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SAR EVALUATION REPORT

Applicant Name:
Samsung Electronics Co., Ltd.
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Gyeonggi-do, 16677, Korea

Date of Testing:
09/04/18 - 10/11/18
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M1808310176-01-R1.A3L

FCC ID: **A3LSMA920F**

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

DUT Type:	Portable Handset
Application Type:	Certification
FCC Rule Part(s):	CFR §2.1093
Model:	SM-A920F/DS
Additional Model(s):	SM-A920F

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	0.15	0.33	0.37	N/A
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	< 0.1	0.35	0.43	1.11
PCE	UMTS 850	826.40 - 846.60 MHz	0.24	0.38	0.91	N/A
PCE	UMTS 1750	1712.4 - 1752.6 MHz	< 0.1	0.84	1.28	3.30
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.12	0.51	1.36	3.19
PCE	LTE Band 12	699.7 - 715.3 MHz	0.12	0.18	0.29	N/A
PCE	LTE Band 17	706.5 - 713.5 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 13	779.5 - 784.5 MHz	0.12	0.21	0.43	N/A
PCE	LTE Band 26 (Cell)	814.7 - 848.3 MHz	0.13	0.36	0.86	N/A
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.11	0.82	1.00	2.85
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	0.16	0.57	1.13	1.98
PCE	LTE Band 41	2498.5 - 2687.5 MHz	< 0.1	0.19	1.40	2.12
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.27	0.11	0.22	N/A
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	N/A	N/A
NII	U-NII-2A	5260 - 5320 MHz	0.16	< 0.1	N/A	0.97
NII	U-NII-2C	5500 - 5720 MHz	0.14	0.12	N/A	0.93
NII	U-NII-3	5745 - 5825 MHz	0.20	0.13	0.16	N/A
DSS/DTS	Bluetooth	2402 - 2480 MHz	0.20	< 0.1	< 0.1	N/A
Simultaneous SAR per KDB 690783 D01v01r03:			0.72	1.03	1.58	3.95

Note: This revised Test Report (S/N: 1M1808310176-01-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

The SAR Tick is an initiative of the Mobile & Wireless Forum (MWF). While a product may be considered eligible, use of the SAR Tick logo requires an agreement with the MWF. Further details can be obtained by emailing: sartick@mwfai.info.

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 17	Voice/Data	706.5 - 713.5 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 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 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 - 2462 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

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 Output Power

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 TX Slot	*1 TX Slots*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*	*1 TX Slots*	*2 TX Slots*	*3 TX Slots*	*4 TX Slots*
GSM/GPRS/EDGE 850	Maximum	**34.0**	**34.0**	**31.0**	**29.0**	**28.0**	**26.5**	**25.0**	**24.0**	**23.0**
	Nominal	**33.0**	**33.0**	**30.0**	**28.0**	**27.0**	**25.5**	**24.0**	**23.0**	**22.0**
GSM/GPRS/EDGE 1900	Maximum	**31.0**	**31.0**	**28.0**	**26.0**	**25.0**	**26.5**	**24.0**	**23.5**	**22.0**
	Nominal	**30.0**	**30.0**	**27.0**	**25.0**	**24.0**	**25.5**	**23.0**	**22.5**	**21.0**

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*	*3GPP DC-HSDPA*
UMTS Band 5 (850 MHz)	Maximum	**25.5**	**24.0**	**24.0**	**24.0**
	Nominal	**24.5**	**23.0**	**23.0**	**23.0**
UMTS Band 4 (1750 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	**23.5**	**22.5**	**22.5**	**22.5**
	Nominal	**22.5**	**21.5**	**21.5**	**21.5**

Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	**25.0**
	Nominal	**24.0**
LTE Band 17	Maximum	**25.0**
	Nominal	**24.0**
LTE Band 13	Maximum	**24.5**
	Nominal	**23.5**
LTE Band 26 (Cell)	Maximum	**25.5**
	Nominal	**24.5**
LTE Band 5 (Cell)	Maximum	**25.5**
	Nominal	**24.5**
LTE Band 66 (AWS)	Maximum	**24.0**
	Nominal	**23.0**
LTE Band 4 (AWS)	Maximum	**24.0**
	Nominal	**23.0**
LTE Band 2 (PCS)	Maximum	**24.0**
	Nominal	**23.0**
LTE Band 41	Maximum	**24.5**
	Nominal	**23.5**

Mode / Band		Modulated Average - Single Tx Chain (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	**19.0**
	Nominal	**18.0**
IEEE 802.11g (2.4 GHz)	Maximum	**17.0**
	Nominal	**16.0**
IEEE 802.11n (2.4 GHz)	Maximum	**17.0**
	Nominal	**16.0**

Mode / Band		Modulated Average - Single Tx Chain (dBm)											
		20 MHz Bandwidth				40 MHz Bandwidth				80 MHz Bandwidth			
	Channel	36	40-60	64	100-165	38	46-54	62	102 - 159	42	58	106	122 - 155
IEEE 802.11a (5 GHz)	Maximum	15.0	17.0										
	Nominal	14.0	16.0										
IEEE 802.11n (5 GHz)	Maximum	14.0	16.0	14.0	16.0	12.0	15.0	13.0	15.0				
	Nominal	13.0	15.0	13.0	15.0	11.0	14.0	12.0	14.0				
IEEE 802.11ac (5 GHz)	Maximum	14.0	16.0	14.0	16.0	12.0	15.0	13.0	15.0	11.0	11.0	12.0	15.0
	Nominal	13.0	15.0	13.0	15.0	11.0	14.0	12.0	14.0	10.0	10.0	11.0	14.0

Mode / Band		Modulated Average - MIMO (dBm)
IEEE 802.11g (2.4 GHz)	Maximum	20.0
	Nominal	19.0
IEEE 802.11n (2.4 GHz)	Maximum	20.0
	Nominal	19.0

Mode / Band		Modulated Average - MIMO (dBm)											
		20 MHz Bandwidth				40 MHz Bandwidth				80 MHz Bandwidth			
	Channel	36	40-60	64	100 - 165	38	46-54	62	102 - 159	42	58	106	122 - 155
IEEE 802.11a (5 GHz)	Maximum	18.0	20.0										
	Nominal	17.0	19.0										
IEEE 802.11n (5 GHz)	Maximum	17.0	19.0	17.0	19.0	15.0	18.0	16.0	18.0				
	Nominal	16.0	18.0	16.0	18.0	14.0	17.0	15.0	17.0				
IEEE 802.11ac (5 GHz)	Maximum	17.0	19.0	17.0	19.0	15.0	18.0	16.0	18.0	14.0	14.0	15.0	18.0
	Nominal	16.0	18.0	16.0	18.0	14.0	17.0	15.0	17.0	13.0	13.0	14.0	17.0

Mode / Band		Modulated Average - Single Tx Chain (dBm)
Bluetooth	Maximum	13.5
	Nominal	12.5
Bluetooth EDR	Maximum	10.5
	Nominal	9.5
Bluetooth LE	Maximum	2.5
	Nominal	1.5

1.3.2 Reduced 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 1900	Maximum	27.0	27.0	24.5	22.5	21.5	22.5	20.0	19.5	18.0
	Nominal	26.0	26.0	23.5	21.5	20.5	21.5	19.0	18.5	17.0

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*	*3GPP DC-HSDPA*
UMTS Band 4 (1750 MHz)	Maximum	**22.5**	**22.0**	**22.0**	**22.0**
	Nominal	**21.5**	**21.0**	**21.0**	**21.0**
UMTS Band 2 (1900 MHz)	Maximum	**21.0**	**20.0**	**20.0**	**20.0**
	Nominal	**20.0**	**19.0**	**19.0**	**19.0**

Mode / Band		Modulated Average (dBm)
LTE Band 66 (AWS)	Maximum	**21.5**
	Nominal	**20.5**
LTE Band 4 (AWS)	Maximum	**21.5**
	Nominal	**20.5**
LTE Band 2 (PCS)	Maximum	**20.0**
	Nominal	**19.0**

Mode / Band		Modulated Average (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	**13.0**
	Nominal	**12.0**
IEEE 802.11g (2.4 GHz)	Maximum	**13.0**
	Nominal	**12.0**
IEEE 802.11n (2.4 GHz)	Maximum	**13.0**
	Nominal	**12.0**

Mode / Band		Modulated Average - Single Tx Chain (dBm)									
		20 MHz Bandwidth				40 MHz Bandwidth		80 MHz Bandwidth			
	Channel	36	40-60	64	100 - 165	38	46 - 159	42	58	106	122 - 155
IEEE 802.11a (5 GHz)	Maximum	**13.0**									
	Nominal	**12.0**									
IEEE 802.11n (5 GHz)	Maximum	**13.0**				**12.0**	**13.0**				
	Nominal	**12.0**				**11.0**	**12.0**				
IEEE 802.11ac (5 GHz)	Maximum	**13.0**				**12.0**	**13.0**	**11.0**	**11.0**	**12.0**	**13.0**
	Nominal	**12.0**				**11.0**	**12.0**	**10.0**	**10.0**	**11.0**	**12.0**

Mode / Band		Modulated Average - MIMO (dBm)
IEEE 802.11g (2.4 GHz)	Maximum	**16.0**
	Nominal	**15.0**
IEEE 802.11n (2.4 GHz)	Maximum	**16.0**
	Nominal	**15.0**

Mode / Band		Modulated Average - MIMO (dBm)									
		20 MHz Bandwidth				40 MHz Bandwidth		80 MHz Bandwidth			
	Channel	36	40-60	64	100 - 165	38	46 - 159	42	58	106	122 - 155
IEEE 802.11a (5 GHz)	Maximum	**16.0**									
	Nominal	**15.0**									
IEEE 802.11n (5 GHz)	Maximum	**16.0**				**15.0**	**16.0**				
	Nominal	**15.0**				**14.0**	**15.0**				
IEEE 802.11ac (5 GHz)	Maximum	**16.0**				**15.0**	**16.0**	**14.0**	**14.0**	**15.0**	**16.0**
	Nominal	**15.0**				**14.0**	**15.0**	**13.0**	**13.0**	**14.0**	**15.0**

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 1750	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 66 (AWS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 2 (PCS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 41	Yes	Yes	No	Yes	Yes	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 transmitting 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 WI-FI MIMO	Yes	Yes	N/A	Yes	
5	GSM voice + 5 GHz WI-FI MIMO	Yes	Yes	N/A	Yes	
6	GSM voice + 2.4 GHz WI-FI Ant 1 + 5 GHz WI-FI Ant 2	Yes	Yes	N/A	Yes	
7	UMTS + 2.4 GHz WI-FI	Yes	Yes	Yes	Yes	
8	UMTS + 5 GHz WI-FI	Yes	Yes	Yes	Yes	
9	UMTS + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^Bluetooth Tethering is considered
10	UMTS + 2.4 GHz WI-FI MIMO	Yes	Yes	Yes	Yes	
11	UMTS + 5 GHz WI-FI MIMO	Yes	Yes	Yes	Yes	
12	UMTS + 2.4 GHz WI-FI Ant 1 + 5 GHz WI-FI Ant 2	Yes	Yes	Yes	Yes	
13	LTE + 2.4 GHz WI-FI	Yes	Yes	Yes	Yes	
14	LTE + 5 GHz WI-FI	Yes	Yes	Yes	Yes	
15	LTE + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^Bluetooth Tethering is considered
16	LTE + 2.4 GHz WI-FI MIMO	Yes	Yes	Yes	Yes	
17	LTE + 5 GHz WI-FI MIMO	Yes	Yes	Yes	Yes	
18	LTE + 2.4 GHz WI-FI Ant 1 + 5 GHz WI-FI Ant 2	Yes	Yes	Yes	Yes	
19	GPRS/EDGE + 2.4 GHz WI-FI	N/A	N/A	Yes	Yes	
20	GPRS/EDGE + 5 GHz WI-FI	N/A	N/A	Yes	Yes	
21	GPRS/EDGE + 2.4 GHz Bluetooth	N/A	N/A	Yes^	Yes	^Bluetooth Tethering is considered
22	GPRS/EDGE + 2.4 GHz WI-FI MIMO	N/A	N/A	Yes	Yes	
23	GPRS/EDGE + 5 GHz WI-FI MIMO	N/A	N/A	Yes	Yes	
24	GPRS/EDGE + 2.4 GHz WI-FI Ant 1 + 5 GHz WI-FI Ant 2	N/A	N/A	Yes	Yes	

1. Bluetooth cannot transmit simultaneously with WLAN
2. All licensed modes share the same antenna path and cannot transmit simultaneously.
3. When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.
4. Per the manufacturer, WIFI Direct is not expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Therefore, there are no simultaneous transmission scenarios involving WIFI direct beyond that listed in the above table.
5. 5 GHz Wireless Router is only supported for the U-NII-3 by S/W, therefore U-NII-1, U-NII2A, and U-NII2C were not evaluated for wireless router conditions.
6. This device supports 2x2 MIMO Tx for WLAN. 802.11a/g/n/ac supports CDD and STBC and 802.11n/ac 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 BT 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 802.11ac with the following features:
a) Up to 80 MHz Bandwidth only
b) No aggregate channel configurations
c) 2 Tx antenna output
d) 256 QAM is supported
e) TDWR and Band gap channels are 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 2.4 GHz BT/WLAN operations since wireless router 1g SAR was < 1.2 W/kg.

(B) Licensed Transmitter(s)

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

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

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

This device supports LTE Carrier Aggregation (CA) in the downlink 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 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 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 $\leq \frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is $\leq$ 1.45 W/kg, per Section 5.2.4 of FCC KDB Publication 941225 D05v02r05.

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

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)
- 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					
FCC ID	**A3LSMA920F**				
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 17 (706.5 - 713.5 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 66 (AWS) (1710.7 - 1779.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 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 17: 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 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 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 17: 5 MHz	706.5 (23755)		710 (23790)	713.5 (23825)	
LTE Band 17: 10 MHz	709 (23780)		710 (23790)	711 (23800)	
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 66 (AWS): 1.4 MHz	1710.7 (131979)		1745 (132322)	1779.3 (132665)	
LTE Band 66 (AWS): 3 MHz	1711.5 (131987)		1745 (132322)	1778.5 (132657)	
LTE Band 66 (AWS): 5 MHz	1712.5 (131997)		1745 (132322)	1777.5 (132647)	
LTE Band 66 (AWS): 10 MHz	1715 (132022)		1745 (132322)	1775 (132622)	
LTE Band 66 (AWS): 15 MHz	1717.5 (132047)		1745 (132322)	1772.5 (132597)	
LTE Band 66 (AWS): 20 MHz	1720 (132072)		1745 (132322)	1770 (132572)	
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)		1732.5 (20175)	1754.3 (20393)	
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)		1732.5 (20175)	1753.5 (20385)	
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)		1732.5 (20175)	1752.5 (20375)	
LTE Band 4 (AWS): 10 MHz	1715 (20000)		1732.5 (20175)	1750 (20350)	
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)		1732.5 (20175)	1747.5 (20325)	
LTE Band 4 (AWS): 20 MHz	1720 (20050)		1732.5 (20175)	1745 (20300)	
LTE Band 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)
Uplink UE Category	15				
Downlink UE Category	11				
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 10. It supports a maximum of 3 carriers in the downlink. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 10 Features are not supported: Relay, HetNet, Enhanced MIMO, eICIC, WIFI Offloading, 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

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

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:

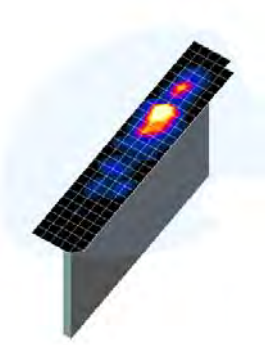


Figure 4-1
Sample SAR Area Scan

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].

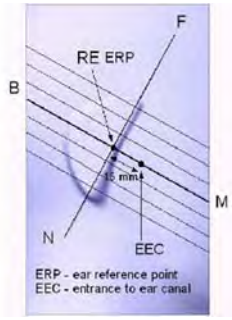


Figure 5-1
Close-Up Side view of ERP

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

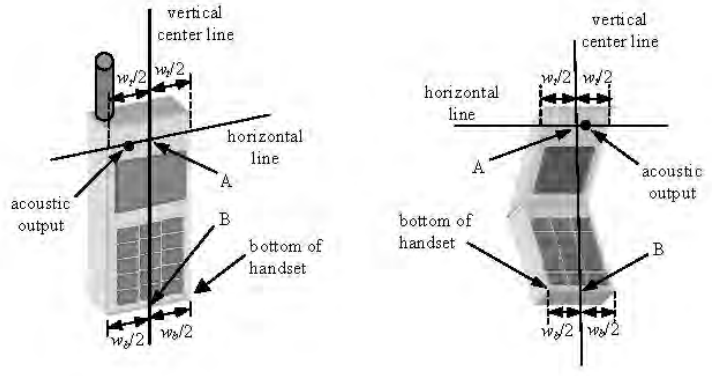


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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.

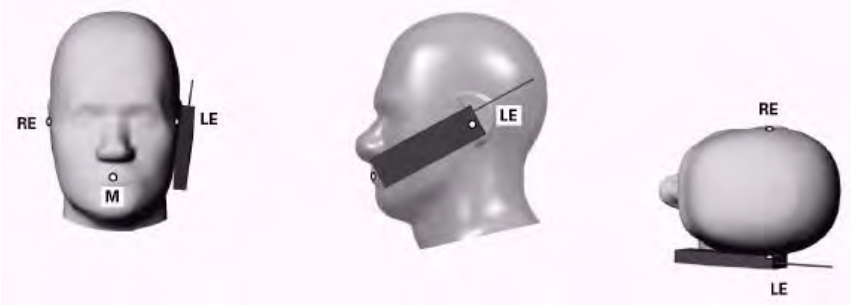


Figure 6-1 Front, Side and Top View of Cheek Position

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

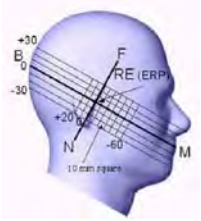


Figure 6-3
Side view w/ relevant markings

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

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.

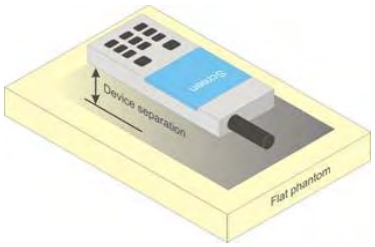


Figure 6-4
Sample Body-Worn Diagram

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 nonreduced 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 $\leq$ 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 $\leq$ 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 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. 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	32.59	32.66	30.48	28.19	**27.00**	25.60	24.25	23.10	22.00
	190	32.84	32.94	30.74	28.56	**27.32**	25.50	24.18	23.00	21.90
	251	33.00	33.13	30.97	28.90	**27.60**	25.50	24.15	23.11	21.89
GSM 1900	512	29.40	29.32	28.00	25.64	**24.67**	25.15	23.07	22.35	20.70
	661	29.30	29.27	27.87	25.40	**24.41**	25.20	23.16	22.37	20.80
	810	29.12	29.07	27.57	25.04	**24.18**	25.28	23.20	22.52	20.86

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	23.56	23.63	24.46	23.93	**23.99**	16.57	18.23	18.84	18.99
	190	23.81	23.91	24.72	24.30	**24.31**	16.47	18.16	18.74	18.89
	251	23.97	24.10	24.95	24.64	**24.59**	16.47	18.13	18.85	18.88
GSM 1900	512	20.37	20.29	21.98	21.38	**21.66**	16.12	17.05	18.09	17.69
	661	20.27	20.24	21.85	21.14	**21.40**	16.17	17.14	18.11	17.79
	810	20.09	20.04	21.55	20.78	**21.17**	16.25	17.18	18.26	17.85

GSM 850	**Frame Avg.Targets:**	23.97	23.97	23.98	23.74	**23.99**	16.47	17.98	18.74	18.99
GSM 1900		20.97	20.97	20.98	20.74	**20.99**	16.47	16.98	18.24	17.99

Table 9-2
Reduced Conducted Power

Maximum Burst-Averaged Output Power										
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 1900	512	26.27	26.01	24.32	22.15	**21.46**	21.52	19.45	18.73	17.11
	661	26.08	25.87	24.23	22.02	**21.36**	21.65	19.56	18.81	17.28
	810	25.80	25.62	24.03	21.81	**21.06**	21.83	19.78	19.05	17.41
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	17.24	16.98	18.30	17.89	**18.45**	12.49	13.43	14.47	14.10
	661	17.05	16.84	18.21	17.76	**18.35**	12.62	13.54	14.55	14.27
	810	16.77	16.59	18.01	17.55	**18.05**	12.80	13.76	14.79	14.40
GSM 1900	**Frame Avg.Targets:**	16.97	16.97	17.48	17.24	**17.49**	12.47	12.98	14.24	13.99

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

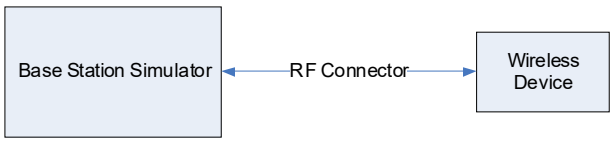


Figure 9-1
Power Measurement Setup

9.2 UMTS Conducted Powers

Table 9-3
Maximum Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	24.22	24.12	24.10	24.09	24.41	24.16	22.49	22.64	22.69	-
99		12.2 kbps AMR	24.20	24.08	24.03	24.15	24.49	24.25	22.50	22.65	22.66	-
6	HSDPA	Subtest 1	24.00	23.99	23.89	23.55	23.86	23.39	21.91	22.17	22.19	0
6		Subtest 2	23.99	23.98	23.92	23.58	23.91	23.41	22.02	22.25	22.20	0
6		Subtest 3	23.58	23.64	23.36	23.07	23.39	22.90	21.45	21.72	21.68	0.5
6		Subtest 4	23.53	23.56	23.42	23.09	23.38	23.04	21.48	21.78	21.67	0.5
6	HSUPA	Subtest 1	24.00	23.83	23.77	23.30	23.56	23.30	22.15	22.32	22.29	0
6		Subtest 2	22.05	21.85	21.77	21.30	21.67	21.45	20.11	20.33	20.30	2
6		Subtest 3	23.07	22.87	22.77	22.30	22.62	22.38	21.15	21.31	21.29	1
6		Subtest 4	22.04	21.86	21.77	21.31	21.55	21.33	20.15	20.31	20.28	2
6		Subtest 5	24.00	23.86	23.79	23.20	23.58	23.23	22.14	22.30	22.33	0
8	DC-HSDPA	Subtest 1	24.00	23.85	23.79	23.25	23.49	23.17	22.20	22.34	22.30	0
8		Subtest 2	24.00	23.80	23.75	23.26	23.50	23.14	22.15	22.30	22.29	0
8		Subtest 3	23.55	23.34	23.27	22.73	22.98	22.64	21.67	21.80	21.77	0.5
8		Subtest 4	23.54	23.32	23.26	22.70	22.98	22.72	21.62	21.82	21.77	0.5

Table 9-4
Reduced Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	22.01	22.38	22.22	19.99	20.20	20.16	-
99		12.2 kbps AMR	21.99	22.39	22.17	19.99	20.23	20.16	-
6	HSDPA	Subtest 1	21.21	21.57	21.32	19.20	19.30	19.32	0
6		Subtest 2	21.19	21.60	21.26	19.19	19.32	19.31	0
6		Subtest 3	20.72	21.09	20.73	18.64	18.84	18.84	0.5
6		Subtest 4	20.68	21.11	20.74	18.69	18.84	18.86	0.5
6	HSUPA	Subtest 1	21.29	21.55	21.30	19.17	19.32	19.32	0
6		Subtest 2	19.34	19.57	19.36	17.20	17.34	17.33	2
6		Subtest 3	20.32	20.67	20.34	18.20	18.35	18.32	1
6		Subtest 4	19.33	19.59	19.34	17.21	17.32	17.29	2
6		Subtest 5	21.20	21.55	21.22	19.18	19.34	19.32	0
8	DC-HSDPA	Subtest 1	21.20	21.56	21.22	19.20	19.33	19.34	0
8		Subtest 2	21.21	21.55	21.22	19.16	19.34	19.27	0
8		Subtest 3	20.71	21.04	20.72	18.69	18.82	18.85	0.5
8		Subtest 4	20.68	21.06	20.69	18.67	18.86	18.78	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.

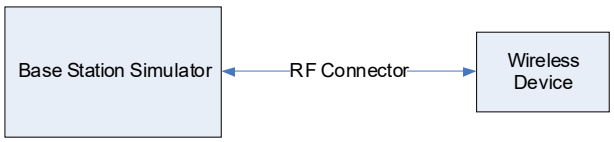


Figure 9-2
Power Measurement Setup

9.3 LTE Conducted Powers

9.3.1 LTE Band 12

Table 9-5
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	**24.02**	0	0
	1	25	23.90		0
	1	49	23.81		0
	25	0	23.06	0-1	1
	25	12	**23.07**		1
	25	25	22.97		1
	50	0	23.01		1
16QAM	1	0	23.28	0-1	1
	1	25	23.19		1
	1	49	23.19		1
	25	0	22.16	0-2	2
	25	12	22.10		2
	25	25	22.08		2
	50	0	22.11		2
64QAM	1	0	22.32	0-2	2
	1	25	22.23		2
	1	49	22.13		2
	25	0	21.17	0-3	3
	25	12	21.15		3
	25	25	21.08		3
	50	0	21.12		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 9-6
LTE Band 12 Conducted Powers - 5 MHz Bandwidth

LTE Band 12 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23035 (701.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23155 (713.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.97	23.82	23.72	0	0
	1	12	23.90	23.76	23.77		0
	1	24	23.76	23.74	23.71		0
	12	0	22.96	22.86	22.70	0-1	1
	12	6	22.98	22.82	22.83		1
	12	13	22.82	22.83	22.77		1
	25	0	22.82	22.82	22.66		1
16QAM	1	0	23.13	23.02	22.87	0-1	1
	1	12	23.10	22.95	22.95		1
	1	24	22.95	22.92	22.88		1
	12	0	22.06	21.89	21.83	0-2	2
	12	6	22.11	21.89	21.92		2
	12	13	21.92	21.85	21.89		2
	25	0	21.94	21.90	21.78		2
64QAM	1	0	22.24	22.15	21.99	0-2	2
	1	12	22.22	22.04	22.08		2
	1	24	22.07	22.01	22.03		2
	12	0	21.12	20.95	20.88	0-3	3
	12	6	21.15	20.97	21.00		3
	12	13	21.00	20.90	20.94		3
	25	0	20.94	20.91	20.80		3

Table 9-7
LTE Band 12 Conducted Powers - 3 MHz Bandwidth

LTE Band 12 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23025 (700.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23165 (714.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.98	23.81	23.81	0	0
	1	7	24.00	23.89	23.84		0
	1	14	23.95	23.77	23.71		0
	8	0	22.97	22.85	22.80	0-1	1
	8	4	23.03	22.85	22.77		1
	8	7	23.00	22.81	22.76		1
	15	0	23.00	22.85	22.80		1
16QAM	1	0	23.14	22.94	22.95	0-1	1
	1	7	23.25	23.01	23.04		1
	1	14	23.15	22.92	22.88		1
	8	0	22.12	21.97	21.90	0-2	2
	8	4	22.15	21.95	21.93		2
	8	7	22.12	21.91	21.86		2
	15	0	22.11	21.95	21.88		2
64QAM	1	0	22.25	22.07	22.08	0-2	2
	1	7	22.38	22.19	22.18		2
	1	14	22.31	22.04	22.02		2
	8	0	21.18	20.97	20.96	0-3	3
	8	4	21.19	20.95	20.98		3
	8	7	21.16	20.94	20.92		3
	15	0	21.13	20.94	20.90		3

Table 9-8
LTE Band 12 Conducted Powers -1.4 MHz Bandwidth

LTE Band 12 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23017 (699.7 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23173 (715.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.89	23.73	23.67	0	0
	1	2	23.95	23.77	23.74		0
	1	5	23.88	23.70	23.65		0
	3	0	23.91	23.77	23.68		0
	3	2	23.95	23.80	23.72		0
	3	3	23.92	23.76	23.66		0
	6	0	22.95	22.77	22.71	0-1	1
16QAM	1	0	23.08	22.90	22.85	0-1	1
	1	2	23.10	22.95	22.93		1
	1	5	23.07	22.84	22.83		1
	3	0	23.06	22.87	22.83		1
	3	2	23.09	22.93	22.85		1
	3	3	23.01	22.86	22.76		1
	6	0	22.07	21.87	21.82	0-2	2
64QAM	1	0	22.16	22.01	22.00	0-2	2
	1	2	22.26	22.07	22.01		2
	1	5	22.20	21.98	21.94		2
	3	0	22.17	21.97	21.94		2
	3	2	22.17	22.01	21.96		2
	3	3	22.16	21.97	21.91		2
	6	0	21.06	20.87	20.82	0-3	3

9.3.2 LTE Band 13

Table 9-9
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	**23.84**	0	0
	1	25	23.77		0
	1	49	23.59		0
	25	0	**22.94**	0-1	1
	25	12	22.86		1
	25	25	22.84		1
	50	0	22.85		1
16QAM	1	0	23.09	0-1	1
	1	25	23.04		1
	1	49	22.85		1
	25	0	22.00	0-2	2
	25	12	21.97		2
	25	25	21.89		2
	50	0	21.94		2
64QAM	1	0	22.09	0-2	2
	1	25	22.10		2
	1	49	21.85		2
	25	0	21.02	0-3	3
	25	12	20.98		3
	25	25	20.90		3
	50	0	20.98		3

Table 9-10
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	23.57	0	0
	1	12	23.55		0
	1	24	23.45		0
	12	0	23.10	0-1	1
	12	6	23.10		1
	12	13	23.08		1
	25	0	23.07		1
16QAM	1	0	23.18	0-1	1
	1	12	23.12		1
	1	24	23.03		1
	12	0	22.10	0-2	2
	12	6	22.12		2
	12	13	22.08		2
	25	0	22.11		2
64QAM	1	0	22.30	0-2	2
	1	12	22.25		2
	1	24	22.13		2
	12	0	21.20	0-3	3
	12	6	21.20		3
	12	13	21.14		3
	25	0	21.14		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 9-11
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	**24.49**	0	0
	1	36	24.42		0
	1	74	24.29		0
	36	0	23.50	0-1	1
	36	18	**23.51**		1
	36	37	23.43		1
	75	0	23.50		1
16QAM	1	0	23.65	0-1	1
	1	36	23.59		1
	1	74	23.41		1
	36	0	22.59	0-2	2
	36	18	22.63		2
	36	37	22.50		2
	75	0	22.55		2
64QAM	1	0	22.81	0-2	2
	1	36	22.70		2
	1	74	22.54		2
	36	0	21.67	0-3	3
	36	18	21.65		3
	36	37	21.57		3
	75	0	21.58		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 9-12
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	24.45	24.47	24.36	0	0
	1	25	24.43	24.40	24.32		0
	1	49	24.33	24.33	24.21		0
	25	0	23.50	23.55	23.44	0-1	1
	25	12	23.48	23.50	23.43		1
	25	25	23.42	23.43	23.37		1
	50	0	23.49	23.47	23.43		1
16QAM	1	0	23.52	23.58	23.47	0-1	1
	1	25	23.61	23.57	23.45		1
	1	49	23.50	23.45	23.30		1
	25	0	22.57	22.60	22.50	0-2	2
	25	12	22.58	22.57	22.48		2
	25	25	22.52	22.51	22.45		2
	50	0	22.56	22.57	22.47		2
64QAM	1	0	22.66	22.72	22.55	0-2	2
	1	25	22.74	22.71	22.58		2
	1	49	22.61	22.54	22.43		2
	25	0	21.64	21.63	21.51	0-3	3
	25	12	21.62	21.62	21.52		3
	25	25	21.57	21.56	21.47		3
	50	0	21.61	21.60	21.50		3

Table 9-13
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	24.45	24.46	24.30	0	0
	1	12	24.41	24.41	24.28		0
	1	24	24.40	24.37	24.21		0
	12	0	23.53	23.51	23.42	0-1	1
	12	6	23.52	23.52	23.41		1
	12	13	23.51	23.50	23.38		1
	25	0	23.51	23.50	23.38		1
16QAM	1	0	23.54	23.60	23.43	0-1	1
	1	12	23.57	23.57	23.47		1
	1	24	23.55	23.51	23.33		1
	12	0	22.53	22.60	22.47	0-2	2
	12	6	22.57	22.63	22.50		2
	12	13	22.55	22.55	22.44		2
	25	0	22.58	22.59	22.43		2
64QAM	1	0	22.68	22.65	22.57	0-2	2
	1	12	22.68	22.65	22.58		2
	1	24	22.66	22.62	22.43		2
	12	0	21.64	21.68	21.53	0-3	3
	12	6	21.67	21.67	21.56		3
	12	13	21.65	21.62	21.48		3
	25	0	21.59	21.61	21.49		3

Table 9-14
LTE Band 26 (Cell) Conducted Powers - 3 MHz Bandwidth

LTE Band 26 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26705 (815.5 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27025 (847.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.45	24.40	24.29	0	0
	1	7	24.50	24.50	24.38		0
	1	14	24.39	24.39	24.25		0
	8	0	23.47	23.48	23.36	0-1	1
	8	4	23.48	23.51	23.38		1
	8	7	23.50	23.44	23.32		1
	15	0	23.53	23.48	23.40		1
16QAM	1	0	23.48	23.56	23.43	0-1	1
	1	7	23.66	23.66	23.50		1
	1	14	23.55	23.51	23.33		1
	8	0	22.55	22.56	22.45	0-2	2
	8	4	22.62	22.58	22.46		2
	8	7	22.57	22.57	22.38		2
	15	0	22.60	22.58	22.51		2
64QAM	1	0	22.61	22.70	22.59	0-2	2
	1	7	22.76	22.75	22.62		2
	1	14	22.70	22.63	22.45		2
	8	0	21.58	21.60	21.49	0-3	3
	8	4	21.66	21.65	21.52		3
	8	7	21.61	21.63	21.44		3
	15	0	21.60	21.60	21.47		3

Table 9-15
LTE Band 26 (Cell) Conducted Powers -1.4 MHz Bandwidth

LTE Band 26 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26697 (814.7 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27033 (848.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.39	24.35	24.21	0	0
	1	2	24.45	24.44	24.25		0
	1	5	24.37	24.33	24.18		0
	3	0	24.41	24.37	24.26		0
	3	2	24.45	24.42	24.29		0
	3	3	24.43	24.34	24.22		0
	6	0	23.48	23.40	23.30	0-1	1
16QAM	1	0	23.45	23.47	23.32	0-1	1
	1	2	23.49	23.58	23.33		1
	1	5	23.40	23.45	23.25		1
	3	0	23.44	23.45	23.31		1
	3	2	23.50	23.52	23.33		1
	3	3	23.40	23.46	23.30		1
	6	0	22.50	22.51	22.39	0-2	2
64QAM	1	0	22.55	22.61	22.46	0-2	2
	1	2	22.66	22.64	22.48		2
	1	5	22.56	22.55	22.37		2
	3	0	22.57	22.57	22.44		2
	3	2	22.62	22.64	22.45		2
	3	3	22.62	22.59	22.40		2
	6	0	21.52	21.51	21.39	0-3	3

9.3.4 LTE Band 66 (AWS)

Table 9-16
LTE Band 66 (AWS) Conducted Powers - 20 MHz Bandwidth

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132072 (1720.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132572 (1770.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.08	22.96	23.20	0	0
	1	50	22.94	22.88	23.22		0
	1	99	22.96	23.03	**23.25**		0
	50	0	22.04	22.00	22.11	0-1	1
	50	25	22.02	22.02	22.18		1
	50	50	21.97	22.03	**22.19**		1
	100	0	21.99	22.00	22.17		1
16QAM	1	0	22.40	22.25	22.43	0-1	1
	1	50	22.34	22.00	22.50		1
	1	99	22.35	22.10	22.47		1
	50	0	21.19	21.10	21.30	0-2	2
	50	25	21.17	21.05	21.32		2
	50	50	21.16	21.02	21.37		2
	100	0	21.17	21.07	21.35		2
64QAM	1	0	21.38	21.35	21.49	0-2	2
	1	50	21.32	21.17	21.20		2
	1	99	21.33	21.30	21.30		2
	50	0	20.25	20.15	20.30	0-3	3
	50	25	20.16	20.11	20.38		3
	50	50	20.11	20.08	20.41		3
	100	0	20.14	20.08	20.37		3

Table 9-17
LTE Band 66 (AWS) Conducted Powers - 15 MHz Bandwidth

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.24	23.01	23.44	0	0
	1	36	23.11	22.84	23.38		0
	1	74	23.12	22.99	23.45		0
	36	0	22.20	22.00	22.37	0-1	1
	36	18	22.19	21.98	22.35		1
	36	37	22.17	21.93	22.41		1
	75	0	22.12	21.96	22.32		1
16QAM	1	0	22.43	22.33	22.49	0-1	1
	1	36	22.26	22.09	22.40		1
	1	74	22.26	22.28	22.50		1
	36	0	21.34	21.21	21.49	0-2	2
	36	18	21.33	21.22	21.47		2
	36	37	21.32	21.14	21.48		2
	75	0	21.34	21.18	21.49		2
64QAM	1	0	21.50	21.47	21.50	0-2	2
	1	36	21.43	21.26	21.45		2
	1	74	21.46	21.33	21.46		2
	36	0	20.43	20.30	20.44	0-3	3
	36	18	20.42	20.26	20.49		3
	36	37	20.35	20.22	20.48		3
	75	0	20.36	20.22	20.50		3

Table 9-18
LTE Band 66 (AWS) Conducted Powers - 10 MHz Bandwidth

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.09	23.03	23.35	0	0
	1	25	23.03	22.92	23.30		0
	1	49	23.04	23.05	23.38		0
	25	0	22.15	22.07	22.36	0-1	1
	25	12	22.13	22.04	22.38		1
	25	25	22.08	22.03	22.35		1
	50	0	22.12	22.05	22.36		1
16QAM	1	0	22.30	22.21	22.49	0-1	1
	1	25	22.23	22.12	22.48		1
	1	49	22.25	22.17	22.47		1
	25	0	21.30	21.14	21.41	0-2	2
	25	12	21.28	21.14	21.46		2
	25	25	21.25	21.10	21.46		2
	50	0	21.26	21.12	21.47		2
64QAM	1	0	21.46	21.34	21.46	0-2	2
	1	25	21.44	21.23	21.45		2
	1	49	21.47	21.27	21.49		2
	25	0	20.32	20.20	20.48	0-3	3
	25	12	20.33	20.16	20.47		3
	25	25	20.29	20.13	20.44		3
	50	0	20.33	20.16	20.47		3

Table 9-19
LTE Band 66 (AWS) Conducted Powers - 5 MHz Bandwidth

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.10	22.99	23.29	0	0
	1	12	23.02	22.90	23.34		0
	1	24	23.07	23.01	23.39		0
	12	0	22.15	22.03	22.34	0-1	1
	12	6	22.16	22.03	22.49		1
	12	13	22.14	22.02	22.45		1
	25	0	22.10	22.00	22.34		1
16QAM	1	0	22.32	22.09	22.50	0-1	1
	1	12	22.25	22.09	22.49		1
	1	24	22.21	22.04	22.47		1
	12	0	21.28	21.12	21.45	0-2	2
	12	6	21.29	21.13	21.48		2
	12	13	21.30	21.06	21.48		2
	25	0	21.25	21.10	21.47		2
64QAM	1	0	21.49	21.27	21.40	0-2	2
	1	12	21.44	21.24	21.47		2
	1	24	21.40	21.19	21.49		2
	12	0	20.31	20.19	20.46	0-3	3
	12	6	20.38	20.23	20.48		3
	12	13	20.37	20.17	20.50		3
	25	0	20.29	20.15	20.45		3

Table 9-20
LTE Band 66 (AWS) Conducted Powers - 3 MHz Bandwidth

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131987 (1711.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132657 (1778.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.07	22.99	23.33	0	0
	1	7	23.15	23.04	23.40		0
	1	14	23.03	22.97	23.43		0
	8	0	22.14	22.02	22.48	0-1	1
	8	4	22.17	22.04	22.49		1
	8	7	22.14	22.01	22.47		1
	15	0	22.13	22.04	22.42		1
16QAM	1	0	22.30	22.11	22.47	0-1	1
	1	7	22.38	22.17	22.42		1
	1	14	22.26	22.12	22.44		1
	8	0	21.30	21.13	21.50	0-2	2
	8	4	21.34	21.16	21.47		2
	8	7	21.29	21.09	21.49		2
	15	0	21.29	21.16	21.46		2
64QAM	1	0	21.43	21.29	21.47	0-2	2
	1	7	21.50	21.40	21.48		2
	1	14	21.44	21.22	21.45		2
	8	0	20.36	20.19	20.50	0-3	3
	8	4	20.40	20.24	20.49		3
	8	7	20.38	20.20	20.44		3
	15	0	20.30	20.17	20.46		3

Table 9-21
LTE Band 66 (AWS) Conducted Powers -1.4 MHz Bandwidth

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131979 (1710.7 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132665 (1779.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.02	22.90	23.23	0	0
	1	2	23.11	22.97	23.32		0
	1	5	22.99	22.88	23.19		0
	3	0	23.05	22.93	23.26		0
	3	2	23.06	23.00	23.31		0
	3	3	23.05	22.94	23.27		0
	6	0	22.09	21.98	22.33	0-1	1
16QAM	1	0	22.22	22.04	22.48	0-1	1
	1	2	22.32	22.13	22.50		1
	1	5	22.19	22.01	22.40		1
	3	0	22.18	22.06	22.44		1
	3	2	22.19	22.07	22.47		1
	3	3	22.21	22.06	22.41		1
	6	0	21.25	21.09	21.48	0-2	2
64QAM	1	0	21.40	21.18	21.48	0-2	2
	1	2	21.42	21.25	21.49		2
	1	5	21.36	21.13	21.49		2
	3	0	21.32	21.18	21.48		2
	3	2	21.38	21.21	21.45		2
	3	3	21.31	21.13	21.47		2
	6	0	20.25	20.11	20.49	0-3	3

Table 9-22
LTE Band 66 (AWS) Reduced Conducted Powers - 20 MHz Bandwidth

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132072 (1720.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132572 (1770.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.36	20.52	20.50	0	0
	1	50	20.28	20.28	20.53		0
	1	99	20.40	20.35	**20.58**		0
	50	0	20.36	20.43	20.42	0-1	0
	50	25	20.34	20.34	20.46		0
	50	50	20.31	20.33	**20.53**		0
	100	0	20.35	20.36	20.49		0
16QAM	1	0	20.74	20.95	20.95	0-1	0
	1	50	20.77	20.70	20.98		0
	1	99	20.78	20.67	21.06		0
	50	0	20.50	20.52	20.55	0-2	0
	50	25	20.43	20.45	20.58		0
	50	50	20.51	20.42	20.68		0
	100	0	20.55	20.50	20.64		0
64QAM	1	0	20.76	20.89	20.88	0-2	0
	1	50	20.75	20.71	20.99		0
	1	99	20.77	20.68	21.05		0
	50	0	20.53	20.58	20.62	0-3	0.5
	50	25	20.55	20.51	20.64		0.5
	50	50	20.57	20.43	20.71		0.5
	100	0	20.53	20.52	20.66		0.5

Table 9-23
LTE Band 66 (AWS) Reduced Conducted Powers - 15 MHz Bandwidth

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.31	20.20	20.47	0	0
	1	36	20.16	20.06	20.46		0
	1	74	20.18	20.17	20.60		0
	36	0	20.25	20.13	20.44	0-1	0
	36	18	20.21	20.13	20.43		0
	36	37	20.18	20.08	20.48		0
	75	0	20.18	20.12	20.42		0
16QAM	1	0	20.55	20.44	20.80	0-1	0
	1	36	20.42	20.29	20.73		0
	1	74	20.46	20.34	20.83		0
	36	0	20.39	20.28	20.60	0-2	0
	36	18	20.36	20.23	20.58		0
	36	37	20.34	20.22	20.64		0
	75	0	20.34	20.22	20.51		0
64QAM	1	0	20.58	20.58	20.86	0-2	0
	1	36	20.51	20.34	20.87		0
	1	74	20.56	20.44	20.96		0
	36	0	20.43	20.32	20.67	0-3	0.5
	36	18	20.44	20.27	20.63		0.5
	36	37	20.40	20.23	20.69		0.5
	75	0	20.37	20.23	20.57		0.5

Table 9-24
LTE Band 66 (AWS) Reduced Conducted Powers - 10 MHz Bandwidth

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.20	20.09	20.45	0	0
	1	25	20.11	20.01	20.42		0
	1	49	20.13	20.11	20.48		0
	25	0	20.19	20.10	20.46	0-1	0
	25	12	20.17	20.09	20.43		0
	25	25	20.13	20.05	20.43		0
	50	0	20.14	20.08	20.41		0
16QAM	1	0	20.40	20.34	20.78	0-1	0
	1	25	20.38	20.27	20.64		0
	1	49	20.40	20.27	20.76		0
	25	0	20.33	20.21	20.60	0-2	0
	25	12	20.30	20.19	20.60		0
	25	25	20.29	20.15	20.54		0
	50	0	20.29	20.18	20.54		0
64QAM	1	0	20.39	20.39	20.72	0-2	0
	1	25	20.38	20.33	20.70		0
	1	49	20.40	20.40	20.71		0
	25	0	20.36	20.24	20.63	0-3	0.5
	25	12	20.35	20.22	20.62		0.5
	25	25	20.32	20.18	20.60		0.5
	50	0	20.35	20.23	20.61		0.5

Table 9-25
LTE Band 66 (AWS) Reduced Conducted Powers - 5 MHz Bandwidth

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.20	20.04	20.40	0	0
	1	12	20.14	20.03	20.48		0
	1	24	20.13	20.02	20.47		0
	12	0	20.20	20.07	20.45	0-1	0
	12	6	20.18	20.09	20.55		0
	12	13	20.16	20.05	20.51		0
	25	0	20.15	20.05	20.39		0
16QAM	1	0	20.46	20.26	20.77	0-1	0
	1	12	20.41	20.20	20.77		0
	1	24	20.43	20.18	20.89		0
	12	0	20.35	20.16	20.60	0-2	0
	12	6	20.32	20.18	20.72		0
	12	13	20.32	20.15	20.62		0
	25	0	20.25	20.14	20.55		0
64QAM	1	0	20.54	20.40	20.83	0-2	0
	1	12	20.51	20.31	20.84		0
	1	24	20.52	20.28	20.88		0
	12	0	20.41	20.26	20.68	0-3	0.5
	12	6	20.41	20.27	20.81		0.5
	12	13	20.39	20.21	20.74		0.5
	25	0	20.30	20.18	20.58		0.5

Table 9-26
LTE Band 66 (AWS) Reduced Conducted Powers - 3 MHz Bandwidth

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131987 (1711.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132657 (1778.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.12	20.00	20.48	0	0
	1	7	20.22	20.10	20.56		0
	1	14	20.11	20.04	20.48		0
	8	0	20.15	20.06	20.58	0-1	0
	8	4	20.19	20.08	20.51		0
	8	7	20.15	20.05	20.52		0
	15	0	20.13	20.04	20.47		0
16QAM	1	0	20.35	20.18	20.75	0-1	0
	1	7	20.56	20.25	20.83		0
	1	14	20.40	20.20	20.66		0
	8	0	20.32	20.20	20.70	0-2	0
	8	4	20.37	20.18	20.72		0
	8	7	20.32	20.17	20.66		0
	15	0	20.29	20.14	20.64		0
64QAM	1	0	20.44	20.35	20.85	0-2	0
	1	7	20.57	20.39	20.98		0
	1	14	20.51	20.29	20.83		0
	8	0	20.38	20.22	20.74	0-3	0.5
	8	4	20.39	20.24	20.75		0.5
	8	7	20.37	20.20	20.80		0.5
	15	0	20.29	20.16	20.63		0.5

Table 9-27
LTE Band 66 (AWS) Reduced Conducted Powers -1.4 MHz Bandwidth

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131979 (1710.7 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132665 (1779.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	20.08	19.95	20.40	0	0
	1	2	20.14	20.03	20.52		0
	1	5	20.08	19.99	20.41		0
	3	0	20.09	20.00	20.44		0
	3	2	20.10	19.97	20.47		0
	3	3	20.07	19.95	20.44		0
	6	0	20.08	19.99	20.43	0-1	0
16QAM	1	0	20.24	20.10	20.65	0-1	0
	1	2	20.37	20.22	20.74		0
	1	5	20.28	20.14	20.62		0
	3	0	20.30	20.11	20.61		0
	3	2	20.33	20.14	20.65		0
	3	3	20.28	20.13	20.58		0
	6	0	20.23	20.09	20.59	0-2	0
64QAM	1	0	20.40	20.33	20.84	0-2	0
	1	2	20.47	20.32	20.88		0
	1	5	20.45	20.23	20.73		0
	3	0	20.35	20.21	20.73		0
	3	2	20.44	20.26	20.78		0
	3	3	20.38	20.24	20.71		0
	6	0	20.23	20.11	20.66	0-3	0.5

9.3.5 LTE Band 2 (PCS)

Table 9-28
LTE Band 2 (PCS) Conducted Powers - 20 MHz Bandwidth

LTE Band 2 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18700 (1860.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19100 (1900.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.80	**22.85**	22.51	0	0
	1	50	22.79	22.76	22.46		0
	1	99	22.71	22.77	22.08		0
	50	0	21.70	21.77	21.49	0-1	1
	50	25	21.74	**21.78**	21.55		1
	50	50	**21.78**	21.70	21.50		1
	100	0	21.77	21.76	21.51		1
16QAM	1	0	22.25	22.17	21.94	0-1	1
	1	50	22.23	22.17	21.91		1
	1	99	22.23	22.15	21.50		1
	50	0	20.84	20.89	20.62	0-2	2
	50	25	20.84	20.89	20.65		2
	50	50	20.92	20.83	20.66		2
	100	0	20.93	20.92	20.65		2
64QAM	1	0	21.09	21.14	20.92	0-2	2
	1	50	21.08	21.11	20.86		2
	1	99	21.10	21.07	20.82		2
	50	0	19.85	19.88	19.59	0-3	3
	50	25	19.85	19.95	19.63		3
	50	50	19.87	19.87	19.66		3
	100	0	19.90	19.88	19.66		3

Table 9-29
LTE Band 2 (PCS) Conducted Powers - 15 MHz Bandwidth

LTE Band 2 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18675 (1857.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19125 (1902.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.63	22.72	22.65	0	0
	1	36	22.62	22.80	22.66		0
	1	74	22.61	22.72	22.69		0
	36	0	21.65	21.76	21.68	0-1	1
	36	18	21.75	21.82	21.71		1
	36	37	21.70	21.79	21.74		1
	75	0	21.72	21.78	21.71		1
16QAM	1	0	21.89	21.95	22.01	0-1	1
	1	36	21.89	22.07	22.00		1
	1	74	21.92	22.06	22.03		1
	36	0	20.84	20.98	20.82	0-2	2
	36	18	20.91	21.01	20.87		2
	36	37	20.83	20.97	20.89		2
	75	0	20.89	20.94	20.87		2
64QAM	1	0	21.04	21.18	21.13	0-2	2
	1	36	21.02	21.19	21.09		2
	1	74	21.01	21.18	21.15		2
	36	0	19.85	20.00	19.86	0-3	3
	36	18	19.99	20.04	19.90		3
	36	37	19.88	19.97	19.93		3
	75	0	19.90	19.94	19.85		3

Table 9-30
LTE Band 2 (PCS) Conducted Powers - 10 MHz Bandwidth

LTE Band 2 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18650 (1855.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19150 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.73	22.85	22.64	0	0
	1	25	22.62	22.77	22.67		0
	1	49	22.73	22.81	22.68		0
	25	0	21.37	21.45	21.35	0-1	1
	25	12	21.34	21.46	21.35		1
	25	25	21.33	21.44	21.34		1
	50	0	21.33	21.40	21.33		1
16QAM	1	0	22.00	22.13	21.90	0-1	1
	1	25	21.88	22.10	21.92		1
	1	49	22.02	22.13	21.97		1
	25	0	21.24	21.30	21.29	0-2	2
	25	12	21.29	21.33	21.31		2
	25	25	21.30	21.34	21.32		2
	50	0	21.25	21.34	21.32		2
64QAM	1	0	21.16	21.23	21.00	0-2	2
	1	25	21.02	21.15	21.05		2
	1	49	21.16	21.24	21.08		2
	25	0	19.81	19.97	19.82	0-3	3
	25	12	19.85	19.95	19.85		3
	25	25	19.87	19.95	19.86		3
	50	0	19.92	19.93	19.82		3

Table 9-31
LTE Band 2 (PCS) Conducted Powers - 5 MHz Bandwidth

LTE Band 2 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18625 (1852.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19175 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.51	22.66	22.50	0	0
	1	12	22.54	22.69	22.56		0
	1	24	22.48	22.64	22.53		0
	12	0	21.60	21.71	21.57	0-1	1
	12	6	21.59	21.74	21.60		1
	12	13	21.57	21.71	21.57		1
	25	0	21.05	21.20	21.20		1
16QAM	1	0	21.78	21.90	21.92	0-1	1
	1	12	21.81	21.94	21.84		1
	1	24	21.75	21.92	21.81		1
	12	0	20.72	20.86	20.75	0-2	2
	12	6	20.77	20.87	20.81		2
	12	13	20.70	20.85	20.76		2
	25	0	20.70	20.81	20.71		2
64QAM	1	0	20.89	21.06	20.91	0-2	2
	1	12	20.90	21.08	21.10		2
	1	24	20.88	21.09	21.04		2
	12	0	19.81	19.91	19.85	0-3	3
	12	6	19.81	19.97	19.93		3
	12	13	19.82	19.91	19.89		3
	25	0	19.72	19.84	19.78		3

Table 9-32
LTE Band 2 (PCS) Conducted Powers - 3 MHz Bandwidth

LTE Band 2 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18615 (1851.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19185 (1908.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.57	22.70	22.60	0	0
	1	7	22.70	22.83	22.65		0
	1	14	22.54	22.64	22.58		0
	8	0	21.65	21.77	21.64	0-1	1
	8	4	21.66	21.78	21.68		1
	8	7	21.61	21.75	21.65		1
	15	0	21.61	21.74	21.61		1
16QAM	1	0	21.82	21.96	21.81	0-1	1
	1	7	21.95	22.08	22.02		1
	1	14	21.83	21.92	21.87		1
	8	0	20.81	20.92	20.85	0-2	2
	8	4	20.85	20.96	20.89		2
	8	7	20.79	20.94	20.85		2
	15	0	20.74	20.86	20.76		2
64QAM	1	0	20.94	21.05	20.99	0-2	2
	1	7	21.06	21.20	21.14		2
	1	14	20.91	21.06	21.04		2
	8	0	19.85	19.97	19.89	0-3	3
	8	4	19.89	20.02	19.96		3
	8	7	19.85	19.98	19.90		3
	15	0	19.77	19.87	19.80		3

Table 9-33
LTE Band 2 (PCS) Conducted Powers -1.4 MHz Bandwidth

LTE Band 2 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18607 (1850.7 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19193 (1909.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.55	22.66	22.54	0	0
	1	2	22.58	22.74	22.61		0
	1	5	22.51	22.67	22.54		0
	3	0	22.51	22.67	22.54		0
	3	2	22.56	22.71	22.60		0
	3	3	22.49	22.66	22.56		0
	6	0	21.53	21.67	21.58	0-1	1
16QAM	1	0	21.77	21.90	21.80	0-1	1
	1	2	21.85	21.99	21.88		1
	1	5	21.75	21.93	21.82		1
	3	0	21.72	21.90	21.77		1
	3	2	21.77	21.90	21.80		1
	3	3	21.75	21.85	21.77		1
	6	0	20.73	20.84	20.74	0-2	2
64QAM	1	0	20.86	21.02	20.96	0-2	2
	1	2	20.95	21.11	21.04		2
	1	5	20.85	21.01	20.92		2
	3	0	20.84	20.98	20.91		2
	3	2	20.86	21.03	20.94		2
	3	3	20.80	20.96	20.92		2
	6	0	19.70	19.82	19.75	0-3	3

Table 9-34
LTE Band 2 (PCS) Reduced Conducted Powers - 20 MHz Bandwidth

LTE Band 2 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18700 (1860.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19100 (1900.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.97	**19.10**	18.89	0	0
	1	50	18.93	19.08	18.90		0
	1	99	18.98	19.05	18.91		0
	50	0	18.98	19.11	18.95	0-1	0
	50	25	18.98	**19.14**	18.98		0
	50	50	19.01	19.09	18.98		0
	100	0	19.08	19.09	18.96		0
16QAM	1	0	19.44	19.46	19.27	0-1	0
	1	50	19.28	19.50	19.32		0
	1	99	19.35	19.50	19.39		0
	50	0	19.08	19.20	19.03	0-2	0
	50	25	19.12	19.22	19.06		0
	50	50	19.16	19.22	19.07		0
	100	0	19.16	19.20	19.05		0
64QAM	1	0	19.37	19.47	19.29	0-2	0
	1	50	19.27	19.49	19.25		0
	1	99	19.36	19.48	19.37		0
	50	0	19.15	19.22	19.07	0-3	0
	50	25	19.16	19.29	19.09		0
	50	50	19.17	19.24	19.09		0
	100	0	19.19	19.27	19.08		0

Table 9-35
LTE Band 2 (PCS) Reduced Conducted Powers - 15 MHz Bandwidth

LTE Band 2 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18675 (1857.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19125 (1902.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.56	18.96	18.62	0	0
	1	36	18.58	18.75	18.61		0
	1	74	18.59	18.70	18.62		0
	36	0	18.60	18.78	18.65	0-1	0
	36	18	18.74	18.82	18.71		0
	36	37	18.67	18.78	18.67		0
	75	0	18.69	18.78	18.66		0
16QAM	1	0	18.79	18.72	18.84	0-1	0
	1	36	18.80	18.77	18.84		0
	1	74	18.82	18.71	18.84		0
	36	0	18.74	18.77	18.75	0-2	0
	36	18	18.87	18.81	18.79		0
	36	37	18.80	18.87	18.79		0
	75	0	18.81	18.77	18.76		0
64QAM	1	0	18.89	19.04	18.98	0-2	0
	1	36	18.89	19.08	18.96		0
	1	74	18.85	19.03	19.05		0
	36	0	18.71	18.92	18.81	0-3	0
	36	18	18.85	18.97	18.85		0
	36	37	18.80	18.93	18.84		0
	75	0	18.81	18.92	18.80		0

Table 9-36
LTE Band 2 (PCS) Reduced Conducted Powers - 10 MHz Bandwidth

LTE Band 2 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18650 (1855.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19150 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.67	18.85	18.62	0	0
	1	25	18.58	18.77	18.67		0
	1	49	18.68	18.77	18.62		0
	25	0	18.63	18.79	18.66	0-1	0
	25	12	18.62	18.78	18.64		0
	25	25	18.66	18.77	18.63		0
	50	0	18.68	18.76	18.64		0
16QAM	1	0	18.91	19.04	18.82	0-1	0
	1	25	18.80	18.98	18.85		0
	1	49	18.90	19.02	18.88		0
	25	0	18.74	18.89	18.75	0-2	0
	25	12	18.75	18.89	18.75		0
	25	25	18.79	18.87	18.76		0
	50	0	18.82	18.87	18.74		0
64QAM	1	0	18.96	19.01	18.95	0-2	0
	1	25	18.90	18.97	18.97		0
	1	49	19.00	19.00	19.01		0
	25	0	18.74	18.88	18.80	0-3	0
	25	12	18.74	18.89	18.82		0
	25	25	18.80	18.86	18.82		0
	50	0	18.81	18.87	18.78		0

Table 9-37
LTE Band 2 (PCS) Reduced Conducted Powers - 5 MHz Bandwidth

LTE Band 2 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18625 (1852.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19175 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.59	18.74	18.61	0	0
	1	12	18.63	18.78	18.63		0
	1	24	18.55	18.71	18.63		0
	12	0	18.62	18.77	18.67	0-1	0
	12	6	18.63	18.81	18.70		0
	12	13	18.61	18.78	18.66		0
	25	0	18.61	18.75	18.66		0
16QAM	1	0	18.95	18.73	18.82	0-1	0
	1	12	18.85	18.76	18.85		0
	1	24	18.79	18.74	18.79		0
	12	0	18.77	18.80	18.75	0-2	0
	12	6	18.76	18.82	18.79		0
	12	13	18.74	18.77	18.77		0
	25	0	18.71	18.76	18.76		0
64QAM	1	0	18.86	18.97	18.96	0-2	0
	1	12	18.91	18.88	18.99		0
	1	24	18.84	18.88	18.97		0
	12	0	18.81	18.98	18.86	0-3	0
	12	6	18.82	18.97	18.87		0
	12	13	18.77	18.94	18.85		0
	25	0	18.70	18.89	18.79		0

Table 9-38
LTE Band 2 (PCS) Reduced Conducted Powers - 3 MHz Bandwidth

LTE Band 2 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18615 (1851.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19185 (1908.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.56	18.69	18.57	0	0
	1	7	18.68	18.86	18.74		0
	1	14	18.54	18.71	18.58		0
	8	0	18.62	18.77	18.65	0-1	0
	8	4	18.63	18.81	18.68		0
	8	7	18.59	18.75	18.65		0
	15	0	18.59	18.78	18.65		0
16QAM	1	0	18.81	18.94	18.82	0-1	0
	1	7	18.92	19.06	18.94		0
	1	14	18.79	18.93	18.82		0
	8	0	18.76	18.91	18.76	0-2	0
	8	4	18.77	18.91	18.82		0
	8	7	18.75	18.89	18.80		0
	15	0	18.69	18.87	18.76		0
64QAM	1	0	18.85	19.07	18.98	0-2	0
	1	7	19.01	19.16	19.16		0
	1	14	18.84	19.05	19.05		0
	8	0	18.78	18.94	18.88	0-3	0
	8	4	18.82	19.00	18.94		0
	8	7	18.79	18.96	18.89		0
	15	0	18.70	18.88	18.79		0

Table 9-39
LTE Band 2 (PCS) Reduced Conducted Powers -1.4 MHz Bandwidth

LTE Band 2 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18607 (1850.7 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19193 (1909.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.48	18.66	18.56	0	0
	1	2	18.57	18.76	18.74		0
	1	5	18.49	18.65	18.68		0
	3	0	18.51	18.65	18.68		0
	3	2	18.57	18.72	18.73		0
	3	3	18.53	18.66	18.70		0
	6	0	18.52	18.69	18.70	0-1	0
16QAM	1	0	18.70	18.90	18.75	0-1	0
	1	2	18.82	18.93	18.88		0
	1	5	18.77	18.88	18.78		0
	3	0	18.74	18.85	18.75		0
	3	2	18.78	18.90	18.88		0
	3	3	18.68	18.76	18.75		0
	6	0	18.68	18.82	18.74	0-2	0
64QAM	1	0	18.82	18.97	18.97	0-2	0
	1	2	18.88	19.08	19.05		0
	1	5	18.78	19.00	18.95		0
	3	0	18.80	18.95	18.93		0
	3	2	18.81	19.01	18.94		0
	3	3	18.76	18.93	18.91		0
	6	0	18.63	18.82	18.77	0-3	0

9.3.6 LTE Band 41

Table 9-40
LTE Band 41 Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel 39750 (2506.0 MHz)	Low-Mid Channel 40185 (2549.5 MHz)	Mid Channel 40620 (2593.0 MHz)	Mid-High Channel 41055 (2636.5 MHz)	High Channel 41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]						
QPSK	1	0	23.51	23.99	**24.05**	23.60	23.42	0	0
	1	50	23.35	23.98	23.94	23.40	23.15		0
	1	99	23.26	23.99	23.88	23.27	23.14		0
	50	0	22.54	**23.08**	22.96	22.46	22.28	0-1	1
	50	25	22.39	23.03	22.83	22.47	22.27		1
	50	50	22.38	23.02	22.83	22.41	22.11		1
	100	0	22.40	23.04	22.86	22.45	22.24		1
16QAM	1	0	22.63	23.14	23.13	22.71	22.48	0-1	1
	1	50	22.54	23.13	23.08	22.57	22.34		1
	1	99	22.47	23.12	22.99	22.47	22.30		1
	50	0	21.61	22.17	22.09	21.61	21.44	0-2	2
	50	25	21.49	22.11	21.98	21.59	21.45		2
	50	50	21.45	22.11	21.98	21.54	21.26		2
	100	0	21.52	22.11	22.01	21.64	21.43		2
64QAM	1	0	21.48	22.00	21.99	21.61	21.35	0-2	2
	1	50	21.41	22.02	21.95	21.45	21.19		2
	1	99	21.33	21.97	21.88	21.36	21.20		2
	50	0	20.66	21.22	21.15	20.65	20.48	0-3	3
	50	25	20.51	21.15	21.03	20.62	20.49		3
	50	50	20.50	21.14	21.03	20.58	20.32		3
	100	0	20.50	21.10	20.99	20.59	20.43		3

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

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.96	24.06	24.10	23.37	23.36	0	0
	1	36	23.93	23.90	24.01	23.19	23.24		0
	1	74	23.81	23.85	23.87	23.18	23.15		0
	36	0	23.01	22.99	23.07	22.41	22.48	0-1	1
	36	18	22.92	22.99	22.96	22.38	22.45		1
	36	37	22.93	22.89	22.93	22.26	22.31		1
	75	0	22.89	23.02	22.89	22.32	22.36		1
16QAM	1	0	23.08	23.20	23.20	22.54	22.56	0-1	1
	1	36	23.07	23.07	23.15	22.40	22.42		1
	1	74	23.02	23.00	23.03	22.44	22.35		1
	36	0	22.06	22.05	22.22	21.53	21.64	0-2	2
	36	18	21.96	22.07	22.10	21.57	21.64		2
	36	37	21.98	22.01	22.05	21.44	21.47		2
	75	0	21.99	22.10	22.03	21.53	21.53		2
64QAM	1	0	21.94	22.03	22.09	21.47	21.50	0-2	2
	1	36	21.94	21.92	22.04	21.31	21.32		2
	1	74	21.87	21.89	21.93	21.34	21.34		2
	36	0	21.02	21.06	21.21	20.51	20.61	0-3	3
	36	18	20.96	21.06	21.08	20.53	20.64		3
	36	37	20.95	20.97	21.06	20.41	20.49		3
	75	0	20.99	21.09	21.07	20.53	20.61		3

Table 9-42
LTE Band 41 Conducted Powers - 10 MHz Bandwidth

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.97	24.08	24.11	23.36	23.34	0	0
	1	25	23.87	23.94	24.04	23.24	23.24		0
	1	49	23.81	23.96	23.84	23.14	23.20		0
	25	0	22.41	22.48	22.50	21.83	21.87	0-1	1
	25	12	22.44	22.48	22.42	21.85	21.86		1
	25	25	22.39	22.47	22.37	21.69	21.71		1
	50	0	22.41	22.46	22.38	21.84	21.84		1
16QAM	1	0	23.07	23.16	23.13	22.51	22.56	0-1	1
	1	25	22.97	23.08	23.12	22.38	22.40		1
	1	49	22.98	23.07	22.97	22.40	22.35		1
	25	0	21.88	21.95	22.07	21.42	21.51	0-2	2
	25	12	21.89	22.01	21.97	21.46	21.52		2
	25	25	21.87	21.98	21.93	21.31	21.37		2
	50	0	21.96	22.07	22.05	21.49	21.55		2
64QAM	1	0	21.92	22.03	22.03	21.39	21.50	0-2	2
	1	25	21.86	21.95	22.05	21.31	21.29		2
	1	49	21.85	21.98	21.89	21.30	21.33		2
	25	0	21.02	21.12	21.27	20.56	20.69	0-3	3
	25	12	21.06	21.15	21.18	20.61	20.67		3
	25	25	21.00	21.15	21.15	20.48	20.54		3
	50	0	20.98	21.10	21.10	20.56	20.61		3

Table 9-43
LTE Band 41 Conducted Powers - 5 MHz Bandwidth

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.99	23.99	23.97	23.31	23.34	0	0
	1	12	23.92	23.99	23.97	23.23	23.24		0
	1	24	23.88	23.97	23.87	23.17	23.15		0
	12	0	22.96	22.97	22.99	22.35	22.35	0-1	1
	12	6	22.90	22.97	23.01	22.26	22.32		1
	12	13	22.85	22.97	22.88	22.22	22.27		1
	25	0	22.86	22.96	22.91	22.37	22.38		1
16QAM	1	0	23.08	23.08	23.16	22.53	22.51	0-1	1
	1	12	22.97	23.06	23.13	22.42	22.46		1
	1	24	22.98	23.11	23.02	22.41	22.40		1
	12	0	22.10	22.07	22.19	21.51	21.57	0-2	2
	12	6	21.99	22.10	22.25	21.47	21.51		2
	12	13	22.00	22.07	22.05	21.40	21.49		2
	25	0	21.89	22.01	21.98	21.44	21.52		2
64QAM	1	0	21.97	21.93	22.07	21.43	21.39	0-2	2
	1	12	21.87	21.96	22.02	21.32	21.35		2
	1	24	21.84	21.96	21.92	21.30	21.29		2
	12	0	21.00	21.01	21.09	20.44	20.52	0-3	3
	12	6	20.94	21.06	21.13	20.35	20.45		3
	12	13	20.89	21.02	20.97	20.35	20.40		3
	25	0	21.03	21.14	21.11	20.61	20.65		3

9.4 WLAN Conducted Powers

Table 9-44
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
		Average	Average	Average
2412	1	17.82	16.15	15.98
2437	6	**18.53**	15.94	16.69
2462	11	18.03	16.07	15.96

Table 9-45
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
		Average	Average	Average
2412	1	18.00	15.97	15.83
2437	6	**18.23**	16.50	16.29
2462	11	17.59	16.15	15.96

Table 9-46
5 GHz (20MHz) WLAN Maximum Average RF Power – Ant 1

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
		Average	Average	Average
5180	36	14.29	13.17	13.20
5200	40	16.37	15.38	15.37
5220	44	16.62	15.54	15.51
5240	48	16.61	15.55	15.62
5260	52	16.40	15.37	15.35
5280	56	**16.98**	15.84	15.78
5300	60	16.92	15.78	15.89
5320	64	15.97	13.96	13.93
5500	100	**16.92**	15.65	15.68
5600	120	16.90	15.75	15.73
5620	124	16.11	15.82	15.83
5720	144	15.77	15.48	15.58
5745	149	16.03	15.86	15.86
5785	157	**16.12**	15.19	15.13
5825	165	15.99	14.95	14.95

Table 9-47
5 GHz (20MHz) WLAN Maximum Average RF Power – Ant 2

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
		Average	Average	Average
5180	36	14.10	13.47	13.51
5200	40	16.00	14.87	14.92
5220	44	16.12	15.00	15.04
5240	48	16.32	15.14	15.25
5260	52	16.25	14.99	15.11
5280	56	16.24	15.08	15.14
5300	60	15.84	14.60	14.97
5320	64	**16.48**	12.95	13.04
5500	100	15.97	15.54	15.85
5600	120	15.98	15.73	15.84
5620	124	16.23	15.97	14.95
5720	144	**16.64**	15.09	15.34
5745	149	16.95	15.41	15.64
5785	157	**16.99**	15.57	15.71
5825	165	15.95	15.78	15.84

Table 9-48
5 GHz (20 MHz) WLAN Maximum Average RF Power – MIMO

5GHz (20MHz) 802.11a Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
5180	36	14.29	14.10	17.21
5200	40	16.37	16.00	19.20
5220	44	16.62	16.12	19.39
5240	48	16.61	16.32	19.48
5260	52	16.40	16.25	19.34
5280	56	**16.98**	**16.24**	**19.64**
5300	60	16.92	15.84	19.42
5320	64	15.97	16.48	19.24
5500	100	**16.92**	**15.97**	**19.48**
5600	120	16.90	15.98	19.47
5620	124	16.11	16.23	19.18
5720	144	15.77	16.64	19.24
5745	149	16.03	16.95	19.52
5785	157	**16.12**	**16.99**	**19.59**
5825	165	15.99	15.95	18.98

Table 9-49
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	12.10	11.72	11.47
2437	6	**12.93**	12.46	12.29
2462	11	12.44	11.94	11.76

Table 9-50
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	11.60	11.03	10.82
2437	6	**11.83**	11.25	11.06
2462	11	10.97	11.51	11.34

Table 9-51
5 GHz (40 MHz) WLAN Reduced Average RF Power – Ant 1

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
		Average	Average
5190	38	11.13	11.03
5230	46	11.53	11.53
5270	54	**12.50**	11.48
5310	62	12.04	11.99
5510	102	11.80	11.85
5590	118	12.08	12.09
5630	126	11.80	11.84
5710	142	12.38	11.49
5755	151	11.63	11.75
5795	159	12.35	12.37

Table 9-52
5 GHz (40 MHz) WLAN Reduced Average RF Power – Ant 2

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
		Average	Average
5190	38	11.08	11.01
5230	46	12.32	12.32
5270	54	12.50	12.46
5310	62	**12.67**	12.70
5510	102	12.32	12.35
5590	118	11.85	11.77
5630	126	11.74	11.70
5710	142	11.50	11.40
5755	151	12.60	12.56
5795	159	12.30	12.27

Table 9-53
5 GHz (80 MHz) WLAN Reduced Average RF Power – Ant 1

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
		Average
5210	42	10.14
5290	58	10.54
5530	106	11.70
5610	122	11.52
5690	138	**12.30**
5775	155	**11.90**

Table 9-54
5 GHz (80 MHz) WLAN Reduced Average RF Power – Ant2

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
		Average
5210	42	10.62
5290	58	10.36
5530	106	11.51
5610	122	12.19
5690	138	**12.22**
5775	155	**12.48**

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

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.

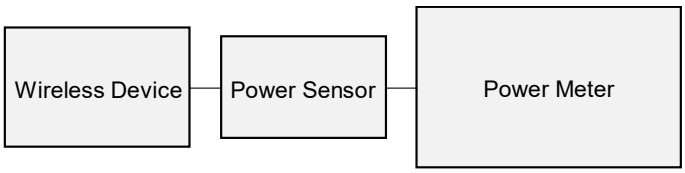


Figure 9-3
Power Measurement Setup

9.5 Bluetooth Conducted Powers

Table 9-55
Bluetooth Average RF Power

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
			[dBm]	[mW]
2402	1.0	0	**12.56**	18.016
2441	1.0	39	12.26	16.829
2480	1.0	78	11.98	15.760
2402	2.0	0	9.97	9.931
2441	2.0	39	9.47	8.856
2480	2.0	78	9.78	9.515
2402	3.0	0	10.03	10.077
2441	3.0	39	9.53	8.972
2480	3.0	78	9.85	9.651

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

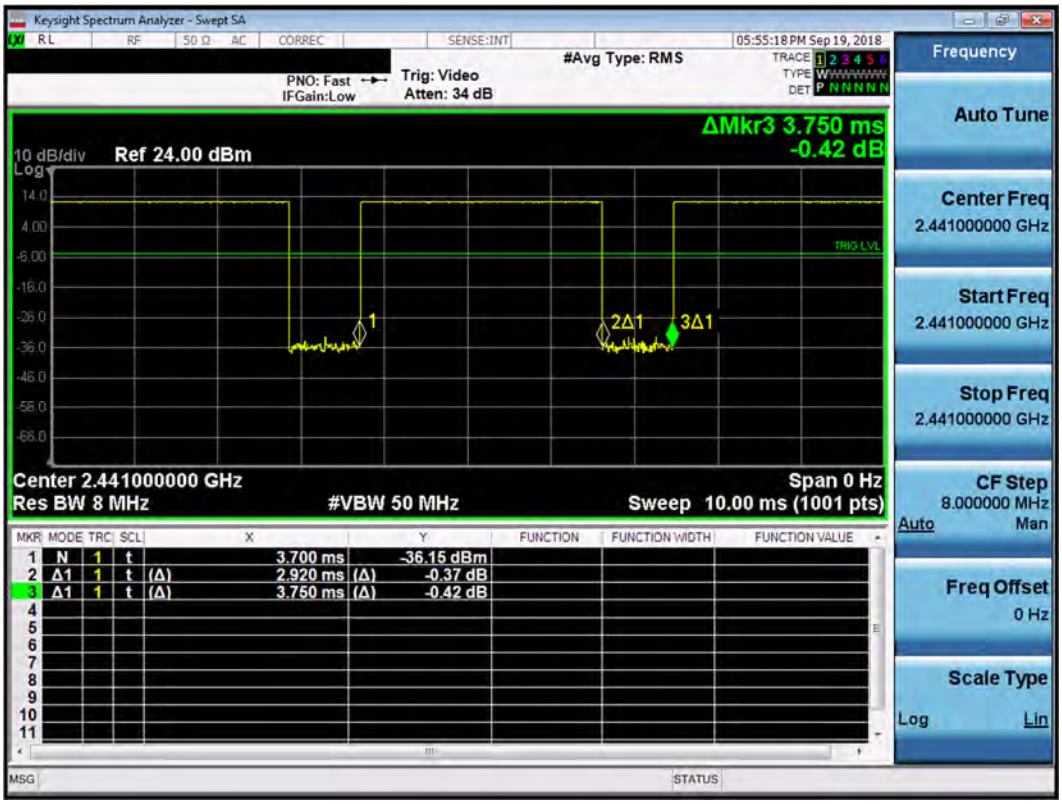


Figure 9-4
Bluetooth Transmission Plot

Equation 9-1
Bluetooth Duty Cycle Calculation

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.92ms}{3.75ms} * 100\% = 77.9\%$$

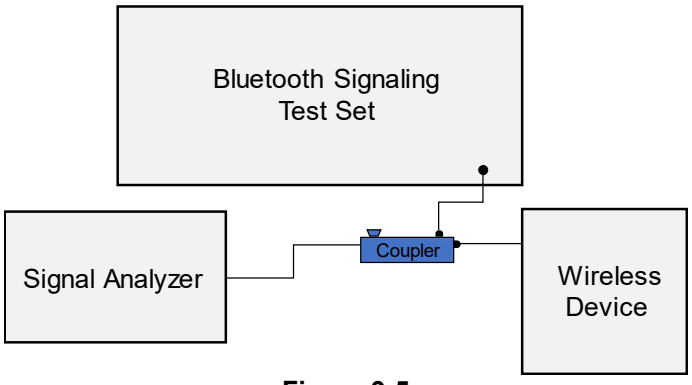


Figure 9-5
Power Measurement Setup

10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
9/10/2018	750H	20.9	700	0.860	42.412	0.889	42.201	-3.26%	0.50%
			710	0.868	42.390	0.890	42.149	-2.47%	0.57%
			740	0.880	42.129	0.893	41.994	-1.46%	0.32%
			755	0.887	42.069	0.894	41.916	-0.78%	0.37%
9/19/2018	750H	22.1	740	0.885	40.636	0.893	41.994	-0.90%	-3.23%
			755	0.892	40.492	0.894	41.916	-0.22%	-3.40%
			770	0.897	40.493	0.895	41.838	0.22%	-3.21%
			785	0.899	40.456	0.896	41.760	0.33%	-3.12%
9/11/2018	835H	21.3	820	0.913	40.759	0.899	41.578	1.56%	-1.97%
			835	0.921	40.740	0.900	41.500	2.33%	-1.83%
			850	0.924	40.709	0.916	41.500	0.87%	-1.91%
9/13/2018	1750H	22.2	1710	1.339	41.277	1.348	40.142	-0.67%	2.83%
			1750	1.366	41.282	1.371	40.079	-0.36%	3.00%
			1790	1.393	41.184	1.394	40.016	-0.07%	2.92%
9/11/2018	1900H	21.6	1850	1.413	38.439	1.400	40.000	0.93%	-3.90%
			1880	1.431	38.357	1.400	40.000	2.21%	-4.11%
			1910	1.449	38.367	1.400	40.000	3.50%	-4.08%
9/6/2018	2450H	21.9	2400	1.780	38.175	1.756	39.289	1.37%	-2.84%
			2450	1.816	38.122	1.800	39.200	0.89%	-2.75%
			2500	1.855	38.004	1.855	39.136	0.00%	-2.89%
9/13/2018	2450H	22.2	2400	1.796	40.345	1.756	39.289	2.28%	2.69%
			2450	1.833	40.298	1.800	39.200	1.83%	2.80%
			2500	1.874	40.205	1.855	39.136	1.02%	2.73%
9/18/2018	2450H	20.8	2450	1.836	38.486	1.800	39.200	2.00%	-1.82%
			2500	1.868	38.473	1.855	39.136	0.70%	-1.69%
			2550	1.907	38.345	1.909	39.073	-0.10%	-1.86%
			2600	1.950	38.309	1.964	39.009	-0.71%	-1.79%
			2650	1.989	38.194	2.018	38.945	-1.44%	-1.93%
			2700	2.030	38.111	2.073	38.882	-2.07%	-1.98%
09/04/2018	5200H-5800H	21.5	5180	4.469	35.841	4.635	36.009	-3.58%	-0.47%
			5200	4.497	35.852	4.655	35.986	-3.39%	-0.37%
			5220	4.511	35.821	4.676	35.963	-3.53%	-0.39%
			5240	4.530	35.794	4.696	35.940	-3.53%	-0.41%
			5260	4.552	35.772	4.717	35.917	-3.50%	-0.40%
			5280	4.581	35.744	4.737	35.894	-3.29%	-0.42%
			5300	4.595	35.701	4.758	35.871	-3.43%	-0.47%
			5320	4.610	35.683	4.778	35.849	-3.52%	-0.46%
			5500	4.787	35.398	4.963	35.643	-3.55%	-0.69%
			5520	4.812	35.417	4.983	35.620	-3.43%	-0.57%
			5540	4.834	35.376	5.004	35.597	-3.40%	-0.62%
			5560	4.863	35.336	5.024	35.574	-3.20%	-0.67%
			5580	4.866	35.327	5.045	35.551	-3.55%	-0.63%
			5600	4.886	35.309	5.065	35.529	-3.53%	-0.62%
			5620	4.914	35.303	5.086	35.506	-3.38%	-0.57%
			5640	4.938	35.209	5.106	35.483	-3.29%	-0.77%
			5660	4.972	35.212	5.127	35.460	-3.02%	-0.70%
			5680	4.979	35.210	5.147	35.437	-3.26%	-0.64%
			5700	5.004	35.181	5.168	35.414	-3.17%	-0.66%
			5745	5.055	35.080	5.214	35.363	-3.05%	-0.80%
			5765	5.073	35.035	5.234	35.340	-3.08%	-0.86%
			5785	5.093	35.055	5.255	35.317	-3.08%	-0.74%
			5800	5.111	35.041	5.270	35.300	-3.02%	-0.73%
			5805	5.116	35.020	5.275	35.294	-3.01%	-0.78%
			5825	5.133	35.001	5.296	35.271	-3.08%	-0.77%

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
9/10/2018	750B	20.5	700	0.944	54.806	0.959	55.726	-1.56%	-1.65%
			710	0.947	54.774	0.960	55.687	-1.35%	-1.64%
			740	0.958	54.645	0.963	55.570	-0.52%	-1.66%
			755	0.964	54.631	0.964	55.512	0.00%	-1.59%
9/18/2018	750B	22.2	740	0.941	57.107	0.963	55.570	-2.28%	2.77%
			755	0.953	57.006	0.964	55.512	-1.14%	2.69%
			770	0.971	56.899	0.965	55.453	0.62%	2.61%
			785	0.985	56.819	0.966	55.395	1.97%	2.57%
9/6/2018	835B	22.2	820	0.931	53.949	0.969	55.258	-3.92%	-2.37%
			835	0.945	53.865	0.970	55.200	-2.58%	-2.42%
			850	0.961	53.732	0.988	55.154	-2.73%	-2.58%
10/8/2018	835B	21.0	820	0.961	54.601	0.969	55.258	-0.83%	-1.19%
			835	0.973	54.482	0.970	55.200	0.31%	-1.30%
			850	0.990	54.336	0.988	55.154	0.20%	-1.48%
9/12/2018	1750B	20.0	1710	1.460	52.667	1.463	53.537	-0.21%	-1.63%
			1750	1.486	52.593	1.488	53.432	-0.13%	-1.57%
			1790	1.513	52.539	1.514	53.326	-0.07%	-1.48%
10/11/2018	1750B	21.0	1710	1.455	52.543	1.463	53.537	-0.55%	-1.86%
			1750	1.484	52.483	1.488	53.432	-0.27%	-1.78%
			1790	1.511	52.382	1.514	53.326	-0.20%	-1.77%
9/4/2018	1900B	21.3	1850	1.518	53.383	1.520	53.300	-0.13%	0.16%
			1880	1.539	53.339	1.520	53.300	1.25%	0.07%
			1910	1.562	53.305	1.520	53.300	2.76%	0.01%
9/17/2018	1900B	21.5	1850	1.517	52.304	1.520	53.300	-0.20%	-1.87%
			1880	1.554	52.290	1.520	53.300	2.24%	-1.89%
			1910	1.580	52.232	1.520	53.300	3.95%	-2.00%
9/17/2018	1900B	20.1	1850	1.545	51.833	1.520	53.300	1.64%	-2.75%
			1880	1.566	51.765	1.520	53.300	3.03%	-2.88%
			1910	1.588	51.733	1.520	53.300	4.47%	-2.94%
9/25/2018	1900B	21.4	1850	1.505	50.783	1.520	53.300	-0.99%	-4.72%
			1880	1.528	50.672	1.520	53.300	0.53%	-4.93%
			1910	1.548	50.668	1.520	53.300	1.84%	-4.94%
9/4/2018	2450B	23.3	2400	1.977	50.994	1.902	52.767	3.94%	-3.36%
			2450	2.029	50.839	1.950	52.700	4.05%	-3.53%
			2500	2.088	50.680	2.021	52.636	3.32%	-3.72%
9/10/2018	2450B	21.8	2400	1.987	50.928	1.902	52.767	4.47%	-3.49%
			2450	2.043	50.771	1.950	52.700	4.77%	-3.66%
			2500	2.104	50.628	2.021	52.636	4.11%	-3.81%

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
9/19/2018	2450B	23.2	2450	2.018	51.443	1.950	52.700	3.49%	-2.39%
			2500	2.076	51.296	2.021	52.636	2.72%	-2.55%
			2550	2.139	51.128	2.092	52.573	2.25%	-2.75%
			2600	2.194	51.007	2.163	52.509	1.43%	-2.86%
			2650	2.253	50.808	2.234	52.445	0.85%	-3.12%
			2700	2.314	50.688	2.305	52.382	0.39%	-3.23%
9/24/2018	2450B	22.0	2400	1.970	52.243	1.902	52.767	3.58%	-0.99%
			2450	2.040	52.078	1.950	52.700	4.62%	-1.18%
			2500	2.091	52.010	2.021	52.636	3.46%	-1.19%
			2550	2.168	51.775	2.092	52.573	3.63%	-1.52%
			2600	2.208	51.775	2.163	52.509	2.08%	-1.40%
			2650	2.292	51.421	2.234	52.445	2.60%	-1.95%
			2700	2.341	51.483	2.305	52.382	1.56%	-1.72%
09/04/2018	5200B-5800B	22.0	5180	5.406	47.691	5.276	49.041	2.46%	-2.75%
			5200	5.431	47.672	5.299	49.014	2.49%	-2.74%
			5220	5.451	47.631	5.323	48.987	2.40%	-2.77%
			5240	5.486	47.593	5.346	48.960	2.62%	-2.79%
			5260	5.510	47.560	5.369	48.933	2.63%	-2.81%
			5280	5.544	47.558	5.393	48.906	2.80%	-2.76%
			5300	5.560	47.536	5.416	48.879	2.66%	-2.75%
			5320	5.583	47.465	5.439	48.851	2.65%	-2.84%
			5500	5.818	47.144	5.650	48.607	2.97%	-3.01%
			5520	5.853	47.140	5.673	48.580	3.17%	-2.96%
			5540	5.876	47.098	5.696	48.553	3.16%	-3.00%
			5560	5.910	47.061	5.720	48.526	3.32%	-3.02%
			5580	5.923	47.023	5.743	48.499	3.13%	-3.04%
			5600	5.960	47.006	5.766	48.471	3.36%	-3.02%
			5620	5.994	47.017	5.790	48.444	3.52%	-2.95%
			5640	6.020	46.919	5.813	48.417	3.56%	-3.09%
			5660	6.055	46.923	5.837	48.390	3.73%	-3.03%
			5680	6.070	46.879	5.860	48.363	3.58%	-3.07%
			5700	6.100	46.853	5.883	48.336	3.69%	-3.07%
			5745	6.170	46.740	5.936	48.275	3.94%	-3.18%
			5765	6.190	46.665	5.959	48.248	3.88%	-3.28%
			5785	6.215	46.706	5.982	48.220	3.90%	-3.14%
			5800	6.237	46.667	6.000	48.200	3.95%	-3.18%
			5805	6.244	46.644	6.006	48.193	3.96%	-3.21%
			5825	6.269	46.644	6.029	48.166	3.98%	-3.16%
09/20/2018	5200B-5800B	22.1	5180	5.307	47.250	5.276	49.041	0.59%	-3.65%
			5200	5.333	47.217	5.299	49.014	0.64%	-3.67%
			5220	5.359	47.182	5.323	48.987	0.68%	-3.68%
			5240	5.385	47.145	5.346	48.960	0.73%	-3.71%
			5260	5.412	47.110	5.369	48.933	0.80%	-3.73%
			5280	5.439	47.075	5.393	48.906	0.85%	-3.74%
			5300	5.466	47.038	5.416	48.879	0.92%	-3.77%
			5320	5.493	47.003	5.439	48.851	0.99%	-3.78%
			5500	5.734	46.714	5.650	48.607	1.49%	-3.89%
			5520	5.761	46.683	5.673	48.580	1.55%	-3.90%
			5540	5.789	46.652	5.696	48.553	1.63%	-3.92%
			5560	5.816	46.623	5.720	48.526	1.68%	-3.92%
			5580	5.843	46.592	5.743	48.499	1.74%	-3.93%
			5600	5.871	46.559	5.766	48.471	1.82%	-3.94%
			5620	5.898	46.528	5.790	48.444	1.87%	-3.96%
			5640	5.926	46.498	5.813	48.417	1.94%	-3.96%
			5660	5.954	46.468	5.837	48.390	2.00%	-3.97%
			5680	5.981	46.434	5.860	48.363	2.06%	-3.99%
			5700	6.009	46.403	5.883	48.336	2.14%	-4.00%
			5745	6.071	46.335	5.936	48.275	2.27%	-4.02%
			5765	6.099	46.303	5.959	48.248	2.35%	-4.03%
			5785	6.127	46.272	5.982	48.220	2.42%	-4.04%
			5800	6.148	46.247	6.000	48.200	2.47%	-4.05%
			5805	6.156	46.240	6.006	48.193	2.50%	-4.05%
			5825	6.184	46.206	6.029	48.166	2.57%	-4.07%

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 10-2
System Verification Results – 1g

SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	$Deviation_{1g}$ (%)
H	750	HEAD	09/10/2018	21.5	20.9	0.200	1003	7409	1.750	8.280	8.750	5.68%
G	750	HEAD	09/19/2018	23.5	22.1	0.200	1054	7410	1.580	8.370	7.900	-5.62%
G	835	HEAD	09/11/2018	21.5	21.3	0.200	4d133	7410	1.990	9.520	9.950	4.52%
G	1750	HEAD	09/13/2018	23.0	22.0	0.100	1148	7410	3.440	36.400	34.400	-5.49%
G	1900	HEAD	09/11/2018	22.2	21.6	0.100	5d149	7410	3.960	39.600	39.600	0.00%
G	2450	HEAD	09/06/2018	22.6	21.9	0.100	797	7410	5.520	52.700	55.200	4.74%
G	2450	HEAD	09/13/2018	23.0	22.0	0.100	797	7410	5.260	52.700	52.600	-0.19%
E	2450	HEAD	09/18/2018	21.1	20.8	0.100	719	3213	5.390	51.900	53.900	3.85%
E	2600	HEAD	09/18/2018	21.1	20.8	0.100	1064	3213	6.070	57.000	60.700	6.49%
H	5250	HEAD	09/04/2018	21.4	21.5	0.050	1057	7409	3.790	79.200	75.800	-4.29%
H	5600	HEAD	09/04/2018	21.4	21.5	0.050	1057	7409	3.930	84.100	78.600	-6.54%
H	5750	HEAD	09/04/2018	21.4	21.5	0.050	1057	7409	3.980	80.500	79.600	-1.12%
J	750	BODY	09/10/2018	20.2	20.5	0.200	1161	3347	1.670	8.430	8.350	-0.95%
K	750	BODY	09/18/2018	23.2	21.7	0.200	1161	3319	1.810	8.430	9.050	7.35%
E	835	BODY	09/06/2018	23.1	22.2	0.200	4d132	3213	2.050	9.710	10.250	5.56%
D	835	BODY	10/08/2018	22.5	21.0	0.200	4d133	7357	1.970	9.410	9.850	4.68%
J	1750	BODY	09/12/2018	22.1	21.0	0.100	1008	3347	3.890	37.400	38.900	4.01%
J	1750	BODY	10/11/2018	21.0	21.1	0.100	1008	3347	3.750	37.400	37.500	0.27%
J	1900	BODY	09/04/2018	20.5	21.3	0.100	5d148	3347	4.270	39.600	42.700	7.83%
K	1900	BODY	09/17/2018	22.4	21.5	0.100	5d149	3319	3.980	40.100	39.800	-0.75%
J	1900	BODY	09/17/2018	22.1	20.5	0.100	5d148	3347	4.300	39.600	43.000	8.59%
K	2450	BODY	09/04/2018	23.0	21.4	0.100	797	3319	5.380	51.100	53.800	5.28%
K	2450	BODY	09/10/2018	23.0	22.0	0.100	797	3319	5.170	51.100	51.700	1.17%
K	2450	BODY	09/19/2018	22.5	23.0	0.100	797	3319	5.300	51.100	53.000	3.72%
K	2450	BODY	09/24/2018	23.0	21.9	0.100	719	3319	5.040	50.100	50.400	0.60%
K	2600	BODY	09/19/2018	22.5	23.0	0.100	1004	3319	5.480	54.800	54.800	0.00%
K	2600	BODY	09/24/2018	23.0	21.9	0.100	1064	3319	5.190	54.700	51.900	-5.12%
D	5250	BODY	09/04/2018	22.5	21.5	0.050	1191	7357	3.650	77.000	73.000	-5.19%
D	5600	BODY	09/04/2018	22.5	21.5	0.050	1191	7357	4.060	79.200	81.200	2.53%
D	5750	BODY	09/04/2018	22.5	21.5	0.050	1191	7357	3.840	76.100	76.800	0.92%

Table 10-3
System Verification Results – 10g

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)	$Deviation_{10g}$ (%)
J	1750	BODY	09/12/2018	22.1	21.0	0.100	1008	3347	2.080	19.900	20.800	4.52%
K	1900	BODY	09/17/2018	22.4	21.5	0.100	5d149	3319	2.060	21.300	20.600	-3.29%
H	1900	BODY	09/25/2018	22.6	21.4	0.100	5d148	7409	2.200	20.900	22.000	5.26%
K	2450	BODY	09/24/2018	23.0	21.9	0.100	719	3319	2.320	23.700	23.200	-2.11%
K	2600	BODY	09/24/2018	23.0	21.9	0.100	1064	3319	2.280	24.400	22.800	-6.56%
D	5250	BODY	09/20/2018	22.5	21.3	0.050	1057	7357	0.985	21.100	19.700	-6.64%
D	5600	BODY	09/20/2018	22.5	21.3	0.050	1057	7357	1.080	22.300	21.600	-3.14%
D	5750	BODY	09/20/2018	22.5	21.3	0.050	1057	7357	1.030	21.200	20.600	-2.83%

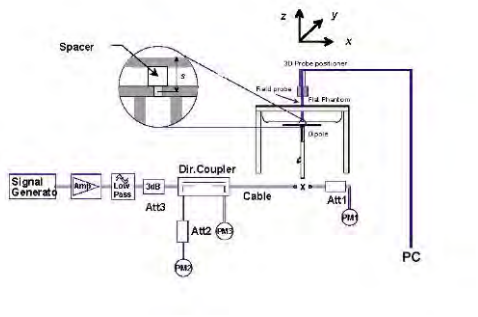


Figure 10-1
System Verification Setup Diagram

Figure 10-2
System Verification Setup Photo

11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
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	34.0	32.84	0.12	Right	Cheek	10288	1:8.3	0.116	1.306	0.151	A1
836.60	190	GSM 850	GSM	34.0	32.84	0.11	Right	Tilt	10288	1:8.3	0.064	1.306	0.084	
836.60	190	GSM 850	GSM	34.0	32.84	0.01	Left	Cheek	10288	1:8.3	0.086	1.306	0.112	
836.60	190	GSM 850	GSM	34.0	32.84	0.07	Left	Tilt	10288	1:8.3	0.064	1.306	0.084	
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	31.0	29.30	0.20	Right	Cheek	10130	1:8.3	0.038	1.479	0.056	
1880.00	661	GSM 1900	GSM	31.0	29.30	0.15	Right	Tilt	10130	1:8.3	0.027	1.479	0.040	
1880.00	661	GSM 1900	GSM	31.0	29.30	0.12	Left	Cheek	10130	1:8.3	0.042	1.479	0.062	A2
1880.00	661	GSM 1900	GSM	31.0	29.30	-0.15	Left	Tilt	10130	1:8.3	0.028	1.479	0.041	
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	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	25.5	24.12	0.04	Right	Cheek	10288	1:1	0.176	1.374	**0.242**	A3
836.60	4183	UMTS 850	RMC	25.5	24.12	0.07	Right	Tilt	10288	1:1	0.092	1.374	0.126	
836.60	4183	UMTS 850	RMC	25.5	24.12	0.06	Left	Cheek	10288	1:1	0.127	1.374	0.174	
836.60	4183	UMTS 850	RMC	25.5	24.12	0.00	Left	Tilt	10288	1:1	0.100	1.374	0.137	
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 1750 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)	
1732.40	1412	UMTS 1750	RMC	25.0	24.41	0.15	Right	Cheek	39131	1:1	0.067	1.146	0.077	
1732.40	1412	UMTS 1750	RMC	25.0	24.41	-0.03	Right	Tilt	39131	1:1	0.044	1.146	0.050	
1732.40	1412	UMTS 1750	RMC	25.0	24.41	0.04	Left	Cheek	39131	1:1	0.078	1.146	0.089	A4
1732.40	1412	UMTS 1750	RMC	25.0	24.41	0.03	Left	Tilt	39131	1:1	0.049	1.146	0.056	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-5
UMTS 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	9400	UMTS 1900	RMC	23.5	22.64	0.11	Right	Cheek	10130	1:1	0.099	1.219	0.121	
1880.00	9400	UMTS 1900	RMC	23.5	22.64	0.07	Right	Tilt	10130	1:1	0.066	1.219	0.080	
1880.00	9400	UMTS 1900	RMC	23.5	22.64	0.10	Left	Cheek	10130	1:1	0.102	1.219	0.124	A5
1880.00	9400	UMTS 1900	RMC	23.5	22.64	0.13	Left	Tilt	10130	1:1	0.070	1.219	0.085	
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 12 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.0	24.02	-0.02	0	Right	Cheek	QPSK	1	0	39139	1:1	0.092	1.253	0.115	A6
707.50	23095	Mid	LTE Band 12	10	24.0	23.07	0.07	1	Right	Cheek	QPSK	25	12	39139	1:1	0.081	1.239	0.100	
707.50	23095	Mid	LTE Band 12	10	25.0	24.02	0.15	0	Right	Tilt	QPSK	1	0	39139	1:1	0.038	1.253	0.048	
707.50	23095	Mid	LTE Band 12	10	24.0	23.07	0.15	1	Right	Tilt	QPSK	25	12	39139	1:1	0.035	1.239	0.043	
707.50	23095	Mid	LTE Band 12	10	25.0	24.02	0.05	0	Left	Cheek	QPSK	1	0	39139	1:1	0.070	1.253	0.088	
707.50	23095	Mid	LTE Band 12	10	24.0	23.07	-0.10	1	Left	Cheek	QPSK	25	12	39139	1:1	0.063	1.239	0.078	
707.50	23095	Mid	LTE Band 12	10	25.0	24.02	-0.17	0	Left	Tilt	QPSK	1	0	39139	1:1	0.044	1.253	0.055	
707.50	23095	Mid	LTE Band 12	10	24.0	23.07	0.21	1	Left	Tilt	QPSK	25	12	39139	1:1	0.038	1.239	0.047	
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 13 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
782.00	23230	Mid	LTE Band 13	10	24.5	23.84	-0.06	0	Right	Cheek	QPSK	1	0	10090	1:1	0.105	1.164	0.122	A7
782.00	23230	Mid	LTE Band 13	10	23.5	22.94	0.16	1	Right	Cheek	QPSK	25	0	10090	1:1	0.079	1.138	0.090	
782.00	23230	Mid	LTE Band 13	10	24.5	23.84	0.14	0	Right	Tilt	QPSK	1	0	10090	1:1	0.049	1.164	0.057	
782.00	23230	Mid	LTE Band 13	10	23.5	22.94	0.06	1	Right	Tilt	QPSK	25	0	10090	1:1	0.035	1.138	0.040	
782.00	23230	Mid	LTE Band 13	10	24.5	23.84	0.04	0	Left	Cheek	QPSK	1	0	10090	1:1	0.067	1.164	0.078	
782.00	23230	Mid	LTE Band 13	10	23.5	22.94	0.16	1	Left	Cheek	QPSK	25	0	10090	1:1	0.048	1.138	0.055	
782.00	23230	Mid	LTE Band 13	10	24.5	23.84	0.17	0	Left	Tilt	QPSK	1	0	10090	1:1	0.044	1.164	0.051	
782.00	23230	Mid	LTE Band 13	10	23.5	22.94	-0.03	1	Left	Tilt	QPSK	25	0	10090	1:1	0.030	1.138	0.034	
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 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	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	25.5	24.49	0.10	0	Right	Cheek	QPSK	1	0	10288	1:1	0.104	1.262	0.131	A8
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.51	0.05	1	Right	Cheek	QPSK	36	18	10288	1:1	0.081	1.256	0.102	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	24.49	0.13	0	Right	Tilt	QPSK	1	0	10288	1:1	0.055	1.262	0.069	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.51	0.14	1	Right	Tilt	QPSK	36	18	10288	1:1	0.039	1.256	0.049	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	24.49	0.12	0	Left	Cheek	QPSK	1	0	10288	1:1	0.092	1.262	0.116	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.51	0.18	1	Left	Cheek	QPSK	36	18	10288	1:1	0.062	1.256	0.078	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	24.49	0.09	0	Left	Tilt	QPSK	1	0	10288	1:1	0.065	1.262	0.082	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.51	0.06	1	Left	Tilt	QPSK	36	18	10288	1:1	0.047	1.256	0.059	
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 66 (AWS) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.25	-0.12	0	Right	Cheek	QPSK	1	99	39131	1:1	0.078	1.189	0.093	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.19	0.19	1	Right	Cheek	QPSK	50	50	39131	1:1	0.068	1.205	0.082	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.25	0.09	0	Right	Tilt	QPSK	1	99	39131	1:1	0.029	1.189	0.034	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.19	0.07	1	Right	Tilt	QPSK	50	50	39131	1:1	0.026	1.205	0.031	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.25	-0.11	0	Left	Cheek	QPSK	1	99	39131	1:1	0.090	1.189	0.107	A9
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.19	0.04	1	Left	Cheek	QPSK	50	50	39131	1:1	0.074	1.205	0.089	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.25	0.05	0	Left	Tilt	QPSK	1	99	39131	1:1	0.042	1.189	0.050	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.19	-0.01	1	Left	Tilt	QPSK	50	50	39131	1:1	0.033	1.205	0.040	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-10
LTE Band 2 (PCS) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.0	22.85	0.15	0	Right	Cheek	QPSK	1	0	10098	1:1	0.114	1.303	0.149	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.0	21.78	0.15	1	Right	Cheek	QPSK	50	25	10098	1:1	0.108	1.324	0.143	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.0	22.85	0.17	0	Right	Tilt	QPSK	1	0	10098	1:1	0.058	1.303	0.076	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.0	21.78	0.13	1	Right	Tilt	QPSK	50	25	10098	1:1	0.056	1.324	0.074	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.0	22.85	0.15	0	Left	Cheek	QPSK	1	0	10098	1:1	0.122	1.303	0.159	A10
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.0	21.78	0.07	1	Left	Cheek	QPSK	50	25	10098	1:1	0.110	1.324	0.146	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.0	22.85	0.09	0	Left	Tilt	QPSK	1	0	10098	1:1	0.064	1.303	0.083	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.0	21.78	0.12	1	Left	Tilt	QPSK	50	25	10098	1:1	0.054	1.324	0.071	
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																			
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)	
2593.00	40620	Mid	LTE Band 41	20	24.5	24.05	0.15	0	Right	Cheek	QPSK	1	0	39139	1:1.58	0.065	1.109	0.072	
2549.50	40185	Low-Mid	LTE Band 41	20	23.5	23.08	0.19	1	Right	Cheek	QPSK	50	0	39139	1:1.58	0.064	1.102	0.071	
2593.00	40620	Mid	LTE Band 41	20	24.5	24.05	0.14	0	Right	Tilt	QPSK	1	0	39139	1:1.58	0.060	1.109	0.067	
2549.50	40185	Low-Mid	LTE Band 41	20	23.5	23.08	0.14	1	Right	Tilt	QPSK	50	0	39139	1:1.58	0.058	1.102	0.064	
2593.00	40620	Mid	LTE Band 41	20	24.5	24.05	0.17	0	Left	Cheek	QPSK	1	0	39139	1:1.58	0.082	1.109	0.091	A11
2549.50	40185	Low-Mid	LTE Band 41	20	23.5	23.08	0.11	1	Left	Cheek	QPSK	50	0	39139	1:1.58	0.078	1.102	0.086	
2593.00	40620	Mid	LTE Band 41	20	24.5	24.05	0.12	0	Left	Tilt	QPSK	1	0	39139	1:1.58	0.040	1.109	0.044	
2549.50	40185	Low-Mid	LTE Band 41	20	23.5	23.08	0.20	1	Left	Tilt	QPSK	50	0	39139	1:1.58	0.033	1.102	0.036	
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)	
2437	6	802.11b	DSSS	22	13.0	12.93	0.12	Right	Cheek	1	17715	1	99.0	0.325	0.262	1.016	1.010	0.269	A12
2437	6	802.11b	DSSS	22	13.0	12.93	0.12	Right	Tilt	1	17715	1	99.0	0.277	-	1.016	1.010	-	
2437	6	802.11b	DSSS	22	13.0	12.93	0.17	Left	Cheek	1	17715	1	99.0	0.166	-	1.016	1.010	-	
2437	6	802.11b	DSSS	22	13.0	12.93	0.17	Left	Tilt	1	17715	1	99.0	0.119	-	1.016	1.010	-	
2437	6	802.11b	DSSS	22	13.0	11.83	0.04	Right	Cheek	2	16244	1	99.0	0.183	0.160	1.309	1.010	0.212	
2437	6	802.11b	DSSS	22	13.0	11.83	0.14	Right	Tilt	2	16244	1	99.0	0.139	-	1.309	1.010	-	
2437	6	802.11b	DSSS	22	13.0	11.83	0.13	Left	Cheek	2	16244	1	99.0	0.083	-	1.309	1.010	-	
2437	6	802.11b	DSSS	22	13.0	11.83	0.13	Left	Tilt	2	16244	1	99.0	0.097	-	1.309	1.010	-	
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	13.0	12.50	0.20	Right	Cheek	1	16246	13.5	93.5	0.284	0.137	1.122	1.070	0.164	
5270	54	802.11n	OFDM	40	13.0	12.50	0.14	Right	Tilt	1	16246	13.5	93.5	0.179	-	1.122	1.070	-	
5270	54	802.11n	OFDM	40	13.0	12.50	-0.14	Left	Cheek	1	16246	13.5	93.5	0.108	-	1.122	1.070	-	
5270	54	802.11n	OFDM	40	13.0	12.50	0.19	Left	Tilt	1	16246	13.5	93.5	0.074	-	1.122	1.070	-	
5310	62	802.11n	OFDM	40	13.0	12.67	0.00	Right	Cheek	2	16246	13.5	93.6	0.151	0.079	1.079	1.068	0.091	
5310	62	802.11n	OFDM	40	13.0	12.67	0.19	Right	Tilt	2	16246	13.5	93.6	0.110	-	1.079	1.068	-	
5310	62	802.11n	OFDM	40	13.0	12.67	0.19	Left	Cheek	2	16246	13.5	93.6	0.070	-	1.079	1.068	-	
5310	62	802.11n	OFDM	40	13.0	12.67	0.19	Left	Tilt	2	16246	13.5	93.6	0.058	-	1.079	1.068	-	
5690	138	802.11ac	OFDM	80	13.0	12.30	0.20	Right	Cheek	1	16246	29.3	87.0	0.146	0.052	1.175	1.149	0.070	
5690	138	802.11ac	OFDM	80	13.0	12.30	0.20	Right	Tilt	1	16246	29.3	87.0	0.105	-	1.175	1.149	-	
5690	138	802.11ac	OFDM	80	13.0	12.30	0.19	Left	Cheek	1	16246	29.3	87.0	0.043	-	1.175	1.149	-	
5690	138	802.11ac	OFDM	80	13.0	12.30	0.18	Left	Tilt	1	16246	29.3	87.0	0.056	-	1.175	1.149	-	
5690	138	802.11ac	OFDM	80	13.0	12.22	0.19	Right	Cheek	2	16246	29.3	87.7	0.248	0.099	1.197	1.140	0.135	
5690	138	802.11ac	OFDM	80	13.0	12.22	0.20	Right	Tilt	2	16246	29.3	87.7	0.197	-	1.197	1.140	-	
5690	138	802.11ac	OFDM	80	13.0	12.22	0.19	Left	Cheek	2	16246	29.3	87.7	0.168	-	1.197	1.140	-	
5690	138	802.11ac	OFDM	80	13.0	12.22	0.18	Left	Tilt	2	16246	29.3	87.7	0.174	-	1.197	1.140	-	
5775	155	802.11ac	OFDM	80	13.0	11.90	0.19	Right	Cheek	1	16246	29.3	87.0	0.091	-	1.288	1.149	-	
5775	155	802.11ac	OFDM	80	13.0	11.90	0.18	Right	Tilt	1	16246	29.3	87.0	0.095	0.024	1.288	1.149	0.036	
5775	155	802.11ac	OFDM	80	13.0	11.90	0.14	Left	Cheek	1	16246	29.3	87.0	0.047	-	1.288	1.149	-	
5775	155	802.11ac	OFDM	80	13.0	11.90	0.12	Left	Tilt	1	16246	29.3	87.0	0.041	-	1.288	1.149	-	
5775	155	802.11ac	OFDM	80	13.0	12.48	0.11	Right	Cheek	2	16246	29.3	87.7	0.285	0.154	1.127	1.140	**0.198**	A13
5775	155	802.11ac	OFDM	80	13.0	12.48	0.14	Right	Tilt	2	16246	29.3	87.7	0.257	-	1.127	1.140	-	
5775	155	802.11ac	OFDM	80	13.0	12.48	0.19	Left	Cheek	2	16246	29.3	87.7	0.222	-	1.127	1.140	-	
5775	155	802.11ac	OFDM	80	13.0	12.48	0.13	Left	Tilt	2	16246	29.3	87.7	0.223	-	1.127	1.140	-	
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
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	13.5	12.56	-0.12	Right	Cheek	16244	1	77.9	0.126	1.242	1.284	**0.201**	A14
2402.00	0	Bluetooth	FHSS	13.5	12.56	-0.16	Right	Tilt	16244	1	77.9	0.100	1.242	1.284	0.159	
2402.00	0	Bluetooth	FHSS	13.5	12.56	0.10	Left	Cheek	16244	1	77.9	0.055	1.242	1.284	0.088	
2402.00	0	Bluetooth	FHSS	13.5	12.56	0.13	Left	Tilt	16244	1	77.9	0.033	1.242	1.284	0.053	
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 11-15
GSM/UMTS Body-Worn SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	34.0	32.84	-0.01	15 mm	10098	1:8.3	back	0.255	1.306	0.333	A15
1880.00	661	GSM 1900	GSM	31.0	29.30	-0.02	15 mm	10132	1:8.3	back	0.233	1.479	0.345	A17
836.60	4183	UMTS 850	RMC	25.5	24.12	-0.01	15 mm	10288	1:1	back	0.274	1.374	0.376	A19
1712.40	1312	UMTS 1750	RMC	25.0	24.09	0.02	15 mm	10090	1:1	back	0.682	1.233	**0.841**	A21
1732.40	1412	UMTS 1750	RMC	25.0	24.41	0.10	15 mm	10090	1:1	back	0.525	1.146	0.602	
1752.60	1513	UMTS 1750	RMC	25.0	24.16	0.02	15 mm	10090	1:1	back	0.625	1.213	0.758	
1880.00	9400	UMTS 1900	RMC	23.5	22.64	-0.03	15 mm	10132	1:1	back	0.415	1.219	0.506	A23
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**				**Body** **1.6 W/kg (mW/g)** averaged over 1 gram										

Table 11-16
LTE Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.0	24.02	0.02	0	39156	QPSK	1	0	15 mm	back	1:1	0.147	1.253	0.184	A25
707.50	23095	Mid	LTE Band 12	10	24.0	23.07	0.02	1	39156	QPSK	25	12	15 mm	back	1:1	0.135	1.239	0.167	
782.00	23230	Mid	LTE Band 13	10	24.5	23.84	-0.02	0	39139	QPSK	1	0	15 mm	back	1:1	0.184	1.164	0.214	A27
782.00	23230	Mid	LTE Band 13	10	23.5	22.94	0.02	1	39139	QPSK	25	0	15 mm	back	1:1	0.156	1.138	0.178	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	24.49	-0.01	0	10098	QPSK	1	0	15 mm	back	1:1	0.286	1.262	0.361	A29
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.51	0.04	1	10098	QPSK	36	18	15 mm	back	1:1	0.237	1.256	0.298	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.08	0.05	0	10132	QPSK	1	0	15 mm	back	1:1	0.521	1.236	0.644	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.03	0.00	0	10132	QPSK	1	99	15 mm	back	1:1	0.654	1.250	0.818	A31
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.25	0.04	0	10132	QPSK	1	99	15 mm	back	1:1	0.527	1.189	0.627	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.19	0.01	1	10132	QPSK	50	50	15 mm	back	1:1	0.402	1.205	0.484	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.17	-0.07	1	10132	QPSK	100	0	15 mm	back	1:1	0.406	1.211	0.492	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.0	22.85	0.02	0	10132	QPSK	1	0	15 mm	back	1:1	0.437	1.303	0.569	A33
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.0	21.78	0.02	1	10132	QPSK	50	25	15 mm	back	1:1	0.421	1.324	0.557	
2593.00	40620	Mid	LTE Band 41	20	24.5	24.05	0.02	0	39139	QPSK	1	0	15 mm	back	1:1.58	0.170	1.109	0.189	A35
2549.50	40185	Low-Mid	LTE Band 41	20	23.5	23.08	-0.07	1	39139	QPSK	50	0	15 mm	back	1:1.58	0.127	1.102	0.140	
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
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	19.0	18.53	0.19	15 mm	1	16244	1	back	99.0	0.068	0.052	1.114	1.010	0.059	
2437	6	802.11b	DSSS	22	19.0	18.23	0.06	15 mm	2	16244	1	back	99.0	0.106	0.092	1.194	1.010	**0.111**	A37
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
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)	
5280	56	802.11a	OFDM	20	17.0	16.98	0.10	15 mm	1	17115	6	back	92.8	0.110	0.044	1.005	1.078	0.048	
5320	64	802.11a	OFDM	20	17.0	16.48	0.18	15 mm	2	17115	6	back	94.0	0.138	0.060	1.127	1.064	0.072	
5500	100	802.11a	OFDM	20	17.0	16.92	0.20	15 mm	1	17115	6	back	92.8	0.087	0.028	1.019	1.078	0.031	
5720	144	802.11a	OFDM	20	17.0	16.64	0.14	15 mm	2	17115	6	back	94.0	0.242	0.100	1.086	1.064	0.116	
5785	157	802.11a	OFDM	20	17.0	16.12	0.18	15 mm	1	17115	6	back	92.8	0.041	0.019	1.225	1.078	0.025	
5785	157	802.11a	OFDM	20	17.0	16.99	0.12	15 mm	2	17115	6	back	94.0	0.290	0.124	1.002	1.064	**0.132**	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 11-19
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)	
2402	0	Bluetooth	FHSS	13.5	12.56	0.19	15 mm	16244	1	back	77.9	0.007	1.242	1.284	**0.011**	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 11-20
GPRS/UMTS Hotspot SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of GPRS Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
848.80	251	GSM 850	GPRS	28.0	27.60	-0.06	10 mm	10098	4	1:2.076	back	0.335	1.096	0.367	A16
848.80	251	GSM 850	GPRS	28.0	27.60	-0.09	10 mm	10098	4	1:2.076	front	0.213	1.096	0.233	
848.80	251	GSM 850	GPRS	28.0	27.60	-0.01	10 mm	10098	4	1:2.076	bottom	0.177	1.096	0.194	
848.80	251	GSM 850	GPRS	28.0	27.60	-0.06	10 mm	10098	4	1:2.076	right	0.130	1.096	0.142	
848.80	251	GSM 850	GPRS	28.0	27.60	0.17	10 mm	10098	4	1:2.076	left	0.026	1.096	0.028	
1880.00	661	GSM 1900	GPRS	21.5	21.36	-0.06	10 mm	10090	4	1:2.076	back	0.219	1.033	0.226	
1880.00	661	GSM 1900	GPRS	21.5	21.36	-0.04	10 mm	10090	4	1:2.076	front	0.153	1.033	0.158	
1880.00	661	GSM 1900	GPRS	21.5	21.36	-0.04	10 mm	10090	4	1:2.076	bottom	0.415	1.033	0.429	A18
1880.00	661	GSM 1900	GPRS	21.5	21.36	0.12	10 mm	10090	4	1:2.076	right	0.024	1.033	0.025	
1880.00	661	GSM 1900	GPRS	21.5	21.36	0.04	10 mm	10090	4	1:2.076	left	0.019	1.033	0.020	
826.40	4132	UMTS 850	RMC	25.5	24.22	0.00	10 mm	10288	N/A	1:1	back	0.536	1.343	0.720	
836.60	4183	UMTS 850	RMC	25.5	24.12	0.02	10 mm	10288	N/A	1:1	back	0.583	1.374	0.801	
846.60	4233	UMTS 850	RMC	25.5	24.10	0.00	10 mm	10288	N/A	1:1	back	0.658	1.380	0.908	A20
836.60	4183	UMTS 850	RMC	25.5	24.12	-0.02	10 mm	10288	N/A	1:1	front	0.364	1.374	0.500	
836.60	4183	UMTS 850	RMC	25.5	24.12	-0.06	10 mm	10288	N/A	1:1	bottom	0.401	1.374	0.551	
836.60	4183	UMTS 850	RMC	25.5	24.12	-0.03	10 mm	10288	N/A	1:1	right	0.299	1.374	0.411	
836.60	4183	UMTS 850	RMC	25.5	24.12	0.03	10 mm	10288	N/A	1:1	left	0.089	1.374	0.122	
1712.40	1312	UMTS 1750	RMC	22.5	22.01	0.03	10 mm	10090	N/A	1:1	back	0.861	1.119	0.963	
1732.40	1412	UMTS 1750	RMC	22.5	22.38	0.03	10 mm	10090	N/A	1:1	back	0.666	1.028	0.685	
1752.60	1513	UMTS 1750	RMC	22.5	22.22	0.05	10 mm	10090	N/A	1:1	back	0.794	1.067	0.847	
1732.40	1412	UMTS 1750	RMC	22.5	22.38	-0.01	10 mm	10090	N/A	1:1	front	0.537	1.028	0.552	
1712.40	1312	UMTS 1750	RMC	22.5	22.01	-0.11	10 mm	10090	N/A	1:1	bottom	1.140	1.119	1.276	A22
1732.40	1412	UMTS 1750	RMC	22.5	22.38	-0.06	10 mm	10090	N/A	1:1	bottom	0.889	1.028	0.914	
1752.60	1513	UMTS 1750	RMC	22.5	22.22	-0.06	10 mm	10090	N/A	1:1	bottom	1.080	1.067	1.152	
1732.40	1412	UMTS 1750	RMC	22.5	22.38	-0.02	10 mm	10090	N/A	1:1	right	0.089	1.028	0.091	
1732.40	1412	UMTS 1750	RMC	22.5	22.38	-0.03	10 mm	10090	N/A	1:1	left	0.063	1.028	0.065	
1712.40	1312	UMTS 1750	RMC	22.5	22.01	-0.04	10 mm	10090	N/A	1:1	bottom	1.110	1.119	1.242	
1852.40	9262	UMTS 1900	RMC	21.0	19.99	0.02	10 mm	39156	N/A	1:1	back	0.525	1.262	0.663	
1880.00	9400	UMTS 1900	RMC	21.0	20.20	0.01	10 mm	39156	N/A	1:1	back	0.719	1.202	0.864	
1907.60	9538	UMTS 1900	RMC	21.0	20.16	0.05	10 mm	39156	N/A	1:1	back	0.949	1.213	1.151	
1880.00	9400	UMTS 1900	RMC	21.0	20.20	-0.04	10 mm	39156	N/A	1:1	front	0.461	1.202	0.554	
1852.40	9262	UMTS 1900	RMC	21.0	19.99	-0.05	10 mm	39156	N/A	1:1	bottom	0.721	1.262	0.910	
1880.00	9400	UMTS 1900	RMC	21.0	20.20	-0.03	10 mm	39156	N/A	1:1	bottom	0.889	1.202	1.069	
1907.60	9538	UMTS 1900	RMC	21.0	20.16	-0.05	10 mm	39156	N/A	1:1	bottom	1.120	1.213	1.359	A24
1880.00	9400	UMTS 1900	RMC	21.0	20.20	-0.15	10 mm	39156	N/A	1:1	right	0.060	1.202	0.072	
1880.00	9400	UMTS 1900	RMC	21.0	20.20	-0.08	10 mm	39156	N/A	1:1	left	0.053	1.202	0.064	
1907.60	9538	UMTS 1900	RMC	21.0	20.16	-0.05	10 mm	39156	N/A	1:1	bottom	1.090	1.213	1.322	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Blue entries represent variability data.

Table 11-21
LTE Band 12 Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.0	24.02	-0.01	0	39156	QPSK	1	0	10 mm	back	1:1	0.235	1.253	0.294	A26
707.50	23095	Mid	LTE Band 12	10	24.0	23.07	0.01	1	39156	QPSK	25	12	10 mm	back	1:1	0.218	1.239	0.270	
707.50	23095	Mid	LTE Band 12	10	25.0	24.02	-0.01	0	39156	QPSK	1	0	10 mm	front	1:1	0.150	1.253	0.188	
707.50	23095	Mid	LTE Band 12	10	24.0	23.07	0.02	1	39156	QPSK	25	12	10 mm	front	1:1	0.138	1.239	0.171	
707.50	23095	Mid	LTE Band 12	10	25.0	24.02	-0.04	0	39156	QPSK	1	0	10 mm	bottom	1:1	0.133	1.253	0.167	
707.50	23095	Mid	LTE Band 12	10	24.0	23.07	-0.08	1	39156	QPSK	25	12	10 mm	bottom	1:1	0.117	1.239	0.145	
707.50	23095	Mid	LTE Band 12	10	25.0	24.02	0.19	0	39156	QPSK	1	0	10 mm	right	1:1	0.147	1.253	0.184	
707.50	23095	Mid	LTE Band 12	10	24.0	23.07	-0.08	1	39156	QPSK	25	12	10 mm	right	1:1	0.145	1.239	0.180	
707.50	23095	Mid	LTE Band 12	10	25.0	24.02	-0.01	0	39156	QPSK	1	0	10 mm	left	1:1	0.077	1.253	0.096	
707.50	23095	Mid	LTE Band 12	10	24.0	23.07	-0.08	1	39156	QPSK	25	12	10 mm	left	1:1	0.068	1.239	0.084	
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 11-22
LTE Band 13 Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
782.00	23230	Mid	LTE Band 13	10	24.5	23.84	-0.02	0	39139	QPSK	1	0	10 mm	back	1:1	0.368	1.164	0.428	A28
782.00	23230	Mid	LTE Band 13	10	23.5	22.94	-0.01	1	39139	QPSK	25	0	10 mm	back	1:1	0.312	1.138	0.355	
782.00	23230	Mid	LTE Band 13	10	24.5	23.84	-0.01	0	39139	QPSK	1	0	10 mm	front	1:1	0.218	1.164	0.254	
782.00	23230	Mid	LTE Band 13	10	23.5	22.94	-0.03	1	39139	QPSK	25	0	10 mm	front	1:1	0.189	1.138	0.215	
782.00	23230	Mid	LTE Band 13	10	24.5	23.84	-0.07	0	39139	QPSK	1	0	10 mm	bottom	1:1	0.212	1.164	0.247	
782.00	23230	Mid	LTE Band 13	10	23.5	22.94	-0.02	1	39139	QPSK	25	0	10 mm	bottom	1:1	0.177	1.138	0.201	
782.00	23230	Mid	LTE Band 13	10	24.5	23.84	-0.08	0	39139	QPSK	1	0	10 mm	right	1:1	0.205	1.164	0.239	
782.00	23230	Mid	LTE Band 13	10	23.5	22.94	-0.04	1	39139	QPSK	25	0	10 mm	right	1:1	0.173	1.138	0.197	
782.00	23230	Mid	LTE Band 13	10	24.5	23.84	0.02	0	39139	QPSK	1	0	10 mm	left	1:1	0.080	1.164	0.093	
782.00	23230	Mid	LTE Band 13	10	23.5	22.94	0.15	1	39139	QPSK	25	0	10 mm	left	1:1	0.073	1.138	0.083	
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 26 (Cell) Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	24.49	-0.02	0	10098	QPSK	1	0	10 mm	back	1:1	0.680	1.262	0.858	A30
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.51	0.01	1	10098	QPSK	36	18	10 mm	back	1:1	0.555	1.256	0.697	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.50	-0.01	1	10098	QPSK	75	0	10 mm	back	1:1	0.546	1.259	0.687	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	24.49	-0.07	0	10098	QPSK	1	0	10 mm	front	1:1	0.325	1.262	0.410	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.51	-0.03	1	10098	QPSK	36	18	10 mm	front	1:1	0.264	1.256	0.332	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	24.49	-0.06	0	10098	QPSK	1	0	10 mm	bottom	1:1	0.372	1.262	0.469	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.51	-0.02	1	10098	QPSK	36	18	10 mm	bottom	1:1	0.290	1.256	0.364	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	24.49	-0.06	0	10098	QPSK	1	0	10 mm	right	1:1	0.278	1.262	0.351	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.51	0.01	1	10098	QPSK	36	18	10 mm	right	1:1	0.210	1.256	0.264	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	24.49	-0.04	0	10098	QPSK	1	0	10 mm	left	1:1	0.068	1.262	0.086	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.51	0.08	1	10098	QPSK	36	18	10 mm	left	1:1	0.054	1.256	0.068	
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 66 (AWS) Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.58	0.03	0	10132	QPSK	1	99	10 mm	back	1:1	0.557	1.236	0.688	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.53	0.03	0	10132	QPSK	50	50	10 mm	back	1:1	0.532	1.250	0.665	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.58	0.05	0	10132	QPSK	1	99	10 mm	front	1:1	0.398	1.236	0.492	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.53	0.05	0	10132	QPSK	50	50	10 mm	front	1:1	0.383	1.250	0.479	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.5	20.40	-0.04	0	10132	QPSK	1	99	10 mm	bottom	1:1	0.734	1.288	0.945	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	21.5	20.52	-0.10	0	10132	QPSK	1	0	10 mm	bottom	1:1	0.793	1.253	0.994	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.58	0.12	0	10132	QPSK	1	99	10 mm	bottom	1:1	0.811	1.236	1.002	A32
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.5	20.36	-0.14	0	10132	QPSK	50	0	10 mm	bottom	1:1	0.709	1.300	0.922	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	21.5	20.43	-0.16	0	10132	QPSK	50	0	10 mm	bottom	1:1	0.779	1.279	0.996	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.53	-0.05	0	10132	QPSK	50	50	10 mm	bottom	1:1	0.794	1.250	0.993	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.49	-0.16	0	10132	QPSK	100	0	10 mm	bottom	1:1	0.768	1.262	0.969	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.58	-0.12	0	10132	QPSK	1	99	10 mm	right	1:1	0.085	1.236	0.105	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.53	0.12	0	10132	QPSK	50	50	10 mm	right	1:1	0.082	1.250	0.103	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.58	-0.11	0	10132	QPSK	1	99	10 mm	left	1:1	0.051	1.236	0.063	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.53	0.03	0	10132	QPSK	50	50	10 mm	left	1:1	0.045	1.250	0.056	
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 2 (PCS) Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.10	0.00	0	10098	QPSK	1	0	10 mm	back	1:1	0.427	1.230	0.525	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.14	-0.01	0	10098	QPSK	50	25	10 mm	back	1:1	0.466	1.219	0.568	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.10	-0.05	0	10098	QPSK	1	0	10 mm	front	1:1	0.295	1.230	0.363	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.14	-0.08	0	10098	QPSK	50	25	10 mm	front	1:1	0.324	1.219	0.395	
1860.00	18700	Low	LTE Band 2 (PCS)	20	20.0	18.98	0.08	0	10098	QPSK	1	99	10 mm	bottom	1:1	0.605	1.265	0.765	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.10	0.03	0	10098	QPSK	1	0	10 mm	bottom	1:1	0.746	1.230	0.918	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.0	18.91	-0.05	0	10098	QPSK	1	99	10 mm	bottom	1:1	0.878	1.285	1.128	
1860.00	18700	Low	LTE Band 2 (PCS)	20	20.0	19.01	0.01	0	10098	QPSK	50	50	10 mm	bottom	1:1	0.666	1.256	0.836	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.14	0.09	0	10098	QPSK	50	25	10 mm	bottom	1:1	0.779	1.219	0.950	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.0	18.98	-0.17	0	10098	QPSK	50	25	10 mm	bottom	1:1	0.895	1.265	1.132	A34
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.09	0.06	0	10098	QPSK	100	0	10 mm	bottom	1:1	0.889	1.233	1.096	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.10	0.02	0	10098	QPSK	1	0	10 mm	right	1:1	0.066	1.230	0.081	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.14	0.02	0	10098	QPSK	50	25	10 mm	right	1:1	0.073	1.219	0.089	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.10	0.07	0	10098	QPSK	1	0	10 mm	left	1:1	0.039	1.230	0.048	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.14	-0.03	0	10098	QPSK	50	25	10 mm	left	1:1	0.042	1.219	0.051	
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 41 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2593.00	40620	Mid	LTE Band 41	20	24.5	24.05	-0.07	0	39139	QPSK	1	0	10 mm	back	1:1.58	0.320	1.109	0.355	
2549.50	40185	Low-Mid	LTE Band 41	20	23.5	23.08	-0.03	1	39139	QPSK	50	0	10 mm	back	1:1.58	0.239	1.102	0.263	
2593.00	40620	Mid	LTE Band 41	20	24.5	24.05	-0.01	0	39139	QPSK	1	0	10 mm	front	1:1.58	0.288	1.109	0.319	
2549.50	40185	Low-Mid	LTE Band 41	20	23.5	23.08	-0.06	1	39139	QPSK	50	0	10 mm	front	1:1.58	0.283	1.102	0.312	
2506.00	39750	Low	LTE Band 41	20	24.5	23.51	-0.09	0	39139	QPSK	1	0	10 mm	bottom	1:1.58	0.612	1.256	0.769	
2549.50	40185	Low-Mid	LTE Band 41	20	24.5	23.99	-0.11	0	39139	QPSK	1	0	10 mm	bottom	1:1.58	0.575	1.125	0.647	
2593.00	40620	Mid	LTE Band 41	20	24.5	24.05	-0.07	0	39139	QPSK	1	0	10 mm	bottom	1:1.58	0.607	1.109	0.673	
2636.50	41055	Mid-High	LTE Band 41	20	24.5	23.60	-0.02	0	39139	QPSK	1	0	10 mm	bottom	1:1.58	0.634	1.230	0.780	
2680.00	41490	High	LTE Band 41	20	24.5	23.42	-0.07	0	39139	QPSK	1	0	10 mm	bottom	1:1.58	1.090	1.282	**1.397**	A36
2549.50	40185	Low-Mid	LTE Band 41	20	23.5	23.08	-0.07	1	39139	QPSK	50	0	10 mm	bottom	1:1.58	0.491	1.102	0.541	
2549.50	40185	Low-Mid	LTE Band 41	20	23.5	23.04	-0.16	1	39139	QPSK	100	0	10 mm	bottom	1:1.58	0.437	1.112	0.486	
2593.00	40620	Mid	LTE Band 41	20	24.5	24.05	-0.15	0	39139	QPSK	1	0	10 mm	right	1:1.58	0.045	1.109	0.050	
2549.50	40185	Low-Mid	LTE Band 41	20	23.5	23.08	0.02	1	39139	QPSK	50	0	10 mm	right	1:1.58	0.054	1.102	0.060	
2593.00	40620	Mid	LTE Band 41	20	24.5	24.05	-0.11	0	39139	QPSK	1	0	10 mm	left	1:1.58	0.205	1.109	0.227	
2549.50	40185	Low-Mid	LTE Band 41	20	23.5	23.08	-0.02	1	39139	QPSK	50	0	10 mm	left	1:1.58	0.221	1.102	0.244	
2680.00	41490	High	LTE Band 41	20	24.5	23.42	0.20	0	39139	QPSK	1	0	10 mm	bottom	1:1.58	1.010	1.282	1.295	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram						

Blue entry represents variability data.

Table 11-27
WLAN Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	19.0	18.53	0.14	10 mm	1	16244	1	back	99.0	0.166	0.128	1.114	1.010	0.144	
2437	6	802.11b	DSSS	22	19.0	18.53	0.14	10 mm	1	16244	1	front	99.0	0.148	-	1.114	1.010	-	
2437	6	802.11b	DSSS	22	19.0	18.53	0.16	10 mm	1	16244	1	top	99.0	0.156	-	1.114	1.010	-	
2437	6	802.11b	DSSS	22	19.0	18.53	0.19	10 mm	1	16244	1	left	99.0	0.121	-	1.114	1.010	-	
2437	6	802.11b	DSSS	22	19.0	18.23	0.14	10 mm	2	16244	1	back	99.0	0.253	-	1.194	1.010	-	
2437	6	802.11b	DSSS	22	19.0	18.23	0.17	10 mm	2	16244	1	front	99.0	0.148	-	1.194	1.010	-	
2437	6	802.11b	DSSS	22	19.0	18.23	0.18	10 mm	2	16244	1	top	99.0	0.266	0.181	1.194	1.010	**0.218**	A38
2437	6	802.11b	DSSS	22	19.0	18.23	0.13	10 mm	2	16244	1	left	99.0	0.135	-	1.194	1.010	-	
5785	157	802.11a	OFDM	20	17.0	16.12	0.13	10 mm	1	17115	6	back	92.8	0.090	0.030	1.225	1.078	0.040	
5785	157	802.11a	OFDM	20	17.0	16.12	0.19	10 mm	1	17115	6	front	92.8	0.016	-	1.225	1.078	-	
5785	157	802.11a	OFDM	20	17.0	16.12	-0.19	10 mm	1	17115	6	top	92.8	0.007	-	1.225	1.078	-	
5785	157	802.11a	OFDM	20	17.0	16.12	0.14	10 mm	1	17115	6	left	92.8	0.015	-	1.225	1.078	-	
5785	157	802.11a	OFDM	20	17.0	16.99	0.18	10 mm	2	17115	6	back	94.0	0.303	0.153	1.002	1.064	**0.163**	A40
5785	157	802.11a	OFDM	20	17.0	16.99	0.17	10 mm	2	17115	6	front	94.0	0.246	-	1.002	1.064	-	
5785	157	802.11a	OFDM	20	17.0	16.99	0.04	10 mm	2	17115	6	top	94.0	0.178	-	1.002	1.064	-	
5785	157	802.11a	OFDM	20	17.0	16.99	0.11	10 mm	2	17115	6	left	94.0	0.025	-	1.002	1.064	-	

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

Table 11-28
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)	
2402	0	Bluetooth	FHSS	13.5	12.56	0.00	10 mm	16244	1	back	77.9	0.020	1.242	1.284	**0.032**	A42
2402	0	Bluetooth	FHSS	13.5	12.56	0.10	10 mm	16244	1	front	77.9	0.017	1.242	1.284	0.027	
2402	0	Bluetooth	FHSS	13.5	12.56	0.14	10 mm	16244	1	top	77.9	0.013	1.242	1.284	0.021	
2402	0	Bluetooth	FHSS	13.5	12.56	0.12	10 mm	16244	1	left	77.9	0.013	1.242	1.284	0.021	

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

11.4 Standalone Phablet SAR Data

Table 11-29
GPRS/UMTS Phablet SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of GPRS Slots	Duty Cycle	Side	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GPRS	25.0	24.41	0.01	11 mm	10090	4	1:2.076	back	0.318	1.146	0.364	
1880.00	661	GSM 1900	GPRS	25.0	24.41	-0.02	7 mm	10090	4	1:2.076	front	0.348	1.146	0.399	
1880.00	661	GSM 1900	GPRS	25.0	24.41	0.01	12 mm	10090	4	1:2.076	bottom	0.460	1.146	0.527	
1880.00	661	GSM 1900	GPRS	25.0	24.41	-0.11	0 mm	10090	4	1:2.076	right	0.187	1.146	0.214	
1880.00	661	GSM 1900	GPRS	25.0	24.41	-0.15	0 mm	10090	4	1:2.076	left	0.132	1.146	0.151	
1880.00	661	GSM 1900	GPRS	21.5	21.36	-0.02	0 mm	10090	4	1:2.076	back	0.658	1.033	0.680	
1880.00	661	GSM 1900	GPRS	21.5	21.36	0.07	0 mm	10090	4	1:2.076	front	0.888	1.033	0.917	
1880.00	661	GSM 1900	GPRS	21.5	21.36	-0.03	0 mm	10090	4	1:2.076	bottom	1.070	1.033	1.105	A43
1732.40	1412	UMTS 1750	RMC	25.0	24.41	0.03	11 mm	39156	N/A	1:1	back	0.476	1.146	0.545	
1732.40	1412	UMTS 1750	RMC	25.0	24.41	0.05	7 mm	39156	N/A	1:1	front	0.559	1.146	0.641	
1732.40	1412	UMTS 1750	RMC	25.0	24.41	-0.02	12 mm	39156	N/A	1:1	bottom	0.532	1.146	0.610	
1732.40	1412	UMTS 1750	RMC	25.0	24.41	-0.09	0 mm	39156	N/A	1:1	right	0.257	1.146	0.295	
1732.40	1412	UMTS 1750	RMC	25.0	24.41	-0.05	0 mm	39156	N/A	1:1	left	0.188	1.146	0.215	
1712.40	1312	UMTS 1750	RMC	22.5	22.01	0.11	0 mm	10090	N/A	1:1	back	2.650	1.119	2.965	
1732.40	1412	UMTS 1750	RMC	22.5	22.38	0.11	0 mm	10090	N/A	1:1	back	2.180	1.028	2.241	
1752.60	1513	UMTS 1750	RMC	22.5	22.22	0.21	0 mm	10090	N/A	1:1	back	2.600	1.067	2.774	
1732.40	1412	UMTS 1750	RMC	22.5	22.38	0.06	0 mm	10090	N/A	1:1	front	1.530	1.028	1.573	
1712.40	1312	UMTS 1750	RMC	22.5	22.01	-0.07	0 mm	10090	N/A	1:1	bottom	2.870	1.119	3.212	
1732.40	1412	UMTS 1750	RMC	22.5	22.38	-0.06	0 mm	10090	N/A	1:1	bottom	2.880	1.028	2.961	
1752.60	1513	UMTS 1750	RMC	22.5	22.22	-0.13	0 mm	10090	N/A	1:1	bottom	3.090	1.067	**3.297**	A44
1752.60	1513	UMTS 1750	RMC	22.5	22.22	-0.06	0 mm	10090	N/A	1:1	bottom	2.980	1.067	3.180	
1880.00	9400	UMTS 1900	RMC	23.5	22.64	-0.01	11 mm	39156	N/A	1:1	back	0.538	1.219	0.656	
1880.00	9400	UMTS 1900	RMC	23.5	22.64	0.02	7 mm	39156	N/A	1:1	front	0.634	1.219	0.773	
1880.00	9400	UMTS 1900	RMC	23.5	22.64	-0.03	12 mm	39156	N/A	1:1	bottom	0.768	1.219	0.936	
1880.00	9400	UMTS 1900	RMC	23.5	22.64	-0.03	0 mm	39156	N/A	1:1	right	0.295	1.219	0.360	
1880.00	9400	UMTS 1900	RMC	23.5	22.64	-0.10	0 mm	39156	N/A	1:1	left	0.293	1.219	0.357	
1880.00	9400	UMTS 1900	RMC	21.0	20.20	-0.06	0 mm	39156	N/A	1:1	back	1.480	1.202	1.779	
1880.00	9400	UMTS 1900	RMC	21.0	20.20	-0.07	0 mm	39156	N/A	1:1	front	1.020	1.202	1.226	
1852.40	9262	UMTS 1900	RMC	21.0	19.99	0.16	0 mm	39156	N/A	1:1	bottom	2.400	1.262	3.029	
1880.00	9400	UMTS 1900	RMC	21.0	20.20	-0.09	0 mm	39156	N/A	1:1	bottom	2.580	1.202	3.101	
1907.60	9538	UMTS 1900	RMC	21.0	20.16	0.17	0 mm	39156	N/A	1:1	bottom	2.630	1.213	3.190	A45
1907.60	9538	UMTS 1900	RMC	21.0	20.16	0.00	0 mm	39156	N/A	1:1	bottom	2.330	1.213	2.826	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**												**Phablet** **4.0 W/kg (mW/g)** averaged over 10 grams			

Blue entries represent variability data.

Table 11-30
LTE Phablet SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.25	0.01	0	39156	QPSK	1	99	11 mm	back	1:1	0.607	1.189	0.722	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.19	-0.01	1	39156	QPSK	50	50	11 mm	back	1:1	0.467	1.205	0.563	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.25	0.03	0	39156	QPSK	1	99	7 mm	front	1:1	0.740	1.189	0.880	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.19	-0.05	1	39156	QPSK	50	50	7 mm	front	1:1	0.561	1.205	0.676	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.25	0.00	0	39156	QPSK	1	99	12 mm	bottom	1:1	0.636	1.189	0.756	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.19	-0.04	1	39156	QPSK	50	50	12 mm	bottom	1:1	0.487	1.205	0.587	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.25	0.02	0	39156	QPSK	1	99	0 mm	right	1:1	0.337	1.189	0.401	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.19	-0.01	1	39156	QPSK	50	50	0 mm	right	1:1	0.263	1.205	0.317	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.25	-0.13	0	39156	QPSK	1	99	0 mm	left	1:1	0.195	1.189	0.232	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.19	-0.13	1	39156	QPSK	50	50	0 mm	left	1:1	0.155	1.205	0.187	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.5	20.40	0.00	0	39156	QPSK	1	99	0 mm	back	1:1	1.820	1.288	2.344	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	21.5	20.52	0.01	0	39156	QPSK	1	0	0 mm	back	1:1	1.930	1.253	2.418	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.58	0.02	0	39156	QPSK	1	99	0 mm	back	1:1	1.790	1.236	2.212	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.5	20.36	-0.03	0	39156	QPSK	50	0	0 mm	back	1:1	1.810	1.300	2.353	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	21.5	20.43	-0.02	0	39156	QPSK	50	0	0 mm	back	1:1	1.840	1.279	2.353	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.53	0.00	0	39156	QPSK	50	50	0 mm	back	1:1	1.770	1.250	2.213	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.49	-0.01	0	39156	QPSK	100	0	0 mm	back	1:1	1.760	1.262	2.221	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.58	-0.07	0	39156	QPSK	1	99	0 mm	front	1:1	1.320	1.236	1.632	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.53	-0.08	0	39156	QPSK	50	50	0 mm	front	1:1	1.290	1.250	1.613	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.5	20.40	-0.13	0	39156	QPSK	1	99	0 mm	bottom	1:1	2.050	1.288	2.640	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	21.5	20.52	-0.13	0	39156	QPSK	1	0	0 mm	bottom	1:1	2.060	1.253	2.581	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.58	-0.11	0	39156	QPSK	1	99	0 mm	bottom	1:1	2.030	1.236	2.509	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.5	20.36	-0.13	0	39156	QPSK	50	0	0 mm	bottom	1:1	2.190	1.300	2.847	A46
1745.00	132322	Mid	LTE Band 66 (AWS)	20	21.5	20.43	-0.14	0	39156	QPSK	50	0	0 mm	bottom	1:1	2.050	1.279	2.622	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.53	-0.14	0	39156	QPSK	50	50	0 mm	bottom	1:1	2.070	1.250	2.588	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.5	20.49	-0.13	0	39156	QPSK	100	0	0 mm	bottom	1:1	1.980	1.262	2.499	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.0	22.85	0.01	0	10090	QPSK	1	0	11 mm	back	1:1	0.463	1.303	0.603	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.0	21.78	-0.03	1	10090	QPSK	50	25	11 mm	back	1:1	0.410	1.324	0.543	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.0	22.85	0.00	0	10090	QPSK	1	0	7 mm	front	1:1	0.289	1.303	0.377	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.0	21.78	-0.06	1	10090	QPSK	50	25	7 mm	front	1:1	0.261	1.324	0.346	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.0	22.85	-0.07	0	10090	QPSK	1	0	12 mm	bottom	1:1	0.834	1.303	1.087	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.0	21.78	0.15	1	10090	QPSK	50	25	12 mm	bottom	1:1	0.812	1.324	1.075	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.0	22.85	-0.17	0	10090	QPSK	1	0	0 mm	right	1:1	0.314	1.303	0.409	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.0	21.78	-0.04	1	10090	QPSK	50	25	0 mm	right	1:1	0.279	1.324	0.369	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.0	22.85	-0.20	0	10090	QPSK	1	0	0 mm	left	1:1	0.326	1.303	0.425	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.0	21.78	-0.13	1	10090	QPSK	50	25	0 mm	left	1:1	0.285	1.324	0.377	
1860.00	18700	Low	LTE Band 2 (PCS)	20	20.0	18.98	0.13	0	10090	QPSK	1	99	0 mm	back	1:1	1.340	1.265	1.695	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.10	0.11	0	10090	QPSK	1	0	0 mm	back	1:1	1.440	1.230	1.771	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.0	18.91	0.16	0	10090	QPSK	1	99	0 mm	back	1:1	1.540	1.285	1.979	A47
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.14	0.03	0	10090	QPSK	50	25	0 mm	back	1:1	1.410	1.219	1.719	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.10	-0.01	0	10090	QPSK	1	0	0 mm	front	1:1	1.100	1.230	1.353	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.14	-0.01	0	10090	QPSK	50	25	0 mm	front	1:1	1.080	1.219	1.317	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.10	-0.02	0	10090	QPSK	1	0	0 mm	bottom	1:1	1.340	1.230	1.648	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.0	19.14	-0.06	0	10090	QPSK	50	25	0 mm	bottom	1:1	1.410	1.219	1.719	
2506.00	39750	Low	LTE Band 41	20	24.5	23.51	-0.13	0	39139	QPSK	1	0	0 mm	bottom	1:1.58	1.150	1.256	1.444	
2549.50	40185	Low-Mid	LTE Band 41	20	24.5	23.99	-0.15	0	39139	QPSK	1	0	0 mm	bottom	1:1.58	0.984	1.125	1.107	
2593.00	40620	Mid	LTE Band 41	20	24.5	24.05	-0.15	0	39139	QPSK	1	0	0 mm	bottom	1:1.58	1.550	1.109	1.719	
2636.50	41055	Mid-High	LTE Band 41	20	24.5	23.60	-0.13	0	39139	QPSK	1	0	0 mm	bottom	1:1.58	1.720	1.230	2.116	A48
2680.00	41490	High	LTE Band 41	20	24.5	23.42	-0.17	0	39139	QPSK	1	0	0 mm	bottom	1:1.58	1.650	1.282	2.115	
2549.50	40185	Low-Mid	LTE Band 41	20	23.5	23.08	-0.17	1	39139	QPSK	50	0	0 mm	bottom	1:1.58	0.743	1.102	0.819	
2549.50	40185	Low-Mid	LTE Band 41	20	23.5	23.04	-0.18	1	39139	QPSK	100	0	0 mm	bottom	1:1.58	0.724	1.112	0.805	
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 11-31
5 GHz WLAN 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 W/kg	SAR (10g) (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g) (W/kg)	Plot #
MHz	Ch.																		
5280	56	802.11a	OFDM	20	17.0	16.98	0.05	0 mm	1	17115	6	back	92.8	4.162	0.473	1.005	1.078	0.512	
5280	56	802.11a	OFDM	20	17.0	16.98	-0.13	0 mm	1	17115	6	front	92.8	2.690	-	1.005	1.078	-	
5280	56	802.11a	OFDM	20	17.0	16.98	0.13	0 mm	1	17115	6	top	92.8	1.846	-	1.005	1.078	-	
5280	56	802.11a	OFDM	20	17.0	16.98	0.10	0 mm	1	17115	6	left	92.8	0.730	-	1.005	1.078	-	
5320	64	802.11a	OFDM	20	17.0	16.48	-0.19	0 mm	2	17115	6	back	94.0	11.638	0.807	1.127	1.064	0.968	
5320	64	802.11a	OFDM	20	17.0	16.48	0.00	0 mm	2	17115	6	front	94.0	1.238	-	1.127	1.064	-	
5320	64	802.11a	OFDM	20	17.0	16.48	0.18	0 mm	2	17115	6	top	94.0	1.725	-	1.127	1.064	-	
5320	64	802.11a	OFDM	20	17.0	16.48	0.13	0 mm	2	17115	6	left	94.0	0.709	-	1.127	1.064	-	
5500	100	802.11a	OFDM	20	17.0	16.92	0.19	0 mm	1	17115	6	back	92.8	3.436	0.342	1.019	1.078	0.376	
5500	100	802.11a	OFDM	20	17.0	16.92	-0.11	0 mm	1	17115	6	front	92.8	1.948	-	1.019	1.078	-	
5500	100	802.11a	OFDM	20	17.0	16.92	-0.08	0 mm	1	17115	6	top	92.8	1.087	-	1.019	1.078	-	
5500	100	802.11a	OFDM	20	17.0	16.92	0.13	0 mm	1	17115	6	left	92.8	0.445	-	1.019	1.078	-	
5720	144	802.11a	OFDM	20	17.0	16.64	-0.12	0 mm	2	17115	6	back	94.0	13.339	0.801	1.086	1.064	0.926	
5720	144	802.11a	OFDM	20	17.0	16.64	0.19	0 mm	2	17115	6	front	94.0	2.717	-	1.086	1.064	-	
5720	144	802.11a	OFDM	20	17.0	16.64	0.12	0 mm	2	17115	6	top	94.0	11.271	-	1.086	1.064	-	
5720	144	802.11a	OFDM	20	17.0	16.64	0.11	0 mm	2	17115	6	left	94.0	0.480	-	1.086	1.064	-	
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 11-32
5 GHz MIMO WLAN 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 W/kg	SAR (10g) (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g) (W/kg)	Plot #
MHz	Ch.																				
5280	56	802.11a	OFDM	20	17.0	16.98	17.0	16.24	0.01	0 mm	MIMO	17115	6	back	96.2	6.933	0.888	1.191	1.040	1.100	A49
5280	56	802.11a	OFDM	20	17.0	16.98	17.0	16.24	0.12	0 mm	MIMO	17115	6	front	96.2	2.818	0.342	1.191	1.040	0.424	
5280	56	802.11a	OFDM	20	17.0	16.98	17.0	16.24	0.19	0 mm	MIMO	17115	6	top	96.2	2.534	-	1.191	1.040	-	
5280	56	802.11a	OFDM	20	17.0	16.98	17.0	16.24	-0.17	0 mm	MIMO	17115	6	left	96.2	0.861	-	1.191	1.040	-	
5500	100	802.11a	OFDM	20	17.0	16.92	17.0	15.97	0.00	0 mm	MIMO	17115	6	back	96.2	8.501	0.721	1.268	1.040	0.951	
5500	100	802.11a	OFDM	20	17.0	16.92	17.0	15.97	0.12	0 mm	MIMO	17115	6	front	96.2	3.044	-	1.268	1.040	-	
5500	100	802.11a	OFDM	20	17.0	16.92	17.0	15.97	0.16	0 mm	MIMO	17115	6	top	96.2	3.079	-	1.268	1.040	-	
5500	100	802.11a	OFDM	20	17.0	16.92	17.0	15.97	0.20	0 mm	MIMO	17115	6	left	96.2	0.724	-	1.268	1.040	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population															Phablet 4.0 W/kg (mW/g) averaged over 10 grams						

11.5 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 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.
12. Unless otherwise noted, when 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds below.

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.

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) 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.

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.

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.

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	0.151	0.269	0.212	0.420	0.363	0.632
	GSM 1900	0.062	0.269	0.212	0.331	0.274	0.543
	UMTS 850	0.242	0.269	0.212	0.511	0.454	**0.723**
	UMTS 1750	0.089	0.269	0.212	0.358	0.301	0.570
	UMTS 1900	0.124	0.269	0.212	0.393	0.336	0.605
	LTE Band 12	0.115	0.269	0.212	0.384	0.327	0.596
	LTE Band 13	0.122	0.269	0.212	0.391	0.334	0.603
	LTE Band 26 (Cell)	0.131	0.269	0.212	0.400	0.343	0.612
	LTE Band 66 (AWS)	0.107	0.269	0.212	0.376	0.319	0.588
	LTE Band 2 (PCS)	0.159	0.269	0.212	0.428	0.371	0.640
	LTE Band 41	0.091	0.269	0.212	0.360	0.303	0.572

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	0.151	0.164	0.198	0.315	0.349	0.513
	GSM 1900	0.062	0.164	0.198	0.226	0.260	0.424
	UMTS 850	0.242	0.164	0.198	0.406	0.440	**0.604**
	UMTS 1750	0.089	0.164	0.198	0.253	0.287	0.451
	UMTS 1900	0.124	0.164	0.198	0.288	0.322	0.486
	LTE Band 12	0.115	0.164	0.198	0.279	0.313	0.477
	LTE Band 13	0.122	0.164	0.198	0.286	0.320	0.484
	LTE Band 26 (Cell)	0.131	0.164	0.198	0.295	0.329	0.493
	LTE Band 66 (AWS)	0.107	0.164	0.198	0.271	0.305	0.469
	LTE Band 2 (PCS)	0.159	0.164	0.198	0.323	0.357	0.521
	LTE Band 41	0.091	0.164	0.198	0.255	0.289	0.453

Table 12-3
Simultaneous Transmission Scenario with 2.4 GHz Ant 1 and 5 GHz Ant 2 WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 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	0.151	0.269	0.198	0.420	0.349	0.618
	GSM 1900	0.062	0.269	0.198	0.331	0.260	0.529
	UMTS 850	0.242	0.269	0.198	0.511	0.440	**0.709**
	UMTS 1750	0.089	0.269	0.198	0.358	0.287	0.556
	UMTS 1900	0.124	0.269	0.198	0.393	0.322	0.591
	LTE Band 12	0.115	0.269	0.198	0.384	0.313	0.582
	LTE Band 13	0.122	0.269	0.198	0.391	0.320	0.589
	LTE Band 26 (Cell)	0.131	0.269	0.198	0.400	0.329	0.598
	LTE Band 66 (AWS)	0.107	0.269	0.198	0.376	0.305	0.574
	LTE Band 2 (PCS)	0.159	0.269	0.198	0.428	0.357	0.626
	LTE Band 41	0.091	0.269	0.198	0.360	0.289	0.558

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	0.151	0.201	0.352
	GSM 1900	0.062	0.201	0.263
	UMTS 850	0.242	0.201	**0.443**
	UMTS 1750	0.089	0.201	0.290
	UMTS 1900	0.124	0.201	0.325
	LTE Band 12	0.115	0.201	0.316
	LTE Band 13	0.122	0.201	0.323
	LTE Band 26 (Cell)	0.131	0.201	0.332
	LTE Band 66 (AWS)	0.107	0.201	0.308
	LTE Band 2 (PCS)	0.159	0.201	0.360
	LTE Band 41	0.091	0.201	0.292

12.4 Body-Worn Simultaneous Transmission Analysis

Table 12-5
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	0.333	0.059	0.111	0.392	0.444	0.503
	GSM 1900	0.345	0.059	0.111	0.404	0.456	0.515
	UMTS 850	0.376	0.059	0.111	0.435	0.487	0.546
	UMTS 1750	0.841	0.059	0.111	0.900	0.952	**1.011**
	UMTS 1900	0.506	0.059	0.111	0.565	0.617	0.676
	LTE Band 12	0.184	0.059	0.111	0.243	0.295	0.354
	LTE Band 13	0.214	0.059	0.111	0.273	0.325	0.384
	LTE Band 26 (Cell)	0.361	0.059	0.111	0.420	0.472	0.531
	LTE Band 66 (AWS)	0.818	0.059	0.111	0.877	0.929	0.988
	LTE Band 2 (PCS)	0.569	0.059	0.111	0.628	0.680	0.739
	LTE Band 41	0.189	0.059	0.111	0.248	0.300	0.359

Table 12-6
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	0.333	0.048	0.132	0.381	0.465	0.513
	GSM 1900	0.345	0.048	0.132	0.393	0.477	0.525
	UMTS 850	0.376	0.048	0.132	0.424	0.508	0.556
	UMTS 1750	0.841	0.048	0.132	0.889	0.973	**1.021**
	UMTS 1900	0.506	0.048	0.132	0.554	0.638	0.686
	LTE Band 12	0.184	0.048	0.132	0.232	0.316	0.364
	LTE Band 13	0.214	0.048	0.132	0.262	0.346	0.394
	LTE Band 26 (Cell)	0.361	0.048	0.132	0.409	0.493	0.541
	LTE Band 66 (AWS)	0.818	0.048	0.132	0.866	0.950	0.998
	LTE Band 2 (PCS)	0.569	0.048	0.132	0.617	0.701	0.749
	LTE Band 41	0.189	0.048	0.132	0.237	0.321	0.369

Table 12-7
Simultaneous Transmission Scenario with 2.4 GHz Ant 1 and 5 GHz Ant 2 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)	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	0.333	0.059	0.132	0.392	0.465	0.524
	GSM 1900	0.345	0.059	0.132	0.404	0.477	0.536
	UMTS 850	0.376	0.059	0.132	0.435	0.508	0.567
	UMTS 1750	0.841	0.059	0.132	0.900	0.973	**1.032**
	UMTS 1900	0.506	0.059	0.132	0.565	0.638	0.697
	LTE Band 12	0.184	0.059	0.132	0.243	0.316	0.375
	LTE Band 13	0.214	0.059	0.132	0.273	0.346	0.405
	LTE Band 26 (Cell)	0.361	0.059	0.132	0.420	0.493	0.552
	LTE Band 66 (AWS)	0.818	0.059	0.132	0.877	0.950	1.009
	LTE Band 2 (PCS)	0.569	0.059	0.132	0.628	0.701	0.760
	LTE Band 41	0.189	0.059	0.132	0.248	0.321	0.380

Table 12-8
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	0.333	0.011	0.344
	GSM 1900	0.345	0.011	0.356
	UMTS 850	0.376	0.011	0.387
	UMTS 1750	0.841	0.011	0.852
	UMTS 1900	0.506	0.011	0.517
	LTE Band 12	0.184	0.011	0.195
	LTE Band 13	0.214	0.011	0.225
	LTE Band 26 (Cell)	0.361	0.011	0.372
	LTE Band 66 (AWS)	0.818	0.011	0.829
	LTE Band 2 (PCS)	0.569	0.011	0.580
	LTE Band 41	0.189	0.011	0.200

12.5 Hotspot SAR Simultaneous Transmission Analysis

Per FCC KDB Publication 941225 D06v02r01, the devices edges with antennas more than 2.5 cm from edge are not required to be evaluated for 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 applicable exposure conditions was used for simultaneous transmission analysis.

Table 12-9
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	0.367	0.144	0.218	0.511	0.585	0.729
	GPRS 1900	0.429	0.144	0.218	0.573	0.647	0.791
	UMTS 850	0.908	0.144	0.218	1.052	1.126	1.270
	UMTS 1750	1.276	0.144	0.218	1.420	1.494	See Table Below
	UMTS 1900	1.359	0.144	0.218	1.503	**1.577**	See Table Below
	LTE Band 12	0.294	0.144	0.218	0.438	0.512	0.656
	LTE Band 13	0.428	0.144	0.218	0.572	0.646	0.790
	LTE Band 26 (Cell)	0.858	0.144	0.218	1.002	1.076	1.220
	LTE Band 66 (AWS)	1.002	0.144	0.218	1.146	1.220	1.364
	LTE Band 2 (PCS)	1.132	0.144	0.218	1.276	1.350	1.494
	LTE Band 41	1.397	0.144	0.218	1.541	See Table Below	See Table Below

Simult Tx	Configuration	UMTS 1750 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	Back	0.963	0.144	0.218*	1.107	1.181	**1.325**
	Front	0.552	0.144*	0.218*	0.696	0.770	0.914
	Top	-	0.144*	0.218	0.144	0.218	0.362
	Bottom	1.276	-	-	1.276	1.276	1.276
	Right	0.091	-	-	0.091	0.091	0.091
	Left	0.065	0.144*	0.218*	0.209	0.283	0.427

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	Back	1.151	0.144	0.218*	1.295	1.369	**1.513**
	Front	0.554	0.144*	0.218*	0.698	0.772	0.916
	Top	-	0.144*	0.218	0.144	0.218	0.362
	Bottom	1.359	-	-	1.359	1.359	1.359
	Right	0.072	-	-	0.072	0.072	0.072
	Left	0.064	0.144*	0.218*	0.208	0.282	0.426

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	Back	0.355	0.144	0.218*	0.499	0.573	0.717
	Front	0.319	0.144*	0.218*	0.463	0.537	0.681
	Top	-	0.144*	0.218	0.144	0.218	0.362
	Bottom	1.397	-	-	**1.397**	**1.397**	**1.397**
	Right	0.060	-	-	0.060	0.060	0.060
	Left	0.244	0.144*	0.218*	0.388	0.462	0.606

Table 12-10
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	1+2+3
Hotspot SAR	GPRS 850	0.367	0.040	0.163	0.407	0.530	0.570
	GPRS 1900	0.429	0.040	0.163	0.469	0.592	0.632
	UMTS 850	0.908	0.040	0.163	0.948	1.071	1.111
	UMTS 1750	1.276	0.040	0.163	1.316	1.439	1.479
	UMTS 1900	1.359	0.040	0.163	1.399	1.522	**1.562**
	LTE Band 12	0.294	0.040	0.163	0.334	0.457	0.497
	LTE Band 13	0.428	0.040	0.163	0.468	0.591	0.631
	LTE Band 26 (Cell)	0.858	0.040	0.163	0.898	1.021	1.061
	LTE Band 66 (AWS)	1.002	0.040	0.163	1.042	1.165	1.205
	LTE Band 2 (PCS)	1.132	0.040	0.163	1.172	1.295	1.335
	LTE Band 41	1.397	0.040	0.163	1.437	1.560	See Table Below

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	Back	0.355	0.040	0.163	0.395	0.518	0.558
	Front	0.319	0.040*	0.163*	0.359	0.482	0.522
	Top	-	0.040*	0.163*	0.040	0.163	0.203
	Bottom	1.397	-	-	**1.397**	**1.397**	**1.397**
	Right	0.060	-	-	0.060	0.060	0.060
	Left	0.244	0.040*	0.163*	0.284	0.407	0.447

Table 12-11
Simultaneous Transmission Scenario with 2.4 GHz Ant 1 and 5 GHz Ant 2 WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	0.367	0.144	0.163	0.511	0.530	0.674
	GPRS 1900	0.429	0.144	0.163	0.573	0.592	0.736
	UMTS 850	0.908	0.144	0.163	1.052	1.071	1.215
	UMTS 1750	1.276	0.144	0.163	1.420	1.439	**1.583**
	UMTS 1900	1.359	0.144	0.163	1.503	1.522	See Table Below
	LTE Band 12	0.294	0.144	0.163	0.438	0.457	0.601
	LTE Band 13	0.428	0.144	0.163	0.572	0.591	0.735
	LTE Band 26 (Cell)	0.858	0.144	0.163	1.002	1.021	1.165
	LTE Band 66 (AWS)	1.002	0.144	0.163	1.146	1.165	1.309
	LTE Band 2 (PCS)	1.132	0.144	0.163	1.276	1.295	1.439
	LTE Band 41	1.397	0.144	0.163	1.541	1.560	See Table Below

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	Back	1.151	0.144	0.163	1.295	1.314	**1.458**
	Front	0.554	0.144*	0.163*	0.698	0.717	0.861
	Top	-	0.144*	0.163*	0.144	0.163	0.307
	Bottom	1.359	-	-	1.359	1.359	1.359
	Right	0.072	-	-	0.072	0.072	0.072
	Left	0.064	0.144*	0.163*	0.208	0.227	0.371

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	Back	0.355	0.144	0.163	0.499	0.518	0.662
	Front	0.319	0.144*	0.163*	0.463	0.482	0.626
	Top	-	0.144*	0.163*	0.144	0.163	0.307
	Bottom	1.397	-	-	**1.397**	**1.397**	**1.397**
	Right	0.060	-	-	0.060	0.060	0.060
	Left	0.244	0.144*	0.163*	0.388	0.407	0.551

Table 12-12
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	0.367	0.032	0.399
	GPRS 1900	0.429	0.032	0.461
	UMTS 850	0.908	0.032	0.940
	UMTS 1750	1.276	0.032	1.308
	UMTS 1900	1.359	0.032	1.391
	LTE Band 12	0.294	0.032	0.326
	LTE Band 13	0.428	0.032	0.460
	LTE Band 26 (Cell)	0.858	0.032	0.890
	LTE Band 66 (AWS)	1.002	0.032	1.034
	LTE Band 2 (PCS)	1.132	0.032	1.164
	LTE Band 41	1.397	0.032	**1.429**

12.6 Phablet Simultaneous Transmission Analysis

Per FCC KDB Publication 941225 D06v02r01, the devices edges with antennas more than 2.5 cm from edge are not required to be evaluated for 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 applicable exposure conditions was used for 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 12-13
Simultaneous Transmission Scenario with 5 GHz WLAN (Phablet)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Phablet SAR	GPRS 1900	1.105	0.512	0.968	1.617	2.073
	UMTS 1750	3.297	0.512	0.968	3.809	See Table Below
	UMTS 1900	3.190	0.512	0.968	3.702	See Table Below
	LTE Band 66 (AWS)	2.847	0.512	0.968	3.359	**3.815**
	LTE Band 2 (PCS)	1.979	0.512	0.968	2.491	2.947
	LTE Band 41	2.116	0.512	0.968	2.628	3.084

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	2.965	0.968	**3.933**
	Front	1.573	0.968*	2.541
	Top	-	0.968*	0.968
	Bottom	3.297	-	3.297
	Right	0.295	-	0.295
	Left	0.215	0.968*	1.183

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	1.779	0.968	2.747
	Front	1.226	0.968*	2.194
	Top	-	0.968*	0.968
	Bottom	3.190	-	**3.190**
	Right	0.360	-	0.360
	Left	0.357	0.968*	1.325

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	GPRS 1900	1.105	1.100	2.205
	UMTS 1750	3.297	1.100	See Table Below
	UMTS 1900	3.190	1.100	See Table Below
	LTE Band 66 (AWS)	2.847	1.100	**3.947**
	LTE Band 2 (PCS)	1.979	1.100	3.079
	LTE Band 41	2.116	1.100	3.216

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Phablet SAR	Back	2.965	1.100	See Note 1	0.05
	Front	1.573	0.424	1.997	N/A
	Top	-	1.100*	1.100	N/A
	Bottom	3.297	-	**3.297**	N/A
	Right	0.295	-	0.295	N/A
	Left	0.215	1.100*	1.315	N/A

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	1.779	1.100	2.879
	Front	1.226	0.424	1.650
	Top	-	1.100*	1.100
	Bottom	3.190	-	**3.190**
	Right	0.360	-	0.360
	Left	0.357	1.100*	1.457

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 12.7 for detailed SPLS ratio analysis.

12.7 SPLSR Evaluation and Analysis

Per FCC KDB Publication 447498 D01v06, when the sum of the standalone transmitters is more than 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 ≤0.10 for 10g, simultaneous SAR evaluation is not required. The distance between the transmitters was calculated using the following formula.

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

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

12.7.1 Back Side SPLSR Evaluation and Analysis

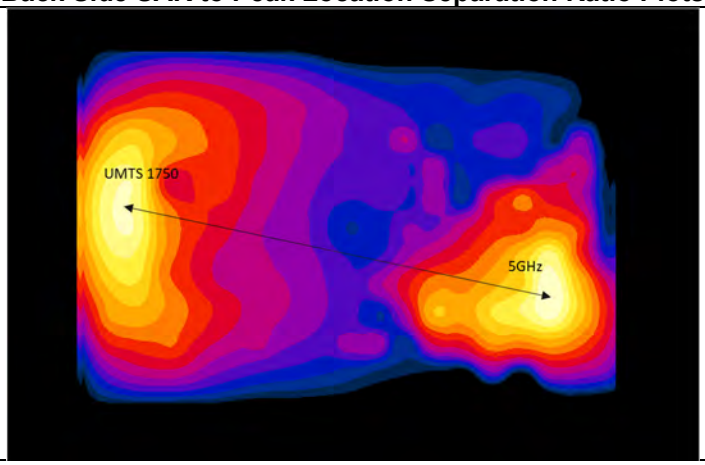
Table 12-14
Peak SAR Locations for Phablet Back Side

Mode/Band	x (mm)	y (mm)
5 GHz WLAN MIMO	0.00	68.00
UMTS 1750	-32.50	-78.00

Table 12-15
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}	$(a+b)^{1.5}/D_{a-b}$	
5 GHz WLAN MIMO	UMTS 1750	1.10	2.965	4.065	149.57	0.05	1

Table 12-16
Back Side SAR to Peak Location Separation Ratio Plots



1

12.8 Simultaneous Transmission Conclusion

The above numerical summed SAR results and SPLSR analysis are sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528- 2013 Section 6.3.4.1.

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 preformed 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)	
1750	1712.40	1312	UMTS 1750	RMC	bottom	10 mm	1.140	1.110	1.03	N/A	N/A	N/A	N/A
1900	1907.60	9538	UMTS 1900	RMC	bottom	10 mm	1.120	1.090	1.03	N/A	N/A	N/A	N/A
2600	2680.00	41490	LTE Band 41, 20 MHz Bandwidth	QPSK, 1 RB, 0 RB Offset	bottom	10 mm	1.090	1.010	1.08	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	FREQUENCY		Mode	Service	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	1752.60	1513	UMTS 1750	RMC	bottom	0 mm	3.090	2.980	1.04	N/A	N/A	N/A	N/A
1900	1907.60	9538	UMTS 1900	RMC	bottom	0 mm	2.630	2.330	1.13	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 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	85033E	3.5mm Standard Calibration Kit	8/13/2018	Annual	8/13/2019	MY53402352
Agilent	8753ES	S-Parameter Vector Network Analyzer	8/30/2018	Annual	8/30/2019	MY40003841
Agilent	E4432B	ESG-D Series Signal Generator	4/19/2018	Annual	4/19/2019	US40053896
Agilent	E4438C	ESG Vector Signal Generator	6/22/2018	Annual	6/22/2019	MY53401181
Agilent	E5515C	Wireless Communications Test Set	1/29/2016	Triennial	1/29/2019	GB46310798
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB44450273
Agilent	N5182A	MXG Vector Signal Generator	11/1/2017	Annual	11/1/2018	MY47420603
Agilent	N9020A	MXA Signal Analyzer	1/24/2018	Annual	1/24/2019	US46470561
Amplifier Research	150A100C	Amplifier	CBT	N/A	CBT	350132
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	MA2411B	Pulse Power Sensor	11/15/2017	Annual	11/15/2018	1339007
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1339018
Anritsu	ML2496A	Power Meter	5/21/2018	Annual	5/21/2019	1351001
Anritsu	MT8821C	Radio Communication Analyzer	7/24/2018	Annual	7/24/2019	6201664756
Anritsu	MT8862A	Wireless Connectivity Test Set	7/3/2018	Annual	7/3/2019	6261782395
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M15SA00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
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	170330174
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
Mini Circuits	PWR-4GHS	USB Power Sensor	1/20/2018	Annual	1/20/2019	11710030063
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mitutoyo	CD-6"CSX	Digital Caliper	4/18/2018	Biennial	4/18/2020	13264165
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	NC-100	Torque Wrench	4/18/2018	Annual	4/18/2019	1445
Pasternack	NC-100	Torque Wrench	4/18/2018	Annual	4/18/2019	N/A
Pasternack	NC-100	Torque Wrench	5/23/2018	Biennial	5/23/2020	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
Rohde & Schwarz	CMW500	Radio Communication tester	8/3/2018	Annual	8/3/2019	140144
Rohde& Schwarz	CMW500	Wideband Radio Communication Tester	7/5/2018	Annual	7/5/2019	145663
Seekonk	NC-100	Torque Wrench	7/11/2018	Annual	7/11/2019	N/A
SPEAG	D1750V2	1750 MHz SAR Dipole	5/9/2017	Biennial	5/9/2019	1148
SPEAG	D1765V2	1765 MHz SAR Dipole	5/23/2018	Annual	5/23/2019	1008
SPEAG	D1900V2	1900 MHz SAR Dipole	2/7/2018	Annual	2/7/2019	5d148
SPEAG	D1900V2	1900 MHz SAR Dipole	7/11/2017	Biennial	7/11/2019	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	D2600V2	2600 MHz SAR Dipole	4/11/2018	Annual	4/11/2019	1004
SPEAG	D2600V2	2600 MHz SAR Dipole	6/7/2017	Biennial	6/7/2019	1064
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/16/2018	Annual	1/16/2019	1057
SPEAG	D5GHzV2	5 GHz SAR Dipole	9/21/2016	Triennial	9/21/2019	1191
SPEAG	D750V3	750 MHz SAR Dipole	1/15/2018	Annual	1/15/2019	1003
SPEAG	D750V3	750 MHz Dipole	3/7/2017	Biennial	3/7/2019	1054
SPEAG	D750V3	750 MHz SAR Dipole	7/13/2016	Triennial	7/13/2019	1161
SPEAG	D835V2	835 MHz SAR Dipole	1/15/2018	Annual	1/15/2019	4d132
SPEAG	D835V2	835 MHz SAR Dipole	7/11/2017	Biennial	7/11/2019	4d133
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/15/2018	Annual	2/15/2019	665
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	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	DAK-3.5	Dielectric Assessment Kit	5/15/2018	Annual	5/15/2019	1070
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	7/11/2018	Annual	7/11/2019	1039
SPEAG	ES3DV3	SAR Probe	2/13/2018	Annual	2/13/2019	3213
SPEAG	ES3DV3	SAR Probe	3/13/2018	Annual	3/13/2019	3319
SPEAG	ES3DV3	SAR Probe	3/27/2018	Annual	3/27/2019	3347
SPEAG	EX3DV4	SAR Probe	4/18/2018	Annual	4/18/2019	7357
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: 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.

15 MEASUREMENT UNCERTAINTIES

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	

16 CONCLUSION

16.1 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]

17 REFERENCES

[1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, Aug. 1996.

[2] ANSI/IEEE C95.1-2005, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, 2006.

[3] ANSI/IEEE C95.1-1992, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, Sept. 1992.

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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10288

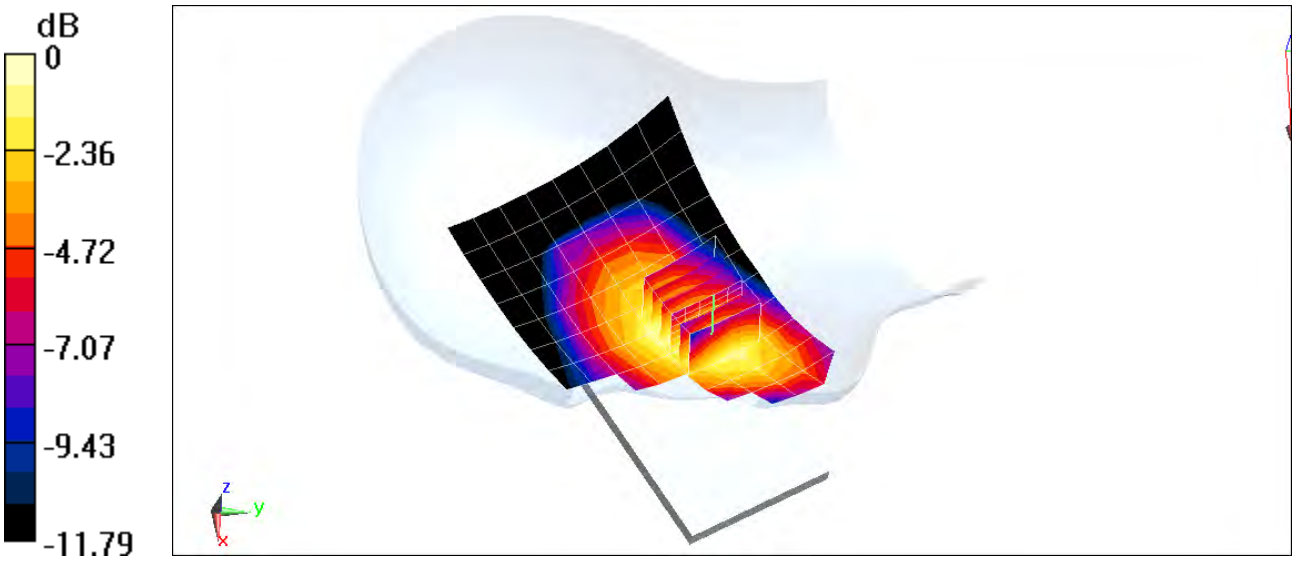
Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: 835 Head Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.921 S/m; ε_r = 40.737; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-11-2018; Ambient Temp: 21.5°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7410; ConvF(9.81, 9.81, 9.81);@ 836.6 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: GSM 850, Right Head, Cheek, 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 = 11.26 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.152 W/kg
SAR(1 g) = 0.116 W/kg



0 dB = 0.138 W/kg = -8.60 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10130

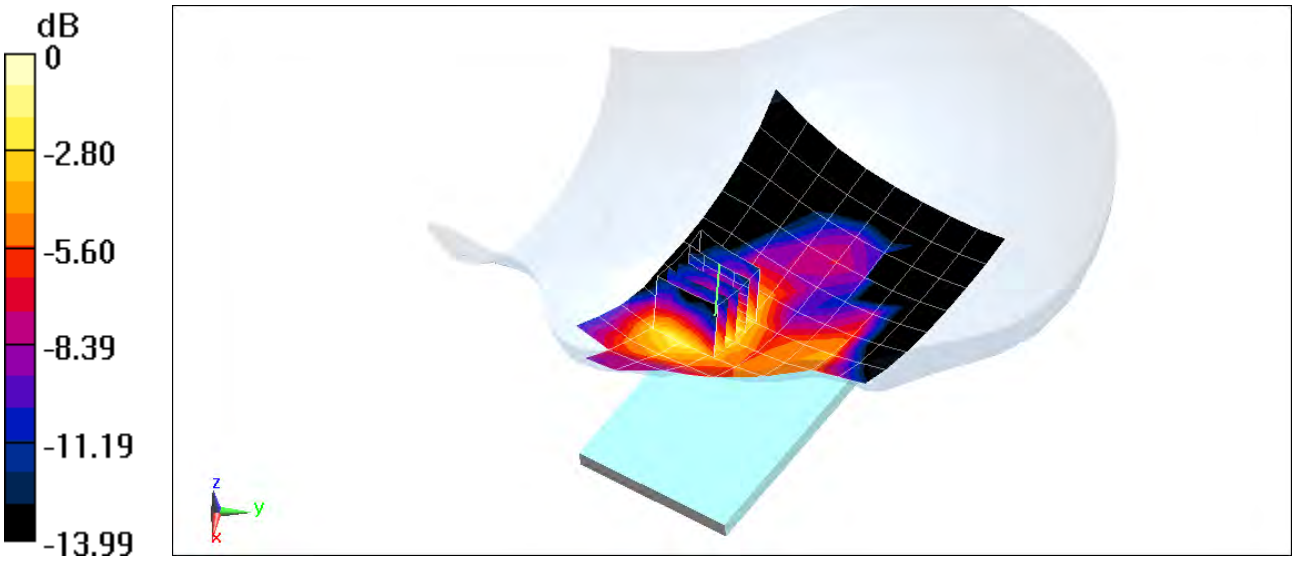
Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.431 S/m; ε_r = 38.357; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-11-2018; Ambient Temp: 22.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7410; ConvF(8.16, 8.16, 8.16); @ 1880 MHz; Calibrated: 7/20/2018;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

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 = 5.622 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.0670 W/kg
SAR(1 g) = 0.042 W/kg



0 dB = 0.0561 W/kg = -12.51 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10288

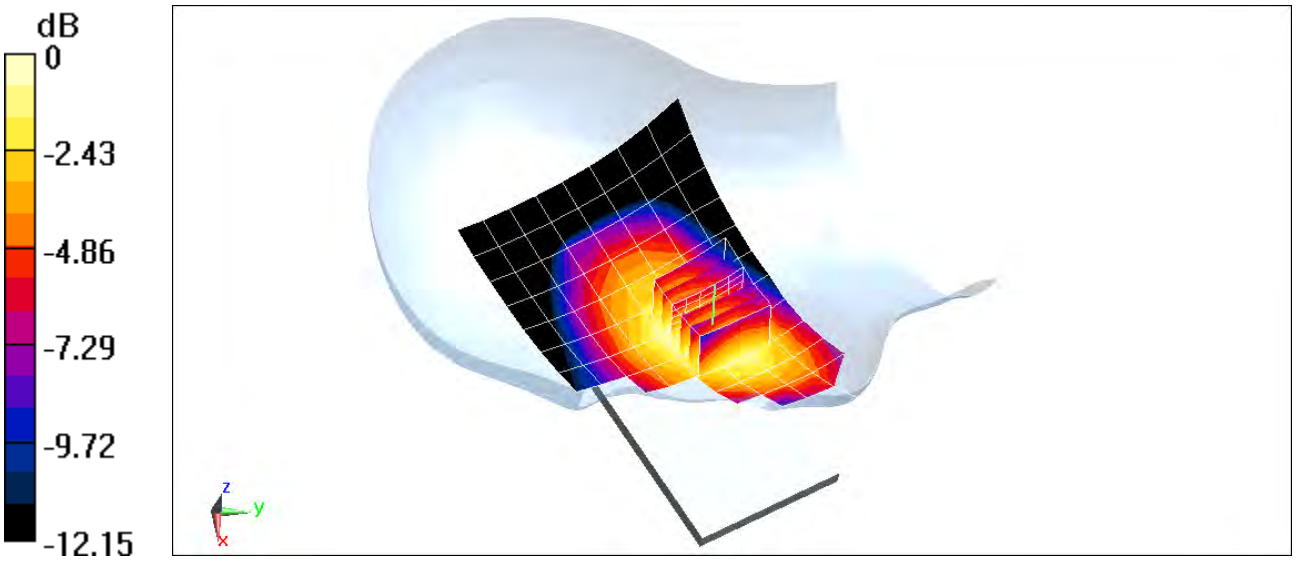
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.921 S/m; ε_r = 40.737; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-11-2018; Ambient Temp: 21.5°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7410; ConvF(9.81, 9.81, 9.81);@836.6 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: UMTS 850, Right Head, Cheek, 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 = 14.16 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.232 W/kg
SAR(1 g) = 0.176 W/kg



0 dB = 0.209 W/kg = -6.80 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39131

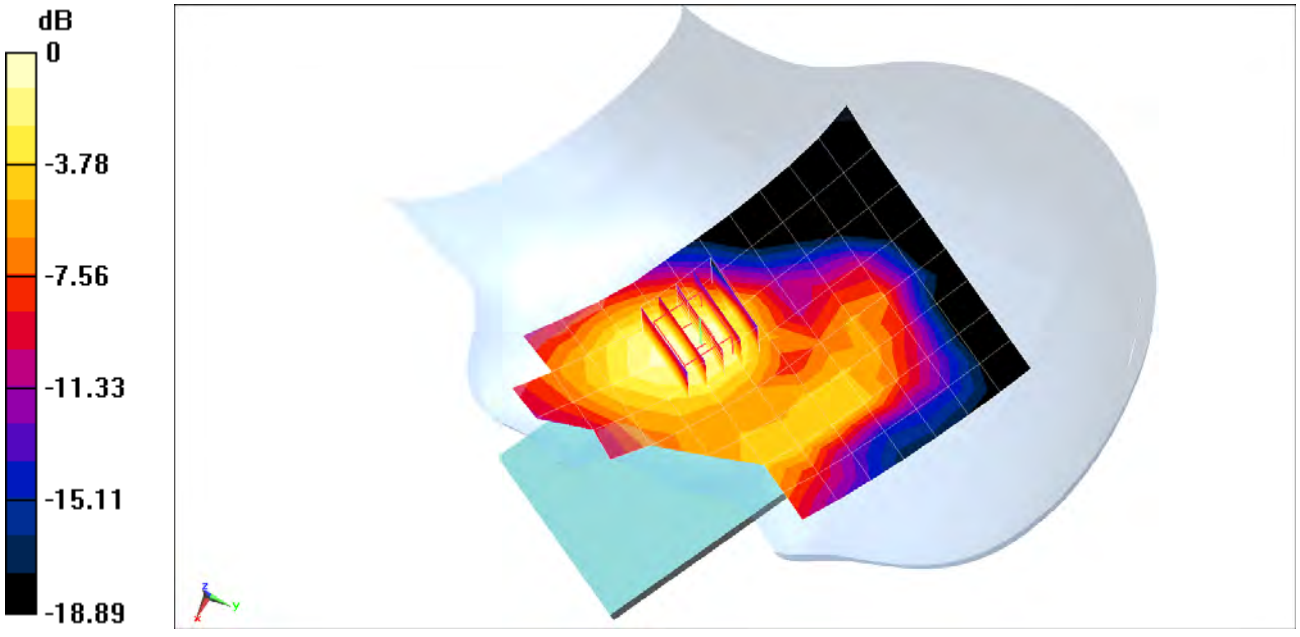
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.354 S/m; ε_r = 41.28; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-13-2018; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(8.4, 8.4, 8.4) @ 1732.4 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: UMTS 1750, Left Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.131 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.114 W/kg
SAR(1 g) = 0.078 W/kg



0 dB = 0.0985 W/kg = -10.07 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10130

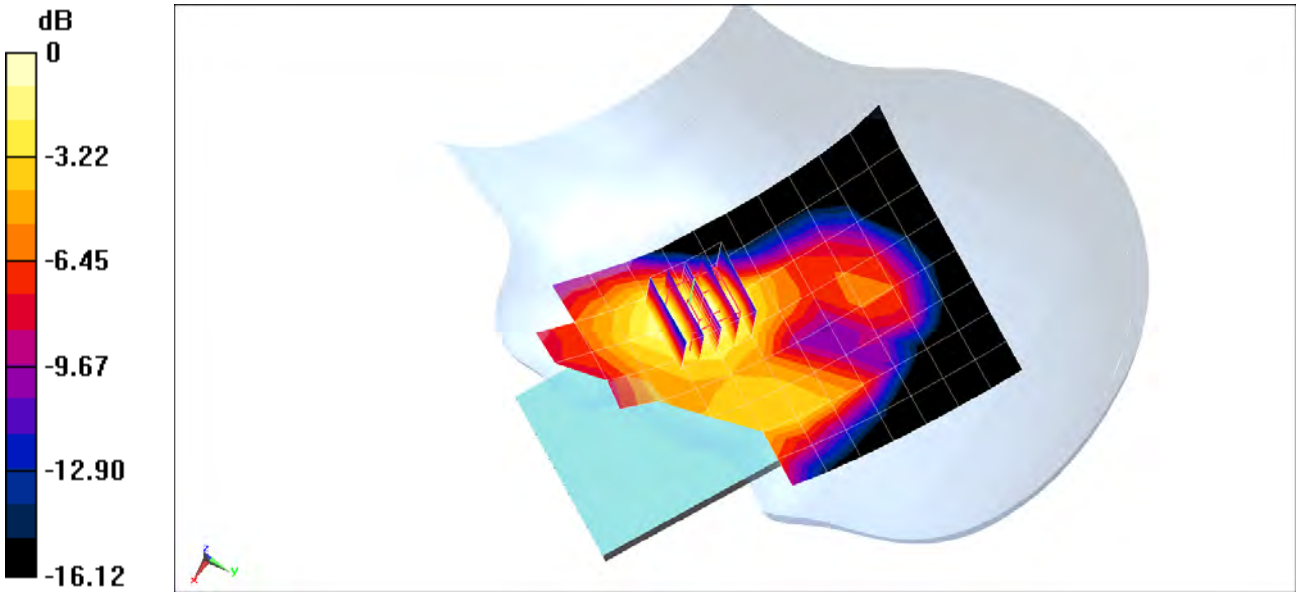
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.431 S/m; ε_r = 38.357; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-11-2018; Ambient Temp: 22.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7410; ConvF(8.16, 8.16, 8.16) @ 1880 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.739 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.163 W/kg
SAR(1 g) = 0.102 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39139

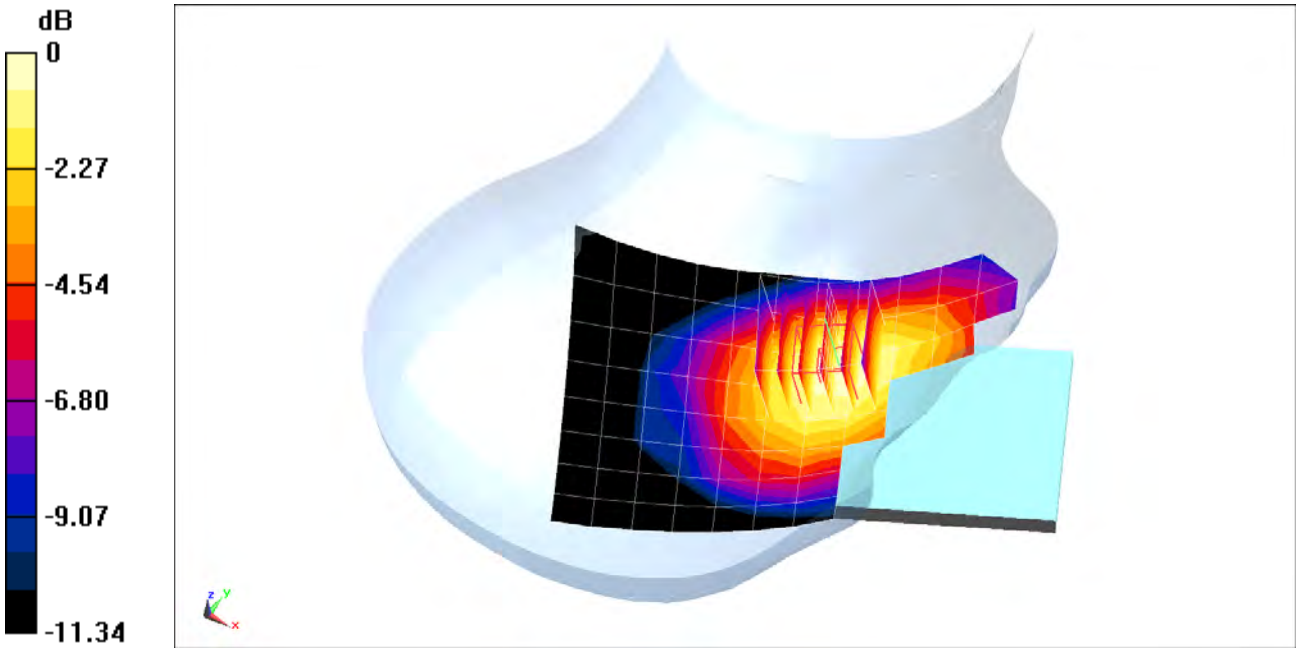
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 MHz Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.866 S/m; ε_r = 42.396; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-10-2018; Ambient Temp: 21.5°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7409; ConvF(9.91, 9.91, 9.91) @ 707.5 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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 (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.87 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.120 W/kg
SAR(1 g) = 0.092 W/kg



0 dB = 0.110 W/kg = -9.59 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10090

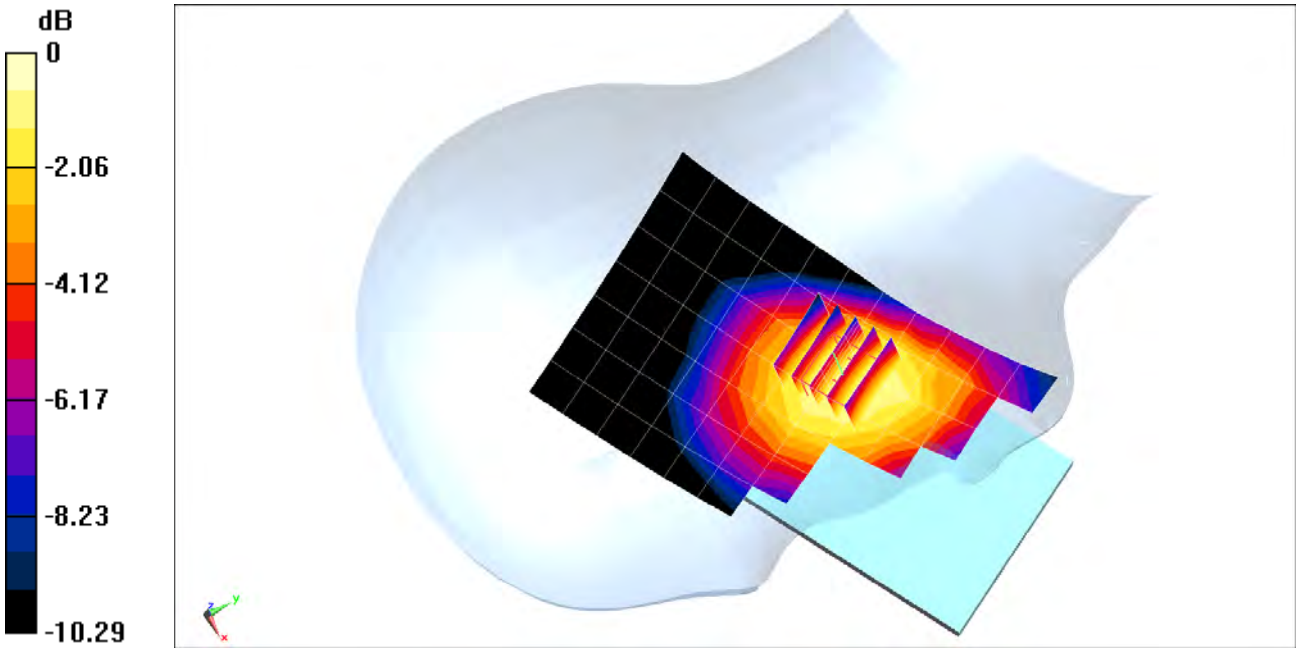
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Head Medium parameters used (interpolated):
f = 782 MHz; σ = 0.899 S/m; ε_r = 40.463; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-19-2018; Ambient Temp: 23.5°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7410; ConvF(10.13, 10.13, 10.13) @ 782 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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 = 11.57 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.136 W/kg
SAR(1 g) = 0.105 W/kg



0 dB = 0.126 W/kg = -9.00 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10288

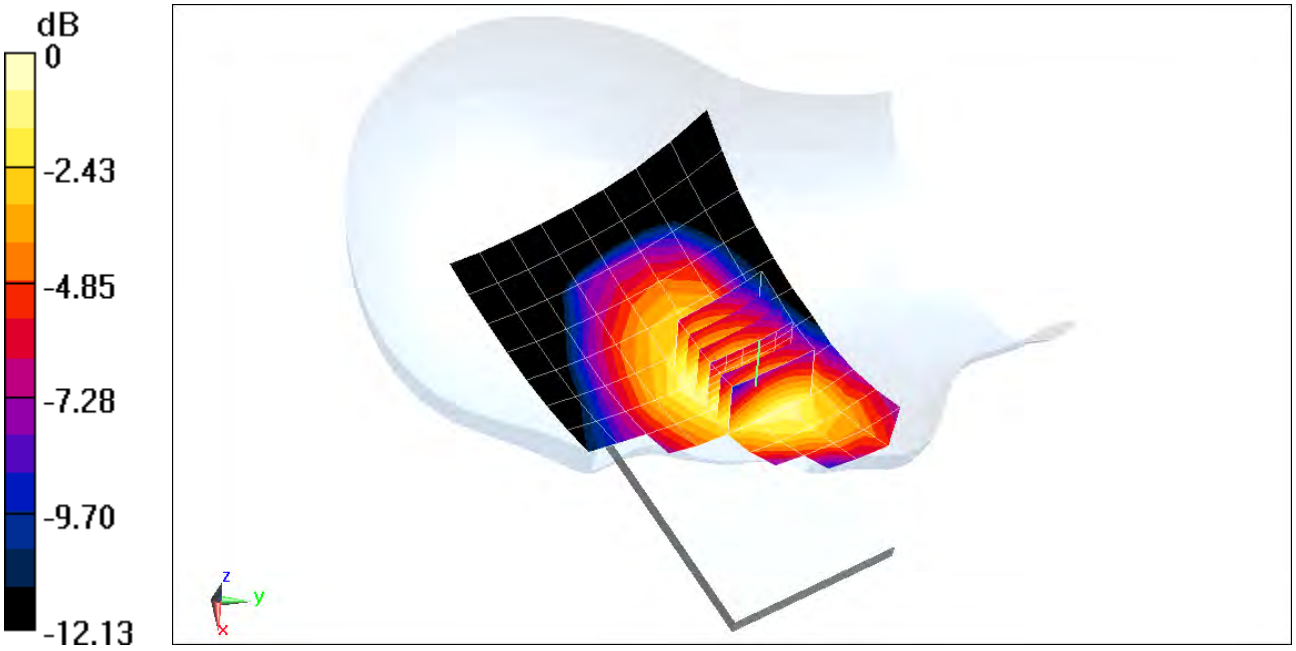
Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 831.5 MHz; σ = 0.919 S/m; ε_r = 40.744; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-11-2018; Ambient Temp: 21.5°C; Tissue Temp: 21.3°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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 26 (Cell.), Right Head, Cheek, Mid.ch,
15 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 = 11.25 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.137 W/kg
SAR(1 g) = 0.104 W/kg



0 dB = 0.125 W/kg = -9.03 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39131

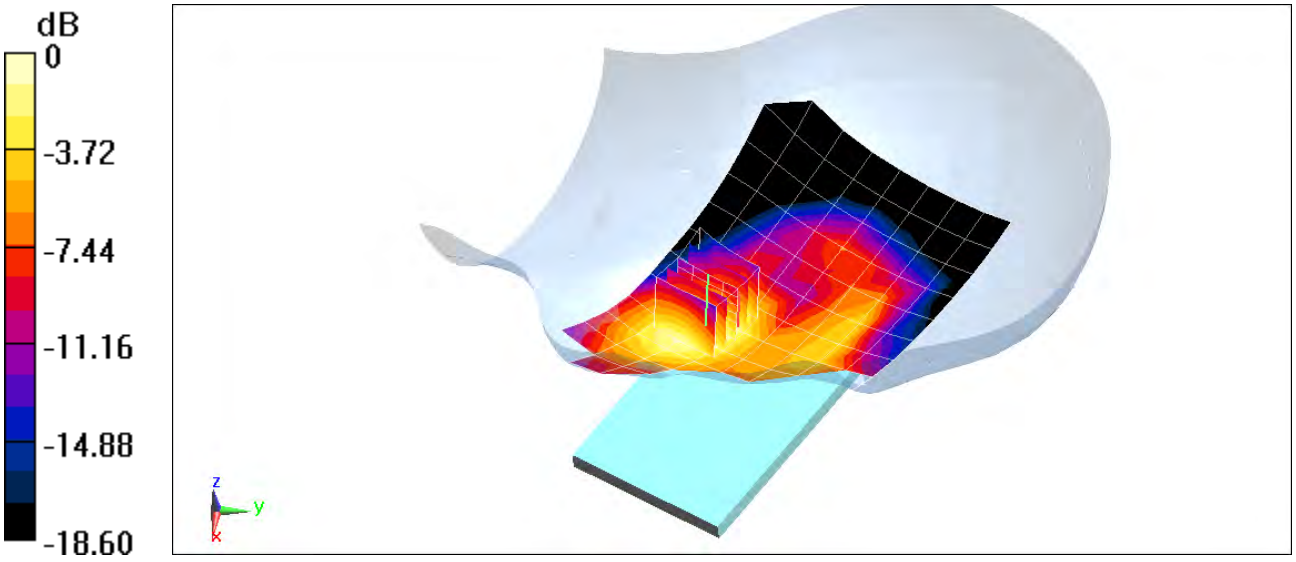
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1770 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
$f = 1770$ MHz; $\sigma = 1.379$ S/m; $\varepsilon_r = 41.233$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 09-13-2018; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(8.4, 8.4, 8.4); 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 66 (AWS), Left Head, Cheek, High.ch
20 MHz Bandwidth, QPSK, 1 RB, 99 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 = 9.263 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.133 W/kg
SAR(1 g) = 0.090 W/kg



0 dB = 0.115 W/kg = -9.39 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10098

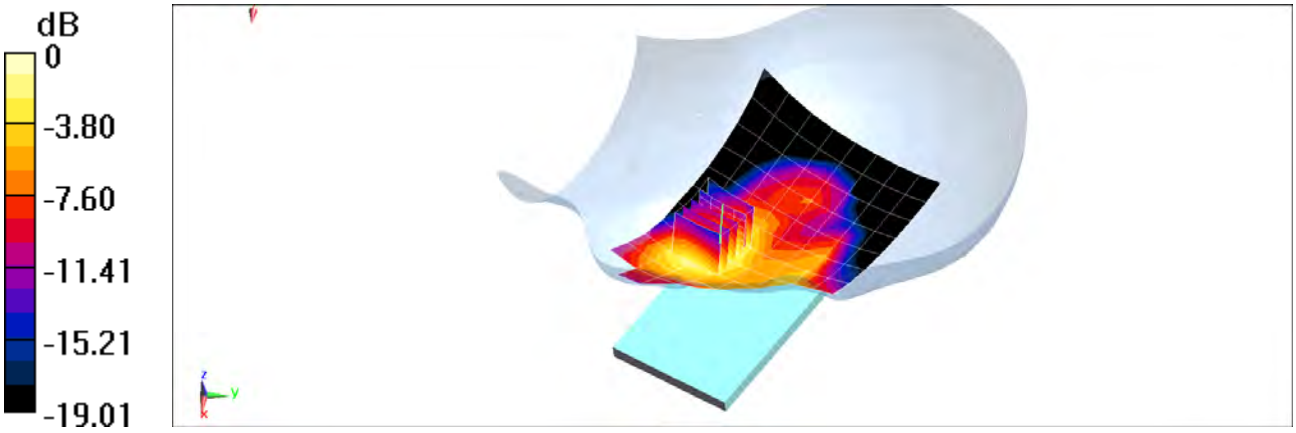
Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.431 S/m; ε_r = 38.357; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-11-2018; Ambient Temp: 22.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7410; ConvF(8.16, 8.16, 8.16); 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 2 (PCS), 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 = 10.14 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.195 W/kg
SAR(1 g) = 0.122 W/kg



0 dB = 0.171 W/kg = -7.67 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39139

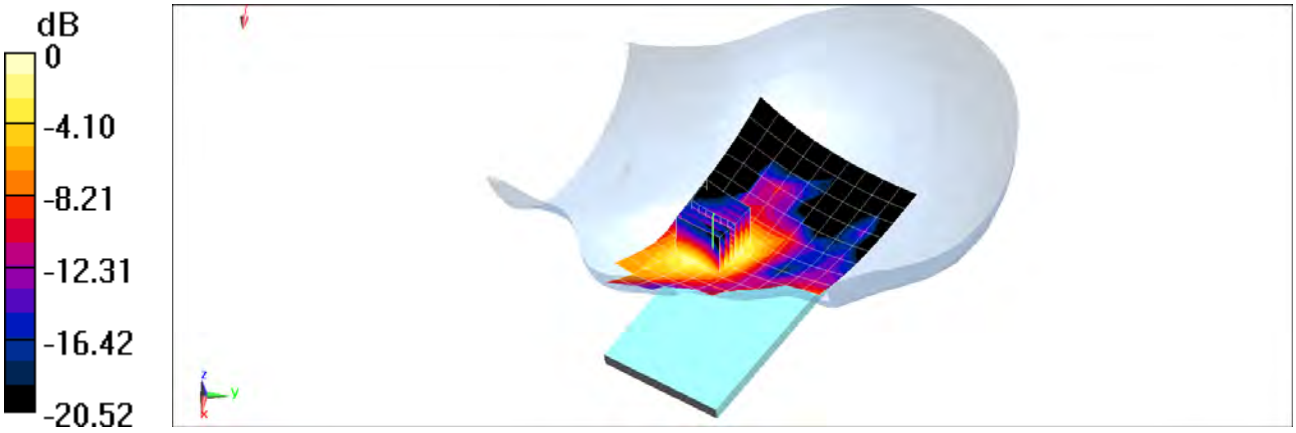
Communication System: UID 0, LTE Band 41; Frequency: 2593 MHz; Duty Cycle: 1:1.58
Medium: 2450 Head Medium parameters used (interpolated):
$f = 2593$ MHz; $\sigma = 1.944$ S/m; $\varepsilon_r = 38.314$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 09-18-2018; Ambient Temp: 21.1°C; Tissue Temp: 20.8°C

Probe: ES3DV3 - SN3213; ConvF(4.53, 4.53, 4.53); Calibrated: 2/13/2018;
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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 41, Left Head, Cheek, Mid.ch, QPSK,
20 MHz Bandwidth, 1 RB, 0 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.545 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.151 W/kg
SAR(1 g) = 0.082 W/kg



0 dB = 0.103 W/kg = -9.87 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 17715

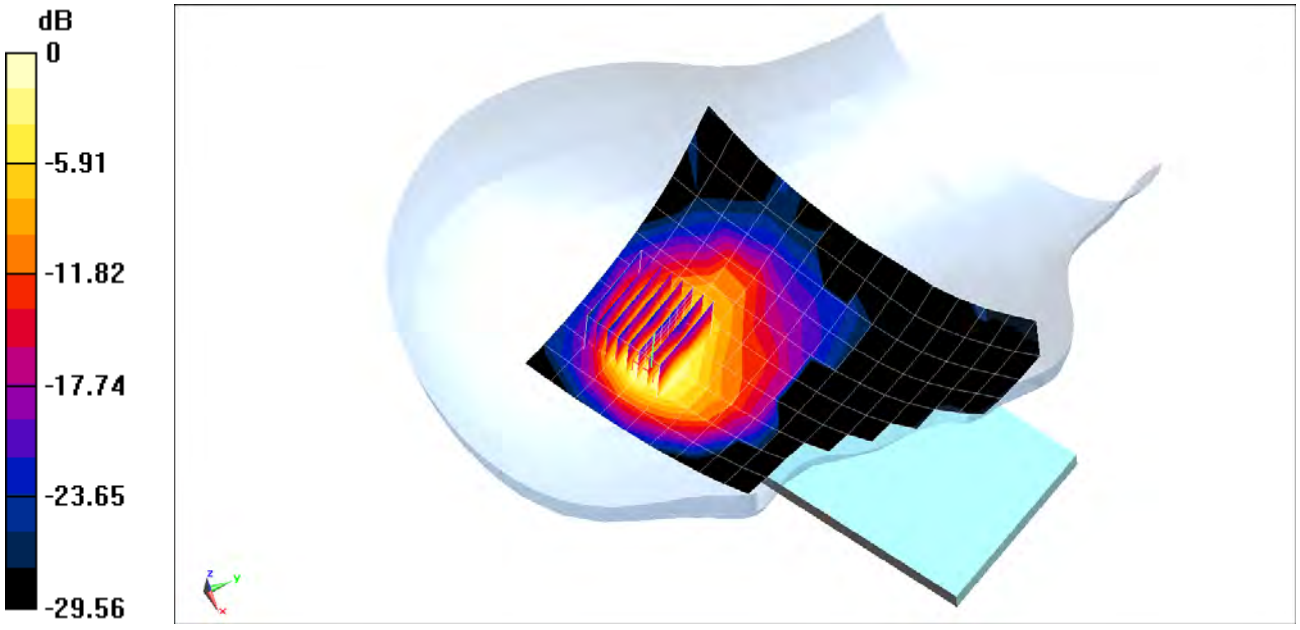
Communication System: UID 0, _IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2437 MHz; σ = 1.807 S/m; ε_r = 38.136; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-06-2018; Ambient Temp: 22.6°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7410; ConvF(7.5, 7.5, 7.5) @ 2437 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: IEEE 802.11b, 22 MHz Bandwidth, Antenna 1, Right Head, Cheek, Ch 6, 1 Mbps

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.847 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.631 W/kg
SAR(1 g) = 0.262 W/kg



0 dB = 0.478 W/kg = -3.21 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA920F; Type: Portable Handset; Serial: 16246

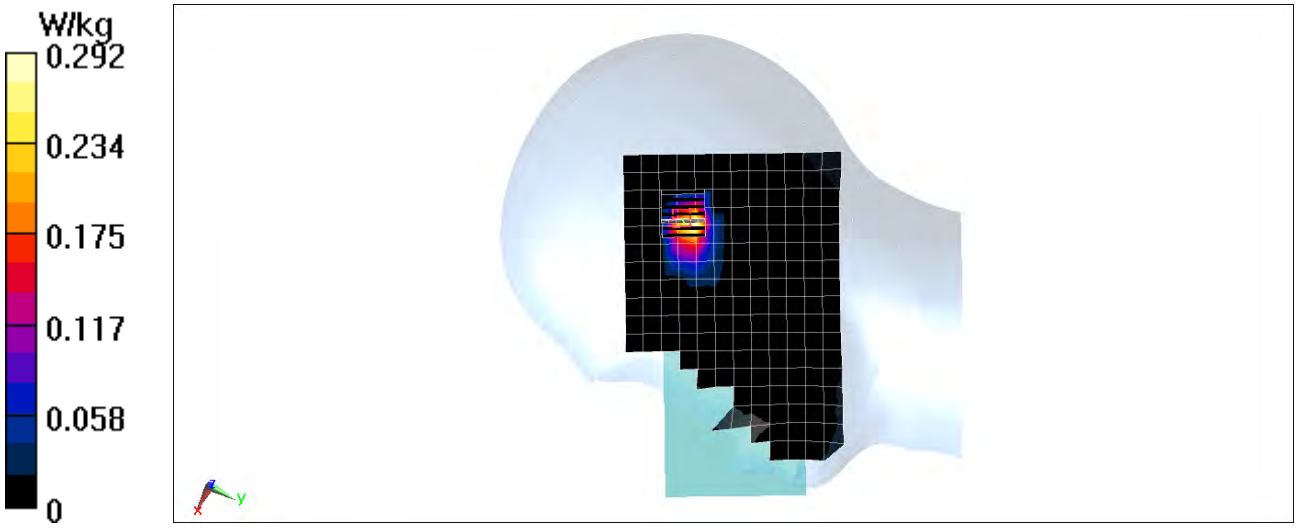
Communication System: UID 0, 802.11ac 5.2-5.8 GHz Band; Frequency: 5775 MHz; Duty Cycle: 1:1
Medium: 5GHz Medium parameters used (interpolated):
f = 5775 MHz; σ = 5.083 S/m; ε_r = 35.045; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-04-2018; Ambient Temp: 21.4°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(4.82, 4.82, 4.82) @ 5775 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: IEEE 802.11ac, U-NII-3, 80 MHz Bandwidth, Antenna 2,
Right Head, Cheek, Ch 155, 29.3 Mbps

Area Scan (13x13x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 2.242 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.740 W/kg
SAR(1 g) = 0.154 W/kg



0 dB = 0.436 W/kg = -3.61 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 16244

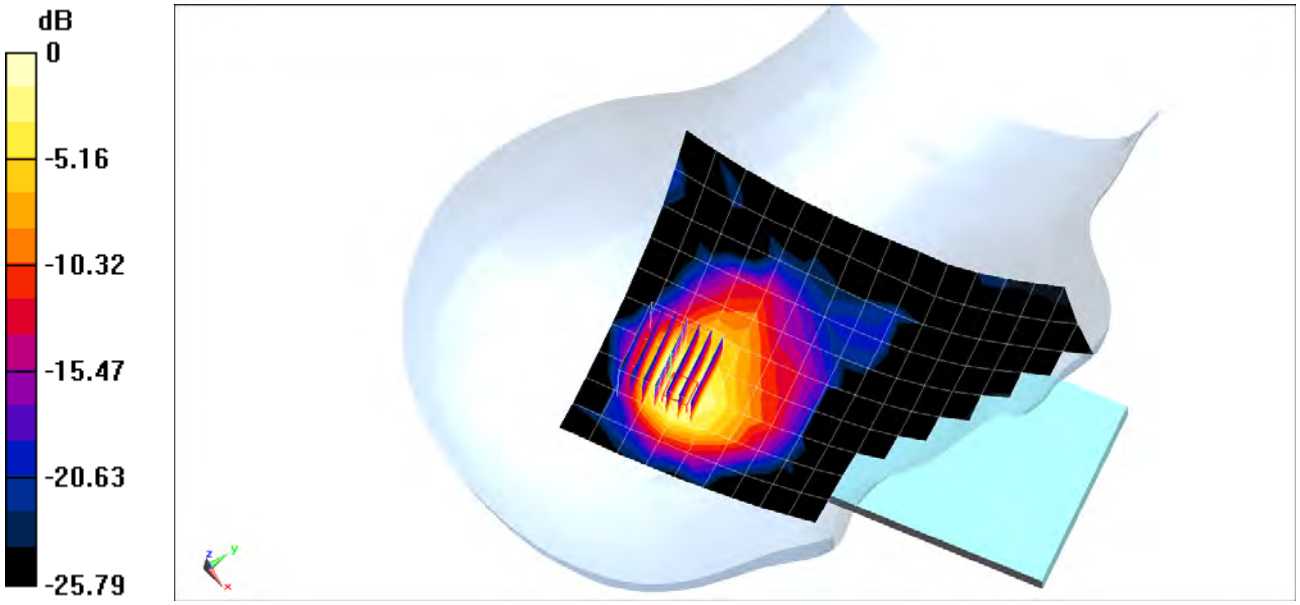
Communication System: UID 0, Bluetooth; Frequency: 2402 MHz; Duty Cycle: 1:1.284
Medium: 2450 Head Medium parameters used (interpolated):
$f = 2402$ MHz; $\sigma = 1.797$ S/m; $\varepsilon_r = 40.343$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 09-13-2018; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(7.5, 7.5, 7.5) @ 2402 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: Bluetooth, Right Head, Cheek, Ch 0, 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 = 8.842 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.317 W/kg
SAR(1 g) = 0.126 W/kg



0 dB = 0.236 W/kg = -6.27 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10098

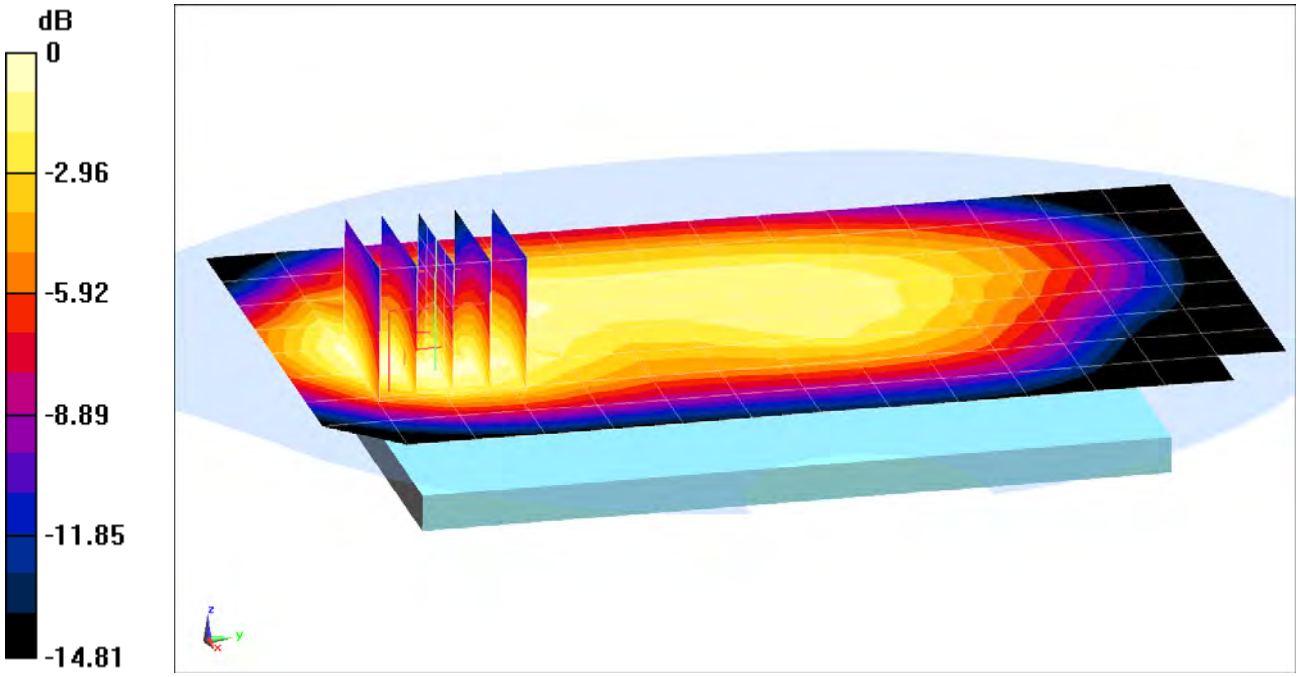
Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.947 S/m; ε_r = 53.851; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-06-2018; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3213; ConvF(6.2, 6.2, 6.2) @ 836.6 MHz; Calibrated: 2/13/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: GSM 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 = 17.30 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.407 W/kg
SAR(1 g) = 0.255 W/kg



0 dB = 0.303 W/kg = -5.19 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10098

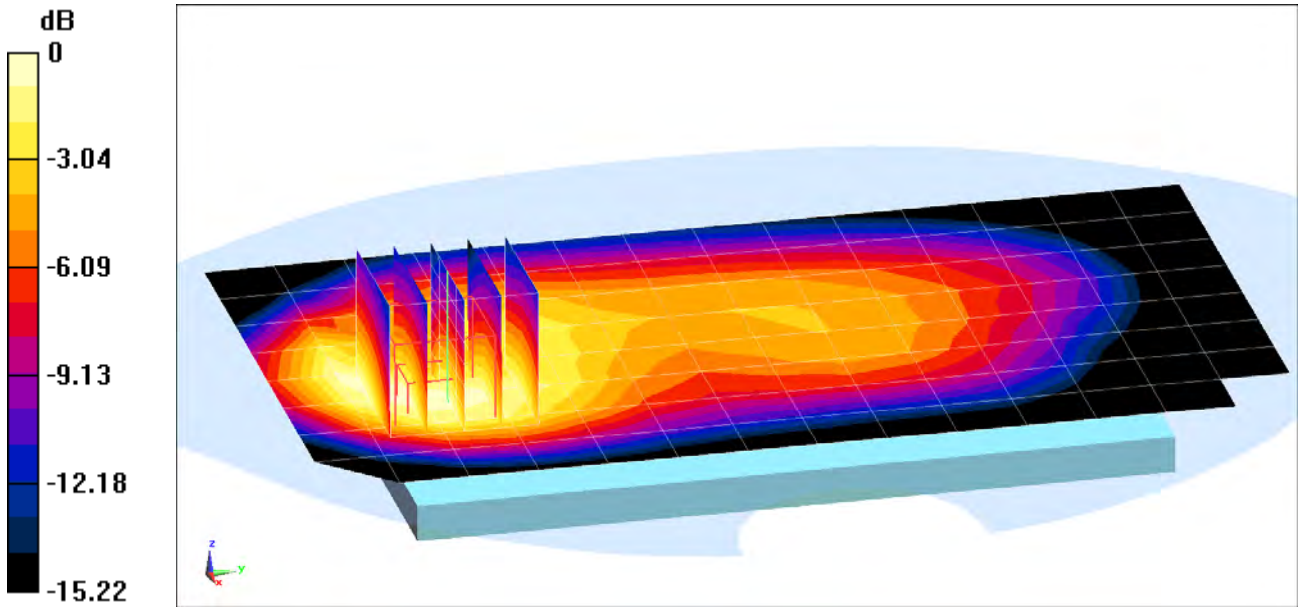
Communication System: UID 0, _GSM GPRS; 4 Tx slots; Frequency: 848.8 MHz; Duty Cycle: 1:2.076
Medium: 835 Body Medium parameters used (interpolated):
f = 848.8 MHz; σ = 0.989 S/m; ε_r = 54.348; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-08-2018; Ambient Temp: 22.5°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7357; ConvF(10.17, 10.17, 10.17) @ 848.8 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: GPRS 850, Body SAR, Back side, High.ch, 4 Tx Slots

Area Scan (9x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.38 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.587 W/kg
SAR(1 g) = 0.335 W/kg



0 dB = 0.487 W/kg = -3.12 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10132

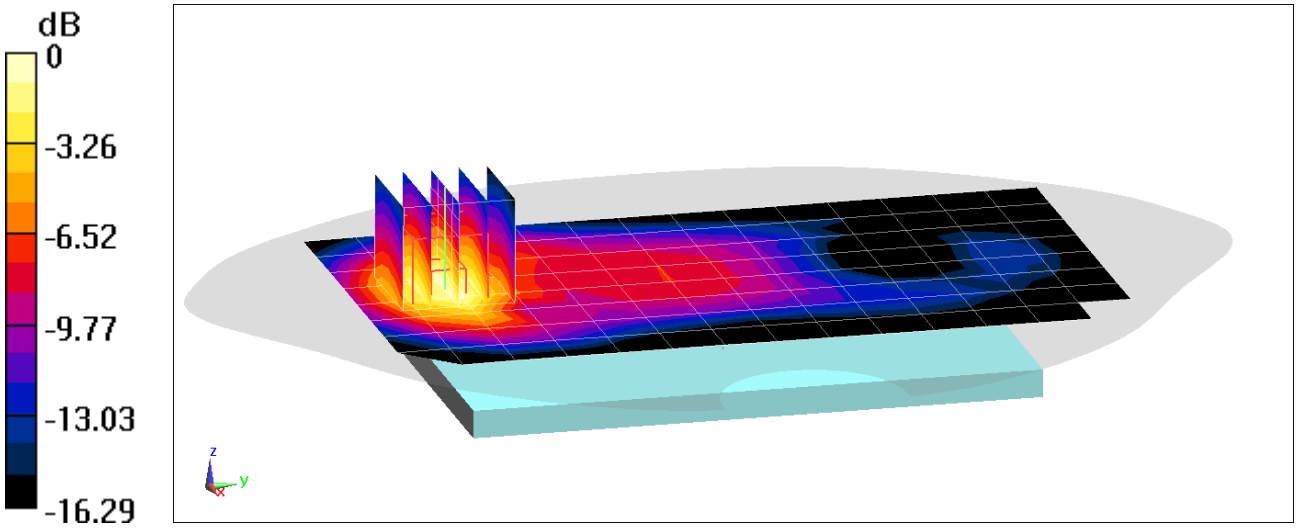
Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.539 S/m; ε_r = 53.339; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-04-2018; Ambient Temp: 20.5°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3347; ConvF(4.94, 4.94, 4.94) @ 1880 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: GSM 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 = 13.28 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.376 W/kg
SAR(1 g) = 0.233 W/kg



0 dB = 0.283 W/kg = -5.48 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10090

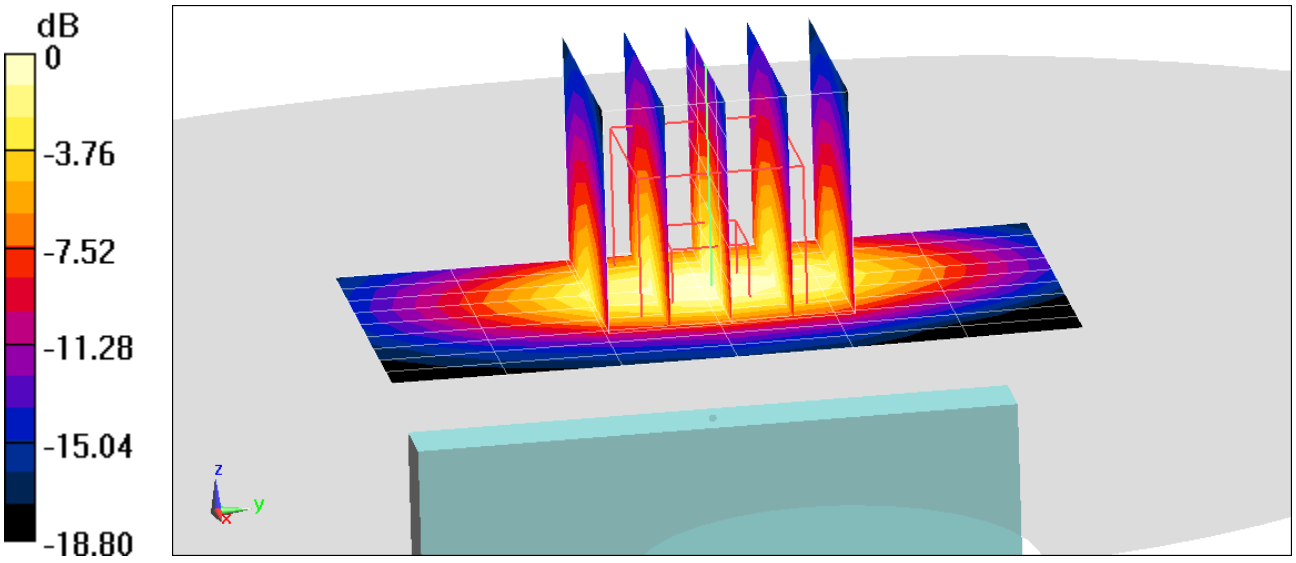
Communication System: UID 0, _GSM GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.554 S/m; ε_r = 52.29; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-17-2018; Ambient Temp: 22.4°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3319; ConvF(4.84, 4.84, 4.84); @ 1880 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: GPRS 1900, Body SAR, Bottom Edge, Mid.ch, 4 Tx Slots

Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.85 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.714 W/kg
SAR(1 g) = 0.415 W/kg



0 dB = 0.526 W/kg = -2.79 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10288

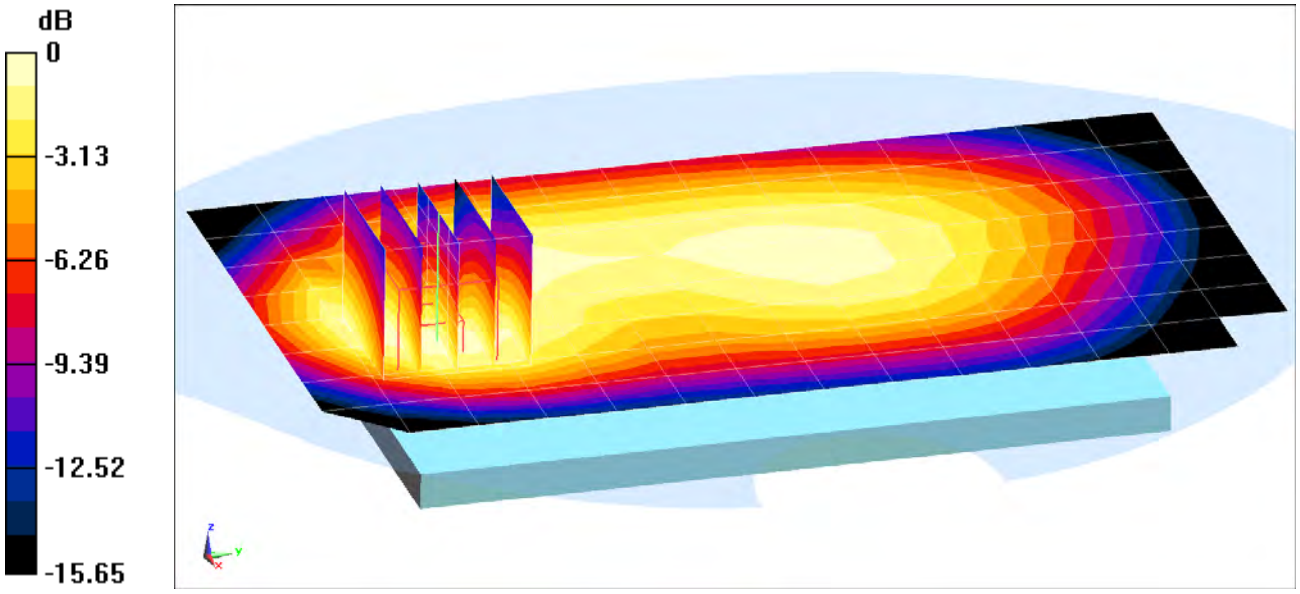
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.947 S/m; ε_r = 53.851; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-06-2018; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3213; ConvF(6.2, 6.2, 6.2) @ 836.6 MHz; Calibrated: 2/13/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

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 = 18.02 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.436 W/kg
SAR(1 g) = 0.274 W/kg



0 dB = 0.325 W/kg = -4.88 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10288

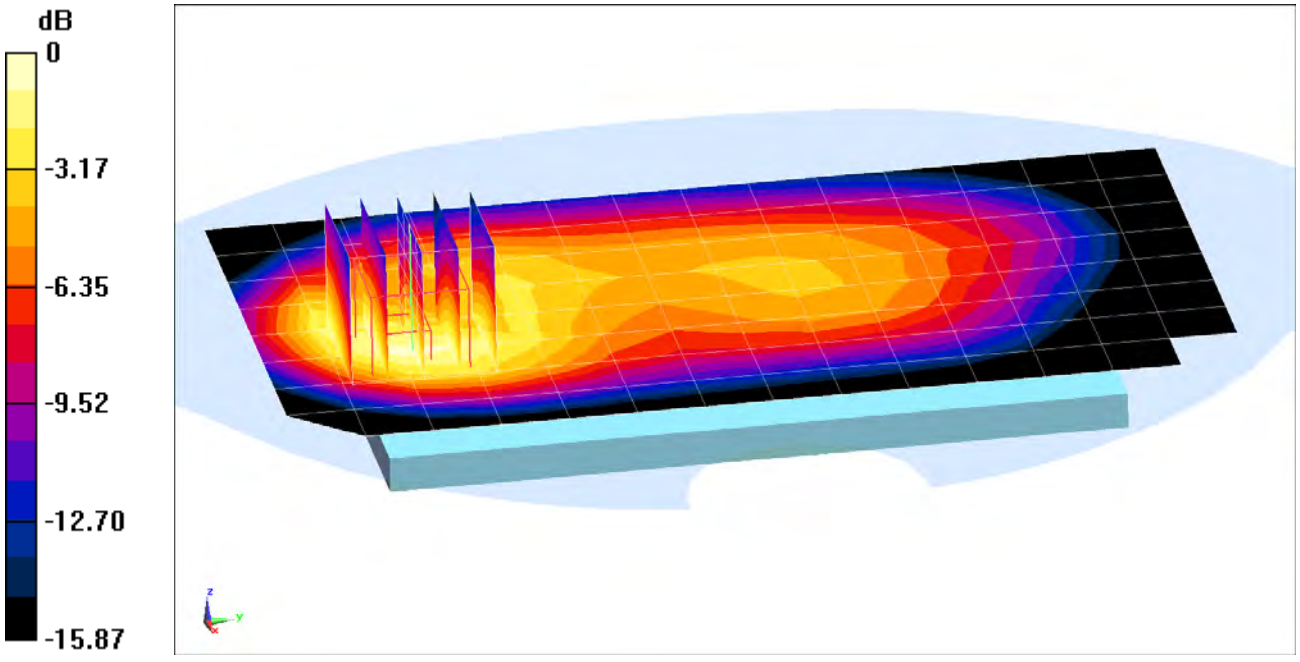
Communication System: UID 0, UMTS; Frequency: 846.6 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 846.6 MHz; σ = 0.957 S/m; ε_r = 53.762; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-06-2018; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3213; ConvF(6.2, 6.2, 6.2) @ 846.6 MHz; Calibrated: 2/13/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: UMTS 850, Body SAR, Back side, High.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 = 27.62 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.658 W/kg



0 dB = 0.792 W/kg = -1.01 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10090

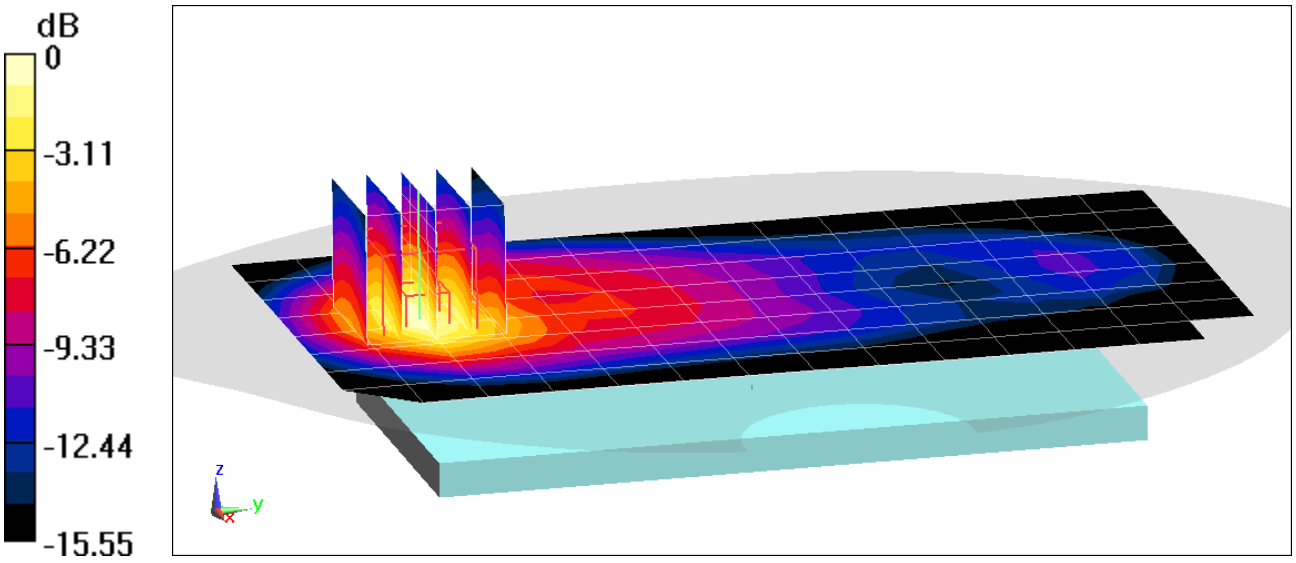
Communication System: UID 0, UMTS; Frequency: 1712.4 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1712.4 MHz; σ = 1.462 S/m; ε_r = 52.663; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-12-2018; Ambient Temp: 22.1°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3347; ConvF(5.17, 5.17, 5.17); @ 1712.4 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: UMTS 1750, Body SAR, Back side, Low.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 = 23.21 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.682 W/kg



0 dB = 0.826 W/kg = -0.83 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10090

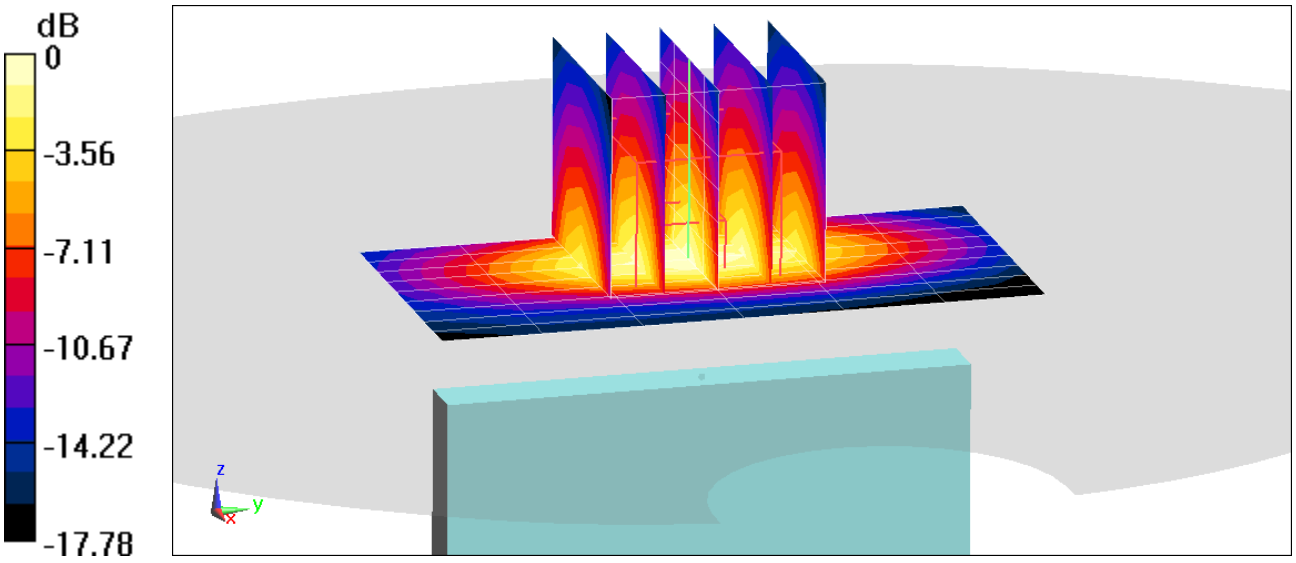
Communication System: UID 0, UMTS; Frequency: 1712.4 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1712.4 MHz; σ = 1.462 S/m; ε_r = 52.663; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-12-2018; Ambient Temp: 22.1°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3347; ConvF(5.17, 5.17, 5.17); @ 1712.4 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: UMTS 1750, Body SAR, Bottom Edge, Low.ch

Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.29 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.98 W/kg
SAR(1 g) = 1.14 W/kg



0 dB = 1.39 W/kg = 1.43 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10132

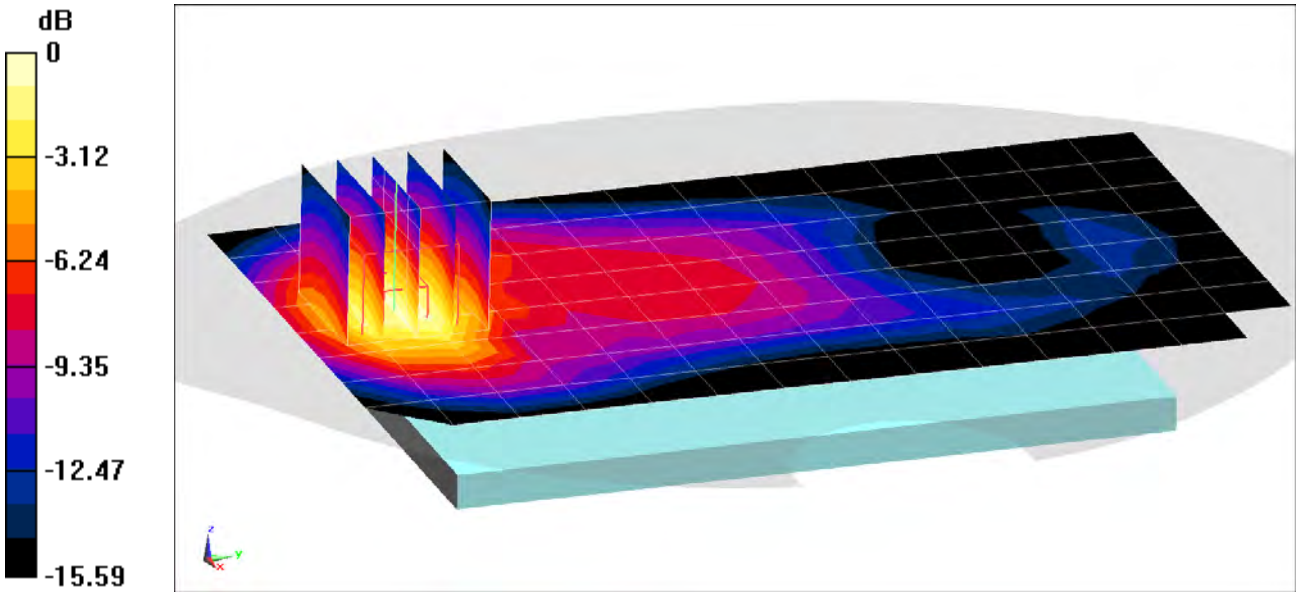
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.539 S/m; ε_r = 53.339; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-04-2018; Ambient Temp: 20.5°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3347; ConvF(4.94, 4.94, 4.94) @ 1880 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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 = 17.63 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.665 W/kg
SAR(1 g) = 0.415 W/kg



0 dB = 0.502 W/kg = -2.99 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39156

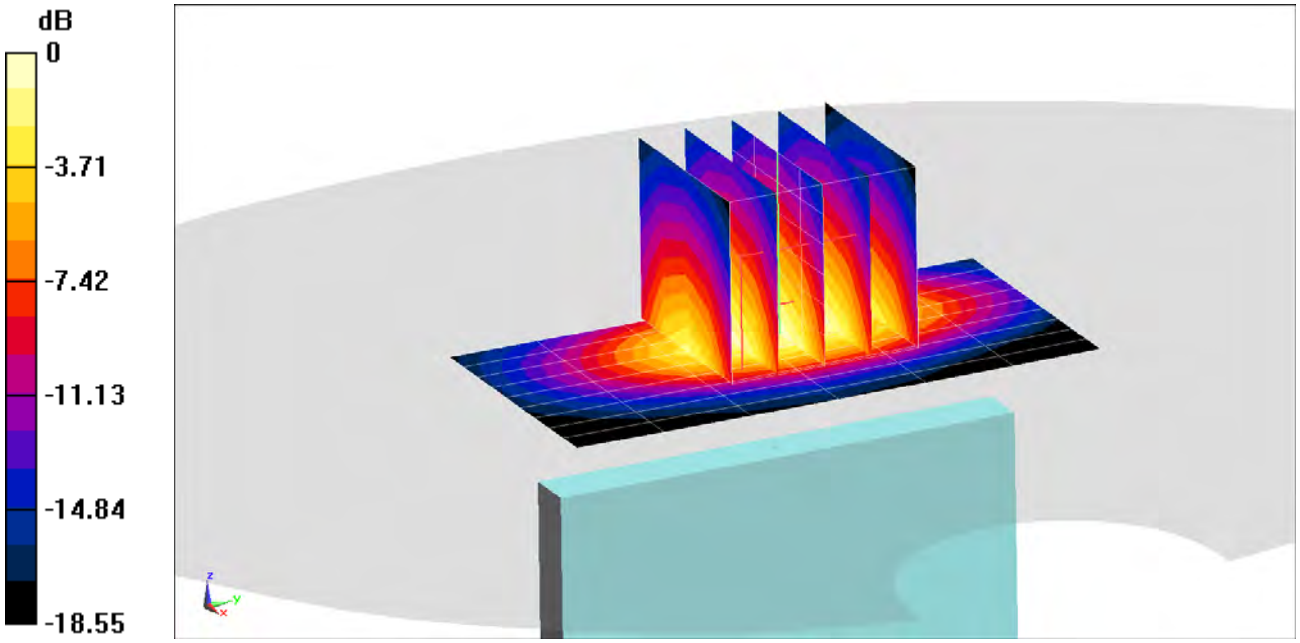
Communication System: UID 0, UMTS; Frequency: 1907.6 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1907.6 MHz; σ = 1.578 S/m; ε_r = 52.237; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-17-2018; Ambient Temp: 22.4°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3319; ConvF(4.84, 4.84, 4.84) @ 1907.6 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

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

Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.99 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.94 W/kg
SAR(1 g) = 1.12 W/kg



0 dB = 1.41 W/kg = 1.49 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39156

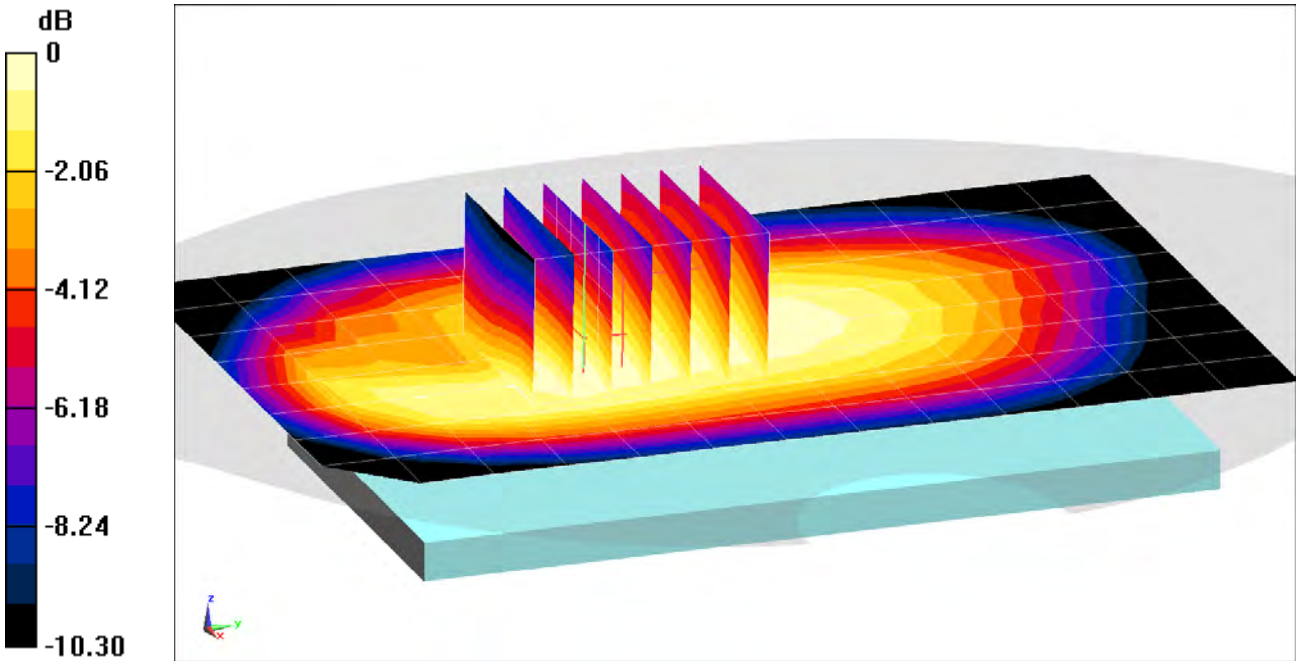
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.946 S/m; ε_r = 54.782; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-10-2018; Ambient Temp: 20.2°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3347; ConvF(6.59, 6.59, 6.59) @ 707.5 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.94 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.193 W/kg
SAR(1 g) = 0.147 W/kg



0 dB = 0.163 W/kg = -7.88 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39156

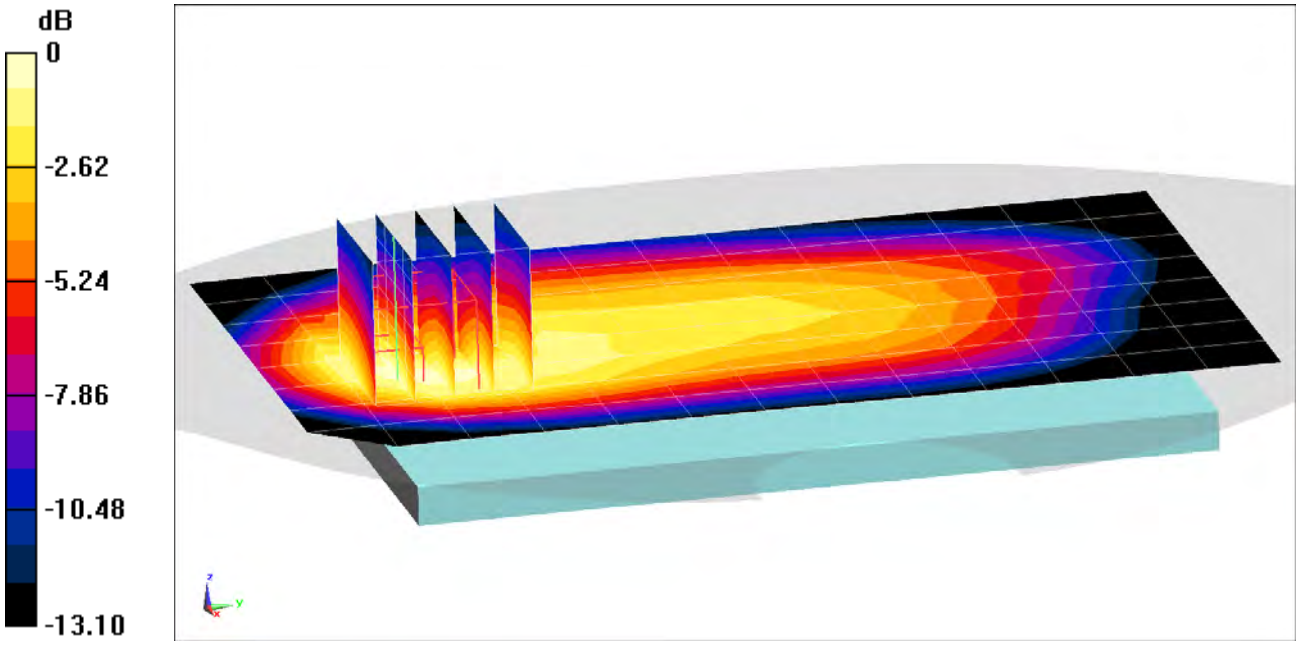
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.946 S/m; ε_r = 54.782; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-10-2018; Ambient Temp: 20.2°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3347; ConvF(6.59, 6.59, 6.59) @ 707.5 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 12, Body SAR, Back side, 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 = 16.04 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.401 W/kg
SAR(1 g) = 0.235 W/kg



0 dB = 0.283 W/kg = -5.48 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39139

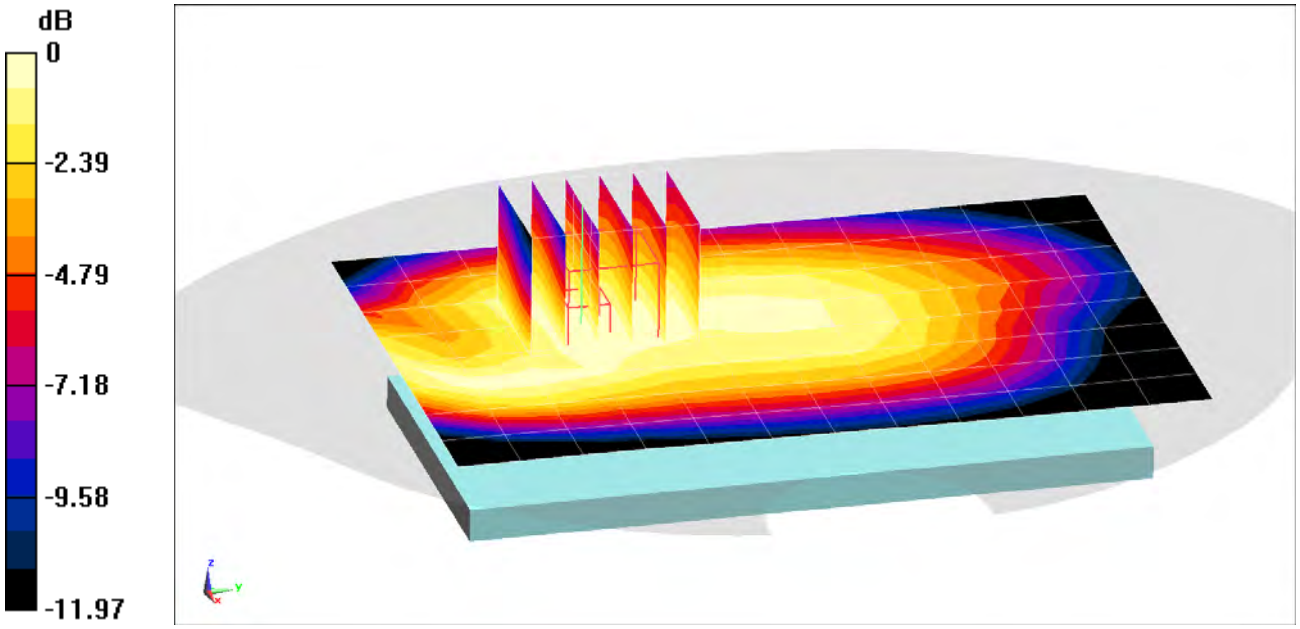
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used (interpolated):
f = 782 MHz; σ = 0.982 S/m; ε_r = 56.835; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-18-2018; Ambient Temp: 23.2°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3319; ConvF(6.32, 6.32, 6.32) @ 782 MHz; Calibrated: 3/13/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/7/2018
Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 13, Body SAR, Back side, Mid.ch
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.11 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.238 W/kg
SAR(1 g) = 0.184 W/kg



0 dB = 0.202 W/kg = -6.95 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39139

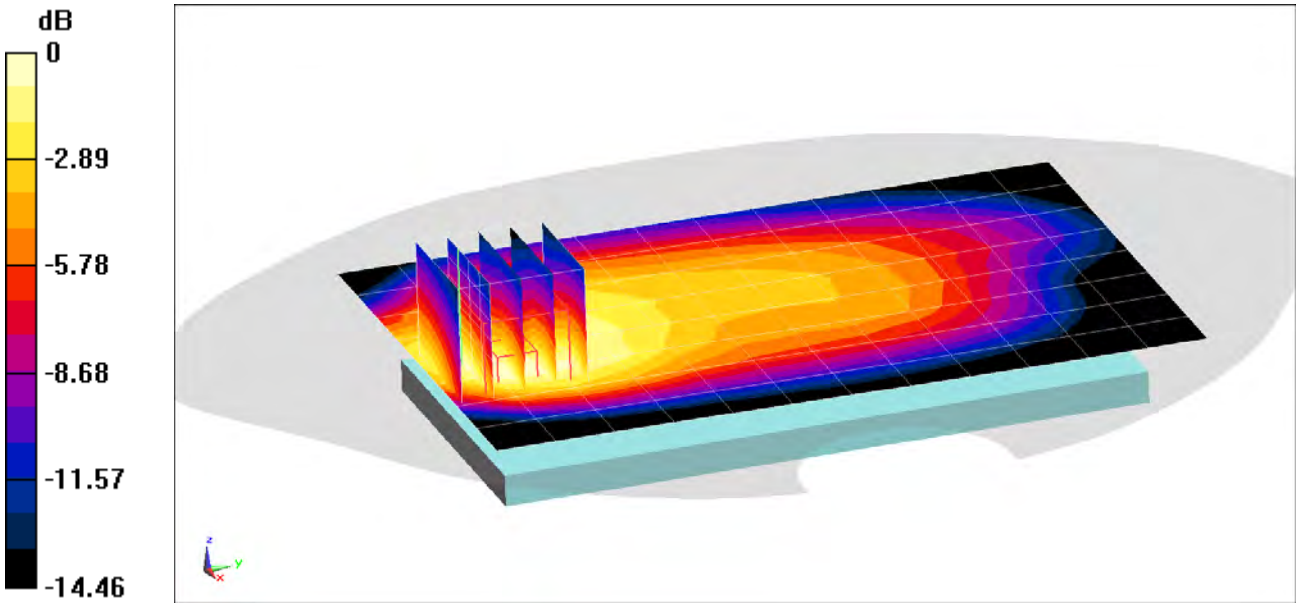
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used (interpolated):
f = 782 MHz; σ = 0.982 S/m; ε_r = 56.835; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-18-2018; Ambient Temp: 23.2°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3319; ConvF(6.32, 6.32, 6.32) @ 782 MHz; Calibrated: 3/13/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/7/2018
Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 13, Body SAR, Back side, Mid.ch
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.30 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.643 W/kg
SAR(1 g) = 0.368 W/kg



0 dB = 0.449 W/kg = -3.48 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10098

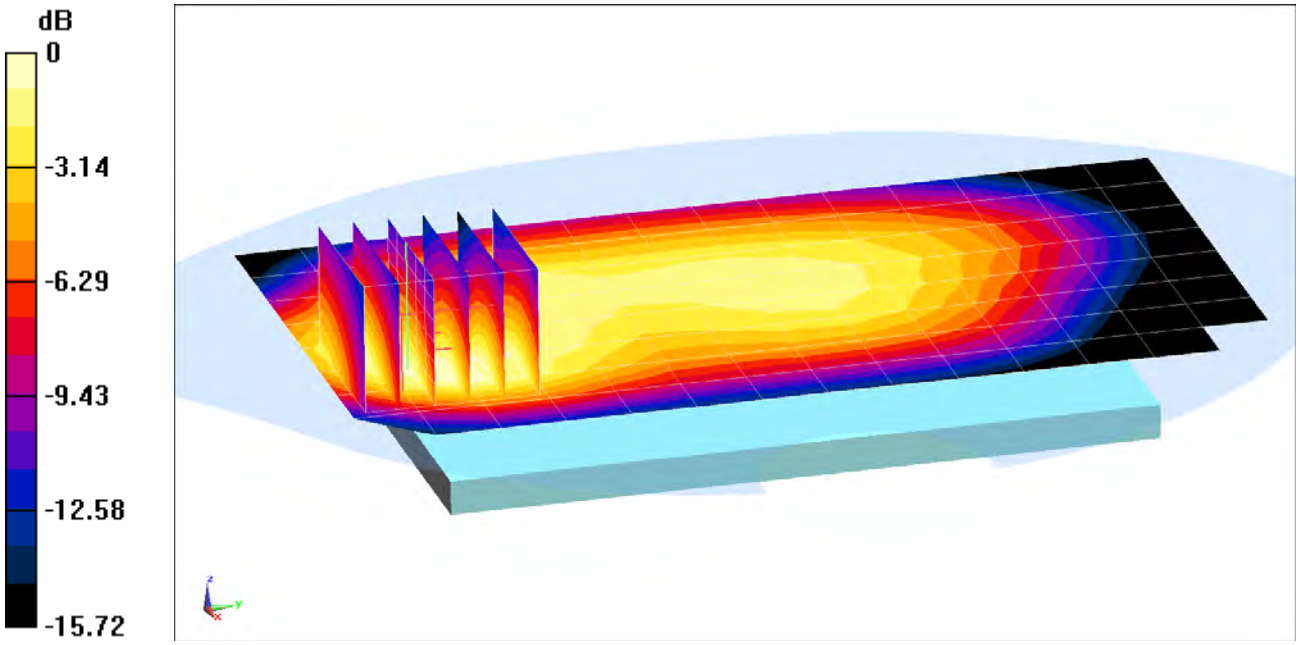
Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 831.5 MHz; σ = 0.942 S/m; ε_r = 53.885; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-06-2018; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3213; ConvF(6.2, 6.2, 6.2) @ 831.5 MHz; Calibrated: 2/13/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 26 (Cell.), Body SAR, Back side, Mid.ch
15 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 = 18.37 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.459 W/kg
SAR(1 g) = 0.286 W/kg



0 dB = 0.338 W/kg = -4.71 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10098

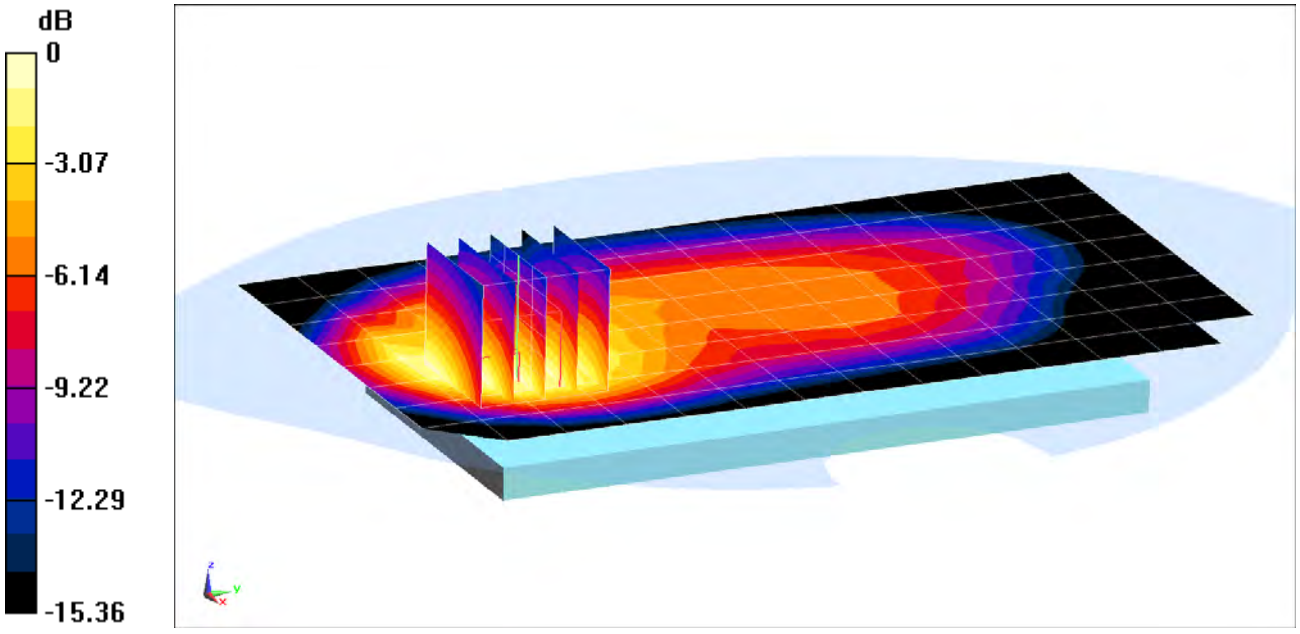
Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 831.5 MHz; σ = 0.942 S/m; ε_r = 53.885; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-06-2018; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3213; ConvF(6.2, 6.2, 6.2) @ 831.5 MHz; Calibrated: 2/13/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 26 (Cell.), Body SAR, Back side, Mid.ch
15 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 = 28.35 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.680 W/kg



0 dB = 0.820 W/kg = -0.86 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10132

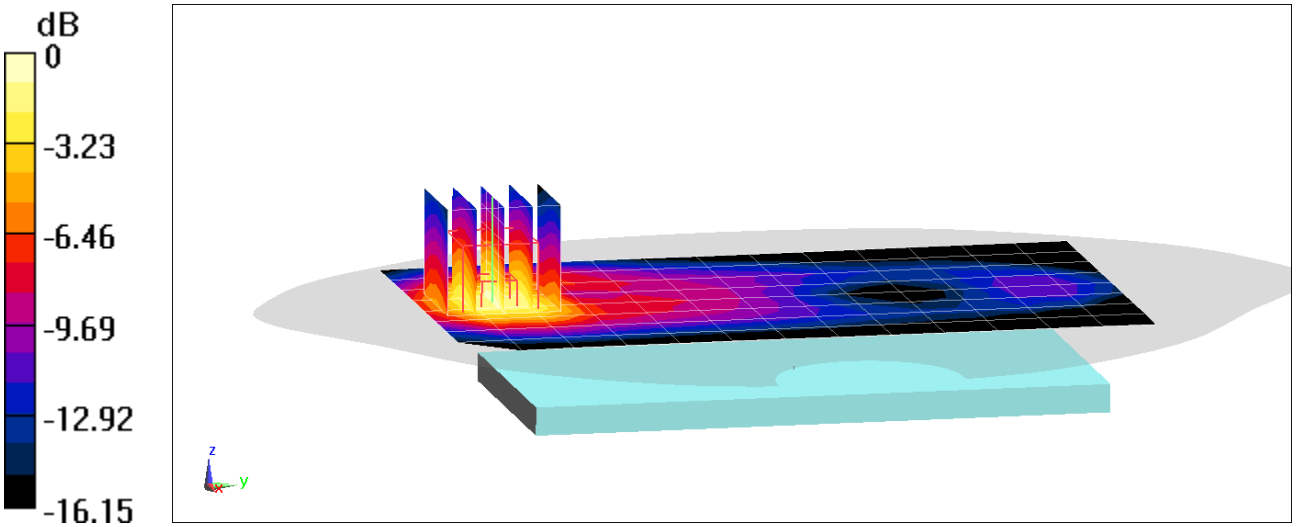
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1745 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1745 MHz; σ = 1.48 S/m; ε_r = 52.49; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-11-2018; Ambient Temp: 21.0°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3347; ConvF(5.17, 5.17, 5.17) @ 1745 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 66 (AWS), Body SAR, Back side, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 99 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 = 22.63 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.654 W/kg



0 dB = 0.790 W/kg = -1.02 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10132

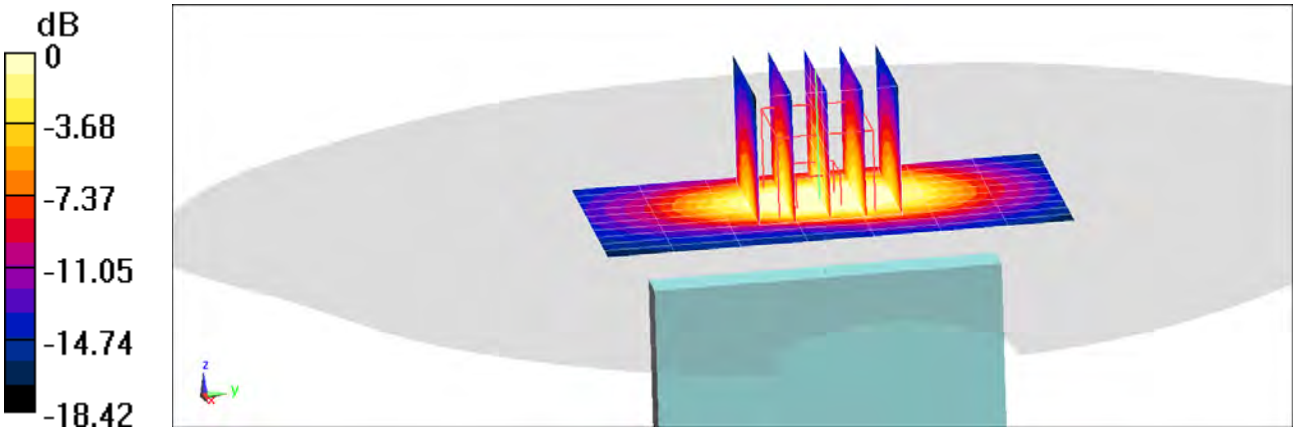
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1770 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1770 MHz; σ = 1.499 S/m; ε_r = 52.566; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-12-2018; Ambient Temp: 22.1°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3347; ConvF(5.17, 5.17, 5.17); 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 66 (AWS), Body SAR, Bottom Edge, High.ch
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

Area Scan (11x8x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.62 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.811 W/kg



0 dB = 1.02 W/kg = 0.09 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10132

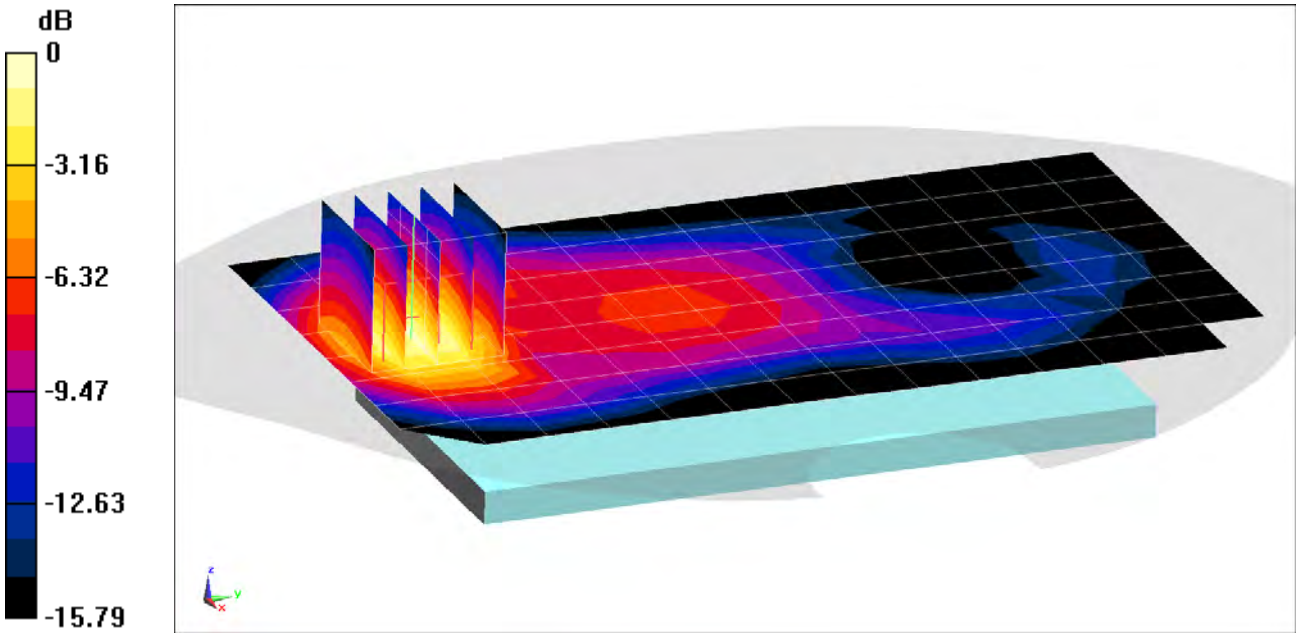
Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.539 S/m; ε_r = 53.339; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-04-2018; Ambient Temp: 20.5°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3347; ConvF(4.94, 4.94, 4.94) @ 1880 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 2 (PCS), 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 = 18.01 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.703 W/kg
SAR(1 g) = 0.437 W/kg



0 dB = 0.530 W/kg = -2.76 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10098

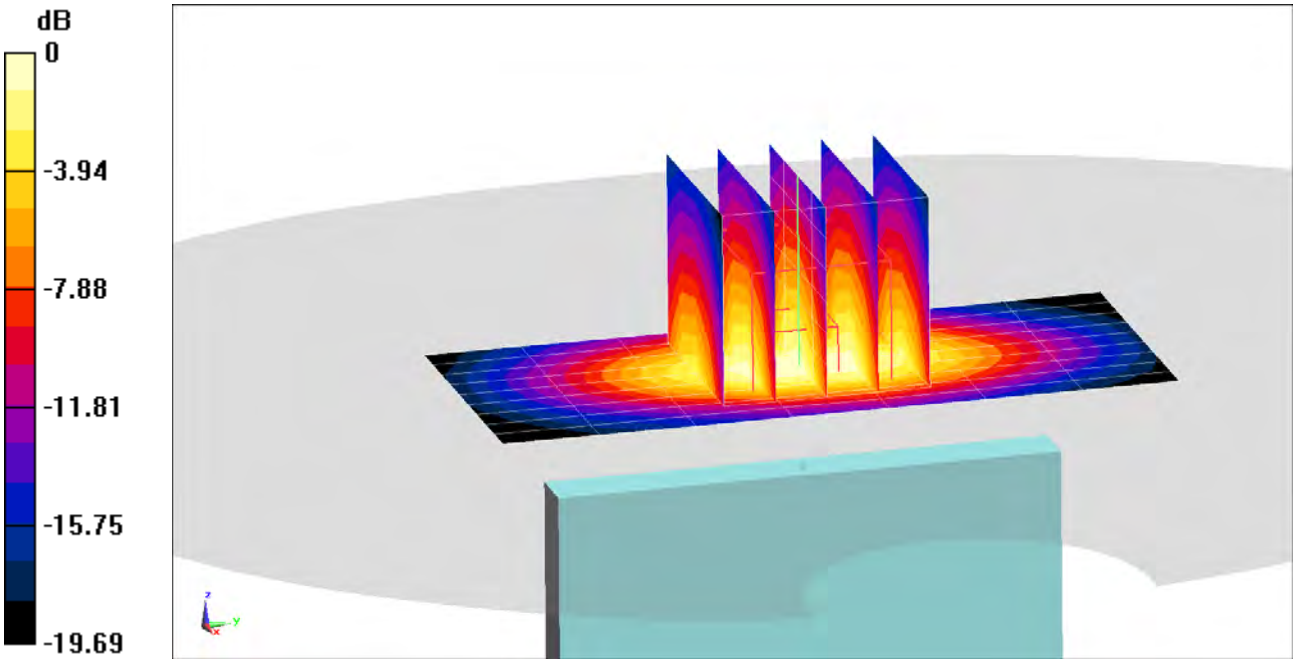
Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.581 S/m; ε_r = 51.744; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-17-2018; Ambient Temp: 22.1°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3347; ConvF(4.94, 4.94, 4.94) @ 1900 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 2 (PCS), Body SAR, Bottom Edge, High.ch
20 MHz Bandwidth, QPSK, 50 RB, 25 RB Offset

Area Scan (10x8x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.62 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 1.58 W/kg
SAR(1 g) = 0.895 W/kg



0 dB = 1.12 W/kg = 0.49 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39139

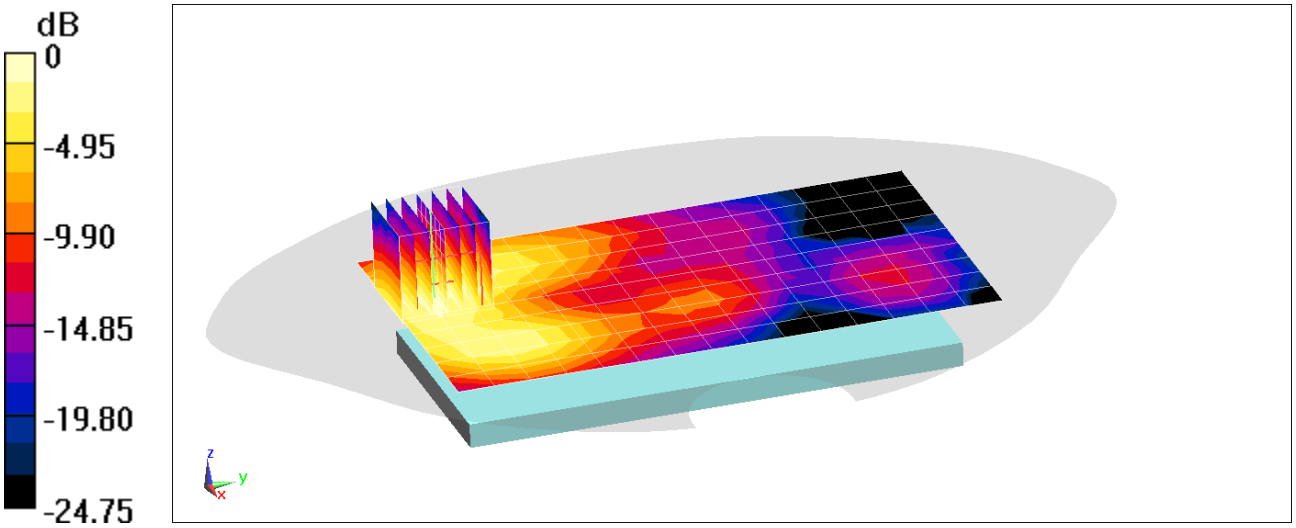
Communication System: UID 0, LTE Band 41 (Class 3); Frequency: 2593 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body Medium parameters used (interpolated):
f = 2593 MHz; σ = 2.186 S/m; ε_r = 51.024; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-19-2018; Ambient Temp: 22.5°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3319; ConvF(4.33, 4.33, 4.33) @ 2593 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 41, Body SAR, Back side, Mid.ch
20 MHz Bandwidth, QPSK, 1 RB, 0 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 = 8.372 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.321 W/kg
SAR(1 g) = 0.170 W/kg



0 dB = 0.210 W/kg = -6.78 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39139

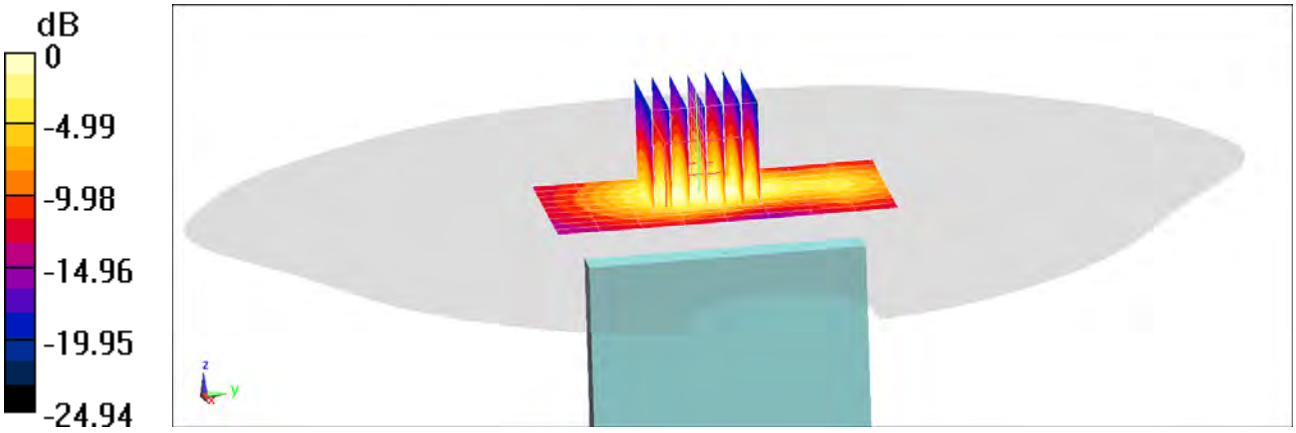
Communication System: UID 0, _LTE Band 41; Frequency: 2680 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body Medium parameters used (interpolated):
f = 2680 MHz; σ = 2.321 S/m; ε_r = 51.458; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2018; Ambient Temp: 23.0°C; Tissue Temp: 21.9°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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

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

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.52 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 2.28 W/kg
SAR(1 g) = 1.09 W/kg



0 dB = 1.43 W/kg = 1.55 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 16244

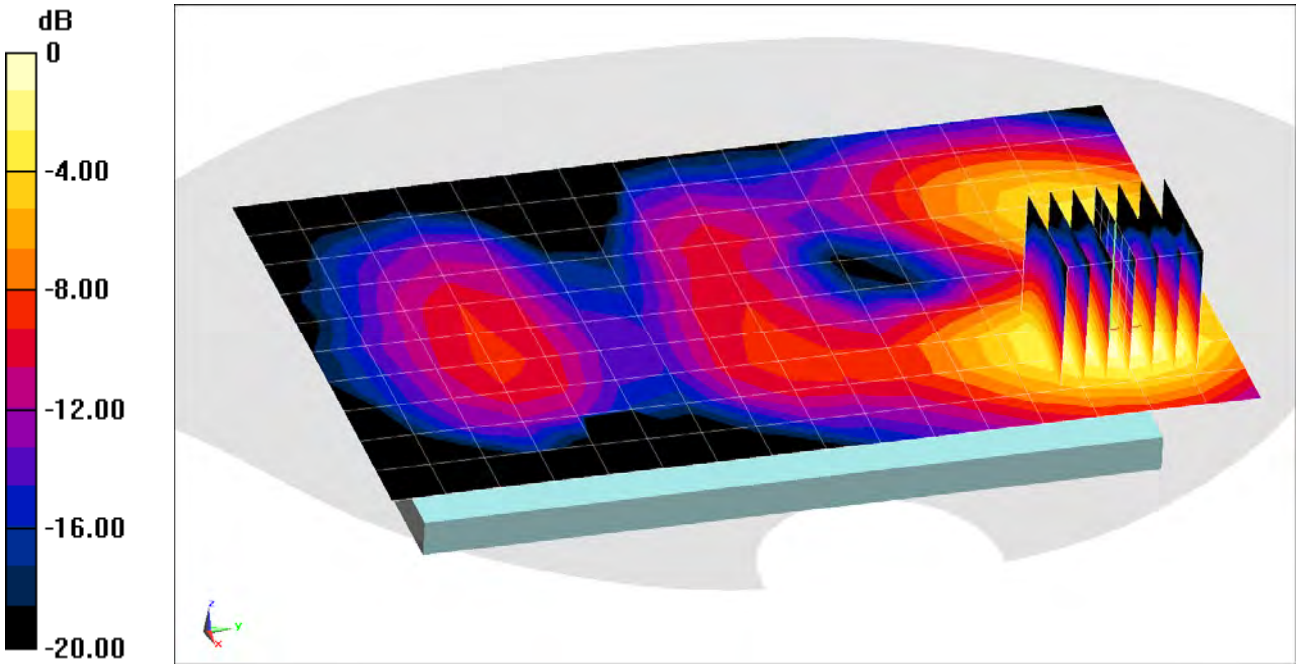
Communication System: UID 0, _IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2437 MHz; σ = 2.015 S/m; ε_r = 50.879; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-04-2018; Ambient Temp: 23.0°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3319; ConvF(4.51, 4.51, 4.51) @ 2437 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: IEEE 802.11b, 22 MHz Bandwidth, Antenna 2, Body SAR, Ch 6, 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 = 7.325 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.182 W/kg
SAR(1 g) = 0.092 W/kg



0 dB = 0.116 W/kg = -9.36 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 16244

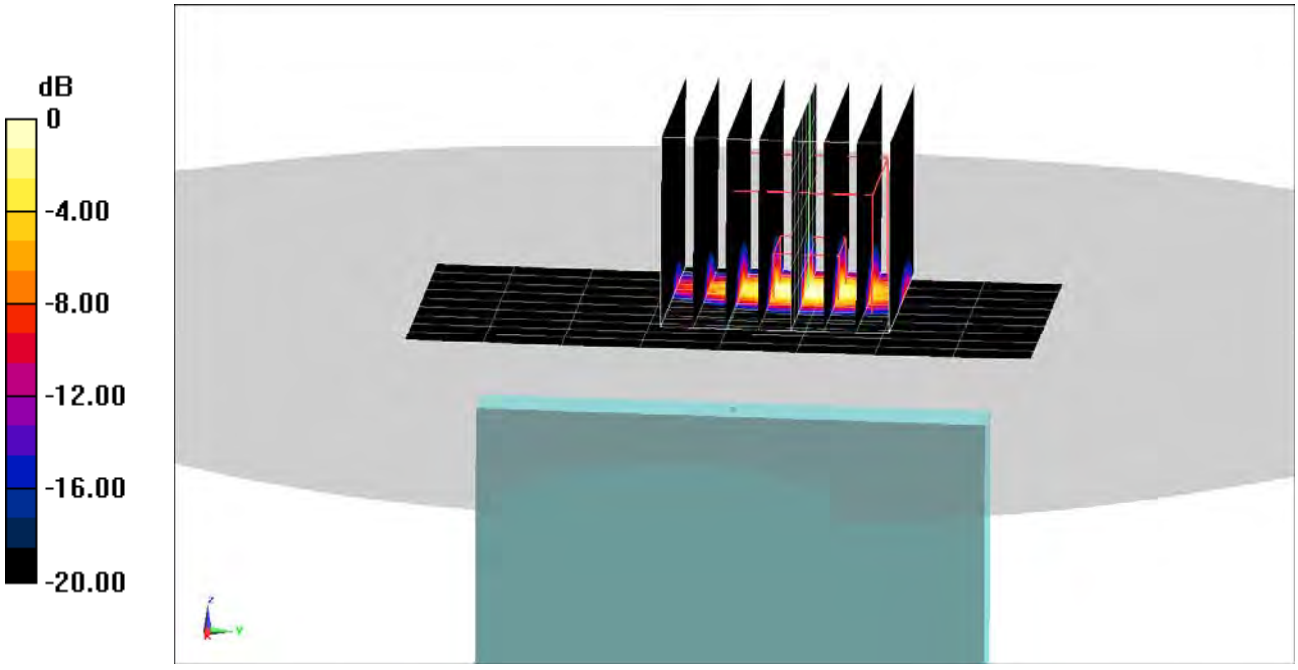
Communication System: UID 0, _IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2437 MHz; σ = 2.015 S/m; ε_r = 50.879; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-04-2018; Ambient Temp: 23.0°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3319; ConvF(4.51, 4.51, 4.51) @ 2437 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: IEEE 802.11b, 22 MHz Bandwidth, Antenna 2, Body SAR, Ch 6, 1 Mbps, Top Edge

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.973 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.355 W/kg
SAR(1 g) = 0.181 W/kg



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

DUT: A3LSMA920F; Type: Portable Handset; Serial: 17115

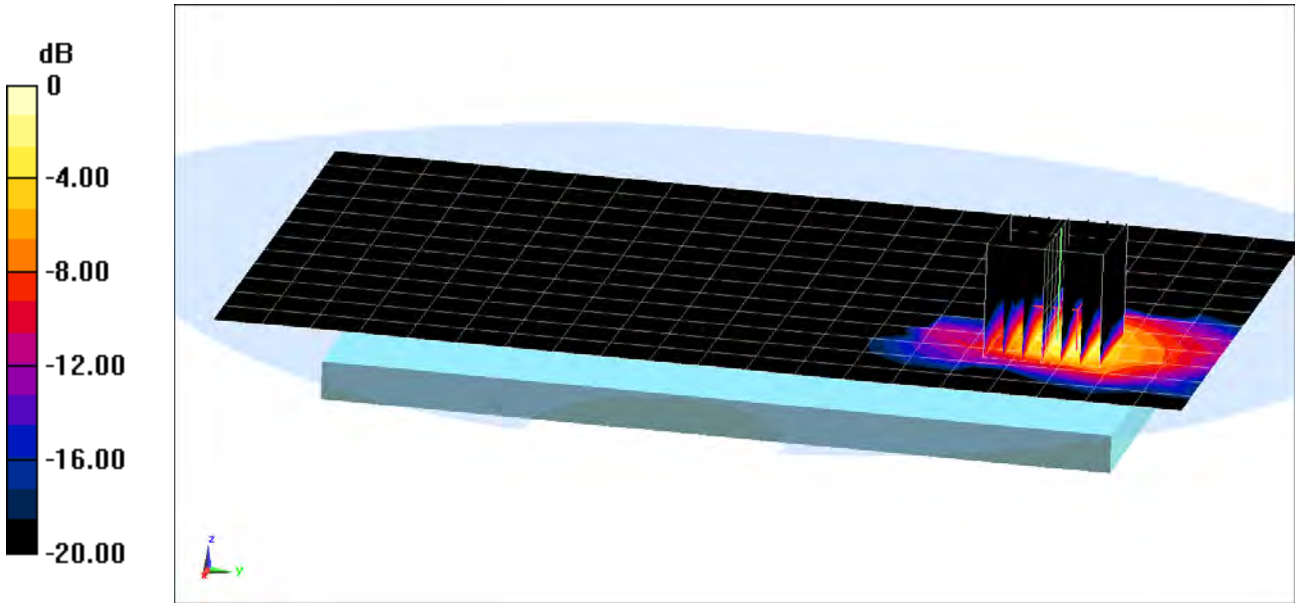
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5785 MHz; σ = 6.215 S/m; ε_r = 46.706; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-04-2018; Ambient Temp: 22.5°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(4.21, 4.21, 4.21) @ 5785 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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

Area Scan (13x21x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 4.428 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.546 W/kg
SAR(1 g) = 0.124 W/kg



0 dB = 0.405 W/kg = -3.93 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 17115

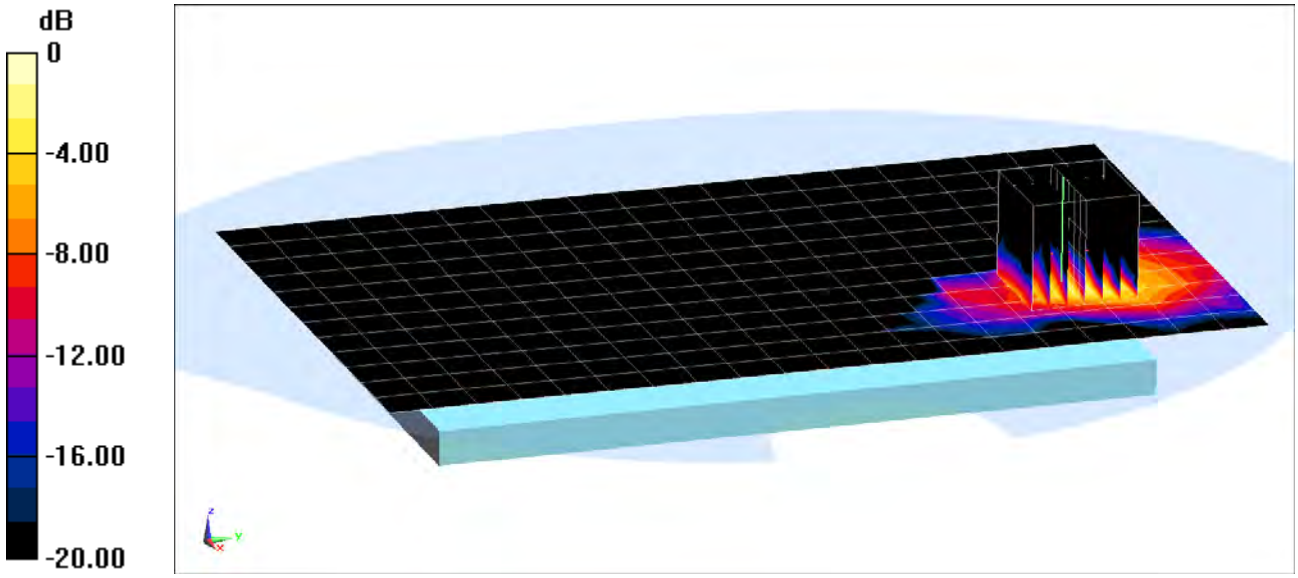
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5785 MHz; σ = 6.215 S/m; ε_r = 46.706; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-04-2018; Ambient Temp: 22.5°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(4.21, 4.21, 4.21) @ 5785 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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

Area Scan (13x21x1): 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 = 4.335 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.740 W/kg
SAR(1 g) = 0.153 W/kg



0 dB = 0.421 W/kg = -3.76 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 16244

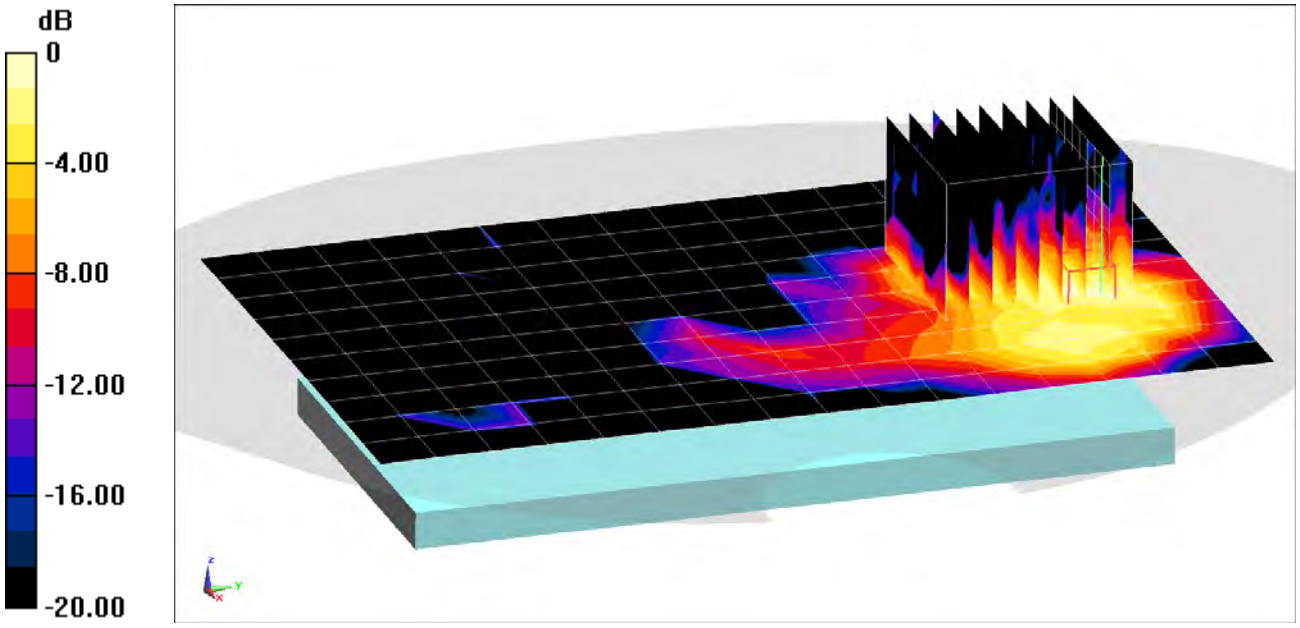
Communication System: UID 0, Bluetooth; Frequency: 2402 MHz; Duty Cycle: 1:1.284
Medium: 2450 Body Medium parameters used (interpolated):
f = 2402 MHz; σ = 1.989 S/m; ε_r = 50.922; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-10-2018; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3319; ConvF(4.51, 4.51, 4.51) @ 2402 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: Bluetooth, Body SAR, Ch 0, 1 Mbps, Back Side

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.612 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.0150 W/kg
SAR(1 g) = 0.0068 W/kg



0 dB = 0.00953 W/kg = -20.21 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 16244

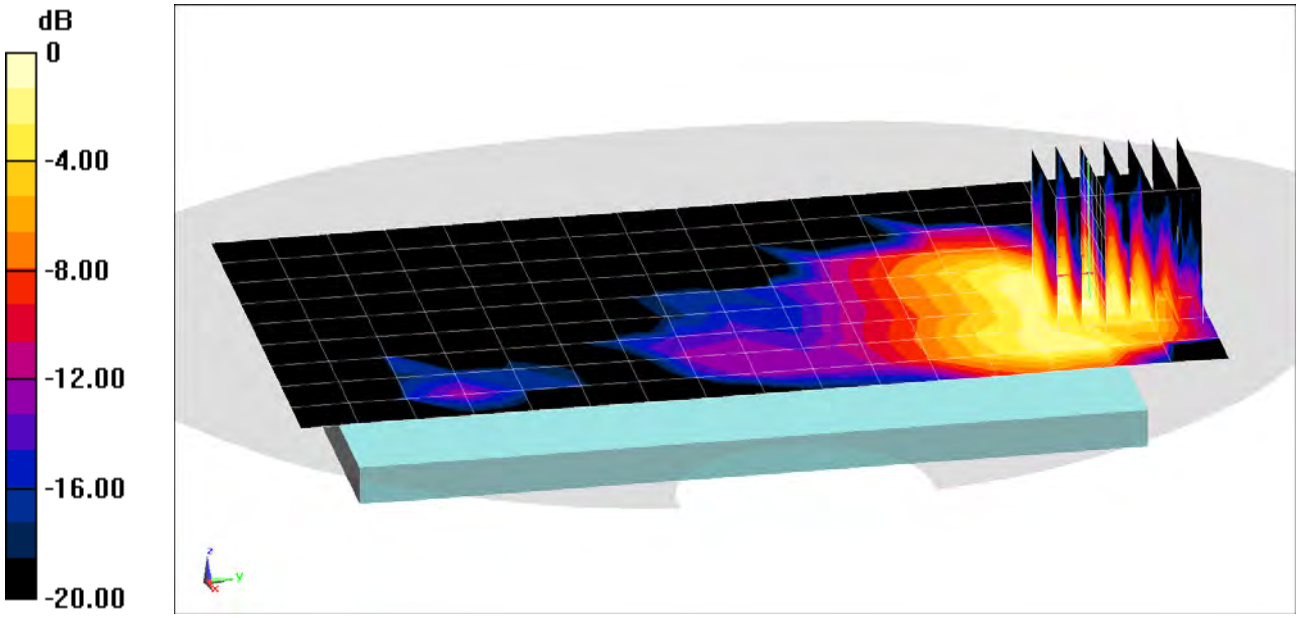
Communication System: UID 0, Bluetooth; Frequency: 2402 MHz; Duty Cycle: 1:1.284
Medium: 2450 Body Medium parameters used (interpolated):
f = 2402 MHz; σ = 1.989 S/m; ε_r = 50.922; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-10-2018; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3319; ConvF(4.51, 4.51, 4.51) @ 2402 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: Bluetooth, Body SAR, Ch 0, 1 Mbps, Back Side

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.139 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.0400 W/kg
SAR(1 g) = 0.020 W/kg



0 dB = 0.0268 W/kg = -15.72 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10090

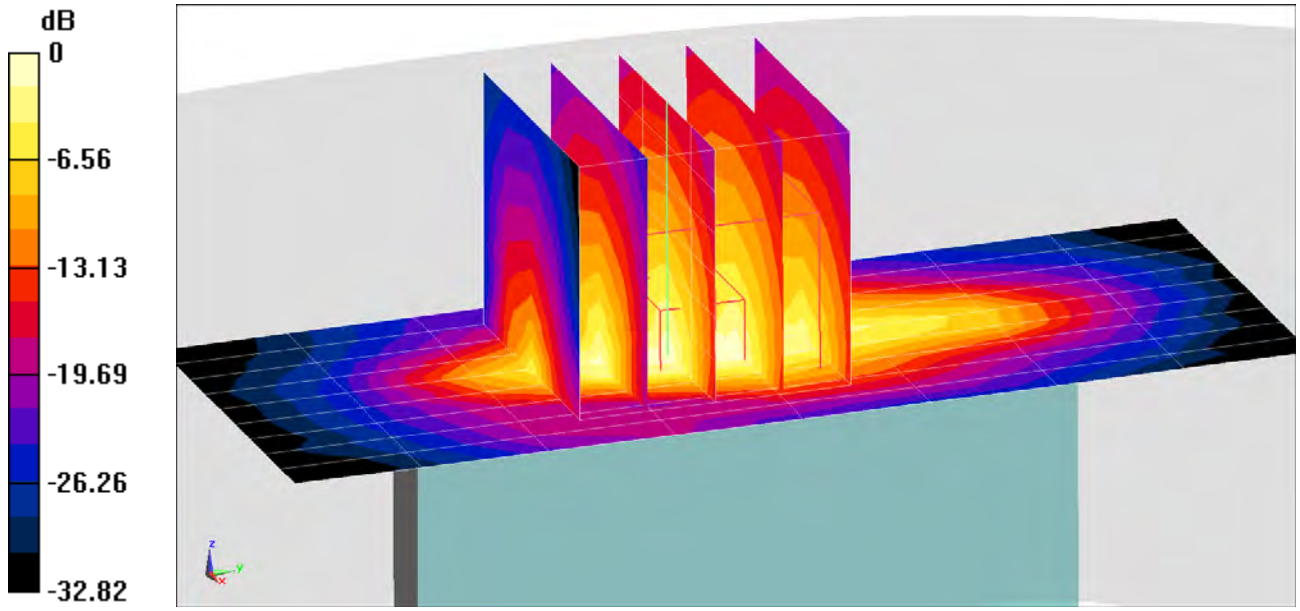
Communication System: UID 0, _GSM GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.554 S/m; ε_r = 52.29; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-17-2018; Ambient Temp: 22.4°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3319; ConvF(4.84, 4.84, 4.84) @ 1880 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: GPRS 1900, Phablet SAR, Bottom Edge, Mid.ch, 4 Tx Slots

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.25 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 5.73 W/kg
SAR(10 g) = 1.07 W/kg



0 dB = 4.12 W/kg = 6.15 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10090

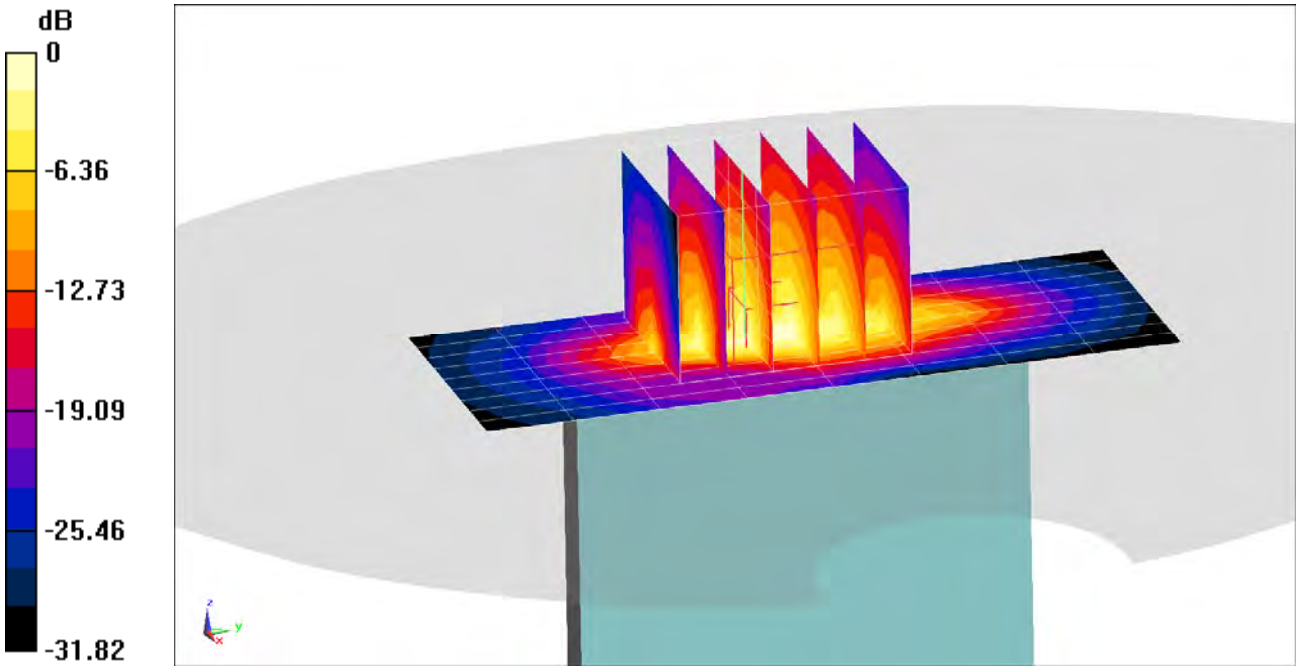
Communication System: UID 0, UMTS; Frequency: 1752.6 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1752.6 MHz; σ = 1.488 S/m; ε_r = 52.589; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-12-2018; Ambient Temp: 22.1°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3347; ConvF(5.17, 5.17, 5.17) @ 1752.6 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 82.62 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 16.9 W/kg
SAR(10 g) = 3.09 W/kg



0 dB = 11.6 W/kg = 10.64 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39156

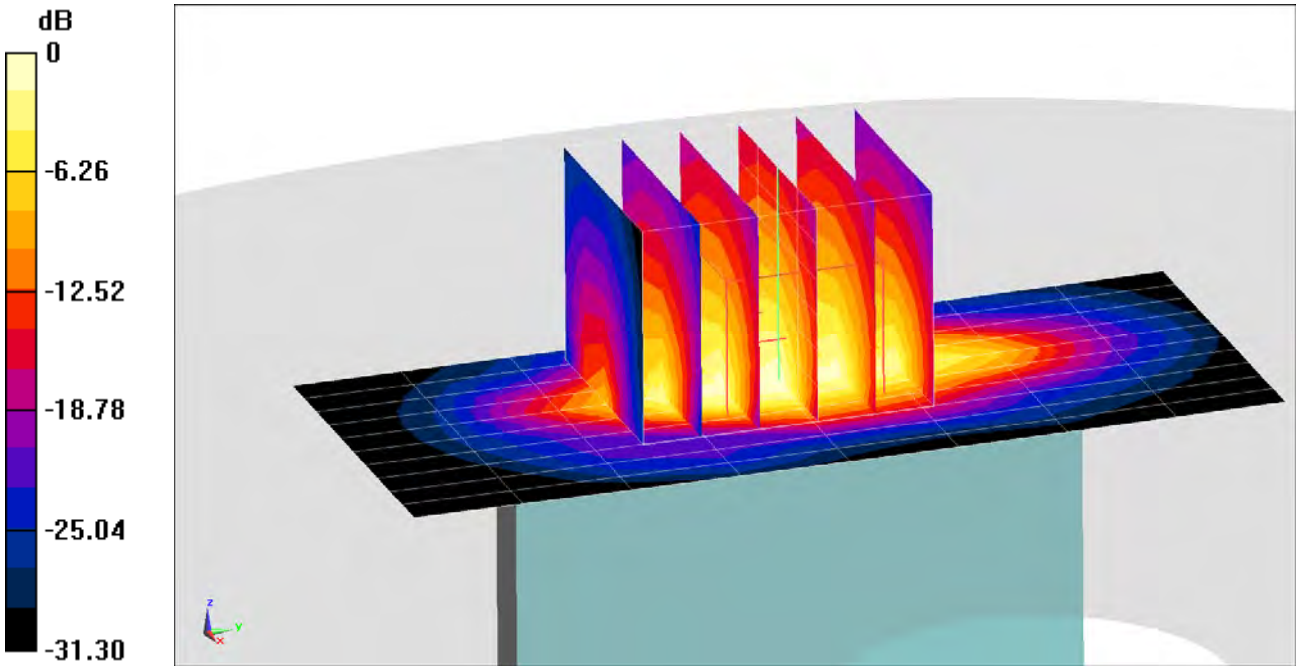
Communication System: UID 0, UMTS; Frequency: 1907.6 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1907.6 MHz; σ = 1.578 S/m; ε_r = 52.237; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 mm

Test Date: 09-17-2018; Ambient Temp: 22.4°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3319; ConvF(4.84, 4.84, 4.84) @ 1907.6 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: UMTS 1900, Phablet SAR, Bottom Edge, High.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 = 65.56 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 13.8 W/kg
SAR(10 g) = 2.63 W/kg



0 dB = 8.82 W/kg = 9.45 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39156

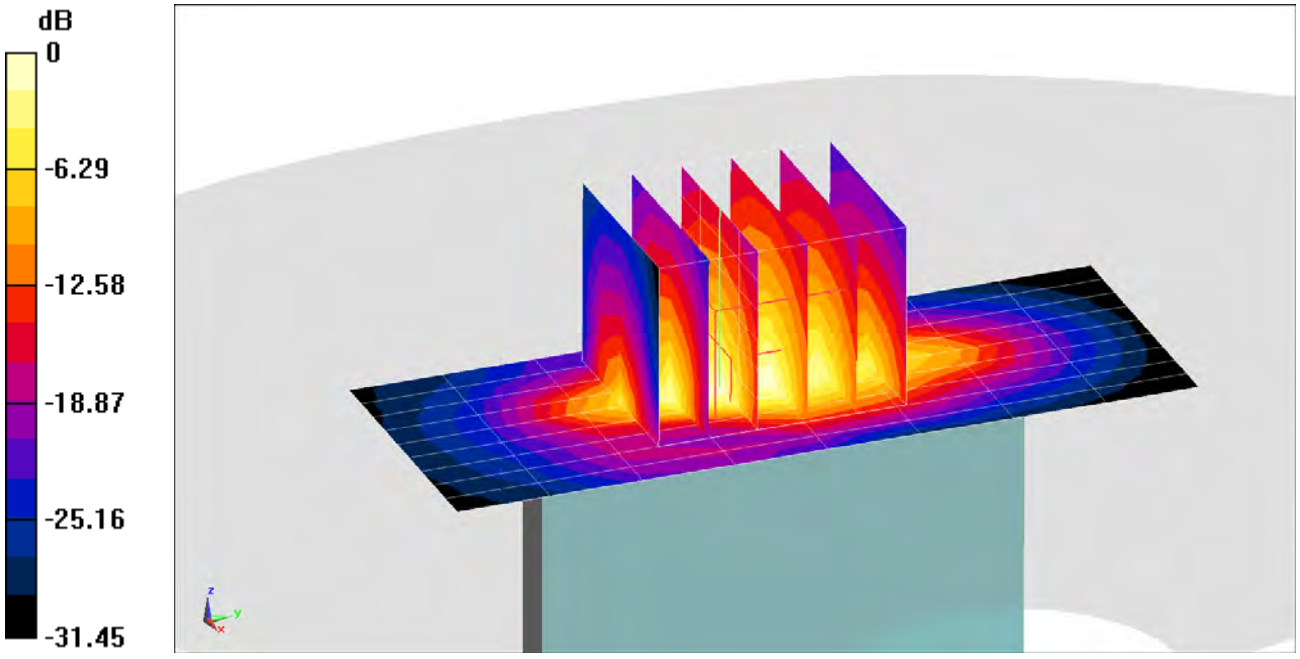
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1720 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
$f = 1720$ MHz; $\sigma = 1.466$ S/m; $\varepsilon_r = 52.648$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-12-2018; Ambient Temp: 22.1°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3347; ConvF(5.17, 5.17, 5.17) @ 1720 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 66 (AWS), Phablet SAR, Bottom Edge, Low.ch
20 MHz Bandwidth, QPSK,50 RB, 0 RB Offset

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 68.37 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 11.8 W/kg
SAR(10 g) = 2.19 W/kg



0 dB = 7.98 W/kg = 9.02 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 10090

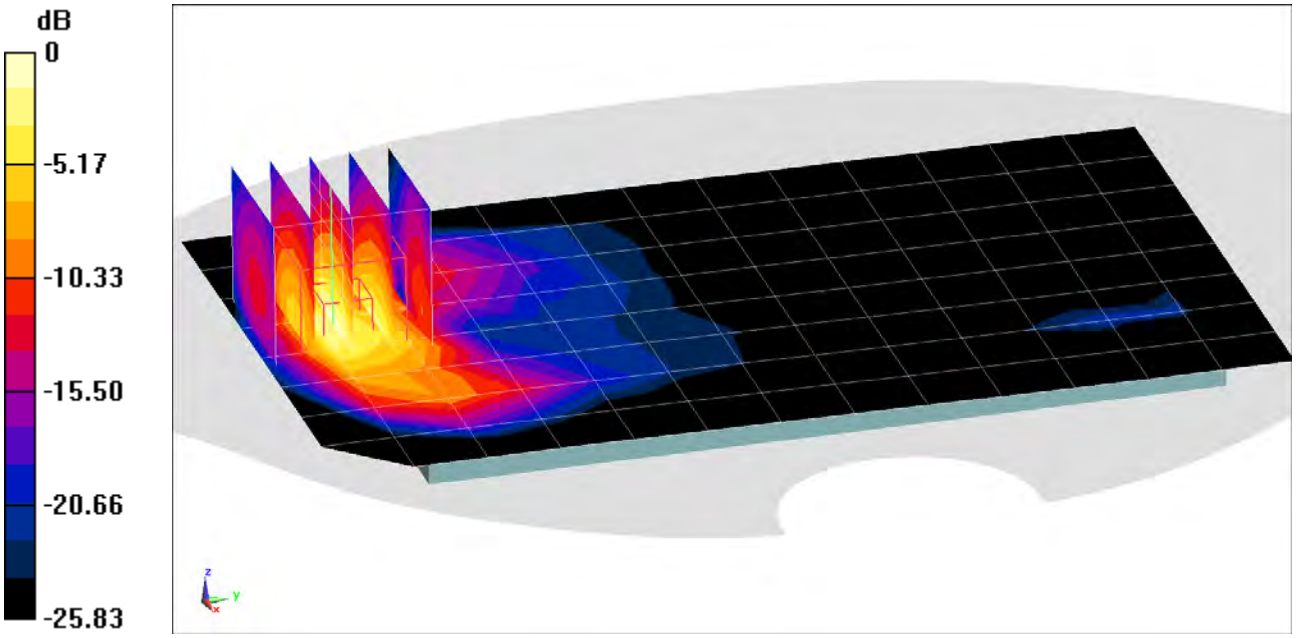
Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
$f = 1900$ MHz; $\sigma = 1.541$ S/m; $\varepsilon_r = 50.669$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-25-2018; Ambient Temp: 22.6°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7409; ConvF(7.6, 7.6, 7.6) @ 1900 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 2 (PCS), Phablet SAR, Back side, High.ch
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 44.06 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 9.34 W/kg
SAR(10 g) = 1.54 W/kg



0 dB = 4.45 W/kg = 6.48 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 39139

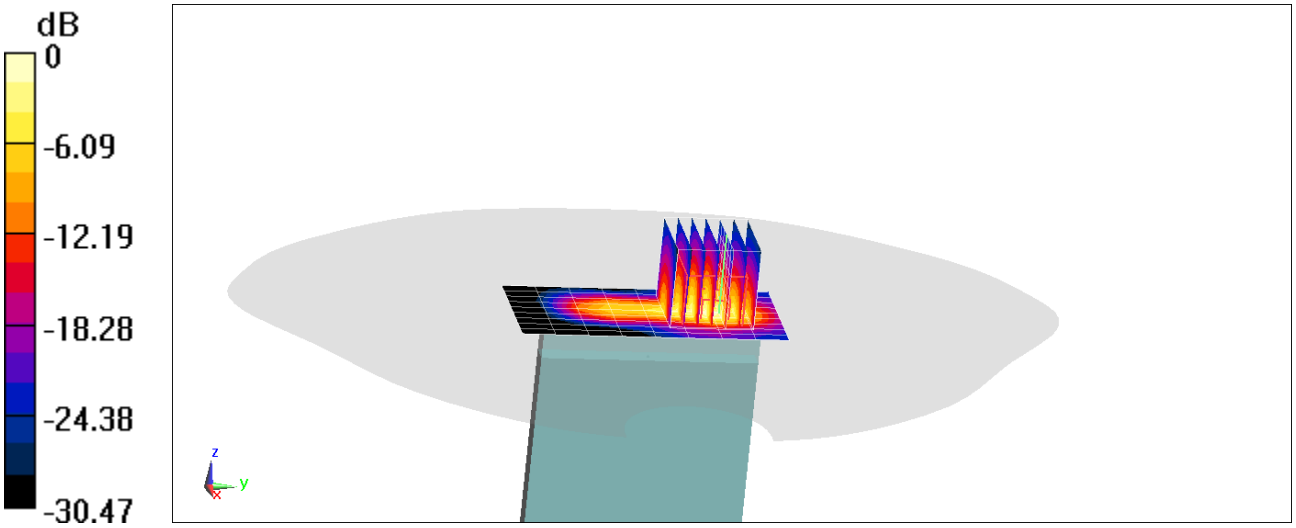
Communication System: UID 0, _LTE Band 41; Frequency: 2636.5 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body Medium parameters used (interpolated):
f = 2636.5 MHz; σ = 2.269 S/m; εr = 51.517; ρ = 1000 kg/m3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-24-2018; Ambient Temp: 23.0°C; Tissue Temp: 21.9°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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

Mode: LTE Band 41, Phablet SAR, Bottom Edge, Mid-High.ch
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.13 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 19.8 W/kg
SAR(10 g) = 1.72 W/kg



0 dB = 8.74 W/kg = 9.42 dBW/kg

DUT: A3LSMA920F; Type: Portable Handset; Serial: 17115

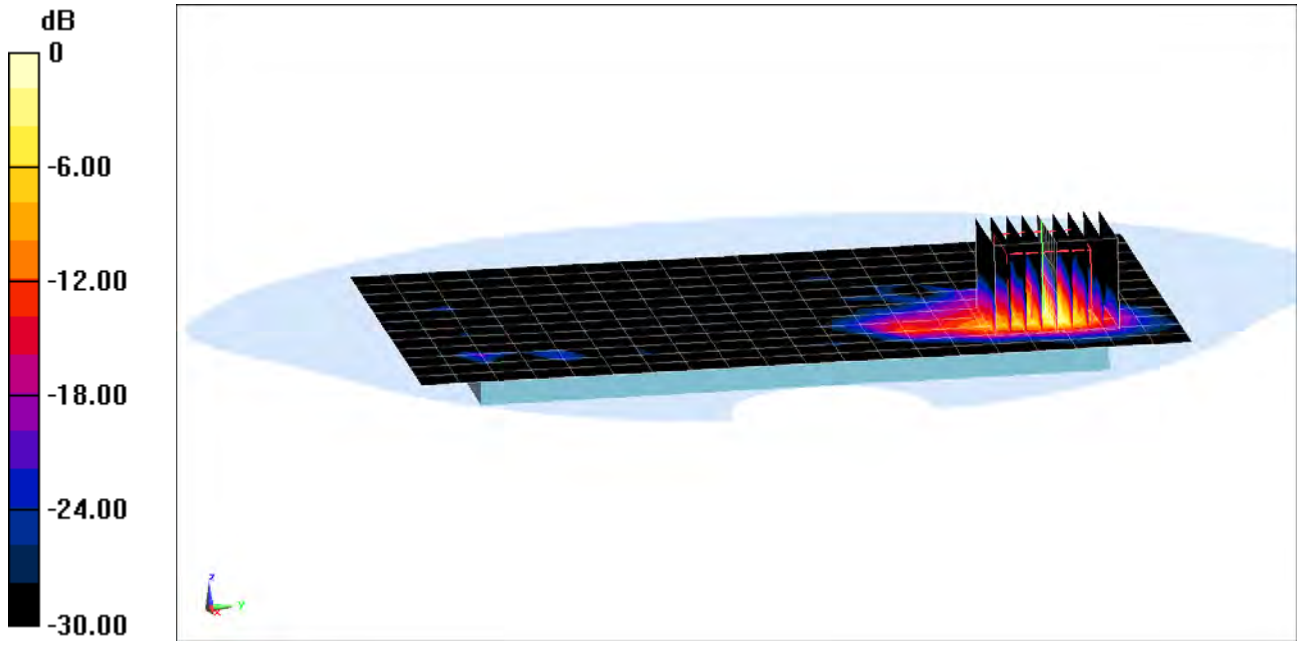
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5280 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5280 MHz; σ = 5.439 S/m; ε_r = 47.075; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 09-20-2018; Ambient Temp: 22.5°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7357; ConvF(4.78, 4.78, 4.78) @ 5280 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

Mode: IEEE 802.11a, U-NII-2A, MIMO
20 MHz Bandwidth, Phablet SAR, Ch 56, 6 Mbps, Back Side

Area Scan (13x21x1): 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 = 20.39 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.7 W/kg
SAR(10 g) = 0.888 W/kg



0 dB = 12.3 W/kg = 10.90 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

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

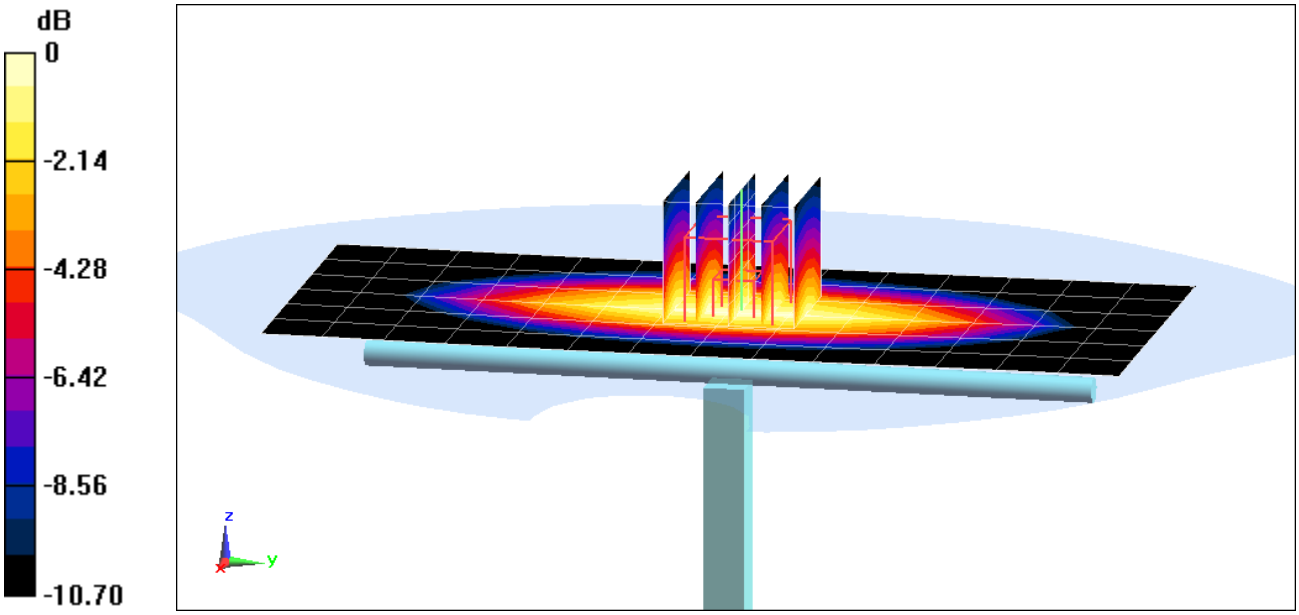
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 MHz Head Medium parameters used (interpolated):
f = 750 MHz; σ = 0.885 S/m; ε_r = 42.089; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-10-2018; Ambient Temp: 21.5°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7409; ConvF(9.91, 9.91, 9.91) @ 750 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 2.79 W/kg
SAR(1 g) = 1.75 W/kg
Deviation(1 g) = 5.68%



0 dB = 2.41 W/kg = 3.82 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

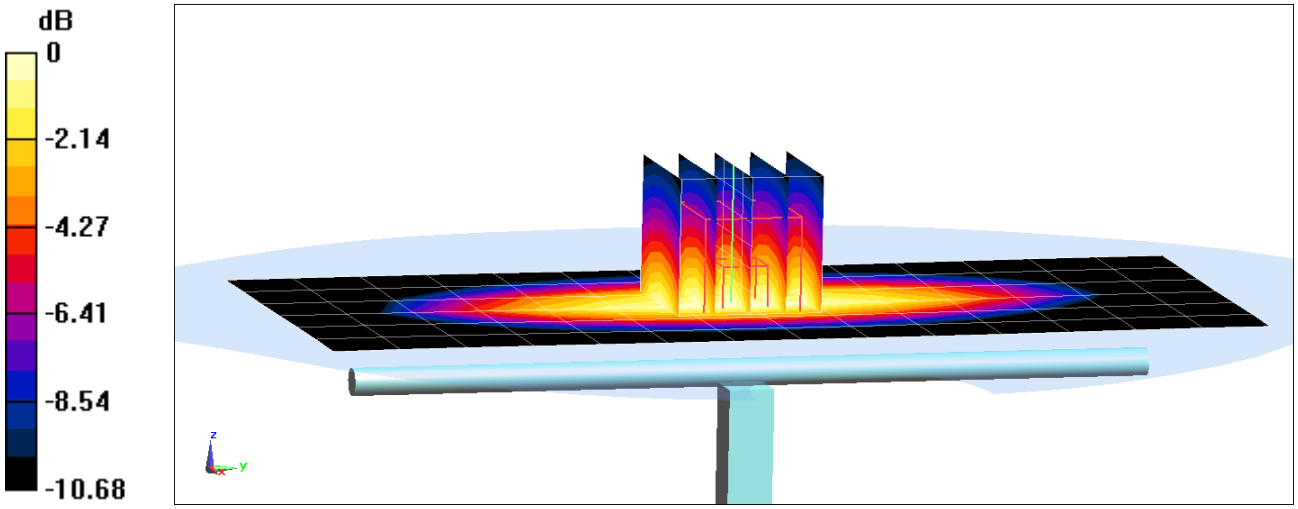
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Head Medium parameters used (interpolated):
f = 750 MHz; σ = 0.89 S/m; ε_r = 40.54; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-19-2018; Ambient Temp: 23.5°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7410; ConvF(10.13, 10.13, 10.13) @ 750 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 2.39 W/kg
SAR(1 g) = 1.58 W/kg
Deviation(1 g) = -5.62%



0 dB = 2.11 W/kg = 3.24 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

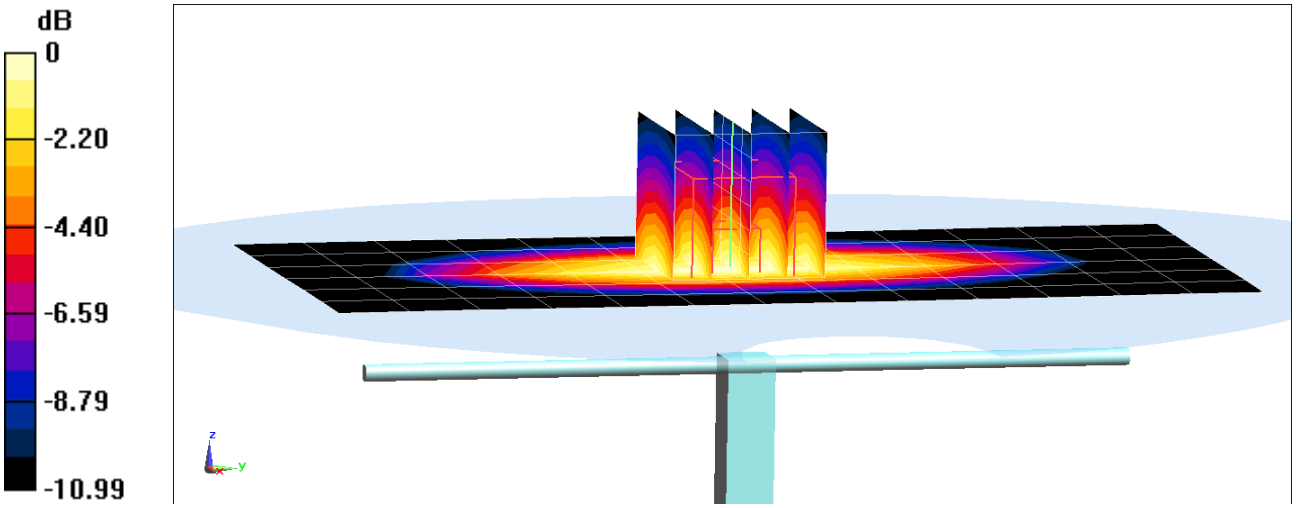
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.921 S/m; ε_r = 40.74; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-11-2018; Ambient Temp: 21.5°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7410; ConvF(9.81, 9.81, 9.81) @ 835 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 3.04 W/kg
SAR(1 g) = 1.99 W/kg
Deviation(1 g) = 4.52%



0 dB = 2.69 W/kg = 4.30 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

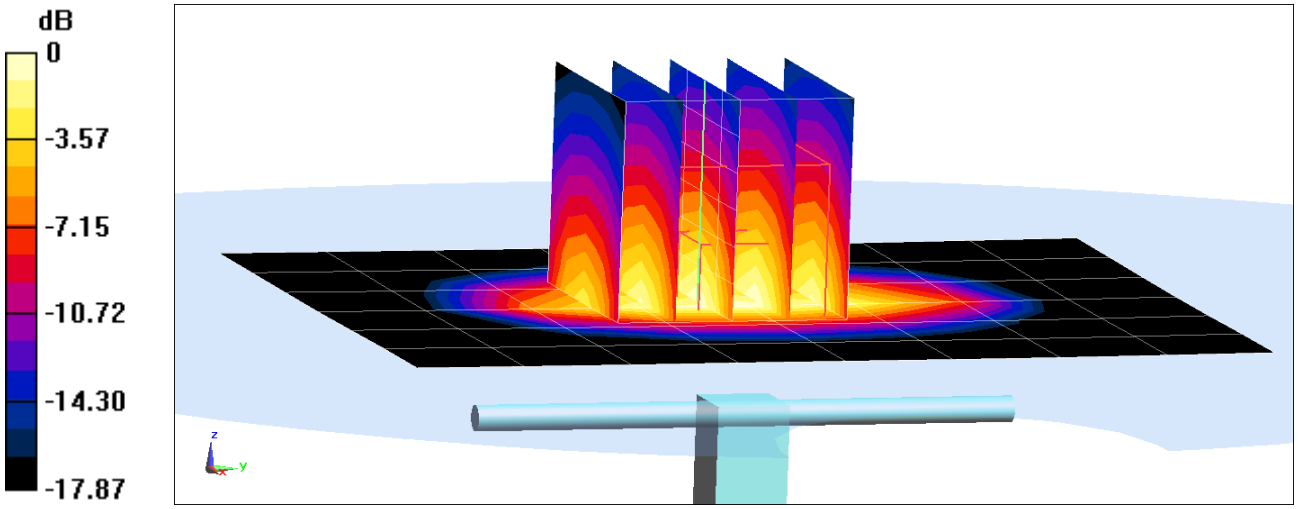
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used:
f = 1750 MHz; σ = 1.366 S/m; ε_r = 41.282; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-13-2018; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(8.4, 8.4, 8.4) @ 1750 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 6.04 W/kg
SAR(1 g) = 3.44 W/kg
Deviation(1 g) = -5.49%



0 dB = 5.12 W/kg = 7.09 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

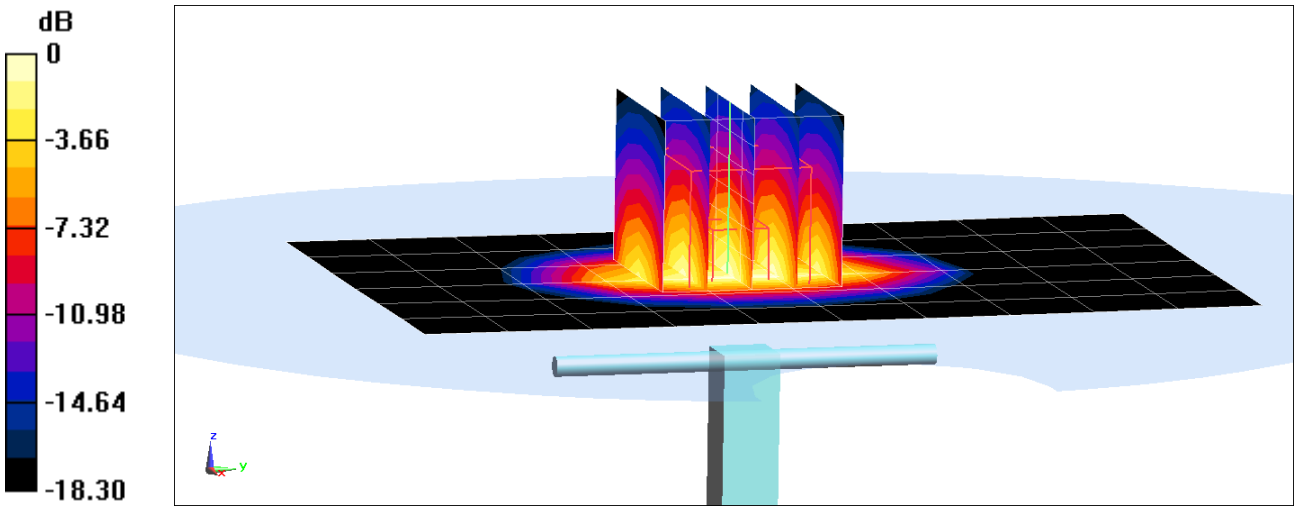
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.443 S/m; ε_r = 38.364; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-11-2018; Ambient Temp: 22.2°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7410; ConvF(8.16, 8.16, 8.16) @ 1900 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

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) = 7.25 W/kg
SAR(1 g) = 3.96 W/kg
Deviation(1 g) = 0.00%



0 dB = 6.17 W/kg = 7.90 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

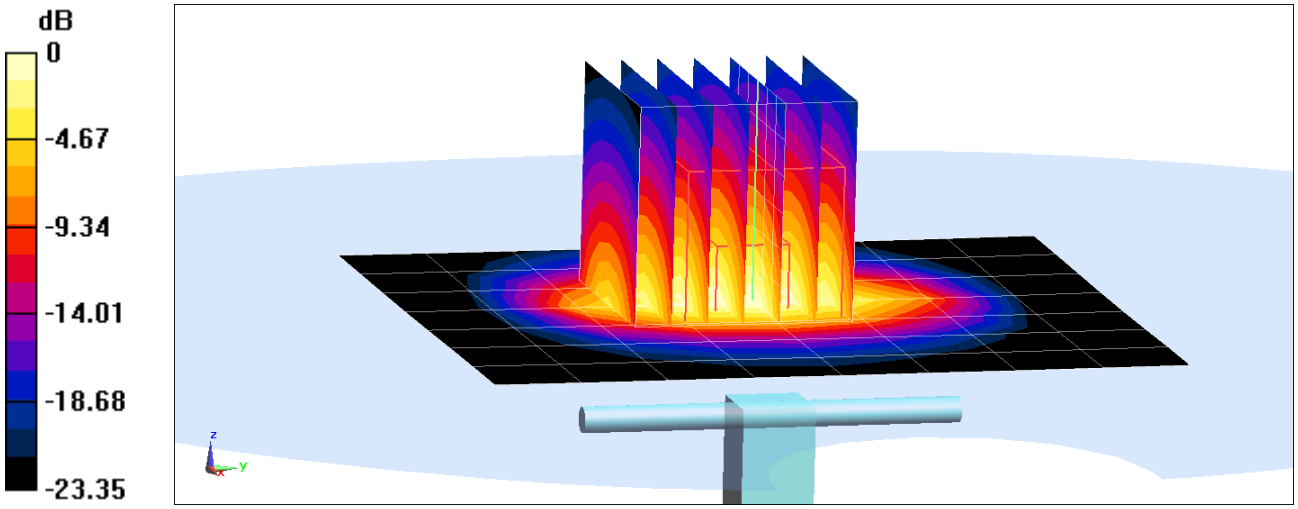
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.816 S/m; ε_r = 38.122; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-06-2018; Ambient Temp: 22.6°C; Tissue Temp: 21.9°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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 11.5 W/kg
SAR(1 g) = 5.52 W/kg
Deviation(1 g) = 4.74%



0 dB = 9.23 W/kg = 9.65 dBW/kg

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

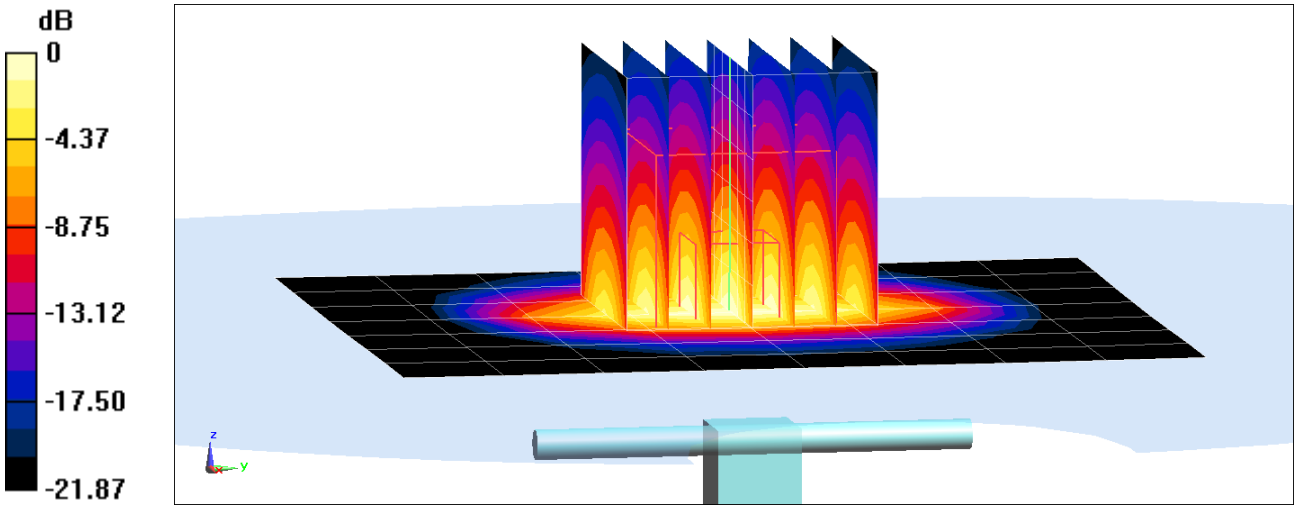
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.833 S/m; ε_r = 40.298; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-13-2018; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(7.5, 7.5, 7.5) @ 2450 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 5.26 W/kg
Deviation(1 g) = -0.19%



0 dB = 8.79 W/kg = 9.44 dBW/kg

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

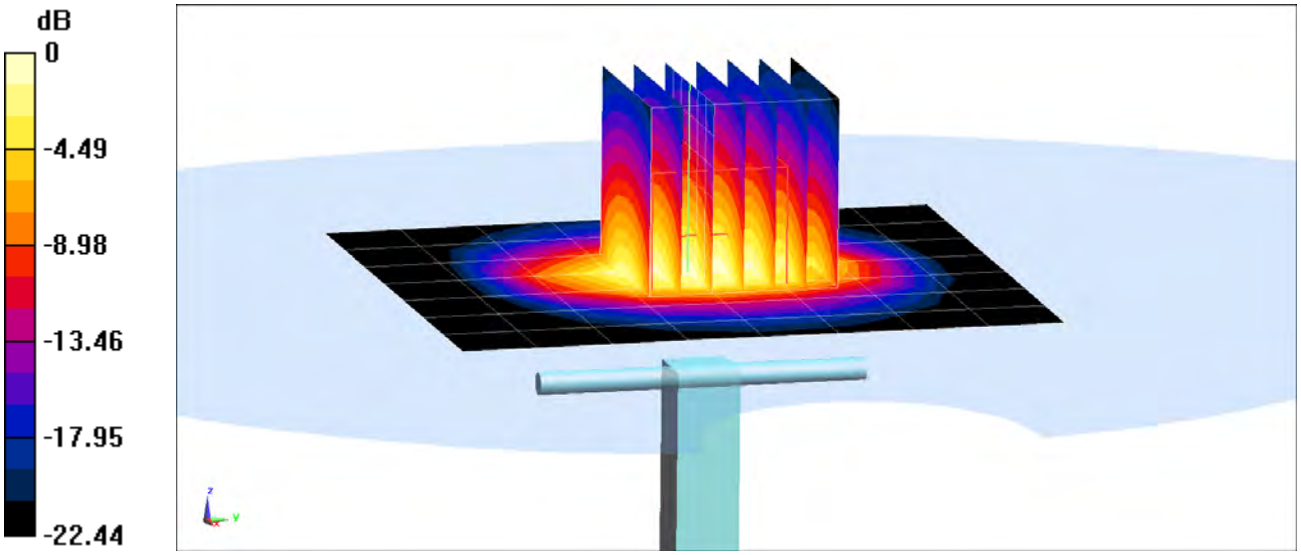
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.836 S/m; ε_r = 38.486; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-18-2018; Ambient Temp: 21.1°C; Tissue Temp: 20.8°C

Probe: ES3DV3 - SN3213; ConvF(4.72, 4.72, 4.72); Calibrated: 2/13/2018
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 (1); SEMCAD X Version 14.6.11 (7439)

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) = 5.39 W/kg
Deviation(1 g) = 3.85%



0 dB = 7.03 W/kg = 8.47 dBW/kg

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1064

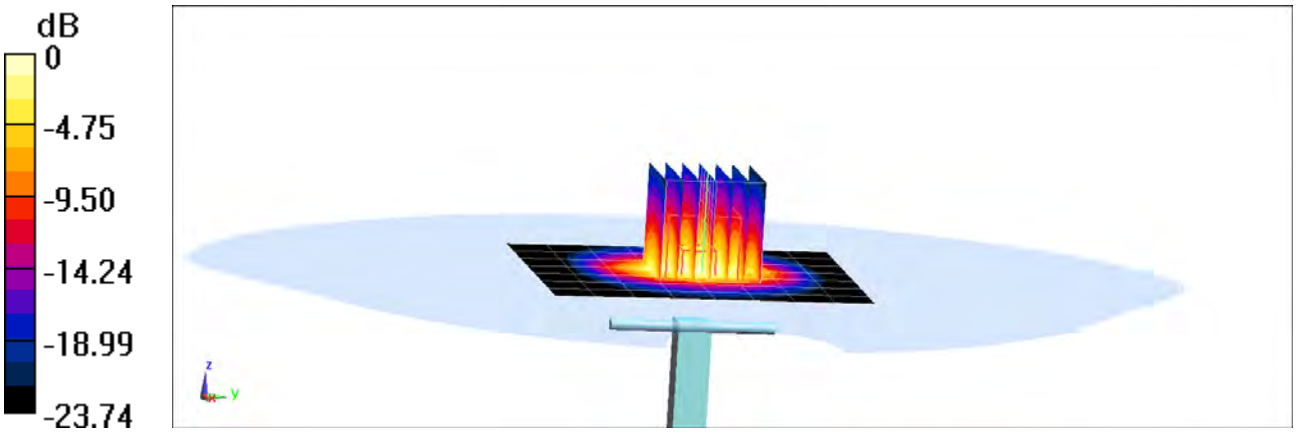
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2600 MHz; σ = 1.95 S/m; ε_r = 38.309; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-18-2018; Ambient Temp: 21.1°C; Tissue Temp: 20.8°C

Probe: ES3DV3 - SN3213; ConvF(4.53, 4.53, 4.53); Calibrated: 2/13/2018;
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 (1);SEMCAD X Version 14.6.10 (7439)

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) = 12.9 W/kg
SAR(1 g) = 6.07 W/kg
Deviation(1 g) = 6.49%



0 dB = 7.92 W/kg = 8.99 dBW/kg

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

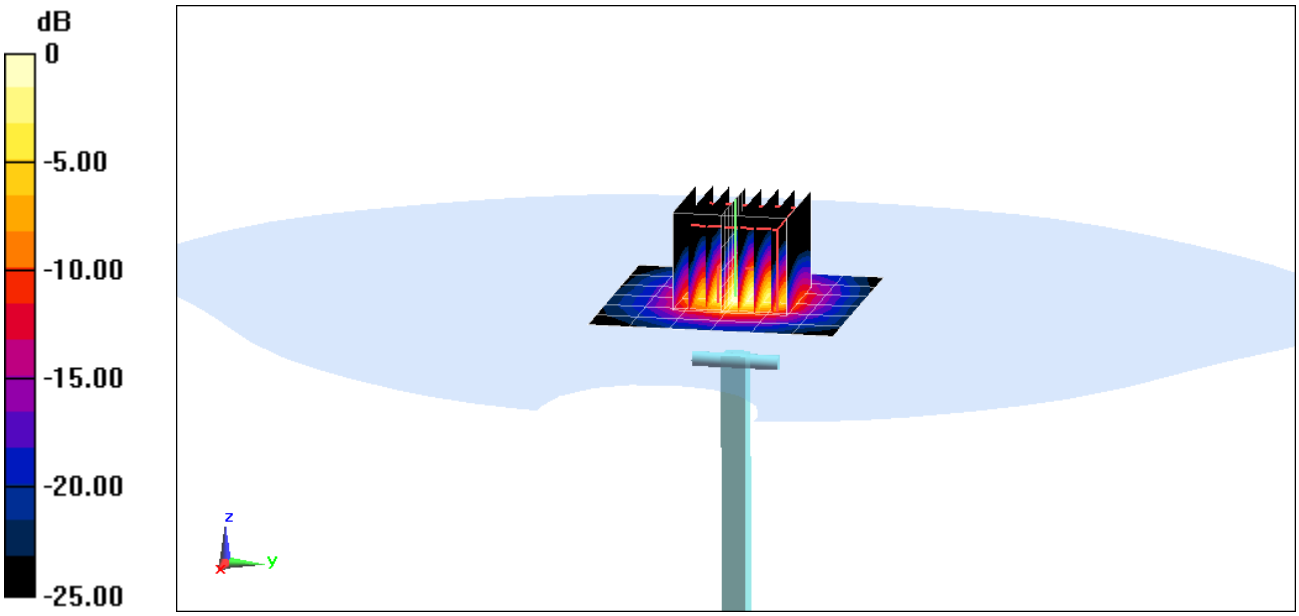
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5GHz Head Medium parameters used (interpolated):
$f = 5250$ MHz; $\sigma = 4.541$ S/m; $\varepsilon_r = 35.783$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-04-2018; Ambient Temp: 21.4°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(5.2, 5.2, 5.2) @ 5250 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 15.5 W/kg
SAR(1 g) = 3.79 W/kg
Deviation(1 g) = -4.29%



0 dB = 9.01 W/kg = 9.55 dBW/kg

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DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

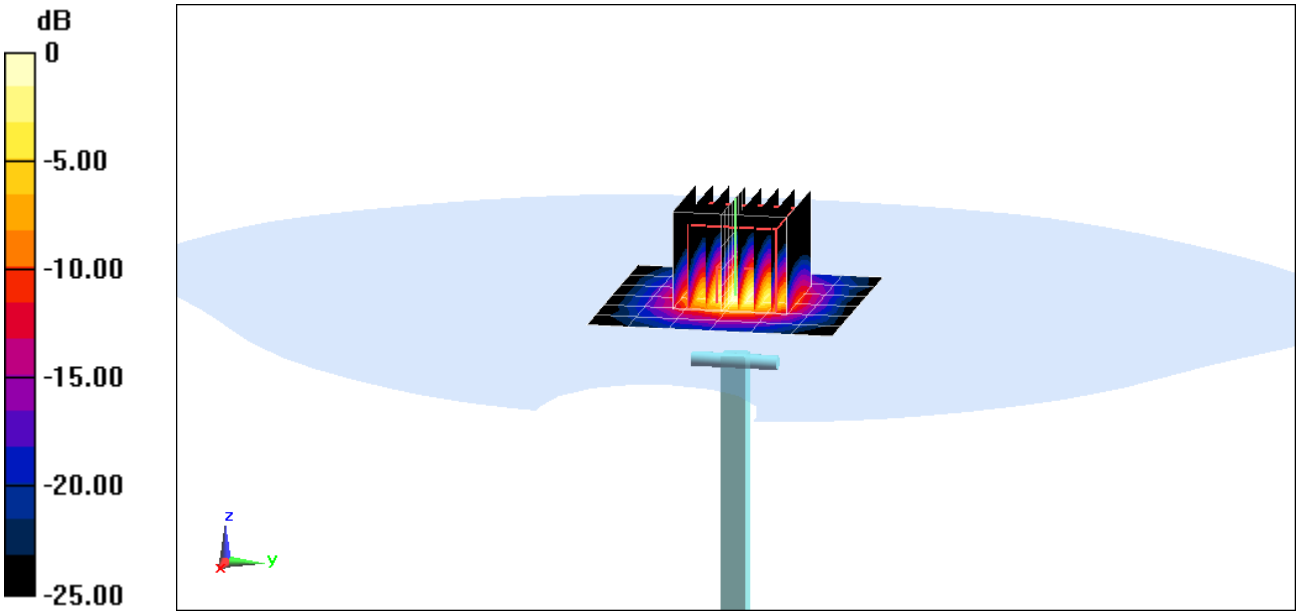
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5GHz Head Medium parameters used:
f = 5600 MHz; σ = 4.886 S/m; ε_r = 35.309; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-04-2018; Ambient Temp: 21.4°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(4.77, 4.77, 4.77) @ 5600 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 17.2 W/kg
SAR(1 g) = 3.93 W/kg
Deviation(1 g) = -6.54%



0 dB = 9.28 W/kg = 9.68 dBW/kg

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

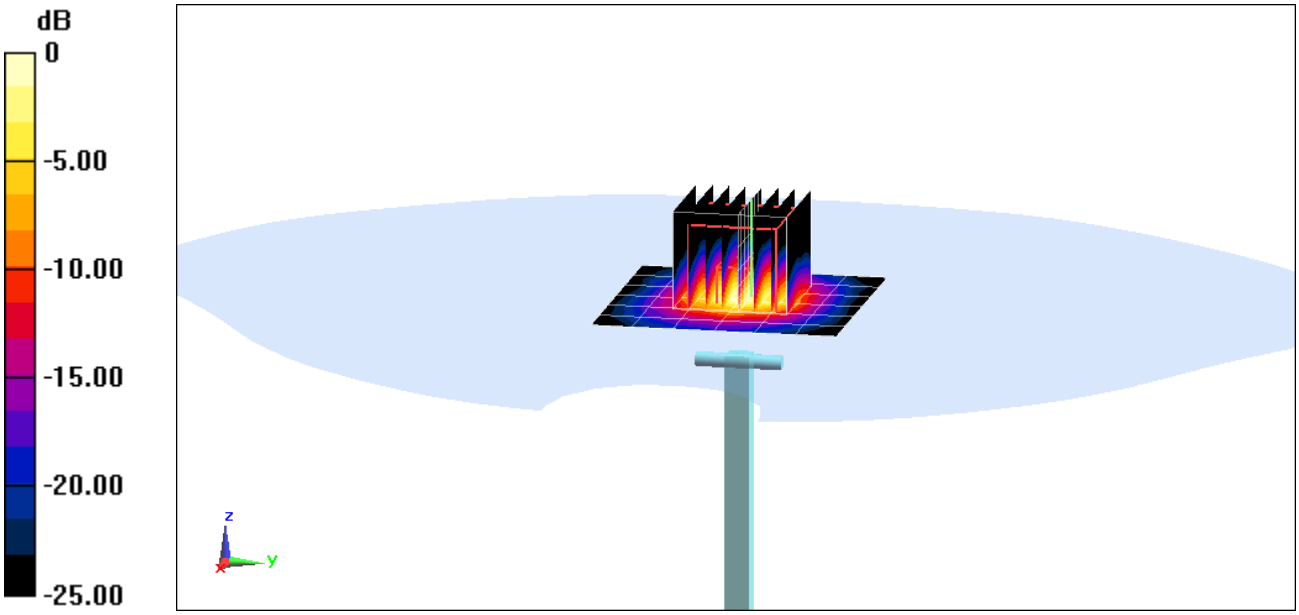
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5GHz Head Medium parameters used (interpolated):
f = 5750 MHz; σ = 5.06 S/m; ε_r = 35.069; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-04-2018; Ambient Temp: 21.4°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(4.82, 4.82, 4.82) @ 5750 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 17.9 W/kg
SAR(1 g) = 3.98 W/kg
Deviation(1 g) = -1.12%



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

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1161

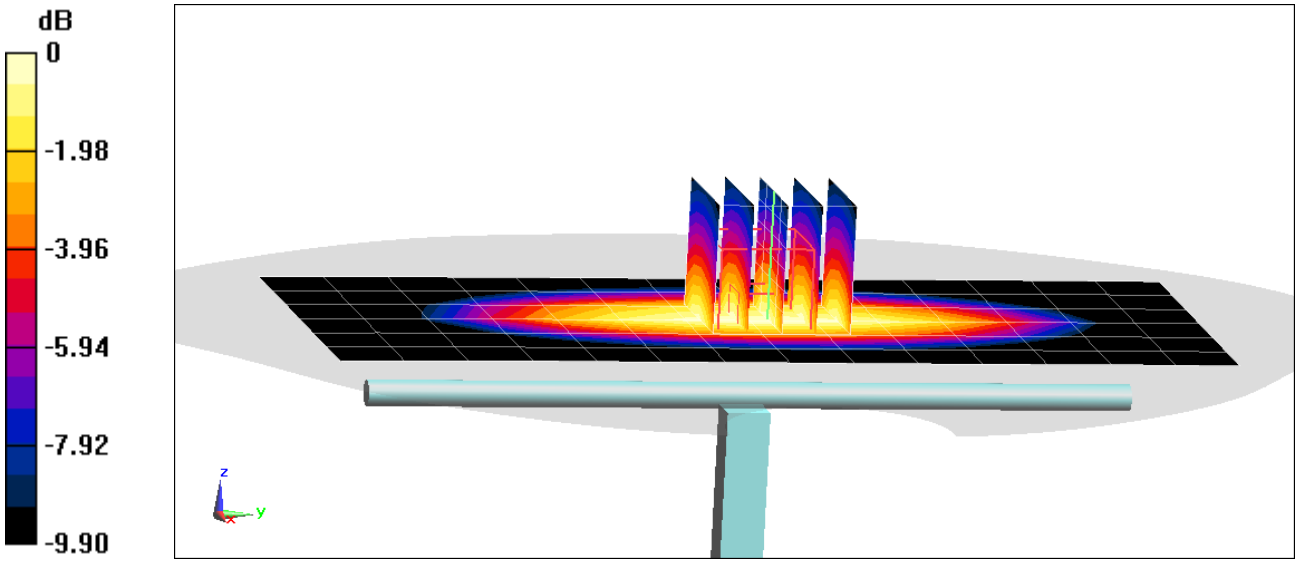
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used (interpolated):
f = 750 MHz; σ = 0.962 S/m; ε_r = 54.636; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-10-2018; Ambient Temp: 20.2°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3347; ConvF(6.59, 6.59, 6.59) @ 750 MHz; 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 (1); SEMCAD X Version 14.6.11 (7439)

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) = 2.43 W/kg
SAR(1 g) = 1.67 W/kg
Deviation(1 g) = -0.95%



0 dB = 1.94 W/kg = 2.88 dBW/kg

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DUT: Dipole 750 MHz; Type: D750V3; Serial: 1161

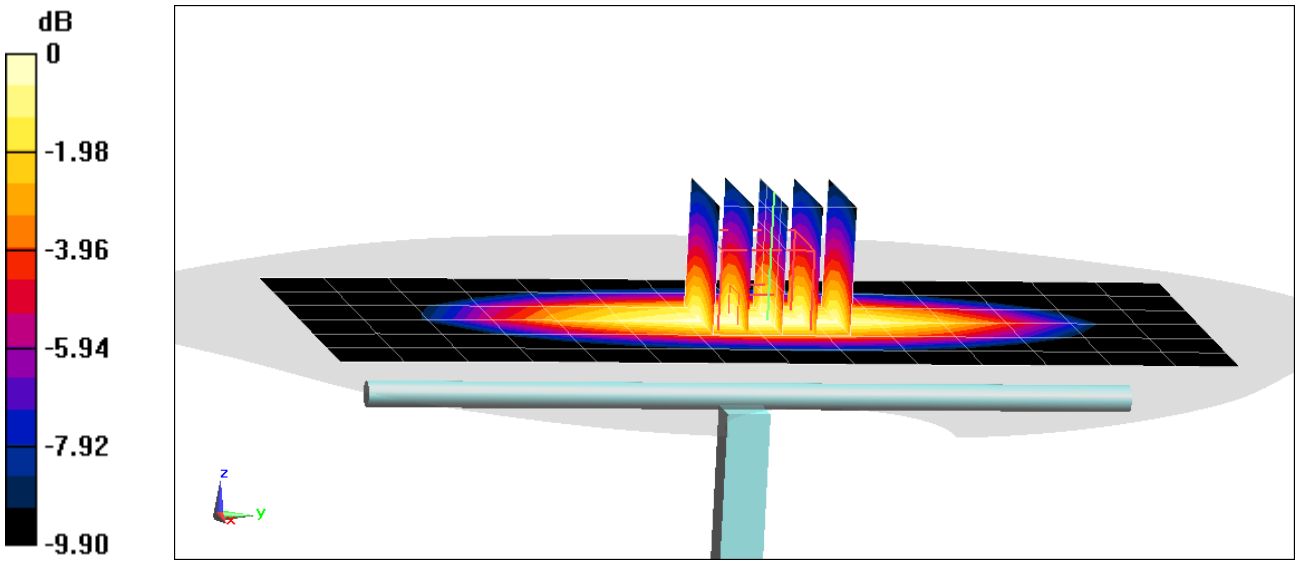
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 750 MHz; σ = 0.949 S/m; ε_r = 57.04; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-18-2018; Ambient Temp: 23.2°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3319; ConvF(6.32, 6.32, 6.32) @ 750 MHz; Calibrated: 3/13/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/7/2018
Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

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) = 2.63 W/kg
SAR(1 g) = 1.81 W/kg
Deviation(1 g) = 7.35%



0 dB = 2.09 W/kg = 3.20 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d132

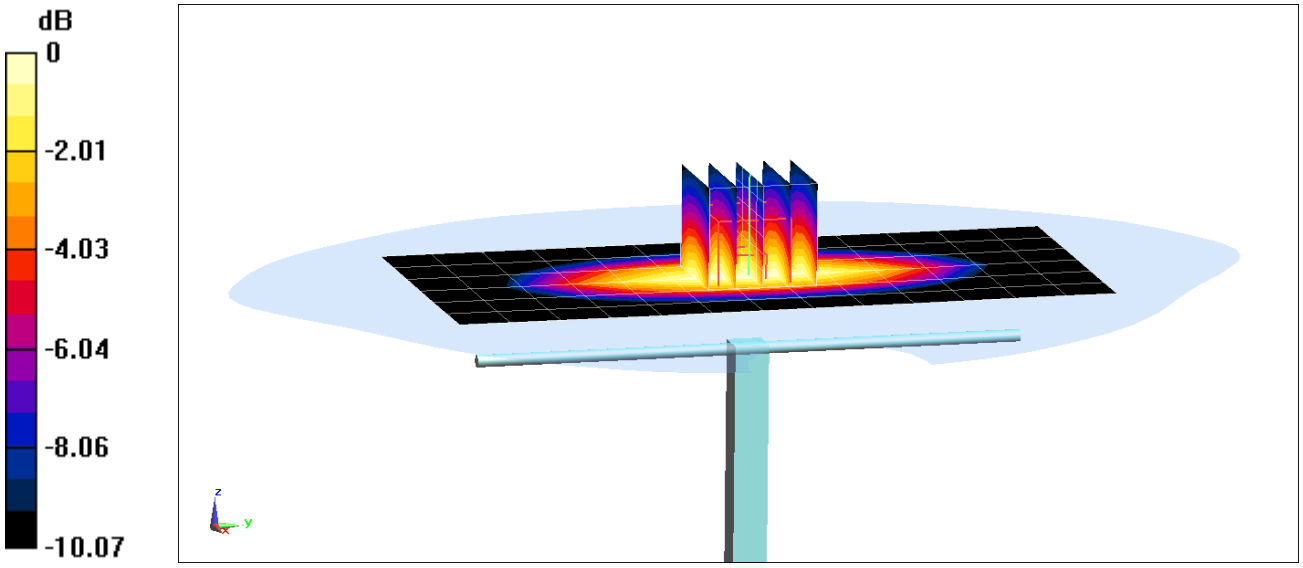
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.945 S/m; ε_r = 53.865; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-06-2018; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3213; ConvF(6.2, 6.2, 6.2) @ 835 MHz; Calibrated: 2/13/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/9/2018
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

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) = 2.97 W/kg
SAR(1 g) = 2.05 W/kg
Deviation(1 g) = 5.56%



0 dB = 2.38 W/kg = 3.77 dBW/kg

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

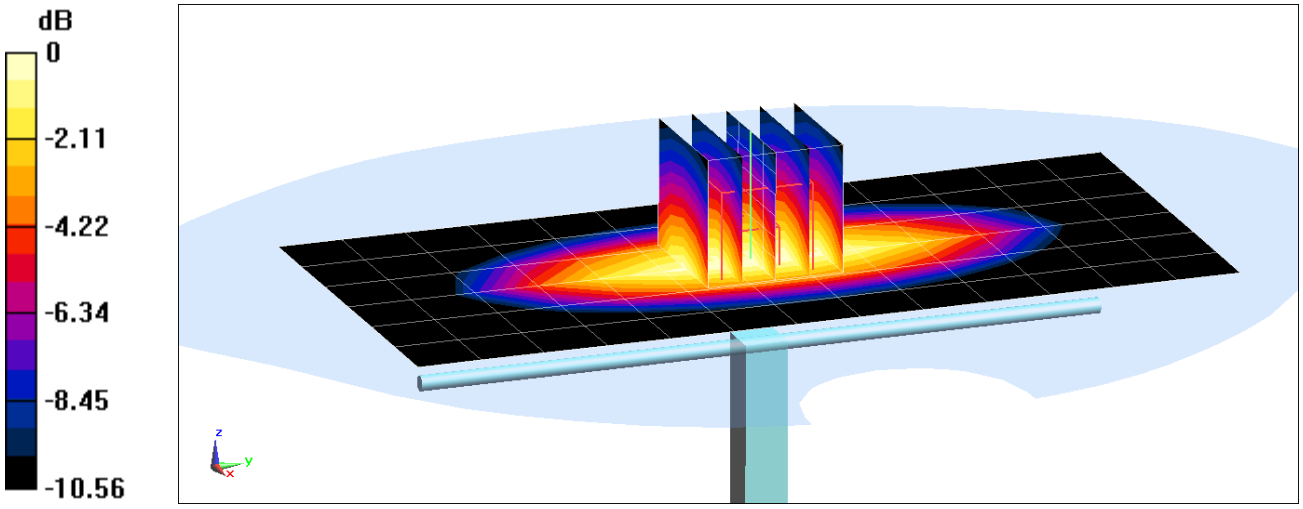
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.973 S/m; ε_r = 54.482; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-08-2018; Ambient Temp: 22.5°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7357; ConvF(10.17, 10.17, 10.17) @ 835 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.99 W/kg
SAR(1 g) = 1.97 W/kg
Deviation(1 g) = 4.68%



0 dB = 2.63 W/kg = 4.20 dBW/kg

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DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

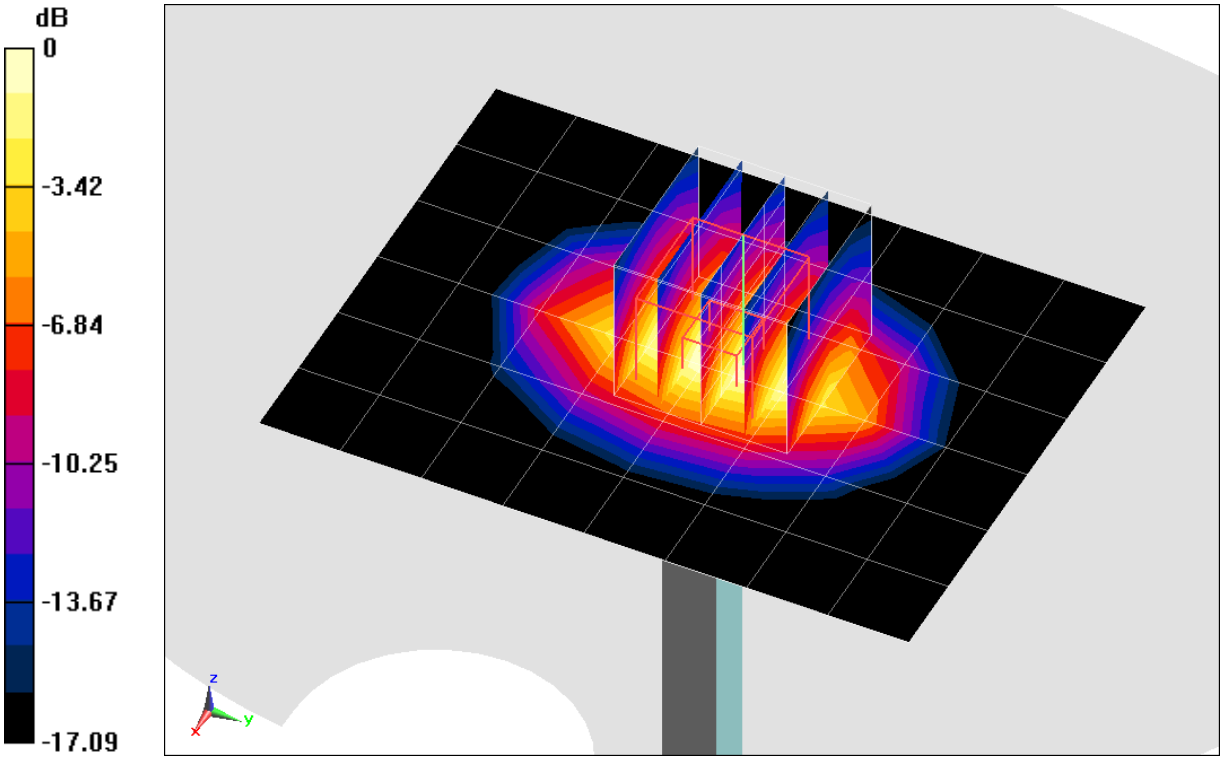
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used:
f = 1750 MHz; σ = 1.486 S/m; ε_r = 52.593; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-12-2018; Ambient Temp: 22.1°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3347; ConvF(5.17, 5.17, 5.17) @ 1750 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 6.80 W/kg
SAR(1 g) = 3.89 W/kg; SAR(10 g) = 2.08 W/kg
Deviation(1 g) = 4.01% Deviation(10 g) = 4.52%



0 dB = 4.82 W/kg = 6.83 dBW/kg

DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

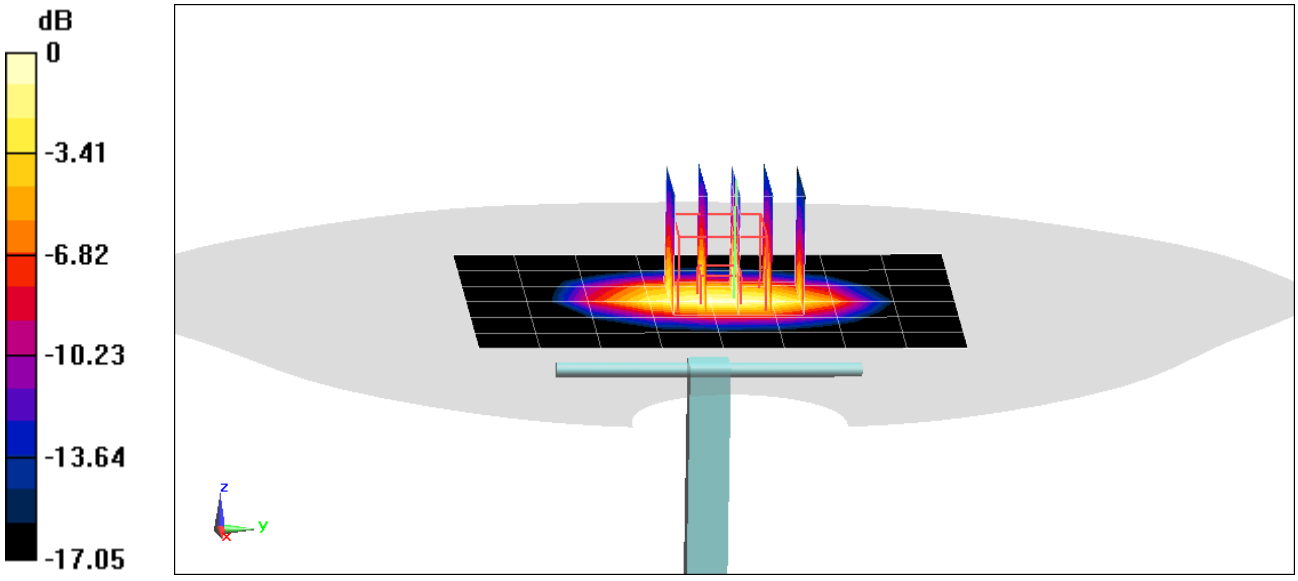
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used:
f = 1750 MHz; σ = 1.484 S/m; ε_r = 52.483; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-11-2018; Ambient Temp: 21.0°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3347; ConvF(5.17, 5.17, 5.17) @ 1750 MHz; 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 (1); SEMCAD X Version 14.6.11 (7439)

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) = 6.54 W/kg
SAR(1 g) = 3.75 W/kg
Deviation(1 g) = 0.27%



0 dB = 4.65 W/kg = 6.67 dBW/kg

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

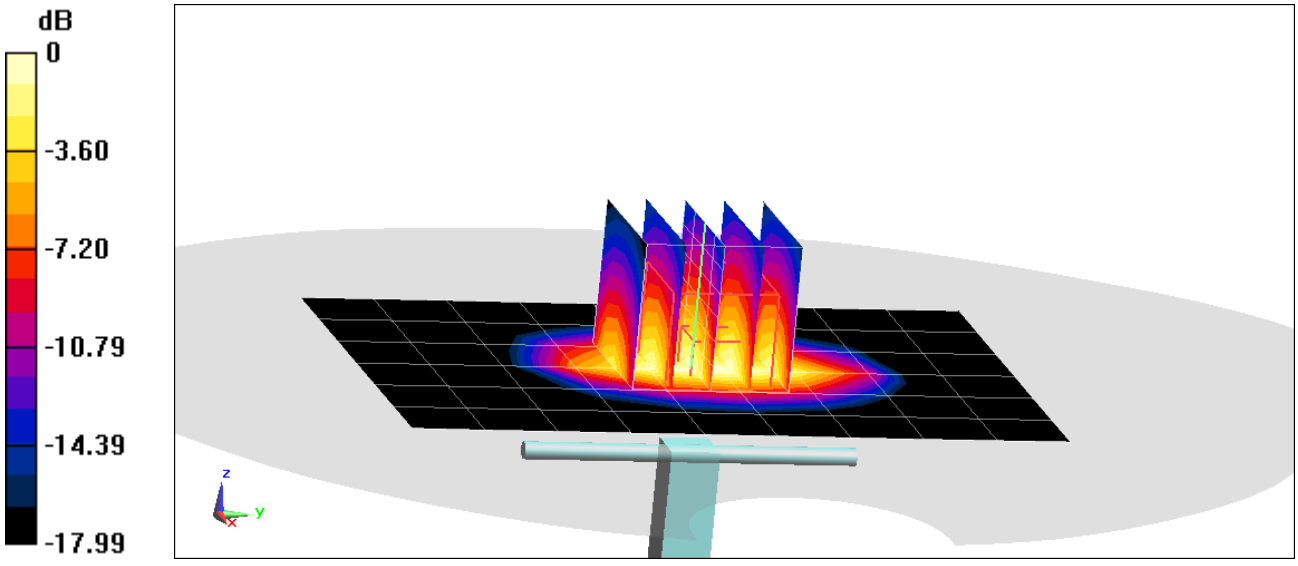
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.554 S/m; ε_r = 53.316; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-04-2018; Ambient Temp: 20.5°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3347; ConvF(4.94, 4.94, 4.94); 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 (1); SEMCAD X Version 14.6.11 (7439)

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) = 7.69 W/kg
SAR(1 g) = 4.27 W/kg
Deviation(1 g) = 7.83%



0 dB = 5.32 W/kg = 7.26 dBW/kg

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

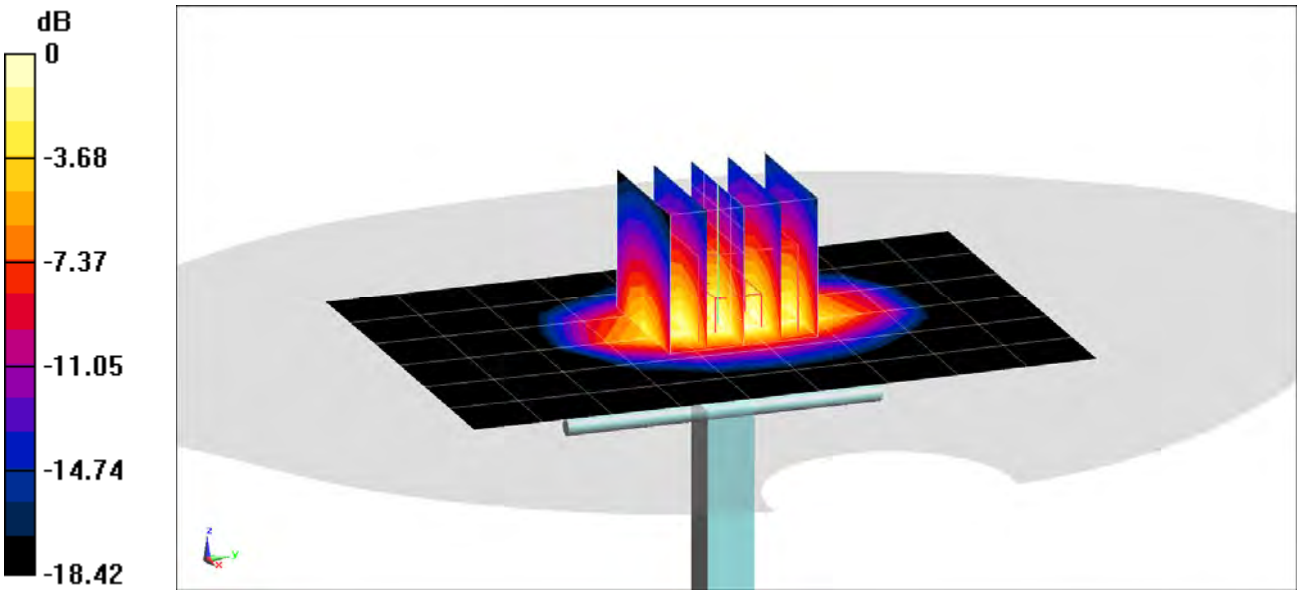
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.571 S/m; ε_r = 52.251; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-17-2018; Ambient Temp: 22.4°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3319; ConvF(4.84, 4.84, 4.84) @ 1900 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

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) = 7.19 W/kg
SAR(1 g) = 3.98 W/kg; SAR(10 g) = 2.06 W/kg
Deviation(1 g) = -0.75%; Deviation(10 g) = -3.29%



0 dB = 5.02 W/kg = 7.01 dBW/kg

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

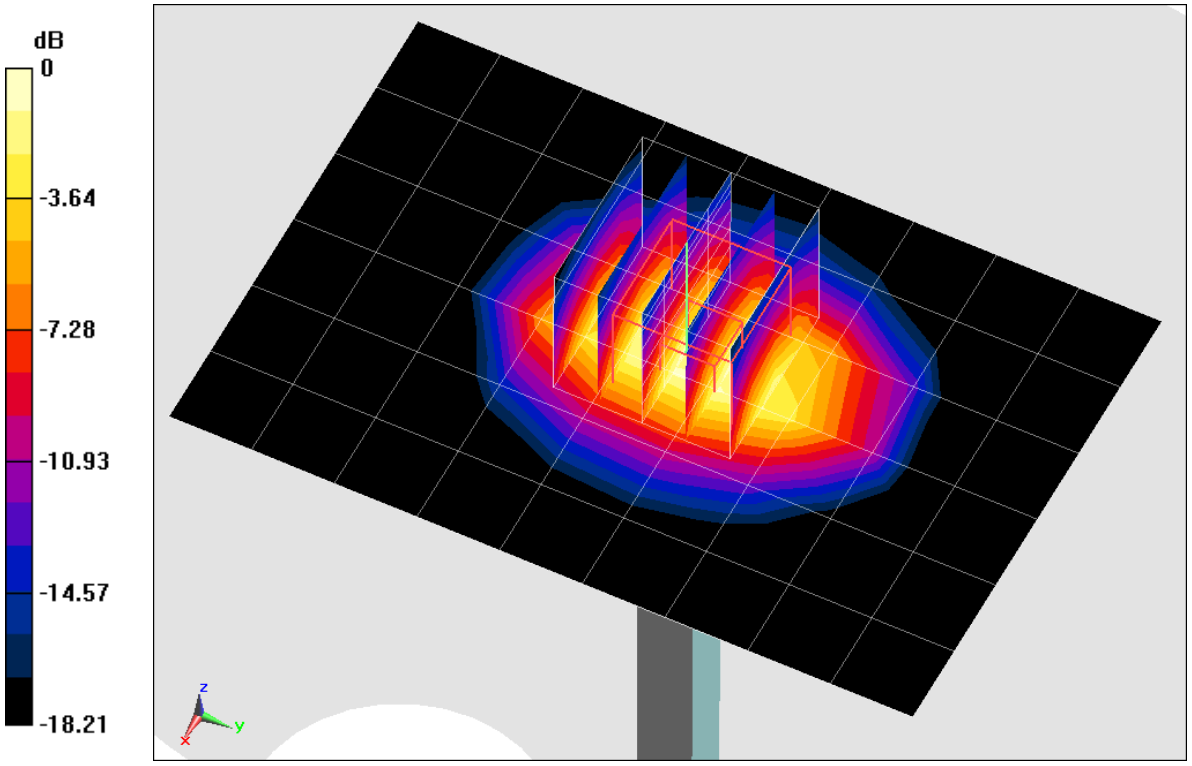
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.581 S/m; ε_r = 51.744; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-17-2018; Ambient Temp: 22.1°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3347; ConvF(4.94, 4.94, 4.94); 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 7.82 W/kg
SAR(1 g) = 4.3 W/kg
Deviation(1 g) = 8.59%



0 dB = 5.43 W/kg = 7.35 dBW/kg

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

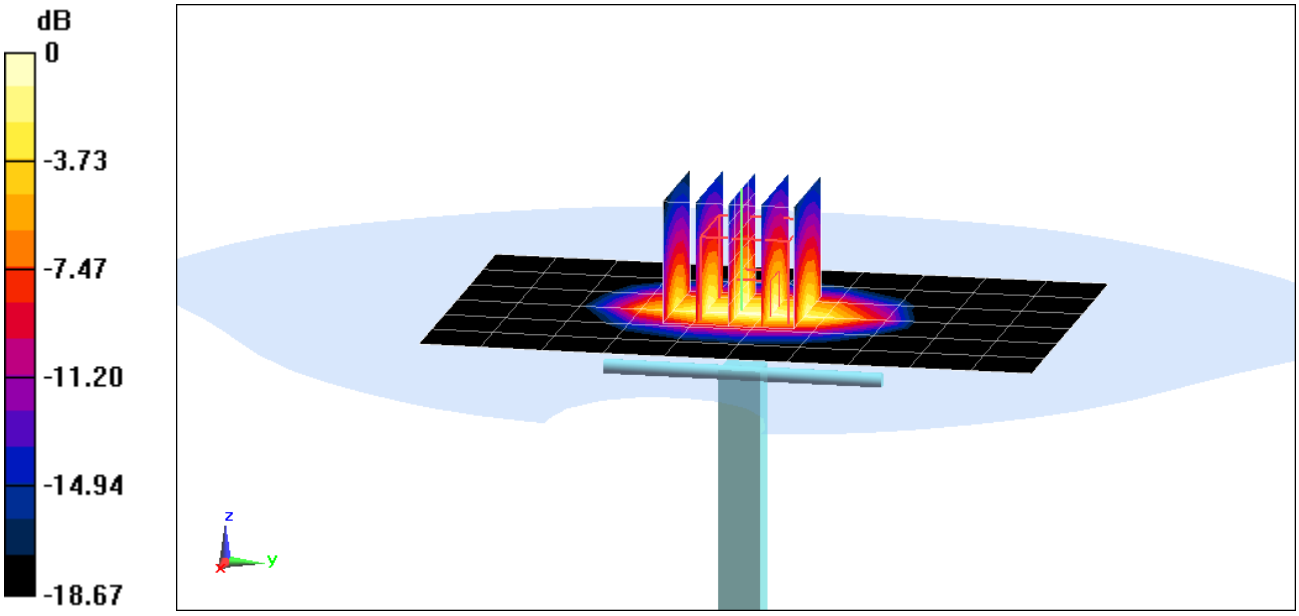
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.541 S/m; ε_r = 50.669; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-25-2018; Ambient Temp: 22.6°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7409; ConvF(7.6, 7.6, 7.6) @ 1900 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 7.98 W/kg
SAR(10 g) = 2.2 W/kg
Deviation(10 g) = 5.26%



0 dB = 6.55 W/kg = 8.16 dBW/kg

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

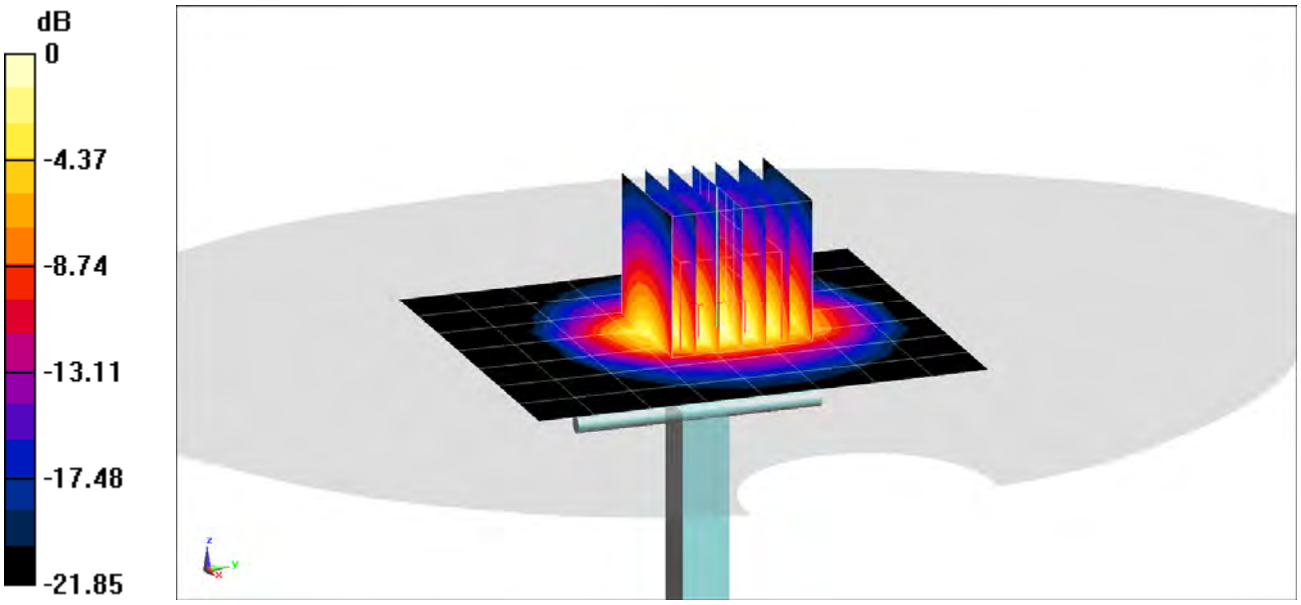
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.029 S/m; ε_r = 50.839; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-04-2018; Ambient Temp: 23.0°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3319; ConvF(4.51, 4.51, 4.51) @ 2450 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

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) = 5.38 W/kg
Deviation(1 g) = 5.28%



0 dB = 7.11 W/kg = 8.52 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

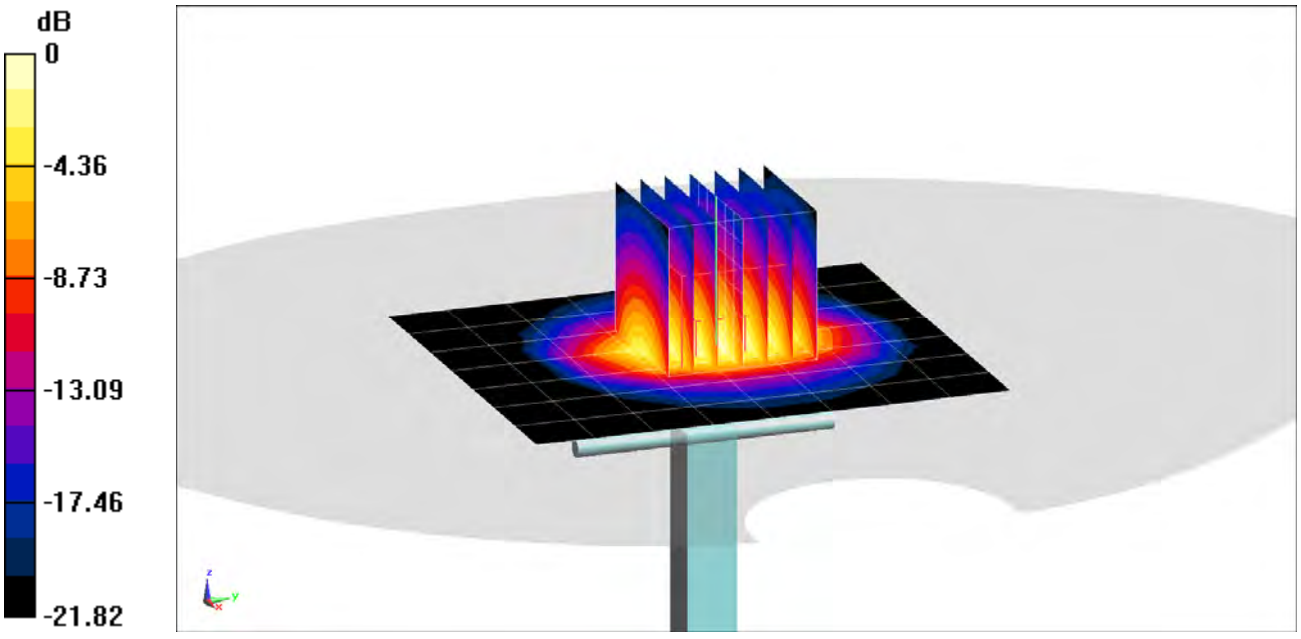
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.043 S/m; ε_r = 50.771; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-10-2018; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3319; ConvF(4.51, 4.51, 4.51) @ 2450 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

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) = 5.17 W/kg
Deviation(1 g) = 1.17%



0 dB = 6.88 W/kg = 8.38 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

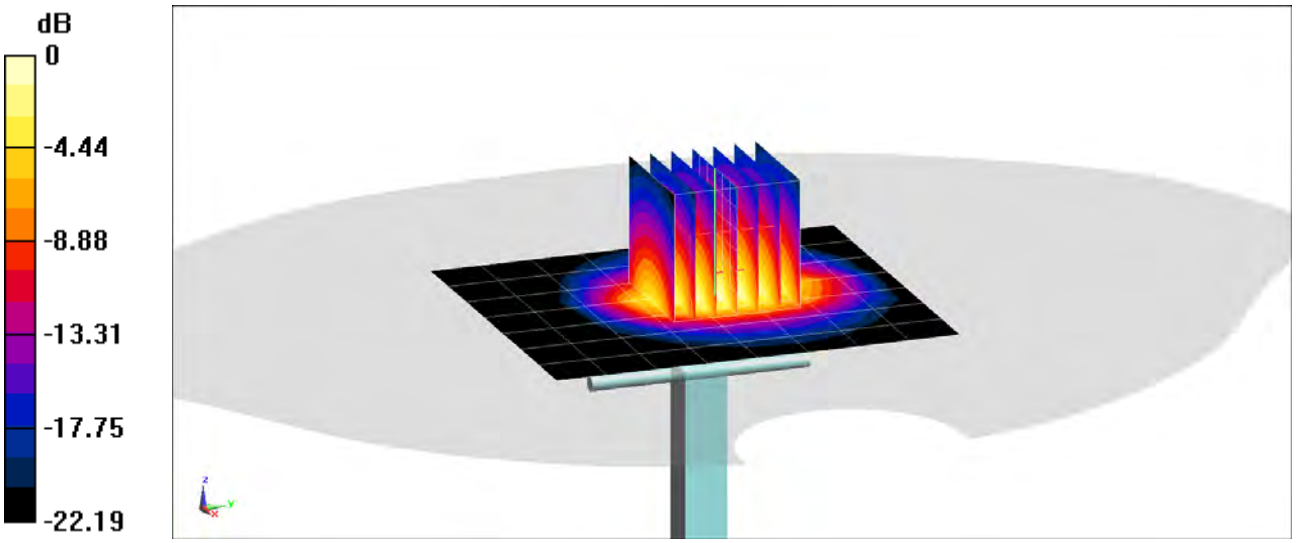
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.018 S/m; ε_r = 51.443; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-19-2018; Ambient Temp: 22.5°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3319; ConvF(4.51, 4.51, 4.51) @ 2450 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

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) = 10.9 W/kg
SAR(1 g) = 5.3 W/kg
Deviation(1 g) = 3.72%



0 dB = 7.04 W/kg = 8.48 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

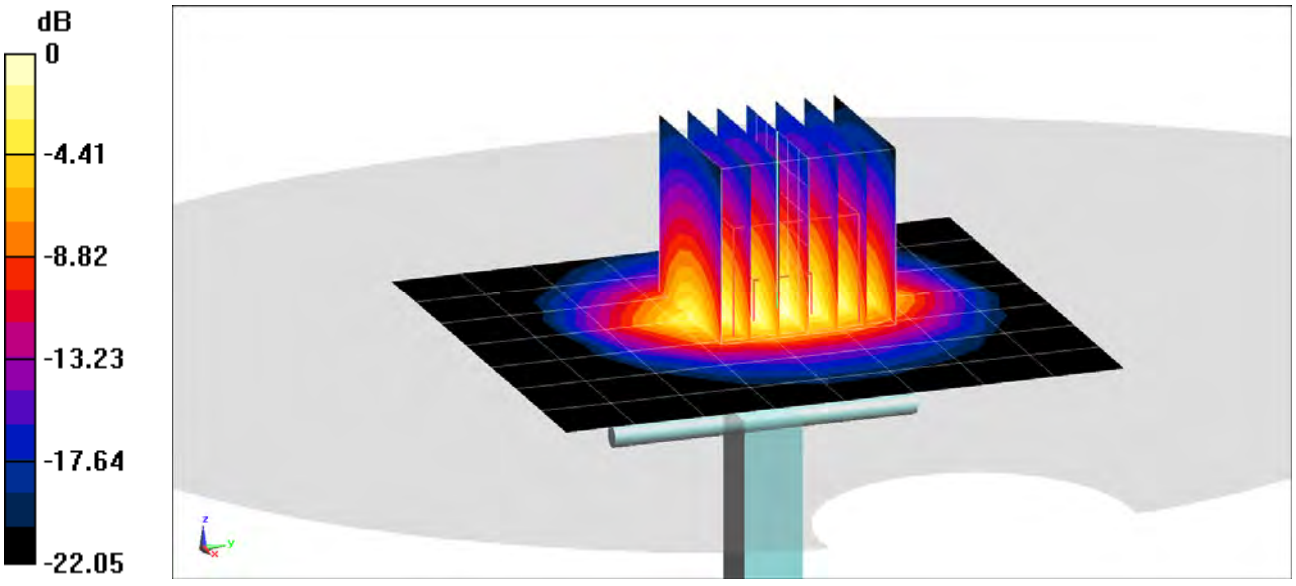
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.04 S/m; ε_r = 52.078; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2018; Ambient Temp: 23.0°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3319; ConvF(4.51, 4.51, 4.51) @ 2450 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

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) = 10.4 W/kg
SAR(1 g) = 5.04 W/kg; SAR(10 g) = 2.32 W/kg
Deviation(1 g) = 0.60%; Deviation(10 g) = -2.11%



0 dB = 6.70 W/kg = 8.26 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

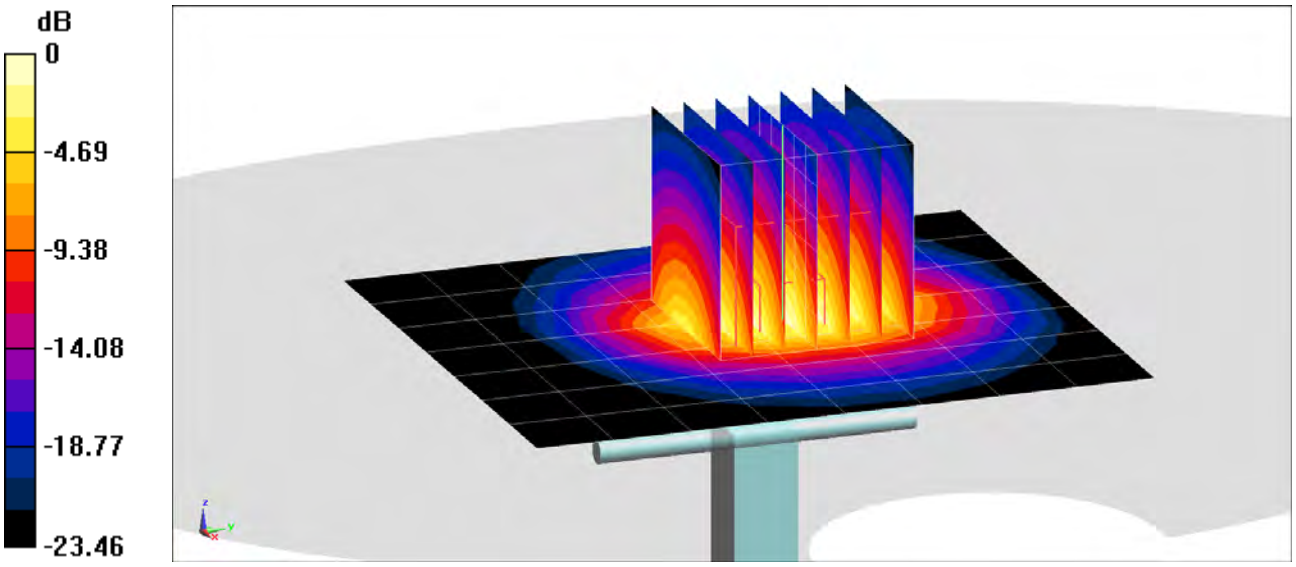
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2600 MHz; σ = 2.194 S/m; ε_r = 51.007; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-19-2018; Ambient Temp: 22.5°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3319; ConvF(4.33, 4.33, 4.33) @ 2600 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.9 W/kg
SAR(1 g) = 5.48 W/kg
Deviation(1 g) = 0.00%



0 dB = 7.26 W/kg = 8.61 dBW/kg

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1064

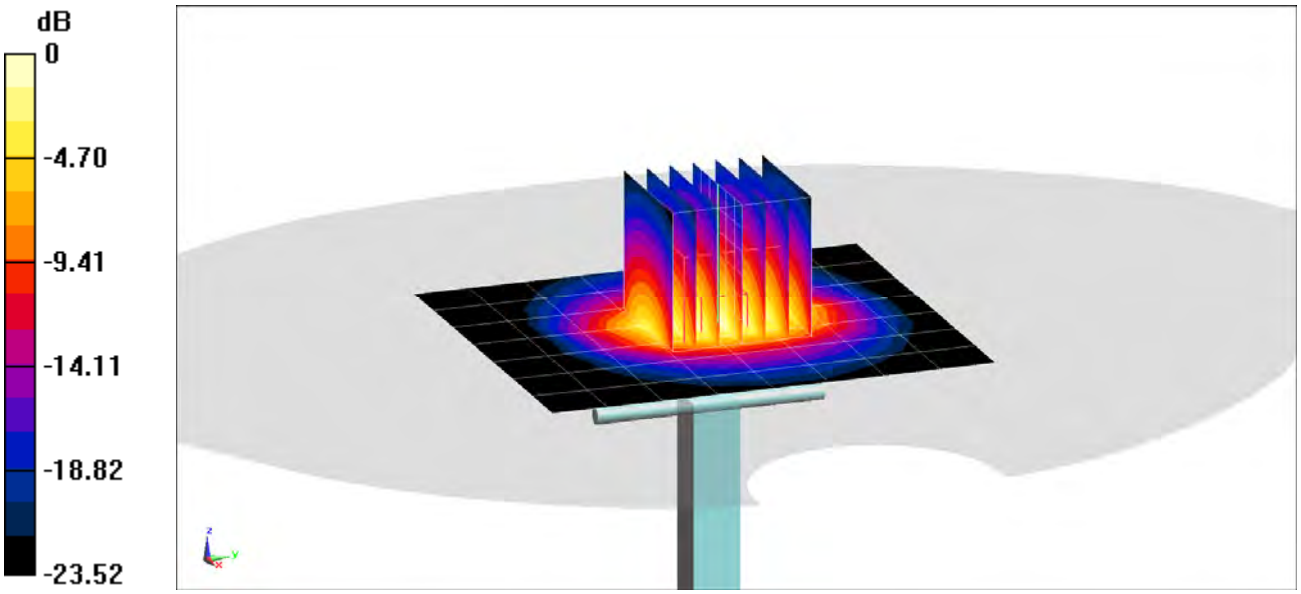
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2600 MHz; σ = 2.208 S/m; ε_r = 51.775; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2018; Ambient Temp: 23.0°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3319; ConvF(4.33, 4.33, 4.33) @ 2600 MHz; 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: 1375
Measurement SW: DASY52, Version 52.10 (1);SEMCAD X Version 14.6.11 (7439)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.4 W/kg
SAR(1 g) = 5.19 W/kg; SAR(10 g) = 2.28 W/kg
Deviation(1 g) = -5.12%; Deviation(10 g) = -6.56%



0 dB = 6.95 W/kg = 8.42 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

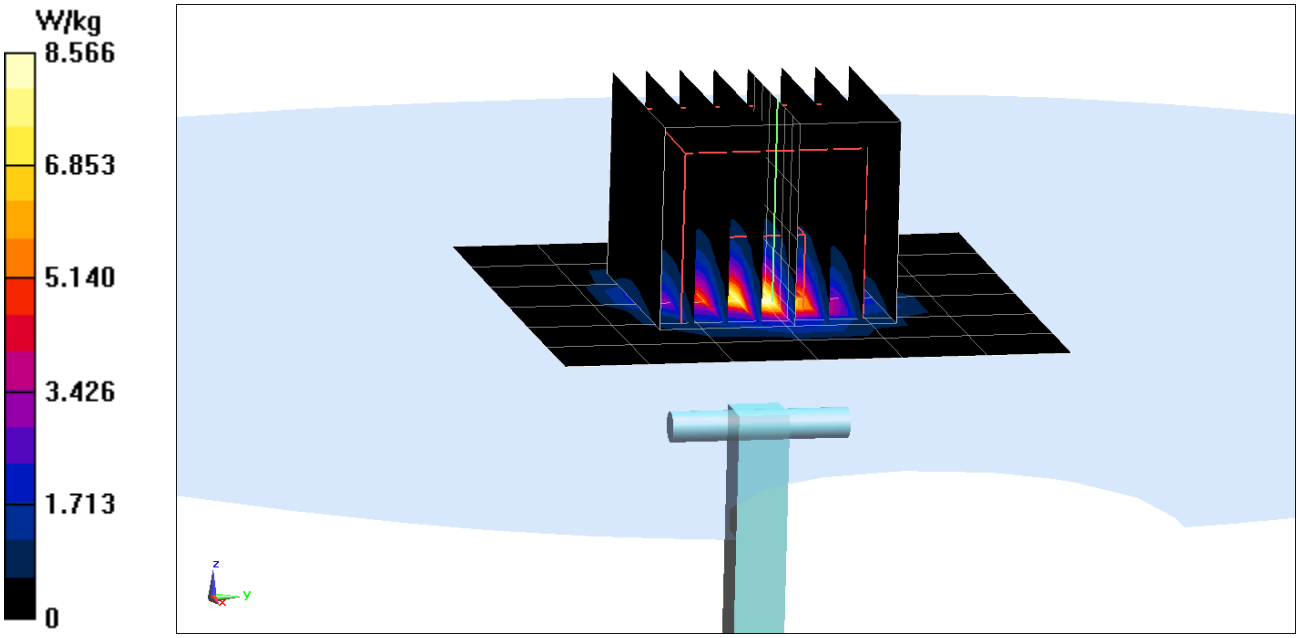
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5250 MHz; σ = 5.498 S/m; ε_r = 47.577; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-04-2018; Ambient Temp: 22.5°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(4.78, 4.78, 4.78) @ 5250 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 3.65 W/kg
Deviation(1 g) = -5.19%



PCTEST ENGINEERING LABORATORY, INC.

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

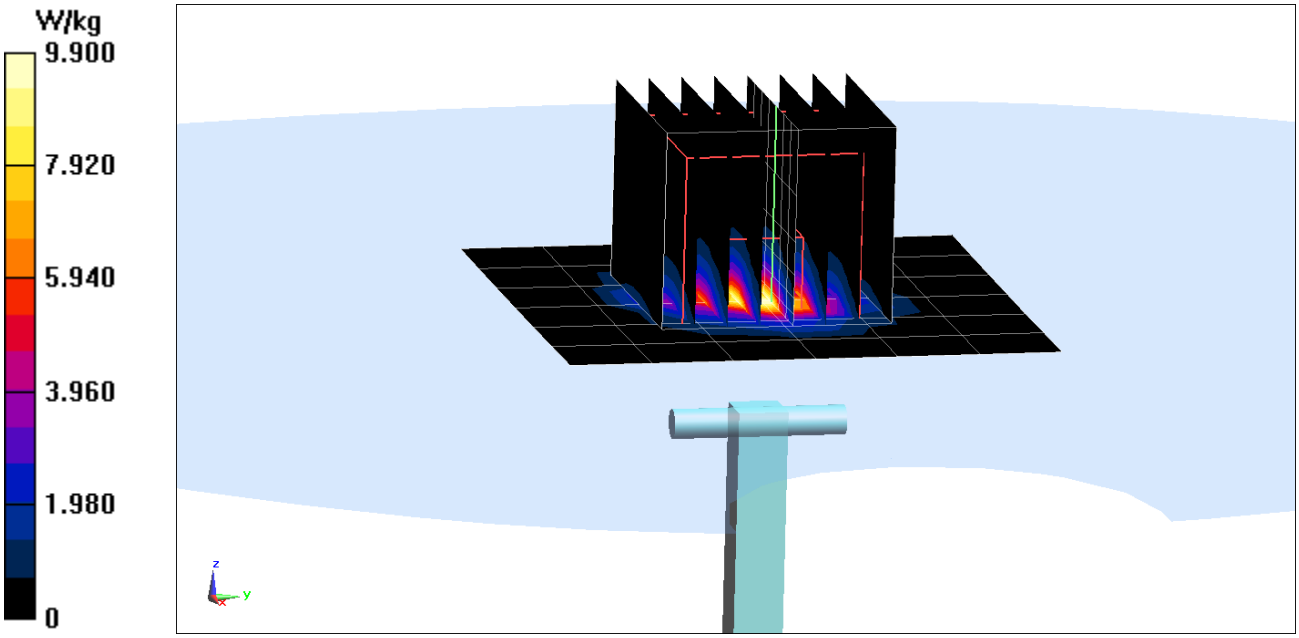
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5600 MHz; σ = 5.96 S/m; ε_r = 47.006; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-04-2018; Ambient Temp: 22.5°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(4.2, 4.2, 4.2) @ 5600 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 17.9 W/kg
SAR(1 g) = 4.06 W/kg
Deviation(1 g) = 2.53%



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

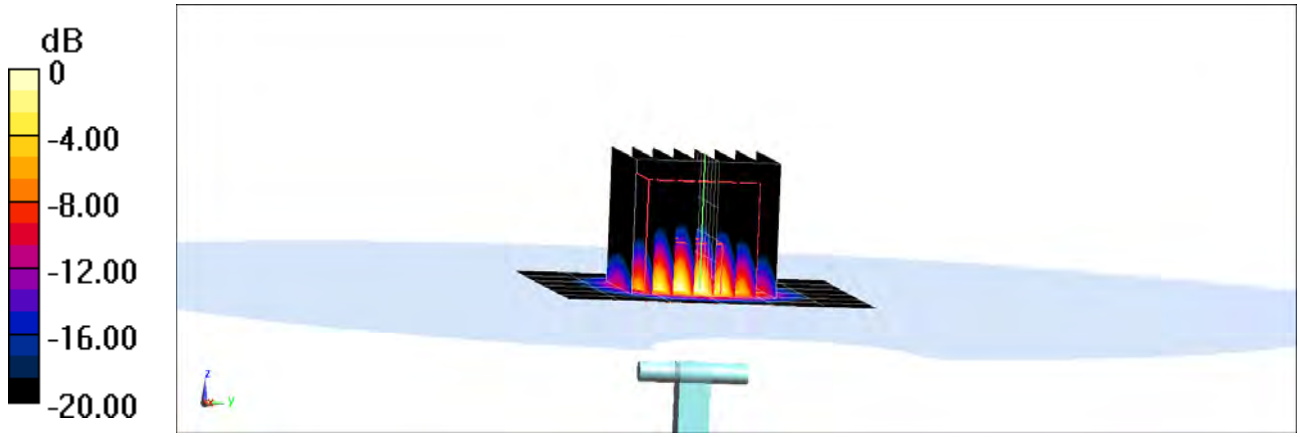
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5750 MHz; σ = 6.175 S/m; ε_r = 46.721; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-04-2018; Ambient Temp: 22.5°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(4.21, 4.21, 4.21) @ 5750 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 17.7 W/kg
SAR(1 g) = 3.84 W/kg
Deviation(1 g) = 0.92%



DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

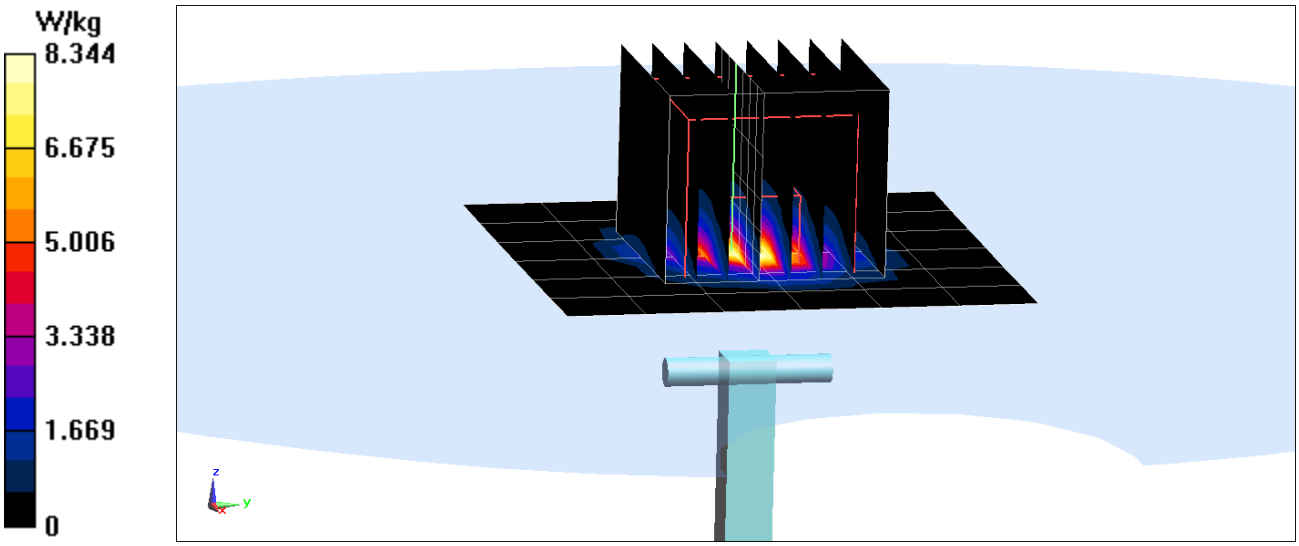
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5250 MHz; σ = 5.399 S/m; ε_r = 47.128; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-20-2018; Ambient Temp: 22.5°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7357; ConvF(4.78, 4.78, 4.78) @ 5250 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 14.3 W/kg
SAR(10 g) = 0.985 W/kg
Deviation(10 g) = -6.64%



DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

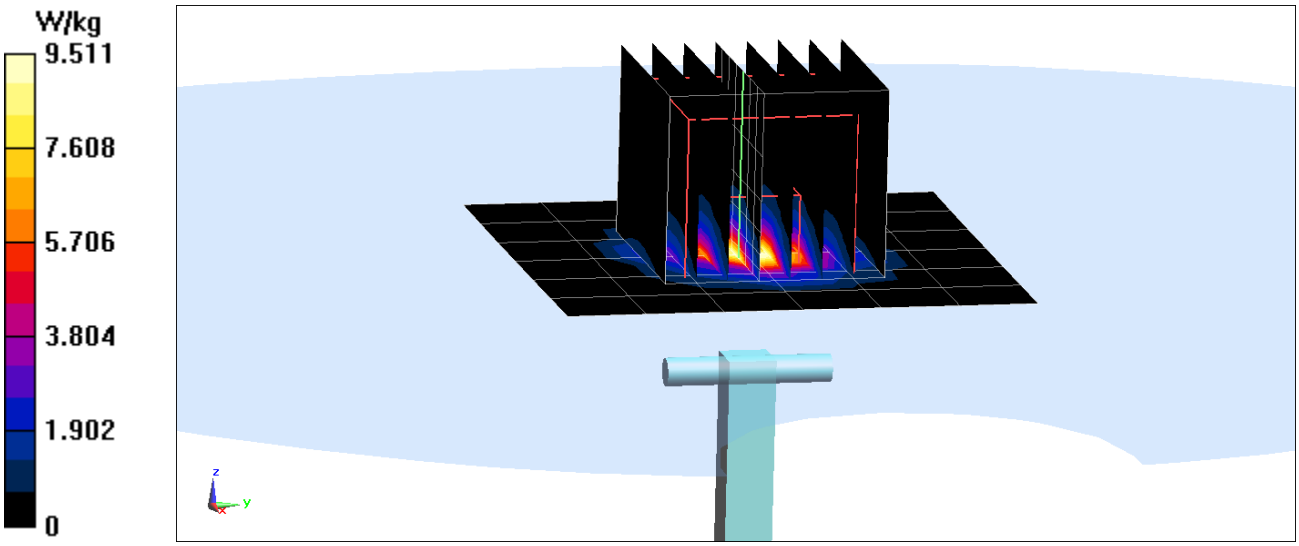
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5600 MHz; σ = 5.871 S/m; ε_r = 46.559; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-20-2018; Ambient Temp: 22.5°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7357; ConvF(4.2, 4.2, 4.2) @ 5600 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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(10 g) = 1.08 W/kg
Deviation(10 g) = -3.14%



DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

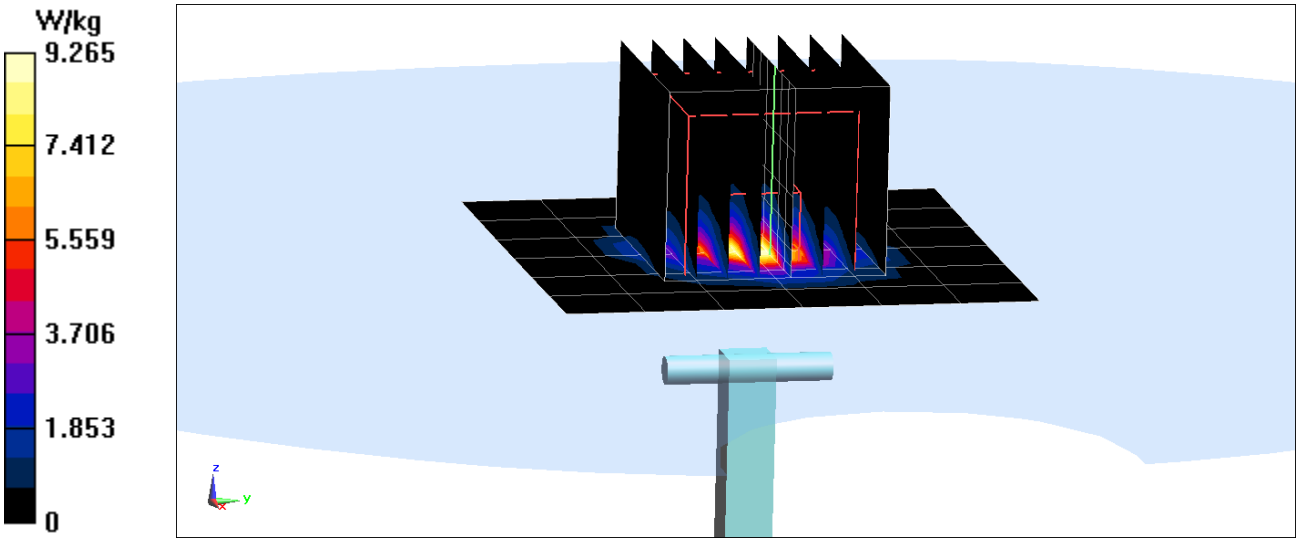
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5750 MHz; σ = 6.078 S/m; ε_r = 46.327; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-20-2018; Ambient Temp: 22.5°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7357; ConvF(4.21, 4.21, 4.21) @ 5750 MHz; 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 (1);SEMCAD X Version 14.6.11 (7439)

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) = 17.6 W/kg
SAR(10 g) = 1.03 W/kg
Deviation(10 g) = -2.83%



APPENDIX C: PROBE CALIBRATION

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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	
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 cm³ (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 cm³ (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 cm³ (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 cm³ (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 cm³ (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 cm³ (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 cm³ (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 cm³ (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 cm³ (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 cm³ (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 cm³ (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 cm³ (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)**

Date: 12.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

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

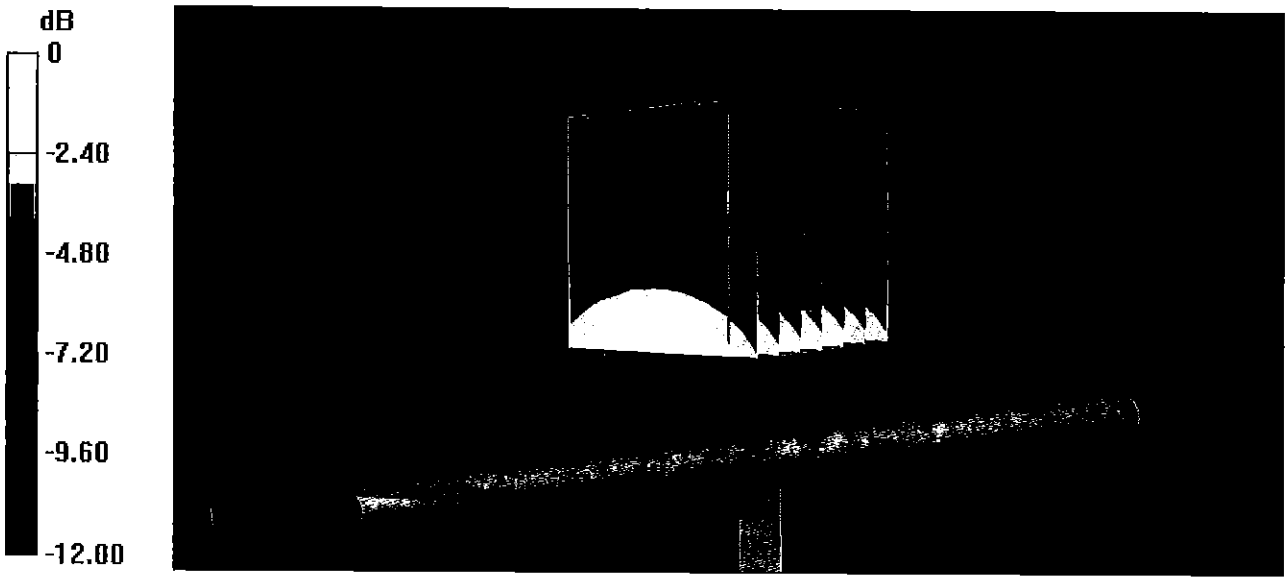
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.9 S/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.22, 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)

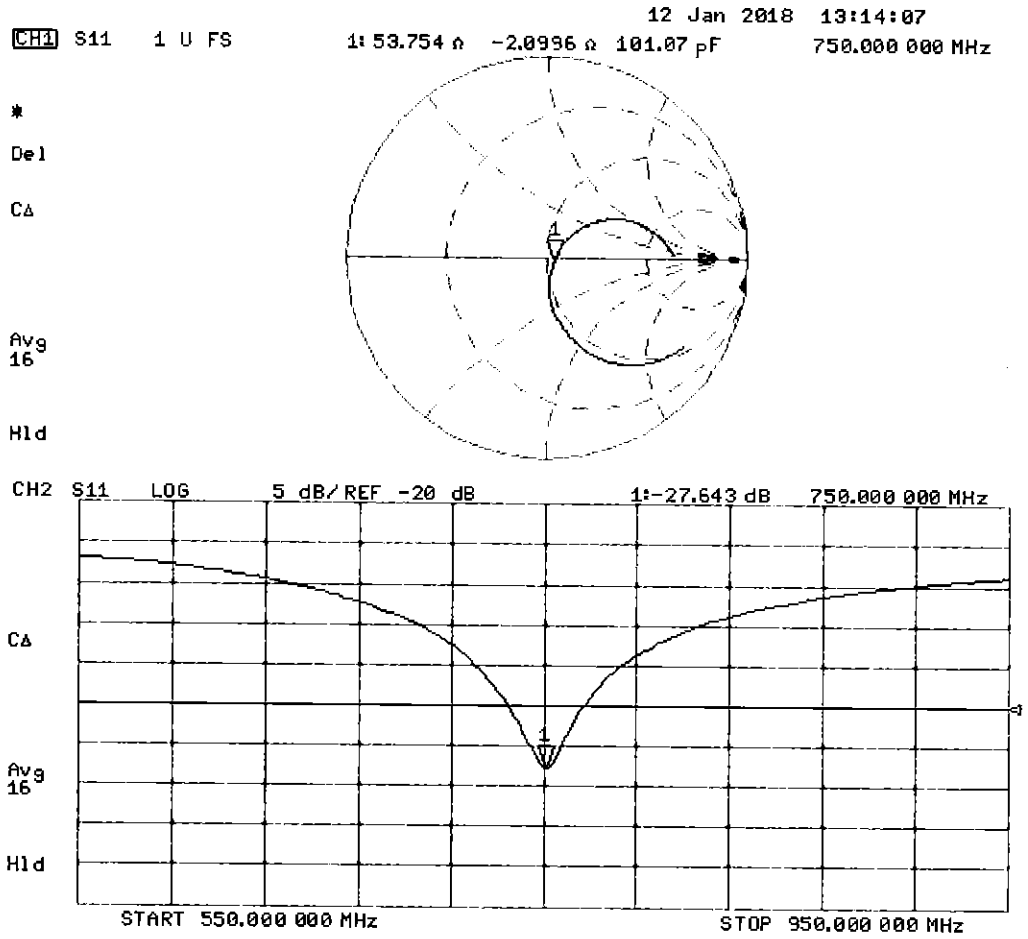
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

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



Date: 12.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

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

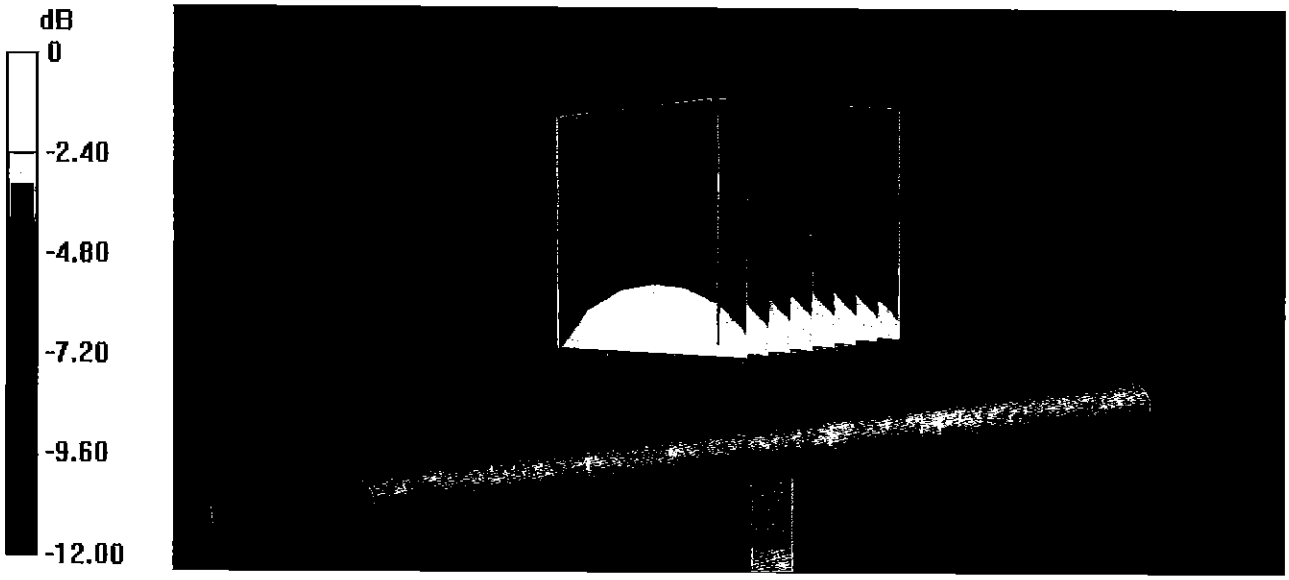
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.96 S/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.19, 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)

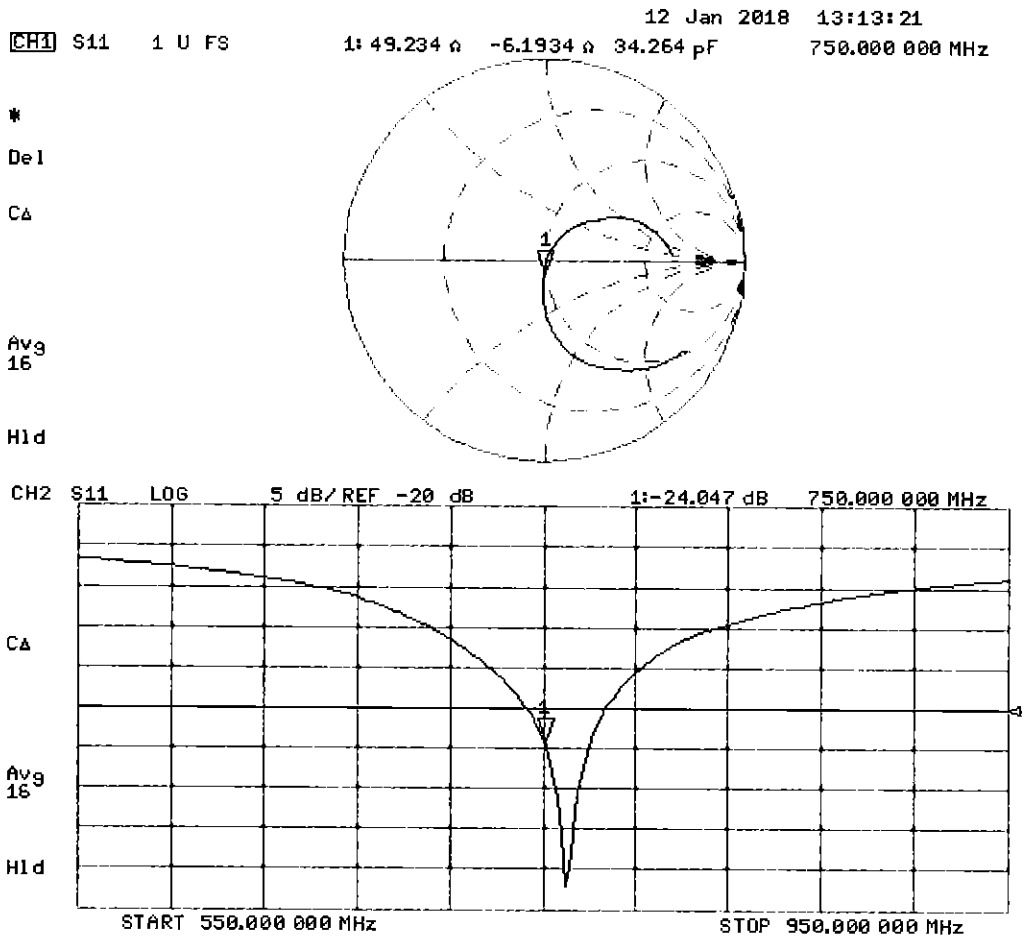
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x8x7)/Cube 0:

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; σ = 0.9 S/m; ε_r = 44.2; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

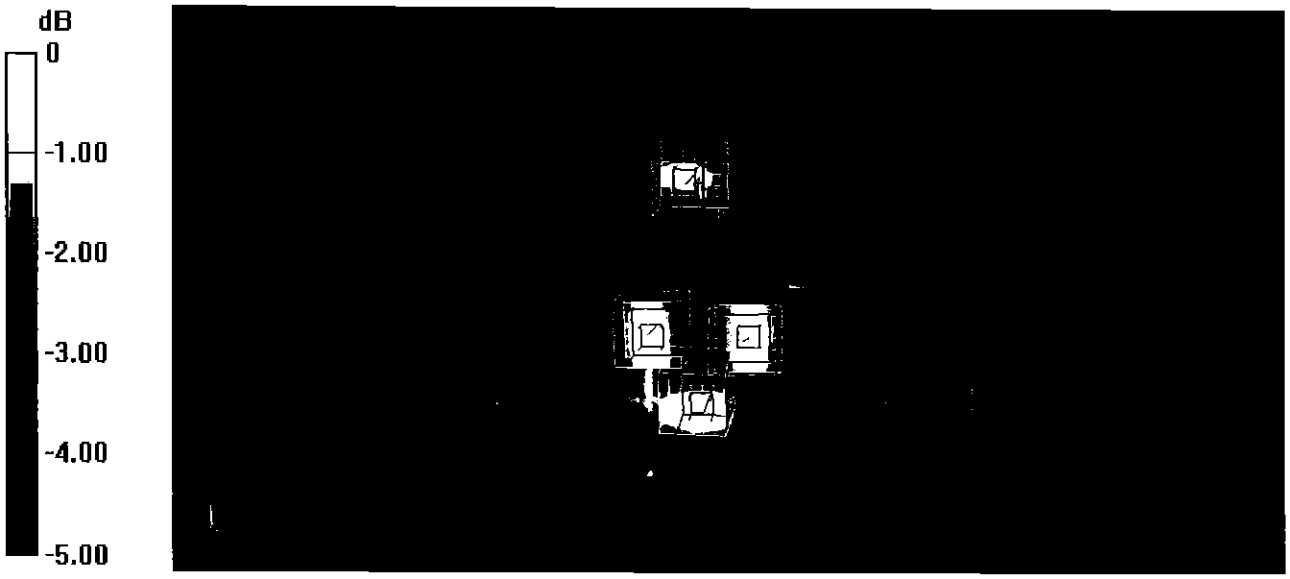
- Probe: EX3DV4 - SN7349; ConvF(10.22, 10.22, 10.22); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: SAM Head
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

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

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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

BNV 03-27-2017

BNV 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-18)	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	**5.50 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

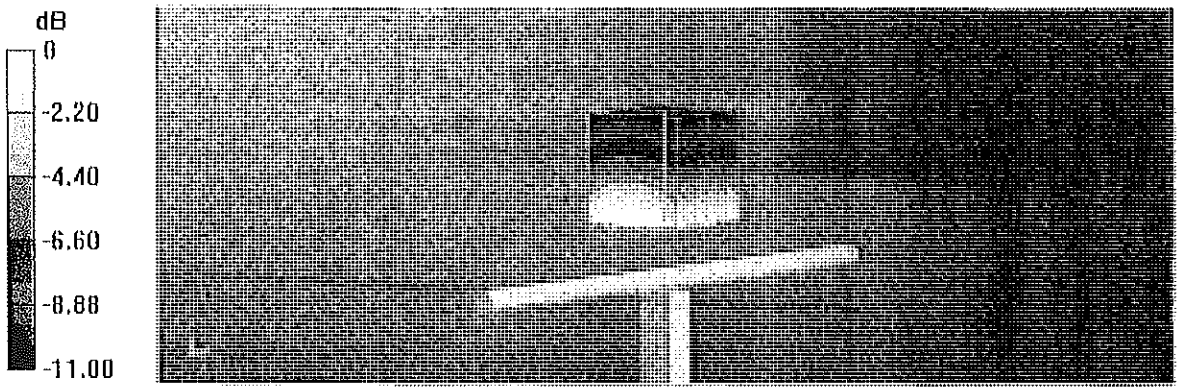
Communication System: UID 0 - CW ; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.91 S/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

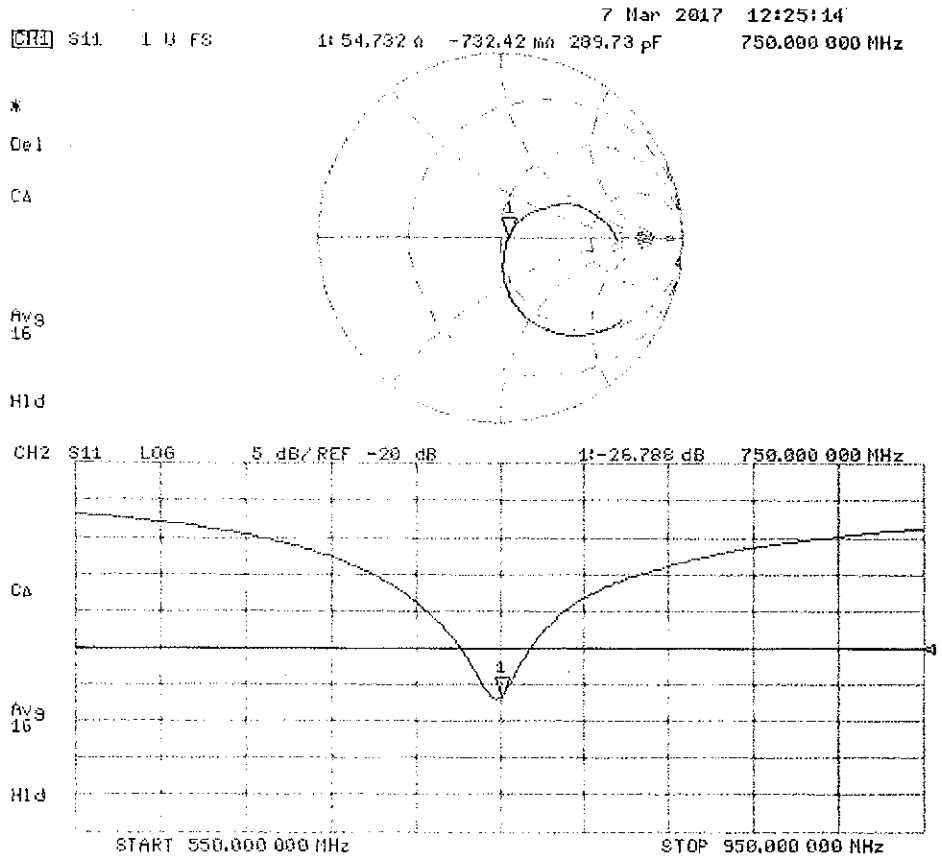
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

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

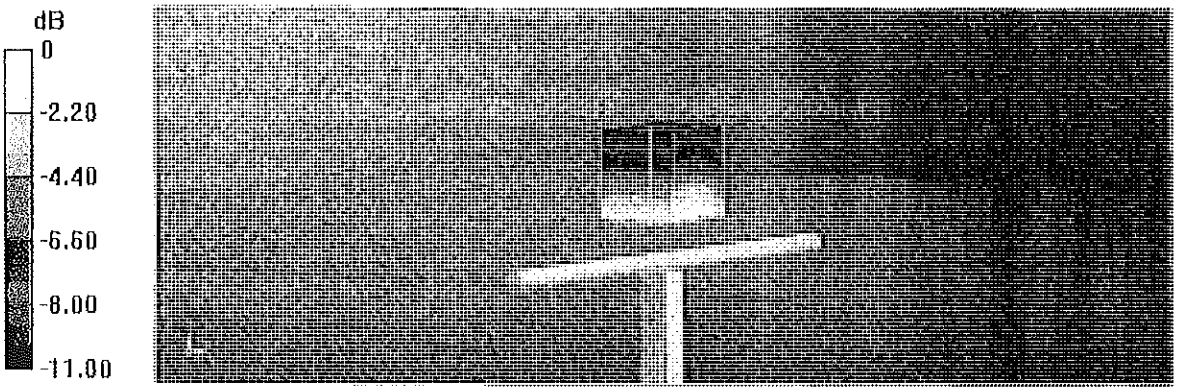
Communication System: UID 0 - CW ; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.99 S/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

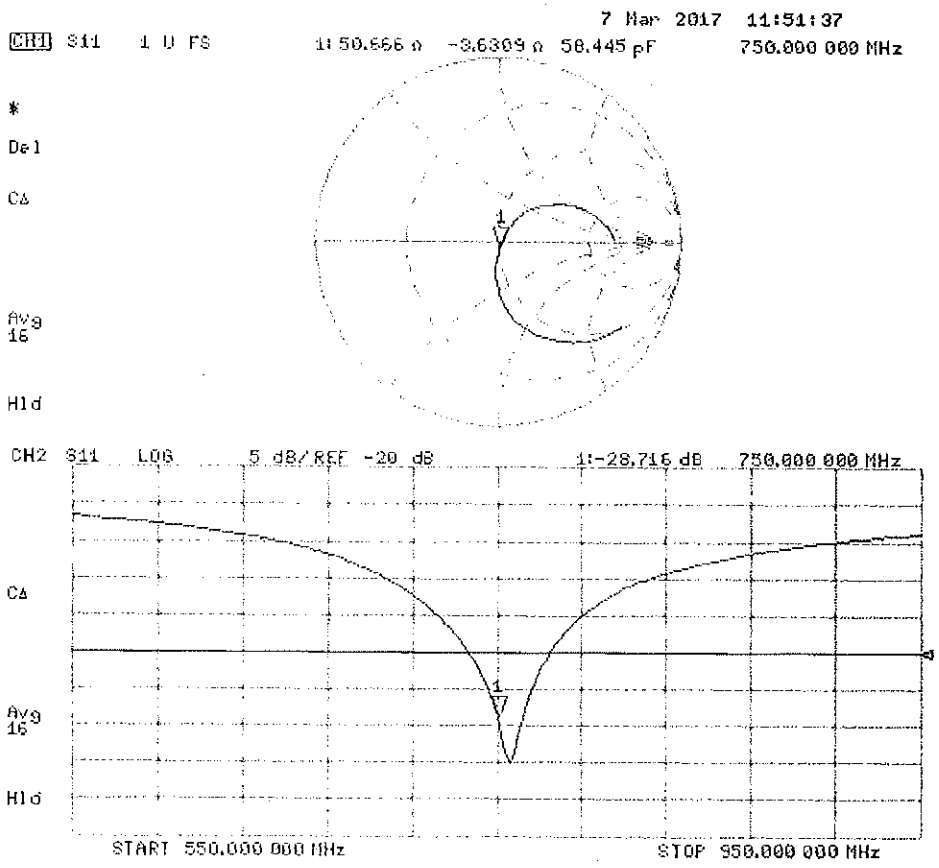
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

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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7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. +1.410.290.6652 / Fax +1.410.290.6654
http://www.pctest.com

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	1S51G6	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:

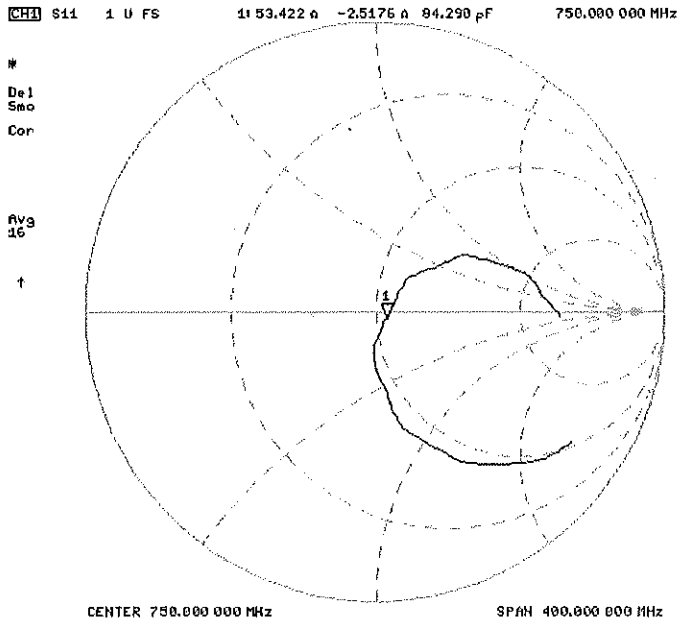
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

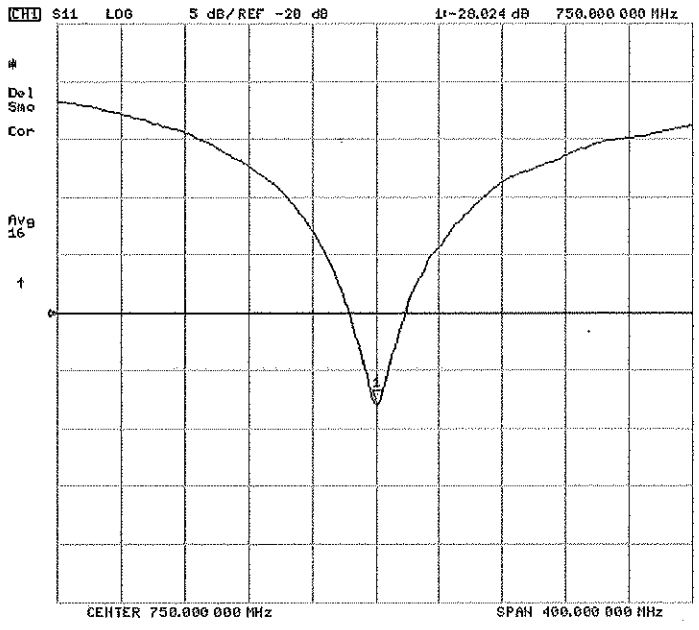
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 21.0 dBm	Measured Head SAR (1g) W/kg @ 21.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 21.0 dBm	Measured Head SAR (10g) W/kg @ 21.0 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	1.80%	1.10	1.11	0.91%	54.7	53.4	-1.3	-0.7	-2.5	-1.8	-26.8	-28.0	-4.60%	PASS

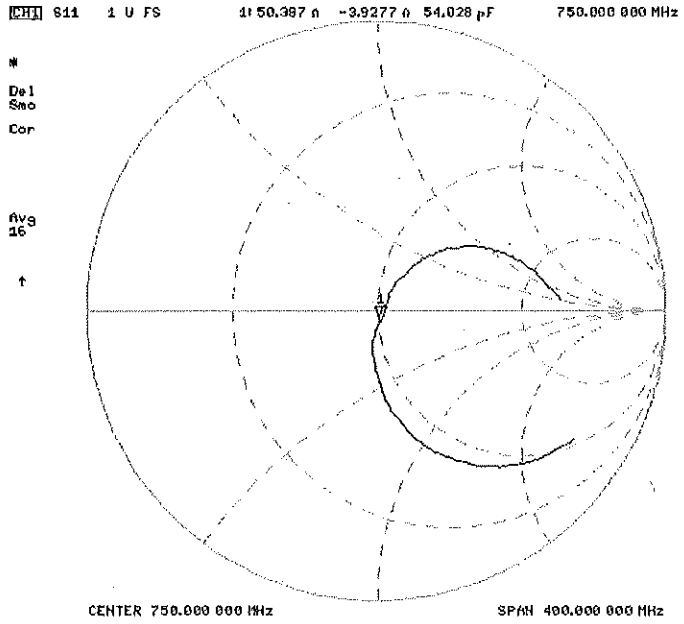
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 21.0 dBm	Measured Body SAR (1g) W/kg @ 21.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 21.0 dBm	Measured Body SAR (10g) W/kg @ 21.0 dBm	Deviation 10g (%)	Certificate Impedance 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	-1.28%	1.14	1.12	-1.41%	50.7	50.4	-0.3	-3.6	-3.9	-0.3	-28.7	-28.5	0.69%	PASS

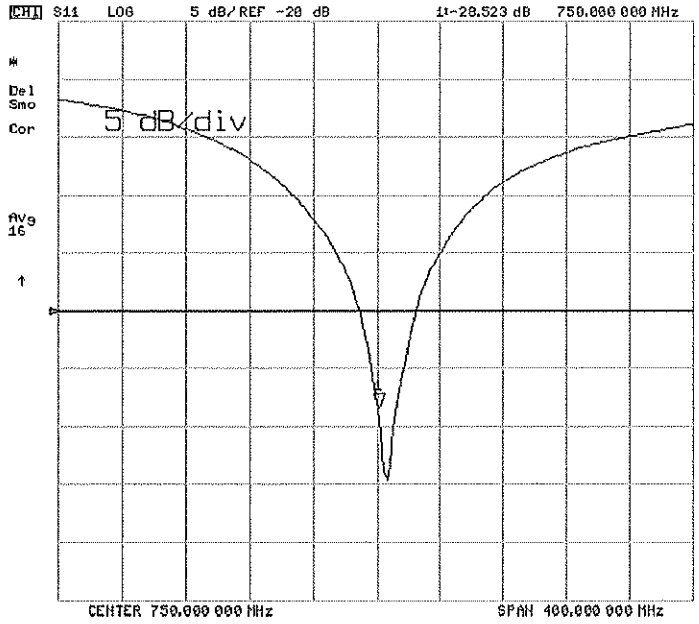
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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: D750V3-1161_Jul16

CALIBRATION CERTIFICATE

Object	D750V3 - SN:1161
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 13, 2016

√PM
8/9/16
Extended
BN
7/18/2018

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	15-Jun-16 (No. EX3-7349_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:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 13, 2016

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	2.09 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.17 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	**5.39 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	55.1 ± 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	2.16 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.43 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.53 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	55.6 Ω - 0.9 jΩ
Return Loss	- 25.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.2 Ω - 4.0 jΩ
Return Loss	- 28.0 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 19, 2015

DASY5 Validation Report for Head TSL

Date: 13.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1161

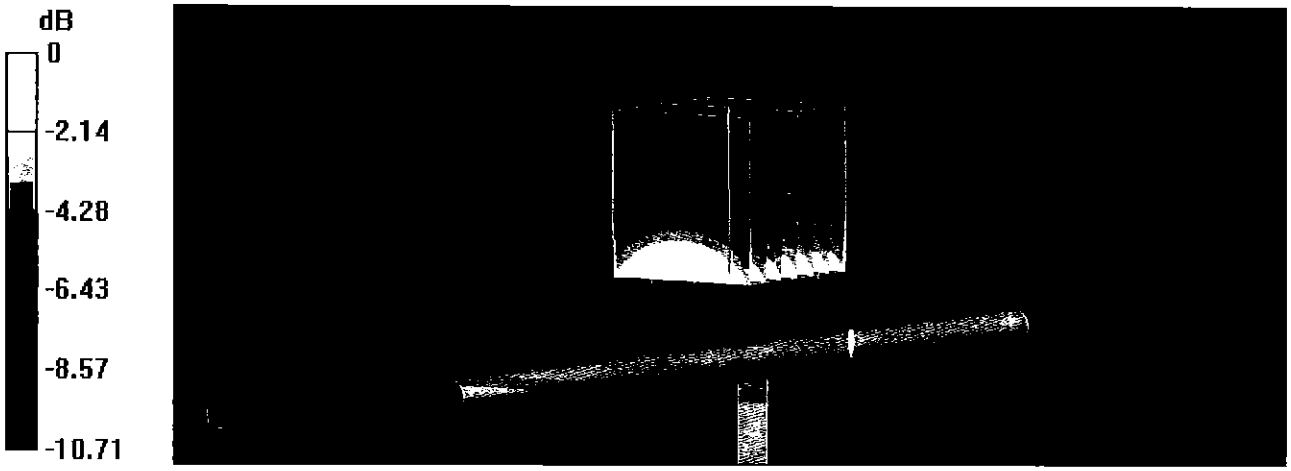
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.91 S/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.07, 10.07, 10.07); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

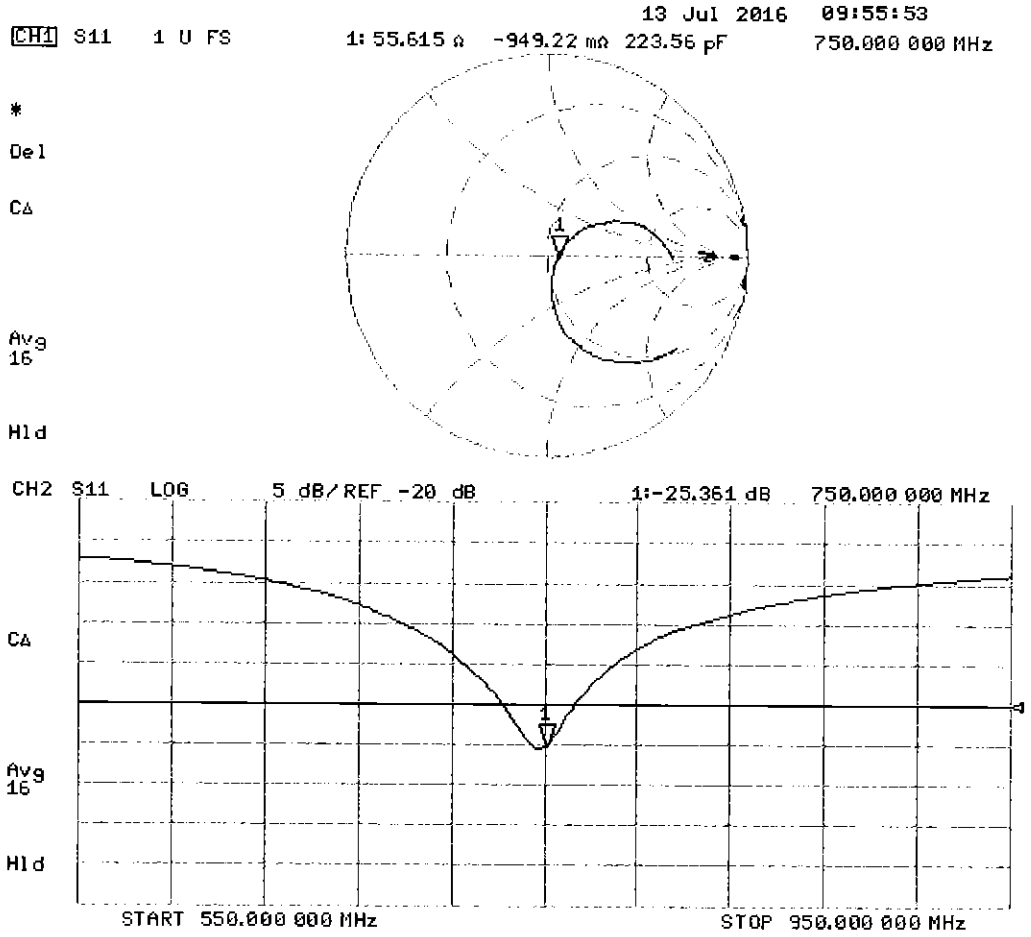
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.07 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 3.13 W/kg
SAR(1 g) = 2.09 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: 13.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1161

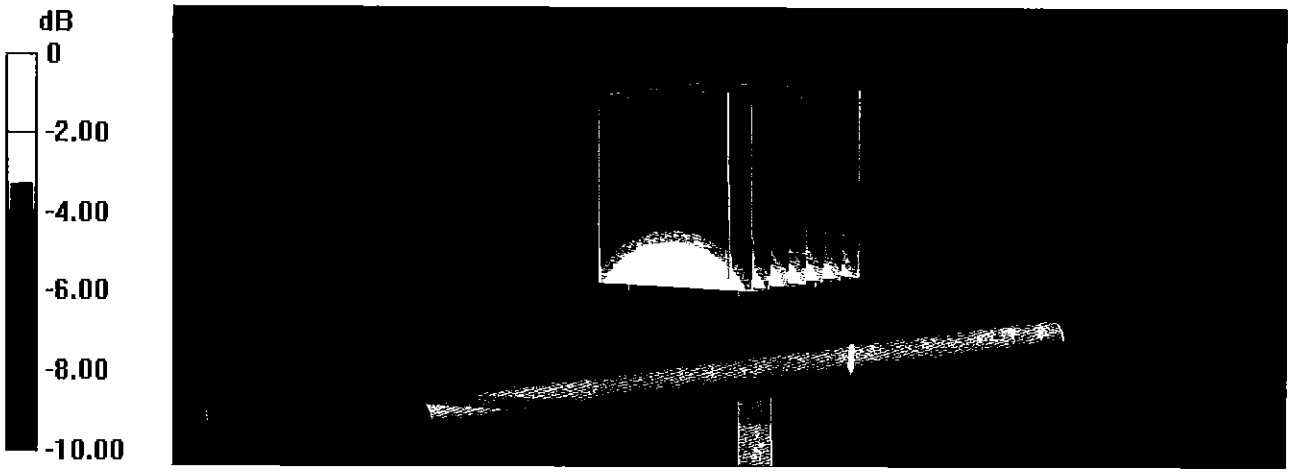
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.99 S/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.99, 9.99, 9.99); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

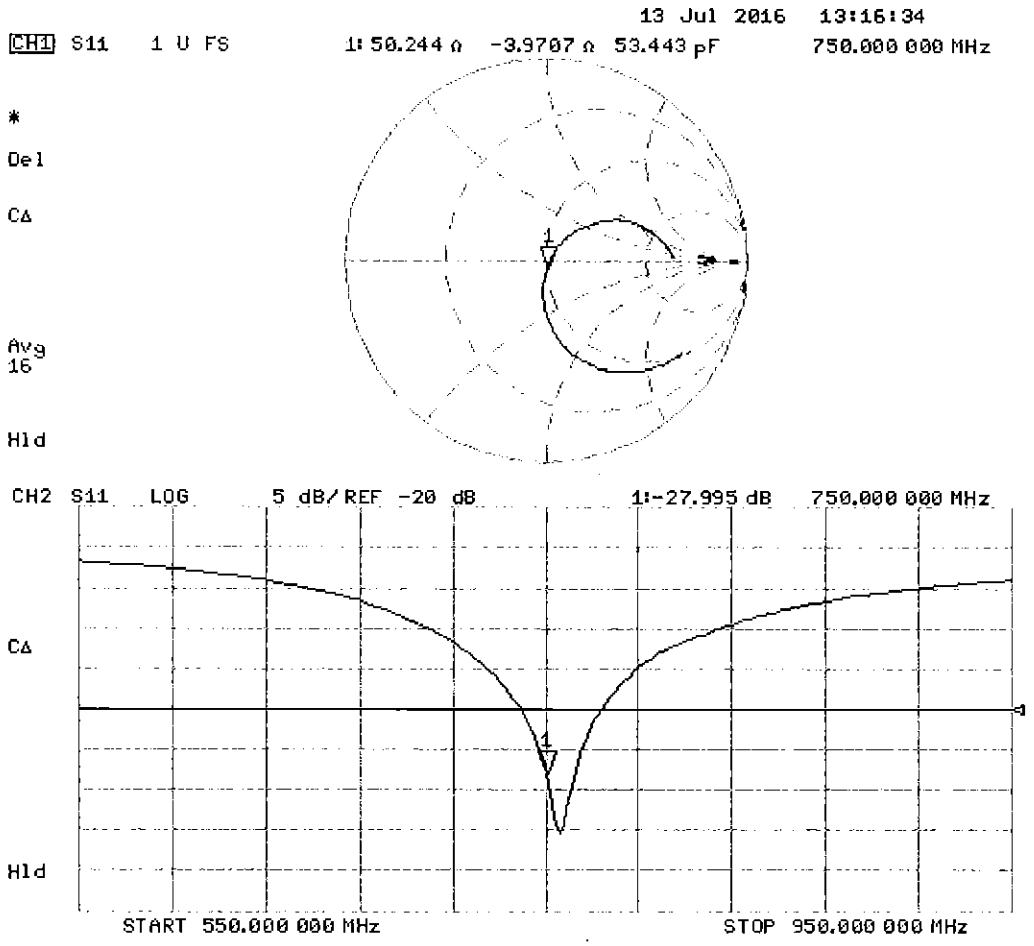
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.33 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 3.22 W/kg
SAR(1 g) = 2.16 W/kg; SAR(10 g) = 1.41 W/kg
Maximum value of SAR (measured) = 2.87 W/kg



0 dB = 2.87 W/kg = 4.58 dBW/kg

Impedance Measurement Plot for Body TSL



Certification of Calibration

Object	D750V3 – SN: 1161
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Calibration date:	July 12, 2017
Description:	SAR Validation Dipole at 750 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 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	DAE4	Dasy Data Acquisition Electronics	3/8/2017	Annual	3/8/2018	1368
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/14/2017	Annual	6/14/2018	1334
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/10/2017	Annual	5/10/2018	1070
SPEAG	ES3DV3	SAR Probe	11/15/2016	Annual	11/15/2017	3334
SPEAG	ES3DV3	SAR Probe	3/14/2017	Annual	3/14/2018	3319
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
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Pasternack	PE2208-6	Bidirectional 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:

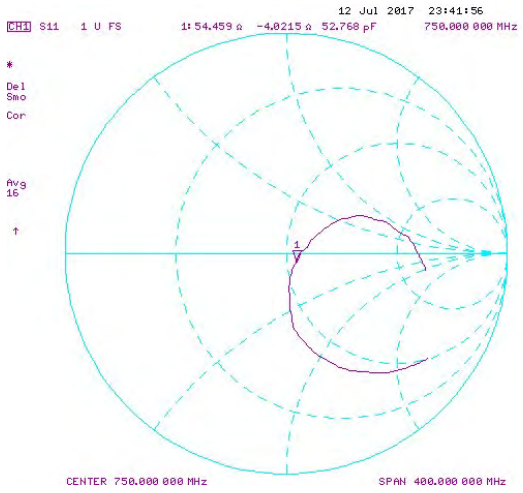
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

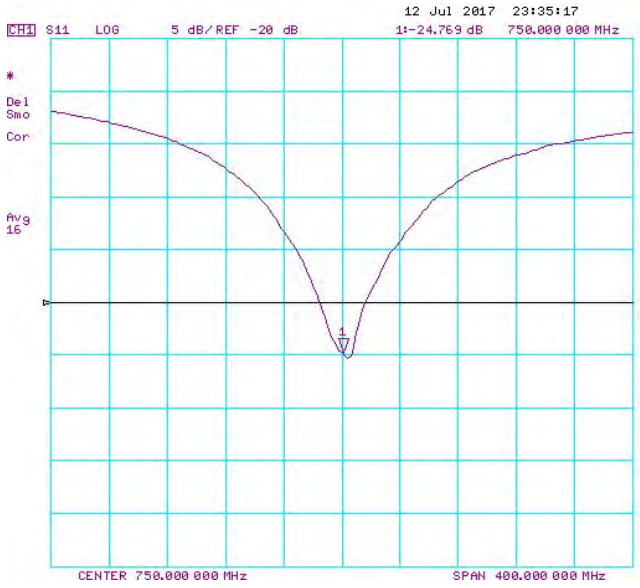
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

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
7/13/2016	7/12/2017	1.033	1.63	1.65	0.98%	1.08	1.09	1.11%	55.6	54.5	1.1	-0.9	-4.0	3.1	-25.4	-24.8	2.40%	PASS

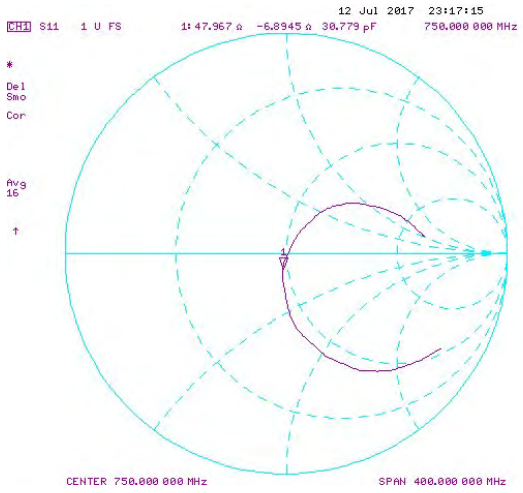
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	Measured Body SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance 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
7/13/2016	7/12/2017	1.033	1.69	1.75	3.80%	1.11	1.17	5.79%	50.2	48.0	2.2	-4.0	-6.9	2.9	-28.0	-23.9	14.60%	PASS

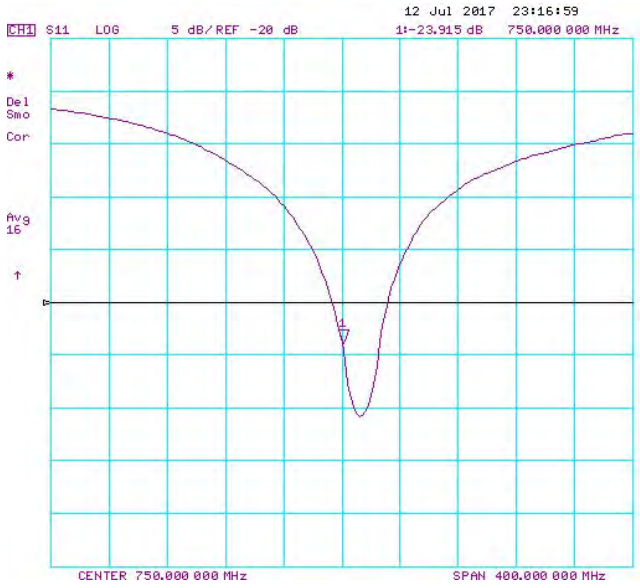
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Certification of Calibration

Object D750V3 – SN: 1161

Calibration procedure(s) Procedure for Calibration Extension for SAR Dipoles.

Extended Calibration date: 07/12/2018

Description: SAR Validation Dipole at 750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E4438C	ESG Vector Signal Generator	3/24/2017	Biennial	3/24/2019	MY42082385
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	ML2495A	Power Meter	11/28/2017	Annual	11/28/2018	1039008
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1207364
Anritsu	MA2411B	Pulse Power Sensor	11/15/2017	Annual	11/15/2018	1339007
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
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
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/9/2018	Annual	2/9/2019	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2018	Annual	6/18/2019	1334
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/12/2017	Annual	9/12/2018	1091
SPEAG	ES3DV3	SAR Probe	2/13/2018	Annual	2/13/2019	3213
SPEAG	ES3DV3	SAR Probe	6/25/2018	Annual	6/25/2019	7409

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Test Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

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:

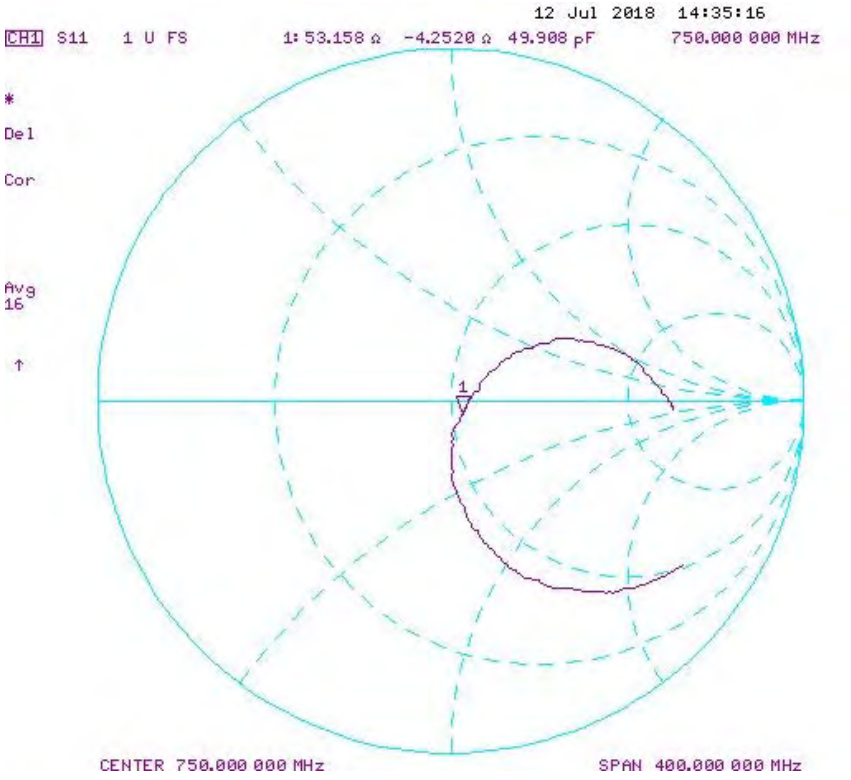
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

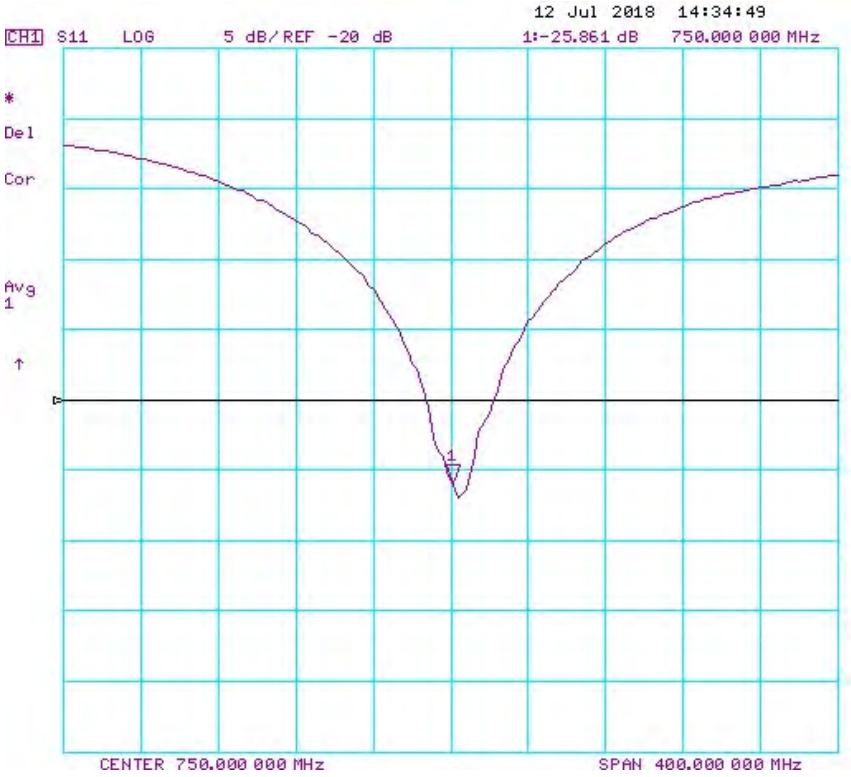
The following dipole was checked to pass the above 3 requirements to have 3-year calibration period from the calibration date:

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
7/13/2016	7/12/2018	1.033	1.63	1.58	-3.30%	1.08	1.03	-4.45%	55.6	53.2	2.4	-0.9	-4.3	3.4	-25.4	-25.9	-2.00%	PASS

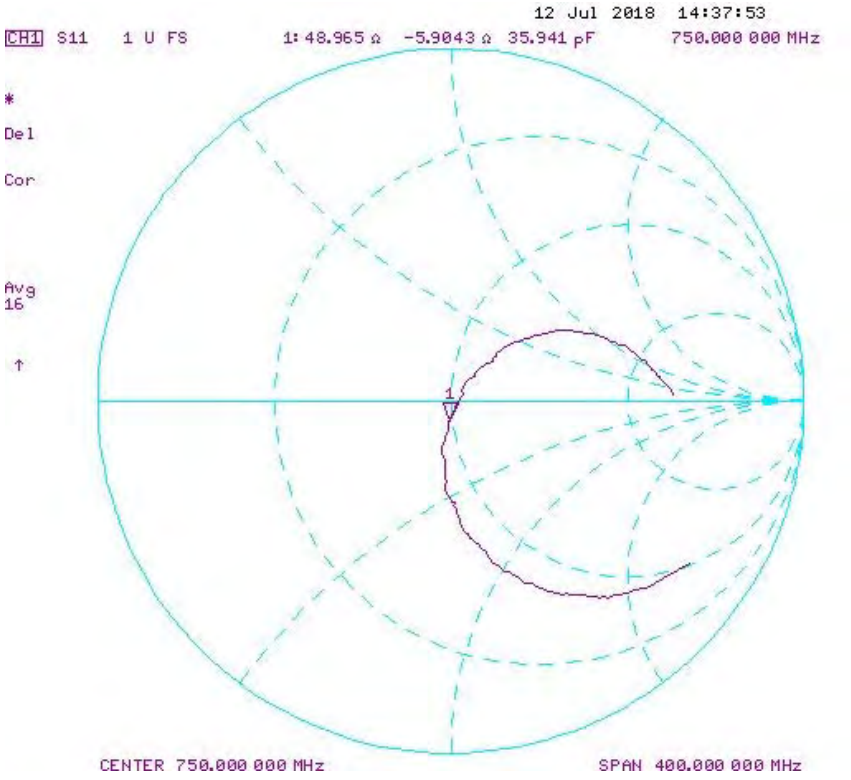
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	Measured Body SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance 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
7/13/2016	7/12/2018	1.033	1.69	1.74	3.20%	1.11	1.15	3.98%	50.2	49.0	1.2	-4.0	-5.9	1.9	-28.0	-24.4	12.90%	PASS

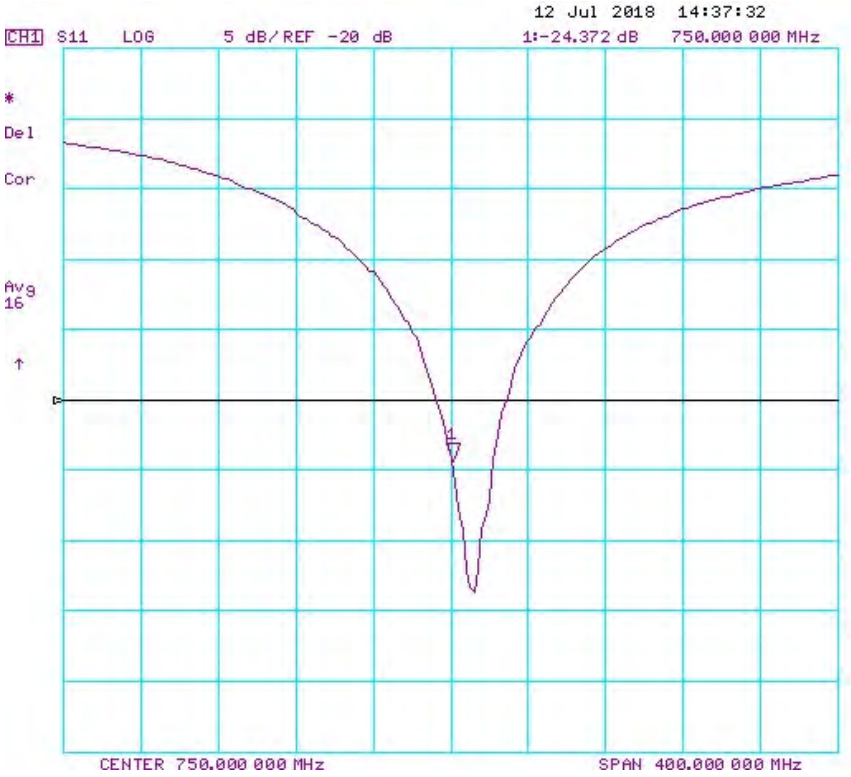
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





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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

Client **PC Test**

Certificate No: D835V2-4d132_Jan18

CALIBRATION CERTIFICATE

Object	D835V2 - SN:4d132
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	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 15, 2018

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 62209-1, "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 = 5.0 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.7 ± 6 %	0.92 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	2.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.36 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (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	**6.10 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	54.8 ± 6 %	0.99 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	2.47 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.71 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.62 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.39 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.8 Ω - 2.9 jΩ
Return Loss	- 29.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.4 Ω - 5.7 jΩ
Return Loss	- 23.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.386 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

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 cm³ (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	**9.41 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.21 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.69 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.64 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.45 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Neck)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.22 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.59 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.25 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Ear)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.03 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**7.96 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm³ (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	**5.39 W/kg ± 16.9 % (k=2)**

DASY5 Validation Report for Head TSL

Date: 08.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d132

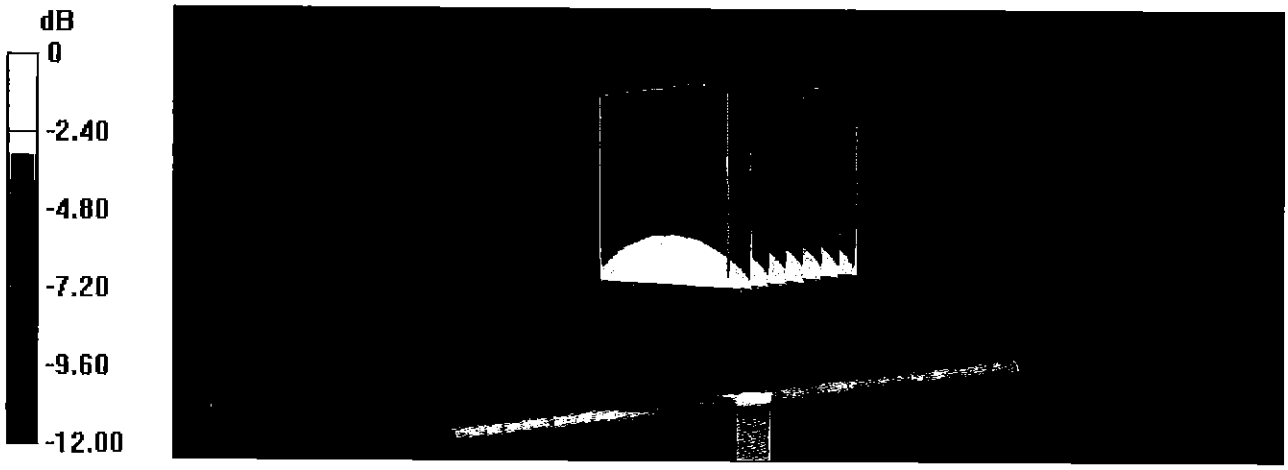
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.92 S/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.9, 9.9, 9.9); 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)

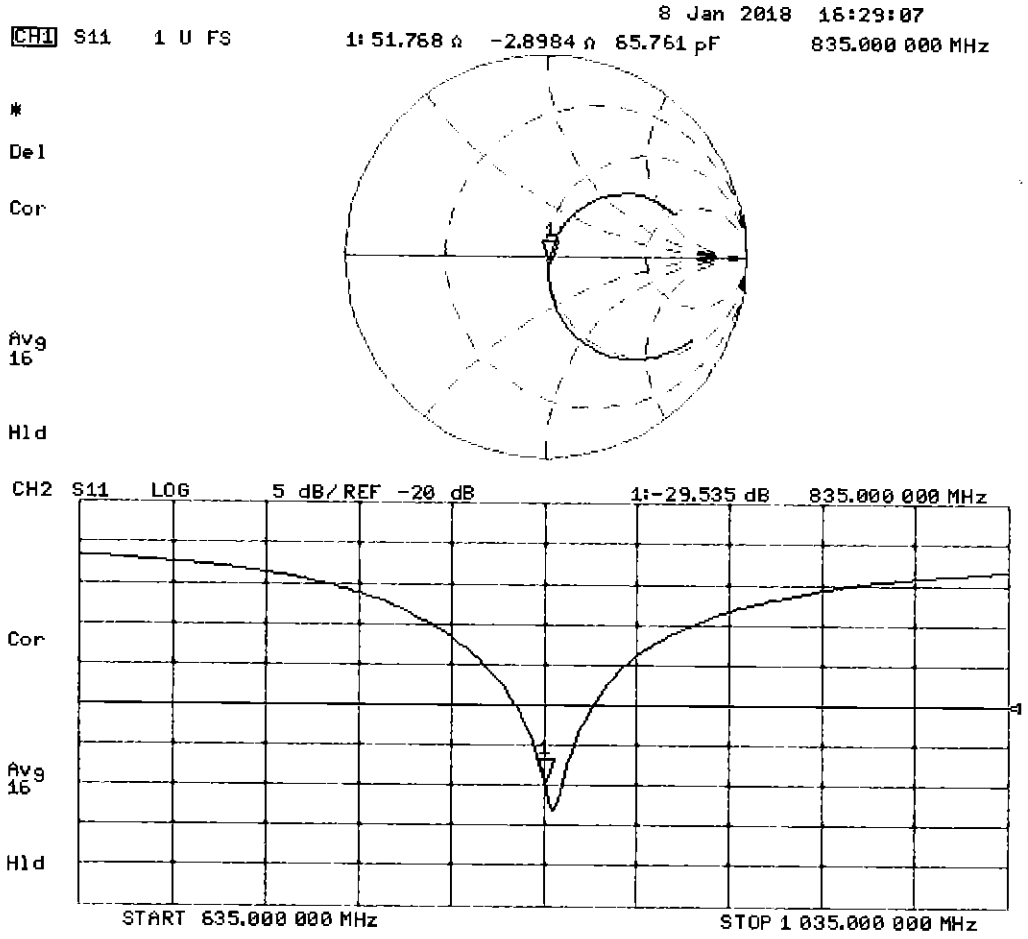
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 63.23 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.64 W/kg
SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.55 W/kg
Maximum value of SAR (measured) = 3.22 W/kg



0 dB = 3.22 W/kg = 5.08 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 08.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d132

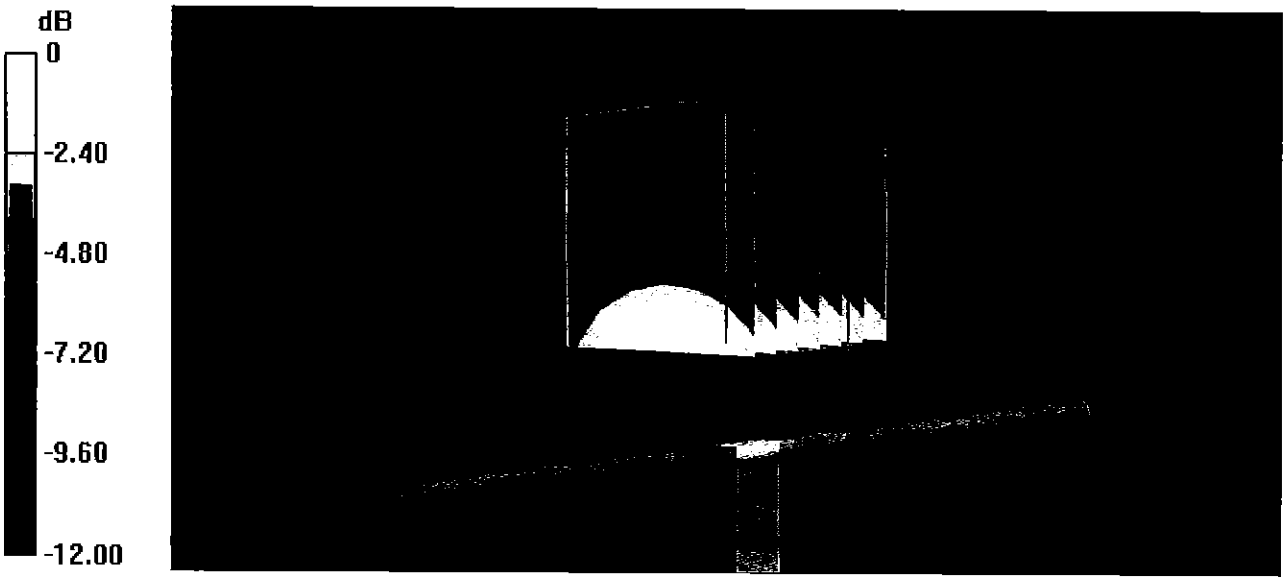
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.99 S/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.05, 10.05, 10.05); 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)

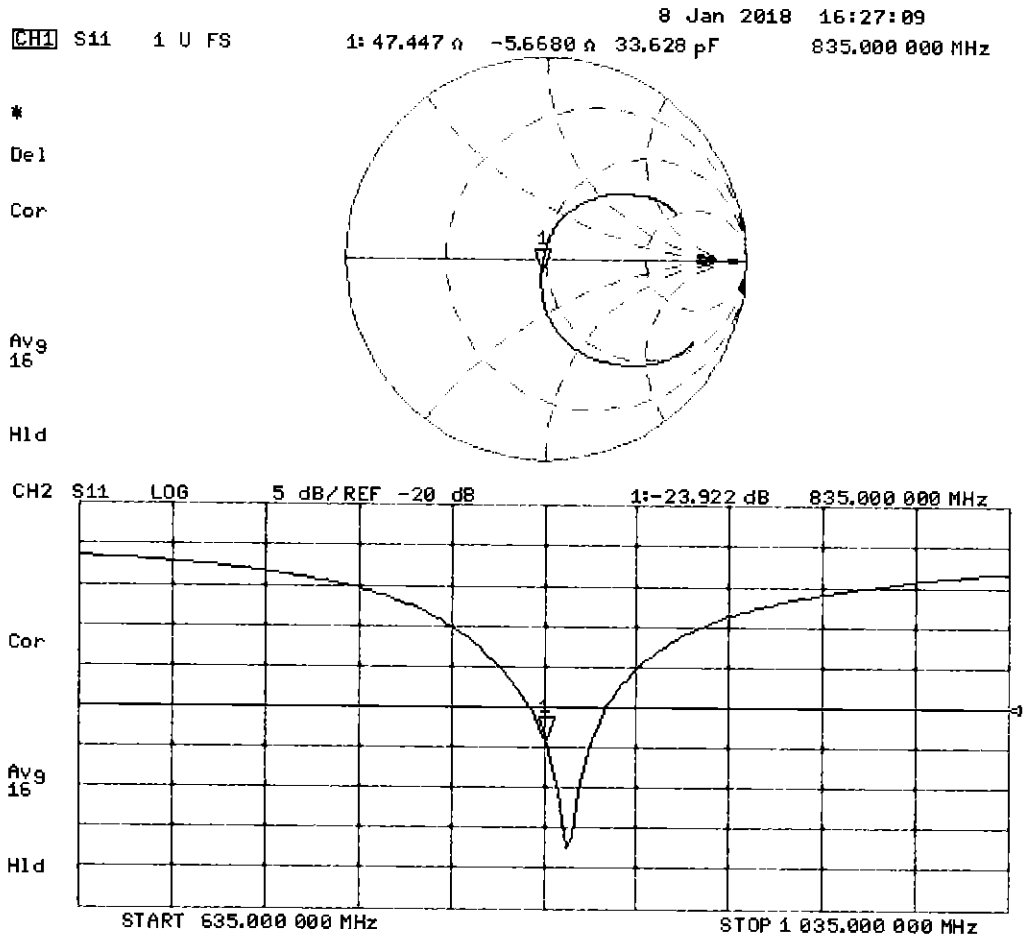
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.55 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 3.66 W/kg
SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.62 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 Body TSL



DASY5 Validation Report for SAM Head

Date: 15.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d132

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.94 S/m; ε_r = 44.1; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

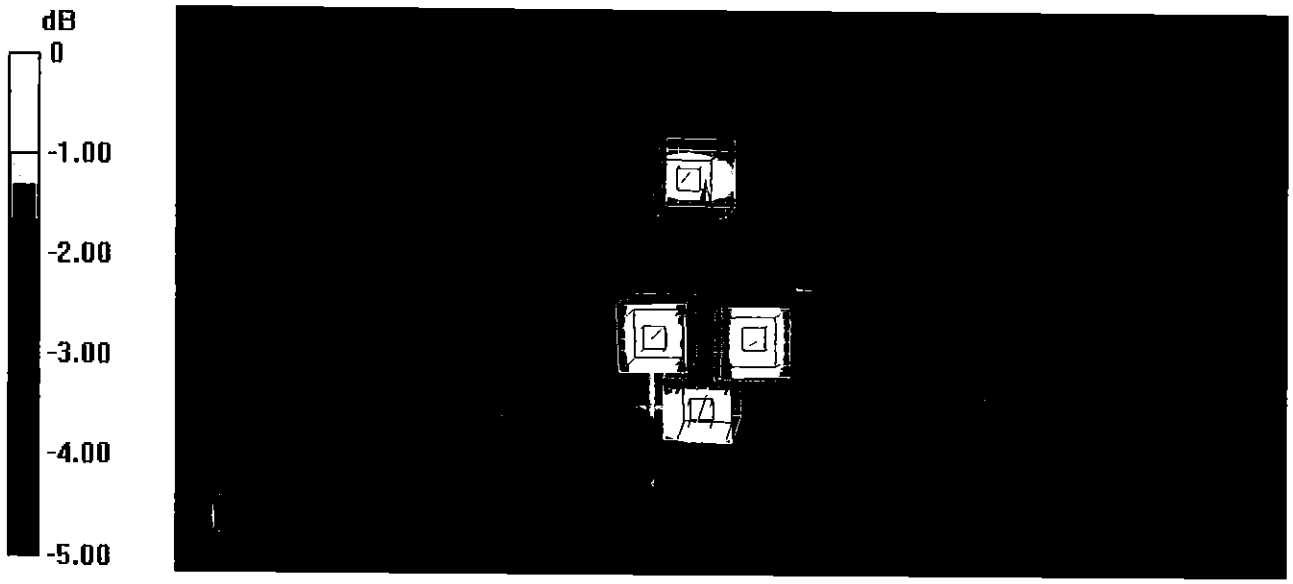
- Probe: EX3DV4 - SN7349; ConvF(9.9, 9.9, 9.9); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: SAM Head
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

SAM Head/Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.00 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.58 W/kg
Maximum value of SAR (measured) = 3.16 W/kg

SAM Head/Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.99 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.65 W/kg
SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.64 W/kg
Maximum value of SAR (measured) = 3.19 W/kg

SAM Head/Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.20 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 3.33 W/kg
SAR(1 g) = 2.35 W/kg; SAR(10 g) = 1.59 W/kg
Maximum value of SAR (measured) = 3.04 W/kg

SAM Head/Ear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.03 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 2.90 W/kg
SAR(1 g) = 2.03 W/kg; SAR(10 g) = 1.37 W/kg
Maximum value of SAR (measured) = 2.61 W/kg



0 dB = 2.61 W/kg = 4.17 dBW/kg

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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**

Client **PC Test**

Certificate No: **D835V2-4d133_Jul17**

CALIBRATION CERTIFICATE

Object D835V2 - SN:4d133

BN ✓ 8/3/2017

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Extended BN 7/18/2018

Calibration date: July 11, 2017

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-May-17 (No. EX3-7349_May17)	May-18
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:	Johannes Kurikka	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 12, 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, "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 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	40.8 ± 6 %	0.91 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	2.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.52 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (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	54.8 ± 6 %	1.01 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	2.43 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.41 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.58 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.16 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 - 2.9 jΩ
Return Loss	- 30.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.7 Ω - 6.8 jΩ
Return Loss	- 22.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.196 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: 11.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

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

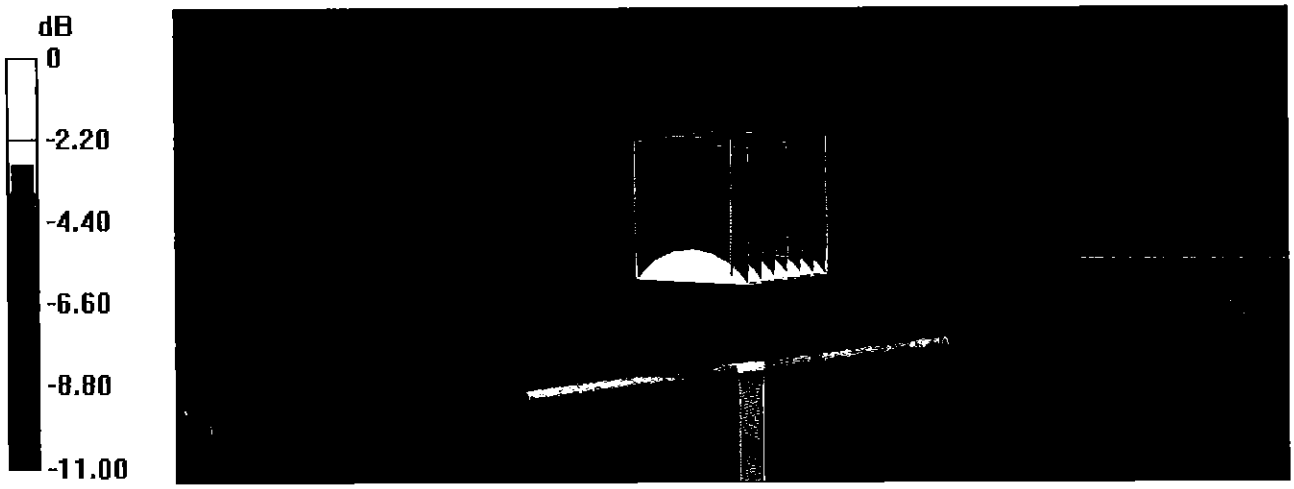
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.91 S/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.07, 10.07, 10.07); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

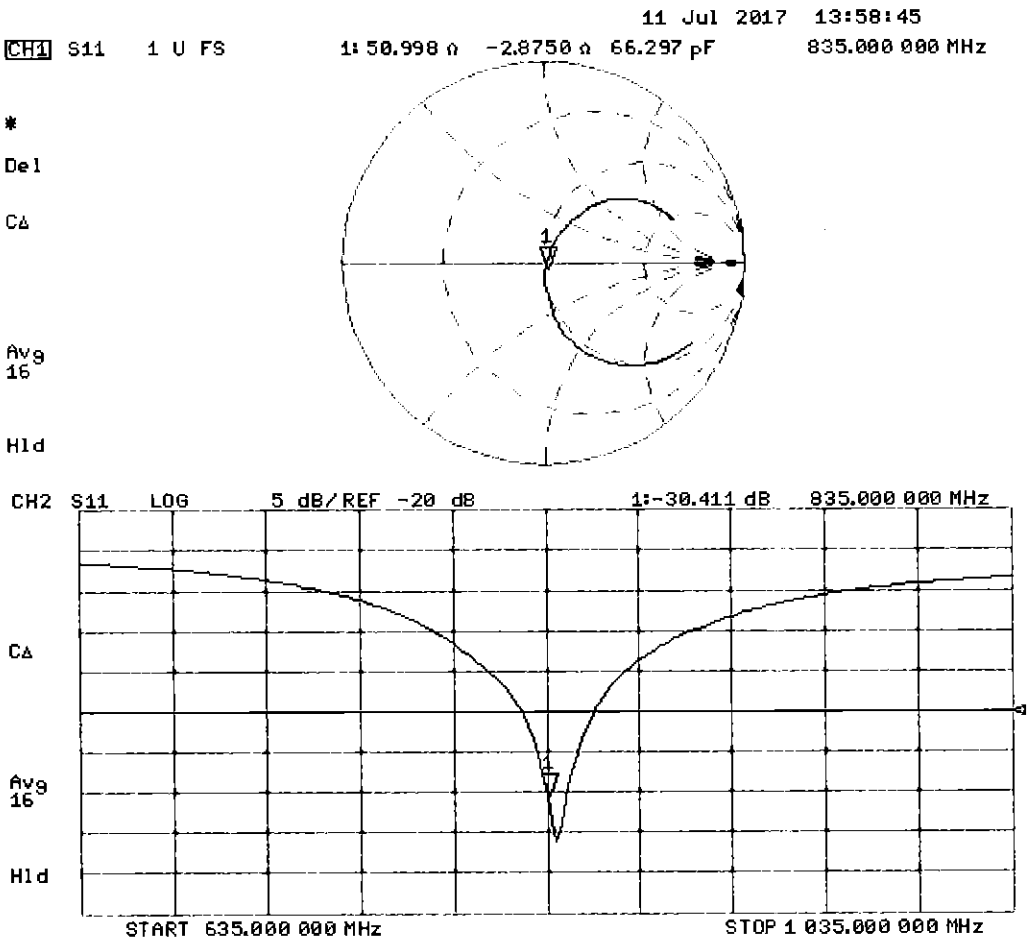
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 62.84 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.74 W/kg
SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.54 W/kg
Maximum value of SAR (measured) = 3.28 W/kg



0 dB = 3.28 W/kg = 5.16 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 11.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

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

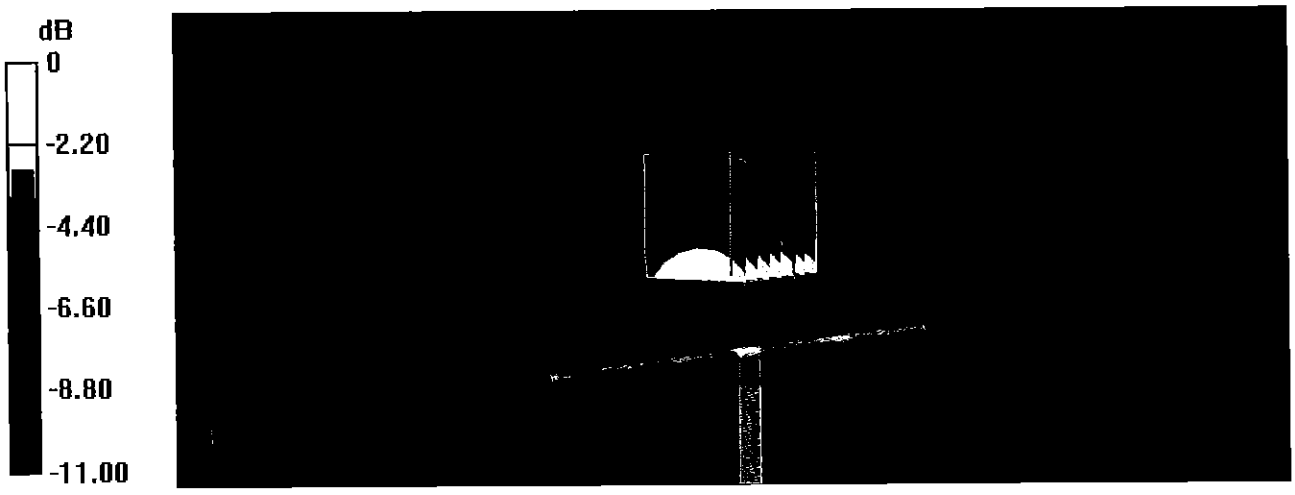
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.01 S/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.2, 10.2, 10.2); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

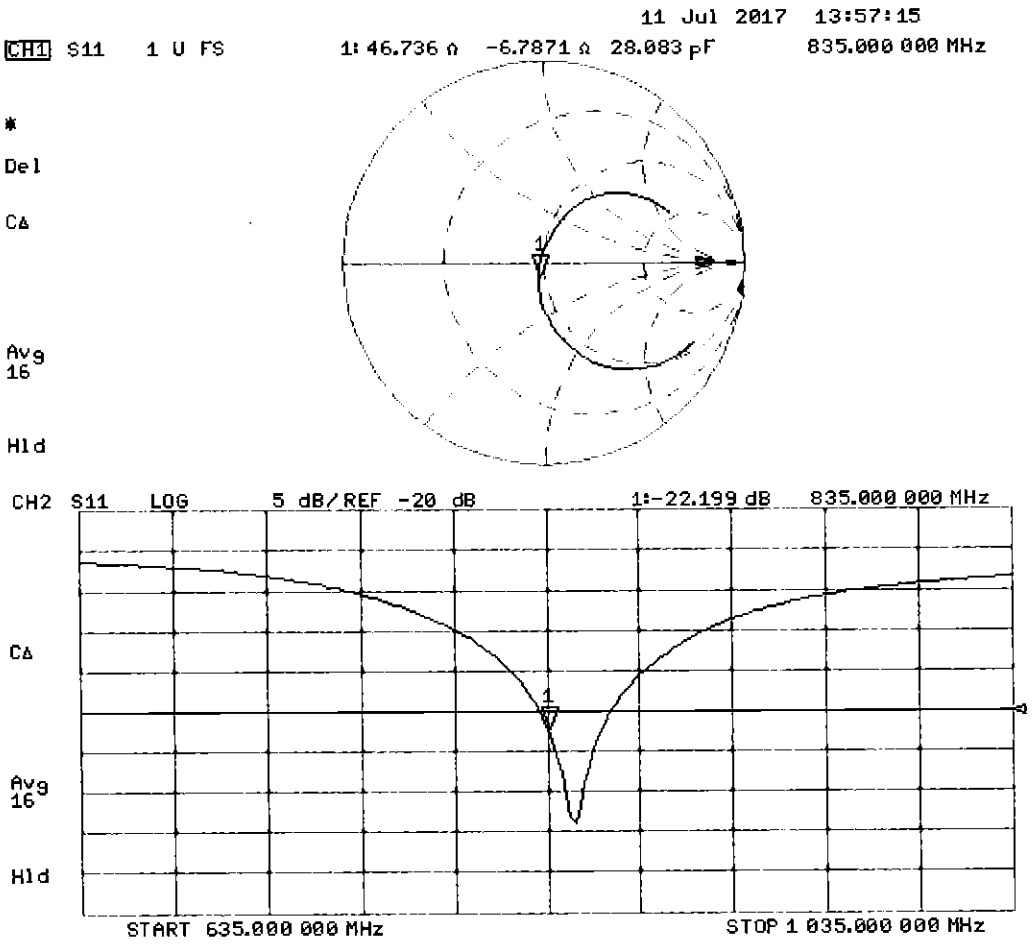
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.25 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 3.67 W/kg
SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.58 W/kg
Maximum value of SAR (measured) = 3.21 W/kg



0 dB = 3.21 W/kg = 5.07 dBW/kg

Impedance Measurement Plot for Body TSL



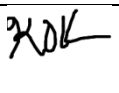
Certification of Calibration

Object	D835V2 – SN: 4d133
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	07/11/2018
Description:	SAR Validation Dipole at 835 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E4438C	ESG Vector Signal Generator	3/24/2017	Biennial	3/24/2019	MY42082385
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	ML2495A	Power Meter	11/28/2017	Annual	11/28/2018	1039008
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1207364
Anritsu	MA2411B	Pulse Power Sensor	11/15/2017	Annual	11/15/2018	1339007
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
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
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2018	Annual	6/18/2019	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/9/2017	Annual	11/9/2018	1450
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/12/2017	Annual	9/12/2018	1091
SPEAG	EX3DV4	SAR Probe	6/25/2018	Annual	6/25/2019	7409
SPEAG	ES3DV3	SAR Probe	3/27/2018	Annual	3/27/2019	3347

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Test Engineer	
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

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:

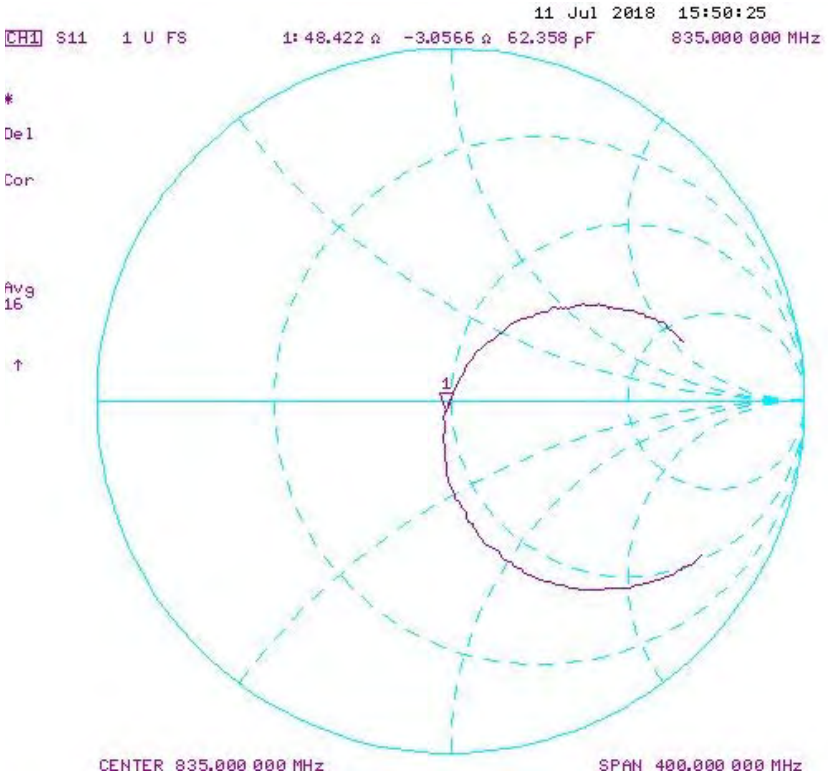
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

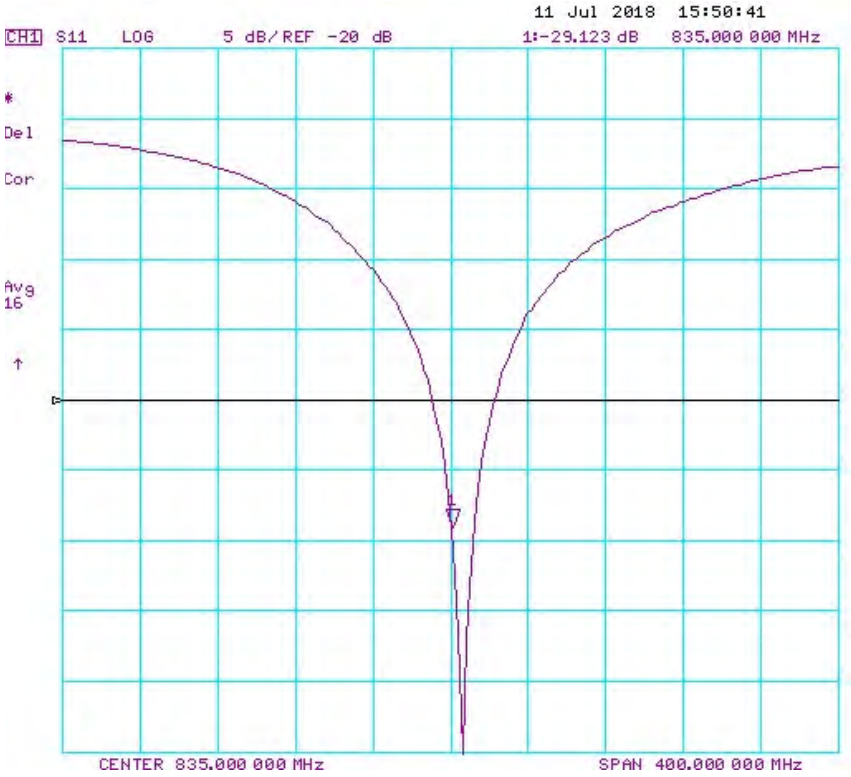
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

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
7/11/2017	7/11/2018	1.196	1.904	2.020	6.09%	1.220	1.310	7.38%	51.0	48.4	2.6	-2.9	-3.1	0.2	-30.4	-29.1	4.30%	PASS

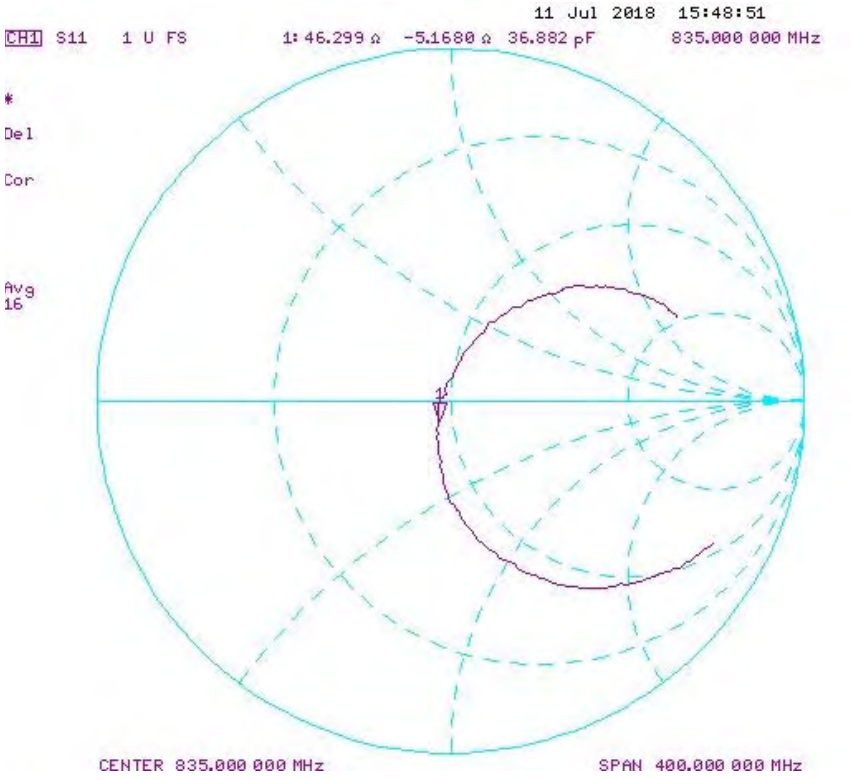
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	Measured Body SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance 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
7/11/2017	7/11/2018	1.196	1.882	2.030	7.86%	1.232	1.340	8.77%	46.7	46.3	0.4	-6.8	-5.2	1.6	-22.2	-23.6	-6.30%	PASS

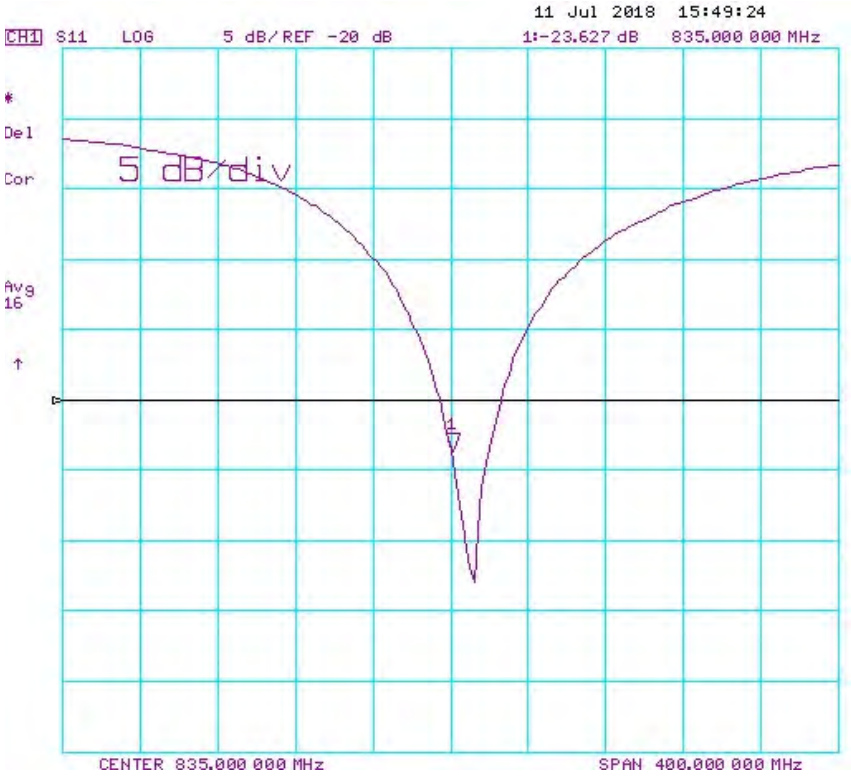
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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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

BN ✓
05-23-2017

Calibration date: May 09, 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

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accredited by the Swiss Accreditation Service (SAS)
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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "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

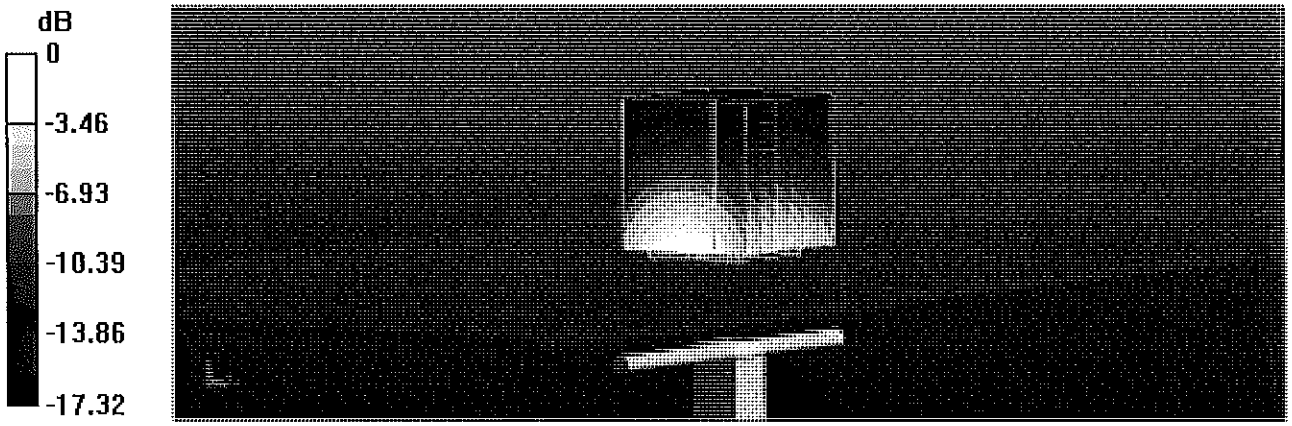
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.36 S/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

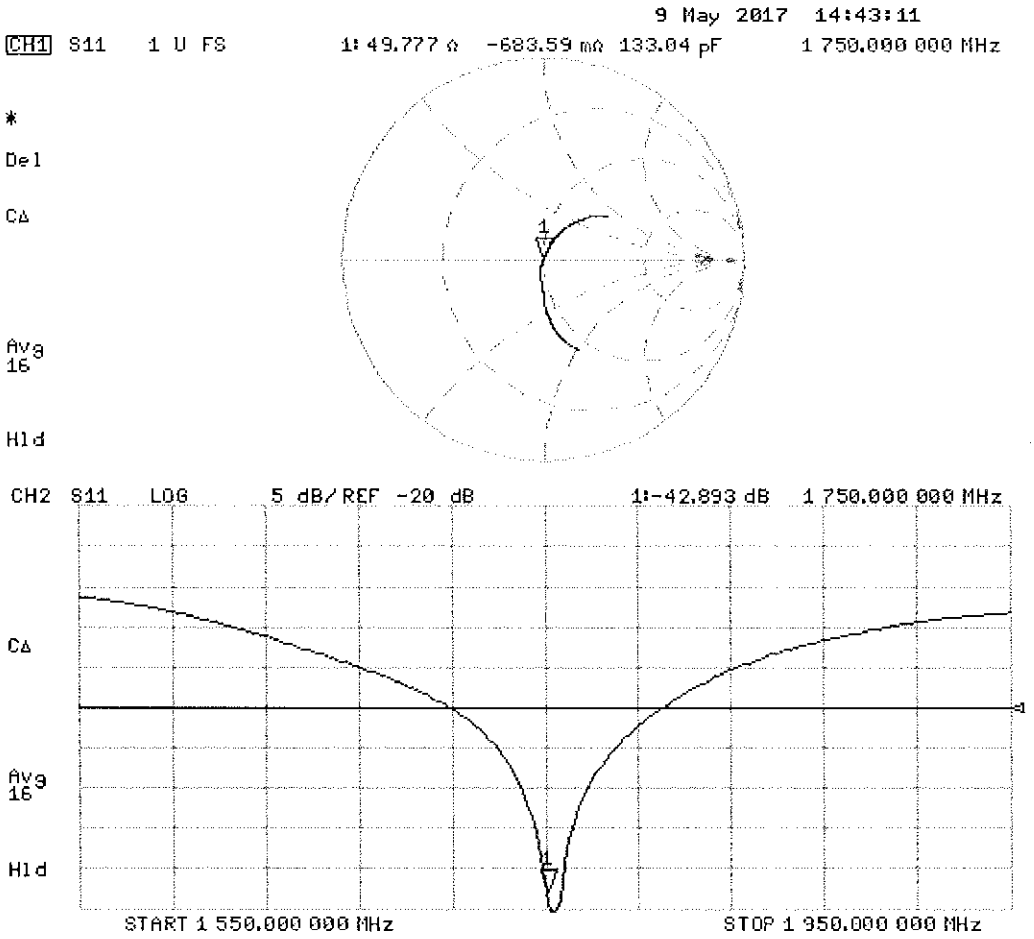
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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

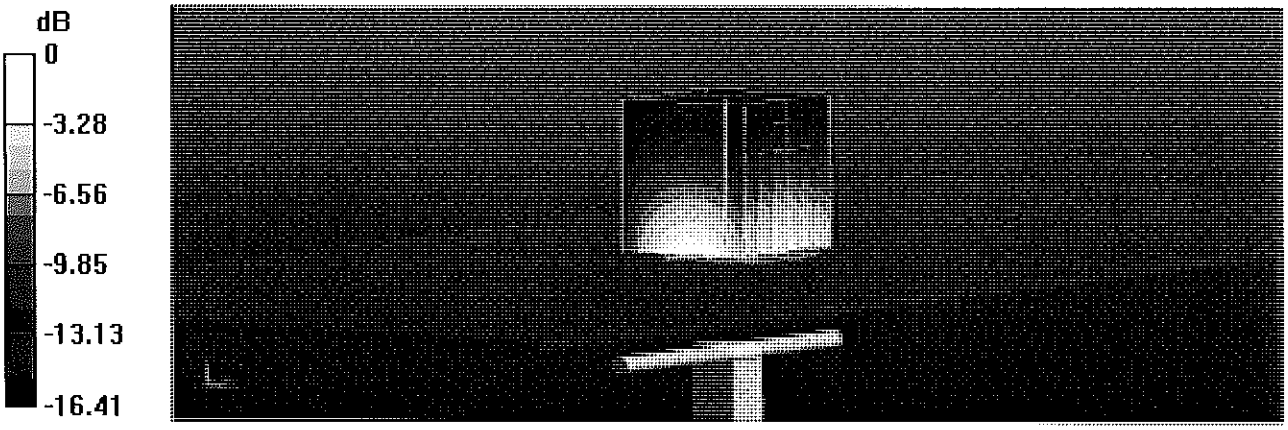
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.47 S/m; ε_r = 53.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

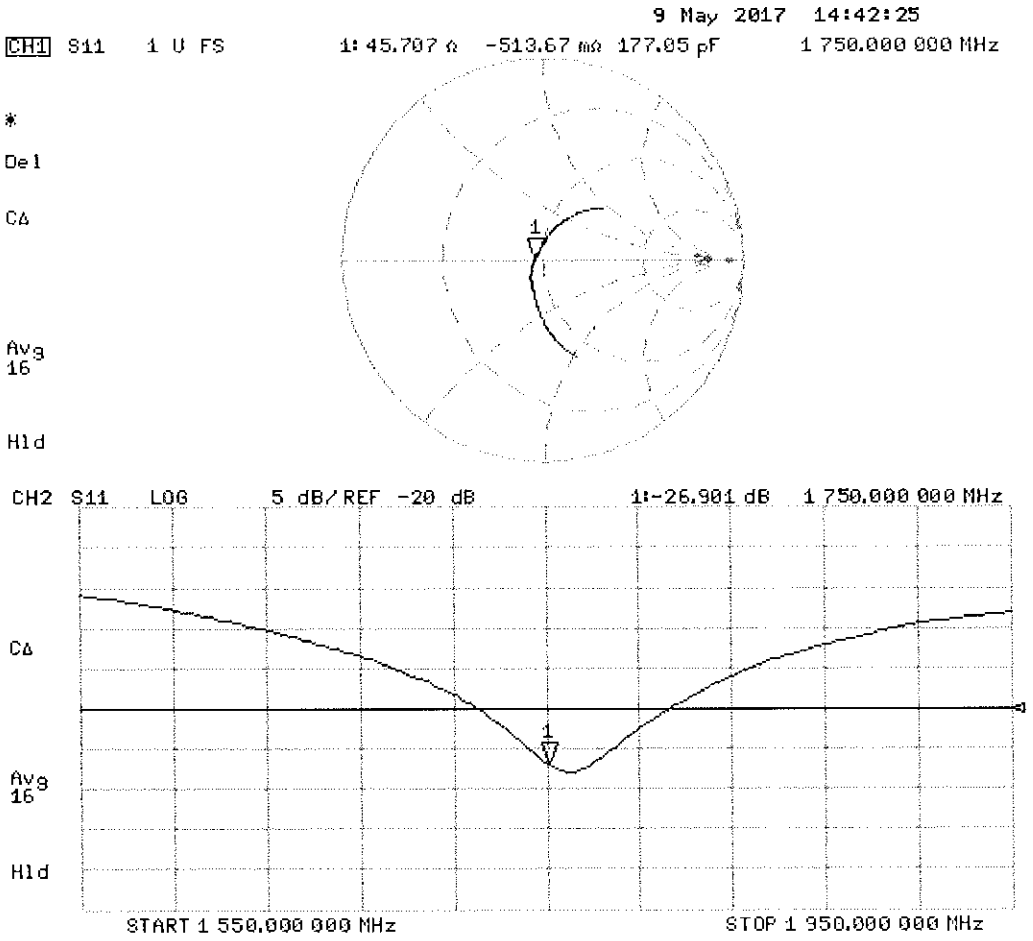
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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	

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:

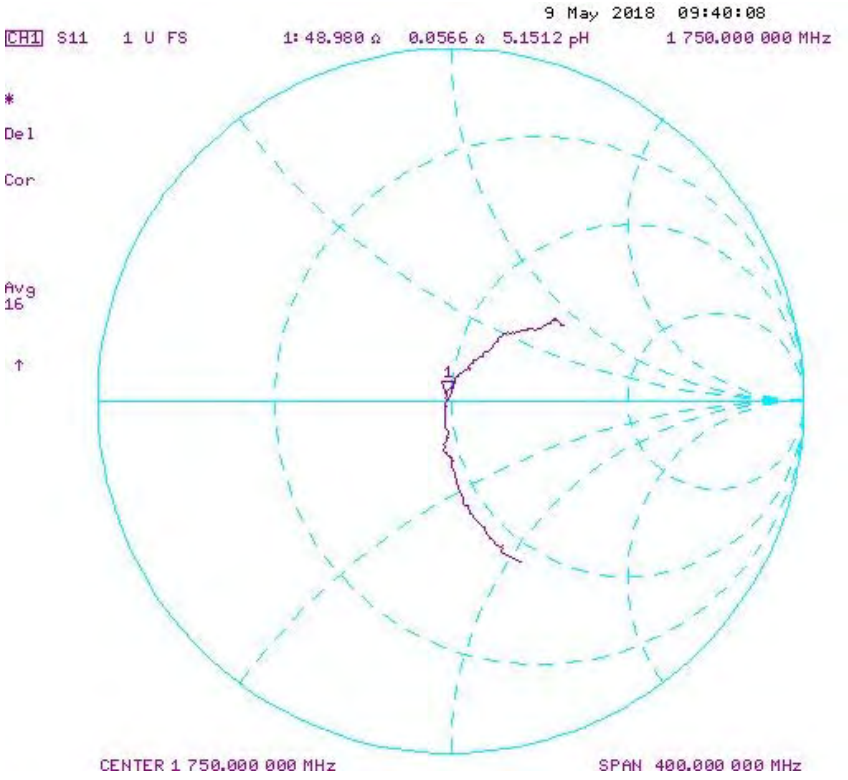
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

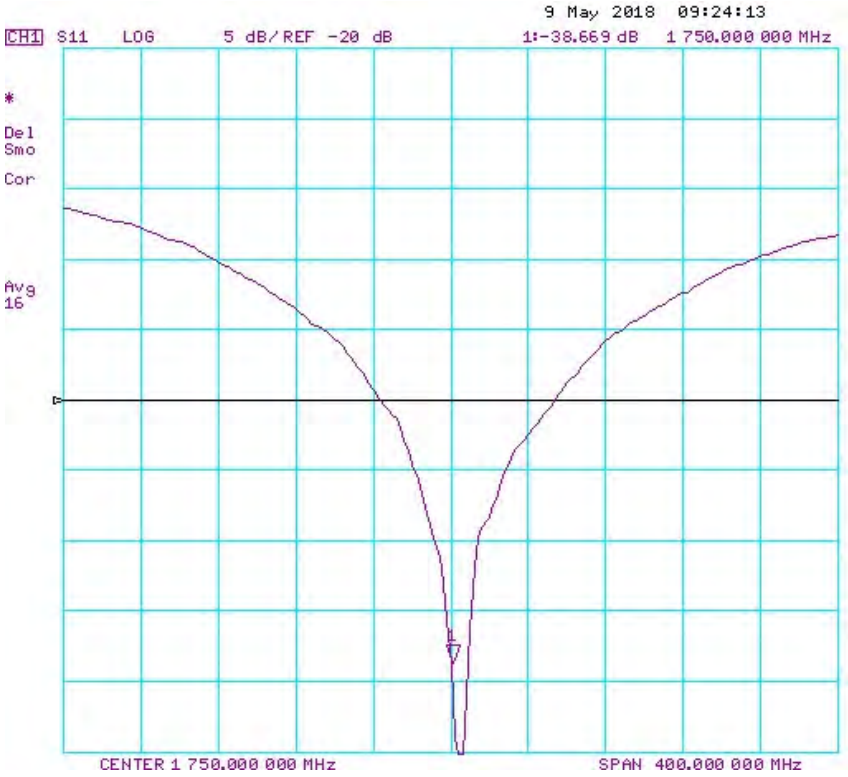
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

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

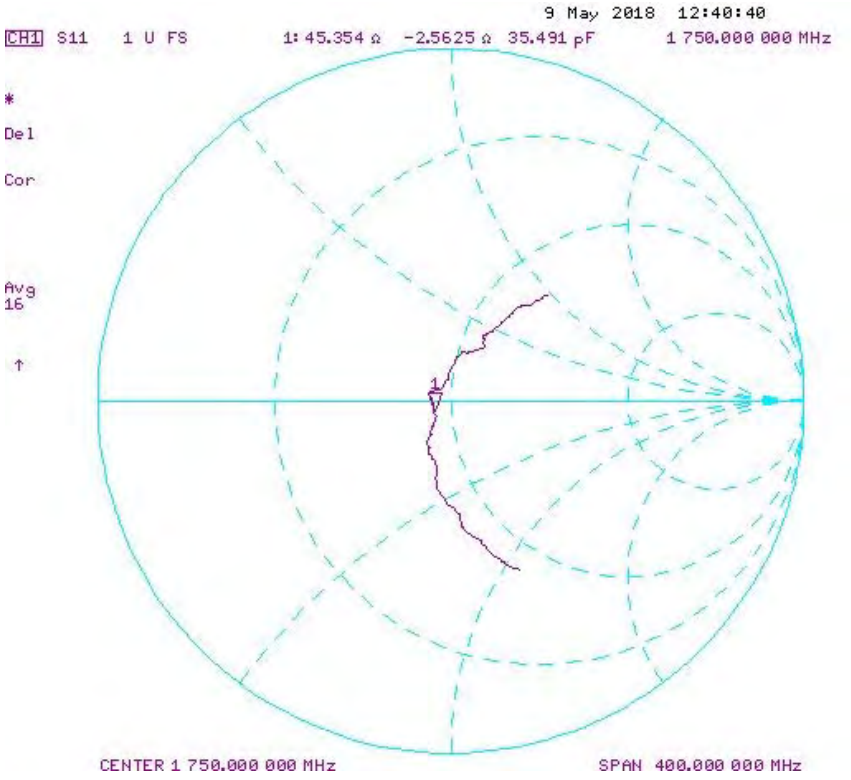
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance 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
S 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: D1765V2-1008_May18

CALIBRATION CERTIFICATE

Object: D1765V2 - SN:1008

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

BN ✓ 7/16/2018

Calibration date: May 23, 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:	Manu Seitz	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 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	V52.10.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5.0 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.0 ± 6 %	1.34 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	8.94 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**36.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.71 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.0 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.2 ± 6 %	1.46 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.21 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**37.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.92 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**19.9 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.7 Ω - 6.5 jΩ
Return Loss	- 23.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	43.3 Ω - 6.0 jΩ
Return Loss	- 20.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.210 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 06, 2005

Appendix (Additional assessments outside the scope of SCS 0108)

Measurement Conditions

DASY system configuration, as far as not given on page 1 and 3.

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L

SAR result with SAM Head (Top)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**37.4 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.9 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**38.2 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.4 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Neck)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**37.4 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.02 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.2 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Ear)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	7.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**28.7 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.01 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**16.1 W/kg ± 16.9 % (k=2)**

DASY5 Validation Report for Head TSL

Date: 15.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1765 MHz; Type: D1765V2; Serial: D1765V2 - SN:1008

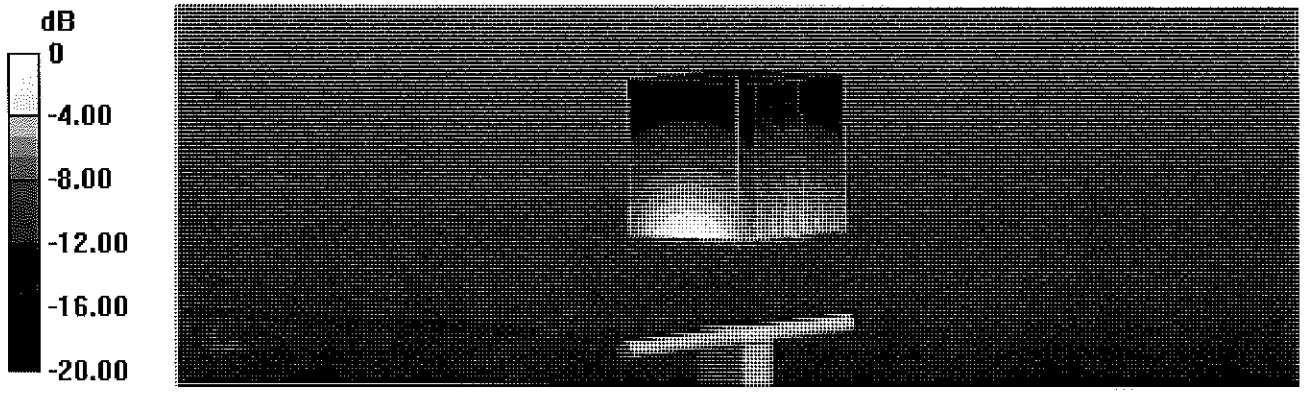
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.34 S/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.5, 8.5, 8.5) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

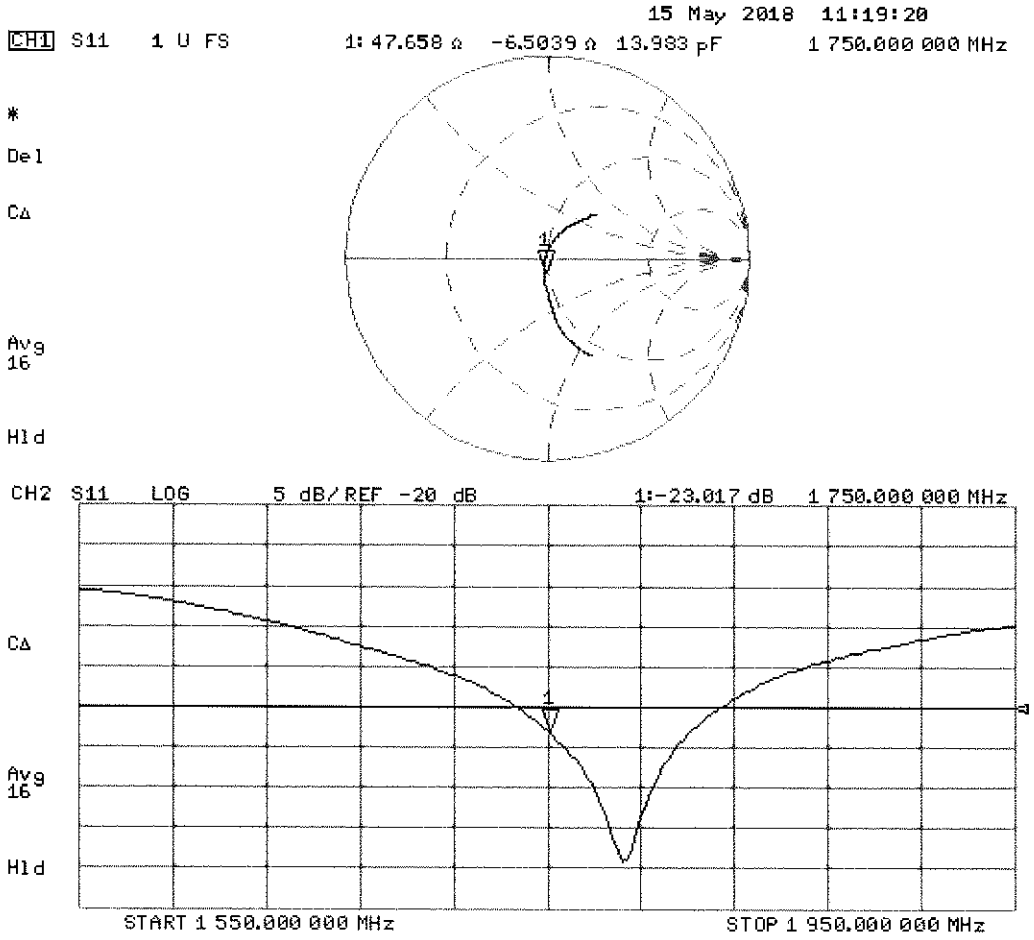
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 106.6 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 16.4 W/kg
SAR(1 g) = 8.94 W/kg; SAR(10 g) = 4.71 W/kg
Maximum value of SAR (measured) = 13.8 W/kg



0 dB = 13.8 W/kg = 11.40 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 15.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1765 MHz; Type: D1765V2; Serial: D1765V2 - SN:1008

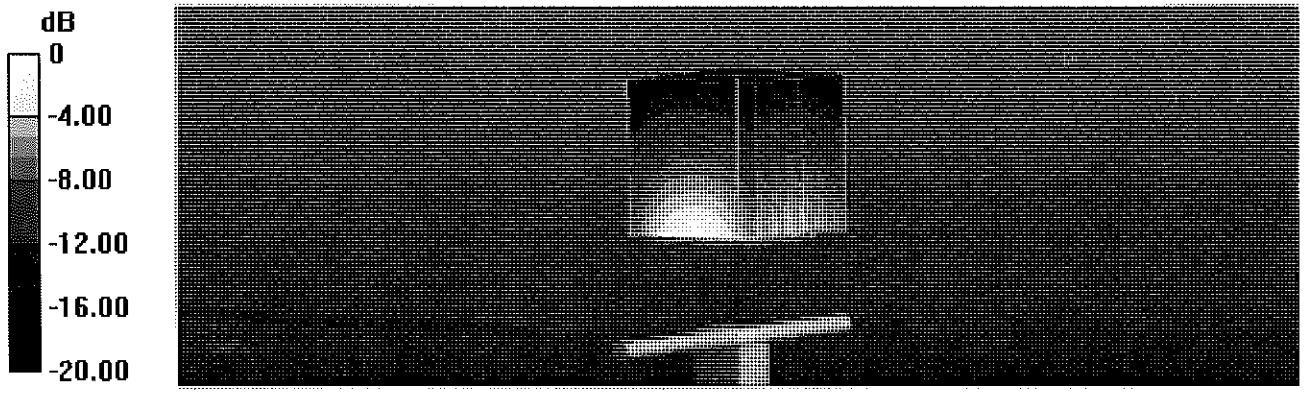
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.46 S/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.35, 8.35, 8.35) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

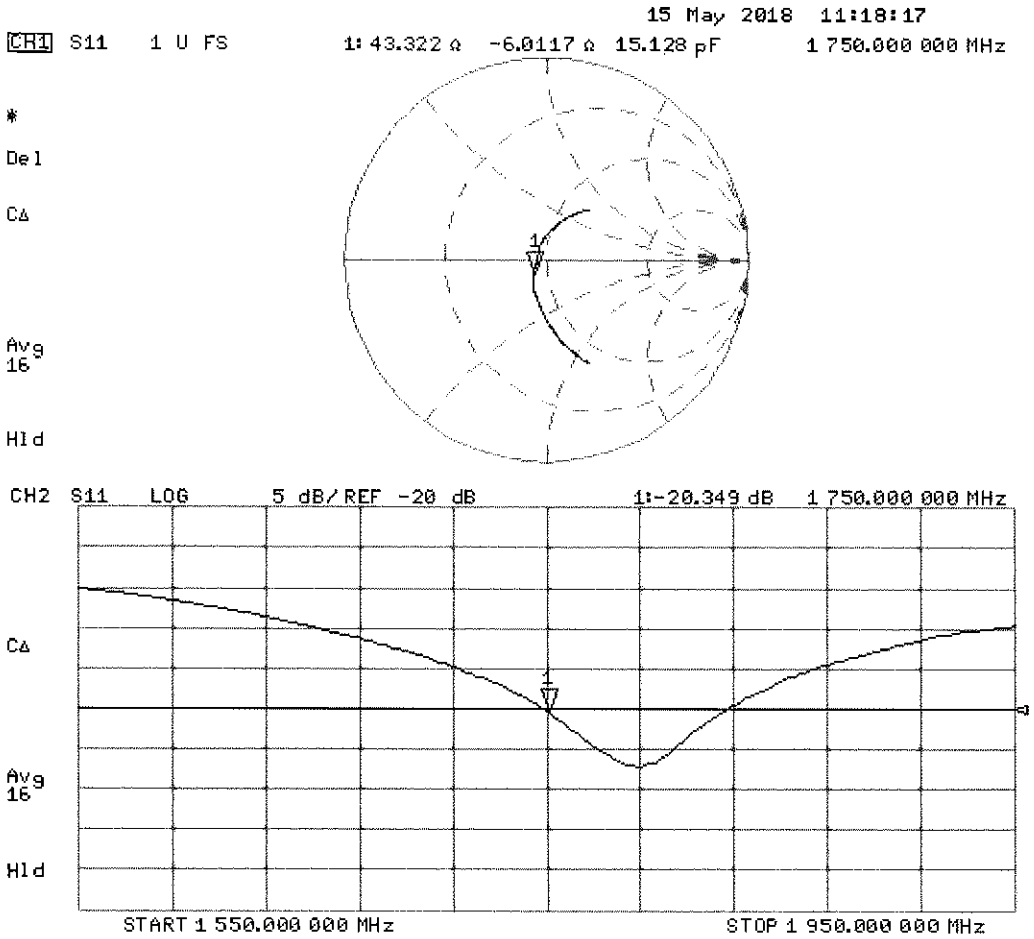
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.4 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 16.1 W/kg
SAR(1 g) = 9.21 W/kg; SAR(10 g) = 4.92 W/kg
Maximum value of SAR (measured) = 13.7 W/kg



0 dB = 13.7 W/kg = 11.37 dBW/kg

Impedance Measurement Plot for Body TSL



DASY5 Validation Report for SAM Head

Date: 23.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1765 MHz; Type: D1765V2; Serial: D1765V2 - SN:1008

Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.37 S/m; ε_r = 41.8; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

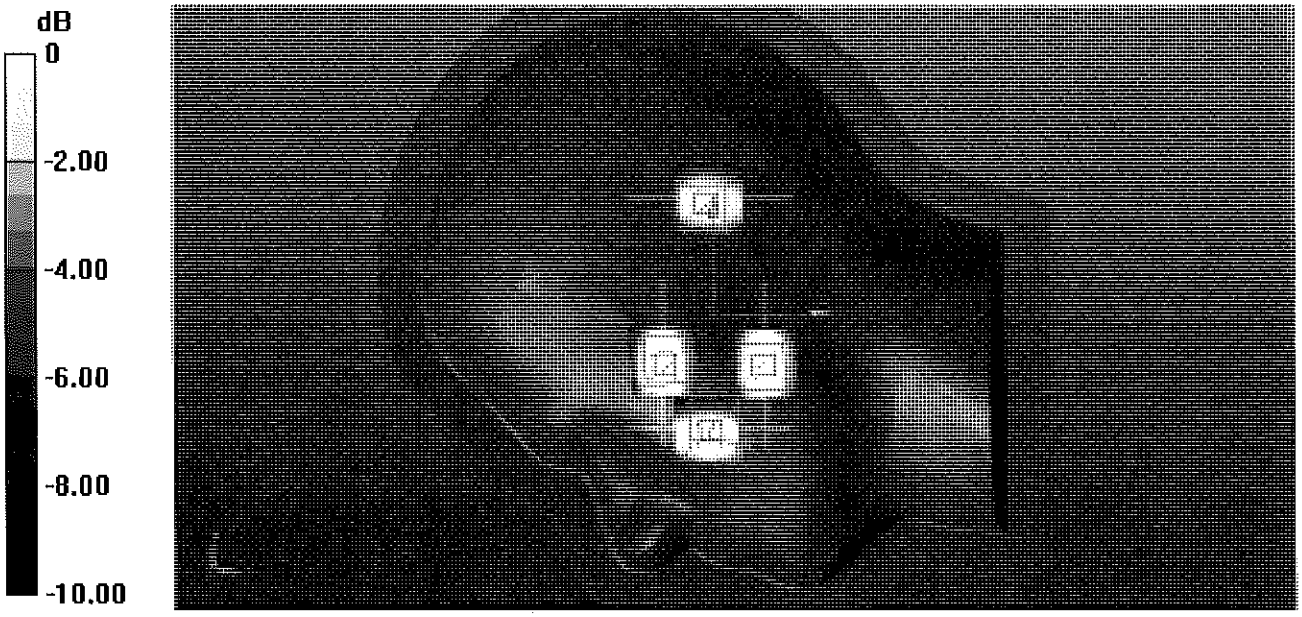
- Probe: EX3DV4 - SN7349; ConvF(8.5, 8.5, 8.5) @ 1750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: SAM Head
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

SAM/Head/Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.8 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 16.4 W/kg
SAR(1 g) = 9.26 W/kg; SAR(10 g) = 4.95 W/kg
Maximum value of SAR (measured) = 13.9 W/kg

SAM/Head/Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.2 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 16.6 W/kg
SAR(1 g) = 9.47 W/kg; SAR(10 g) = 5.06 W/kg
Maximum value of SAR (measured) = 13.7 W/kg

SAM/Head/Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.7 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 15.8 W/kg
SAR(1 g) = 9.26 W/kg; SAR(10 g) = 5.02 W/kg
Maximum value of SAR (measured) = 13.8 W/kg

SAM/Head/Ear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.46 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 11.8 W/kg
SAR(1 g) = 7.12 W/kg; SAR(10 g) = 4.01 W/kg
Maximum value of SAR (measured) = 10.3 W/kg



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

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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

BN ✓ 03-02-2018

Calibration date: February 07, 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

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
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

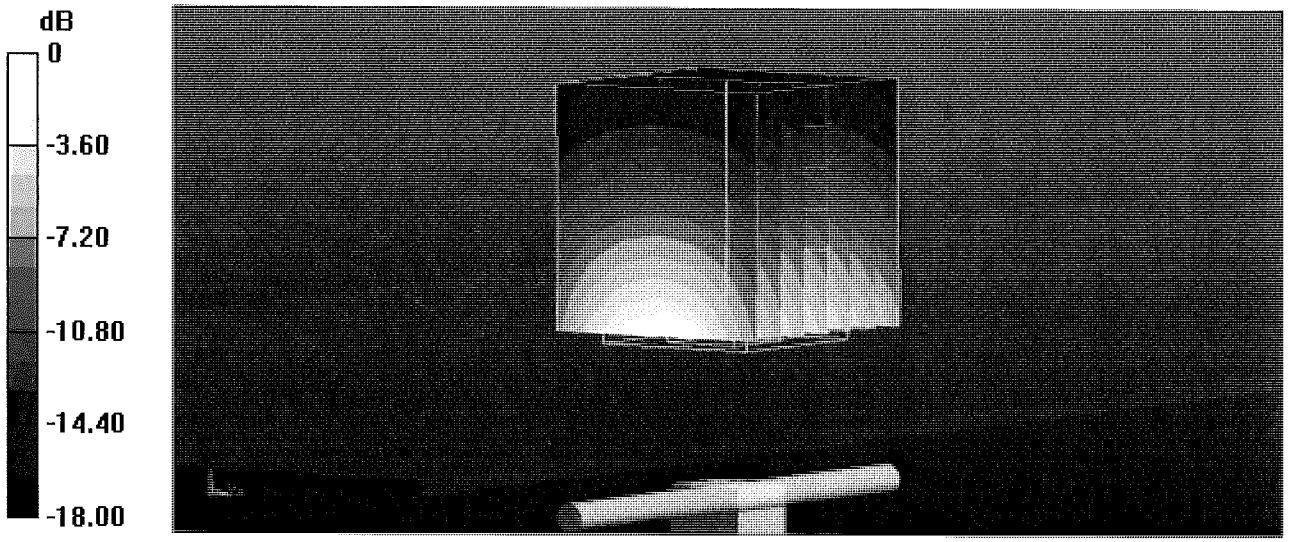
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.39 S/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

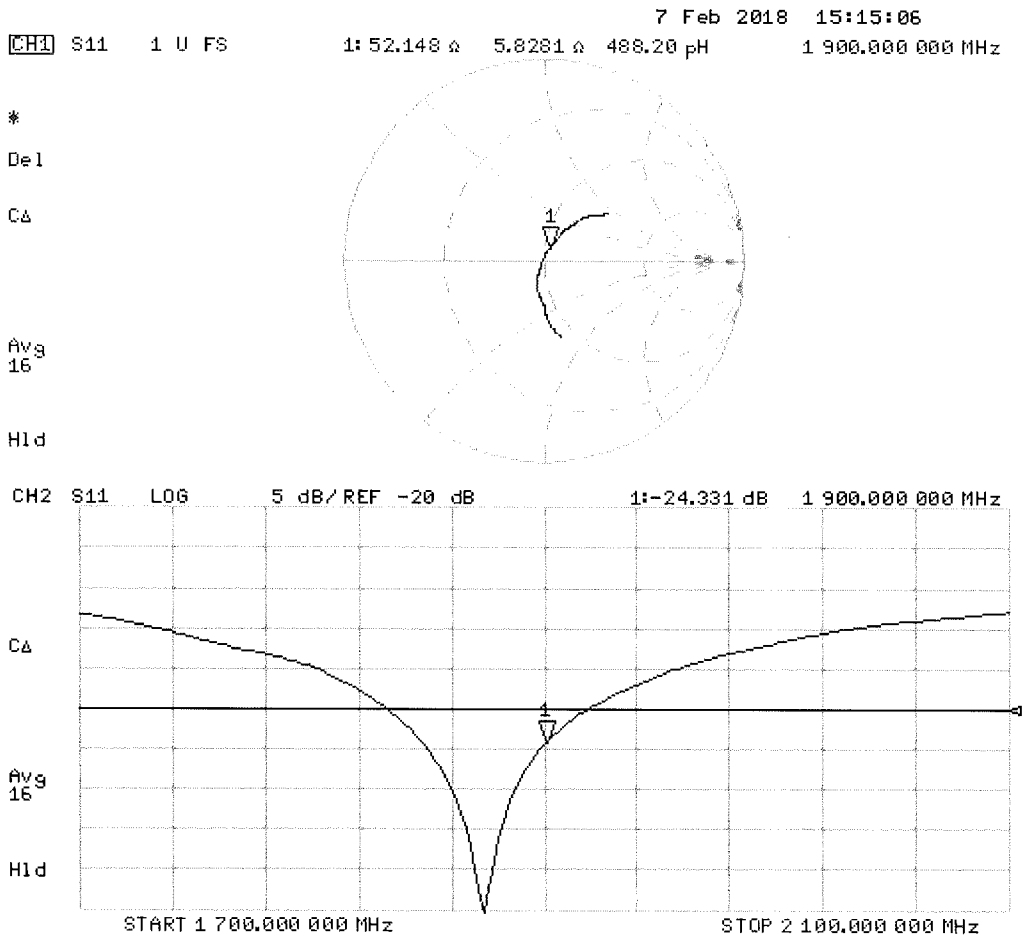
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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

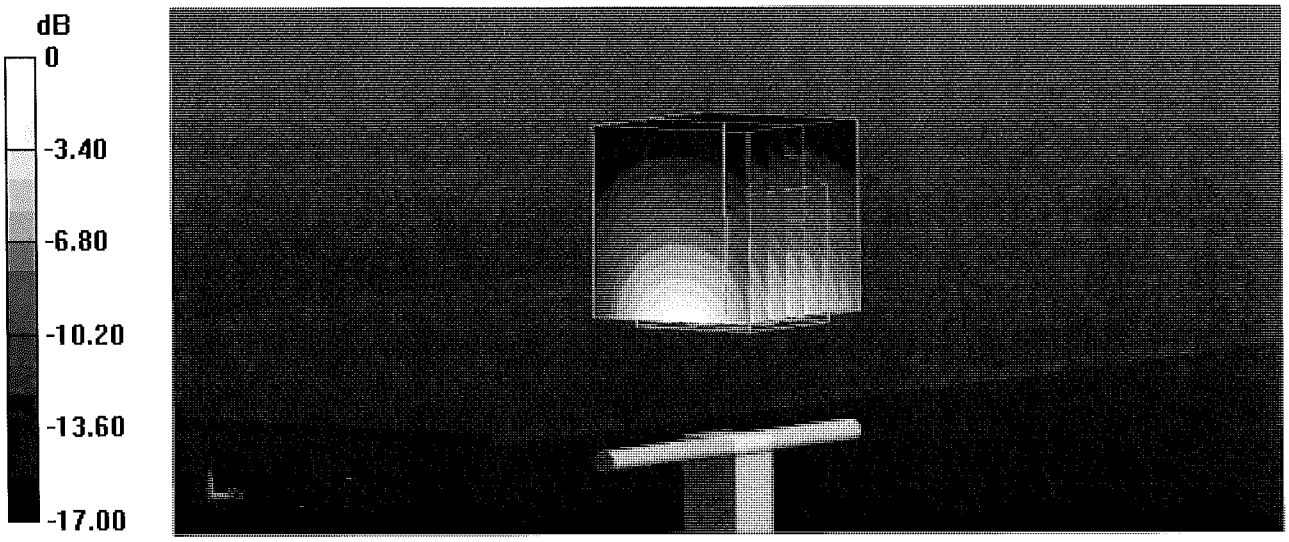
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.48 S/m; ε_r = 55.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

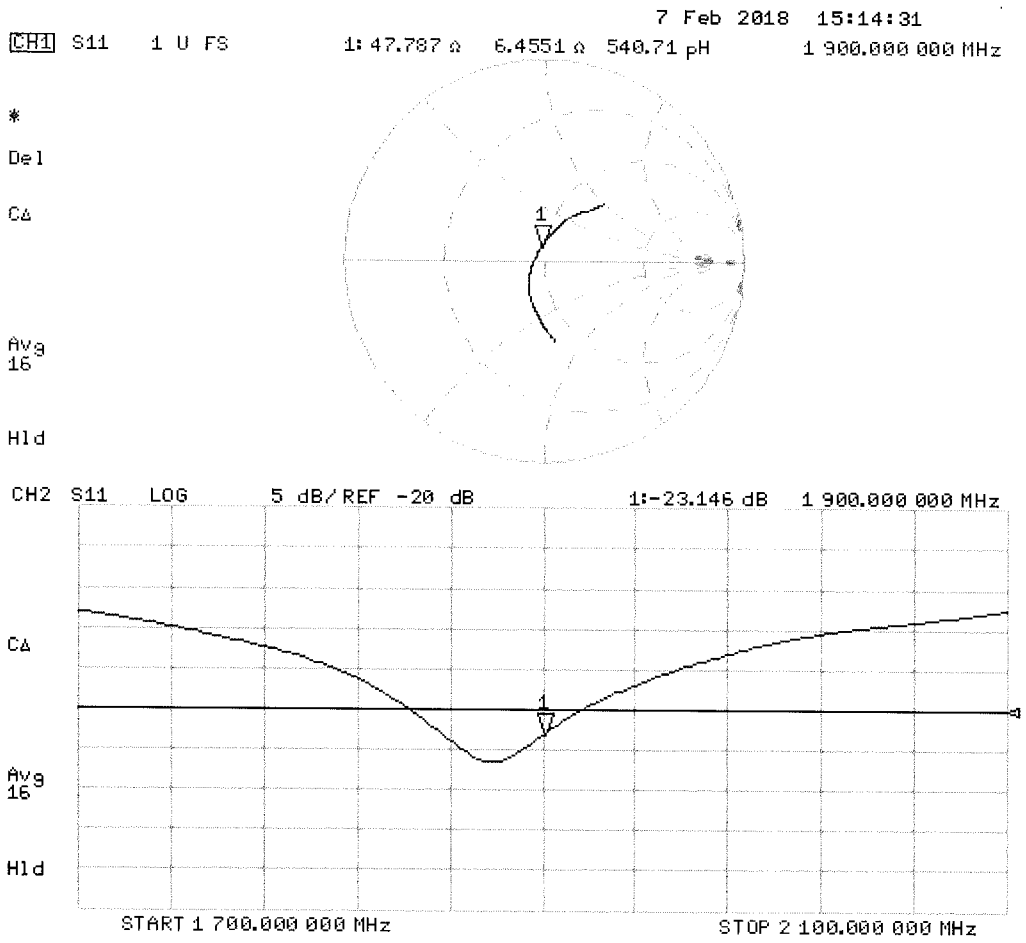
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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



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Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D1900V2-5d149_Jul17**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN:5d149
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 11, 2017

BN 8/3/2017
Extended BN 7/18/2018

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-May-17 (No. EX3-7349_May17)	May-18
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:	Johannes Kurikka	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 12, 2017

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
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 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.82 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**39.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.17 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.8 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	54.1 ± 6 %	1.50 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	9.92 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**40.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.28 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.3 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	52.0 Ω + 5.3 jΩ
Return Loss	- 25.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.4 Ω + 7.3 jΩ
Return Loss	- 22.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.196 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: 11.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

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

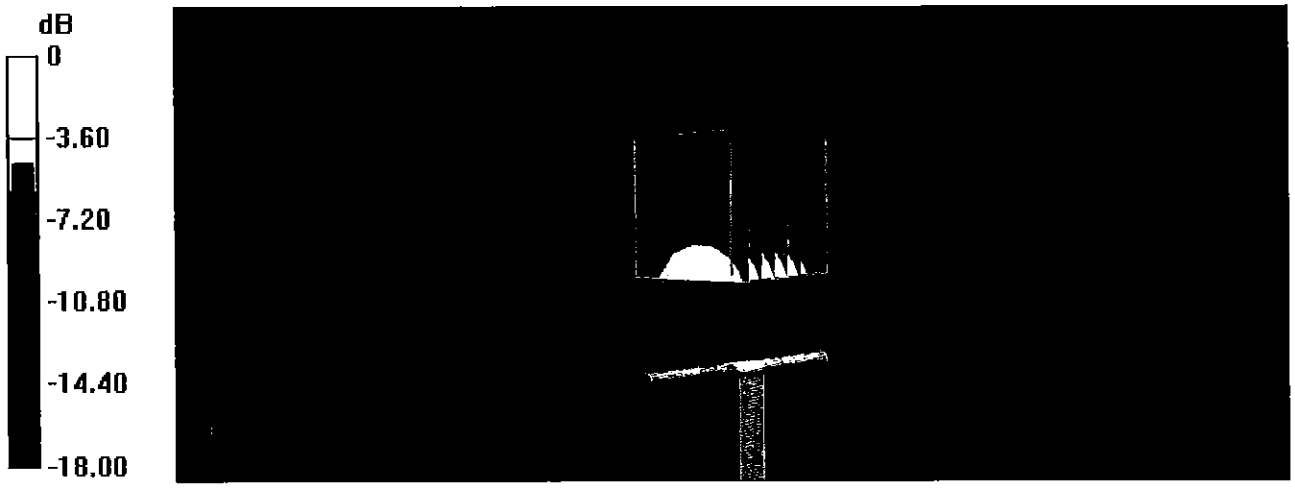
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.39 S/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.43, 8.43, 8.43); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

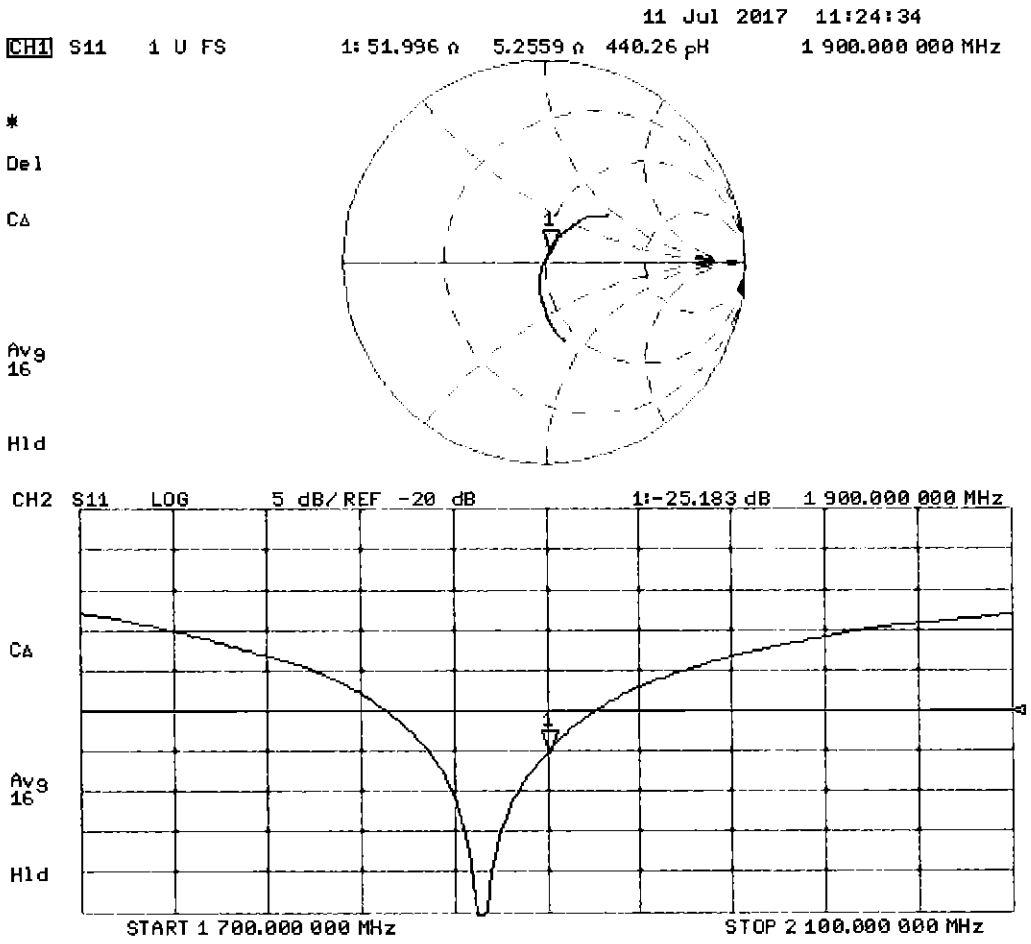
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.6 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 18.3 W/kg
SAR(1 g) = 9.82 W/kg; SAR(10 g) = 5.17 W/kg
Maximum value of SAR (measured) = 14.7 W/kg



0 dB = 14.7 W/kg = 11.67 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 11.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

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

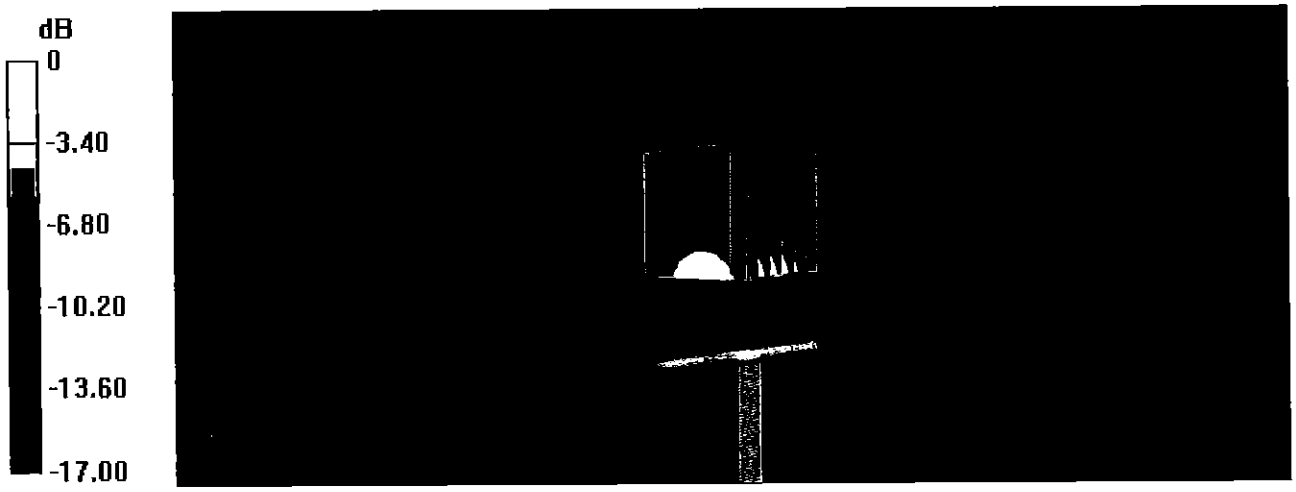
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.5 S/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.2, 8.2, 8.2); Calibrated: 31.05.2017;
- 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(1446); SEMCAD X 14.6.10(7417)

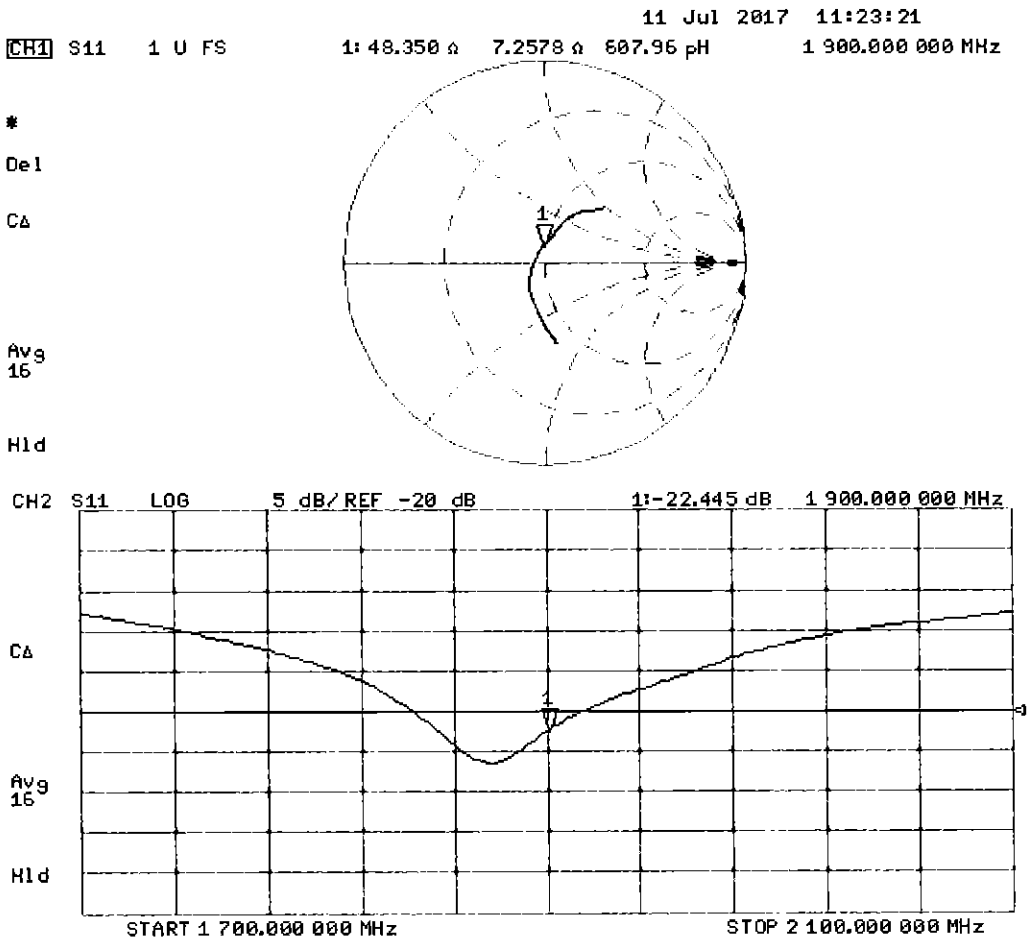
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.4 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 9.92 W/kg; SAR(10 g) = 5.28 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



Certification of Calibration

Object	D1900V2 – SN: 5d149
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	07/11/2018
Description:	SAR Validation Dipole at 1900 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E4438C	ESG Vector Signal Generator	3/24/2017	Biennial	3/24/2019	MY42082385
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	ML2495A	Power Meter	11/28/2017	Annual	11/28/2018	1039008
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1207364
Anritsu	MA2411B	Pulse Power Sensor	11/15/2017	Annual	11/15/2018	1339007
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
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
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/9/2018	Annual	2/9/2019	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/22/2018	Annual	5/22/2019	859
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/12/2017	Annual	9/12/2018	1091
SPEAG	ES3DV3	SAR Probe	2/13/2018	Annual	2/13/2019	3213
SPEAG	EX3DV4	SAR Probe	5/22/2018	Annual	5/22/2019	7406

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Test Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

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:

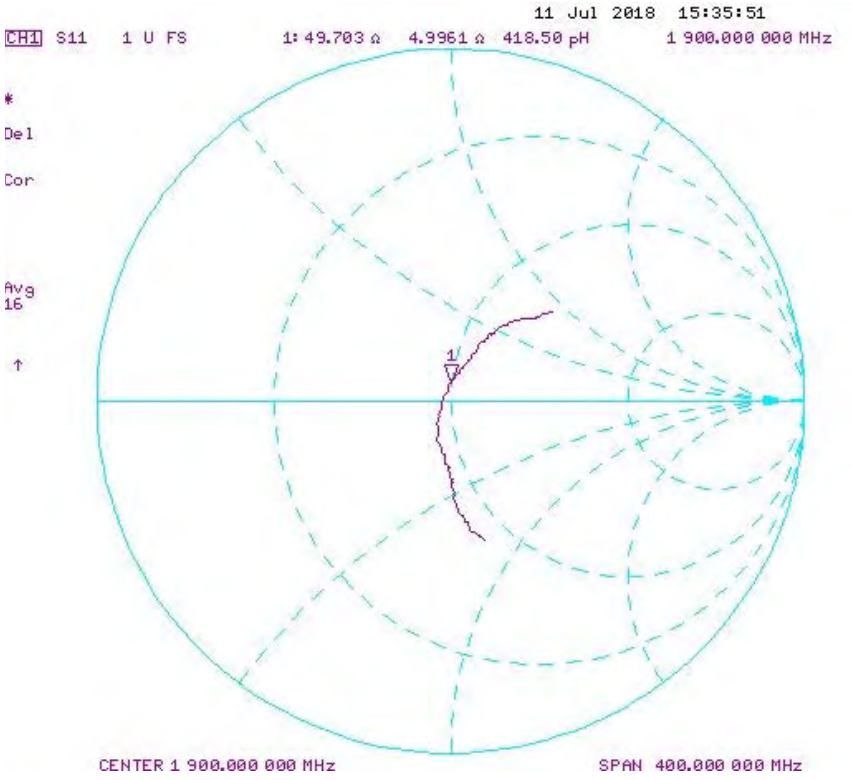
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

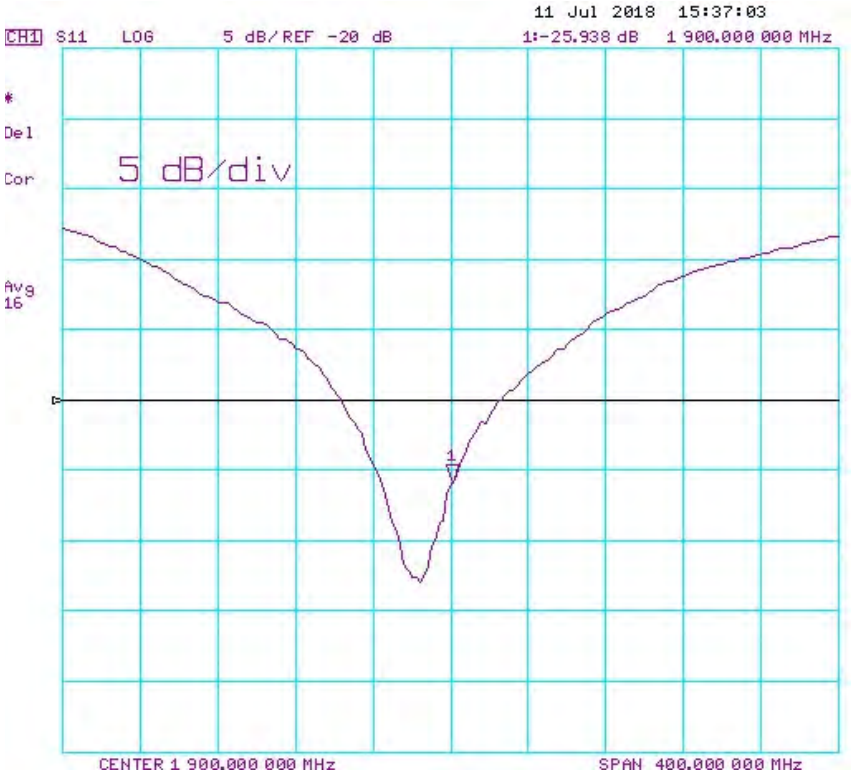
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

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
7/11/2017	7/11/2018	1.196	3.96	4.11	3.79%	2.08	2.12	1.92%	52.0	49.7	2.3	5.3	5.0	0.3	-25.2	-25.9	-2.80%	Pass

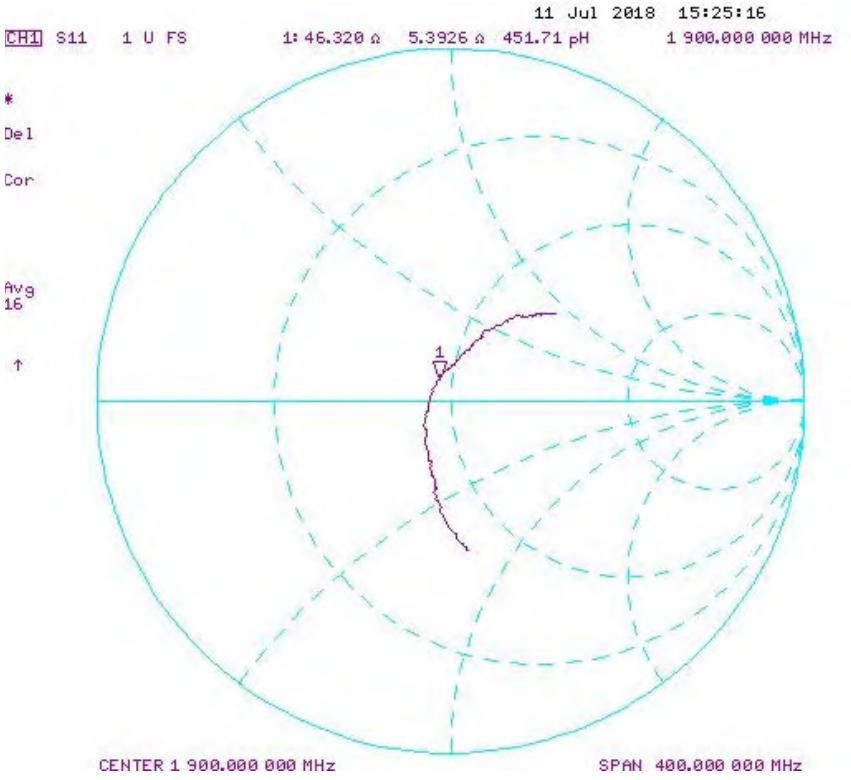
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance 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
7/11/2018	7/11/2018	1.196	4.01	4.28	6.73%	2.13	2.19	2.82%	48.4	46.3	2.1	7.3	5.4	1.9	-22.4	-23.2	-3.60%	PASS

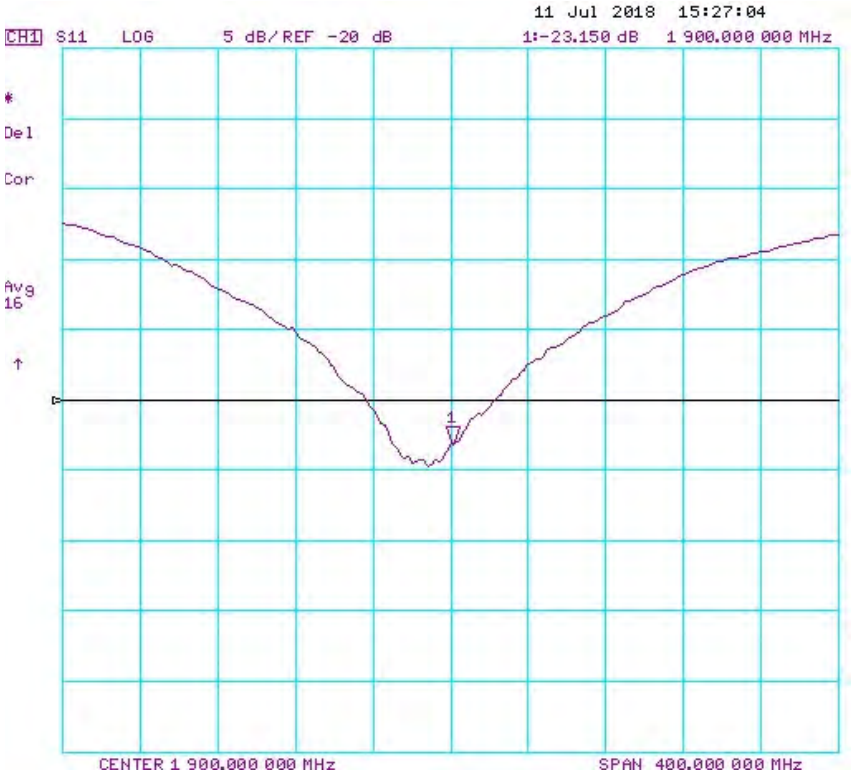
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Calibration Laboratory of
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S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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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**

Client **PC Test** Certificate No: **D2450V2-719_Aug17**

CALIBRATION CERTIFICATE

Object D2450V2 - SN:719

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

PM ✓ 8/27/17
Extended ✓ BN ✓ 7/19/2018

Calibration date: August 17, 2017

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-May-17 (No. EX3-7349_May17)	May-18
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:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 17, 2017

Calibration Laboratory of
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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	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	37.8 ± 6 %	1.86 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	13.3 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**51.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.15 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.3 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	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.9 ± 6 %	2.03 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	12.8 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.00 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.7 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	55.7 Ω + 7.0 jΩ
Return Loss	- 21.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.4 Ω + 8.1 jΩ
Return Loss	- 21.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.150 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 10, 2002

DASY5 Validation Report for Head TSL

Date: 17.08.2017

Test Laboratory: SPEAG, Zurich, Switzerland

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

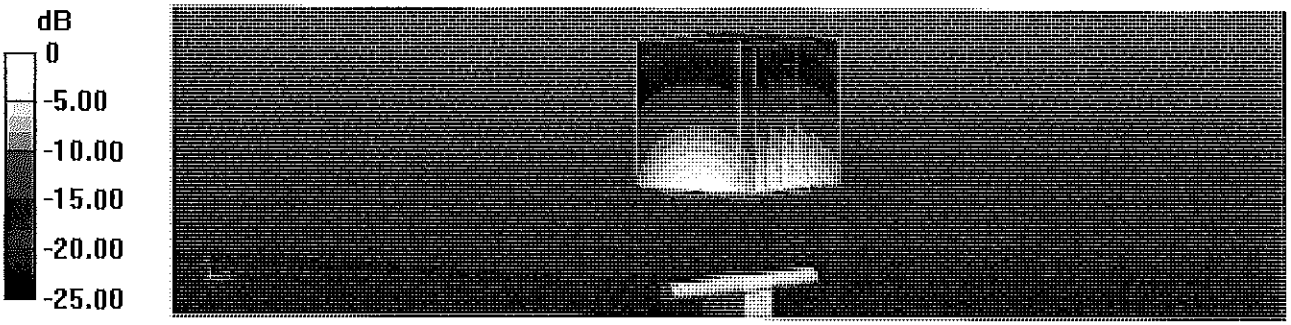
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 37.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.12, 8.12, 8.12); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- 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 = 112.8 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 26.9 W/kg
SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.15 W/kg
Maximum value of SAR (measured) = 21.6 W/kg



0 dB = 21.6 W/kg = 13.34 dBW/kg