4d047_Oct18

CALIBRATION CERTIFICATE

Object	D835V2 - SN:4d047
Calibration procedure(s)	QA CAL-05.v10 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	October 19, 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:	Manu Seitz	Laboratory Technician	
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	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 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	40.6 ± 6 %	0.91 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	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.47 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.55 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.14 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	54.9 ± 6 %	0.98 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	2.45 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.71 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.36 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	51.0 Ω - 0.5 jΩ
Return Loss	- 39.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.6 Ω - 4.1 jΩ
Return Loss	- 24.0 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
Manufactured on	August 16, 2006

DASY5 Validation Report for Head TSL

Date: 19.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d047

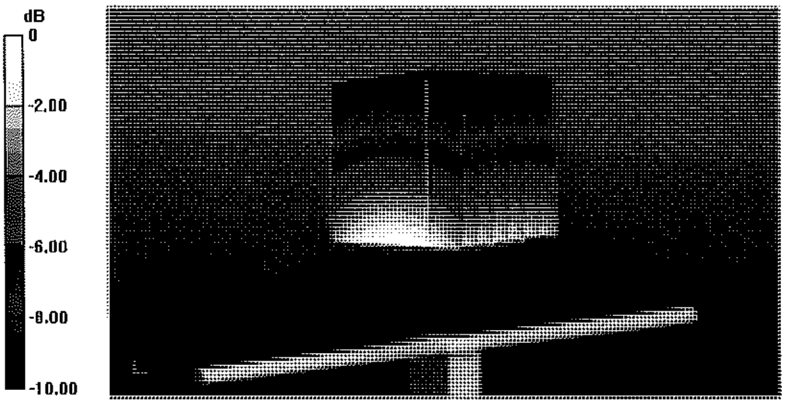
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.91 S/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.9, 9.9, 9.9) @ 835 MHz; Calibrated: 30.12.2017
- 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)

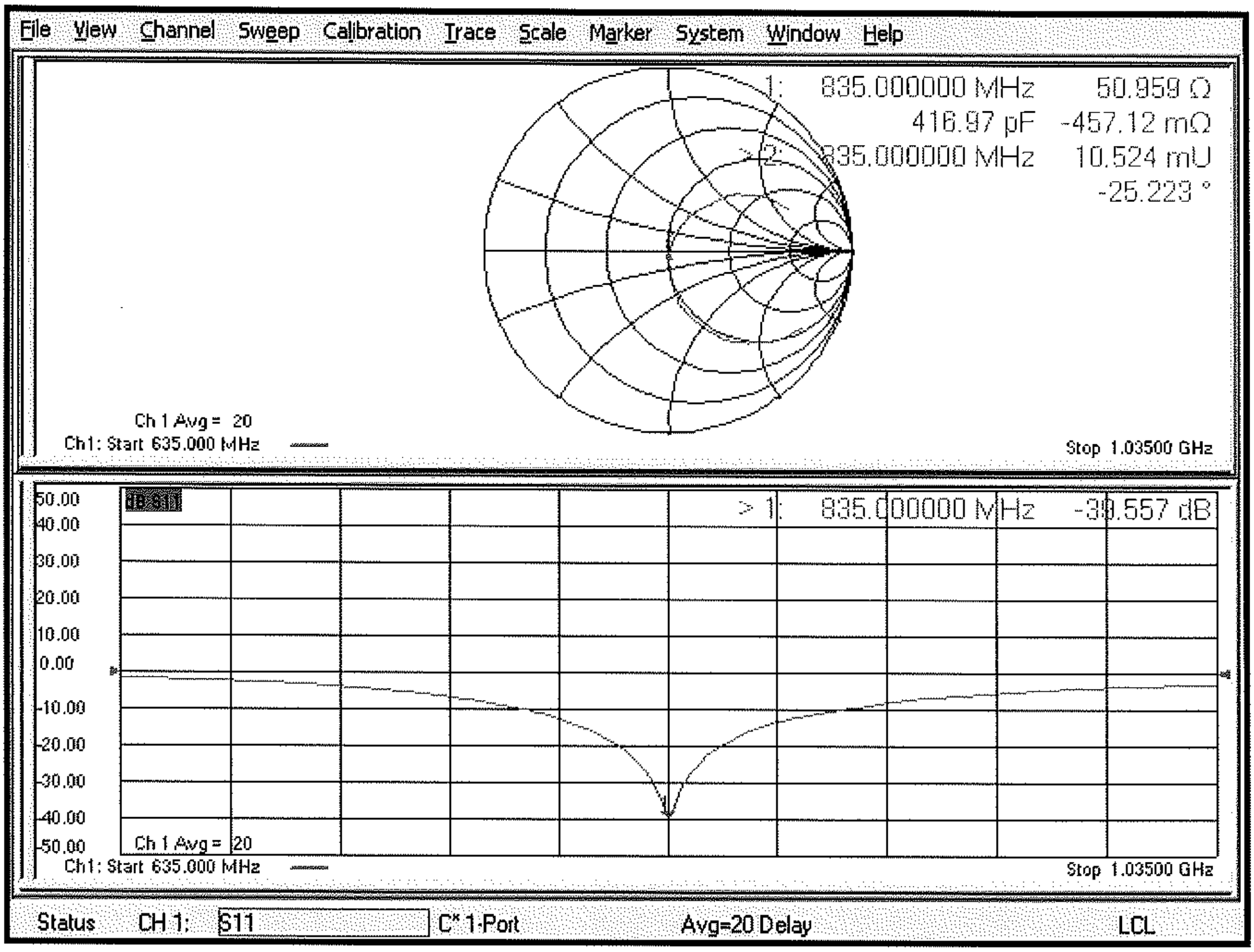
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 62.84 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 3.69 W/kg
SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.55 W/kg
Maximum value of SAR (measured) = 3.24 W/kg



0 dB = 3.24 W/kg = 5.11 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 19.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d047

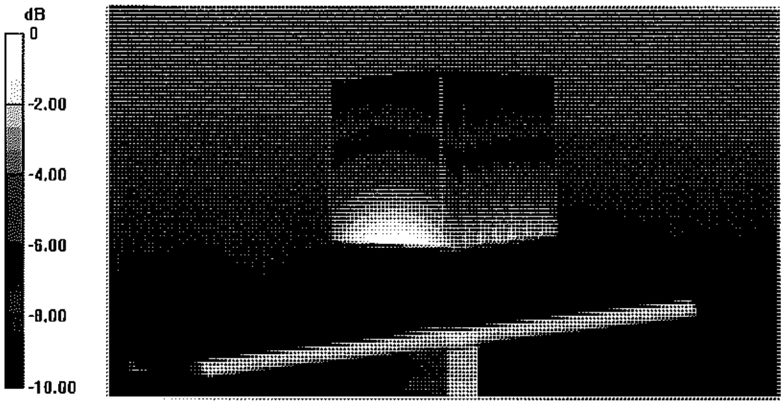
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.98 S/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.05, 10.05, 10.05) @ 835 MHz; Calibrated: 30.12.2017
- 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)

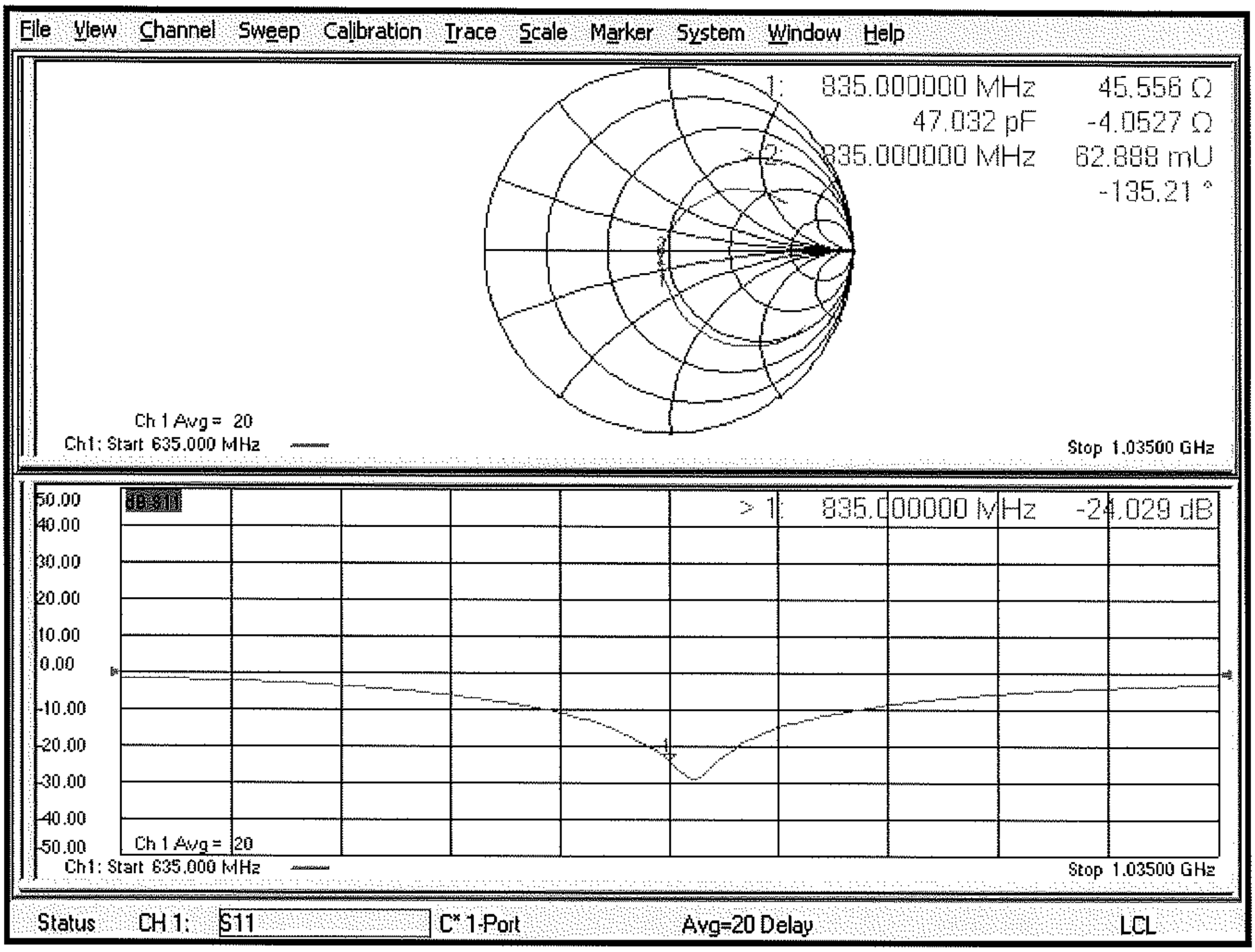
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.27 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 3.68 W/kg
SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.6 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 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: D1750V2-1148_May17

CALIBRATION CERTIFICATE

Object	D1750V2 - SN:1148
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	May 09, 2017

BN ✓
05-23-2017
BN ✓
05-09-2018

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-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: 7349	31-Dec-16 (No. EX3-7349_Dec16)	Dec-17
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-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-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 11, 2017

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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	
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	39.0 ± 6 %	1.36 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	9.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**36.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.83 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.3 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	53.7 ± 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	9.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**37.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.93 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**19.8 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	49.8 Ω - 0.7 jΩ
Return Loss	- 42.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.7 Ω - 0.5 jΩ
Return Loss	- 26.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.223 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	September 30, 2014

DASY5 Validation Report for Head TSL

Date: 09.05.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1148

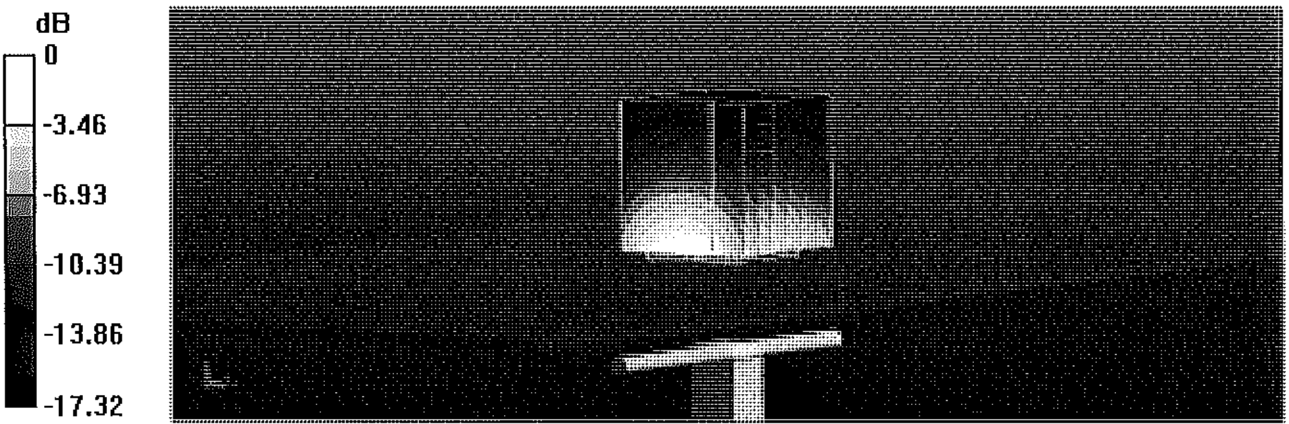
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.36 S/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.46, 8.46, 8.46); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.10.0(1442); SEMCAD X 14.6.10(7413)

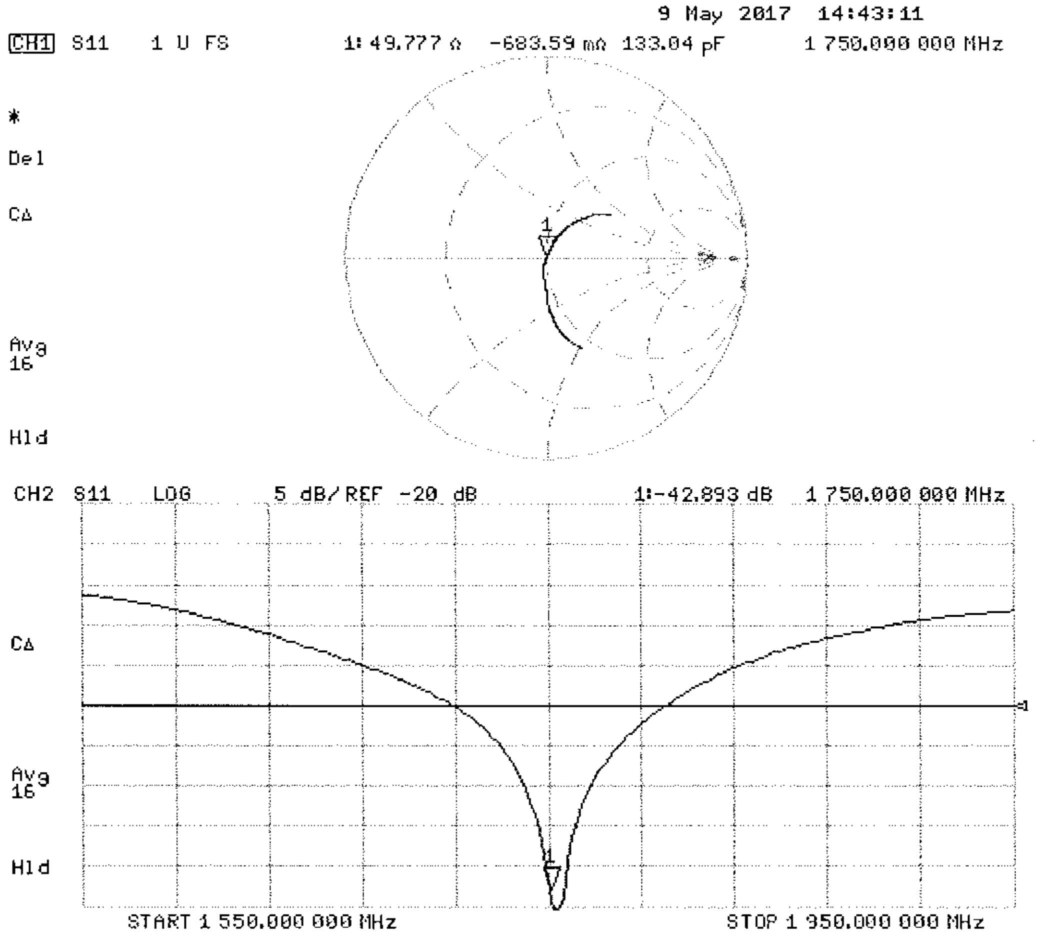
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.4 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 16.5 W/kg
SAR(1 g) = 9.11 W/kg; SAR(10 g) = 4.83 W/kg
Maximum value of SAR (measured) = 13.9 W/kg



0 dB = 13.9 W/kg = 11.43 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 09.05.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1148

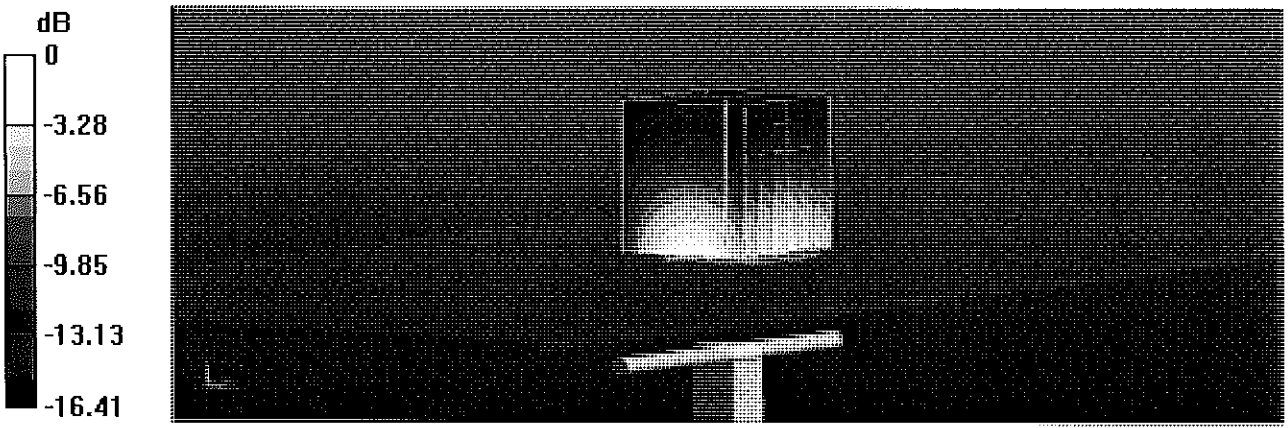
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.47 S/m; ε_r = 53.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.25, 8.25, 8.25); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1442); SEMCAD X 14.6.10(7413)

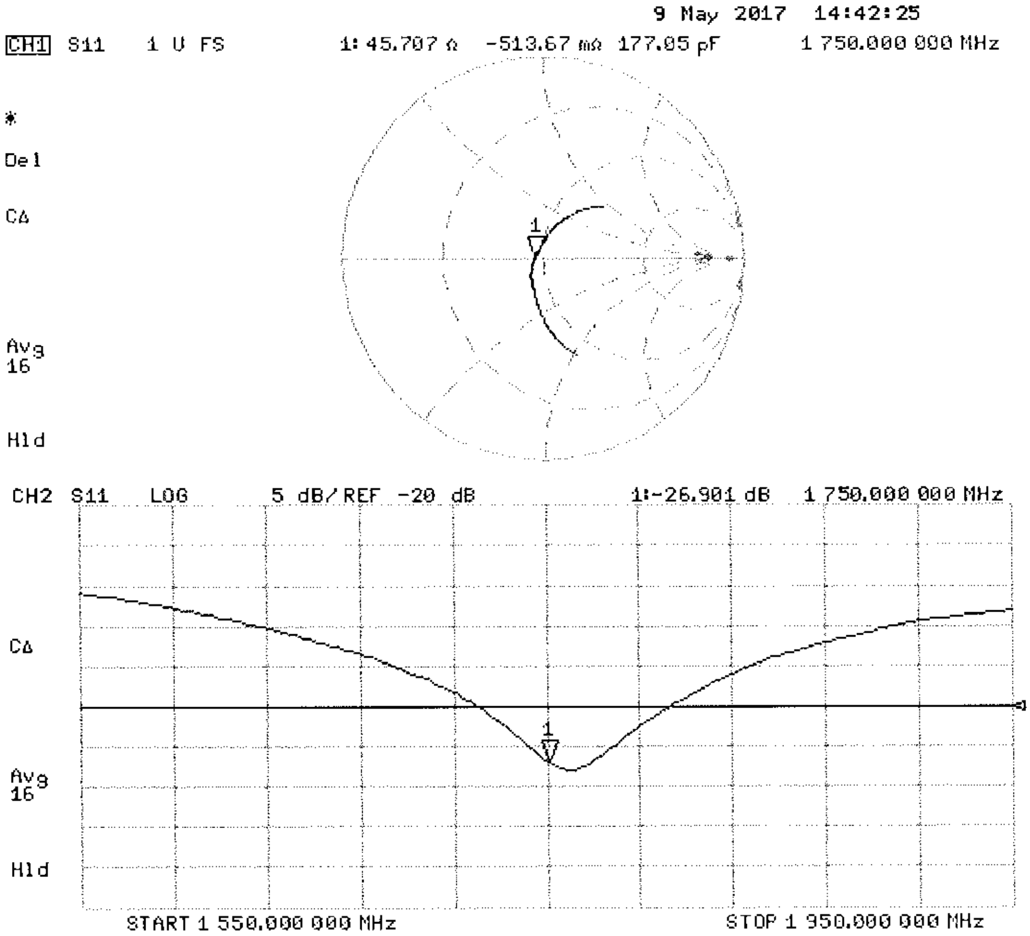
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.49 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 15.9 W/kg
SAR(1 g) = 9.17 W/kg; SAR(10 g) = 4.93 W/kg
Maximum value of SAR (measured) = 13.1 W/kg



0 dB = 13.1 W/kg = 11.17 dBW/kg

Impedance Measurement Plot for Body TSL



Certification of Calibration

Object	D1750V2 – SN: 1148
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	May 09, 2018
Description:	SAR Validation Dipole at 1750 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
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/9/2018	Annual	2/9/2019	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/21/2017	Annual	6/21/2018	1333
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/12/2017	Annual	9/12/2018	1091
SPEAG	ES3DV3	SAR Probe	9/18/2017	Annual	9/18/2018	3287
SPEAG	ES3DV3	SAR Probe	2/13/2018	Annual	2/13/2019	3213
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
Agilent	N5182A	MXG Vector Signal Generator	4/18/2018	Annual	4/18/2019	MY47420800
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Pasternack	NC-100	Torque Wrench	4/18/2018	Annual	4/18/2019	1445
Anritsu	ML2495A	Power Meter	10/22/2017	Annual	10/22/2018	941001

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:

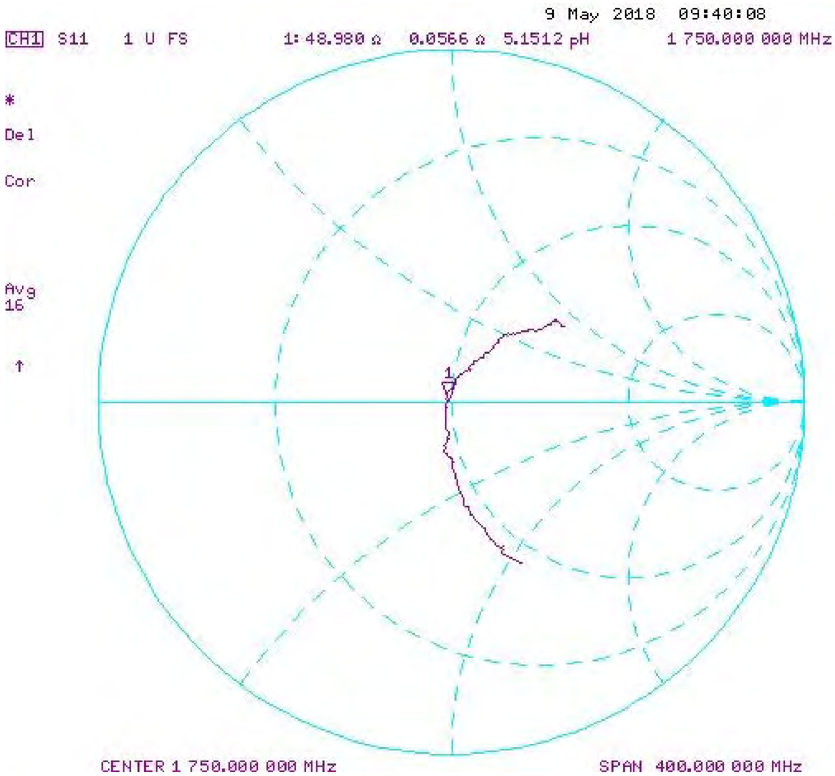
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

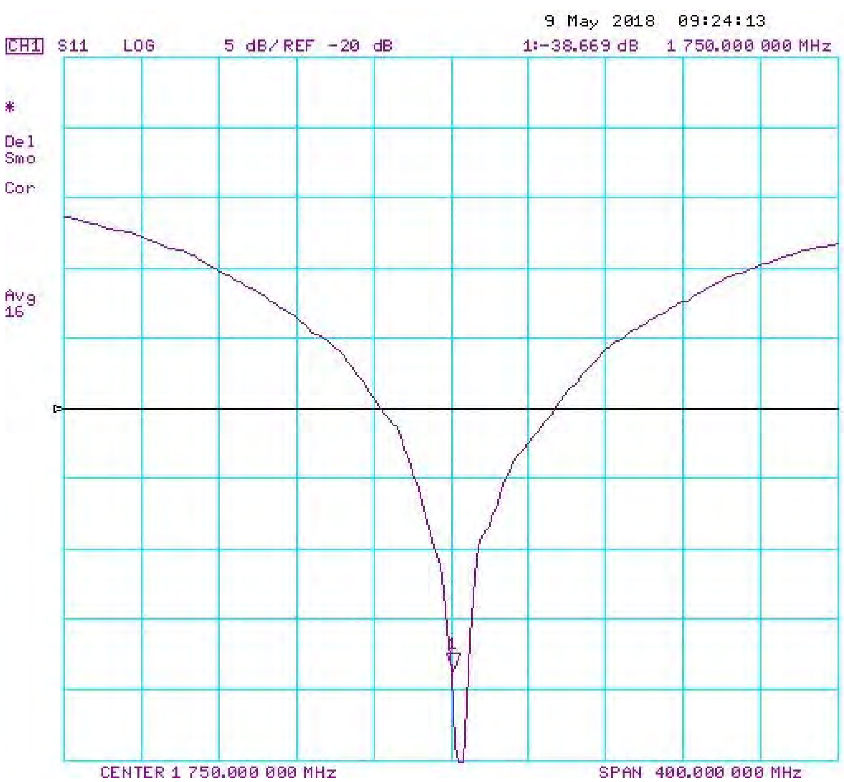
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

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
5/9/2017	5/9/2018	1.223	3.64	3.59	-1.37%	1.93	1.91	-1.04%	49.8	49.0	0.8	-0.7	0.1	0.8	-42.9	-38.7	9.90%	PASS

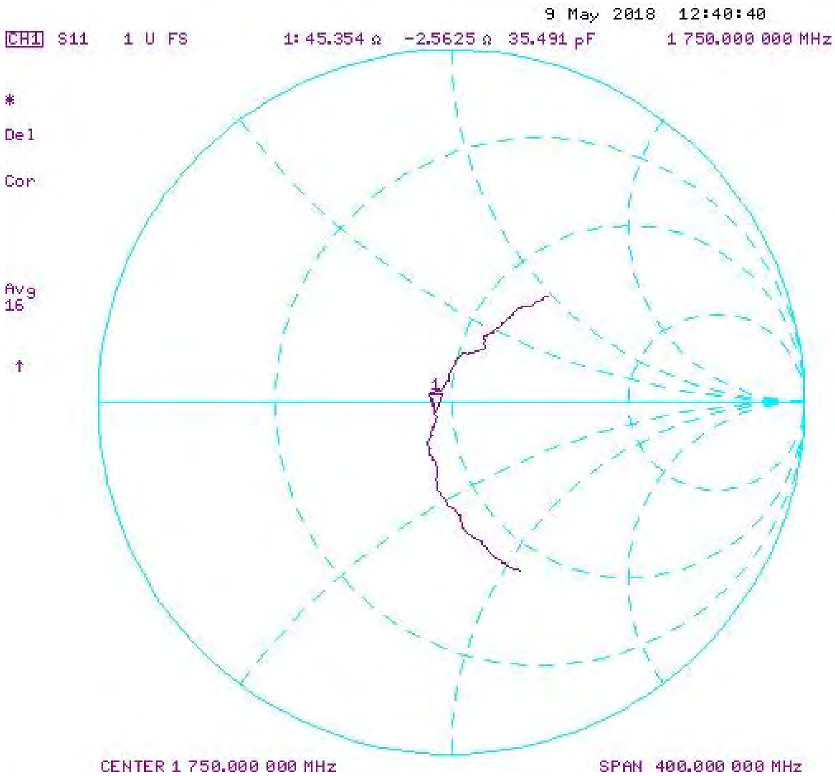
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance 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
5/9/2017	5/9/2018	1.223	3.7	3.88	4.86%	1.98	2.06	4.04%	45.7	45.4	0.3	-0.5	-2.6	2.1	-26.9	-25.0	7.20%	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
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: D1900V2-5d080_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

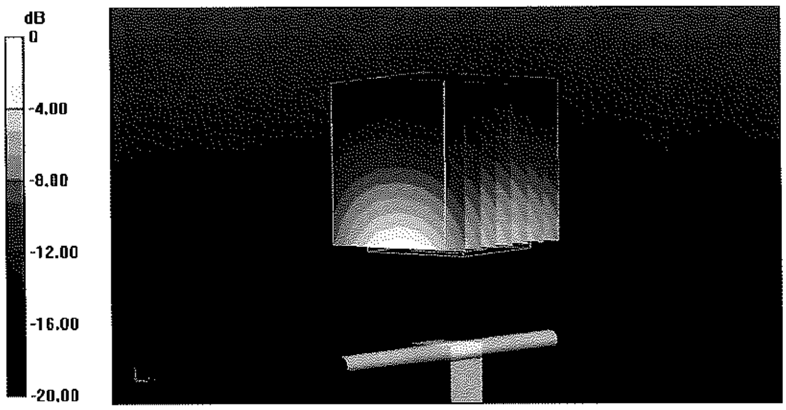
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; $\sigma = 1.4$ S/m; $\varepsilon_r = 40.3$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(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)

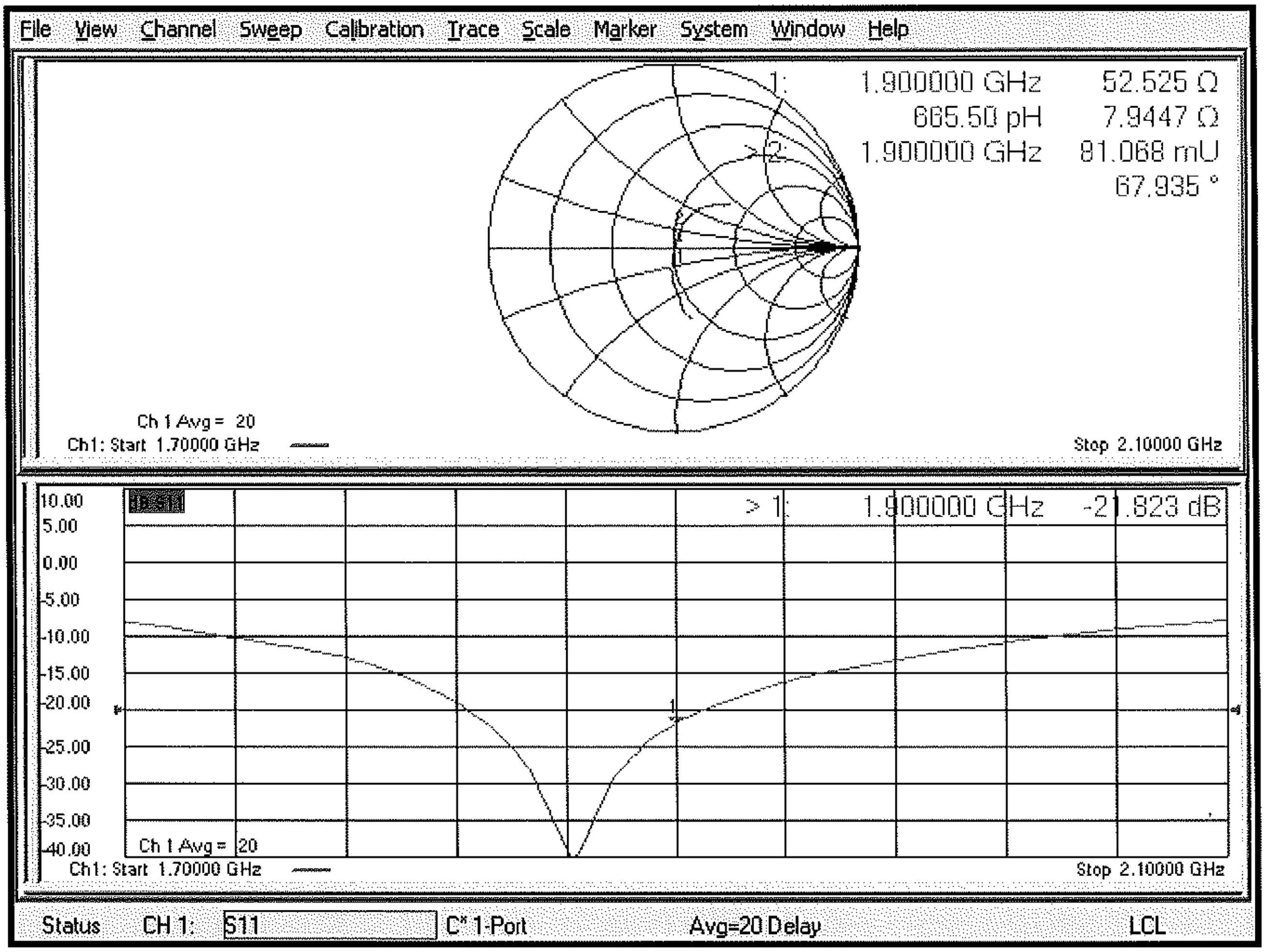
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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

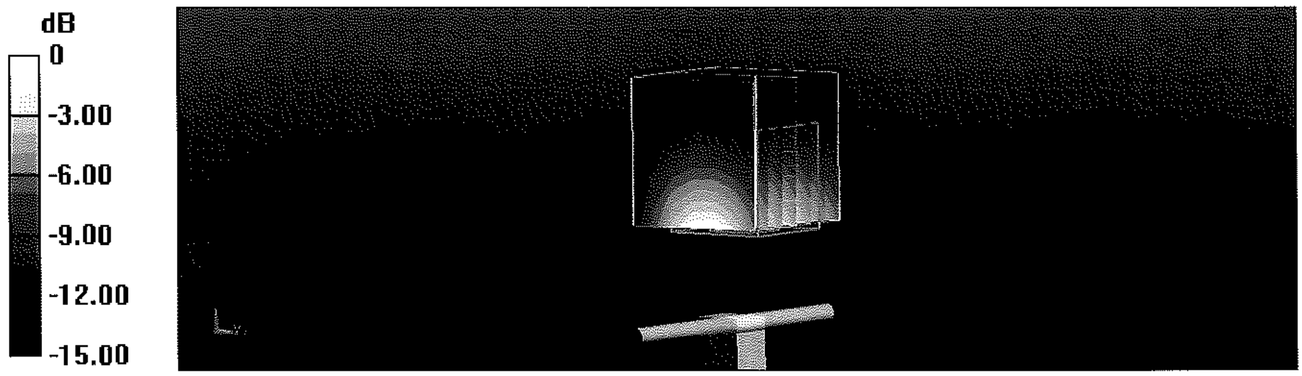
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.47 S/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

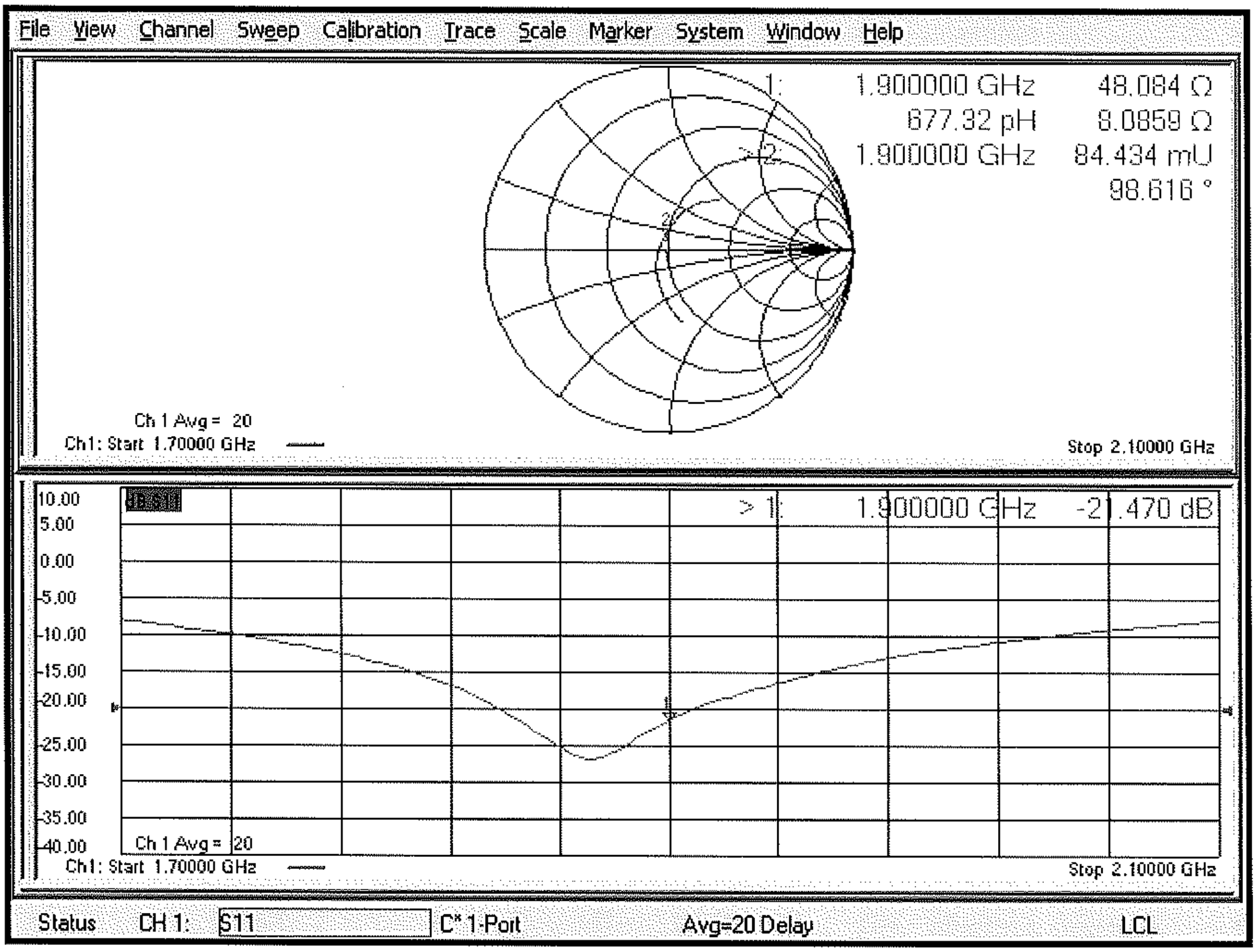
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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

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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: D2450V2-981_Aug18

CALIBRATION CERTIFICATE

Object	D2450V2 - SN:981
Calibration procedure(s)	QA CAL-05.v10 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 16, 2018

BN ✓
09-06/2018

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	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 Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	Leif Klysner
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 23, 2018

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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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

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	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.7 ± 6 %	1.86 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	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**52.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 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	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	2.02 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	13.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.2 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	55.0 Ω + 2.3 jΩ
Return Loss	- 25.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.2 Ω + 4.7 jΩ
Return Loss	- 26.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.162 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	December 30, 2014

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	13.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**54.0 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.2 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	13.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**54.0 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.3 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	12.9 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**51.2 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 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	8.74 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**34.7 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**17.5 W/kg ± 16.9 % (k=2)**

DASY5 Validation Report for Head TSL

Date: 13.08.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:981

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 37.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

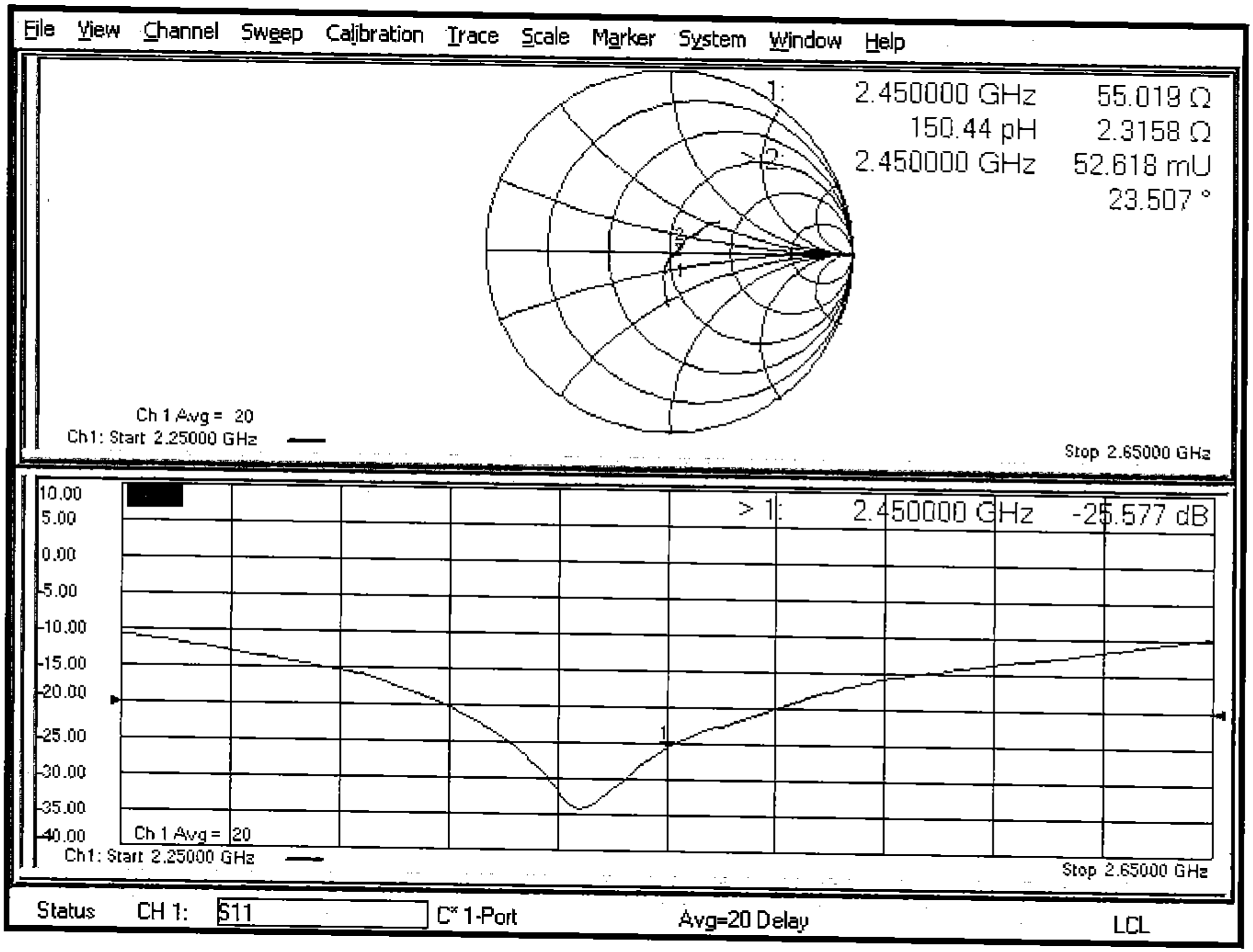
DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.88, 7.88, 7.88) @ 2450 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 = 116.6 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 26.7 W/kg
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.2 W/kg
Maximum value of SAR (measured) = 22.1 W/kg

0 dB = 22.1 W/kg = 13.44 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 13.08.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:981

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.02 S/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

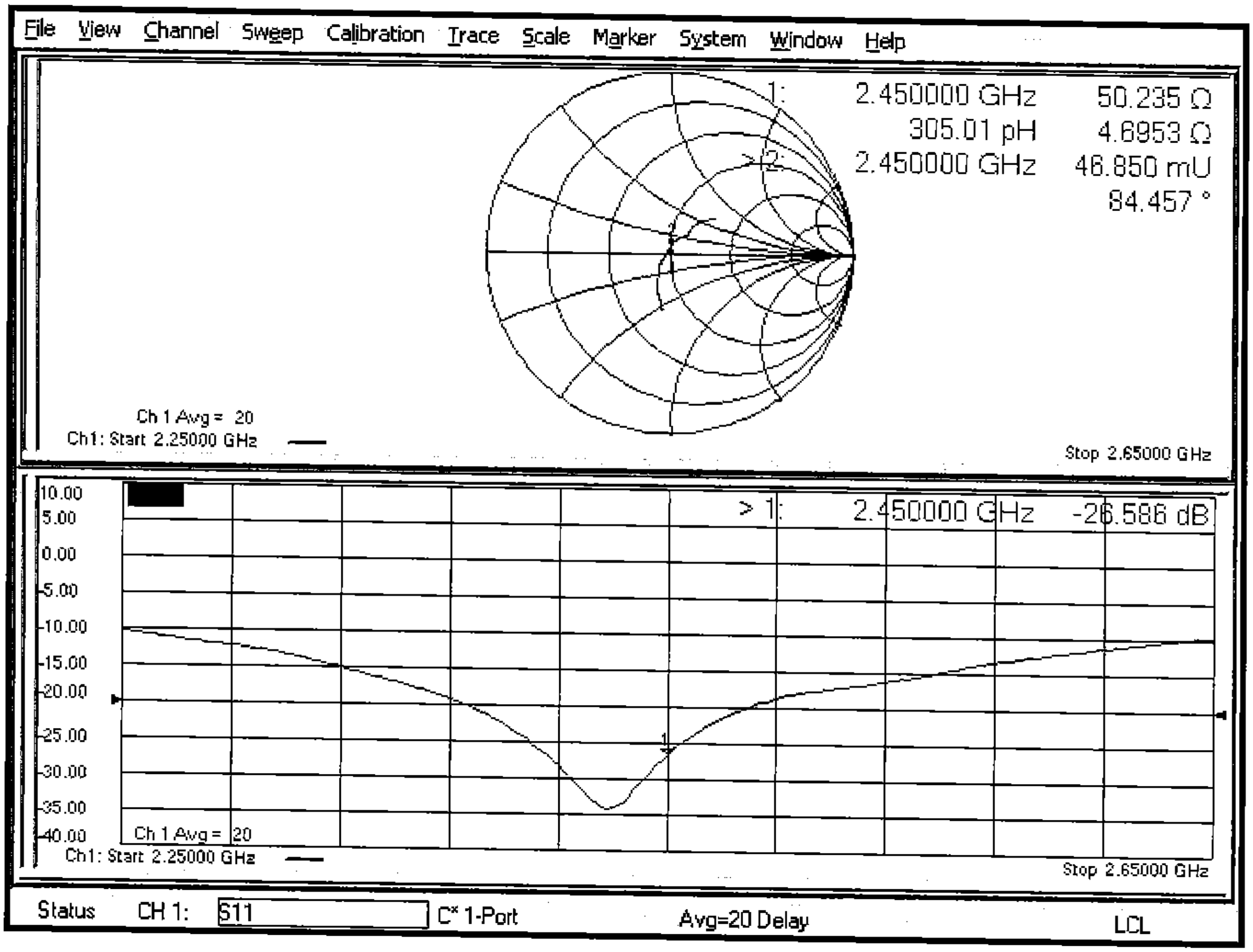
- Probe: EX3DV4 - SN7349; ConvF(8.01, 8.01, 8.01) @ 2450 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

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 = 107.0 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 25.3 W/kg
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.11 W/kg
Maximum value of SAR (measured) = 20.7 W/kg

0 dB = 20.7 W/kg = 13.16 dBW/kg

Impedance Measurement Plot for Body TSL



DASY5 Validation Report for SAM Head

Date: 16.08.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:981

Communication System: UID 0 - CW ; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; $\sigma = 1.85$ S/m; $\varepsilon_r = 40.2$; $\rho = 1000$ kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

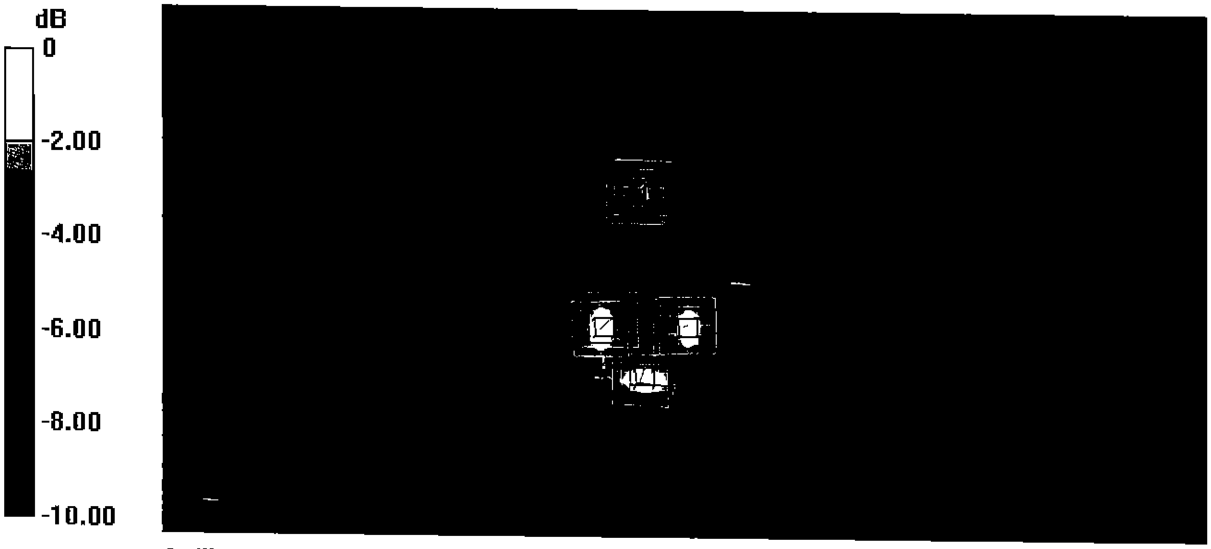
- Probe: EX3DV4 - SN7349; ConvF(7.88, 7.88, 7.88) @ 2450 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: SAM Head
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

SAM Head Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 116.2 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 26.4 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.33 W/kg
Maximum value of SAR (measured) = 22.0 W/kg

SAM Head Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 116.9 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.3 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.35 W/kg
Maximum value of SAR (measured) = 21.7 W/kg

SAM Head Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 112.0 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 24.1 W/kg
SAR(1 g) = 12.9 W/kg; SAR(10 g) = 6.11 W/kg
Maximum value of SAR (measured) = 20.5 W/kg

SAM Head Ear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.03 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 15.8 W/kg
SAR(1 g) = 8.74 W/kg; SAR(10 g) = 4.4 W/kg
Maximum value of SAR (measured) = 13.5 W/kg



0 dB = 22.0 W/kg = 13.42 dBW/kg

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Accreditation No.: SCS 0108

Client PC Test

Certificate No: D2600V2-1004_Apr18

CALIBRATION CERTIFICATE

Object	D2600V2 - SN:1004
Calibration procedure(s)	QA CAL-05.v10 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	April 11, 2018

BN✓
05-01-2018

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	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:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 12, 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	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	2.03 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.3 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**55.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.1 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	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.1 ± 6 %	2.19 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.8 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**54.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.20 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.7 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 - 5.7 jΩ
Return Loss	- 24.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.0 Ω - 3.8 jΩ
Return Loss	- 24.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.149 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	December 23, 2006

DASY5 Validation Report for Head TSL

Date: 11.04.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1004

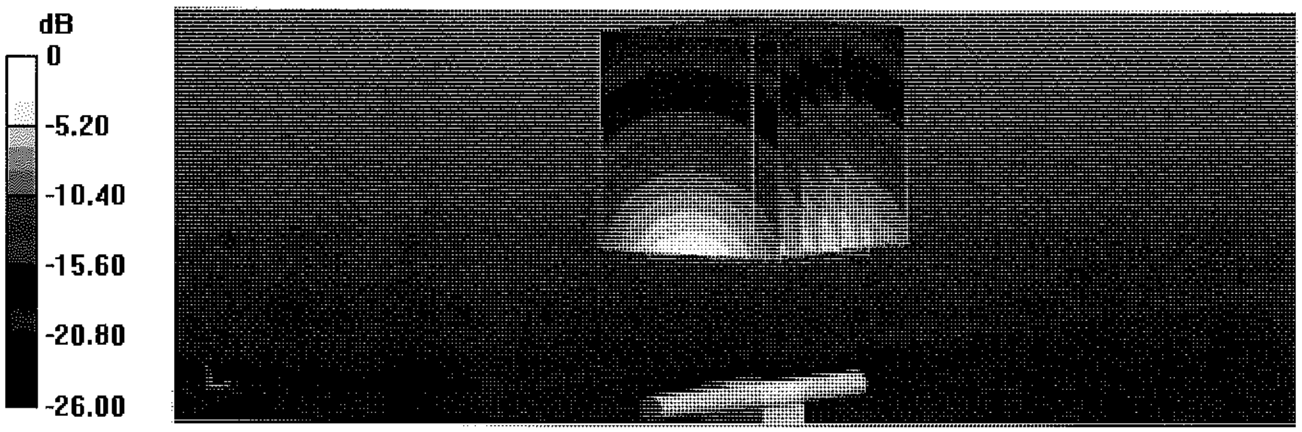
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.03 S/m; ε_r = 37.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.7, 7.7, 7.7); 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 52.10.0(1446); SEMCAD X 14.6.10(7417)

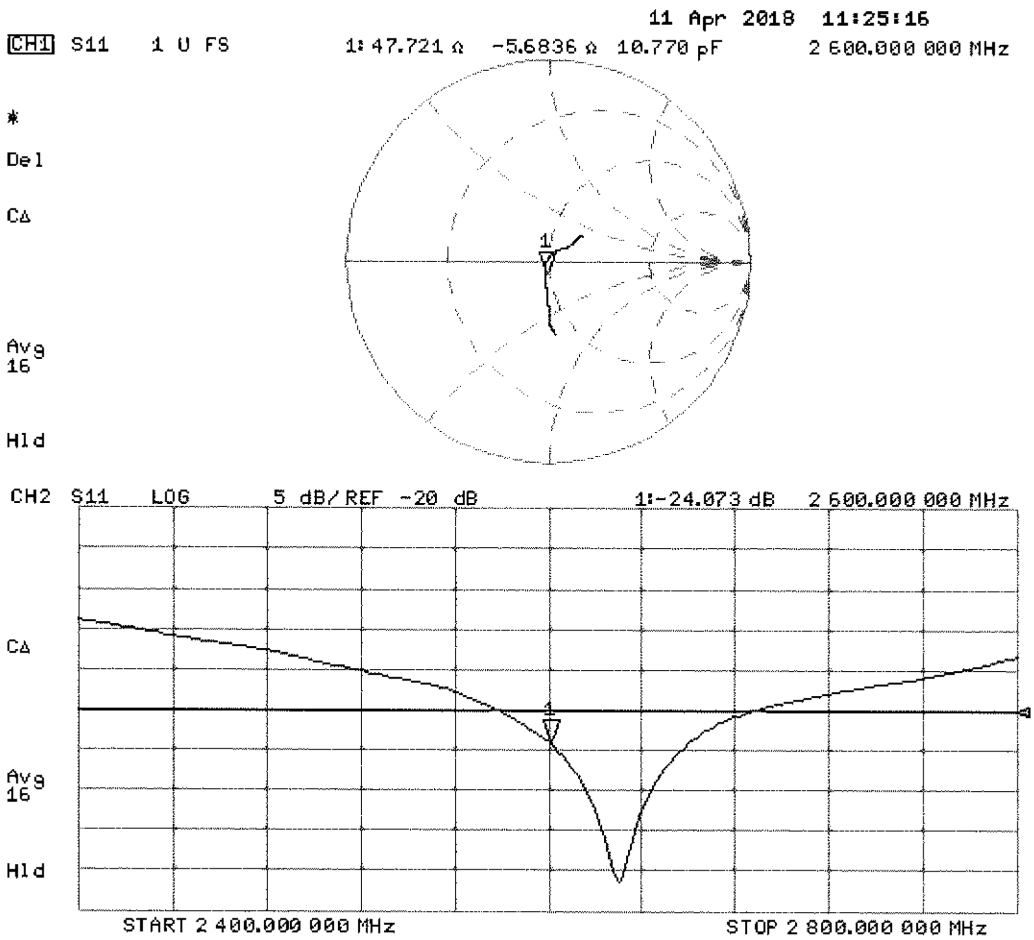
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 118.5 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 28.6 W/kg
SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.35 W/kg
Maximum value of SAR (measured) = 23.9 W/kg



0 dB = 23.9 W/kg = 13.78 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 11.04.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1004

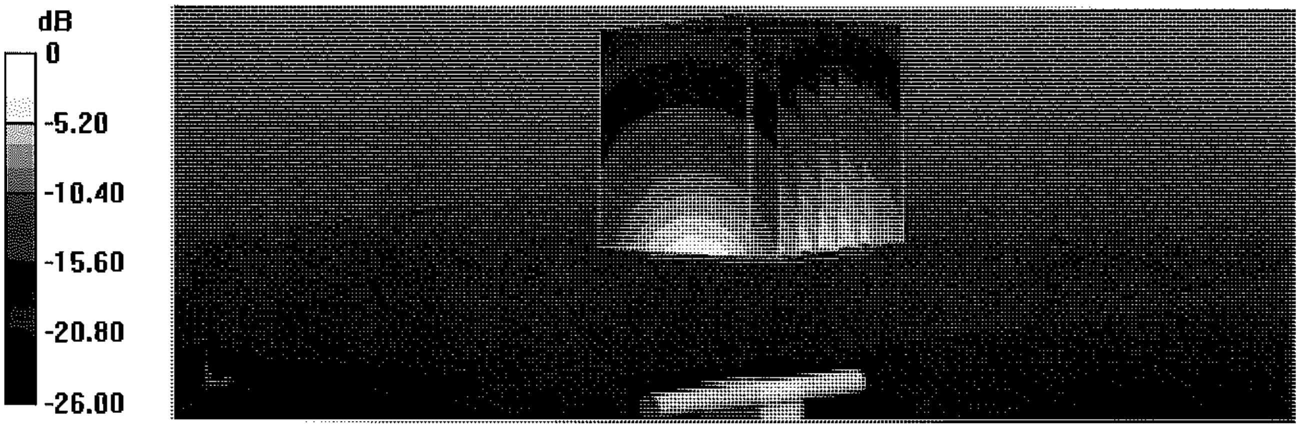
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.19 S/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.81, 7.81, 7.81); 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)

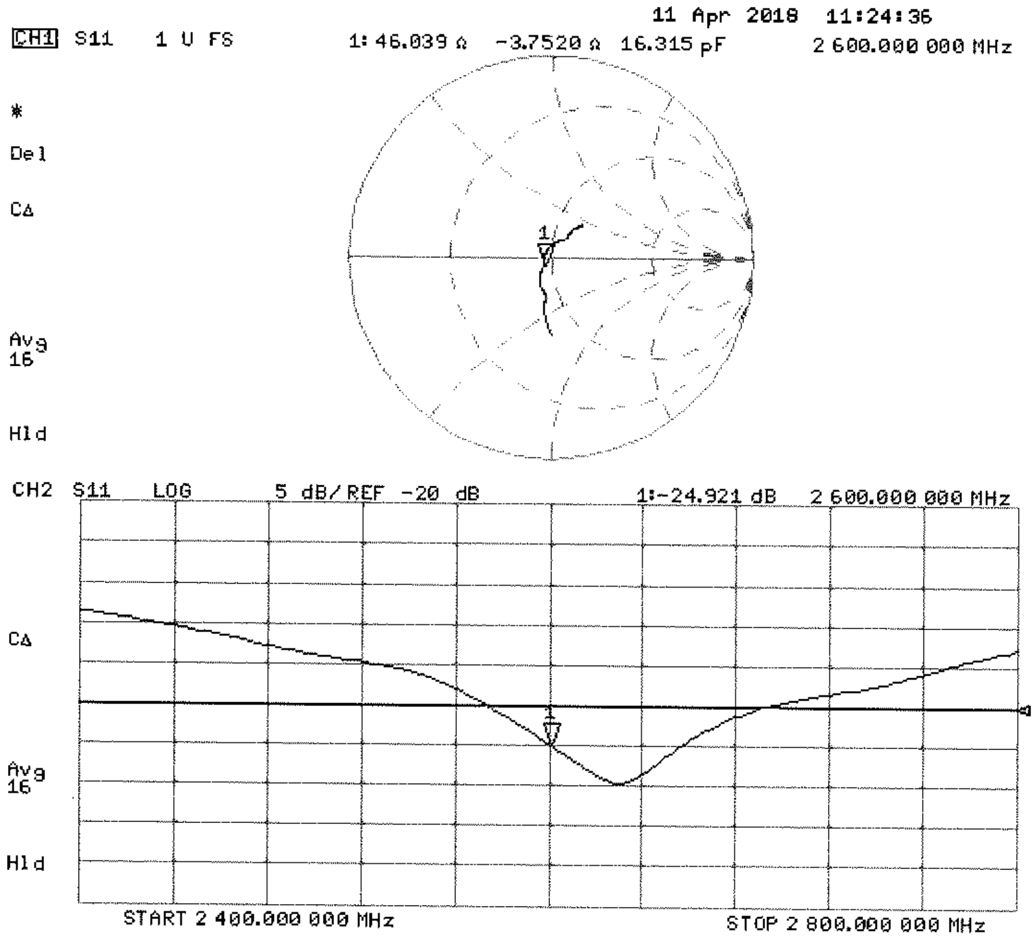
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 108.5 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 28.3 W/kg
SAR(1 g) = 13.8 W/kg; SAR(10 g) = 6.2 W/kg
Maximum value of SAR (measured) = 22.9 W/kg



0 dB = 22.9 W/kg = 13.60 dBW/kg

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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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
Calibration procedure(s)	QA CAL-22.v2 Calibration procedure for dipole validation kits between 3-6 GHz
Calibration date:	September 21, 2016

BNV 09-28-2016

Extended PM √ 9/20/2018

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	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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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

((

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; σ = 4.59 S/m; ε_r = 34.5; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 4.93 S/m; ε_r = 34; ρ = 1000 kg/m^3 , Medium parameters used: f = 5750 MHz; σ = 5.08 S/m; ε_r = 33.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

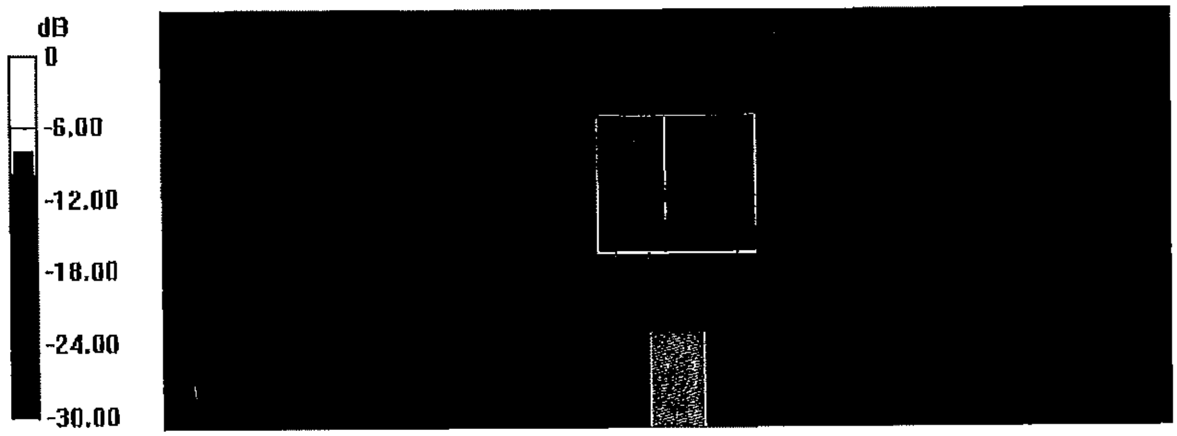
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.42, 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

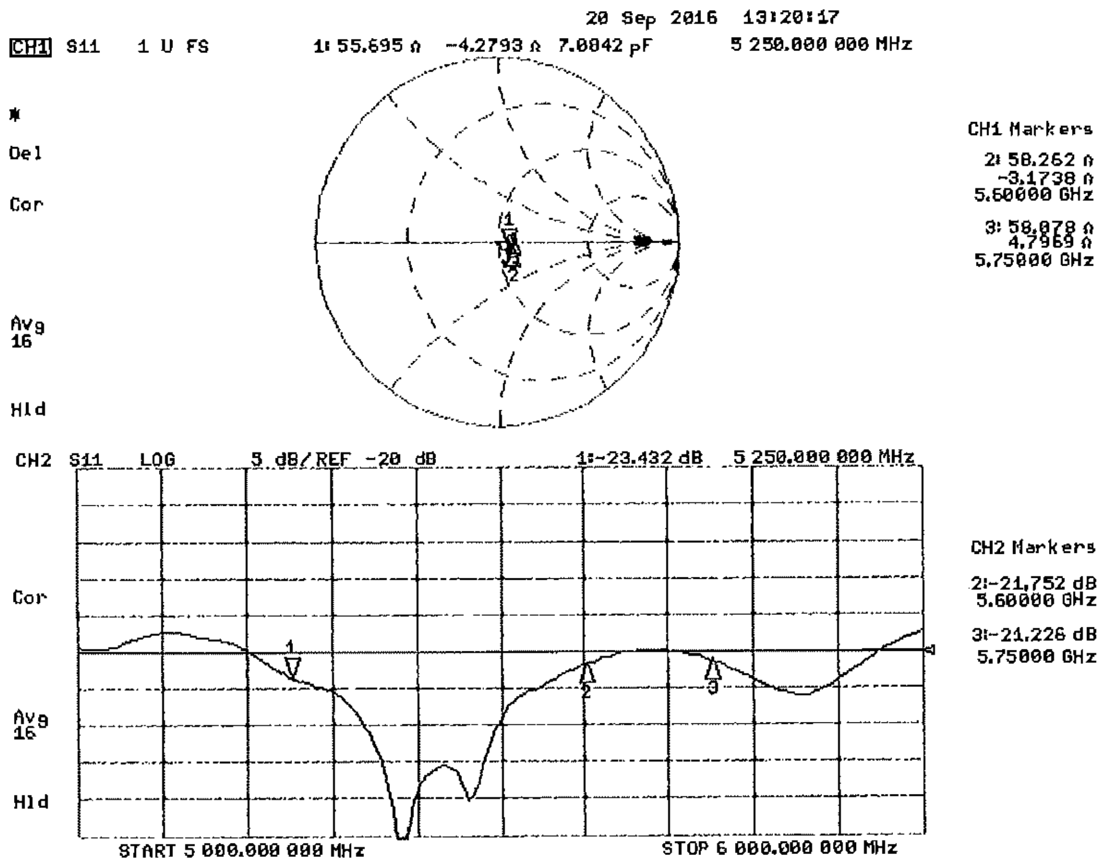
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 69.34 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 32.9 W/kg
SAR(1 g) = 8.45 W/kg; SAR(10 g) = 2.41 W/kg
Maximum value of SAR (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



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)

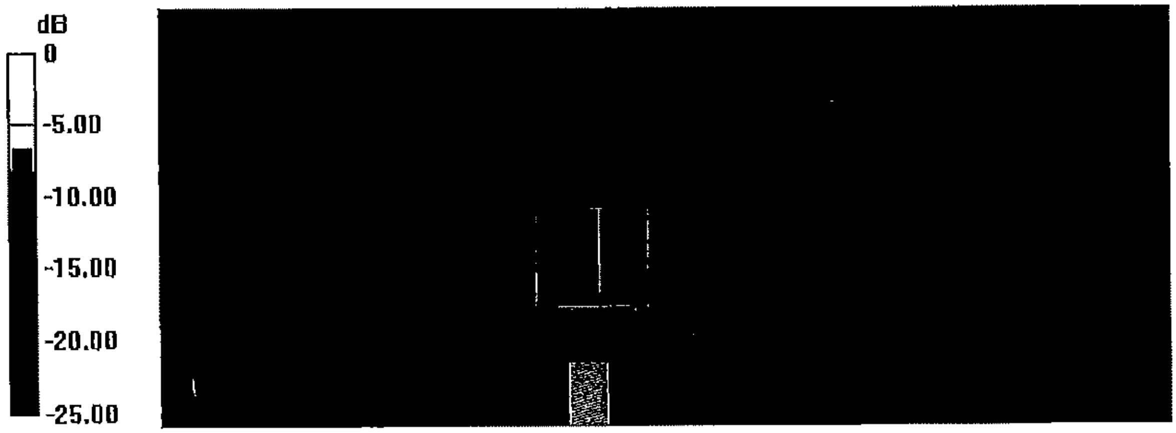
DASY52 Configuration:

- 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

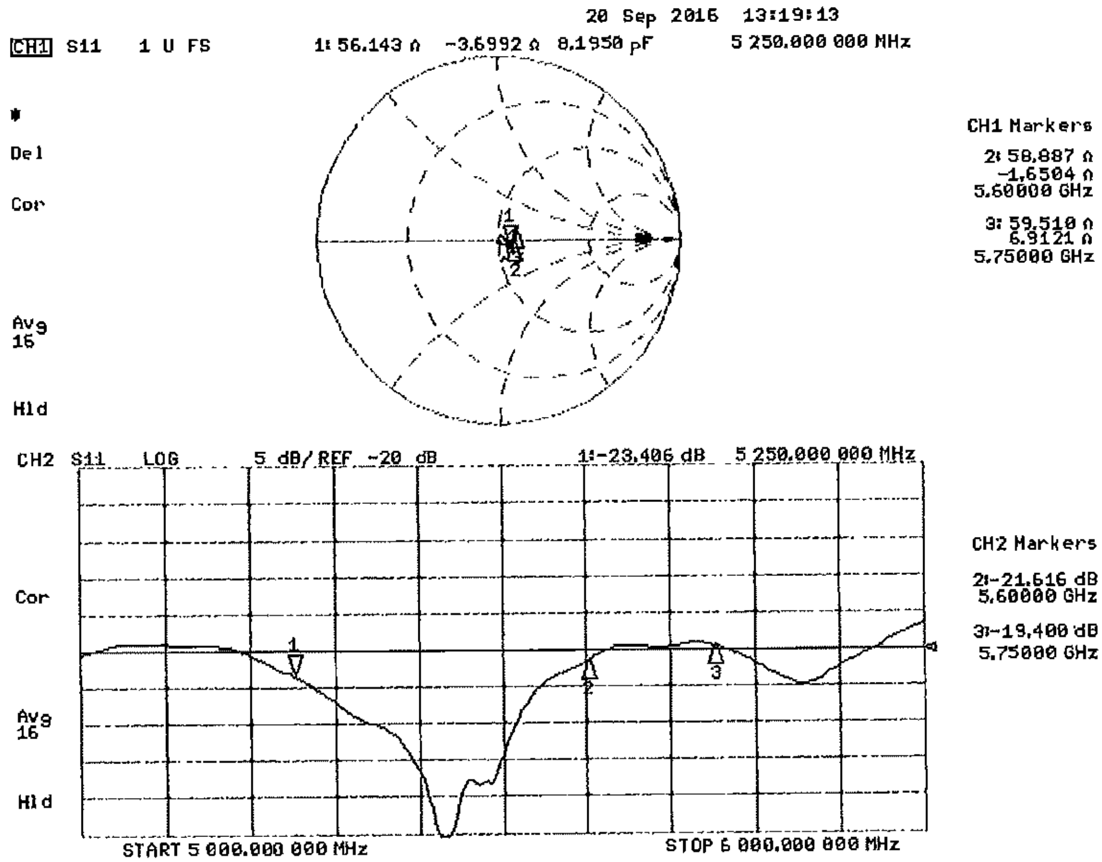
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.85 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 32.5 W/kg
SAR(1 g) = 7.96 W/kg; SAR(10 g) = 2.24 W/kg
Maximum value of SAR (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



PCTEST ENGINEERING LABORATORY, INC.
7185 Oakland Mills Road, Columbia, MD 21046 USA
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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:

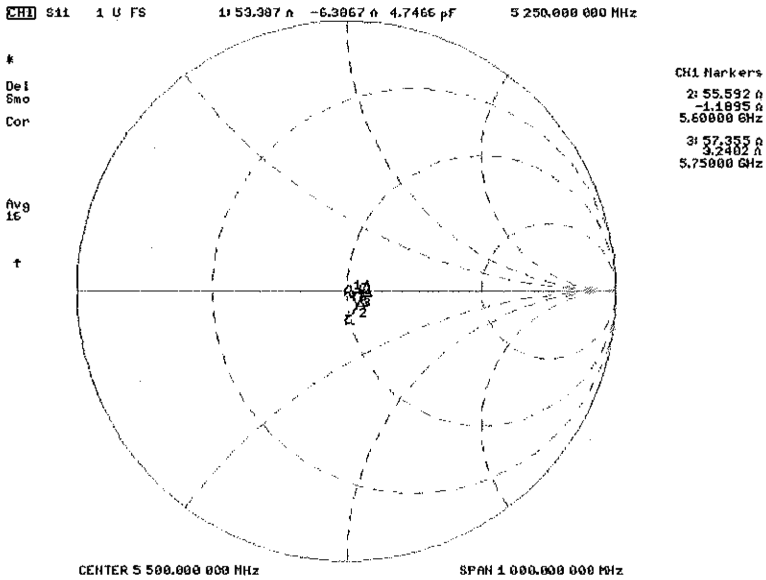
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

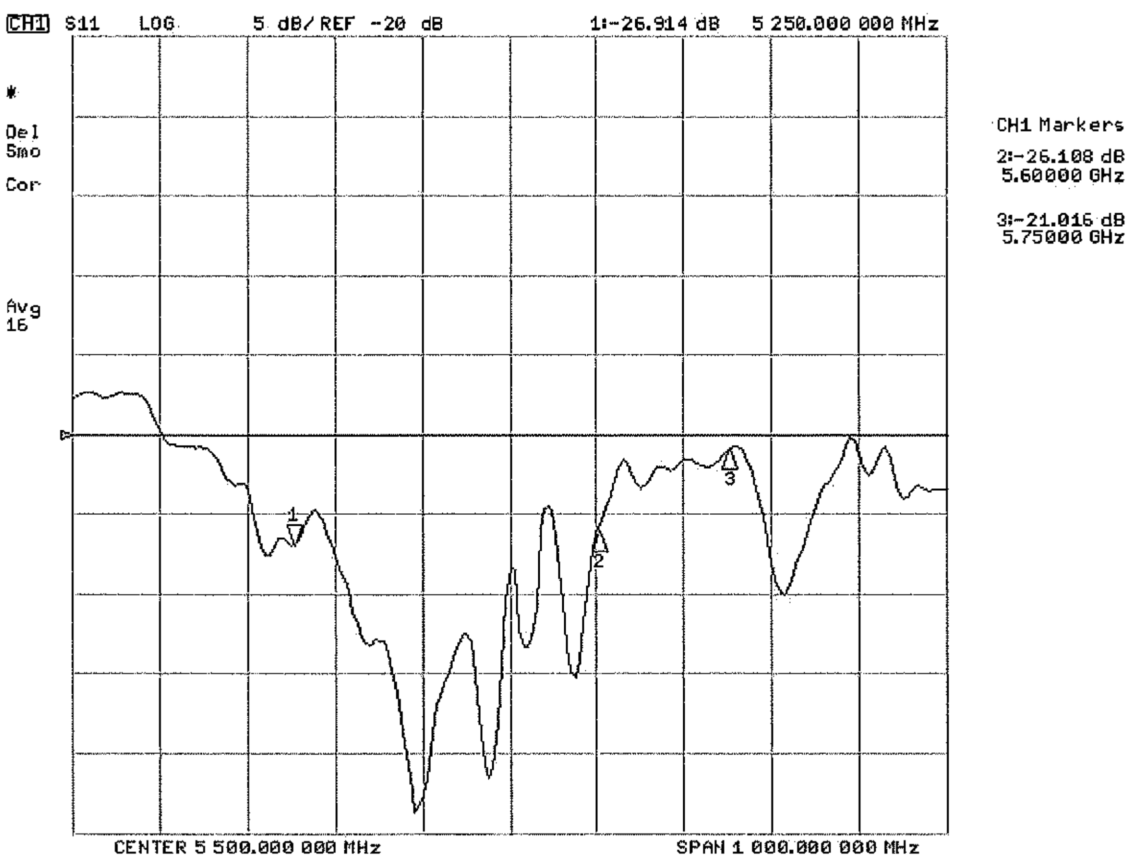
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

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

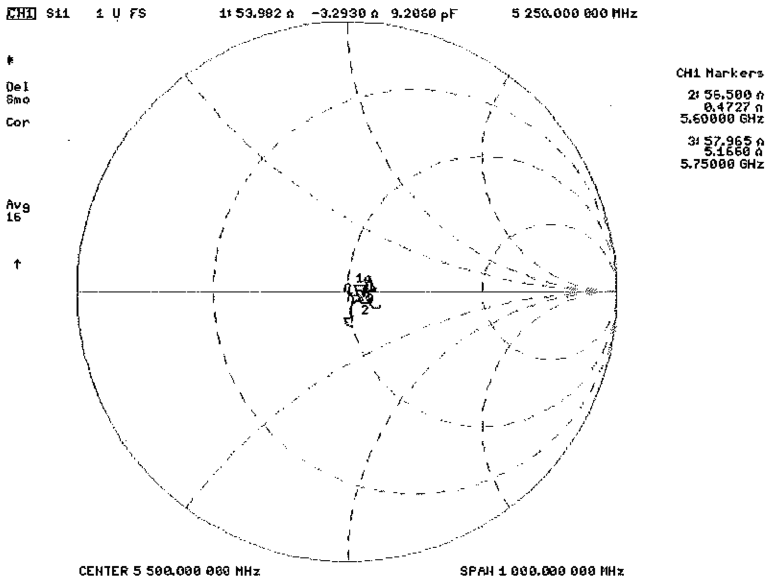
Frequency (MHz)	Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 17.0 dBm	Measured Body SAR (1g) W/kg @ 17.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 17.0 dBm	Measured Body SAR (10g) W/kg @ 17.0 dBm	Deviation 10g (%)	Certificate 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

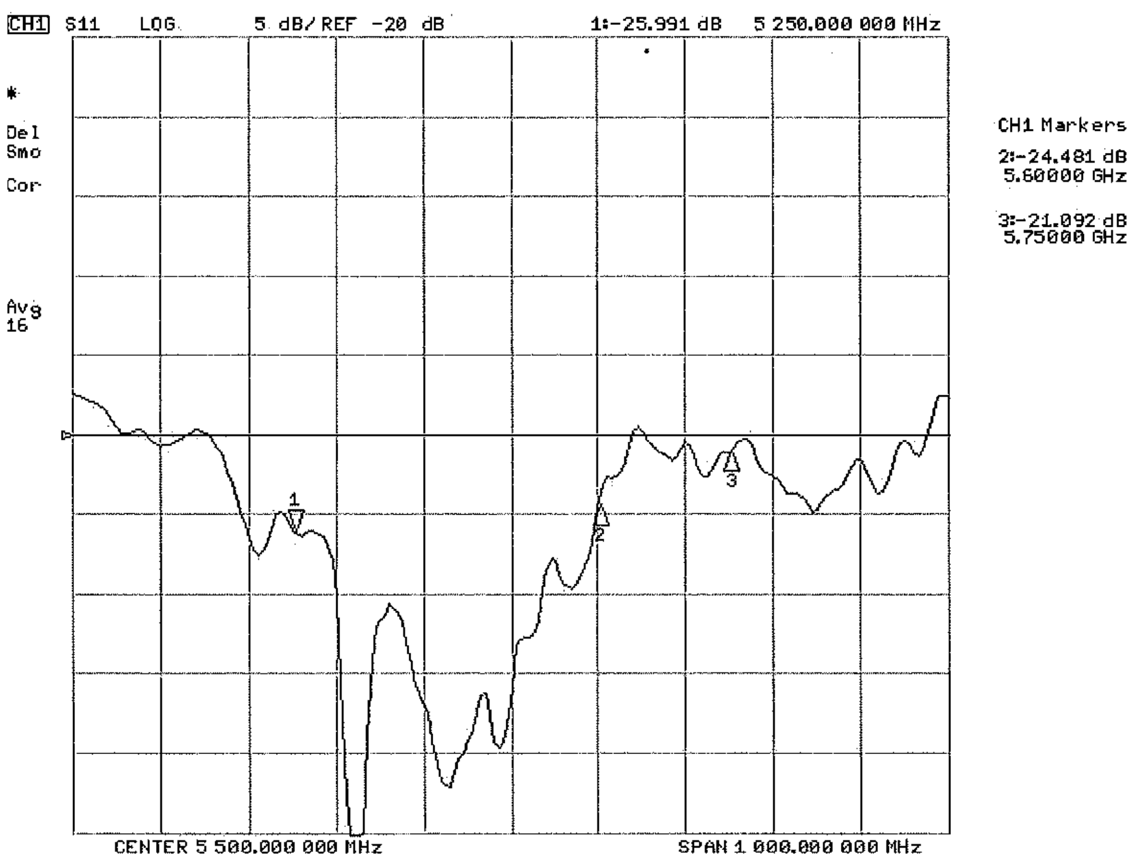
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





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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

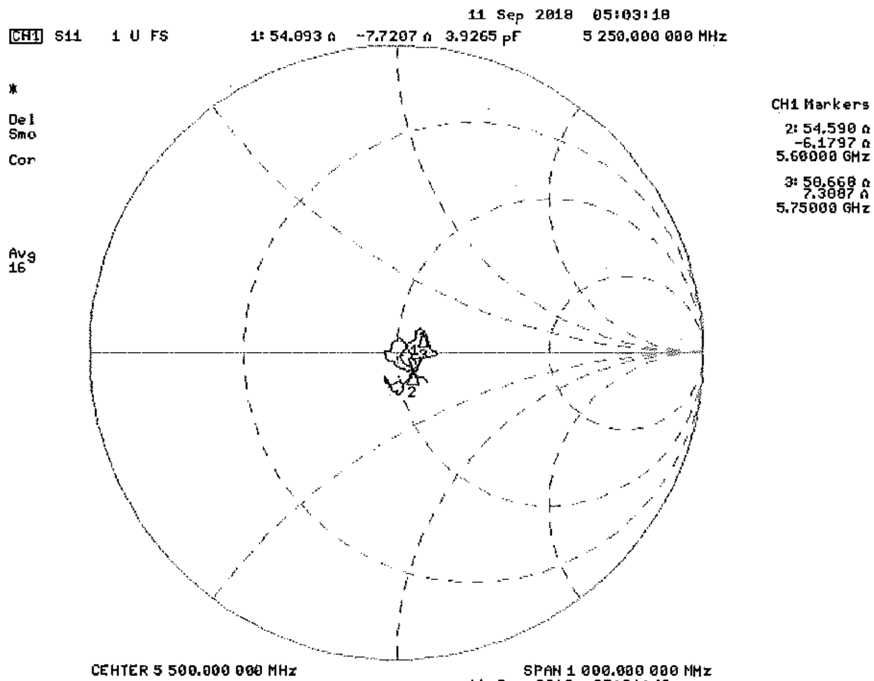
Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

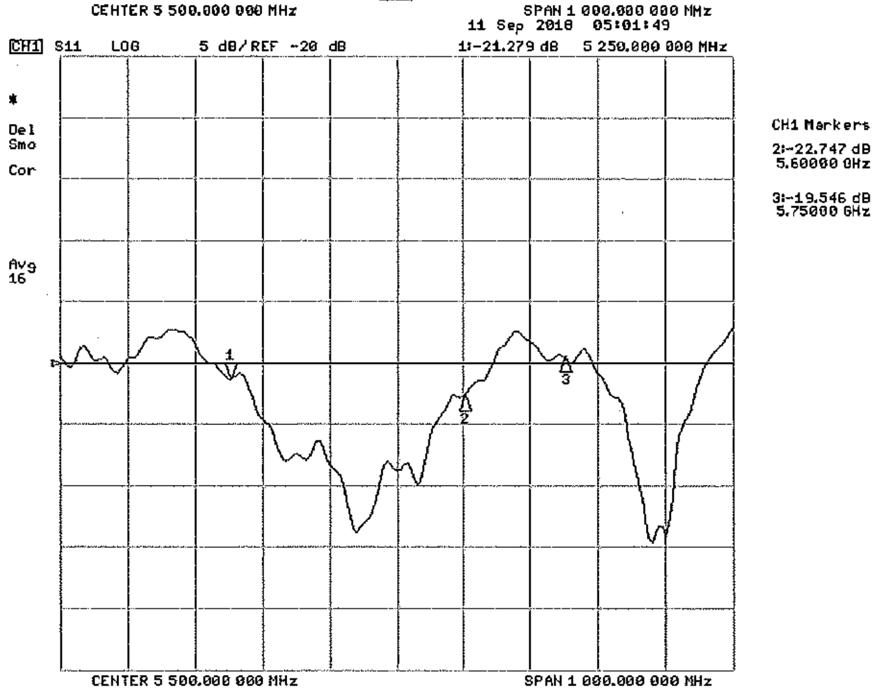
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does 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

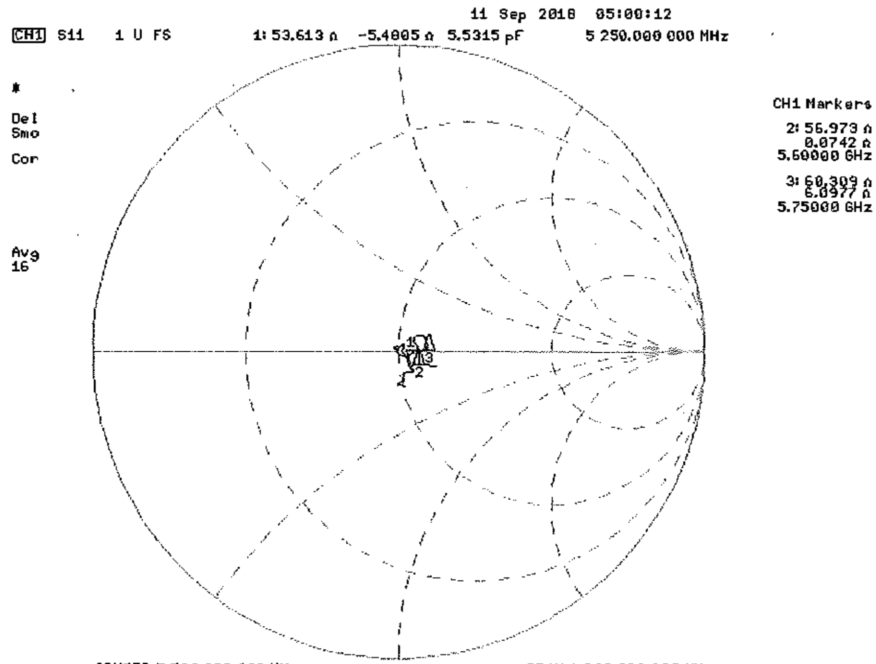
Impedance & Return-Loss Measurement Plot for Head TSL

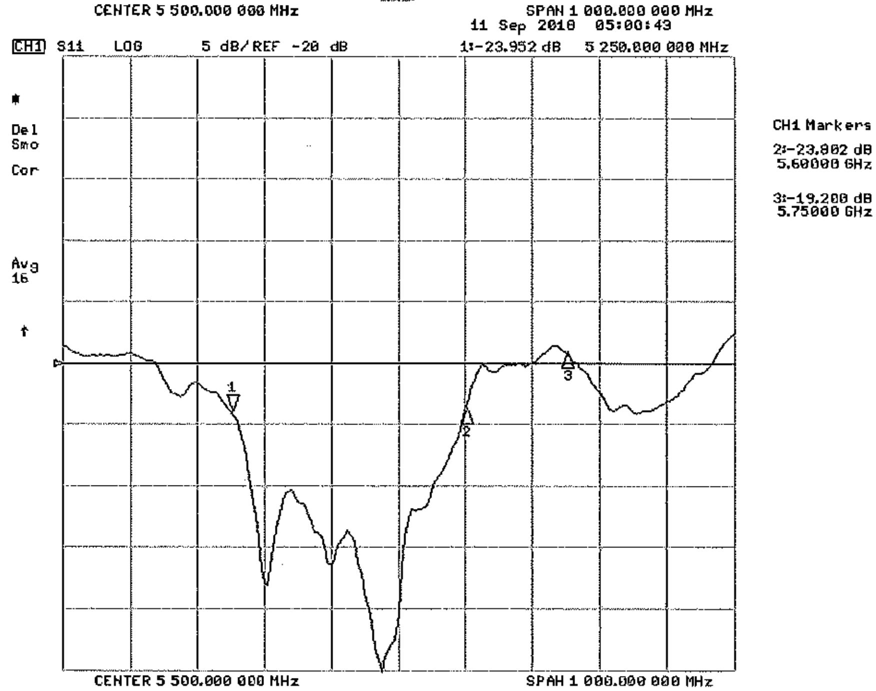




Object:	Date Issued:	Page 3 of 4
D5GHzV2 – SN: 1191	09/11/2018	

Impedance & Return-Loss Measurement Plot for Body TSL





Object:	Date Issued:	Page 4 of 4
D5GHzV2 – SN: 1191	09/11/2018	

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: **D750V3-1054_Mar17**

CALIBRATION CERTIFICATE

Object	D750V3 - SN:1054
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	March 07, 2017

BN✓
03-27-2017

BN✓
04-04-2018

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	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: 7349	31-Dec-16 (No. EX3-7349_Dec16)	Dec-17
DAE4	SN: 601	04-Jan-17 (No. DAE4-601_Jan17)	Jan-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-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Johannes Kurikka	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 14, 2017

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.9 ± 6 %	0.91 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	2.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.37 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.60 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	55.5	0.96 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	2.21 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.61 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.45 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.68 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	54.7 Ω - 0.7 jΩ
Return Loss	- 26.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.7 Ω - 3.6 jΩ
Return Loss	- 28.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.033 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 08, 2011

DASY5 Validation Report for Head TSL

Date: 07.03.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1054

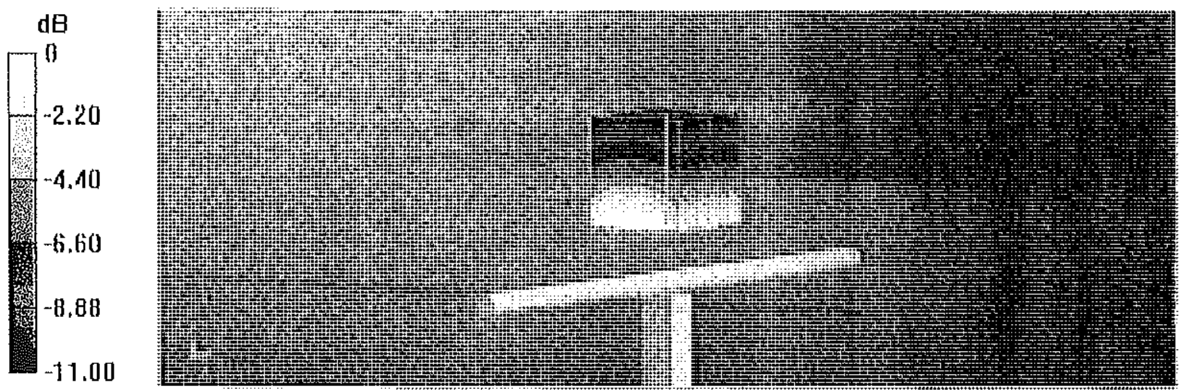
Communication System: UID 0 - CW ; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.91 S/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.17, 10.17, 10.17); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

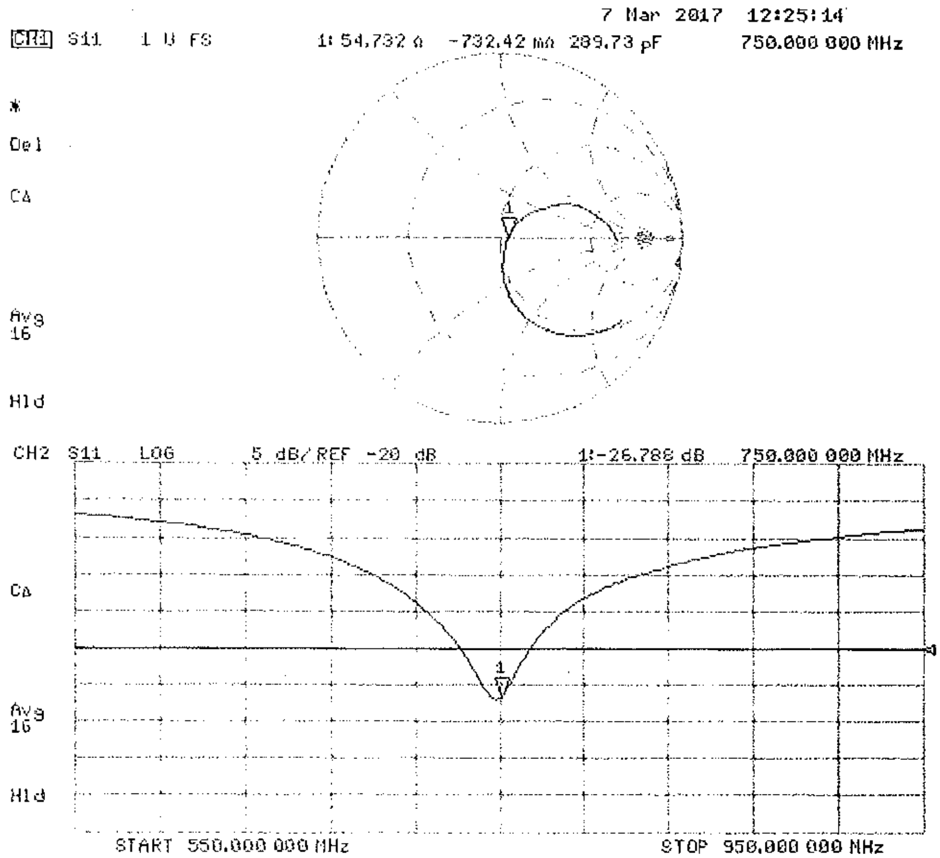
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.71 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.21 W/kg
SAR(1 g) = 2.14 W/kg; SAR(10 g) = 1.4 W/kg
Maximum value of SAR (measured) = 2.85 W/kg



0 dB = 2.85 W/kg = 4.55 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.03.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1054

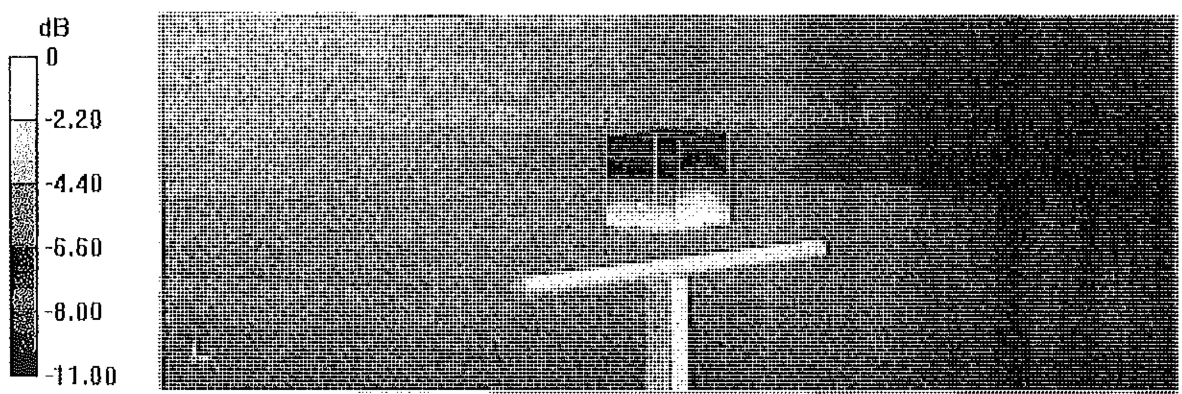
Communication System: UID 0 - CW ; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.99 S/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.99, 9.99, 9.99); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

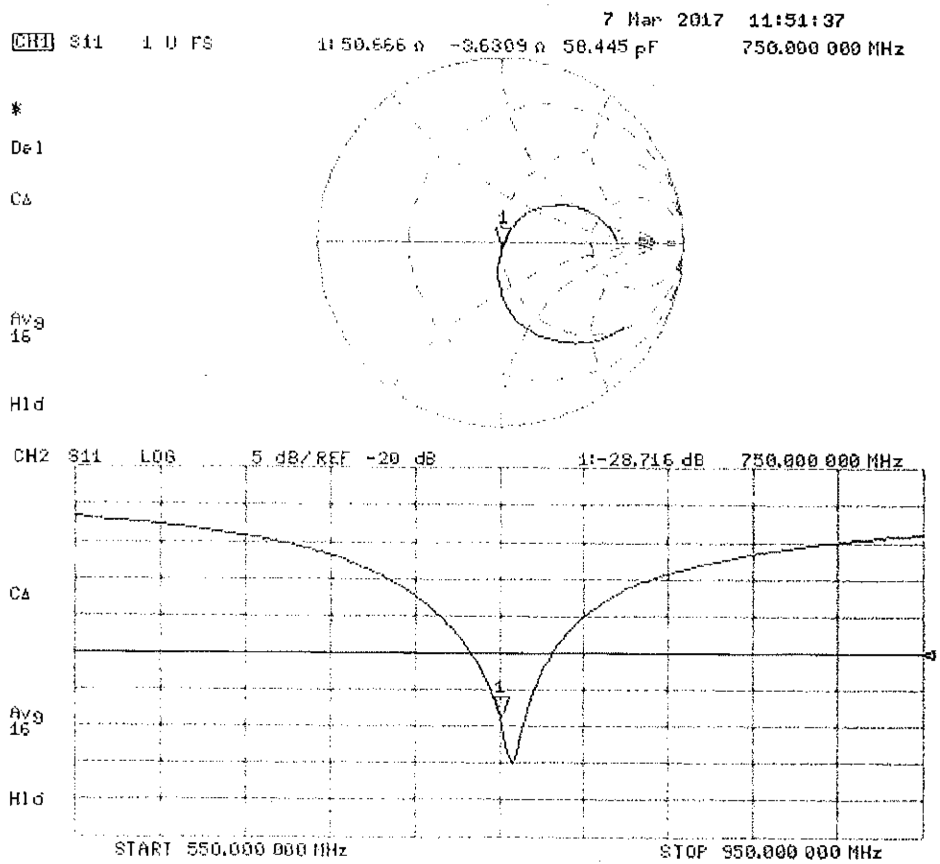
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.88 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.31 W/kg
SAR(1 g) = 2.21 W/kg; SAR(10 g) = 1.45 W/kg
Maximum value of SAR (measured) = 2.94 W/kg



0 dB = 2.94 W/kg = 4.68 dBW/kg

Impedance Measurement Plot for Body TSL



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http://www.pctest.com

ilac-MRA ACCREDITED

Certification of Calibration

Object	D750V3 – SN:1054
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	March 07, 2018
Description:	SAR Validation Dipole at 750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	8/3/2017	Annual	8/3/2018	MY40000670
Agilent	N5182A	MXG Vector Signal Generator	1/24/2018	Annual	1/24/2019	MY47420651
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	10/16/2017	Annual	10/16/2018	1126066
Anritsu	ML2495A	Power Meter	10/22/2017	Annual	10/22/2018	1328004
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/1/2017	Annual	6/1/2018	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	1/22/2018	Annual	1/22/2019	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/13/2017	Annual	7/13/2018	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/21/2017	Annual	6/21/2018	1333
SPEAG	EX3DV4	SAR Probe	7/17/2017	Annual	7/17/2018	7410
SPEAG	ES3DV3	SAR Probe	9/18/2017	Annual	9/18/2018	3287

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:

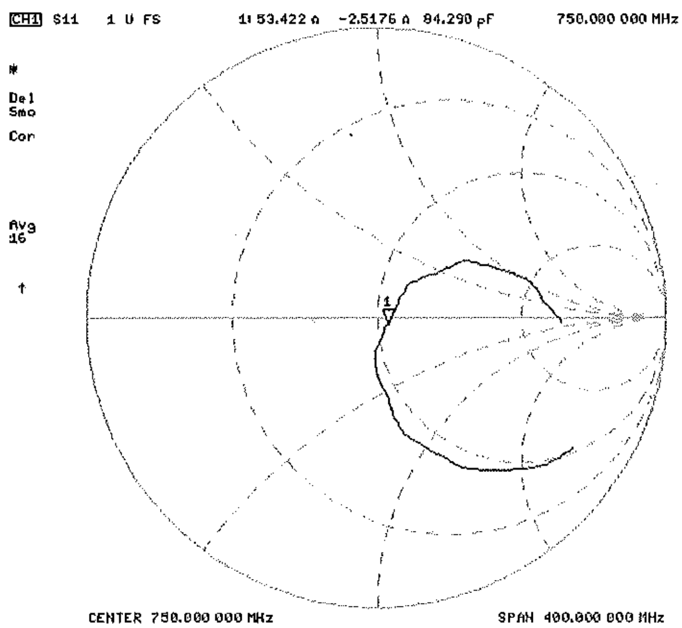
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

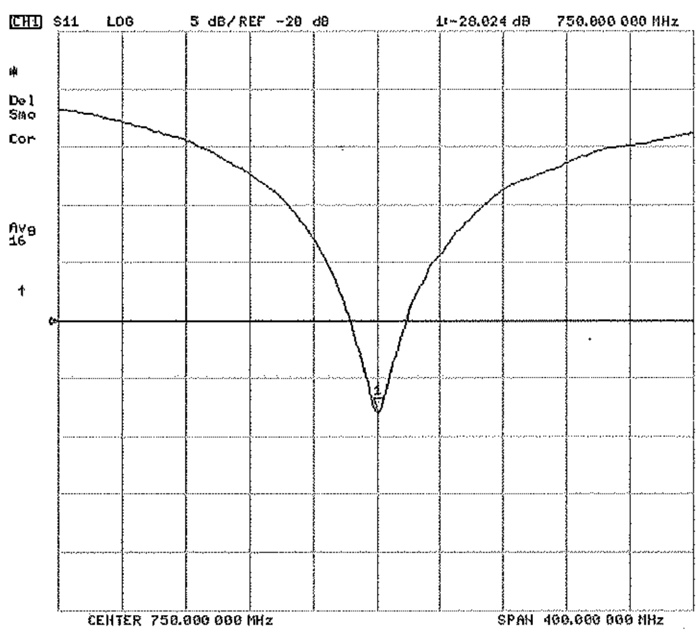
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 23.0 dBm	Measured Head SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 23.0 dBm	Measured Head SAR (10g) W/kg @ 23.0 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
3/7/2017	3/7/2018	1.033	1.67	1.70	1.85%	1.10	1.11	0.91%	54.7	53.4	1.3	-0.7	-2.5	1.8	-26.8	-28.0	-4.50%	PASS

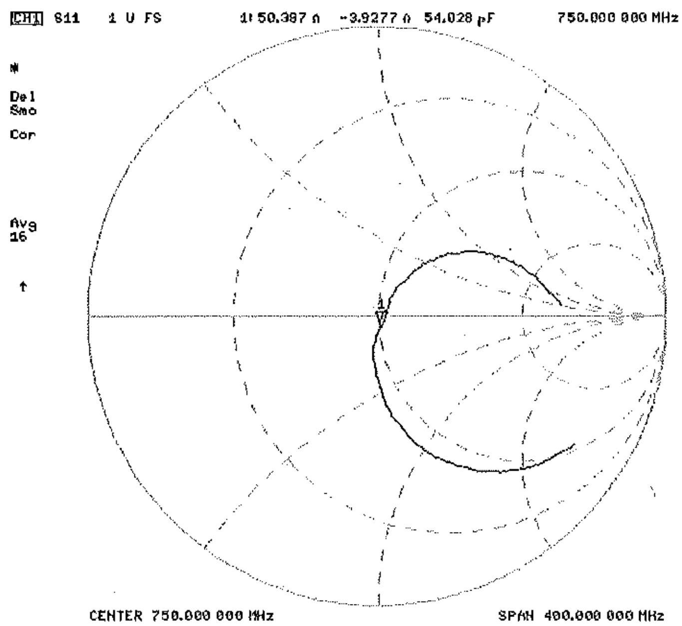
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	Measured Body SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance 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
3/7/2017	3/7/2018	1.033	1.72	1.70	-1.38%	1.14	1.12	-1.41%	50.7	50.4	0.3	-3.6	-3.9	0.3	-28.7	-28.5	0.60%	PASS

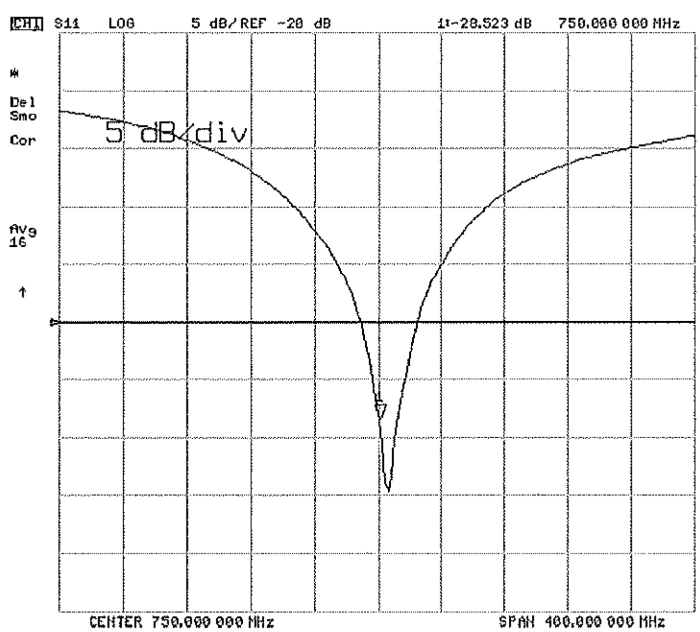
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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C **Service suisse d'étalonnage**
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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: D835V2-4d133_Oct18

CALIBRATION CERTIFICATE

Object: D835V2 - SN:4d133

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

BN ✓
10/30/2018

Calibration date: October 19, 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:	Manu Seitz	Laboratory Technician	
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	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 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	40.6 ± 6 %	0.91 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	2.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.43 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.10 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	54.9 ± 6 %	0.98 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	**9.75 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	**6.40 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	50.6 Ω - 2.4 jΩ
Return Loss	- 32.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.0 Ω - 6.7 jΩ
Return Loss	- 21.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.397 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	July 22, 2011

DASY5 Validation Report for Head TSL

Date: 19.10.2018

Test Laboratory: The name of your organization

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d133

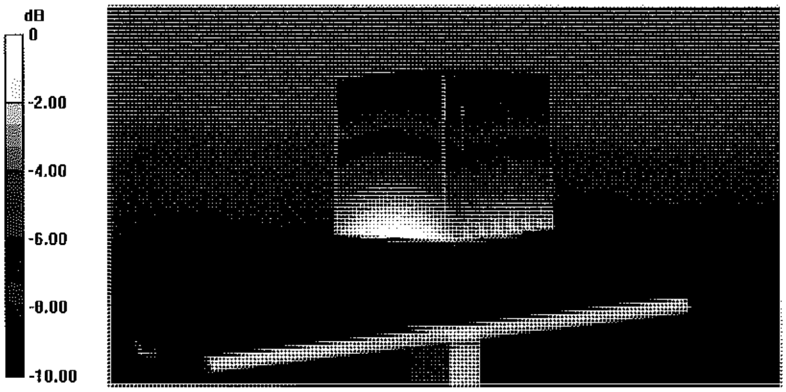
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.91 S/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.9, 9.9, 9.9) @ 835 MHz; Calibrated: 30.12.2017
- 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)

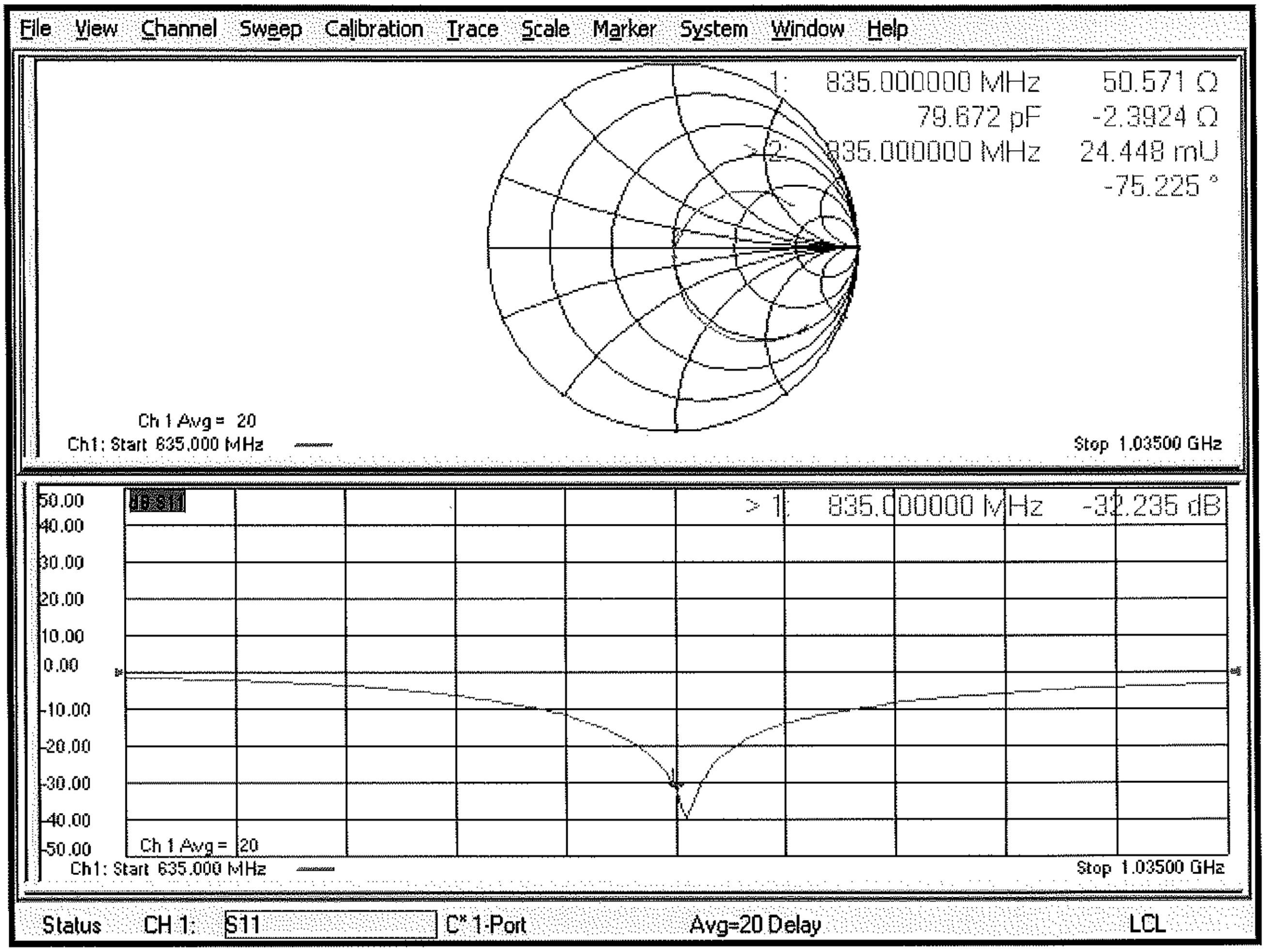
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 63.02 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.68 W/kg
SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.54 W/kg
Maximum value of SAR (measured) = 3.24 W/kg



0 dB = 3.24 W/kg = 5.11 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 19.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d133

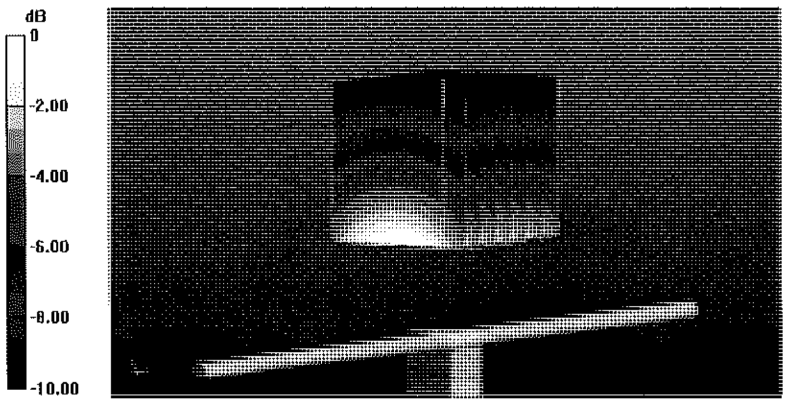
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.98 S/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.05, 10.05, 10.05) @ 835 MHz; Calibrated: 30.12.2017
- 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)

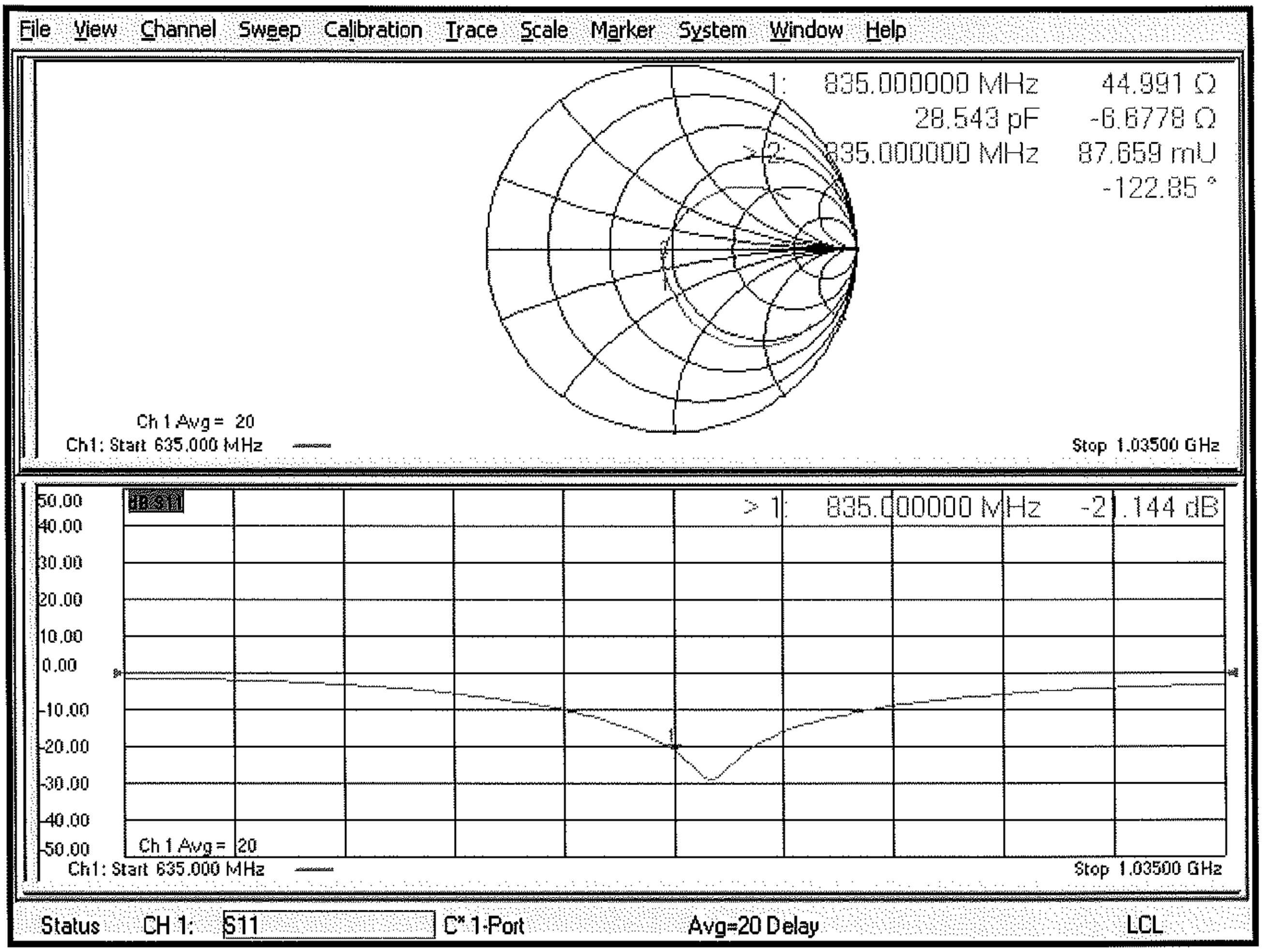
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.61 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.69 W/kg
SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.61 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 Body TSL



Calibration Laboratory of
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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
Calibration date:	October 22, 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:	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

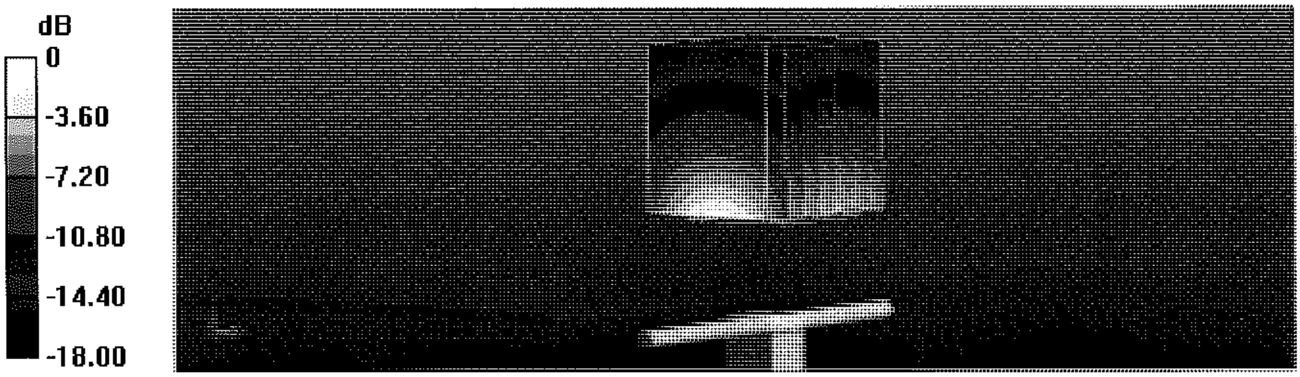
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.33 S/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.5, 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)

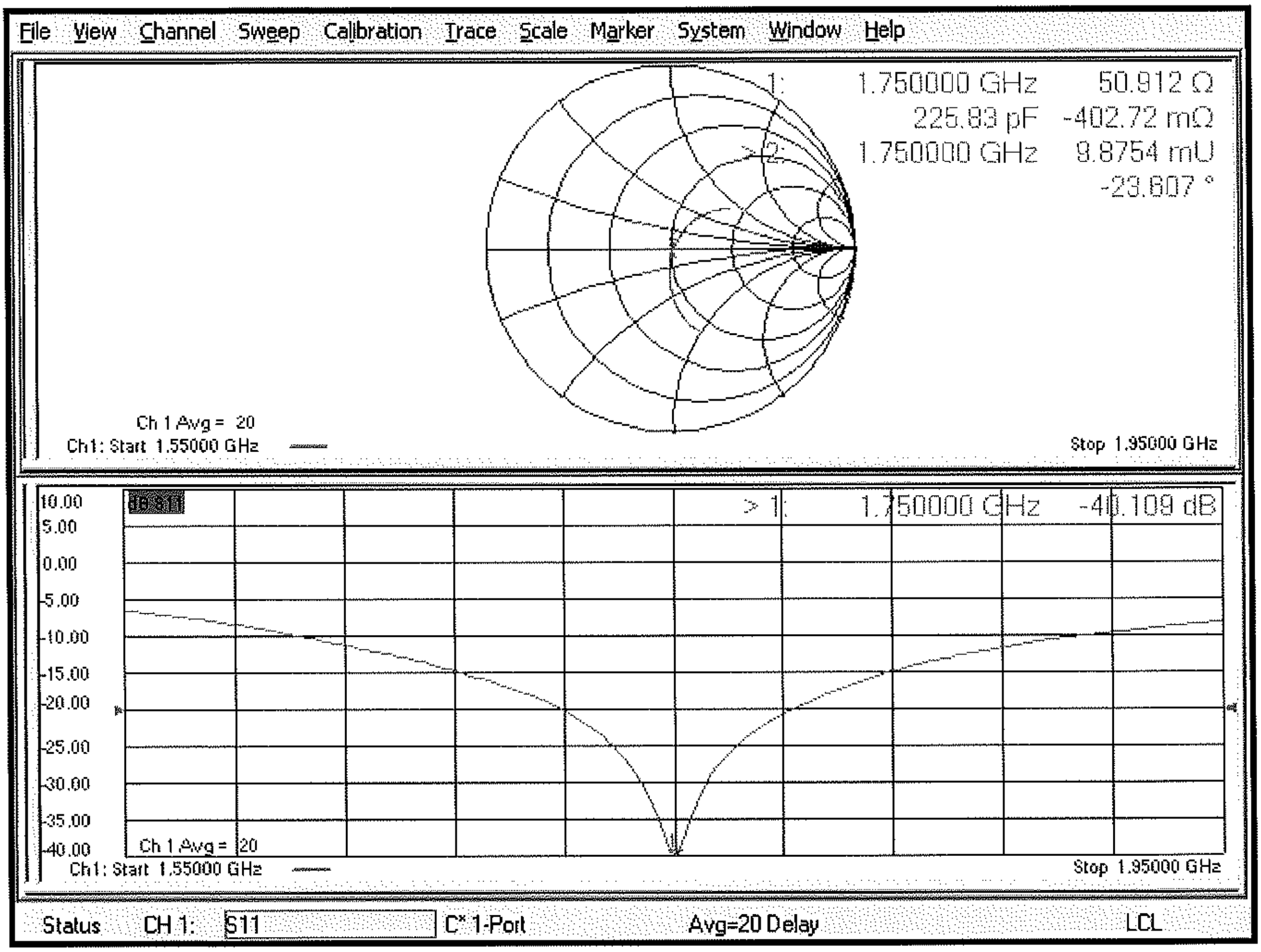
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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

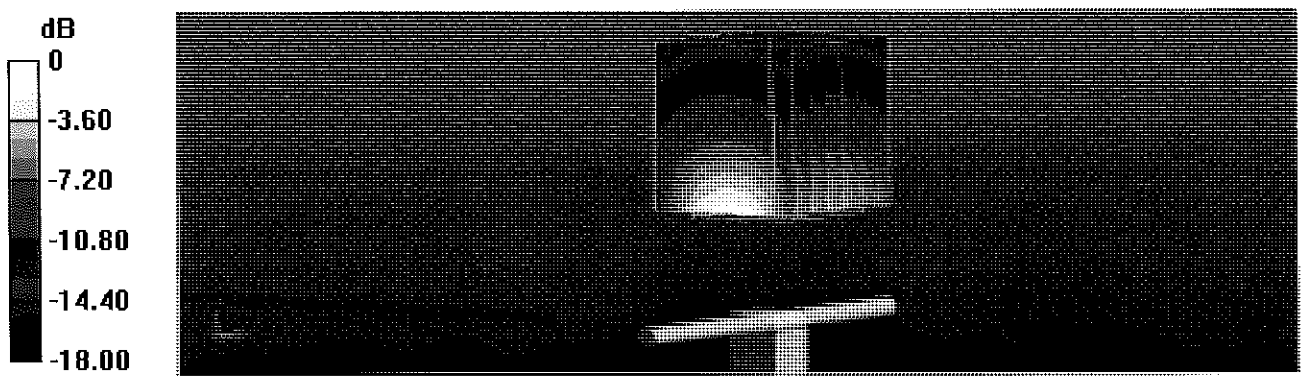
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.46 S/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

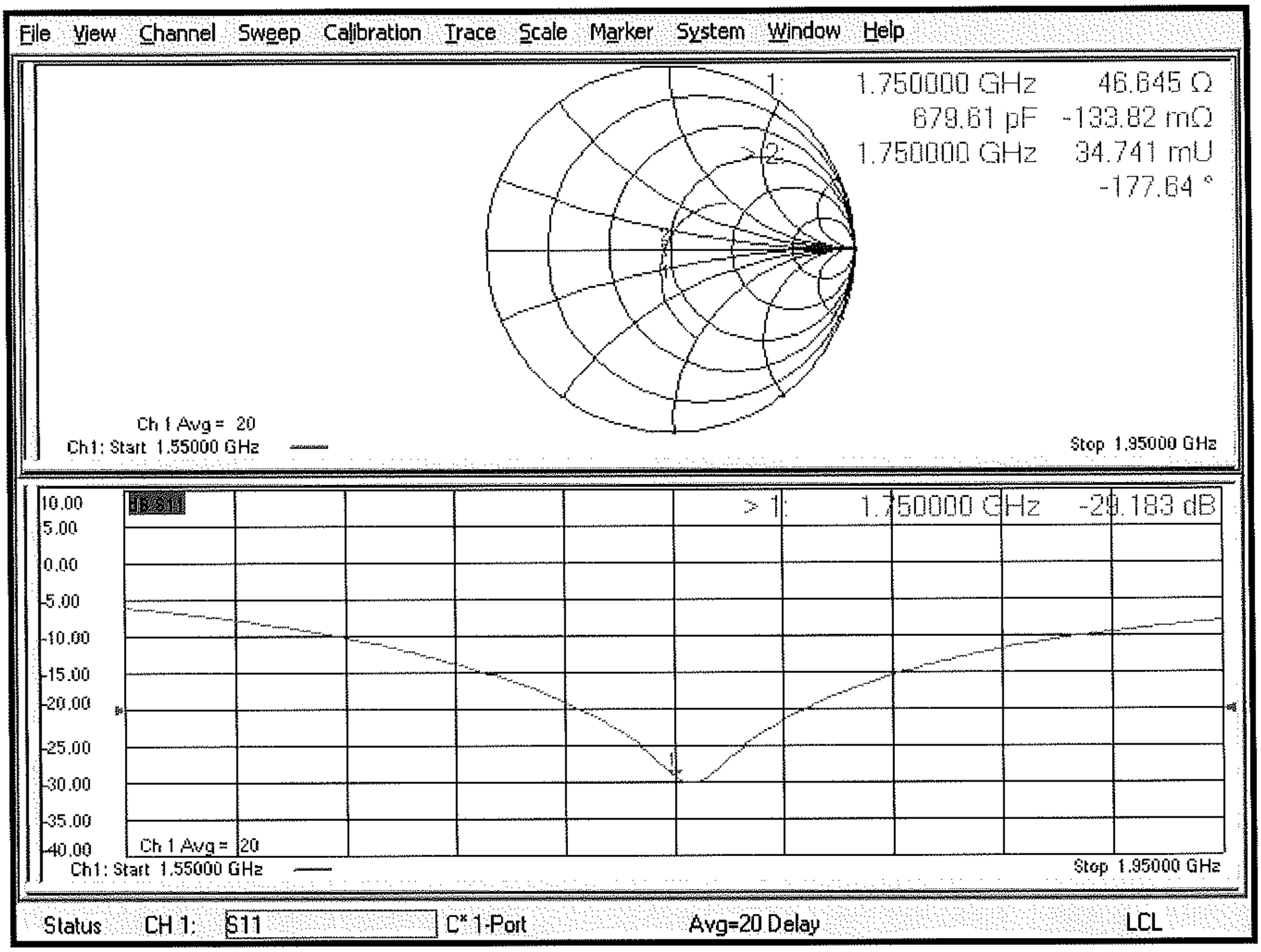
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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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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: D1900V2-5d148_Feb18

CALIBRATION CERTIFICATE

Object	D1900V2 - SN:5d148
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	February 07, 2018

BN
03-02-2018

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-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: 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:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 7, 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	V52.10.0
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	40.7 ± 6 %	1.39 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	9.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.22 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**21.0 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	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.2 ± 6 %	1.48 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	9.68 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**39.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.9 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	52.1 Ω + 5.8 jΩ
Return Loss	- 24.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.8 Ω + 6.5 jΩ
Return Loss	- 23.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 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	March 11, 2011

DASY5 Validation Report for Head TSL

Date: 07.02.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d148

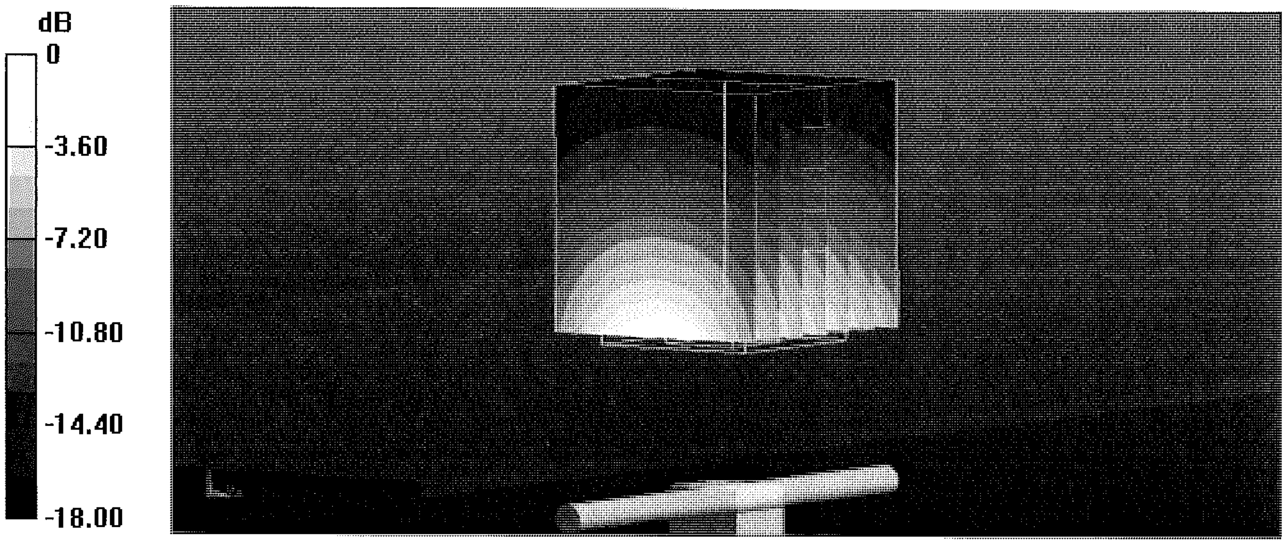
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.39 S/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.18, 8.18, 8.18); 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 52.10.0(1446); SEMCAD X 14.6.10(7417)

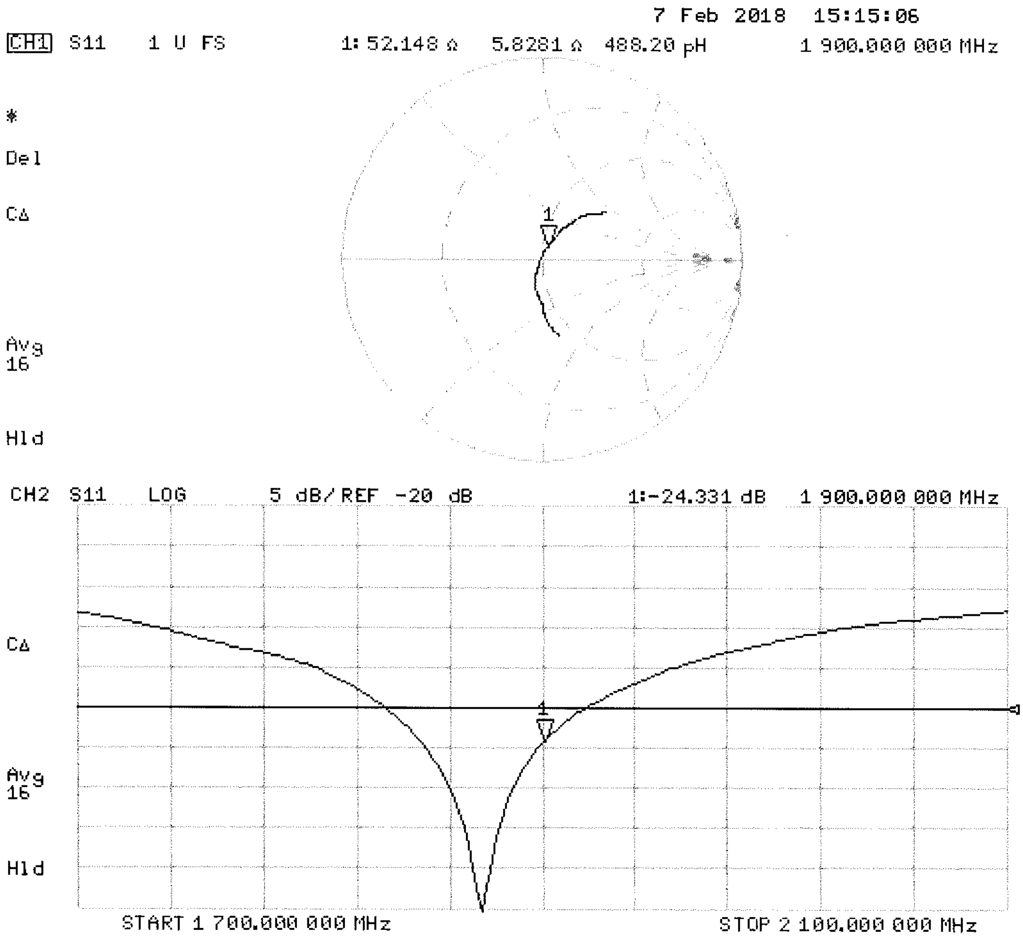
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 109.6 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 18.5 W/kg
SAR(1 g) = 9.95 W/kg; SAR(10 g) = 5.22 W/kg
Maximum value of SAR (measured) = 15.3 W/kg



0 dB = 15.3 W/kg = 11.85 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.02.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d148

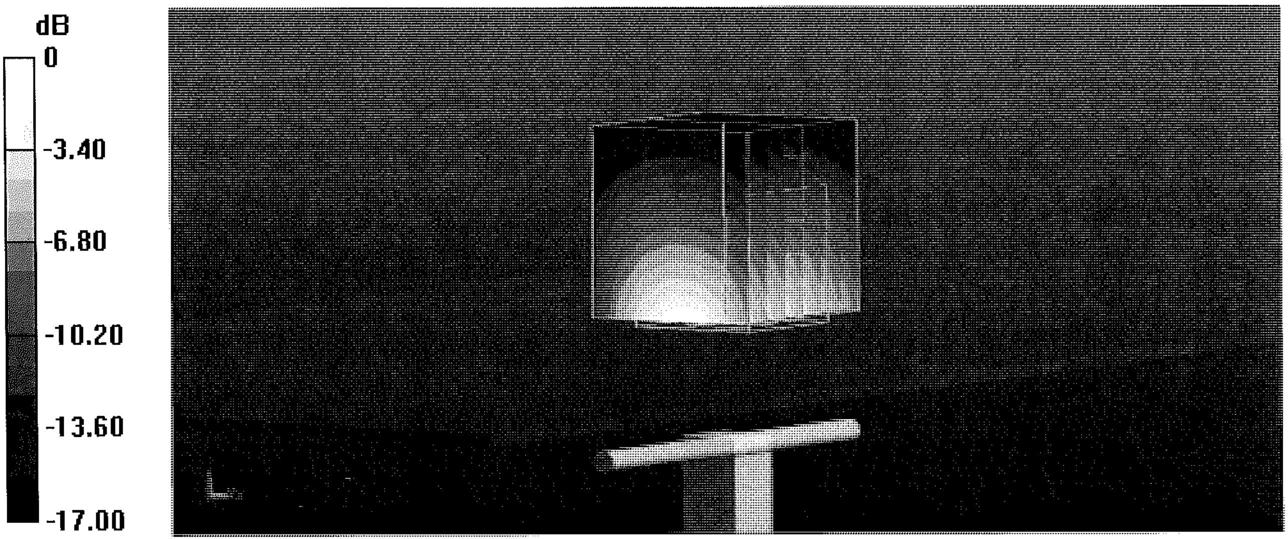
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.48 S/m; ε_r = 55.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.15, 8.15, 8.15); 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)

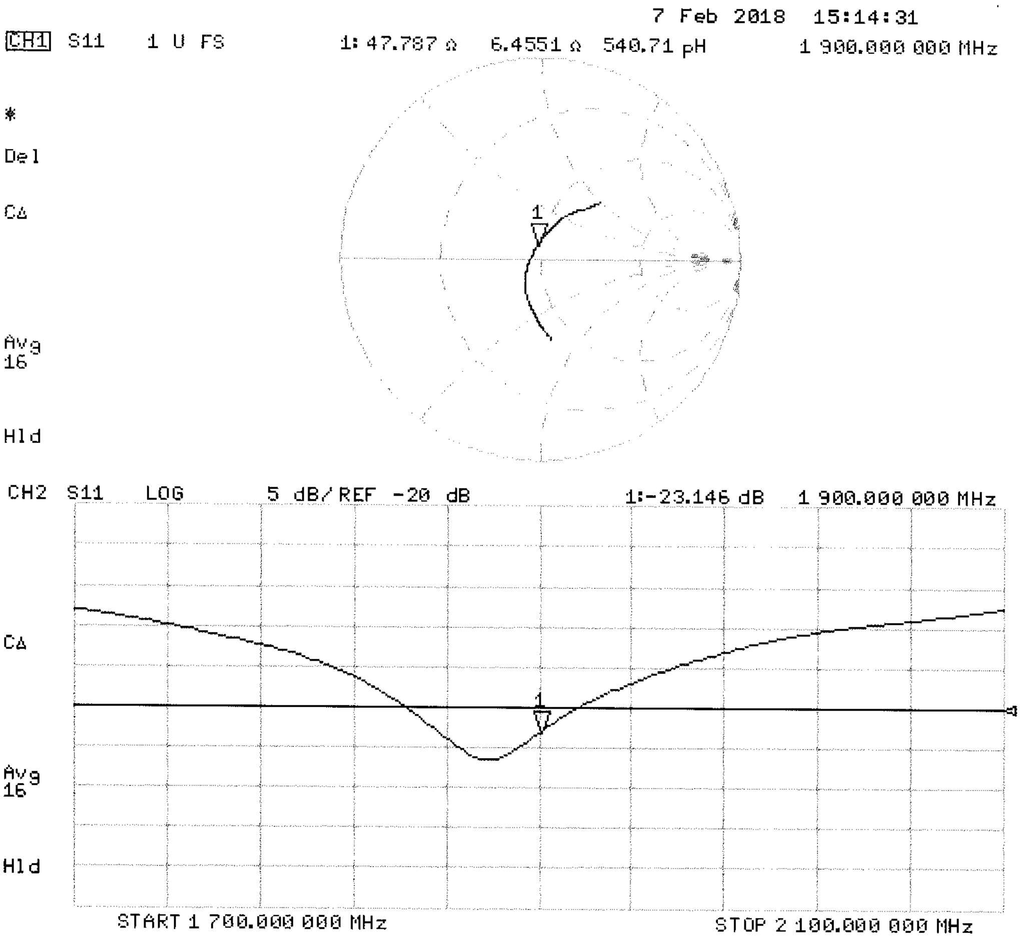
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 103.0 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 9.68 W/kg; SAR(10 g) = 5.14 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



Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D1900V2-5d149_Oct18

CALIBRATION CERTIFICATE

Object	D1900V2 - SN:5d149
Calibration procedure(s)	QA CAL-05.v10 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	October 23, 2018

BNV
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	9.80 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**39.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.5 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	9.68 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**39.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.7 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	52.9 Ω + 6.3 jΩ
Return Loss	- 23.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.5 Ω + 8.2 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	March 11, 2011

DASY5 Validation Report for Head TSL

Date: 23.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d149

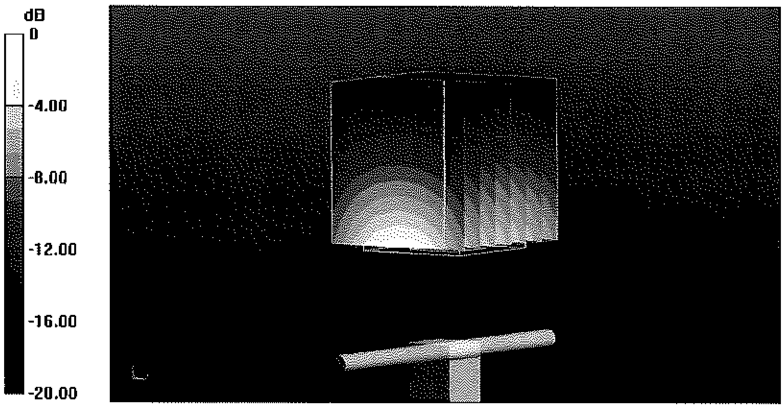
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; $\sigma = 1.4$ S/m; $\varepsilon_r = 40.3$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(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)

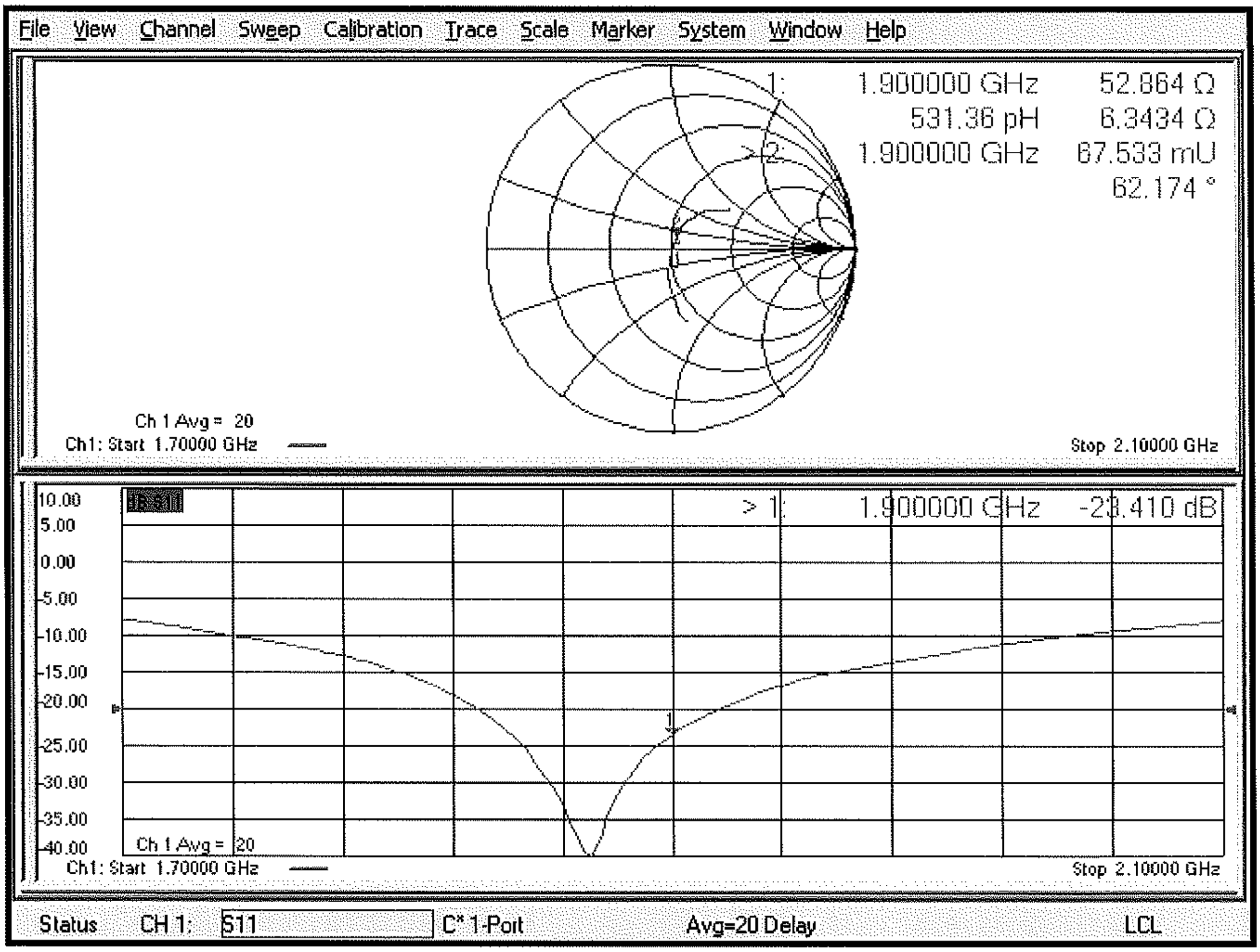
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 110.0 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 18.5 W/kg
SAR(1 g) = 9.8 W/kg; SAR(10 g) = 5.11 W/kg
Maximum value of SAR (measured) = 15.4 W/kg



0 dB = 15.4 W/kg = 11.88 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:5d149

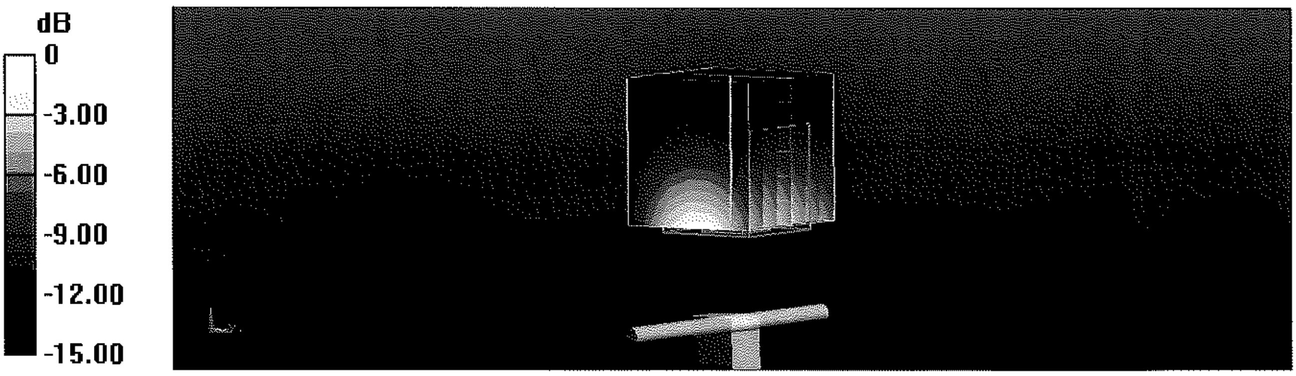
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.47 S/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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 = 103.1 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 9.68 W/kg; SAR(10 g) = 5.11 W/kg
Maximum value of SAR (measured) = 14.2 W/kg



0 dB = 14.2 W/kg = 11.52 dBW/kg