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SAR EVALUATION REPORT

Applicant Name:
LG Electronics U.S.A., Inc.
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:
04/03/19 – 05/02/19
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M1904010049-01-R1.ZNF

FCC ID: **ZNFQ720TS**

APPLICANT: **LG ELECTRONICS U.S.A., INC.**

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model: LM-Q720TS
Additional Model(s): LMQ720TS, Q720TS, LM-Q720MS, LMQ720MS, Q720MS

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	CDMA/EVDO BC10 (§90S)	817.90 - 823.10 MHz	0.16	0.48	0.45	N/A
PCE	CDMA/EVDO BC0 (§22H)	824.70 - 848.31 MHz	0.20	0.59	0.57	N/A
PCE	PCS CDMA/EVDO	1851.25 - 1908.75 MHz	0.18	0.50	1.17	N/A
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.20	0.59	0.59	N/A
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	0.11	0.55	1.24	3.19
PCE	UMTS 850	826.40 - 846.60 MHz	0.23	0.67	0.67	N/A
PCE	UMTS 1750	1712.4 - 1752.6 MHz	0.17	0.68	1.12	N/A
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.18	0.61	1.20	N/A
PCE	LTE Band 71	665.5 - 695.5 MHz	0.25	0.60	0.60	N/A
PCE	LTE Band 12	699.7 - 715.3 MHz	0.18	0.42	0.42	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	0.24	0.56	0.56	N/A
PCE	LTE Band 26 (Cell)	814.7 - 848.3 MHz	0.20	0.68	0.68	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	0.68	1.10	N/A
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.12	0.57	1.12	N/A
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 41	2498.5 - 2687.5 MHz	0.11	0.58	1.01	3.19
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.94	0.86	0.86	N/A
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	0.81	N/A
NII	U-NII-2A	5260 - 5320 MHz	0.64	0.74	N/A	2.03
NII	U-NII-2C	5500 - 5700 MHz	0.68	0.74	N/A	1.90
NII	U-NII-3	5745 - 5825 MHz	0.73	0.77	0.77	N/A
DSS/DTS	Bluetooth	2402 - 2480 MHz	N/A	< 0.1	N/A	0.11
Simultaneous SAR per KDB 690783 D01v01r03:			1.19	1.54	1.59	3.96

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.

Note: This revised Test Report (S/N: 1M1904010049-01-R1.ZNF) 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.

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
CDMA/EVDO BC10 (§90S)	Voice/Data	817.90 - 823.10 MHz
CDMA/EVDO BC0 (§22H)	Voice/Data	824.70 - 848.31 MHz
PCS CDMA/EVDO	Voice/Data	1851.25 - 1908.75 MHz
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 71	Voice/Data	665.5 - 695.5 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 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 25 (PCS)	Voice/Data	1850.7 - 1914.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2462 MHz
U-NII-1	Voice/Data	5180 - 5240 MHz
U-NII-2A	Voice/Data	5260 - 5320 MHz
U-NII-2C	Voice/Data	5500 - 5700 MHz
U-NII-3	Voice/Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz
WMC	Data	500 Hz - 4 kHz

1.2 Power Reduction for SAR

This device uses a power reduction mechanism for SAR compliance. The power reduction mechanism is activated when the device is used in close proximity to the user's body. FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device. 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	**33.2**	**33.2**	**32.2**	**30.7**	**29.2**	**27.7**	**27.7**	**27.2**	**27.2**
	Nominal	**32.7**	**32.7**	**31.7**	**30.2**	**28.7**	**27.2**	**27.2**	**26.7**	**26.7**
GSM/GPRS/EDGE 1900	Maximum	**30.7**	**30.7**	**29.2**	**27.2**	**25.7**	**26.2**	**26.2**	**25.7**	**25.7**
	Nominal	**30.2**	**30.2**	**28.7**	**26.7**	**25.2**	**25.7**	**25.7**	**25.2**	**25.2**

Mode / Band		Modulated Average (dBm)		
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*
UMTS Band 5 (850 MHz)	Maximum	**25.5**	**25.5**	**25.5**
	Nominal	**25.0**	**25.0**	**25.0**
UMTS Band 4 (1750 MHz)	Maximum	**24.0**	**24.0**	**24.0**
	Nominal	**23.5**	**23.5**	**23.5**
UMTS Band 2 (1900 MHz)	Maximum	**24.0**	**24.0**	**24.0**
	Nominal	**23.5**	**23.5**	**23.5**

Mode / Band		Modulated Average (dBm)
CDMA/EVDO BC10 (§90S)	Maximum	**25.0**
	Nominal	**24.5**
CDMA/EVDO BC0 (§22H)	Maximum	**25.0**
	Nominal	**24.5**
PCS CDMA/EVDO	Maximum	**24.7**
	Nominal	**24.2**

Mode / Band		Modulated Average (dBm)
LTE Band 71	Maximum	**25.5**
	Nominal	**25.0**
LTE Band 12	Maximum	**25.5**
	Nominal	**25.0**
LTE Band 17	Maximum	**25.5**
	Nominal	**25.0**
LTE Band 13	Maximum	**25.5**
	Nominal	**25.0**
LTE Band 26 (Cell)	Maximum	**25.5**
	Nominal	**25.0**
LTE Band 5 (Cell)	Maximum	**25.5**
	Nominal	**25.0**
LTE Band 66 (AWS)	Maximum	**24.0**
	Nominal	**23.5**
LTE Band 4 (AWS)	Maximum	**24.0**
	Nominal	**23.5**
LTE Band 25 (PCS)	Maximum	**24.0**
	Nominal	**23.5**
LTE Band 2 (PCS)	Maximum	**24.0**
	Nominal	**23.5**
LTE Band 41 (PC3)	Maximum	**25.0**
	Nominal	**24.5**
LTE Band 41 (PC2)	Maximum	**27.7**
	Nominal	**27.2**

Mode / Band		Modulated Average (dBm)				
	Channel	1	2	3-9	10	11
IEEE 802.11b (2.4 GHz)	Maximum	**23.0**				
	Nominal	**22.0**				
IEEE 802.11g (2.4 GHz)	Maximum	**19.0**	**20.0**	**22.0**	**20.0**	**18.5**
	Nominal	**18.0**	**19.0**	**21.0**	**19.0**	**17.5**
IEEE 802.11n (2.4 GHz)	Maximum	**18.0**	**19.0**	**21.0**	**19.0**	**17.5**
	Nominal	**17.0**	**18.0**	**20.0**	**18.0**	**16.5**

Mode/Band		Modulated Average (dBm)
Bluetooth	Maximum	**11.0**
	Nominal	**10.0**
Bluetooth LE	Maximum	**2.0**
	Nominal	**1.0**

Mode / Band		Modulated Average (dBm)																				
		20 MHz Bandwidth									40 MHz Bandwidth							80 MHz Bandwidth				
	Channel	36	40-60	64	100	104-136	140	149	153-161	165	38	46-54	62	102	110-134	151	159	42	58	106	122	155
IEEE 802.11a (5 GHz)	Maximum	**16.0**	**19.5**	**16.0**	**16.0**	**19.5**	**18.0**	**18.0**	**20.0**	**18.0**												
	Nominal	**15.0**	**18.5**	**15.0**	**15.0**	**18.5**	**17.0**	**17.0**	**19.0**	**17.0**												
IEEE 802.11n (5 GHz)	Maximum	**15.0**	**18.5**	**15.0**	**15.0**	**18.5**	**17.0**	**17.0**	**19.0**	**17.0**	**13.0**	**15.0**	**13.0**	**13.0**	**15.0**	**15.0**	**15.0**					
	Nominal	**14.0**	**17.5**	**14.0**	**14.0**	**17.5**	**16.0**	**16.0**	**18.0**	**16.0**	**12.0**	**14.0**	**12.0**	**12.0**	**14.0**	**14.0**	**14.0**					
IEEE 802.11ac (5 GHz)	Maximum	**12.0**	**15.5**	**12.0**	**12.0**	**15.5**	**14.0**	**14.0**	**16.0**	**14.0**	**12.0**	**13.0**	**12.0**	**12.0**	**13.0**	**13.0**	**13.0**	**11.0**	**12.0**	**11.0**	**13.0**	**13.0**
	Nominal	**11.0**	**14.5**	**11.0**	**11.0**	**14.5**	**13.0**	**13.0**	**15.0**	**13.0**	**11.0**	**12.0**	**11.0**	**11.0**	**12.0**	**12.0**	**12.0**	**10.0**	**11.0**	**10.0**	**12.0**	**12.0**

1.3.2 Reduced Output Power

Mode / Band		Modulated Average (dBm)
LTE Band 41 (PC3)	Maximum	**24.0**
	Nominal	**23.5**
LTE Band 41 (PC2)	Maximum	**25.7**
	Nominal	**25.2**

Mode / Band		Modulated Average (dBm)				
	Channel	1	2	3-9	10	11
IEEE 802.11b (2.4 GHz)	Maximum	**19.0**				
	Nominal	**18.0**				
IEEE 802.11g (2.4 GHz)	Maximum	**16.0**	**17.0**	**19.0**	**17.0**	**15.5**
	Nominal	**15.0**	**16.0**	**18.0**	**16.0**	**14.5**
IEEE 802.11n (2.4 GHz)	Maximum	**16.0**	**17.0**	**19.0**	**17.0**	**15.5**
	Nominal	**15.0**	**16.0**	**18.0**	**16.0**	**14.5**

Mode / Band		Modulated Average (dBm)																				
		20 MHz Bandwidth									40 MHz Bandwidth							80 MHz Bandwidth				
	Channel	36	40-60	64	100	104-136	140	149	153-161	165	38	46-54	62	102	110-134	151	159	42	58	106	122	155
IEEE 802.11a (5 GHz)	Maximum	**14.0**	**17.5**	**14.0**	**14.0**	**17.5**	**16.0**	**16.0**	**18.0**	**16.0**												
	Nominal	**13.0**	**16.5**	**13.0**	**13.0**	**16.5**	**15.0**	**15.0**	**17.0**	**15.0**												
IEEE 802.11n (5 GHz)	Maximum	**14.0**	**17.5**	**14.0**	**14.0**	**17.5**	**16.0**	**16.0**	**18.0**	**16.0**	**13.0**	**15.0**	**13.0**	**13.0**	**15.0**	**15.0**	**15.0**					
	Nominal	**13.0**	**16.5**	**13.0**	**13.0**	**16.5**	**15.0**	**15.0**	**17.0**	**15.0**	**12.0**	**14.0**	**12.0**	**12.0**	**14.0**	**14.0**	**14.0**					
IEEE 802.11ac (5 GHz)	Maximum	**12.0**	**15.5**	**12.0**	**12.0**	**15.5**	**14.0**	**14.0**	**16.0**	**14.0**	**12.0**	**13.0**	**12.0**	**12.0**	**13.0**	**13.0**	**13.0**	**11.0**	**12.0**	**11.0**	**13.0**	**13.0**
	Nominal	**11.0**	**14.5**	**11.0**	**11.0**	**14.5**	**13.0**	**13.0**	**15.0**	**13.0**	**11.0**	**12.0**	**11.0**	**11.0**	**12.0**	**12.0**	**12.0**	**10.0**	**11.0**	**10.0**	**12.0**	**12.0**

1.4 DUT Antenna Locations

The overall dimensions of this device are > 9 x 5 cm. A diagram showing the location of the device antennas can be found in Appendix F. Since the diagonal dimension of this device is > 160 mm and <200 mm, it is considered a "phablet."

Table 1-1
Device Edges/Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
EVDO BC10 (§90S)	Yes	Yes	No	No	No	No
EVDO BC0 (§22H)	Yes	Yes	No	No	No	No
PCS EVDO	Yes	Yes	No	Yes	Yes	No
GPRS 850	Yes	Yes	No	Yes	No	Yes
GPRS 1900	Yes	Yes	No	Yes	Yes	No
UMTS 850	Yes	Yes	No	Yes	No	Yes
UMTS 1750	Yes	Yes	No	Yes	Yes	No
UMTS 1900	Yes	Yes	No	Yes	Yes	No
LTE Band 71	Yes	Yes	No	Yes	No	Yes
LTE Band 12	Yes	Yes	No	Yes	No	Yes
LTE Band 13	Yes	Yes	No	Yes	No	Yes
LTE Band 26 (Cell)	Yes	Yes	No	Yes	No	Yes
LTE Band 66 (AWS)	Yes	Yes	No	Yes	Yes	No
LTE Band 25 (PCS)	Yes	Yes	No	Yes	Yes	No
LTE Band 41	Yes	Yes	No	Yes	Yes	No
2.4 GHz WLAN	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN	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-2A, U-NII-2C operations are disabled.

1.5 Near Field Communications (NFC) Antenna

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

1.6 Simultaneous Transmission Capabilities

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

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

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Phablet	Notes
1	1x CDMA voice + 2.4 GHz WI-FI	Yes	Yes	N/A	Yes	
2	1x CDMA voice + 5 GHz WI-FI	Yes	Yes	N/A	Yes	
3	1x CDMA voice + 5 GHz WI-FI + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
4	1x CDMA voice + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
5	GSM voice + 2.4 GHz WI-FI	Yes	Yes	N/A	Yes	
6	GSM voice + 5 GHz WI-FI	Yes	Yes	N/A	Yes	
7	GSM voice + 5 GHz WI-FI + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
8	GSM voice + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
9	UMTS + 2.4 GHz WI-FI	Yes	Yes	Yes	Yes	
10	UMTS + 5 GHz WI-FI	Yes	Yes	Yes	Yes	
11	UMTS + 5 GHz WI-FI + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
12	UMTS + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
13	LTE + 2.4 GHz WI-FI	Yes	Yes	Yes	Yes	
14	LTE + 5 GHz WI-FI	Yes	Yes	Yes	Yes	
15	LTE + 5 GHz WI-FI + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
16	LTE + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
17	CDMA/EVDO data + 2.4 GHz WI-FI	Yes*	Yes*	Yes	Yes	* Pre-installed VOIP applications are considered
18	CDMA/EVDO data + 5 GHz WI-FI	Yes*	Yes*	Yes	Yes	* Pre-installed VOIP applications are considered
19	CDMA/EVDO data + 5 GHz WI-FI + 2.4 GHz Bluetooth	N/A	Yes*	N/A	Yes	* Pre-installed VOIP applications are considered
20	CDMA/EVDO data + 2.4 GHz Bluetooth	N/A	Yes*	N/A	Yes	* Pre-installed VOIP applications are considered
21	GPRS/EDGE + 2.4 GHz WI-FI	Yes*	Yes*	Yes	Yes	* Pre-installed VOIP applications are considered
22	GPRS/EDGE + 5 GHz WI-FI	Yes*	Yes*	Yes	Yes	* Pre-installed VOIP applications are considered
22	GRPS/EDGE data + 5 GHz WI-FI + 2.4 GHz Bluetooth	N/A	Yes*	N/A	Yes	* Pre-installed VOIP applications are considered
23	GPRS/EDGE + 2.4 GHz Bluetooth	N/A	Yes*	N/A	Yes	* Pre-installed VOIP applications are considered

1. 2.4 GHz WLAN and 2.4 GHz Bluetooth share the same antenna path and cannot transmit simultaneously.
2. All licensed modes share the same antenna path and cannot transmit simultaneously.
3. When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.
4. Per the manufacturer, WIFI Direct is 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 U-NII-1 and U-NII-3 by S/W, therefore U-NII2A and U-NII2C were not evaluated for wireless router conditions.
6. This device supports VOLTE.
7. This device supports VoWIFI.

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 2.4GHz Bluetooth, UNII-2A, & UNII-2C WIFI, only 2.4GHz, UNII-1, and UNII-3 WIFI hotspot SAR tests and combinations are considered for SAR with respect to wireless router configurations according to FCC KDB Publication 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) 1 Tx antenna output
d) 256 QAM is supported
e) TDWR 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-2A & U-NII-2C WLAN, phablet SAR tests were performed. Phablet SAR was not evaluated for 2.4 GHz WLAN, U-NII-1 WLAN, and U-NII-3 WLAN operations since wireless router 1g SAR was < 1.2 W/kg.

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

(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. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information).

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

This device supports both Power Class 2 (PC2) and Power Class 3 (PC3) for LTE Band 41. Per May 2017 TCB Workshop Notes, SAR tests were performed with Power Class 3 (given the specific UL/DL limitations for Power Class 2). Additionally, SAR testing for the power class condition was evaluated for the highest configuration in Power Class 3 for each test configuration to confirm the results were scalable linearly (See Section 14.1).

1.8 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 941225 D01v03r01, D05v02r04, D05Av01r02, D06v02r01 (2G/3G/4G and Hotspot)
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v06 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 648474 D04v01r03 (Phablet Procedures)
- FCC KDB Publication 616217 D04v01r02 (Proximity Sensor)
- October 2013 TCB Workshop Notes (GPRS Testing Considerations)
- May 2017 TCB Workshop Notes (LTE Band 41 Power Class 2/3)
- April 2018 TCB Workshop Notes (LTE Carrier Aggregation)

1.9 Device Serial Numbers

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

2 LTE INFORMATION

LTE Information					
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 71 (665.5 - 695.5 MHz)				
	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 25 (PCS) (1850.7 - 1914.3 MHz)				
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)				
	LTE Band 41 (2498.5 - 2687.5 MHz)				
Channel Bandwidths	LTE Band 71: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	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 25 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 71: 5 MHz	665.5 (133147)		680.5 (133297)	695.5 (133447)	
LTE Band 71: 10 MHz	668 (133172)		680.5 (133297)	693 (133422)	
LTE Band 71: 15 MHz	670.5 (133197)		680.5 (133297)	690.5 (133397)	
LTE Band 71: 20 MHz	673 (133222)		680.5 (133297)	688 (133372)	
LTE Band 12: 1.4 MHz	699.7 (23017)		707.5 (23095)	715.3 (23173)	
LTE Band 12: 3 MHz	700.5 (23025)		707.5 (23095)	714.5 (23165)	
LTE Band 12: 5 MHz	701.5 (23035)		707.5 (23095)	713.5 (23155)	
LTE Band 12: 10 MHz	704 (23060)		707.5 (23095)	711 (23130)	
LTE Band 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 25 (PCS): 1.4 MHz	1850.7 (26047)		1882.5 (26365)	1914.3 (26683)	
LTE Band 25 (PCS): 3 MHz	1851.5 (26055)		1882.5 (26365)	1913.5 (26675)	
LTE Band 25 (PCS): 5 MHz	1852.5 (26065)		1882.5 (26365)	1912.5 (26665)	
LTE Band 25 (PCS): 10 MHz	1855 (26090)		1882.5 (26365)	1910 (26640)	
LTE Band 25 (PCS): 15 MHz	1857.5 (26115)		1882.5 (26365)	1907.5 (26615)	
LTE Band 25 (PCS): 20 MHz	1860 (26140)		1882.5 (26365)	1905 (26590)	
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)		1880 (18900)	1909.3 (19193)	
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)		1880 (18900)	1908.5 (19185)	
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)		1880 (18900)	1907.5 (19175)	
LTE Band 2 (PCS): 10 MHz	1855 (18650)		1880 (18900)	1905 (19150)	
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)		1880 (18900)	1902.5 (19125)	
LTE Band 2 (PCS): 20 MHz	1860 (18700)		1880 (18900)	1900 (19100)	
LTE Band 41: 5 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 10 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 15 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
UE Category	LTE UE Cat 6				
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. 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, 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:

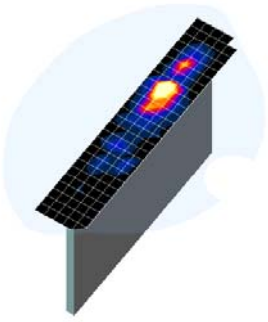

Figure 4-1
Sample SAR Area Scan

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].

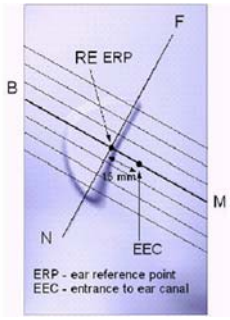

Figure 5-1
Close-Up Side view of ERP

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.

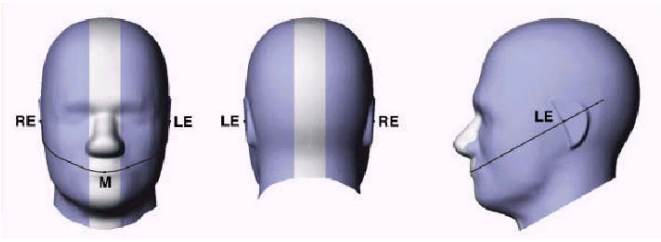

Figure 5-2
Front, back and side view of SAM Twin Phantom

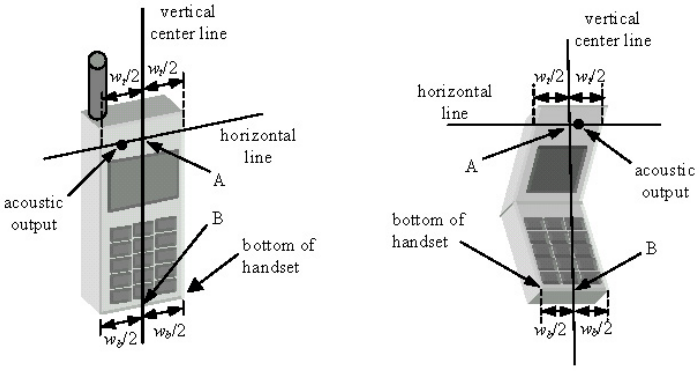

Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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.

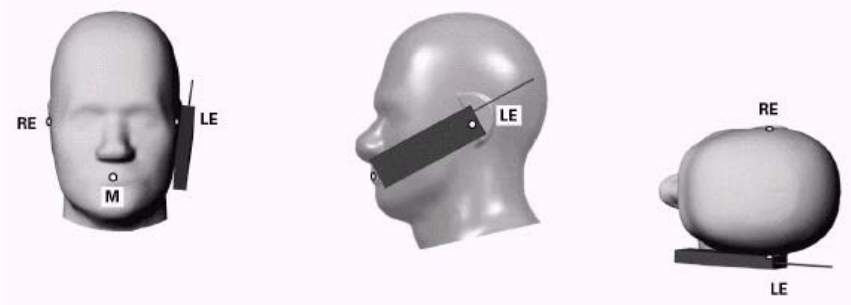

Figure 6-1 Front, Side and Top View of Cheek Position

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).

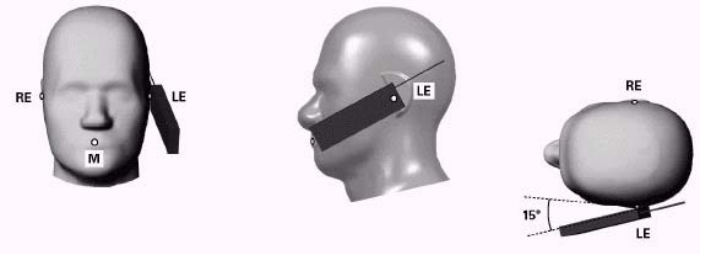

Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

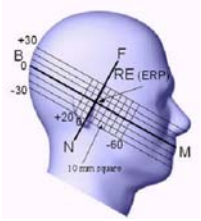

Figure 6-3
Side view w/ relevant markings

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.

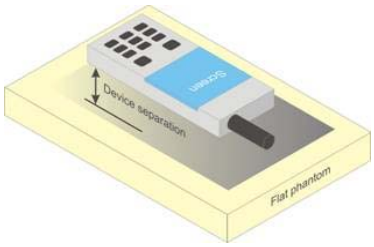

Figure 6-4
Sample Body-Worn Diagram

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 non-reduced output power level. FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device at these additional test positions. Sensor triggering distance summary data is included in Appendix G.

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

7 RF EXPOSURE LIMITS

7.1 Uncontrolled Environment

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

7.2 Controlled Environment

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

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

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

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

8 FCC MEASUREMENT PROCEDURES

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

8.1 Measured and Reported SAR

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

8.2 3G SAR Test Reduction Procedure

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

8.3 Procedures Used to Establish RF Signal for SAR

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

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

8.4 SAR Measurement Conditions for CDMA2000

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

8.4.1 Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by FCC KDB Publication 941225 D01v03r01 “3G SAR Measurement Procedures.” Maximum output power is verified on the High, Middle and Low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. SO55 tests were measured with power control bits in the “All Up” condition.

1. If the mobile station (MS) supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1, Table 8-1 parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse SCH_0 and demodulation of RC 3,4, or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9600 bps Fundamental Channel and 9600 bps SCH0 data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2, Table 8-2 was applied.

Table 8-1
Parameters for Max. Power for RC1

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1.23 MHz	-104
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

Table 8-2
Parameters for Max. Power for RC3

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1.23 MHz	-86
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

5. FCHs were configured at full rate for maximum SAR with “All Up” power control bits.

8.4.2 Head SAR Measurements

SAR for next to the ear head exposure is measured in RC3 with the handset configured to transmit at fullrate in SO55. The 3G SAR test reduction procedure is applied to RC1 with RC3 as the primary mode; otherwise, SAR is required for the channel with maximum measured output in RC1 using the head exposure configuration that results in the highest reported SAR in RC3.

Head SAR is additionally evaluated using EVDO Rev. A to support compliance for VoIP operations. See Section 8.4.5 for EVDO Rev. A configuration parameters.

8.4.3 Body-worn SAR Measurements

SAR for body-worn exposure configurations is measured in RC3 with the DUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. The 3G SAR test reduction procedure is applied to the multiple code channel configuration (FCH+SCHn), with FCH only as the primary mode. Otherwise, SAR is required for multiple code channel configuration (FCH + SCHn), with FCH at full rate and SCH0 enabled at 9600 bps, using the highest reported SAR configuration for FCH only. When multiple code channels are enabled, the transmitter output can shift by more than 0.5 dB and may lead to higher SAR drifts and SCH dropouts.

The 3G SAR test reduction procedure is applied to body-worn accessory SAR in RC1 with RC3 as the primary mode. Otherwise, SAR is required for RC1, with SO55 and full rate, using the highest reported SAR configuration for body-worn accessory exposure in RC3.

8.4.4 Body-worn SAR Measurements for EVDO Devices

For handsets with EVDO capabilities, the 3G SAR test reduction procedure is applied to EVDO Rev. 0 with 1x RTT RC3 as the primary mode to determine body-worn accessory test requirements. Otherwise, body-worn accessory SAR is required for Rev. 0, at 153.6 kbps, using the highest reported SAR configuration for body-worn accessory exposure in RC3.

The 3G SAR test reduction procedure is applied to Rev. A, with Rev. 0 as the primary mode to determine body-worn accessory SAR test requirements. When SAR is not required for Rev. 0, the 3G SAR test reduction is applied with 1x RTT RC3 as the primary mode.

When SAR is required for EVDO Rev. A, SAR is measured with a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations, using the highest reported SAR configuration for body-worn accessory exposure in Rev. 0 or 1x RTT RC3, as appropriate.

8.4.5 Body SAR Measurements for EVDO Hotspot

Hotspot Body SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0. The 3G SAR test reduction procedure is applied to Rev. A, Subtype 2 Physical layer configuration, with Rev. 0 as the primary mode; otherwise, SAR is measured for Rev. A using the highest reported SAR configuration for body-worn accessory exposure in Rev. 0. The AT is tested with a Reverse Data Channel rate of 153.6 kbps in Subtype 0/1 Physical Layer configurations; and a Reverse Data Channel payload size of 4096 bits and Termination Target of 16 slots in Subtype 2 Physical Layer configurations.

For EVDO data devices that also support 1x RTT voice and/or data operations, the 3G SAR test reduction procedure is applied to 1x RTT RC3 and RC1 with EVDO Rev. 0 and Rev. A as the respective primary modes. Otherwise, the 'Body-Worn Accessory SAR' procedures in the '3GPP2 CDMA 2000 1x Handsets' section are applied.

8.4.6 CDMA2000 1x Advanced

This device additionally supports 1x Advanced. Conducted powers are measured using SO75 with RC8 on the uplink and RC11 on the downlink per FCC KDB Publication 941225 D01v03r01. Smart blanking is disabled for all measurements. The EUT is configured with forward power control Mode 000 and reverse power control at 400 bps. Conducted powers are measured on an Agilent 8960 Series 10 Wireless Communications Test Set, Model E5515C using the CDMA2000 1x Advanced application, Option E1962B-410.

The 3G SAR test reduction procedure is applied to the 1x-Advanced transmission mode with 1x RTT RC3 as the primary mode. When SAR measurement is required, the 1x-Advanced power measurement configurations are used. The1x Advanced SAR procedures are applied separately to head, body-worn accessory and other exposure conditions.

8.5 SAR Measurement Conditions for UMTS

8.5.1 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.

8.5.2 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.

8.5.3 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.

8.5.4 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.

8.5.5 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.

8.6 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).

8.6.1 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.

8.6.2 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.

8.6.3 A-MPR

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

8.6.4 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.

8.6.5 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.

8.6.6 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.

8.7 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.

8.7.1 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.

8.7.2 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.

8.7.3 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.

8.7.4 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.

8.7.5 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.

8.7.6 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.

8.7.7 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 8.7.6). When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.7.8 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.

9 RF CONDUCTED POWERS

9.1 CDMA Conducted Powers

Table 9-1
Maximum Conducted Power

Band	Channel	Rule Part	Frequency	SO55 [dBm]	SO55 [dBm]	SO75 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
	F-RC		MHz	RC1	RC3	RC11	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	564	90S	820.1	24.75	24.88	24.88	24.71	24.67	24.98	24.94
Cellular	1013	22H	824.7	24.86	24.81	24.85	24.71	24.92	24.97	24.97
	384	22H	836.52	24.79	24.70	24.70	24.59	24.56	25.00	24.92
	777	22H	848.31	24.82	24.88	24.89	24.62	24.48	24.92	24.91
PCS	25	24E	1851.25	24.40	24.35	24.39	24.54	24.47	24.63	24.42
	600	24E	1880	24.34	24.34	24.57	24.64	24.70	24.39	24.42
	1175	24E	1908.75	24.46	24.25	24.43	24.42	24.42	24.61	24.63

Note: RC1 is only applicable for IS-95 compatibility. For FCC Rule Part 90S, Per FCC KDB Publication 447498 D01v06 4.1.g), only one channel is required since the device operates within the transmission range of 817.90 – 823.10 MHz.

Figure 9-1
Power Measurement Setup

9.2 GSM Conducted Powers

Table 9-2
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	32.96	32.97	31.68	**30.02**	28.55	26.94	26.91	26.54	26.00
	190	32.78	32.81	31.46	**30.18**	28.77	26.92	27.02	26.51	26.09
	251	32.80	32.80	31.49	**30.18**	28.66	26.86	26.99	26.47	26.11
GSM 1900	512	30.24	30.27	28.74	**26.57**	25.67	25.83	25.63	25.05	24.57
	661	30.25	30.24	28.76	**26.47**	25.65	25.82	25.54	25.00	24.65
	810	30.21	30.24	28.77	**26.60**	25.51	25.92	25.72	24.99	24.83

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	23.93	23.94	25.66	**25.76**	25.54	17.91	20.89	22.28	22.99
	190	23.75	23.78	25.44	**25.92**	25.76	17.89	21.00	22.25	23.08
	251	23.77	23.77	25.47	**25.92**	25.65	17.83	20.97	22.21	23.10
GSM 1900	512	21.21	21.24	22.72	**22.31**	22.66	16.80	19.61	20.79	21.56
	661	21.22	21.21	22.74	**22.21**	22.64	16.79	19.52	20.74	21.64
	810	21.18	21.21	22.75	**22.34**	22.50	16.89	19.70	20.73	21.82

GSM 850	**Frame Avg.Targets:**	23.67	23.67	25.68	**25.94**	25.69	18.17	21.18	22.44	23.69
GSM 1900		21.17	21.17	22.68	**22.44**	22.19	16.67	19.68	20.94	22.19

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: 12 (Max 4 Tx uplink slots)
EDGE Multislot class: 12 (Max 4 Tx uplink slots)
DTM Multislot Class: N/A

Figure 9-2
Power Measurement Setup

9.3 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	25.50	25.43	25.50	23.39	23.35	23.33	23.35	23.27	23.43	-
99		12.2 kbps AMR	25.49	25.42	25.45	23.35	23.42	23.40	23.31	23.29	23.42	-
6	HSDPA	Subtest 1	25.49	25.49	25.36	23.45	23.47	23.42	23.32	23.38	23.80	0
6		Subtest 2	25.40	25.27	25.35	23.43	23.55	23.45	23.47	23.49	23.50	0
6		Subtest 3	24.92	24.78	24.72	22.96	23.12	22.92	22.91	22.92	23.02	0.5
6		Subtest 4	24.56	24.70	24.78	22.95	23.12	22.96	22.94	22.95	22.94	0.5
6	HSUPA	Subtest 1	25.48	25.50	25.38	23.44	23.50	23.46	23.42	23.49	23.50	0
6		Subtest 2	23.05	23.47	23.37	21.48	21.53	21.50	21.50	21.40	21.42	2
6		Subtest 3	24.49	24.48	24.50	22.46	22.55	22.43	22.45	22.51	22.40	1
6		Subtest 4	23.50	23.50	23.42	21.50	21.53	21.48	21.43	21.39	21.41	2
6		Subtest 5	25.50	25.50	25.42	23.49	23.46	23.46	23.49	23.41	23.22	0

This device does not support DC-HSDPA.

Figure 9-3
Power Measurement Setup

9.4 LTE Conducted Powers

9.4.1 LTE Band 71

Table 9-4
LTE Band 71 Conducted Powers - 20 MHz Bandwidth

LTE Band 71 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 133297 (680.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**25.08**	0	0
	1	50	24.96		0
	1	99	24.36		0
	50	0	**23.93**	0-1	1
	50	25	23.84		1
	50	50	23.65		1
	100	0	23.75		1
16QAM	1	0	24.25	0-1	1
	1	50	24.15		1
	1	99	23.64		1
	50	0	22.96	0-2	2
	50	25	22.85		2
	50	50	22.64		2
	100	0	22.76		2
64QAM	1	0	23.12	0-2	2
	1	50	22.85		2
	1	99	22.50		2
	50	0	21.99	0-3	3
	50	25	21.89		3
	50	50	21.60		3
	100	0	21.77		3

Note: LTE Band 71 at 20 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 9-5
LTE Band 71 Conducted Powers - 15 MHz Bandwidth

LTE Band 71 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 133297 (680.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	25.08	0	0
	1	36	25.02		0
	1	74	25.09		0
	36	0	24.09	0-1	1
	36	18	23.84		1
	36	37	24.00		1
	75	0	24.04		1
16QAM	1	0	24.07	0-1	1
	1	36	23.99		1
	1	74	24.07		1
	36	0	23.05	0-2	2
	36	18	22.84		2
	36	37	23.05		2
	75	0	23.08		2
64QAM	1	0	23.20	0-2	2
	1	36	23.23		2
	1	74	22.60		2
	36	0	21.99	0-3	3
	36	18	21.96		3
	36	37	21.59		3
	75	0	21.67		3

Note: LTE Band 71 at 15 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 9-6
LTE Band 71 Conducted Powers - 10 MHz Bandwidth

LTE Band 71 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 133172 (668.0 MHz)	Mid Channel 133297 (680.5 MHz)	High Channel 133422 (693.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	25.08	24.99	25.05	0	0
	1	25	24.99	24.78	25.16		0
	1	49	25.18	24.83	24.66		0
	25	0	23.88	23.91	23.74	0-1	1
	25	12	23.92	23.86	23.73		1
	25	25	23.84	23.83	23.79		1
	50	0	23.94	23.91	23.80		1
16QAM	1	0	23.78	24.06	23.90	0-1	1
	1	25	23.99	24.16	24.06		1
	1	49	23.79	23.77	23.86		1
	25	0	22.89	22.93	22.86	0-2	2
	25	12	22.95	22.91	22.80		2
	25	25	22.78	22.85	22.84		2
	50	0	22.88	22.87	22.78		2
64QAM	1	0	22.77	23.04	23.00	0-2	2
	1	25	23.06	23.18	23.01		2
	1	49	22.76	22.75	22.90		2
	25	0	21.99	21.95	21.85	0-3	3
	25	12	21.85	21.84	21.86		3
	25	25	22.00	21.86	21.77		3
	50	0	21.99	21.77	21.68		3

Table 9-7
LTE Band 71 Conducted Powers - 5 MHz Bandwidth

LTE Band 71 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 133147 (665.5 MHz)	Mid Channel 133297 (680.5 MHz)	High Channel 133447 (695.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	25.07	24.89	25.02	0	0
	1	12	24.92	24.87	24.82		0
	1	24	25.16	24.85	24.87		0
	12	0	23.97	23.84	23.89	0-1	1
	12	6	24.07	23.87	24.04		1
	12	13	24.01	23.82	24.04		1
	25	0	23.83	23.78	23.73		1
16QAM	1	0	24.04	23.74	23.86	0-1	1
	1	12	24.21	23.76	23.96		1
	1	24	24.13	23.88	23.80		1
	12	0	22.96	22.94	22.70	0-2	2
	12	6	22.97	22.89	22.76		2
	12	13	22.94	22.75	22.71		2
	25	0	23.09	22.74	22.80		2
64QAM	1	0	23.14	22.78	22.96	0-2	2
	1	12	23.16	22.75	22.99		2
	1	24	23.09	22.96	22.75		2
	12	0	21.99	22.00	21.76	0-3	3
	12	6	21.87	21.86	21.85		3
	12	13	21.93	21.82	21.74		3
	25	0	22.00	21.84	21.69		3

9.4.2 LTE Band 12

Table 9-8
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	25.34	0	0
	1	25	**25.41**		0
	1	49	25.11		0
	25	0	**23.60**	0-1	1
	25	12	23.51		1
	25	25	23.59		1
	50	0	23.59		1
16QAM	1	0	23.83	0-1	1
	1	25	23.92		1
	1	49	23.67		1
	25	0	22.60	0-2	2
	25	12	22.59		2
	25	25	22.61		2
	50	0	22.59		2
64QAM	1	0	22.73	0-2	2
	1	25	22.62		2
	1	49	22.80		2
	25	0	21.59	0-3	3
	25	12	21.78		3
	25	25	21.61		3
	50	0	21.67		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 9-9
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	25.25	24.67	25.15	0	0
	1	12	25.12	24.77	25.12		0
	1	24	25.23	24.79	25.19		0
	12	0	23.75	23.66	23.76	0-1	1
	12	6	23.66	23.68	23.78		1
	12	13	23.68	23.75	23.74		1
	25	0	23.58	23.60	23.77		1
16QAM	1	0	24.20	23.93	23.89	0-1	1
	1	12	23.99	23.85	23.84		1
	1	24	24.19	24.40	24.22		1
	12	0	22.85	22.75	22.78	0-2	2
	12	6	22.79	22.71	22.80		2
	12	13	22.70	22.81	22.92		2
	25	0	22.67	22.87	22.87		2
64QAM	1	0	22.99	23.23	23.16	0-2	2
	1	12	22.94	22.88	23.14		2
	1	24	22.92	23.05	23.21		2
	12	0	21.86	21.75	21.88	0-3	3
	12	6	21.76	21.63	21.92		3
	12	13	21.72	21.71	21.91		3
	25	0	21.70	21.71	21.90		3

Table 9-10
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	25.16	24.85	25.08	0	0
	1	7	24.95	24.89	25.11		0
	1	14	25.16	24.97	25.17		0
	8	0	23.68	23.56	23.64	0-1	1
	8	4	23.70	23.58	23.70		1
	8	7	23.66	23.61	23.70		1
	15	0	23.72	23.58	23.66		1
16QAM	1	0	24.03	23.89	24.03	0-1	1
	1	7	23.81	23.63	23.79		1
	1	14	23.94	23.93	23.98		1
	8	0	22.78	22.72	22.80	0-2	2
	8	4	22.82	22.69	22.91		2
	8	7	22.74	22.73	22.86		2
	15	0	22.78	22.70	22.71		2
64QAM	1	0	22.71	23.00	23.03	0-2	2
	1	7	22.58	23.05	23.12		2
	1	14	22.36	23.06	23.15		2
	8	0	21.71	21.64	21.73	0-3	3
	8	4	21.78	21.66	21.83		3
	8	7	21.74	21.70	21.73		3
	15	0	21.79	21.59	21.74		3

Table 9-11
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	24.90	24.98	25.11	0	0
	1	2	24.93	25.13	25.14		0
	1	5	24.90	24.95	25.03		0
	3	0	24.76	24.77	24.83		0
	3	2	24.67	24.82	24.97		0
	3	3	24.66	24.80	24.82		0
	6	0	23.57	23.62	23.57	0-1	1
16QAM	1	0	23.72	23.89	24.18	0-1	1
	1	2	23.64	23.80	23.82		1
	1	5	23.62	23.80	23.95		1
	3	0	24.19	23.67	23.76		1
	3	2	24.21	23.59	23.82		1
	3	3	24.21	23.54	23.68		1
	6	0	22.89	22.73	22.80	0-2	2
64QAM	1	0	22.35	22.76	22.83	0-2	2
	1	2	22.37	22.89	23.07		2
	1	5	22.96	22.84	23.22		2
	3	0	22.87	22.70	22.73		2
	3	2	22.84	22.72	22.91		2
	3	3	22.85	22.75	22.82		2
	6	0	21.79	21.55	21.51	0-3	3

9.4.3 LTE Band 13

Table 9-12
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	**25.33**	0	0
	1	25	25.31		0
	1	49	25.11		0
	25	0	24.01	0-1	1
	25	12	**24.02**		1
	25	25	23.91		1
	50	0	23.97		1
16QAM	1	0	24.42	0-1	1
	1	25	24.16		1
	1	49	24.45		1
	25	0	23.04	0-2	2
	25	12	23.13		2
	25	25	23.06		2
	50	0	23.01		2
64QAM	1	0	23.25	0-2	2
	1	25	23.21		2
	1	49	22.96		2
	25	0	22.07	0-3	3
	25	12	22.00		3
	25	25	21.94		3
	50	0	21.95		3

Table 9-13
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	25.11	0	0
	1	12	25.21		0
	1	24	25.13		0
	12	0	23.97	0-1	1
	12	6	23.92		1
	12	13	24.03		1
	25	0	23.98		1
16QAM	1	0	24.37	0-1	1
	1	12	24.17		1
	1	24	24.25		1
	12	0	23.06	0-2	2
	12	6	23.03		2
	12	13	22.89		2
	25	0	22.97		2
64QAM	1	0	23.41	0-2	2
	1	12	23.46		2
	1	24	23.15		2
	12	0	21.90	0-3	3
	12	6	21.98		3
	12	13	22.02		3
	25	0	21.96		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.

9.4.4 LTE Band 26 (Cell)

Table 9-14
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	**25.32**	0	0
	1	36	25.18		0
	1	74	25.04		0
	36	0	**23.86**	0-1	1
	36	18	23.62		1
	36	37	23.52		1
	75	0	23.72		1
16QAM	1	0	24.39	0-1	1
	1	36	24.24		1
	1	74	24.10		1
	36	0	22.91	0-2	2
	36	18	22.62		2
	36	37	22.49		2
	75	0	22.77		2
64QAM	1	0	23.21	0-2	2
	1	36	22.93		2
	1	74	23.10		2
	36	0	21.90	0-3	3
	36	18	21.69		3
	36	37	21.53		3
	75	0	21.74		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 9-15
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	25.10	25.36	25.28	0	0
	1	25	24.98	25.47	25.43		0
	1	49	25.20	25.47	24.84		0
	25	0	23.78	23.75	23.79	0-1	1
	25	12	23.80	23.72	23.66		1
	25	25	23.66	23.82	23.61		1
	50	0	23.77	23.75	23.73		1
16QAM	1	0	24.37	24.05	24.36	0-1	1
	1	25	24.10	24.31	24.11		1
	1	49	24.22	24.23	24.11		1
	25	0	22.75	22.73	22.83	0-2	2
	25	12	22.79	22.68	22.87		2
	25	25	22.72	22.81	22.74		2
	50	0	22.71	22.68	22.70		2
64QAM	1	0	23.29	23.07	23.28	0-2	2
	1	25	22.95	22.80	23.15		2
	1	49	22.98	23.10	23.05		2
	25	0	21.81	21.67	21.76	0-3	3
	25	12	21.84	21.63	21.70		3
	25	25	21.71	21.88	21.75		3
	50	0	21.81	21.68	21.70		3

Table 9-16
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	25.00	25.08	25.15	0	0
	1	12	25.00	25.05	24.94		0
	1	24	25.05	25.04	24.90		0
	12	0	23.80	23.73	23.78	0-1	1
	12	6	23.74	23.70	23.67		1
	12	13	23.69	23.63	23.63		1
	25	0	23.61	23.69	23.65		1
16QAM	1	0	24.31	24.17	24.26	0-1	1
	1	12	24.18	24.08	23.85		1
	1	24	24.14	24.14	23.75		1
	12	0	22.86	22.84	22.84	0-2	2
	12	6	22.76	22.89	22.78		2
	12	13	22.68	22.74	22.72		2
	25	0	22.52	22.57	22.75		2
64QAM	1	0	22.87	23.00	22.90	0-2	2
	1	12	22.74	22.84	22.81		2
	1	24	22.72	22.85	22.96		2
	12	0	21.59	21.18	21.87	0-3	3
	12	6	21.68	21.79	21.72		3
	12	13	21.68	21.73	21.61		3
	25	0	21.54	21.62	21.75		3

Table 9-17
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	25.01	25.16	25.06	0	0
	1	7	25.12	25.08	24.92		0
	1	14	25.05	25.04	24.92		0
	8	0	23.70	23.73	23.69	0-1	1
	8	4	23.68	23.72	23.65		1
	8	7	23.63	23.62	23.63		1
	15	0	23.71	23.71	23.72		1
16QAM	1	0	24.14	23.96	24.11	0-1	1
	1	7	24.24	23.95	23.79		1
	1	14	24.27	23.93	23.81		1
	8	0	22.72	22.90	22.80	0-2	2
	8	4	22.90	22.84	22.75		2
	8	7	22.89	22.75	22.65		2
	15	0	22.71	22.75	22.64		2
64QAM	1	0	23.14	22.43	22.94	0-2	2
	1	7	23.01	22.45	22.90		2
	1	14	23.02	23.00	22.79		2
	8	0	21.67	21.77	21.77	0-3	3
	8	4	21.76	21.88	21.74		3
	8	7	21.64	21.70	21.65		3
	15	0	21.74	21.66	21.66		3

Table 9-18
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	24.80	25.11	24.93	0	0
	1	2	24.90	25.24	24.86		0
	1	5	24.85	25.06	24.83		0
	3	0	24.95	24.94	24.69		0
	3	2	25.07	25.05	24.74		0
	3	3	24.97	24.92	24.69		0
	6	0	23.59	23.66	23.61	0-1	1
16QAM	1	0	24.00	23.87	23.99	0-1	1
	1	2	23.92	24.00	23.99		1
	1	5	23.89	23.85	23.69		1
	3	0	23.89	23.77	23.65		1
	3	2	23.76	23.98	23.64		1
	3	3	23.75	23.95	23.48		1
	6	0	22.89	22.98	22.67	0-2	2
64QAM	1	0	22.73	22.48	22.90	0-2	2
	1	2	23.16	22.68	22.99		2
	1	5	23.10	23.06	22.76		2
	3	0	22.86	22.78	22.79		2
	3	2	22.91	22.85	22.86		2
	3	3	22.80	22.84	22.69		2
	6	0	21.71	21.82	21.52	0-3	3

9.4.5 LTE Band 66 (AWS)

Table 9-19
LTE Band 66 (AWS) Maximum 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	23.52	**23.84**	23.56	0	0
	1	50	23.54	23.47	23.43		0
	1	99	23.34	23.38	23.17		0
	50	0	22.37	22.40	22.43	0-1	1
	50	25	22.47	**22.50**	22.43		1
	50	50	22.38	22.40	22.40		1
	100	0	22.30	22.49	22.46		1
16QAM	1	0	22.72	22.95	22.87	0-1	1
	1	50	22.73	22.72	22.50		1
	1	99	22.61	22.75	22.53		1
	50	0	21.27	21.35	21.35	0-2	2
	50	25	21.50	21.45	21.38		2
	50	50	21.36	21.39	21.40		2
	100	0	21.33	21.41	21.38		2
64QAM	1	0	21.84	21.59	21.62	0-2	2
	1	50	21.83	21.38	21.93		2
	1	99	21.23	21.28	21.53		2
	50	0	20.18	20.25	20.27	0-3	3
	50	25	20.15	20.18	20.33		3
	50	50	20.06	20.12	20.09		3
	100	0	20.04	20.19	20.12		3

Table 9-20
LTE Band 66 (AWS) Maximum 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	23.38	23.28	23.39	0	0
	1	36	23.86	23.53	23.89		0
	1	74	23.39	23.58	23.40		0
	36	0	22.61	22.72	22.79	0-1	1
	36	18	22.85	22.84	22.20		1
	36	37	22.74	22.83	22.85		1
	75	0	22.62	22.70	22.73		1
16QAM	1	0	22.22	22.26	22.24	0-1	1
	1	36	22.70	22.70	22.29		1
	1	74	22.24	22.24	22.71		1
	36	0	21.65	21.76	21.84	0-2	2
	36	18	21.91	21.76	21.87		2
	36	37	21.91	21.91	21.98		2
	75	0	21.74	21.81	21.91		2
64QAM	1	0	21.32	21.36	21.28	0-2	2
	1	36	21.81	21.80	21.56		2
	1	74	21.32	21.37	21.39		2
	36	0	20.35	20.44	20.57	0-3	3
	36	18	20.68	20.56	20.69		3
	36	37	20.63	20.57	20.66		3
	75	0	20.43	20.50	20.58		3

Table 9-21
LTE Band 66 (AWS) Maximum 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	23.83	23.79	23.73	0	0
	1	25	23.81	23.64	23.63		0
	1	49	23.57	23.80	23.83		0
	25	0	22.54	22.43	22.46	0-1	1
	25	12	22.48	22.51	22.42		1
	25	25	22.41	22.61	22.40		1
	50	0	22.60	22.59	22.41		1
16QAM	1	0	22.94	22.67	22.74	0-1	1
	1	25	22.47	22.77	22.77		1
	1	49	22.91	22.82	22.66		1
	25	0	21.57	21.50	21.51	0-2	2
	25	12	21.46	21.53	21.48		2
	25	25	21.50	21.61	21.44		2
	50	0	21.52	21.61	21.34		2
64QAM	1	0	21.83	21.66	21.60	0-2	2
	1	25	21.67	21.50	21.54		2
	1	49	21.61	21.73	21.66		2
	25	0	20.25	20.18	20.16	0-3	3
	25	12	20.19	20.28	20.15		3
	25	25	20.20	20.29	20.12		3
	50	0	20.30	20.34	20.08		3

Table 9-22
LTE Band 66 (AWS) Maximum 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	23.81	23.81	23.82	0	0
	1	12	23.72	23.72	23.63		0
	1	24	23.57	23.77	23.71		0
	12	0	22.59	22.54	22.47	0-1	1
	12	6	22.57	22.51	22.50		1
	12	13	22.49	22.47	22.40		1
	25	0	22.53	22.46	22.47		1
16QAM	1	0	22.90	22.84	22.78	0-1	1
	1	12	22.76	22.92	22.79		1
	1	24	22.75	22.81	22.69		1
	12	0	21.62	21.53	21.50	0-2	2
	12	6	21.67	21.50	21.50		2
	12	13	21.67	21.51	21.50		2
	25	0	21.55	21.47	21.52		2
64QAM	1	0	21.84	21.80	21.74	0-2	2
	1	12	21.85	21.76	21.68		2
	1	24	21.71	21.76	21.59		2
	12	0	20.36	20.25	20.20	0-3	3
	12	6	20.41	20.30	20.23		3
	12	13	20.44	20.31	20.28		3
	25	0	20.25	20.22	20.20		3

Table 9-23
LTE Band 66 (AWS) Maximum 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	23.72	23.69	23.63	0	0
	1	7	23.83	23.28	23.71		0
	1	14	23.68	23.70	23.61		0
	8	0	22.52	22.51	22.43	0-1	1
	8	4	22.50	22.51	22.46		1
	8	7	22.52	22.53	22.41		1
	15	0	22.46	22.50	22.37		1
16QAM	1	0	22.58	22.68	22.60	0-1	1
	1	7	22.61	22.69	22.71		1
	1	14	22.52	22.68	22.66		1
	8	0	21.61	21.53	21.43	0-2	2
	8	4	21.60	21.56	21.47		2
	8	7	21.60	21.56	21.56		2
	15	0	21.49	21.49	21.39		2
64QAM	1	0	21.71	21.67	21.62	0-2	2
	1	7	21.78	21.73	21.72		2
	1	14	21.65	21.74	21.66		2
	8	0	20.34	20.29	20.21	0-3	3
	8	4	20.39	20.28	20.27		3
	8	7	20.29	20.33	20.21		3
	15	0	20.21	20.22	20.12		3

Table 9-24
LTE Band 66 (AWS) Maximum 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	23.71	23.66	23.61	0	0
	1	2	23.93	23.95	23.67		0
	1	5	23.55	23.66	23.67		0
	3	0	22.76	22.63	22.56		1
	3	2	22.55	22.71	22.61		1
	3	3	22.75	22.57	22.45		1
	6	0	22.34	22.40	22.30	0-1	1
16QAM	1	0	22.93	22.76	22.53	0-1	1
	1	2	22.69	22.82	22.66		1
	1	5	22.97	22.78	22.58		1
	3	0	21.65	21.78	21.43		2
	3	2	21.71	21.79	21.51		2
	3	3	21.56	21.78	21.33		2
	6	0	21.72	21.87	21.44	0-2	2
64QAM	1	0	21.87	21.76	21.65	0-2	2
	1	2	21.88	21.84	21.46		2
	1	5	21.75	21.86	21.42		2
	3	0	20.34	20.59	20.46		3
	3	2	20.70	20.48	20.35		3
	3	3	20.47	20.50	20.56		3
	6	0	20.22	20.15	20.16	0-3	3

9.4.6 LTE Band 25 (PCS)

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

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26140 (1860.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26590 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.56	23.63	**23.84**	0	0
	1	50	23.58	23.62	23.55		0
	1	99	23.28	23.16	23.73		0
	50	0	22.52	22.44	22.60	0-1	1
	50	25	22.44	22.52	**22.64**		1
	50	50	22.36	22.41	22.37		1
	100	0	22.48	22.41	22.44		1
16QAM	1	0	22.84	22.55	23.00	0-1	1
	1	50	22.70	22.62	22.99		1
	1	99	22.19	22.09	22.37		1
	50	0	21.61	21.36	21.59	0-2	2
	50	25	21.54	21.53	21.61		2
	50	50	21.40	21.38	21.39		2
	100	0	21.43	21.48	21.47		2
64QAM	1	0	21.67	21.57	21.70	0-2	2
	1	50	21.95	22.00	21.76		2
	1	99	21.09	21.47	21.29		2
	50	0	20.18	20.21	20.27	0-3	3
	50	25	20.14	20.22	20.36		3
	50	50	20.10	20.11	20.30		3
	100	0	20.09	20.16	20.22		3

Table 9-26
LTE Band 25 (PCS) Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 25 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26115 (1857.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26615 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.25	23.12	23.35	0	0
	1	36	23.84	23.83	23.44		0
	1	74	23.27	23.30	23.19		0
	36	0	22.51	22.52	22.59	0-1	1
	36	18	22.87	22.66	22.82		1
	36	37	22.64	22.67	22.70		1
	75	0	22.42	22.50	22.47		1
16QAM	1	0	21.96	21.98	22.04	0-1	1
	1	36	22.66	22.58	22.03		1
	1	74	22.11	22.04	22.63		1
	36	0	21.60	21.47	21.64	0-2	2
	36	18	21.42	21.59	21.81		2
	36	37	21.86	21.51	21.78		2
	75	0	21.46	21.54	21.60		2
64QAM	1	0	21.17	21.22	21.20	0-2	2
	1	36	21.62	21.66	21.50		2
	1	74	20.96	21.11	21.15		2
	36	0	20.16	20.20	20.28	0-3	3
	36	18	20.49	20.36	20.59		3
	36	37	20.40	20.39	20.65		3
	75	0	20.21	20.25	20.41		3

Table 9-27
LTE Band 25 (PCS) Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 25 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26090 (1855.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26640 (1910.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.87	23.81	23.77	0	0
	1	25	23.71	23.67	23.58		0
	1	49	23.50	23.61	23.73		0
	25	0	22.37	22.38	22.39	0-1	1
	25	12	22.33	22.43	22.52		1
	25	25	22.26	22.32	22.37		1
	50	0	22.54	22.45	22.39		1
16QAM	1	0	22.78	22.93	22.94	0-1	1
	1	25	22.71	22.80	22.97		1
	1	49	22.53	22.76	22.94		1
	25	0	21.40	21.42	21.43	0-2	2
	25	12	21.41	21.45	21.46		2
	25	25	21.40	21.36	21.43		2
	50	0	21.17	21.41	21.43		2
64QAM	1	0	21.64	21.63	21.46	0-2	2
	1	25	21.47	21.59	21.78		2
	1	49	21.23	21.81	21.57		2
	25	0	20.19	20.17	20.35	0-3	3
	25	12	20.12	20.24	20.39		3
	25	25	20.09	20.15	20.23		3
	50	0	20.07	20.09	20.20		3

Table 9-28
LTE Band 25 (PCS) Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 25 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26065 (1852.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26665 (1912.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.62	23.30	23.34	0	0
	1	12	23.31	23.54	23.25		0
	1	24	23.26	23.27	23.30		0
	12	0	22.54	22.14	21.99	0-1	1
	12	6	22.45	22.17	21.98		1
	12	13	22.42	22.20	21.99		1
	25	0	22.33	22.11	22.19		1
16QAM	1	0	22.69	22.39	22.27	0-1	1
	1	12	22.59	22.55	22.15		1
	1	24	22.54	22.21	22.29		1
	12	0	21.57	21.11	21.01	0-2	2
	12	6	21.73	21.16	21.03		2
	12	13	21.29	21.14	21.02		2
	25	0	21.47	21.18	21.07		2
64QAM	1	0	21.67	21.29	21.28	0-2	2
	1	12	21.63	21.13	21.45		2
	1	24	21.46	21.35	21.41		2
	12	0	20.17	20.12	20.07	0-3	3
	12	6	20.14	20.01	20.06		3
	12	13	20.18	20.09	20.06		3
	25	0	20.17	20.03	20.05		3

Table 9-29
LTE Band 25 (PCS) Maximum Conducted Powers - 3 MHz Bandwidth

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26055 (1851.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26675 (1913.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.69	23.32	23.16	0	0
	1	7	23.82	23.45	23.14		0
	1	14	23.62	23.67	23.44		0
	8	0	22.60	22.23	22.01	0-1	1
	8	4	22.67	22.23	22.03		1
	8	7	22.47	22.37	21.99		1
	15	0	22.54	22.11	22.13		1
16QAM	1	0	22.55	22.07	22.31	0-1	1
	1	7	22.11	22.09	22.03		1
	1	14	22.30	22.17	22.16		1
	8	0	21.27	21.34	20.93	0-2	2
	8	4	21.42	21.35	21.00		2
	8	7	21.43	21.40	21.00		2
	15	0	21.28	21.18	20.98		2
64QAM	1	0	21.41	21.25	21.29	0-2	2
	1	7	21.52	21.13	21.23		2
	1	14	21.52	21.19	21.15		2
	8	0	20.45	20.18	20.24	0-3	3
	8	4	20.19	20.14	20.27		3
	8	7	20.25	20.09	20.13		3
	15	0	20.15	20.13	20.26		3

Table 9-30
LTE Band 25 (PCS) Maximum Conducted Powers -1.4 MHz Bandwidth

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26047 (1850.7 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26683 (1914.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.41	23.61	23.28	0	0
	1	2	23.65	23.21	23.23		0
	1	5	23.35	23.84	23.53		0
	3	0	22.40	22.23	22.15		1
	3	2	22.66	22.31	22.14		1
	3	3	22.45	22.22	22.33		1
	6	0	22.06	22.05	21.71	0-1	1
16QAM	1	0	22.30	22.02	22.18	0-1	1
	1	2	22.35	22.15	22.11		1
	1	5	22.47	22.16	22.11		1
	3	0	21.26	21.24	21.45		2
	3	2	21.43	21.25	21.10		2
	3	3	21.32	21.34	21.19		2
	6	0	21.20	21.26	21.31	0-2	2
64QAM	1	0	21.27	21.19	21.28	0-2	2
	1	2	21.16	21.34	21.29		2
	1	5	21.17	21.23	21.22		2
	3	0	20.22	20.55	20.21		3
	3	2	20.16	20.21	20.22		3
	3	3	20.37	20.44	20.15		3
	6	0	20.12	20.09	20.17	0-3	3

9.4.7 LTE Band 41

Table 9-31
LTE Band 41 PC3 Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.99	**24.04**	23.73	23.77	23.87	0	0
	1	50	23.93	23.88	23.72	23.83	23.72		0
	1	99	23.97	24.02	23.86	24.01	23.91		0
	50	0	22.98	**23.07**	22.70	22.78	22.94	0-1	1
	50	25	23.01	23.01	22.75	22.81	22.91		1
	50	50	23.01	23.02	22.82	22.78	22.91		1
	100	0	23.04	23.05	22.77	22.76	22.92		1
16QAM	1	0	23.12	23.13	22.61	22.82	23.01	0-1	1
	1	50	22.98	23.02	22.80	22.83	22.87		1
	1	99	23.19	23.13	22.93	23.01	23.07		1
	50	0	22.05	22.13	21.71	21.85	21.87	0-2	2
	50	25	22.06	22.02	21.77	21.87	21.92		2
	50	50	22.09	22.07	21.86	21.99	21.96		2
	100	0	22.12	22.12	21.88	21.89	22.02		2
64QAM	1	0	22.18	22.09	21.68	21.62	22.09	0-2	2
	1	50	22.02	21.93	21.80	21.68	22.02		2
	1	99	22.21	21.86	21.95	21.81	22.23		2
	50	0	20.94	21.06	20.78	20.90	20.89	0-3	3
	50	25	20.98	21.02	20.86	20.84	20.96		3
	50	50	20.99	21.04	20.92	20.96	20.97		3
	100	0	20.92	21.06	20.86	20.79	20.91		3

Table 9-32
LTE Band 41 PC3 Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.99	24.04	24.14	24.08	24.07	0	0
	1	36	23.98	23.96	23.91	24.03	24.14		0
	1	74	23.99	24.18	24.17	24.00	24.19		0
	36	0	22.89	22.93	23.08	22.90	23.06	0-1	1
	36	18	22.91	22.88	23.18	22.84	23.05		1
	36	37	23.20	22.89	23.20	22.99	22.97		1
	75	0	22.85	23.01	23.04	22.90	22.95		1
16QAM	1	0	22.99	22.96	23.04	23.15	22.82	0-1	1
	1	36	23.20	23.09	23.06	23.20	22.93		1
	1	74	22.91	23.07	22.82	23.18	23.04		1
	36	0	22.04	22.09	22.19	22.06	22.01	0-2	2
	36	18	21.97	22.04	22.17	22.11	21.96		2
	36	37	22.14	22.16	22.18	22.02	22.18		2
	75	0	22.12	22.05	22.17	22.03	21.95		2
64QAM	1	0	21.75	21.70	21.81	21.82	22.00	0-2	2
	1	36	21.87	21.75	21.83	21.79	21.83		2
	1	74	21.89	21.86	21.94	22.05	21.92		2
	36	0	20.79	20.84	20.77	20.87	20.88	0-3	3
	36	18	20.65	20.74	20.86	20.88	20.90		3
	36	37	20.78	20.86	20.89	20.99	20.82		3
	75	0	20.83	20.83	20.86	20.87	20.81		3

Table 9-33
LTE Band 41 PC3 Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	24.00	23.99	24.11	23.91	23.96	0	0
	1	25	23.95	24.06	24.07	23.90	23.88		0
	1	49	23.92	24.11	23.88	23.91	24.10		0
	25	0	22.82	22.98	22.91	22.81	22.85	0-1	1
	25	12	22.76	22.97	23.20	22.83	22.80		1
	25	25	22.91	22.89	23.00	23.14	22.81		1
	50	0	22.82	22.87	23.01	22.77	22.93		1
16QAM	1	0	23.17	22.74	22.97	22.91	22.88	0-1	1
	1	25	23.19	22.85	23.17	23.20	23.01		1
	1	49	23.14	22.96	22.98	22.83	22.99		1
	25	0	21.98	21.93	22.17	21.96	22.01	0-2	2
	25	12	22.03	21.88	22.21	21.89	21.96		2
	25	25	21.94	22.17	22.11	22.06	22.08		2
	50	0	21.95	21.87	22.20	22.04	21.97		2
64QAM	1	0	21.95	22.14	22.04	21.96	21.96	0-2	2
	1	25	21.94	22.13	22.09	21.88	21.82		2
	1	49	22.12	21.83	22.12	22.15	21.39		2
	25	0	20.48	21.23	20.99	20.85	20.95	0-3	3
	25	12	20.80	21.11	21.03	20.94	20.99		3
	25	25	20.50	20.90	21.06	20.96	20.98		3
	50	0	20.89	21.19	21.11	21.00	20.97		3

Table 9-34
LTE Band 41 PC3 Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	24.15	23.98	23.99	24.06	24.08	0	0
	1	12	24.10	24.17	23.95	24.03	24.03		0
	1	24	23.96	23.91	23.99	24.11	23.99		0
	12	0	22.85	23.05	23.30	22.82	22.95	0-1	1
	12	6	23.04	23.25	23.05	22.95	23.07		1
	12	13	22.88	22.91	23.10	23.04	22.81		1
	25	0	22.89	23.26	23.05	22.89	22.93		1
16QAM	1	0	23.22	23.26	22.98	22.99	23.01	0-1	1
	1	12	23.00	23.05	23.05	23.05	23.07		1
	1	24	23.06	23.01	23.05	23.05	22.89		1
	12	0	22.06	22.24	22.15	21.96	22.17	0-2	2
	12	6	22.18	22.19	22.28	22.04	22.18		2
	12	13	22.05	22.16	22.15	21.98	21.92		2
	25	0	22.02	22.13	22.09	22.25	22.23		2
64QAM	1	0	21.93	22.30	22.14	22.12	21.93	0-2	2
	1	12	21.79	22.20	22.01	21.98	21.85		2
	1	24	21.80	22.24	22.16	22.09	21.89		2
	12	0	20.87	21.10	21.02	20.95	20.95	0-3	3
	12	6	20.90	21.00	20.96	20.97	20.90		3
	12	13	20.77	21.01	20.97	20.99	20.79		3
	25	0	20.86	21.13	21.05	20.99	20.82		3

Table 9-35
LTE Band 41 PC3 Reduced Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.42	23.26	23.39	22.84	22.92	0	0
	1	50	23.35	23.20	23.41	22.95	22.80		0
	1	99	23.50	23.30	**23.62**	23.10	23.07		0
	50	0	22.72	22.54	22.72	22.56	22.42	0-1	0
	50	25	22.76	22.68	22.89	22.44	22.43		0
	50	50	22.75	22.75	**22.93**	22.55	22.47		0
	100	0	22.75	22.64	22.92	22.39	22.37		0
16QAM	1	0	22.65	22.67	22.63	22.45	22.45	0-1	0
	1	50	22.63	22.58	22.81	22.55	22.48		0
	1	99	22.67	22.81	22.97	22.62	22.64		0
	50	0	21.71	21.59	21.93	21.35	21.22	0-2	1
	50	25	21.74	21.59	21.88	21.36	21.30		1
	50	50	21.71	21.68	21.87	21.54	21.36		1
	100	0	21.73	21.77	21.90	21.52	21.44		1
64QAM	1	0	22.01	22.26	21.98	22.00	22.20	0-2	1
	1	50	22.20	22.35	22.14	22.14	22.18		1
	1	99	22.35	22.36	22.33	22.21	22.21		1
	50	0	20.87	20.77	20.75	20.49	20.60	0-3	2
	50	25	20.93	20.73	20.85	20.61	20.62		2
	50	50	20.88	20.83	20.94	20.73	20.67		2
	100	0	20.82	20.83	20.91	20.63	20.68		2

Table 9-36
LTE Band 41 PC3 Reduced 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	23.68	23.45	22.82	23.01	23.26	0	0
	1	36	23.62	23.64	23.65	23.27	23.42		0
	1	74	23.87	23.67	23.73	23.47	23.50		0
	36	0	23.20	23.28	23.28	23.19	23.25	0-1	0
	36	18	23.18	23.09	23.06	22.87	22.91		0
	36	37	23.19	23.16	23.10	22.93	22.96		0
	75	0	23.21	23.14	23.08	22.92	22.98		0
16QAM	1	0	23.39	23.21	22.79	22.85	23.08	0-1	0
	1	36	23.28	23.15	22.97	22.89	22.94		0
	1	74	23.22	23.22	23.19	23.17	23.02		0
	36	0	22.46	22.32	22.26	21.67	21.93	0-2	1
	36	18	22.32	22.19	22.07	21.75	21.98		1
	36	37	22.32	22.18	22.14	21.81	21.98		1
	75	0	22.27	22.17	22.12	21.84	21.98		1
64QAM	1	0	22.20	22.10	21.75	21.79	21.79	0-2	1
	1	36	22.16	21.98	21.83	21.90	21.75		1
	1	74	22.15	22.08	21.92	22.17	21.83		1
	36	0	20.88	20.78	20.92	20.65	20.60	0-3	2
	36	18	20.87	20.84	20.88	20.52	20.68		2
	36	37	20.94	20.85	20.90	20.52	20.69		2
	75	0	20.95	20.82	20.81	20.50	20.70		2

Table 9-37
LTE Band 41 PC3 Reduced 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	23.46	23.51	23.41	23.61	23.65	0	0
	1	25	23.41	23.49	23.37	23.49	23.51		0
	1	49	23.48	23.74	23.42	23.62	23.62		0
	25	0	22.88	23.11	22.82	22.96	23.07	0-1	0
	25	12	23.04	23.11	22.75	22.96	23.17		0
	25	25	22.98	23.13	22.69	23.05	23.03		0
	50	0	23.00	23.12	23.00	22.95	23.03		0
16QAM	1	0	22.92	23.17	22.80	23.14	23.11	0-1	0
	1	25	23.07	23.13	22.82	23.03	23.13		0
	1	49	23.11	23.40	22.83	23.16	23.15		0
	25	0	21.91	22.03	21.87	21.92	21.98	0-2	1
	25	12	22.12	22.04	21.92	21.94	22.07		1
	25	25	22.05	22.11	21.85	22.04	22.00		1
	50	0	21.99	22.09	21.95	21.98	21.97		1
64QAM	1	0	21.63	21.89	21.71	21.82	21.85	0-2	1
	1	25	21.67	21.89	21.71	21.78	21.80		1
	1	49	21.78	22.06	21.61	21.76	21.86		1
	25	0	20.58	20.80	20.63	20.68	20.74	0-3	2
	25	12	20.83	20.80	20.73	20.74	20.81		2
	25	25	20.75	20.95	20.72	20.86	20.73		2
	50	0	20.64	20.76	20.76	20.75	20.65		2

Table 9-38
LTE Band 41 PC3 Reduced 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	23.60	23.59	23.45	23.42	23.47	0	0
	1	12	23.40	23.44	23.27	23.32	23.38		0
	1	24	23.50	23.38	23.47	23.46	23.45		0
	12	0	23.00	23.10	23.27	22.97	22.99	0-1	0
	12	6	22.95	23.02	22.99	22.98	23.11		0
	12	13	23.02	22.99	22.95	23.03	23.03		0
	25	0	23.03	23.03	22.99	22.99	23.06		0
16QAM	1	0	23.13	23.34	23.25	22.98	23.24	0-1	0
	1	12	23.15	23.14	23.13	23.00	23.16		0
	1	24	23.08	23.21	23.11	22.96	23.12		0
	12	0	22.01	22.13	22.02	22.04	21.99	0-2	1
	12	6	21.91	22.10	21.95	22.03	22.04		1
	12	13	22.00	22.01	21.93	22.06	22.00		1
	25	0	21.96	22.02	21.85	21.91	21.97		1
64QAM	1	0	21.70	22.02	21.51	21.54	21.72	0-2	1
	1	12	21.78	21.91	21.57	21.65	21.61		1
	1	24	21.72	21.60	21.54	21.68	21.51		1
	12	0	20.72	20.84	20.72	20.73	20.71	0-3	2
	12	6	20.63	20.78	20.65	20.72	20.77		2
	12	13	20.66	20.72	20.61	20.78	20.70		2
	25	0	20.76	20.83	20.66	20.72	20.74		2

Table 9-39
LTE Band 41 PC2 Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	27.54	**27.48**	27.15	27.12	27.35	0	0
	1	50	27.51	27.31	27.19	27.11	27.25		0
	1	99	27.48	27.42	27.29	27.10	27.20		0
	50	0	26.62	26.47	26.36	26.38	26.45	0-1	1
	50	25	26.57	26.44	26.41	26.28	26.52		1
	50	50	26.50	26.57	26.40	26.49	26.51		1
	100	0	26.55	26.50	26.29	26.27	26.55		1
16QAM	1	0	26.70	26.70	26.54	26.48	26.70	0-1	1
	1	50	26.54	26.66	26.65	26.30	26.50		1
	1	99	26.65	26.70	26.70	26.54	26.65		1
	50	0	25.64	25.53	25.41	25.30	25.49	0-2	2
	50	25	25.70	25.55	25.43	25.35	25.50		2
	50	50	25.61	25.65	25.48	25.55	25.34		2
	100	0	25.70	25.60	25.52	25.43	25.62		2
64QAM	1	0	25.65	25.43	25.38	25.22	25.70	0-2	2
	1	50	25.46	25.36	25.39	25.30	25.22		2
	1	99	25.57	25.47	25.49	25.44	25.32		2
	50	0	24.66	24.54	24.35	24.41	24.52	0-3	3
	50	25	24.57	24.48	24.48	24.35	24.53		3
	50	50	24.63	24.59	24.51	24.31	24.55		3
	100	0	24.57	24.58	24.50	24.37	24.55		3

Table 9-40
LTE Band 41 PC2 Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	27.49	27.54	27.60	27.58	27.57	0	0
	1	36	27.48	27.46	27.59	27.53	27.64		0
	1	74	27.49	27.68	27.70	27.50	27.69		0
	36	0	26.39	26.43	26.58	26.40	26.56	0-1	1
	36	18	26.41	26.38	26.51	26.34	26.55		1
	36	37	26.70	26.39	26.42	26.49	26.47		1
	75	0	26.35	26.51	26.53	26.40	26.45		1
16QAM	1	0	26.49	26.46	26.56	26.65	26.32	0-1	1
	1	36	26.70	26.59	26.54	26.67	26.43		1
	1	74	26.41	26.57	26.70	26.62	26.54		1
	36	0	25.54	25.59	25.54	25.56	25.51	0-2	2
	36	18	25.47	25.54	25.56	25.61	25.46		2
	36	37	25.64	25.66	25.64	25.52	25.70		2
	75	0	25.62	25.55	25.62	25.53	25.45		2
64QAM	1	0	25.37	25.55	25.13	25.10	25.49	0-2	2
	1	36	25.19	25.50	25.36	25.40	25.30		2
	1	74	25.35	25.59	25.35	25.40	25.36		2
	36	0	24.45	24.57	24.38	24.32	24.46	0-3	3
	36	18	24.42	24.60	24.44	24.46	24.39		3
	36	37	24.50	24.62	24.50	24.50	24.55		3
	75	0	24.23	24.25	24.21	24.23	24.23		3

Table 9-41
LTE Band 41 PC2 Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	27.58	27.57	27.69	27.49	27.54	0	0
	1	25	27.53	27.64	27.65	27.48	27.46		0
	1	49	27.50	27.69	27.46	27.49	27.68		0
	25	0	26.40	26.56	26.49	26.39	26.43	0-1	1
	25	12	26.34	26.55	26.70	26.41	26.38		1
	25	25	26.49	26.47	26.58	26.62	26.39		1
	50	0	26.40	26.45	26.59	26.35	26.51		1
16QAM	1	0	26.65	26.32	26.55	26.49	26.46	0-1	1
	1	25	26.67	26.43	26.65	26.70	26.59		1
	1	49	26.57	26.54	26.56	26.41	26.57		1
	25	0	25.56	25.51	25.65	25.54	25.59	0-2	2
	25	12	25.61	25.46	25.70	25.47	25.54		2
	25	25	25.52	25.65	25.69	25.64	25.66		2
	50	0	25.53	25.45	25.70	25.62	25.55		2
64QAM	1	0	25.37	25.62	25.47	25.65	25.54	0-2	2
	1	25	25.44	25.61	25.51	25.47	25.47		2
	1	49	25.33	25.70	25.55	25.55	25.56		2
	25	0	24.25	24.42	24.25	24.26	24.38	0-3	3
	25	12	24.42	24.42	24.33	24.27	24.41		3
	25	25	24.40	24.54	24.34	24.36	24.37		3
	50	0	24.22	24.39	24.21	24.23	24.22		3

Table 9-42
LTE Band 41 PC2 Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	27.55	27.38	27.39	27.46	27.48	0	0
	1	12	27.50	27.57	27.35	27.43	27.43		0
	1	24	27.36	27.31	27.39	27.51	27.39		0
	12	0	26.25	26.45	26.69	26.22	26.35	0-1	1
	12	6	26.44	26.65	26.45	26.35	26.47		1
	12	13	26.28	26.31	26.50	26.44	26.21		1
	25	0	26.29	26.66	26.45	26.29	26.33		1
16QAM	1	0	26.62	26.66	26.38	26.39	26.41	0-1	1
	1	12	26.40	26.45	26.45	26.45	26.47		1
	1	24	26.46	26.41	26.45	26.45	26.29		1
	12	0	25.46	25.64	25.55	25.36	25.57	0-2	2
	12	6	25.58	25.59	25.68	25.44	25.58		2
	12	13	25.45	25.56	25.55	25.38	25.32		2
	25	0	25.42	25.53	25.49	25.65	25.63		2
64QAM	1	0	25.40	25.70	25.61	25.58	25.48	0-2	2
	1	12	25.40	25.64	25.49	25.49	25.52		2
	1	24	25.37	25.65	25.44	25.54	25.39		2
	12	0	24.34	24.43	24.26	24.25	24.32	0-3	3
	12	6	24.27	24.35	24.20	24.20	24.34		3
	12	13	24.29	24.32	24.22	24.24	24.23		3
	25	0	24.36	24.36	24.26	24.26	24.38		3

Table 9-43
LTE Band 41 PC2 Reduced Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	25.55	25.41	24.82	24.97	25.14	0	0
	1	50	25.45	25.33	25.04	25.01	24.95		0
	1	99	**25.70**	25.53	25.24	25.34	25.30		0
	50	0	25.42	25.35	24.99	24.82	24.77	0-1	0
	50	25	25.47	25.32	25.18	25.05	24.73		0
	50	50	25.39	25.26	25.12	25.12	24.83		0
	100	0	25.35	25.26	25.18	24.98	24.66		0
16QAM	1	0	25.70	25.70	24.95	25.25	25.09	0-1	0
	1	50	25.68	25.70	25.08	25.35	25.12		0
	1	99	25.66	25.69	25.30	24.65	25.23		0
	50	0	24.85	24.82	24.53	24.35	24.30	0-2	0
	50	25	24.86	24.76	24.61	24.42	24.32		0
	50	50	25.00	24.91	24.77	24.49	24.33		0
	100	0	24.93	24.86	24.63	24.48	24.36		0
64QAM	1	0	25.67	25.13	24.83	24.62	24.97	0-2	0
	1	50	25.46	25.19	25.10	24.82	24.94		0
	1	99	25.47	25.26	25.05	25.05	25.07		0
	50	0	24.64	23.93	23.65	23.71	23.88	0-3	1
	50	25	24.59	23.84	23.82	23.74	23.77		1
	50	50	24.61	23.93	23.84	23.89	23.88		1
	100	0	24.65	23.91	23.83	23.75	23.83		1

Table 9-44
LTE Band 41 PC2 Reduced 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	25.42	25.61	25.69	25.16	25.45	0	0
	1	36	25.16	25.51	25.24	25.41	25.28		0
	1	74	25.34	25.59	25.18	25.49	25.34		0
	36	0	25.40	25.52	25.16	25.30	25.51	0-1	0
	36	18	25.35	25.56	25.27	25.39	25.44		0
	36	37	25.42	25.60	25.32	25.58	25.56		0
	75	0	25.46	25.60	25.43	25.35	25.30		0
16QAM	1	0	25.52	25.69	25.06	25.20	25.64	0-1	0
	1	36	25.31	25.52	25.26	25.42	25.41		0
	1	74	25.45	25.67	25.36	25.60	25.52		0
	36	0	24.81	24.98	24.82	24.74	24.93	0-2	0
	36	18	24.72	24.99	24.85	24.79	24.84		0
	36	37	24.83	25.08	24.92	24.99	24.94		0
	75	0	25.00	25.10	24.90	24.88	24.96		0
64QAM	1	0	24.83	24.96	24.74	24.62	24.87	0-2	0
	1	36	24.59	24.93	24.79	24.79	24.78		0
	1	74	24.74	25.00	24.82	24.93	24.81		0
	36	0	23.91	24.10	23.88	23.86	24.01	0-3	1
	36	18	23.88	24.12	23.98	24.00	23.95		1
	36	37	23.96	24.15	24.01	24.05	24.07		1
	75	0	23.79	23.82	23.74	23.65	23.80		1

Table 9-45
LTE Band 41 PC2 Reduced 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	25.54	25.58	25.42	25.50	25.51	0	0
	1	25	25.54	25.47	25.35	25.39	25.40		0
	1	49	25.64	25.63	25.38	25.50	25.40		0
	25	0	25.52	25.56	25.39	25.45	25.48	0-1	0
	25	12	25.62	25.55	25.39	25.45	25.50		0
	25	25	25.63	25.64	25.37	25.53	25.41		0
	50	0	25.61	25.59	25.23	25.46	25.42		0
16QAM	1	0	25.62	25.61	25.51	25.65	25.60	0-1	0
	1	25	25.62	25.59	25.52	25.53	25.48		0
	1	49	25.66	25.60	25.55	25.61	25.61		0
	25	0	24.98	25.01	24.78	24.82	24.90	0-2	0
	25	12	25.18	25.11	24.79	24.84	24.89		0
	25	25	25.09	25.00	24.79	24.92	24.82		0
	50	0	25.04	25.08	24.67	24.88	24.84		0
64QAM	1	0	24.80	25.04	24.83	24.99	24.88	0-2	0
	1	25	24.96	25.05	24.84	24.90	24.85		0
	1	49	24.94	25.21	24.82	25.06	24.78		0
	25	0	23.72	23.77	23.68	23.78	23.71	0-3	1
	25	12	23.96	23.78	23.75	23.88	23.78		1
	25	25	23.93	23.89	23.60	23.79	23.70		1
	50	0	23.75	23.69	23.64	23.65	23.65		1

Table 9-46
LTE Band 41 PC2 Reduced 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	25.66	25.55	25.30	25.35	25.35	0	0
	1	12	25.43	25.51	25.17	25.30	25.28		0
	1	24	25.54	25.47	25.17	25.33	25.17		0
	12	0	25.58	25.42	25.21	25.24	25.24	0-1	0
	12	6	25.49	25.31	25.18	25.19	25.23		0
	12	13	25.58	25.33	25.15	25.20	25.17		0
	25	0	25.63	25.38	25.20	25.20	25.24		0
16QAM	1	0	25.50	25.49	25.18	25.20	25.11	0-1	0
	1	12	25.41	25.36	25.15	25.20	25.04		0
	1	24	25.43	25.34	25.01	25.10	24.95		0
	12	0	25.09	25.03	24.54	24.69	24.73	0-2	0
	12	6	25.02	25.03	24.47	24.68	24.73		0
	12	13	25.07	24.85	24.43	24.75	24.68		0
	25	0	25.00	24.87	24.56	24.61	24.66		0
64QAM	1	0	25.20	25.23	24.63	24.83	24.74	0-2	0
	1	12	24.98	24.96	24.60	24.62	24.64		0
	1	24	24.91	25.07	24.53	24.68	24.56		0
	12	0	23.87	23.80	23.44	23.45	23.50	0-3	1
	12	6	23.80	23.70	23.41	23.36	23.52		1
	12	13	23.82	23.62	23.31	23.46	23.39		1
	25	0	23.87	23.67	23.40	23.41	23.53		1

9.5 WLAN Conducted Powers

Table 9-47
2.4 GHz WLAN Maximum Average RF Power

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
		Average	Average	Average
2412	1	**22.17**	18.09	17.71
2417	2	N/A	19.15	18.71
2422	3	N/A	21.01	20.99
2437	6	22.15	21.01	20.97
2452	9	N/A	21.04	20.88
2457	10	N/A	19.01	18.51
2462	11	22.08	17.55	17.10

Table 9-48
5 GHz WLAN Maximum Average RF Power

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
		Average	Average	Average
5180	36	15.56	14.72	11.75
5200	40	**18.68**	17.78	14.96
5220	44	18.51	17.63	14.90
5240	48	18.58	17.60	14.90
5260	52	18.35	17.58	14.73
5280	56	18.54	17.50	14.76
5300	60	**18.57**	17.56	14.76
5320	64	15.36	14.39	11.49
5500	100	15.48	14.66	11.54
5520	104	**18.71**	17.77	14.94
5600	120	18.62	17.77	14.82
5680	136	18.58	17.76	15.01
5700	140	17.27	16.46	13.46
5745	149	16.99	16.01	13.04
5765	153	19.13	18.25	15.46
5785	157	**19.17**	18.27	15.50
5805	161	19.05	18.18	15.56
5825	165	17.19	16.32	13.53

Table 9-49
2.4 GHz WLAN Reduced Average RF Power

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
		Average	Average	Average
2412	1	18.37	15.18	15.02
2417	2	N/A	16.24	16.02
2422	3	N/A	18.40	18.31
2437	6	**18.37**	18.29	18.30
2452	9	N/A	18.30	18.23
2457	10	N/A	15.79	15.80
2462	11	18.34	14.51	14.30

Table 9-50
5 GHz WLAN Reduced Average RF Power

5GHz (20MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11a	802.11n
		Average	Average
5180	36	13.46	13.69
5200	40	16.69	16.87
5220	44	16.71	16.71
5240	48	16.54	16.62
5260	52	16.49	16.45
5280	56	16.49	16.47
5300	60	**16.53**	16.57
5320	64	13.34	13.33
5500	100	13.47	13.54
5520	104	16.85	16.91
5600	120	16.65	16.75
5680	136	**16.89**	16.88
5700	140	15.40	15.44
5745	149	14.89	15.03
5765	153	17.37	17.34
5785	157	17.27	17.28
5805	161	**17.38**	17.29
5825	165	15.43	15.40

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

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

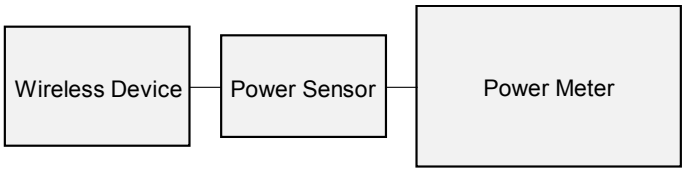

Figure 9-4
Power Measurement Setup

9.6 Bluetooth Conducted Powers

Table 9-51
Bluetooth Average RF Power

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
			[dBm]	[mW]
2402	1.0	0	9.58	9.082
2441	1.0	39	**10.27**	10.651
2480	1.0	78	9.47	8.844
2402	2.0	0	8.91	7.774
2441	2.0	39	9.62	9.155
2480	2.0	78	8.83	7.631
2402	3.0	0	8.93	7.812
2441	3.0	39	9.60	9.111
2480	3.0	78	8.77	7.525

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

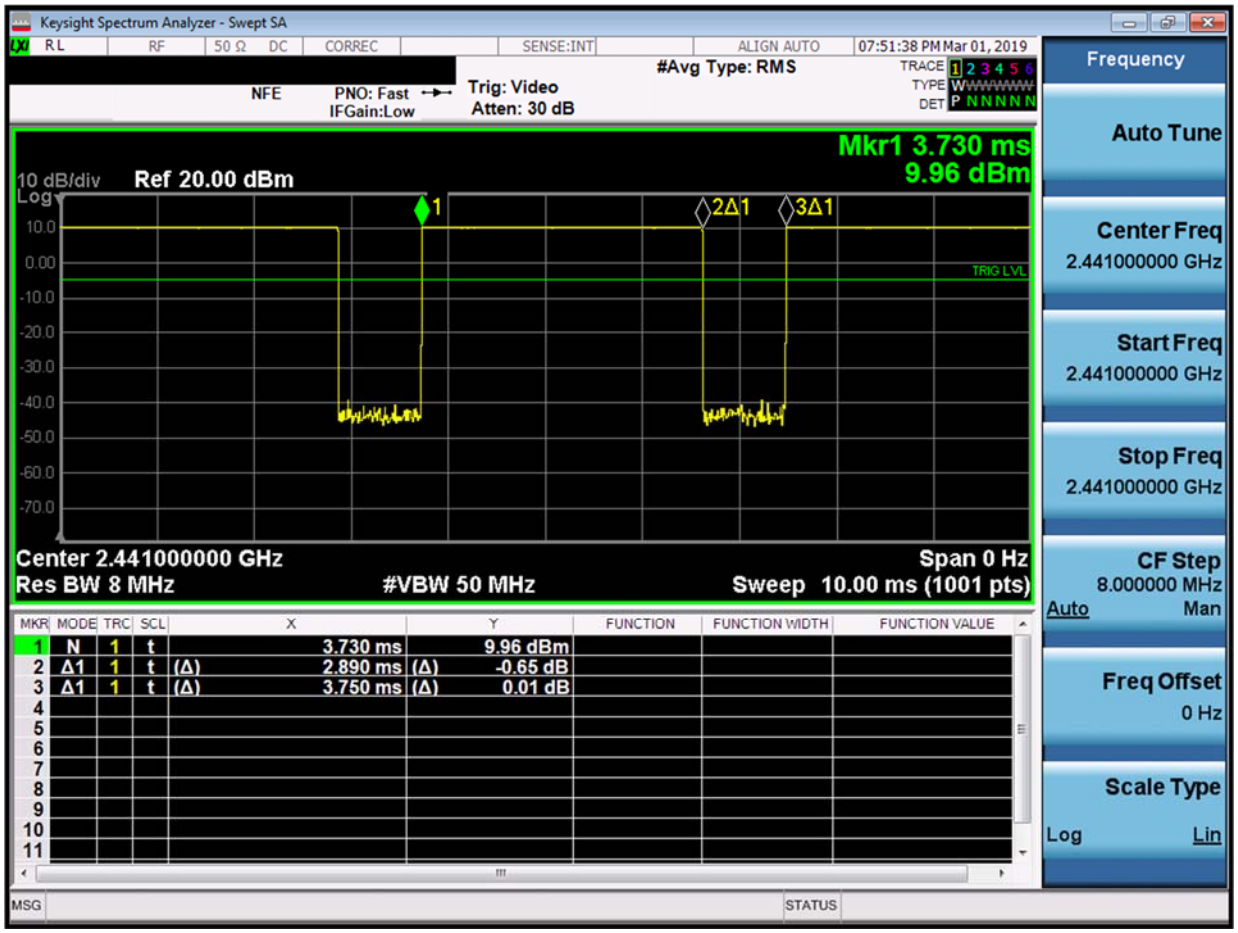

Figure 9-5
Bluetooth Transmission Plot

Equation 9-1
Bluetooth Duty Cycle Calculation

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.890ms}{3.750ms} * 100\% = 77.1\%$$

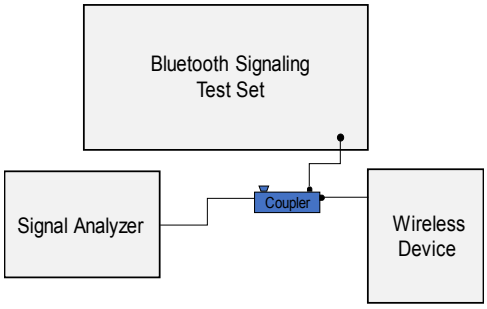

Figure 9-6
Power Measurement Setup

10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Tissue Properties - Head

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (˚C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
4/5/2019	750H	23.0	680	0.896	42.382	0.888	42.305	0.90%	0.18%
			695	0.901	42.343	0.889	42.227	1.35%	0.27%
			740	0.916	42.235	0.893	41.994	2.58%	0.57%
			755	0.921	42.189	0.894	41.916	3.02%	0.65%
4/8/2019	750H	21.9	700	0.873	41.820	0.889	42.201	-1.80%	-0.90%
			710	0.877	41.787	0.890	42.149	-1.46%	-0.86%
			740	0.887	41.683	0.893	41.994	-0.67%	-0.74%
			755	0.892	41.632	0.894	41.916	-0.22%	-0.68%
			770	0.897	41.586	0.895	41.838	0.22%	-0.60%
			785	0.903	41.544	0.896	41.760	0.78%	-0.52%
4/4/2019	835H	23.4	820	0.875	40.041	0.899	41.578	-2.67%	-3.70%
			835	0.890	39.846	0.900	41.500	-1.11%	-3.99%
			850	0.904	39.653	0.916	41.500	-1.31%	-4.45%
4/15/2019	835H	20.6	820	0.915	41.988	0.899	41.578	1.78%	0.99%
			835	0.920	41.957	0.900	41.500	2.22%	1.10%
			850	0.925	41.929	0.916	41.500	0.98%	1.03%
4/24/2019	835H	22.7	820	0.931	41.940	0.899	41.578	3.56%	0.87%
			835	0.936	41.890	0.900	41.500	4.00%	0.94%
			850	0.942	41.857	0.916	41.500	2.84%	0.86%
4/10/2019	1750H	22.7	1710	1.325	38.729	1.348	40.142	-1.71%	-3.52%
			1750	1.350	38.660	1.371	40.079	-1.53%	-3.54%
			1790	1.373	38.604	1.394	40.016	-1.51%	-3.53%
4/10/2019	1900H	22.1	1850	1.391	41.205	1.400	40.000	-0.64%	3.01%
			1880	1.423	41.106	1.400	40.000	1.64%	2.77%
			1910	1.457	41.010	1.400	40.000	4.07%	2.52%
4/17/2019	1900H	20.0	1850	1.382	38.962	1.400	40.000	-1.29%	-2.59%
			1880	1.402	38.932	1.400	40.000	0.14%	-2.67%
			1910	1.422	38.905	1.400	40.000	1.57%	-2.74%
4/28/2019	1900H	21.5	1850	1.430	39.793	1.400	40.000	2.14%	-0.52%
			1880	1.450	39.748	1.400	40.000	3.57%	-0.63%
			1910	1.469	39.684	1.400	40.000	4.93%	-0.79%
4/16/2019	2450H	21.0	2400	1.788	38.404	1.756	39.289	1.82%	-2.25%
			2450	1.827	38.326	1.800	39.200	1.50%	-2.23%
			2500	1.867	38.254	1.855	39.136	0.65%	-2.25%
			2550	1.909	38.172	1.909	39.073	0.00%	-2.31%
			2600	1.952	38.109	1.964	39.009	-0.61%	-2.31%
			2650	1.995	38.012	2.018	38.945	-1.14%	-2.40%
			2700	2.037	37.918	2.073	38.882	-1.74%	-2.48%
04/08/2019	5200H-5800H	20.5	5180	4.522	35.727	4.635	36.009	-2.44%	-0.78%
			5200	4.550	35.693	4.655	35.986	-2.26%	-0.81%
			5220	4.566	35.660	4.676	35.963	-2.35%	-0.84%
			5240	4.588	35.628	4.696	35.940	-2.30%	-0.87%
			5260	4.609	35.567	4.717	35.917	-2.29%	-0.97%
			5280	4.631	35.545	4.737	35.894	-2.24%	-0.97%
			5300	4.653	35.521	4.758	35.871	-2.21%	-0.98%
			5320	4.677	35.488	4.778	35.849	-2.11%	-1.01%
			5500	4.878	35.167	4.963	35.643	-1.71%	-1.34%
			5520	4.900	35.137	4.983	35.620	-1.67%	-1.36%
			5540	4.927	35.093	5.004	35.597	-1.54%	-1.42%
			5560	4.951	35.056	5.024	35.574	-1.45%	-1.46%
			5580	4.974	35.028	5.045	35.551	-1.41%	-1.47%
			5600	4.994	34.982	5.065	35.529	-1.40%	-1.54%
			5620	5.020	34.950	5.086	35.506	-1.30%	-1.57%
			5640	5.046	34.916	5.106	35.483	-1.18%	-1.60%
			5660	5.070	34.881	5.127	35.460	-1.11%	-1.63%
			5680	5.089	34.850	5.147	35.437	-1.13%	-1.66%
			5700	5.111	34.819	5.168	35.414	-1.10%	-1.68%
			5745	5.166	34.723	5.214	35.363	-0.92%	-1.81%
			5765	5.188	34.694	5.234	35.340	-0.88%	-1.83%
			5785	5.212	34.665	5.255	35.317	-0.82%	-1.85%
			5800	5.225	34.635	5.270	35.300	-0.85%	-1.88%
			5805	5.229	34.626	5.275	35.294	-0.87%	-1.89%
			5825	5.251	34.578	5.296	35.271	-0.85%	-1.96%

Table 10-2
Measured Tissue Properties - Body

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
4/3/2019	750B	22.3	680	0.932	54.013	0.958	55.804	-2.71%	-3.21%
			695	0.937	53.984	0.959	55.745	-2.29%	-3.16%
			700	0.939	53.976	0.959	55.726	-2.09%	-3.14%
			710	0.943	53.959	0.960	55.687	-1.77%	-3.10%
			740	0.955	53.876	0.963	55.570	-0.83%	-3.05%
			755	0.960	53.828	0.964	55.512	-0.41%	-3.03%
			770	0.966	53.791	0.965	55.453	0.10%	-3.00%
			785	0.971	53.767	0.966	55.395	0.52%	-2.94%
4/16/2019	835B	22.6	820	0.982	54.505	0.969	55.258	1.34%	-1.36%
			835	0.988	54.474	0.970	55.200	1.86%	-1.32%
			850	0.994	54.443	0.988	55.154	0.61%	-1.29%
4/18/2019	835B	22.5	820	1.004	53.374	0.969	55.258	3.61%	-3.41%
			835	1.009	53.339	0.970	55.200	4.02%	-3.37%
			850	1.015	53.310	0.988	55.154	2.73%	-3.34%
5/1/2019	835B	22.4	820	0.995	52.856	0.969	55.258	2.68%	-4.35%
			835	1.001	52.822	0.970	55.200	3.20%	-4.31%
			850	1.006	52.791	0.988	55.154	1.82%	-4.28%
4/8/2019	1750B	20.5	1710	1.438	51.262	1.463	53.537	-1.71%	-4.25%
			1750	1.483	51.102	1.488	53.432	-0.34%	-4.36%
			1790	1.526	50.939	1.514	53.326	0.79%	-4.48%
4/11/2019	1750B	21.5	1710	1.451	51.678	1.463	53.537	-0.82%	-3.47%
			1750	1.495	51.531	1.488	53.432	0.47%	-3.56%
			1790	1.536	51.374	1.514	53.326	1.45%	-3.66%
4/10/2019	1900B	22.8	1850	1.511	52.096	1.520	53.300	-0.59%	-2.26%
			1880	1.546	51.994	1.520	53.300	1.71%	-2.45%
			1910	1.581	51.896	1.520	53.300	4.01%	-2.63%
4/25/2019	1900B	23.6	1850	1.520	52.630	1.520	53.300	0.00%	-1.26%
			1880	1.553	52.550	1.520	53.300	2.17%	-1.41%
			1910	1.585	52.474	1.520	53.300	4.28%	-1.55%
4/29/2019	1900B	22.9	1850	1.526	53.221	1.520	53.300	0.39%	-0.15%
			1880	1.560	53.108	1.520	53.300	2.63%	-0.36%
			1910	1.593	53.005	1.520	53.300	4.80%	-0.55%
4/8/2019	2450B	22.4	2400	1.982	52.154	1.902	52.767	4.21%	-1.16%
			2450	2.040	52.022	1.950	52.700	4.62%	-1.29%
			2500	2.098	51.888	2.021	52.636	3.81%	-1.42%
4/11/2019	2450B	22.1	2400	1.975	52.168	1.902	52.767	3.84%	-1.14%
			2450	2.033	52.027	1.950	52.700	4.26%	-1.28%
			2500	2.089	51.881	2.021	52.636	3.36%	-1.43%
4/15/2019	2450B	22.4	2400	1.990	51.130	1.902	52.767	4.63%	-3.10%
			2450	2.046	50.998	1.950	52.700	4.92%	-3.23%
			2500	2.104	50.863	2.021	52.636	4.11%	-3.37%
			2550	2.164	50.719	2.092	52.573	3.44%	-3.53%
			2600	2.224	50.581	2.163	52.509	2.82%	-3.67%
			2650	2.284	50.430	2.234	52.445	2.24%	-3.84%
			2700	2.346	50.275	2.305	52.382	1.78%	-4.02%
4/18/2019	2450B	22.9	2500	2.022	50.872	2.021	52.636	0.05%	-3.35%
			2550	2.081	50.694	2.092	52.573	-0.53%	-3.57%
			2600	2.139	50.573	2.163	52.509	-1.11%	-3.69%
4/29/2019	2450B	23.8	2400	1.981	51.268	1.902	52.767	4.15%	-2.84%
			2450	2.042	51.126	1.950	52.700	4.72%	-2.99%
			2500	2.102	50.972	2.021	52.636	4.01%	-3.16%
			2550	2.164	50.821	2.092	52.573	3.44%	-3.33%
			2600	2.225	50.654	2.163	52.509	2.87%	-3.53%
			2650	2.286	50.486	2.234	52.445	2.33%	-3.74%
			2700	2.346	50.318	2.305	52.382	1.78%	-3.94%
5/2/2019	2450B	20.8	2400	1.982	52.908	1.902	52.767	4.21%	0.27%
			2450	2.028	52.830	1.950	52.700	4.00%	0.25%
			2500	2.075	52.763	2.021	52.636	2.67%	0.24%
04/14/2019	5200B-5800B	22.0	5180	5.277	47.494	5.276	49.041	0.02%	-3.15%
			5200	5.310	47.457	5.299	49.014	0.21%	-3.18%
			5220	5.337	47.394	5.323	48.987	0.26%	-3.25%
			5240	5.369	47.350	5.346	48.960	0.43%	-3.29%
			5260	5.390	47.306	5.369	48.933	0.39%	-3.32%
			5280	5.418	47.296	5.393	48.906	0.46%	-3.29%
			5300	5.448	47.266	5.416	48.879	0.59%	-3.30%
			5320	5.475	47.222	5.439	48.851	0.66%	-3.33%
			5500	5.720	46.889	5.650	48.607	1.24%	-3.53%
			5520	5.750	46.841	5.673	48.580	1.36%	-3.58%
			5540	5.793	46.783	5.696	48.553	1.70%	-3.65%
			5560	5.822	46.735	5.720	48.526	1.78%	-3.69%
			5580	5.852	46.731	5.743	48.499	1.90%	-3.65%
			5600	5.876	46.696	5.766	48.471	1.91%	-3.66%
			5620	5.897	46.645	5.790	48.444	1.85%	-3.71%
			5640	5.933	46.589	5.813	48.417	2.06%	-3.78%
			5660	5.974	46.538	5.837	48.390	2.35%	-3.83%
			5680	6.003	46.517	5.860	48.363	2.44%	-3.82%
			5700	6.029	46.514	5.883	48.336	2.48%	-3.77%
			5745	6.097	46.410	5.936	48.275	2.71%	-3.86%
			5765	6.123	46.351	5.959	48.248	2.75%	-3.93%
			5785	6.159	46.306	5.982	48.220	2.96%	-3.97%
			5800	6.181	46.301	6.000	48.200	3.02%	-3.94%
			5805	6.187	46.300	6.006	48.193	3.01%	-3.93%
			5825	6.211	46.284	6.029	48.166	3.02%	-3.91%
04/30/2019	5200B-5800B	21.1	5180	5.366	47.683	5.276	49.041	1.71%	-2.77%
			5200	5.401	47.642	5.299	49.014	1.92%	-2.80%
			5220	5.428	47.586	5.323	48.987	1.97%	-2.86%
			5240	5.462	47.558	5.346	48.960	2.17%	-2.86%
			5260	5.488	47.514	5.369	48.933	2.22%	-2.90%
			5280	5.512	47.489	5.393	48.906	2.21%	-2.90%
			5300	5.537	47.454	5.416	48.879	2.23%	-2.92%
			5320	5.571	47.391	5.439	48.851	2.43%	-2.99%
			5500	5.826	47.067	5.650	48.607	3.12%	-3.17%
			5520	5.857	47.030	5.673	48.580	3.24%	-3.19%
			5540	5.892	46.980	5.696	48.553	3.44%	-3.24%
			5560	5.931	46.938	5.720	48.526	3.69%	-3.27%
			5580	5.959	46.911	5.743	48.499	3.76%	-3.27%
			5600	5.984	46.873	5.766	48.471	3.78%	-3.30%
			5620	6.009	46.827	5.790	48.444	3.78%	-3.34%
			5640	6.044	46.779	5.813	48.417	3.97%	-3.38%
			5660	6.078	46.735	5.837	48.390	4.13%	-3.42%
			5680	6.112	46.706	5.860	48.363	4.30%	-3.43%
			5700	6.141	46.673	5.883	48.336	4.39%	-3.44%
			5745	6.203	46.579	5.936	48.275	4.50%	-3.51%
			5765	6.238	46.542	5.959	48.248	4.68%	-3.54%
			5785	6.271	46.503	5.982	48.220	4.83%	-3.56%
			5800	6.293	46.477	6.000	48.200	4.88%	-3.57%
			5805	6.300	46.470	6.006	48.193	4.90%	-3.58%
			5825	6.328	46.444	6.029	48.166	4.96%	-3.58%

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 10-3
System Verification Results – 1g

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	$Deviation_{1g}$ (%)
E	750	HEAD	04/05/2019	24.0	21.5	0.200	1003	3589	1.540	8.280	7.700	-7.00%
E	750	HEAD	04/08/2019	23.3	21.9	0.200	1003	3589	1.610	8.280	8.050	-2.78%
D	835	HEAD	04/04/2019	22.7	23.4	0.200	4d133	7357	1.940	9.430	9.700	2.86%
D	835	HEAD	04/15/2019	22.4	20.6	0.200	4d132	3914	1.950	9.590	9.750	1.67%
D	835	HEAD	04/24/2019	23.1	22.7	0.200	4d132	3914	1.970	9.590	9.850	2.71%
L	1750	HEAD	04/10/2019	23.0	22.7	0.100	1150	7308	3.590	36.500	35.900	-1.64%
D	1900	HEAD	04/10/2019	23.7	22.1	0.100	5d080	7357	4.290	39.800	42.900	7.79%
H	1900	HEAD	04/17/2019	23.9	20.0	0.100	5d080	7409	4.210	39.800	42.100	5.78%
H	1900	HEAD	04/28/2019	23.0	21.5	0.100	5d080	7409	4.250	39.800	42.500	6.78%
E	2450	HEAD	04/16/2019	23.8	20.9	0.100	981	3589	5.300	52.300	53.000	1.34%
E	2600	HEAD	04/16/2019	23.8	20.9	0.100	1064	3589	6.060	57.000	60.600	6.32%
H	5250	HEAD	04/08/2019	20.9	20.5	0.050	1057	7409	3.730	79.200	74.600	-5.81%
H	5600	HEAD	04/08/2019	20.9	20.5	0.050	1057	7409	4.050	84.100	81.000	-3.69%
H	5750	HEAD	04/08/2019	20.9	20.5	0.050	1057	7409	3.760	80.500	75.200	-6.58%
L	750	BODY	04/03/2019	21.7	22.3	0.200	1161	7308	1.590	8.430	7.950	-5.69%
J	835	BODY	04/16/2019	24.2	22.6	0.200	4d132	7488	1.880	9.670	9.400	-2.79%
J	835	BODY	04/18/2019	24.9	22.5	0.200	4d132	7488	1.870	9.670	9.350	-3.31%
J	835	BODY	05/01/2019	23.3	22.4	0.200	4d132	7488	1.870	9.670	9.350	-3.31%
J	1750	BODY	04/08/2019	20.4	19.8	0.100	1148	7488	3.510	37.000	35.100	-5.14%
J	1750	BODY	04/11/2019	22.5	21.5	0.100	1008	7488	3.600	37.400	36.000	-3.74%
G	1900	BODY	04/10/2019	22.4	21.7	0.100	5d149	7410	4.160	39.400	41.600	5.58%
G	1900	BODY	04/25/2019	23.4	22.7	0.100	5d149	7410	4.250	39.400	42.500	7.87%
G	1900	BODY	04/29/2019	21.6	21.2	0.100	5d149	7410	4.300	39.400	43.000	9.14%
K	2450	BODY	04/08/2019	23.0	22.4	0.100	797	7417	5.060	51.100	50.600	-0.98%
K	2450	BODY	04/11/2019	23.5	22.1	0.100	719	7417	5.210	50.100	52.100	3.99%
K	2450	BODY	04/15/2019	22.5	22.3	0.100	797	7417	5.130	51.100	51.300	0.39%
K	2600	BODY	04/15/2019	22.5	22.3	0.100	1071	7417	5.410	54.200	54.100	-0.18%
K	2600	BODY	04/18/2019	22.3	21.9	0.100	1071	7417	5.200	54.200	52.000	-4.06%
L	5250	BODY	04/14/2019	22.0	21.5	0.050	1057	7308	3.560	75.900	71.200	-6.19%
L	5600	BODY	04/14/2019	22.0	21.5	0.050	1057	7308	4.020	79.900	80.400	0.63%
L	5750	BODY	04/14/2019	22.0	21.5	0.050	1057	7308	3.540	76.700	70.800	-7.69%

Table 10-4
System Verification Results – 10g

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR_{10g} (W/kg)	1 W Target SAR_{10g} (W/kg)	1 W Normalized SAR_{10g} (W/kg)	$Deviation_{10g}$ (%)
G	1900	BODY	04/29/2019	21.6	21.2	0.100	5d149	7410	2.210	20.700	22.100	6.76%
K	2450	BODY	04/29/2019	22.2	21.9	0.100	797	7417	2.230	24.200	22.300	-7.85%
L	2450	BODY	05/02/2019	22.6	20.8	0.100	719	7308	2.240	23.700	22.400	-5.49%
K	2600	BODY	04/29/2019	22.2	21.9	0.100	1071	7417	2.340	24.500	23.400	-4.49%
L	5250	BODY	04/30/2019	22.0	21.1	0.050	1057	7308	0.985	21.100	19.700	-6.64%
L	5600	BODY	04/30/2019	22.0	21.1	0.050	1057	7308	1.060	22.300	21.200	-4.93%
L	5750	BODY	04/30/2019	22.0	21.1	0.050	1057	7308	0.990	21.200	19.800	-6.60%

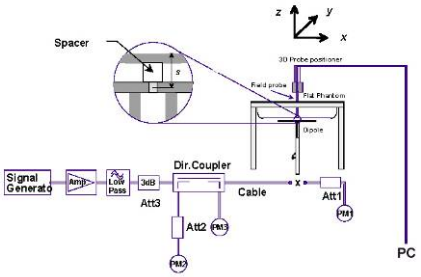

Figure 10-1
System Verification Setup Diagram

Figure 10-2
System Verification Setup Photo

11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
CDMA BC10 (§90S) 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)	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.0	24.88	0.02	Right	Cheek	00744	1:1	0.159	1.028	0.163	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.0	24.88	0.05	Right	Tilt	00744	1:1	0.077	1.028	0.079	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.0	24.88	0.11	Left	Cheek	00744	1:1	0.141	1.028	0.145	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.0	24.88	0.11	Left	Tilt	00744	1:1	0.085	1.028	0.087	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.0	24.94	0.12	Right	Cheek	00744	1:1	0.161	1.014	0.163	A1
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.0	24.94	-0.05	Right	Tilt	00744	1:1	0.095	1.014	0.096	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.0	24.94	0.12	Left	Cheek	00744	1:1	0.137	1.014	0.139	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.0	24.94	0.09	Left	Tilt	00744	1:1	0.108	1.014	0.110	
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
CDMA BC0 (§22H) 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)	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.0	24.70	0.06	Right	Cheek	00744	1:1	0.185	1.072	0.198	A2
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.0	24.70	0.04	Right	Tilt	00744	1:1	0.099	1.072	0.106	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.0	24.70	0.06	Left	Cheek	00744	1:1	0.179	1.072	0.192	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.0	24.70	0.07	Left	Tilt	00744	1:1	0.109	1.072	0.117	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.0	24.92	-0.01	Right	Cheek	00744	1:1	0.178	1.019	0.181	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.0	24.92	0.08	Right	Tilt	00744	1:1	0.123	1.019	0.125	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.0	24.92	0.08	Left	Cheek	00744	1:1	0.167	1.019	0.170	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.0	24.92	0.01	Left	Tilt	00744	1:1	0.135	1.019	0.138	
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
PCS CDMA 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	600	PCS CDMA	RC3 / SO55	24.7	24.34	0.09	Right	Cheek	00751	1:1	0.158	1.086	0.172	
1880.00	600	PCS CDMA	RC3 / SO55	24.7	24.34	-0.07	Right	Tilt	00751	1:1	0.095	1.086	0.103	
1880.00	600	PCS CDMA	RC3 / SO55	24.7	24.34	-0.05	Left	Cheek	00751	1:1	0.155	1.086	0.168	
1880.00	600	PCS CDMA	RC3 / SO55	24.7	24.34	-0.06	Left	Tilt	00751	1:1	0.073	1.086	0.079	
1880.00	600	PCS CDMA	EVDO Rev. A	24.7	24.42	0.08	Right	Cheek	00751	1:1	0.170	1.067	0.181	A3
1880.00	600	PCS CDMA	EVDO Rev. A	24.7	24.42	-0.08	Right	Tilt	00751	1:1	0.077	1.067	0.082	
1880.00	600	PCS CDMA	EVDO Rev. A	24.7	24.42	-0.12	Left	Cheek	00751	1:1	0.153	1.067	0.163	
1880.00	600	PCS CDMA	EVDO Rev. A	24.7	24.42	-0.10	Left	Tilt	00751	1:1	0.075	1.067	0.080	
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
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	# of Time Slots	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.2	32.78	-0.02	Right	Cheek	00744	1	1:8.3	0.123	1.102	0.136	
836.60	190	GSM 850	GSM	33.2	32.78	0.03	Right	Tilt	00744	1	1:8.3	0.062	1.102	0.068	
836.60	190	GSM 850	GSM	33.2	32.78	0.08	Left	Cheek	00744	1	1:8.3	0.112	1.102	0.123	
836.60	190	GSM 850	GSM	33.2	32.78	0.05	Left	Tilt	00744	1	1:8.3	0.074	1.102	0.082	
836.60	190	GSM 850	GPRS	30.7	30.18	0.02	Right	Cheek	00744	3	1:2.76	0.175	1.127	0.197	A4
836.60	190	GSM 850	GPRS	30.7	30.18	0.05	Right	Tilt	00744	3	1:2.76	0.089	1.127	0.100	
836.60	190	GSM 850	GPRS	30.7	30.18	-0.18	Left	Cheek	00744	3	1:2.76	0.147	1.127	0.166	
836.60	190	GSM 850	GPRS	30.7	30.18	0.11	Left	Tilt	00744	3	1:2.76	0.091	1.127	0.103	
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
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	# of Time Slots	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GSM	30.7	30.25	0.09	Right	Cheek	00744	1	1:8.3	0.086	1.109	0.095	
1880.00	661	GSM 1900	GSM	30.7	30.25	0.19	Right	Tilt	00744	1	1:8.3	0.053	1.109	0.059	
1880.00	661	GSM 1900	GSM	30.7	30.25	0.01	Left	Cheek	00744	1	1:8.3	0.078	1.109	0.087	
1880.00	661	GSM 1900	GSM	30.7	30.25	0.12	Left	Tilt	00744	1	1:8.3	0.039	1.109	0.043	
1880.00	661	GSM 1900	GPRS	27.2	26.47	0.13	Right	Cheek	00744	3	1:2.76	0.095	1.183	0.112	A5
1880.00	661	GSM 1900	GPRS	27.2	26.47	0.11	Right	Tilt	00744	3	1:2.76	0.054	1.183	0.064	
1880.00	661	GSM 1900	GPRS	27.2	26.47	0.01	Left	Cheek	00744	3	1:2.76	0.084	1.183	0.099	
1880.00	661	GSM 1900	GPRS	27.2	26.47	0.09	Left	Tilt	00744	3	1:2.76	0.041	1.183	0.049	
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
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	25.43	-0.03	Right	Cheek	00744	1:1	0.225	1.016	0.229	A6
836.60	4183	UMTS 850	RMC	25.5	25.43	0.01	Right	Tilt	00744	1:1	0.111	1.016	0.113	
836.60	4183	UMTS 850	RMC	25.5	25.43	0.05	Left	Cheek	00744	1:1	0.203	1.016	0.206	
836.60	4183	UMTS 850	RMC	25.5	25.43	0.09	Left	Tilt	00744	1:1	0.127	1.016	0.129	
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
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	24.0	23.35	0.15	Right	Cheek	00744	1:1	0.147	1.161	0.171	A7
1732.40	1412	UMTS 1750	RMC	24.0	23.35	-0.03	Right	Tilt	00744	1:1	0.100	1.161	0.116	
1732.40	1412	UMTS 1750	RMC	24.0	23.35	0.08	Left	Cheek	00744	1:1	0.146	1.161	0.170	
1732.40	1412	UMTS 1750	RMC	24.0	23.35	0.11	Left	Tilt	00744	1:1	0.057	1.161	0.066	
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
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	24.0	23.27	0.02	Right	Cheek	00744	1:1	0.154	1.183	0.182	A8
1880.00	9400	UMTS 1900	RMC	24.0	23.27	0.15	Right	Tilt	00744	1:1	0.085	1.183	0.101	
1880.00	9400	UMTS 1900	RMC	24.0	23.27	-0.01	Left	Cheek	00744	1:1	0.128	1.183	0.151	
1880.00	9400	UMTS 1900	RMC	24.0	23.27	0.18	Left	Tilt	00744	1:1	0.052	1.183	0.062	
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 71 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)	
680.50	133297	Mid	LTE Band 71	20	25.5	25.08	-0.08	0	Right	Cheek	QPSK	1	0	00777	1:1	0.197	1.102	0.217	
680.50	133297	Mid	LTE Band 71	20	24.5	23.93	0.06	1	Right	Cheek	QPSK	50	0	00777	1:1	0.099	1.140	0.113	
680.50	133297	Mid	LTE Band 71	20	25.5	25.08	0.03	0	Right	Tilt	QPSK	1	0	00777	1:1	0.094	1.102	0.104	
680.50	133297	Mid	LTE Band 71	20	24.5	23.93	0.12	1	Right	Tilt	QPSK	50	0	00777	1:1	0.048	1.140	0.055	
680.50	133297	Mid	LTE Band 71	20	25.5	25.08	0.05	0	Left	Cheek	QPSK	1	0	00777	1:1	0.229	1.102	0.252	A9
680.50	133297	Mid	LTE Band 71	20	24.5	23.93	0.09	1	Left	Cheek	QPSK	50	0	00777	1:1	0.105	1.140	0.120	
680.50	133297	Mid	LTE Band 71	20	25.5	25.08	0.04	0	Left	Tilt	QPSK	1	0	00777	1:1	0.118	1.102	0.130	
680.50	133297	Mid	LTE Band 71	20	24.5	23.93	0.19	1	Left	Tilt	QPSK	50	0	00777	1:1	0.055	1.140	0.063	
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 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	25.5	25.41	0.10	0	Right	Cheek	QPSK	1	25	00777	1:1	0.156	1.021	0.159	
707.50	23095	Mid	LTE Band 12	10	24.5	23.60	0.19	1	Right	Cheek	QPSK	25	0	00777	1:1	0.116	1.230	0.143	
707.50	23095	Mid	LTE Band 12	10	25.5	25.41	0.05	0	Right	Tilt	QPSK	1	25	00777	1:1	0.092	1.021	0.094	
707.50	23095	Mid	LTE Band 12	10	24.5	23.60	0.03	1	Right	Tilt	QPSK	25	0	00777	1:1	0.073	1.230	0.090	
707.50	23095	Mid	LTE Band 12	10	25.5	25.41	-0.10	0	Left	Cheek	QPSK	1	25	00777	1:1	0.180	1.021	0.184	A10
707.50	23095	Mid	LTE Band 12	10	24.5	23.60	0.05	1	Left	Cheek	QPSK	25	0	00777	1:1	0.126	1.230	0.155	
707.50	23095	Mid	LTE Band 12	10	25.5	25.41	-0.13	0	Left	Tilt	QPSK	1	25	00777	1:1	0.108	1.021	0.110	
707.50	23095	Mid	LTE Band 12	10	24.5	23.60	0.02	1	Left	Tilt	QPSK	25	0	00777	1:1	0.076	1.230	0.093	
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 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	25.5	25.33	-0.14	0	Right	Cheek	QPSK	1	0	00777	1:1	0.235	1.040	0.244	A11
782.00	23230	Mid	LTE Band 13	10	24.5	24.02	0.07	1	Right	Cheek	QPSK	25	12	00777	1:1	0.147	1.117	0.164	
782.00	23230	Mid	LTE Band 13	10	25.5	25.33	-0.09	0	Right	Tilt	QPSK	1	0	00777	1:1	0.130	1.040	0.135	
782.00	23230	Mid	LTE Band 13	10	24.5	24.02	0.05	1	Right	Tilt	QPSK	25	12	00777	1:1	0.087	1.117	0.097	
782.00	23230	Mid	LTE Band 13	10	25.5	25.33	0.07	0	Left	Cheek	QPSK	1	0	00777	1:1	0.215	1.040	0.224	
782.00	23230	Mid	LTE Band 13	10	24.5	24.02	0.07	1	Left	Cheek	QPSK	25	12	00777	1:1	0.138	1.117	0.154	
782.00	23230	Mid	LTE Band 13	10	25.5	25.33	0.08	0	Left	Tilt	QPSK	1	0	00777	1:1	0.134	1.040	0.139	
782.00	23230	Mid	LTE Band 13	10	24.5	24.02	0.04	1	Left	Tilt	QPSK	25	12	00777	1:1	0.089	1.117	0.099	
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
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	25.32	-0.06	0	Right	Cheek	QPSK	1	0	00777	1:1	0.196	1.042	0.204	A12
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.86	0.15	1	Right	Cheek	QPSK	36	0	00777	1:1	0.142	1.159	0.165	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	25.32	0.10	0	Right	Tilt	QPSK	1	0	00777	1:1	0.137	1.042	0.143	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.86	0.09	1	Right	Tilt	QPSK	36	0	00777	1:1	0.094	1.159	0.109	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	25.32	-0.01	0	Left	Cheek	QPSK	1	0	00777	1:1	0.183	1.042	0.191	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.86	0.12	1	Left	Cheek	QPSK	36	0	00777	1:1	0.124	1.159	0.144	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	25.32	0.03	0	Left	Tilt	QPSK	1	0	00777	1:1	0.156	1.042	0.163	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.86	0.03	1	Left	Tilt	QPSK	36	0	00777	1:1	0.109	1.159	0.126	
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
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)	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.84	-0.12	0	Right	Cheek	QPSK	1	0	00777	1:1	0.110	1.038	0.114	A13
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.50	0.00	1	Right	Cheek	QPSK	50	25	00777	1:1	0.096	1.122	0.108	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.84	0.14	0	Right	Tilt	QPSK	1	0	00777	1:1	0.079	1.038	0.082	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.50	0.12	1	Right	Tilt	QPSK	50	25	00777	1:1	0.052	1.122	0.058	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.84	-0.09	0	Left	Cheek	QPSK	1	0	00777	1:1	0.087	1.038	0.090	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.50	0.00	1	Left	Cheek	QPSK	50	25	00777	1:1	0.067	1.122	0.075	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.84	0.00	0	Left	Tilt	QPSK	1	0	00777	1:1	0.041	1.038	0.043	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.50	0.06	1	Left	Tilt	QPSK	50	25	00777	1:1	0.034	1.122	0.038	
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
LTE Band 25 (PCS) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.0	23.84	-0.01	0	Right	Cheek	QPSK	1	0	00785	1:1	0.113	1.038	0.117	A14
1905.00	26590	High	LTE Band 25 (PCS)	20	23.0	22.64	0.11	1	Right	Cheek	QPSK	50	25	00785	1:1	0.088	1.086	0.096	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.0	23.84	0.01	0	Right	Tilt	QPSK	1	0	00785	1:1	0.060	1.038	0.062	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.0	22.64	0.20	1	Right	Tilt	QPSK	50	25	00785	1:1	0.046	1.086	0.050	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.0	23.84	0.04	0	Left	Cheek	QPSK	1	0	00785	1:1	0.106	1.038	0.110	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.0	22.64	0.11	1	Left	Cheek	QPSK	50	25	00785	1:1	0.085	1.086	0.092	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.0	23.84	0.05	0	Left	Tilt	QPSK	1	0	00785	1:1	0.071	1.038	0.074	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.0	22.64	0.09	1	Left	Tilt	QPSK	50	25	00785	1:1	0.049	1.086	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										

Table 11-15
LTE Band 41 Head SAR

MEASUREMENT RESULTS																				
Power Class	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)	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.04	0.12	0	Right	Cheek	QPSK	1	0	00785	1:1.58	0.032	1.247	0.040	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.07	-0.12	1	Right	Cheek	QPSK	50	0	00785	1:1.58	0.023	1.239	0.028	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.04	-0.19	0	Right	Tilt	QPSK	1	0	00785	1:1.58	0.067	1.247	0.084	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.07	-0.13	1	Right	Tilt	QPSK	50	0	00785	1:1.58	0.038	1.239	0.047	
Power Class 2	2549.50	40185	Low-Mid	LTE Band 41	20	27.7	27.48	0.18	0	Right	Tilt	QPSK	1	0	00785	1:2.31	0.106	1.052	0.112	A15
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.04	0.08	0	Left	Cheek	QPSK	1	0	00785	1:1.58	0.057	1.247	0.071	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.07	0.12	1	Left	Cheek	QPSK	50	0	00785	1:1.58	0.042	1.239	0.052	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.04	0.13	0	Left	Tilt	QPSK	1	0	00785	1:1.58	0.057	1.247	0.071	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.07	0.16	1	Left	Tilt	QPSK	50	0	00785	1:1.58	0.041	1.239	0.051	
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 11-16
DTS Head SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	19.0	18.37	0.16	Right	Cheek	00876	1	99.9	1.090	0.735	1.156	1.001	0.851	
2437	6	802.11b	DSSS	22	19.0	18.37	0.21	Right	Cheek	00876	1	99.9	1.383	0.811	1.156	1.001	**0.938**	A16
2462	11	802.11b	DSSS	22	19.0	18.34	-0.19	Right	Cheek	00876	1	99.9	1.291	0.798	1.164	1.001	0.930	
2412	1	802.11b	DSSS	22	19.0	18.37	0.12	Right	Tilt	00876	1	99.9	0.970	0.685	1.156	1.001	0.793	
2437	6	802.11b	DSSS	22	19.0	18.37	0.08	Right	Tilt	00876	1	99.9	1.138	0.733	1.156	1.001	0.848	
2437	6	802.11b	DSSS	22	19.0	18.37	0.01	Left	Cheek	00876	1	99.9	0.516	-	1.156	1.001	-	
2437	6	802.11b	DSSS	22	19.0	18.37	0.09	Left	Tilt	00876	1	99.9	0.554	0.271	1.156	1.001	0.314	
2437	6	802.11b	DSSS	22	19.0	18.37	-0.07	Right	Cheek	00876	1	99.9	1.217	0.756	1.156	1.001	0.875	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram								

Note: Blue entry represents variability measurement.

Table 11-17
NII Head SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	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)	
5300	60	802.11a	OFDM	20	17.5	16.53	0.13	Right	Cheek	00876	6	99.1	1.000	0.504	1.250	1.009	0.636	
5300	60	802.11a	OFDM	20	17.5	16.53	0.13	Right	Tilt	00876	6	99.1	0.600	0.222	1.250	1.009	0.280	
5300	60	802.11a	OFDM	20	17.5	16.53	-0.16	Left	Cheek	00876	6	99.1	0.348	-	1.250	1.009	-	
5300	60	802.11a	OFDM	20	17.5	16.53	-0.15	Left	Tilt	00876	6	99.1	0.328	-	1.250	1.009	-	
5680	136	802.11a	OFDM	20	17.5	16.89	0.12	Right	Cheek	00876	6	99.1	1.200	0.582	1.151	1.009	0.676	
5680	136	802.11a	OFDM	20	17.5	16.89	-0.11	Right	Tilt	00876	6	99.1	0.641	0.250	1.151	1.009	0.290	
5680	136	802.11a	OFDM	20	17.5	16.89	0.13	Left	Cheek	00876	6	99.1	0.288	-	1.151	1.009	-	
5680	136	802.11a	OFDM	20	17.5	16.89	0.14	Left	Tilt	00876	6	99.1	0.225	-	1.151	1.009	-	
5765	153	802.11a	OFDM	20	18.0	17.37	0.18	Right	Cheek	00876	6	99.1	1.228	0.600	1.156	1.009	0.700	
5785	157	802.11a	OFDM	20	18.0	17.27	0.12	Right	Cheek	00876	6	99.1	1.222	0.607	1.183	1.009	**0.725**	A17
5805	161	802.11a	OFDM	20	18.0	17.38	0.12	Right	Cheek	00876	6	99.1	1.177	0.597	1.153	1.009	0.695	
5805	161	802.11a	OFDM	20	18.0	17.38	0.18	Right	Tilt	00876	6	99.1	0.742	0.255	1.153	1.009	0.297	
5805	161	802.11a	OFDM	20	18.0	17.38	-0.21	Left	Cheek	00876	6	99.1	0.369	-	1.153	1.009	-	
5805	161	802.11a	OFDM	20	18.0	17.38	0.15	Left	Tilt	00876	6	99.1	0.311	-	1.153	1.009	-	
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 11-18
GSM/UMTS/CDMA Body-Worn SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
820.10	564	CDMA BC10 (§90S)	TDSO / SO32	25.0	24.67	0.00	10 mm	00744	N/A	1:1	back	0.444	1.079	0.479	A18
836.52	384	CDMA BC0 (§22H)	TDSO / SO32	25.0	24.56	0.00	10 mm	00744	N/A	1:1	back	0.531	1.107	0.588	A20
1880.00	600	PCS CDMA	TDSO / SO32	24.7	24.70	-0.01	10 mm	00744	N/A	1:1	back	0.498	1.000	0.498	A22
836.60	190	GSM 850	GSM	33.2	32.78	0.03	10 mm	00744	1	1:8.3	back	0.376	1.102	0.414	
836.60	190	GSM 850	GPRS	30.7	30.18	0.02	10 mm	00744	3	1:2.76	back	0.521	1.127	0.587	A24
1880.00	661	GSM 1900	GSM	30.7	30.25	-0.07	10 mm	00744	1	1:8.3	back	0.300	1.109	0.333	
1880.00	661	GSM 1900	GPRS	27.2	26.47	-0.04	10 mm	00744	3	1:2.76	back	0.465	1.183	0.550	A25
826.40	4132	UMTS 850	RMC	25.5	25.50	-0.01	10 mm	00744	N/A	1:1	back	0.640	1.000	0.640	
836.60	4183	UMTS 850	RMC	25.5	25.43	0.03	10 mm	00744	N/A	1:1	back	0.658	1.016	0.669	
846.60	4233	UMTS 850	RMC	25.5	25.50	-0.05	10 mm	00744	N/A	1:1	back	0.662	1.000	0.662	A27
1712.40	1312	UMTS 1750	RMC	24.0	23.39	-0.05	10 mm	00744	N/A	1:1	back	0.551	1.151	0.634	
1732.40	1412	UMTS 1750	RMC	24.0	23.35	-0.05	10 mm	00744	N/A	1:1	back	0.581	1.161	**0.675**	A28
1752.60	1513	UMTS 1750	RMC	24.0	23.33	-0.03	10 mm	00744	N/A	1:1	back	0.581	1.167	**0.678**	
1852.40	9262	UMTS 1900	RMC	24.0	23.35	0.01	10 mm	00744	N/A	1:1	back	0.521	1.161	0.605	A30
1880.00	9400	UMTS 1900	RMC	24.0	23.27	0.04	10 mm	00744	N/A	1:1	back	0.513	1.183	0.607	
1907.60	9538	UMTS 1900	RMC	24.0	23.43	-0.09	10 mm	00744	N/A	1:1	back	0.489	1.140	0.557	
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
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)	
680.50	133297	Mid	LTE Band 71	20	25.5	25.08	-0.19	0	00777	QPSK	1	0	10 mm	back	1:1	0.544	1.102	0.599	A32
680.50	133297	Mid	LTE Band 71	20	24.5	23.93	-0.12	1	00777	QPSK	50	0	10 mm	back	1:1	0.318	1.140	0.363	
707.50	23095	Mid	LTE Band 12	10	25.5	25.41	0.01	0	00777	QPSK	1	25	10 mm	back	1:1	0.413	1.021	0.422	A33
707.50	23095	Mid	LTE Band 12	10	24.5	23.60	0.04	1	00777	QPSK	25	0	10 mm	back	1:1	0.314	1.230	0.386	
782.00	23230	Mid	LTE Band 13	10	25.5	25.33	0.15	0	00777	QPSK	1	0	10 mm	back	1:1	0.534	1.040	0.555	A34
782.00	23230	Mid	LTE Band 13	10	24.5	24.02	-0.03	1	00777	QPSK	25	12	10 mm	back	1:1	0.356	1.117	0.398	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	25.32	-0.03	0	00785	QPSK	1	0	10 mm	back	1:1	0.654	1.042	**0.681**	A35
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.86	-0.01	1	00785	QPSK	36	0	10 mm	back	1:1	0.467	1.159	0.541	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.54	-0.03	0	00785	QPSK	1	50	10 mm	back	1:1	0.607	1.112	**0.675**	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.84	0.00	0	00785	QPSK	1	0	10 mm	back	1:1	0.622	1.038	0.646	A36
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.56	0.09	0	00785	QPSK	1	0	10 mm	back	1:1	0.613	1.107	**0.679**	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.50	0.02	1	00785	QPSK	50	25	10 mm	back	1:1	0.465	1.122	0.522	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.0	23.84	-0.03	0	00777	QPSK	1	0	10 mm	back	1:1	0.546	1.038	0.567	A38
1905.00	26590	High	LTE Band 25 (PCS)	20	23.0	22.64	-0.07	1	00777	QPSK	50	25	10 mm	back	1:1	0.419	1.086	0.455	

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

Table 11-20
LTE Band 41 Body-Worn SAR

MEASUREMENT RESULTS																				
Power Class	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)	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.04	0.17	0	00785	QPSK	1	0	10 mm	back	1:1.58	0.350	1.247	0.436	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.07	-0.12	1	00785	QPSK	50	0	10 mm	back	1:1.58	0.238	1.239	0.295	
Power Class 2	2549.50	40185	Low-Mid	LTE Band 41	20	27.7	27.48	0.01	0	00785	QPSK	1	0	10 mm	back	1:2.31	0.555	1.052	0.584	A40

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

Table 11-21
DTS Body-Worn SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	23.0	22.17	0.00	10 mm	00876	1	back	99.9	0.893	0.701	1.211	1.001	0.850	A42
2437	6	802.11b	DSSS	22	23.0	22.15	0.12	10 mm	00876	1	back	99.9	1.075	0.657	1.216	1.001	0.800	
2462	11	802.11b	DSSS	22	23.0	22.08	0.20	10 mm	00876	1	back	99.9	1.078	0.693	1.236	1.001	**0.857**	
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
NII Body-Worn SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
5300	60	802.11a	OFDM	20	19.5	18.57	0.06	10 mm	00876	6	back	99.1	1.248	0.595	1.239	1.009	0.744	
5520	104	802.11a	OFDM	20	19.5	18.71	0.06	10 mm	00876	6	back	99.1	1.324	0.611	1.199	1.009	0.739	
5765	153	802.11a	OFDM	20	20.0	19.13	0.01	10 mm	00876	6	back	99.1	1.320	0.621	1.222	1.009	**0.766**	
5785	157	802.11a	OFDM	20	20.0	19.17	0.04	10 mm	00876	6	back	99.1	1.247	0.625	1.211	1.009	0.764	A43
5805	161	802.11a	OFDM	20	20.0	19.05	0.03	10 mm	00876	6	back	99.1	1.261	0.600	1.245	1.009	0.754	
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
DSS Body-Worn SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	11.0	10.27	0.06	10 mm	00876	1	back	77.1	0.034	1.183	1.297	0.052	A45
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 11-24
GPRS/UMTS/CDMA 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)	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.98	-0.04	10 mm	00744	N/A	1:1	back	0.444	1.005	0.446	A19
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.98	0.06	10 mm	00744	N/A	1:1	front	0.340	1.005	0.342	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.98	-0.08	10 mm	00744	N/A	1:1	bottom	0.162	1.005	0.163	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.0	24.98	-0.04	10 mm	00744	N/A	1:1	left	0.072	1.005	0.072	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	25.00	-0.05	10 mm	00744	N/A	1:1	back	0.565	1.000	0.565	A21
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	25.00	0.15	10 mm	00744	N/A	1:1	front	0.433	1.000	0.433	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	25.00	-0.06	10 mm	00744	N/A	1:1	bottom	0.205	1.000	0.205	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.0	25.00	-0.12	10 mm	00744	N/A	1:1	left	0.093	1.000	0.093	
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.39	-0.09	10 mm	00744	N/A	1:1	back	0.505	1.074	0.542	
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.39	0.00	10 mm	00744	N/A	1:1	front	0.601	1.074	0.645	
1851.25	25	PCS CDMA	EVDO Rev. 0	24.7	24.63	-0.07	10 mm	00744	N/A	1:1	bottom	1.060	1.016	1.077	
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.39	-0.07	10 mm	00744	N/A	1:1	bottom	1.090	1.074	1.171	A23
1908.75	1175	PCS CDMA	EVDO Rev. 0	24.7	24.61	-0.03	10 mm	00744	N/A	1:1	bottom	1.090	1.021	1.113	
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.39	0.00	10 mm	00744	N/A	1:1	right	0.177	1.074	0.190	
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.39	-0.04	10 mm	00744	N/A	1:1	bottom	1.050	1.074	1.128	
836.60	190	GSM 850	GPRS	30.7	30.18	0.02	10 mm	00744	3	1:2.76	back	0.521	1.127	0.587	A24
836.60	190	GSM 850	GPRS	30.7	30.18	-0.11	10 mm	00744	3	1:2.76	front	0.428	1.127	0.482	
836.60	190	GSM 850	GPRS	30.7	30.18	0.13	10 mm	00744	3	1:2.76	bottom	0.203	1.127	0.229	
836.60	190	GSM 850	GPRS	30.7	30.18	-0.16	10 mm	00744	3	1:2.76	left	0.100	1.127	0.113	
1880.00	661	GSM 1900	GPRS	27.2	26.47	-0.04	10 mm	00744	3	1:2.76	back	0.465	1.183	0.550	
1880.00	661	GSM 1900	GPRS	27.2	26.47	-0.01	10 mm	00744	3	1:2.76	front	0.496	1.183	0.587	
1850.20	512	GSM 1900	GPRS	27.2	26.57	-0.09	10 mm	00744	3	1:2.76	bottom	0.960	1.156	1.110	
1880.00	661	GSM 1900	GPRS	27.2	26.47	0.00	10 mm	00744	3	1:2.76	bottom	1.050	1.183	**1.242**	
1909.80	810	GSM 1900	GPRS	27.2	26.60	0.00	10 mm	00744	3	1:2.76	bottom	1.070	1.148	1.228	A26
1880.00	661	GSM 1900	GPRS	27.2	26.47	0.01	10 mm	00744	3	1:2.76	right	0.124	1.183	0.147	
826.40	4132	UMTS 850	RMC	25.5	25.50	-0.01	10 mm	00744	N/A	1:1	back	0.640	1.000	0.640	
836.60	4183	UMTS 850	RMC	25.5	25.43	0.03	10 mm	00744	N/A	1:1	back	0.658	1.016	0.669	
846.60	4233	UMTS 850	RMC	25.5	25.50	-0.05	10 mm	00744	N/A	1:1	back	0.662	1.000	0.662	A27
836.60	4183	UMTS 850	RMC	25.5	25.43	-0.01	10 mm	00744	N/A	1:1	front	0.471	1.016	0.479	
836.60	4183	UMTS 850	RMC	25.5	25.43	-0.03	10 mm	00744	N/A	1:1	bottom	0.273	1.016	0.277	
836.60	4183	UMTS 850	RMC	25.5	25.43	0.03	10 mm	00744	N/A	1:1	left	0.090	1.016	0.091	
1712.40	1312	UMTS 1750	RMC	24.0	23.39	-0.05	10 mm	00744	N/A	1:1	back	0.551	1.151	0.634	
1732.40	1412	UMTS 1750	RMC	24.0	23.35	-0.05	10 mm	00744	N/A	1:1	back	0.581	1.161	0.675	
1752.60	1513	UMTS 1750	RMC	24.0	23.33	-0.03	10 mm	00744	N/A	1:1	back	0.581	1.167	0.678	
1732.40	1412	UMTS 1750	RMC	24.0	23.35	0.03	10 mm	00744	N/A	1:1	front	0.632	1.161	0.734	
1712.40	1312	UMTS 1750	RMC	24.0	23.39	-0.04	10 mm	00744	N/A	1:1	bottom	0.917	1.151	1.055	
1732.40	1412	UMTS 1750	RMC	24.0	23.35	-0.06	10 mm	00744	N/A	1:1	bottom	0.964	1.161	1.119	A29
1752.60	1513	UMTS 1750	RMC	24.0	23.33	0.12	10 mm	00744	N/A	1:1	bottom	0.951	1.167	1.110	
1732.40	1412	UMTS 1750	RMC	24.0	23.35	-0.01	10 mm	00744	N/A	1:1	right	0.256	1.161	0.297	
1852.40	9262	UMTS 1900	RMC	24.0	23.35	0.01	10 mm	00744	N/A	1:1	back	0.521	1.161	0.605	
1880.00	9400	UMTS 1900	RMC	24.0	23.27	0.04	10 mm	00744	N/A	1:1	back	0.513	1.183	0.607	
1907.60	9538	UMTS 1900	RMC	24.0	23.43	-0.09	10 mm	00744	N/A	1:1	back	0.489	1.140	0.557	
1880.00	9400	UMTS 1900	RMC	24.0	23.27	0.06	10 mm	00744	N/A	1:1	front	0.562	1.183	0.665	
1852.40	9262	UMTS 1900	RMC	24.0	23.35	-0.03	10 mm	00744	N/A	1:1	bottom	1.030	1.161	1.196	
1880.00	9400	UMTS 1900	RMC	24.0	23.27	-0.08	10 mm	00744	N/A	1:1	bottom	1.000	1.183	1.183	
1907.60	9538	UMTS 1900	RMC	24.0	23.43	-0.02	10 mm	00744	N/A	1:1	bottom	1.050	1.140	1.197	A31
1880.00	9400	UMTS 1900	RMC	24.0	23.27	-0.01	10 mm	00744	N/A	1:1	right	0.206	1.183	0.244	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram			

Note: Blue entry represents variability measurement.

Table 11-25
LTE Band 71 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)	
680.50	133297	Mid	LTE Band 71	20	25.5	25.08	-0.19	0	00777	QPSK	1	0	10 mm	back	1:1	0.544	1.102	0.599	A32
680.50	133297	Mid	LTE Band 71	20	24.5	23.93	-0.12	1	00777	QPSK	50	0	10 mm	back	1:1	0.318	1.140	0.363	
680.50	133297	Mid	LTE Band 71	20	25.5	25.08	0.04	0	00777	QPSK	1	0	10 mm	front	1:1	0.448	1.102	0.494	
680.50	133297	Mid	LTE Band 71	20	24.5	23.93	-0.02	1	00777	QPSK	50	0	10 mm	front	1:1	0.251	1.140	0.286	
680.50	133297	Mid	LTE Band 71	20	25.5	25.08	0.01	0	00777	QPSK	1	0	10 mm	bottom	1:1	0.077	1.102	0.085	
680.50	133297	Mid	LTE Band 71	20	24.5	23.93	-0.01	1	00777	QPSK	50	0	10 mm	bottom	1:1	0.064	1.140	0.073	
680.50	133297	Mid	LTE Band 71	20	25.5	25.08	-0.19	0	00777	QPSK	1	0	10 mm	left	1:1	0.515	1.102	0.568	
680.50	133297	Mid	LTE Band 71	20	24.5	23.93	0.03	1	00777	QPSK	50	0	10 mm	left	1:1	0.276	1.140	0.315	
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 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	25.5	25.41	0.01	0	00777	QPSK	1	25	10 mm	back	1:1	0.413	1.021	0.422	A33
707.50	23095	Mid	LTE Band 12	10	24.5	23.60	0.04	1	00777	QPSK	25	0	10 mm	back	1:1	0.314	1.230	0.386	
707.50	23095	Mid	LTE Band 12	10	25.5	25.41	-0.05	0	00777	QPSK	1	25	10 mm	front	1:1	0.296	1.021	0.302	
707.50	23095	Mid	LTE Band 12	10	24.5	23.60	-0.01	1	00777	QPSK	25	0	10 mm	front	1:1	0.224	1.230	0.276	
707.50	23095	Mid	LTE Band 12	10	25.5	25.41	-0.01	0	00777	QPSK	1	25	10 mm	bottom	1:1	0.112	1.021	0.114	
707.50	23095	Mid	LTE Band 12	10	24.5	23.60	-0.05	1	00777	QPSK	25	0	10 mm	bottom	1:1	0.081	1.230	0.100	
707.50	23095	Mid	LTE Band 12	10	25.5	25.41	-0.01	0	00777	QPSK	1	25	10 mm	left	1:1	0.336	1.021	0.343	
707.50	23095	Mid	LTE Band 12	10	24.5	23.60	-0.11	1	00777	QPSK	25	0	10 mm	left	1:1	0.255	1.230	0.314	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-27
LTE Band 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	25.5	25.33	0.15	0	00777	QPSK	1	0	10 mm	back	1:1	0.534	1.040	0.555	A34
782.00	23230	Mid	LTE Band 13	10	24.5	24.02	-0.03	1	00777	QPSK	25	12	10 mm	back	1:1	0.356	1.117	0.398	
782.00	23230	Mid	LTE Band 13	10	25.5	25.33	0.03	0	00777	QPSK	1	0	10 mm	front	1:1	0.426	1.040	0.443	
782.00	23230	Mid	LTE Band 13	10	24.5	24.02	0.06	1	00777	QPSK	25	12	10 mm	front	1:1	0.254	1.117	0.284	
782.00	23230	Mid	LTE Band 13	10	25.5	25.33	-0.03	0	00777	QPSK	1	0	10 mm	bottom	1:1	0.180	1.040	0.187	
782.00	23230	Mid	LTE Band 13	10	24.5	24.02	-0.01	1	00777	QPSK	25	12	10 mm	bottom	1:1	0.121	1.117	0.135	
782.00	23230	Mid	LTE Band 13	10	25.5	25.33	0.12	0	00777	QPSK	1	0	10 mm	left	1:1	0.233	1.040	0.242	
782.00	23230	Mid	LTE Band 13	10	24.5	24.02	0.11	1	00777	QPSK	25	12	10 mm	left	1:1	0.168	1.117	0.188	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-28
LTE Band 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	25.32	-0.03	0	00785	QPSK	1	0	10 mm	back	1:1	0.654	1.042	0.681	A35
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.86	-0.01	1	00785	QPSK	36	0	10 mm	back	1:1	0.467	1.159	0.541	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	25.32	-0.06	0	00785	QPSK	1	0	10 mm	front	1:1	0.490	1.042	0.511	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.86	-0.07	1	00785	QPSK	36	0	10 mm	front	1:1	0.348	1.159	0.403	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	25.32	0.05	0	00785	QPSK	1	0	10 mm	bottom	1:1	0.226	1.042	0.235	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.86	-0.07	1	00785	QPSK	36	0	10 mm	bottom	1:1	0.157	1.159	0.182	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.5	25.32	0.06	0	00785	QPSK	1	0	10 mm	left	1:1	0.088	1.042	0.092	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.86	0.09	1	00785	QPSK	36	0	10 mm	left	1:1	0.064	1.159	0.074	
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 11-29
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)	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.54	-0.03	0	00785	QPSK	1	50	10 mm	back	1:1	0.607	1.112	0.675	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.84	0.00	0	00785	QPSK	1	0	10 mm	back	1:1	0.622	1.038	0.646	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.56	0.09	0	00785	QPSK	1	0	10 mm	back	1:1	0.613	1.107	0.679	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.50	0.02	1	00785	QPSK	50	25	10 mm	back	1:1	0.465	1.122	0.522	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.84	0.02	0	00785	QPSK	1	0	10 mm	front	1:1	0.645	1.038	0.670	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.50	0.09	1	00785	QPSK	50	25	10 mm	front	1:1	0.554	1.122	0.622	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.54	-0.02	0	00785	QPSK	1	50	10 mm	bottom	1:1	0.985	1.112	1.095	A37
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.84	0.02	0	00785	QPSK	1	0	10 mm	bottom	1:1	0.968	1.038	1.005	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.56	0.03	0	00785	QPSK	1	0	10 mm	bottom	1:1	0.825	1.107	0.913	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.0	22.47	-0.07	1	00785	QPSK	50	25	10 mm	bottom	1:1	0.726	1.130	0.820	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.50	-0.04	1	00785	QPSK	50	25	10 mm	bottom	1:1	0.725	1.122	0.813	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.43	0.00	1	00785	QPSK	50	25	10 mm	bottom	1:1	0.705	1.140	0.804	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.49	0.00	1	00785	QPSK	100	0	10 mm	bottom	1:1	0.688	1.125	0.774	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.84	0.01	0	00785	QPSK	1	0	10 mm	right	1:1	0.215	1.038	0.223	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.50	-0.01	1	00785	QPSK	50	25	10 mm	right	1:1	0.192	1.122	0.215	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.54	0.01	0	00785	QPSK	1	50	10 mm	bottom	1:1	0.908	1.112	1.010	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram						

Note: Blue entry represents variability measurement.

Table 11-30
LTE Band 25 (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)	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.0	23.84	-0.03	0	00777	QPSK	1	0	10 mm	back	1:1	0.546	1.038	0.567	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.0	22.64	-0.07	1	00777	QPSK	50	25	10 mm	back	1:1	0.419	1.086	0.455	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.0	23.84	-0.02	0	00777	QPSK	1	0	10 mm	front	1:1	0.600	1.038	0.623	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.0	22.64	0.04	1	00777	QPSK	50	25	10 mm	front	1:1	0.463	1.086	0.503	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.58	0.00	0	00777	QPSK	1	50	10 mm	bottom	1:1	1.020	1.102	1.124	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.0	23.63	-0.04	0	00777	QPSK	1	0	10 mm	bottom	1:1	1.010	1.089	1.100	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.0	23.84	0.20	0	00777	QPSK	1	0	10 mm	bottom	1:1	1.030	1.038	1.069	A39
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.0	22.52	0.00	1	00777	QPSK	50	0	10 mm	bottom	1:1	0.870	1.117	0.972	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.0	22.52	-0.08	1	00777	QPSK	50	25	10 mm	bottom	1:1	0.818	1.117	0.914	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.0	22.64	-0.08	1	00777	QPSK	50	25	10 mm	bottom	1:1	0.932	1.086	1.012	
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.0	22.48	-0.09	1	00777	QPSK	100	0	10 mm	bottom	1:1	0.894	1.127	1.008	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.0	23.84	0.15	0	00777	QPSK	1	0	10 mm	right	1:1	0.194	1.038	0.201	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.0	22.64	-0.06	1	00777	QPSK	50	25	10 mm	right	1:1	0.139	1.086	0.151	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population															Body 1.6 W/kg (mW/g) averaged over 1 gram				

Table 11-31
LTE Band 41 Hotspot SAR

MEASUREMENT RESULTS																				
Power Class	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)	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.04	0.17	0	00785	QPSK	1	0	10 mm	back	1:1.58	0.350	1.247	0.436	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.07	-0.12	1	00785	QPSK	50	0	10 mm	back	1:1.58	0.238	1.239	0.295	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.04	0.06	0	00785	QPSK	1	0	10 mm	front	1:1.58	0.289	1.247	0.360	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.07	-0.05	1	00785	QPSK	50	0	10 mm	front	1:1.58	0.210	1.239	0.260	
Power Class 3	2506.00	39750	Low	LTE Band 41	20	25.0	23.99	0.00	0	00785	QPSK	1	0	10 mm	bottom	1:1.58	0.562	1.262	0.709	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.04	0.03	0	00785	QPSK	1	0	10 mm	bottom	1:1.58	0.635	1.247	0.792	
Power Class 3	2593.00	40620	Mid	LTE Band 41	20	25.0	23.86	-0.03	0	00785	QPSK	1	99	10 mm	bottom	1:1.58	0.577	1.300	0.750	
Power Class 3	2636.50	41055	Mid-High	LTE Band 41	20	25.0	24.01	0.00	0	00785	QPSK	1	99	10 mm	bottom	1:1.58	0.526	1.256	0.661	
Power Class 3	2680.00	41490	High	LTE Band 41	20	25.0	23.91	0.04	0	00785	QPSK	1	99	10 mm	bottom	1:1.58	0.451	1.285	0.580	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.07	0.01	1	00785	QPSK	50	0	10 mm	bottom	1:1.58	0.477	1.239	0.591	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.05	-0.02	1	00785	QPSK	100	0	10 mm	bottom	1:1.58	0.457	1.245	0.569	
Power Class 2	2549.50	40185	Low-Mid	LTE Band 41	20	27.7	27.48	0.01	0	00785	QPSK	1	0	10 mm	bottom	1:2.31	0.957	1.052	1.007	A41
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.04	0.02	0	00785	QPSK	1	0	10 mm	right	1:1.58	0.086	1.247	0.107	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.07	-0.03	1	00785	QPSK	50	0	10 mm	right	1:1.58	0.069	1.239	0.085	
Power Class 2	2549.50	40185	Low-Mid	LTE Band 41	20	27.7	27.48	-0.06	0	00785	QPSK	1	0	10 mm	bottom	1:2.31	0.906	1.052	0.953	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population															Body 1.6 W/kg (mW/g) averaged over 1 gram					

Note: Blue entry represents variability measurement.

Table 11-32
WLAN Hotspot SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	23.0	22.17	0.00	10 mm	00876	1	back	99.9	0.893	0.701	1.211	1.001	0.850	A42
2437	6	802.11b	DSSS	22	23.0	22.15	0.12	10 mm	00876	1	back	99.9	1.075	0.657	1.216	1.001	0.800	
2462	11	802.11b	DSSS	22	23.0	22.08	0.20	10 mm	00876	1	back	99.9	1.078	0.693	1.236	1.001	**0.857**	
2412	1	802.11b	DSSS	22	23.0	22.17	0.15	10 mm	00876	1	front	99.9	0.608	-	1.211	1.001	-	
2412	1	802.11b	DSSS	22	23.0	22.17	0.13	10 mm	00876	1	top	99.9	0.697	0.494	1.211	1.001	0.599	
2412	1	802.11b	DSSS	22	23.0	22.17	0.15	10 mm	00876	1	left	99.9	0.978	0.640	1.211	1.001	0.776	
5200	40	802.11a	OFDM	20	19.5	18.68	-0.15	10 mm	00876	6	back	99.1	1.168	0.628	1.208	1.009	0.765	
5220	44	802.11a	OFDM	20	19.5	18.51	-0.02	10 mm	00876	6	back	99.1	1.287	0.639	1.256	1.009	**0.810**	A44
5240	48	802.11a	OFDM	20	19.5	18.58	0.03	10 mm	00876	6	back	99.1	1.294	0.633	1.236	1.009	0.789	
5200	40	802.11a	OFDM	20	19.5	18.68	0.04	10 mm	00876	6	front	99.1	0.196	0.073	1.208	1.009	0.089	
5200	40	802.11a	OFDM	20	19.5	18.68	0.16	10 mm	00876	6	top	99.1	0.141	-	1.208	1.009	-	
5200	40	802.11a	OFDM	20	19.5	18.68	0.01	10 mm	00876	6	left	99.1	0.860	0.380	1.208	1.009	0.463	
5765	153	802.11a	OFDM	20	20.0	19.13	0.01	10 mm	00876	6	back	99.1	1.320	0.621	1.222	1.009	0.766	
5785	157	802.11a	OFDM	20	20.0	19.17	0.04	10 mm	00876	6	back	99.1	1.247	0.625	1.211	1.009	0.764	
5805	161	802.11a	OFDM	20	20.0	19.05	0.03	10 mm	00876	6	back	99.1	1.261	0.600	1.245	1.009	0.754	
5785	157	802.11a	OFDM	20	20.0	19.17	-0.04	10 mm	00876	6	front	99.1	0.335	0.109	1.211	1.009	0.133	
5785	157	802.11a	OFDM	20	20.0	19.17	0.17	10 mm	00876	6	top	99.1	0.121	-	1.211	1.009	-	
5785	157	802.11a	OFDM	20	20.0	19.17	-0.12	10 mm	00876	6	left	99.1	0.858	0.378	1.211	1.009	0.462	

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 11-33
GPRS 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)	
1850.20	512	GSM 1900	GPRS	27.2	26.57	-0.02	0 mm	00744	3	1:2.76	bottom	2.230	1.156	2.578	
1880.00	661	GSM 1900	GPRS	27.2	26.47	0.06	0 mm	00744	3	1:2.76	bottom	2.410	1.183	2.851	
1909.80	810	GSM 1900	GPRS	27.2	26.60	-0.15	0 mm	00744	3	1:2.76	bottom	2.780	1.148	**3.191**	A46
1909.80	810	GSM 1900	GPRS	27.2	26.60	-0.15	0 mm	00744	3	1:2.76	bottom	2.720	1.148	3.123	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**								**Phablet** **4.0 W/kg (mW/g)** averaged over 10 grams							

Note: Blue entry represents variability measurement.

Table 11-34
LTE Band 41 Phablet SAR

MEASUREMENT RESULTS																					
Power Class	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) (W/kg)	Scaling Factor	Reported SAR (10g) (W/kg)	Plot #
	MHz	Ch.																		
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.04	-0.18	0	00785	QPSK	1	0	1 mm	back	1:1.58	1.160	1.247	1.447	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.07	-0.14	1	00785	QPSK	50	0	1 mm	back	1:1.58	0.899	1.239	1.114	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.04	-0.03	0	00785	QPSK	1	0	1 mm	front	1:1.58	0.957	1.247	1.193	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.07	0.00	1	00785	QPSK	50	0	1 mm	front	1:1.58	0.728	1.239	0.902	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.04	-0.03	0	00785	QPSK	1	0	3 mm	bottom	1:1.58	1.040	1.247	1.297	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.07	-0.04	1	00785	QPSK	50	0	3 mm	bottom	1:1.58	0.798	1.239	0.989	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	25.0	24.04	0.01	0	00785	QPSK	1	0	0 mm	right	1:1.58	0.335	1.247	0.418	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.07	-0.13	1	00785	QPSK	50	0	0 mm	right	1:1.58	0.255	1.239	0.316	
Power Class 3	2506.00	39750	Low	LTE Band 41	20	24.0	23.50	-0.20	0	00785	QPSK	1	99	0 mm	back	1:1.58	1.430	1.122	1.604	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.30	-0.18	0	00785	QPSK	1	99	0 mm	back	1:1.58	1.490	1.175	1.751	
Power Class 3	2593.00	40620	Mid	LTE Band 41	20	24.0	23.62	-0.16	0	00785	QPSK	1	99	0 mm	back	1:1.58	1.520	1.091	1.658	
Power Class 3	2636.50	41055	Mid-High	LTE Band 41	20	24.0	23.10	-0.18	0	00785	QPSK	1	99	0 mm	back	1:1.58	1.460	1.230	1.796	
Power Class 3	2680.00	41490	High	LTE Band 41	20	24.0	23.07	-0.19	0	00785	QPSK	1	99	0 mm	back	1:1.58	1.480	1.239	1.834	
Power Class 3	2506.00	39750	Low	LTE Band 41	20	24.0	22.76	-0.12	0	00785	QPSK	50	25	0 mm	back	1:1.58	1.100	1.330	1.463	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	22.75	-0.16	0	00785	QPSK	50	50	0 mm	back	1:1.58	1.170	1.334	1.561	
Power Class 3	2593.00	40620	Mid	LTE Band 41	20	24.0	22.93	-0.12	0	00785	QPSK	50	50	0 mm	back	1:1.58	1.220	1.279	1.560	
Power Class 3	2636.50	41055	Mid-High	LTE Band 41	20	24.0	22.56	-0.16	0	00785	QPSK	50	0	0 mm	back	1:1.58	1.130	1.393	1.574	
Power Class 3	2680.00	41490	High	LTE Band 41	20	24.0	22.47	0.12	0	00785	QPSK	50	50	0 mm	back	1:1.58	1.110	1.422	1.578	
Power Class 3	2593.00	40620	Mid	LTE Band 41	20	24.0	22.92	-0.01	0	00785	QPSK	100	0	0 mm	back	1:1.58	1.160	1.282	1.487	
Power Class 3	2506.00	39750	Low	LTE Band 41	20	24.0	23.50	0.01	0	00785	QPSK	1	99	0 mm	front	1:1.58	1.870	1.122	2.098	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.30	-0.03	0	00785	QPSK	1	99	0 mm	front	1:1.58	1.830	1.175	2.150	
Power Class 3	2593.00	40620	Mid	LTE Band 41	20	24.0	23.62	0.01	0	00785	QPSK	1	99	0 mm	front	1:1.58	1.680	1.091	1.833	
Power Class 3	2636.50	41055	Mid-High	LTE Band 41	20	24.0	23.10	-0.05	0	00785	QPSK	1	99	0 mm	front	1:1.58	1.570	1.230	1.931	
Power Class 3	2680.00	41490	High	LTE Band 41	20	24.0	23.07	0.00	0	00785	QPSK	1	99	0 mm	front	1:1.58	1.430	1.239	1.772	
Power Class 3	2506.00	39750	Low	LTE Band 41	20	24.0	22.76	0.00	0	00785	QPSK	50	25	0 mm	front	1:1.58	1.420	1.330	1.889	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	22.75	0.02	0	00785	QPSK	50	50	0 mm	front	1:1.58	1.440	1.334	1.921	
Power Class 3	2593.00	40620	Mid	LTE Band 41	20	24.0	22.93	-0.04	0	00785	QPSK	50	50	0 mm	front	1:1.58	1.350	1.279	1.727	
Power Class 3	2636.50	41055	Mid-High	LTE Band 41	20	24.0	22.56	0.01	0	00785	QPSK	50	0	0 mm	front	1:1.58	1.250	1.393	1.741	
Power Class 3	2680.00	41490	High	LTE Band 41	20	24.0	22.47	-0.01	0	00785	QPSK	50	50	0 mm	front	1:1.58	1.130	1.422	1.607	
Power Class 3	2593.00	40620	Mid	LTE Band 41	20	24.0	22.92	-0.04	0	00785	QPSK	100	0	0 mm	front	1:1.58	1.330	1.282	1.705	
Power Class 3	2506.00	39750	Low	LTE Band 41	20	24.0	23.50	-0.15	0	00785	QPSK	1	99	0 mm	bottom	1:1.58	2.840	1.122	**3.186**	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.30	-0.12	0	00785	QPSK	1	99	0 mm	bottom	1:1.58	2.610	1.175	3.067	
Power Class 3	2593.00	40620	Mid	LTE Band 41	20	24.0	23.62	-0.11	0	00785	QPSK	1	99	0 mm	bottom	1:1.58	2.650	1.091	2.891	
Power Class 3	2636.50	41055	Mid-High	LTE Band 41	20	24.0	23.10	-0.13	0	00785	QPSK	1	99	0 mm	bottom	1:1.58	2.480	1.230	3.050	
Power Class 3	2680.00	41490	High	LTE Band 41	20	24.0	23.07	-0.13	0	00785	QPSK	1	99	0 mm	bottom	1:1.58	2.340	1.239	2.899	
Power Class 3	2506.00	39750	Low	LTE Band 41	20	24.0	22.76	-0.16	0	00785	QPSK	50	25	0 mm	bottom	1:1.58	2.180	1.330	2.899	
Power Class 3	2549.50	40185	Low-Mid	LTE Band 41	20	24.0	22.75	-0.12	0	00785	QPSK	50	50	0 mm	bottom	1:1.58	2.160	1.334	2.881	
Power Class 3	2593.00	40620	Mid	LTE Band 41	20	24.0	22.93	-0.12	0	00785	QPSK	50	50	0 mm	bottom	1:1.58	2.090	1.279	2.673	
Power Class 3	2636.50	41055	Mid-High	LTE Band 41	20	24.0	22.56	-0.13	0	00785	QPSK	50	0	0 mm	bottom	1:1.58	1.890	1.393	2.633	
Power Class 3	2680.00	41490	High	LTE Band 41	20	24.0	22.47	-0.13	0	00785	QPSK	50	50	0 mm	bottom	1:1.58	1.810	1.422	2.574	
Power Class 3	2593.00	40620	Mid	LTE Band 41	20	24.0	22.92	-0.16	0	00785	QPSK	100	0	0 mm	bottom	1:1.58	2.390	1.282	3.064	
Power Class 2	2506.00	39750	Low	LTE Band 41	20	25.7	25.70	0.12	0	00785	QPSK	1	99	0 mm	bottom	1:2.31	3.130	1.000	3.130	A47
Power Class 2	2506.00	39750	Low	LTE Band 41	20	25.7	25.70	0.12	0	00785	QPSK	1	99	0 mm	bottom	1:2.31	2.930	1.000	2.930	
Power Class 3	2593.00	40620	Mid	LTE Band 41	20	24.0	23.62	0.13	0	00785	QPSK	1	99	0 mm	bottom	1:1.58	2.680	1.091	2.924	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population															Phablet 4.0 W/kg (mW/g) averaged over 10 grams					

Note: Blue entry represents variability measurement.

Table 11-35
WLAN Phablet SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
5260	52	802.11a	OFDM	20	19.5	18.35	0.06	0 mm	00876	6	back	99.1	10.786	1.500	1.303	1.009	1.972	
5280	56	802.11a	OFDM	20	19.5	18.54	-0.09	0 mm	00876	6	back	99.1	9.383	1.610	1.247	1.009	2.026	A48
5300	60	802.11a	OFDM	20	19.5	18.57	-0.21	0 mm	00876	6	back	99.1	9.854	1.560	1.239	1.009	1.950	
5300	60	802.11a	OFDM	20	19.5	18.57	0.16	0 mm	00876	6	front	99.1	4.700	0.558	1.239	1.009	0.698	
5300	60	802.11a	OFDM	20	19.5	18.57	0.15	0 mm	00876	6	top	99.1	6.688	0.283	1.239	1.009	0.354	
5300	60	802.11a	OFDM	20	19.5	18.57	-0.10	0 mm	00876	6	left	99.1	17.373	1.320	1.239	1.009	1.650	
5520	104	802.11a	OFDM	20	19.5	18.71	-0.01	0 mm	00876	6	back	99.1	11.569	1.570	1.199	1.009	1.899	
5520	104	802.11a	OFDM	20	19.5	18.71	0.21	0 mm	00876	6	front	99.1	4.077	0.630	1.199	1.009	0.762	
5520	104	802.11a	OFDM	20	19.5	18.71	0.14	0 mm	00876	6	top	99.1	6.980	0.296	1.199	1.009	0.358	
5520	104	802.11a	OFDM	20	19.5	18.71	-0.17	0 mm	00876	6	left	99.1	17.861	1.510	1.199	1.009	1.827	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Phablet 4.0 W/kg (mW/g) averaged over 10 grams										

Note: Blue entry represents variability measurement.

Table 11-36
DSS Phablet 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 (10g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	11.0	10.27	0.05	0 mm	00876	1	back	77.1	0.067	1.183	1.297	0.103	
2441	39	Bluetooth	FHSS	11.0	10.27	-0.04	0 mm	00876	1	front	77.1	0.041	1.183	1.297	0.063	
2441	39	Bluetooth	FHSS	11.0	10.27	-0.04	0 mm	00876	1	top	77.1	0.025	1.183	1.297	0.038	
2441	39	Bluetooth	FHSS	11.0	10.27	-0.17	0 mm	00876	1	left	77.1	0.074	1.183	1.297	0.114	A49
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 10 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. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information).
11. Unless otherwise noted, when 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds below.
12. This device utilizes power reduction for some wireless modes and technologies, as outlined in Section 1.3. The maximum output power allowed for each transmitter and exposure condition was evaluated for SAR compliance based on expected use conditions and simultaneous transmission scenarios.

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.
4. GPRS was additionally evaluated for head and body-worn exposure conditions to address possible VoIP scenarios.

CDMA Notes:

1. Head SAR for CDMA2000 mode was tested under RC3/SO55 per FCC KDB Publication 941225 D01v03r01.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. EVDO Rev0 and RevA and TDSO / SO32 FCH+SCH SAR tests were not required per the 3G SAR Test Reduction Procedure in FCC KDB Publication 941225 D01v03r01.
3. CDMA Wireless Router SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 according to KDB 941225 D01v03r01 procedures for data devices. Wireless Router SAR tests for Subtype 2 of Rev.A and 1x RTT configurations were not required per the 3G SAR Test Reduction Policy in KDB Publication 941225 D01v03r01.
4. Head SAR was additionally evaluated using EVDO Rev. A to determine compliance for VoIP operations.
5. 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.
6. CDMA 1X Advanced technology was not required for SAR since the maximum allowed output powers for 1X Advanced was not more than 0.25 dB higher than the maximum powers for 1X.

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 8.6.4.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 and MCC=001 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).
4. Per FCC KDB Publication 447498 D01v06, when the reported LTE Band 41 SAR measured at the highest output power channel in a given a test configuration was > 0.6 W/kg for 1g evaluations, testing at the other channels was required for such test configurations.
5. TDD LTE was tested per the guidance provided in FCC KDB Publication 941225 D05v02r04. Testing was performed using UL-DL configuration 0 with 6 UL subframes and 2 S subframes using extended cyclic prefix only and special subframe configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Section 4, the duty factor for special subframe configuration 6 using extended cyclic prefix is 0.633.
6. Per KDB Publication 941225 D05Av01r02, SAR for downlink only LTE CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.
7. This device supports Power Class 2 and Power Class 3 operations for LTE Band 41. The highest available duty cycle for Power Class 2 operations is 43.3 % using UL-DL configuration 1. Per FCC Guidance, all SAR tests were performed using Power Class 3. SAR with power class 2 at the available duty factor was additionally performed for the power class 3 configuration with the highest SAR configuration for each exposure conditions. Please see Section 14 for linearity results.

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 8.7.5 for more information.
3. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI, 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 8.7.6 for more information.

4. 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.
5. 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.
6. When 10-g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

Bluetooth Notes

1. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation and Tx Tests test mode type. Per October 2016 TCB Workshop Notes, the reported SAR was scaled to the 100% transmission duty factor to determine compliance. See Section 9.6 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 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	CDMA/EVDO BC10 (§90S)	0.163	0.938	1.101
	CDMA/EVDO BC0 (§22H)	0.198	0.938	1.136
	PCS CDMA/EVDO	0.181	0.938	1.119
	GSM/GPRS 850	0.197	0.938	1.135
	GSM/GPRS 1900	0.112	0.938	1.050
	UMTS 850	0.229	0.938	1.167
	UMTS 1750	0.171	0.938	1.109
	UMTS 1900	0.182	0.938	1.120
	LTE Band 71	0.252	0.938	**1.190**
	LTE Band 12	0.184	0.938	1.122
	LTE Band 13	0.244	0.938	1.182
	LTE Band 26 (Cell)	0.204	0.938	1.142
	LTE Band 66 (AWS)	0.114	0.938	1.052
	LTE Band 25 (PCS)	0.117	0.938	1.055
	LTE Band 41	0.112	0.938	1.050

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 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	CDMA/EVDO BC10 (§90S)	0.163	0.725	0.888
	CDMA/EVDO BC0 (§22H)	0.198	0.725	0.923
	PCS CDMA/EVDO	0.181	0.725	0.906
	GSM/GPRS 850	0.197	0.725	0.922
	GSM/GPRS 1900	0.112	0.725	0.837
	UMTS 850	0.229	0.725	0.954
	UMTS 1750	0.171	0.725	0.896
	UMTS 1900	0.182	0.725	0.907
	LTE Band 71	0.252	0.725	**0.977**
	LTE Band 12	0.184	0.725	0.909
	LTE Band 13	0.244	0.725	0.969
	LTE Band 26 (Cell)	0.204	0.725	0.929
	LTE Band 66 (AWS)	0.114	0.725	0.839
	LTE Band 25 (PCS)	0.117	0.725	0.842
	LTE Band 41	0.112	0.725	0.837

12.4 Body-Worn Simultaneous Transmission Analysis

Table 12-3
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body-Worn at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	CDMA BC10 (§90S)	0.479	0.857	1.336
	CDMA BC0 (§22H)	0.588	0.857	1.445
	PCS CDMA	0.498	0.857	1.355
	GSM/GPRS 850	0.587	0.857	1.444
	GSM/GPRS 1900	0.550	0.857	1.407
	UMTS 850	0.669	0.857	1.526
	UMTS 1750	0.678	0.857	1.535
	UMTS 1900	0.607	0.857	1.464
	LTE Band 71	0.599	0.857	1.456
	LTE Band 12	0.422	0.857	1.279
	LTE Band 13	0.555	0.857	1.412
	LTE Band 26 (Cell)	0.681	0.857	**1.538**
	LTE Band 66 (AWS)	0.679	0.857	1.536
	LTE Band 25 (PCS)	0.567	0.857	1.424
	LTE Band 41	0.584	0.857	1.441

Table 12-4
Simultaneous Transmission Scenario with 5 GHz WLAN (Body-Worn at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	CDMA BC10 (§90S)	0.479	0.766	1.245
	CDMA BC0 (§22H)	0.588	0.766	1.354
	PCS CDMA	0.498	0.766	1.264
	GSM/GPRS 850	0.587	0.766	1.353
	GSM/GPRS 1900	0.550	0.766	1.316
	UMTS 850	0.669	0.766	1.435
	UMTS 1750	0.678	0.766	1.444
	UMTS 1900	0.607	0.766	1.373
	LTE Band 71	0.599	0.766	1.365
	LTE Band 12	0.422	0.766	1.188
	LTE Band 13	0.555	0.766	1.321
	LTE Band 26 (Cell)	0.681	0.766	**1.447**
	LTE Band 66 (AWS)	0.679	0.766	1.445
	LTE Band 25 (PCS)	0.567	0.766	1.333
	LTE Band 41	0.584	0.766	1.350

Table 12-5
Simultaneous Transmission Scenario with Bluetooth (Body-Worn 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
Body-Worn	CDMA BC10 (§90S)	0.479	0.052	0.531
	CDMA BC0 (§22H)	0.588	0.052	0.640
	PCS CDMA	0.498	0.052	0.550
	GSM/GPRS 850	0.587	0.052	0.639
	GSM/GPRS 1900	0.550	0.052	0.602
	UMTS 850	0.669	0.052	0.721
	UMTS 1750	0.678	0.052	0.730
	UMTS 1900	0.607	0.052	0.659
	LTE Band 71	0.599	0.052	0.651
	LTE Band 12	0.422	0.052	0.474
	LTE Band 13	0.555	0.052	0.607
	LTE Band 26 (Cell)	0.681	0.052	**0.733**
	LTE Band 66 (AWS)	0.679	0.052	0.731
	LTE Band 25 (PCS)	0.567	0.052	0.619
	LTE Band 41	0.584	0.052	0.636

Table 12-6
Simultaneous Transmission Scenario with Bluetooth and 5GHz WLAN (Body-Worn at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body-Worn	CDMA BC10 (§90S)	0.479	0.766	0.052	1.297
	CDMA BC0 (§22H)	0.588	0.766	0.052	1.406
	PCS CDMA	0.498	0.766	0.052	1.316
	GSM/GPRS 850	0.587	0.766	0.052	1.405
	GSM/GPRS 1900	0.550	0.766	0.052	1.368
	UMTS 850	0.669	0.766	0.052	1.487
	UMTS 1750	0.678	0.766	0.052	1.496
	UMTS 1900	0.607	0.766	0.052	1.425
	LTE Band 71	0.599	0.766	0.052	1.417
	LTE Band 12	0.422	0.766	0.052	1.240
	LTE Band 13	0.555	0.766	0.052	1.373
	LTE Band 26 (Cell)	0.681	0.766	0.052	**1.499**
	LTE Band 66 (AWS)	0.679	0.766	0.052	1.497
	LTE Band 25 (PCS)	0.567	0.766	0.052	1.385
	LTE Band 41	0.584	0.766	0.052	1.402

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 the applicable exposure conditions was used for simultaneous transmission analysis.

Table 12-7
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 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	EVDO BC10 (§90S)	0.446	0.857	1.303
	EVDO BC0 (§22H)	0.565	0.857	1.422
	PCS EVDO	1.171	0.857	See Table Below
	GPRS 850	0.587	0.857	1.444
	GPRS 1900	1.242	0.857	See Table Below
	UMTS 850	0.669	0.857	1.526
	UMTS 1750	1.119	0.857	See Table Below
	UMTS 1900	1.197	0.857	See Table Below
	LTE Band 71	0.599	0.857	1.456
	LTE Band 12	0.422	0.857	1.279
	LTE Band 13	0.555	0.857	1.412
	LTE Band 26 (Cell)	0.681	0.857	**1.538**
	LTE Band 66 (AWS)	1.095	0.857	See Table Below
	LTE Band 25 (PCS)	1.124	0.857	See Table Below
	LTE Band 41	1.007	0.857	See Table Below

Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.542	0.857	1.399
	Front	0.645	0.857*	**1.502**
	Top	-	0.599	0.599
	Bottom	1.171	-	1.171
	Right	0.190	-	0.190
	Left	-	0.776	0.776

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.550	0.857	1.407
	Front	0.587	0.857*	**1.444**
	Top	-	0.599	0.599
	Bottom	1.242	-	1.242
	Right	0.147	-	0.147
	Left	-	0.776	0.776

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.678	0.857	1.535
	Front	0.734	0.857*	**1.591**
	Top	-	0.599	0.599
	Bottom	1.119	-	1.119
	Right	0.297	-	0.297
	Left	-	0.776	0.776

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.607	0.857	1.464
	Front	0.665	0.857*	**1.522**
	Top	-	0.599	0.599
	Bottom	1.197	-	1.197
	Right	0.244	-	0.244
	Left	-	0.776	0.776

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.679	0.857	**1.536**
	Front	0.670	0.857*	1.527
	Top	-	0.599	0.599
	Bottom	1.095	-	1.095
	Right	0.223	-	0.223
	Left	-	0.776	0.776

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.567	0.857	1.424
	Front	0.623	0.857*	**1.480**
	Top	-	0.599	0.599
	Bottom	1.124	-	1.124
	Right	0.201	-	0.201
	Left	-	0.776	0.776

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.436	0.857	**1.293**
	Front	0.360	0.857*	1.217
	Top	-	0.599	0.599
	Bottom	1.007	-	1.007
	Right	0.107	-	0.107
	Left	-	0.776	0.776

Table 12-8
Simultaneous Transmission Scenario with 5 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	EVDO BC10 (§90S)	0.446	0.810	1.256
	EVDO BC0 (§22H)	0.565	0.810	1.375
	PCS EVDO	1.171	0.810	See Table Below
	GPRS 850	0.587	0.810	1.397
	GPRS 1900	1.242	0.810	See Table Below
	UMTS 850	0.669	0.810	1.479
	UMTS 1750	1.119	0.810	See Table Below
	UMTS 1900	1.197	0.810	See Table Below
	LTE Band 71	0.599	0.810	1.409
	LTE Band 12	0.422	0.810	1.232
	LTE Band 13	0.555	0.810	1.365
	LTE Band 26 (Cell)	0.681	0.810	**1.491**
	LTE Band 66 (AWS)	1.095	0.810	See Table Below
	LTE Band 25 (PCS)	1.124	0.810	See Table Below
	LTE Band 41	1.007	0.810	See Table Below

Simult Tx	Configuration	PCS EVDO SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.542	0.810	**1.352**
	Front	0.645	0.133	0.778
	Top	-	0.810*	0.810
	Bottom	1.171	-	1.171
	Right	0.190	-	0.190
	Left	-	0.463	0.463

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.550	0.810	**1.360**
	Front	0.587	0.133	0.720
	Top	-	0.810*	0.810
	Bottom	1.242	-	1.242
	Right	0.147	-	0.147
	Left	-	0.463	0.463

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.678	0.810	**1.488**
	Front	0.734	0.133	0.867
	Top	-	0.810*	0.810
	Bottom	1.119	-	1.119
	Right	0.297	-	0.297
	Left	-	0.463	0.463

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.607	0.810	**1.417**
	Front	0.665	0.133	0.798
	Top	-	0.810*	0.810
	Bottom	1.197	-	1.197
	Right	0.244	-	0.244
	Left	-	0.463	0.463

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2			1	2	1+2
Hotspot SAR	Back	0.679	0.810	**1.489**	Hotspot SAR	Back	0.567	0.810	**1.377**
	Front	0.670	0.133	0.803		Front	0.623	0.133	0.756
	Top	-	0.810*	0.810		Top	-	0.810*	0.810
	Bottom	1.095	-	1.095		Bottom	1.124	-	1.124
	Right	0.223	-	0.223		Right	0.201	-	0.201
	Left	-	0.463	0.463		Left	-	0.463	0.463

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.436	0.810	**1.246**
	Front	0.360	0.133	0.493
	Top	-	0.810*	0.810
	Bottom	1.007	-	1.007
	Right	0.107	-	0.107
	Left	-	0.463	0.463

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 the 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 12-9
Simultaneous Transmission Scenario with 5 GHz WLAN (Phablet)

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	-	2.026	2.026
	Front	-	0.762	0.762
	Top	-	0.358	0.358
	Bottom	3.191	-	**3.191**
	Left	-	1.827	1.827
Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	1.834	2.026	**3.860**
	Front	2.150	0.762	2.912
	Top	-	0.358	0.358
	Bottom	3.186	-	3.186
	Right	0.418	-	0.418
	Left	-	1.827	1.827

Table 12-10
Simultaneous Transmission Scenario with Bluetooth (Phablet)

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	-	0.103	0.103
	Front	-	0.063	0.063
	Top	-	0.038	0.038
	Bottom	3.191	-	**3.191**
	Left	-	0.114	0.114
Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	1.834	0.103	1.937
	Front	2.150	0.063	2.213
	Top	-	0.038	0.038
	Bottom	3.186	-	**3.186**
	Right	0.418	-	0.418
	Left	-	0.114	0.114

Table 12-11
Simultaneous Transmission Scenario with Bluetooth and 5GHz WLAN (Phablet)

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Phablet SAR	Back	-	2.026	0.103	2.129
	Front	-	0.762	0.063	0.825
	Top	-	0.358	0.038	0.396
	Bottom	3.191	-	-	**3.191**
	Left	-	1.827	0.114	1.941
Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Phablet SAR	Back	1.834	2.026	0.103	**3.963**
	Front	2.150	0.762	0.063	2.975
	Top	-	0.358	0.038	0.396
	Bottom	3.186	-	-	3.186
	Right	0.418	-	-	0.418
	Left	-	1.827	0.114	1.941

12.7 Simultaneous Transmission Conclusion

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

Table 13-1
Head SAR Measurement Variability Results

HEAD VARIABILITY RESULTS														
Band	FREQUENCY		Mode/Band	Service	Side	Test Position	Data Rate (Mbps)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.						(W/kg)	(W/kg)		(W/kg)		(W/kg)	
2450	2437.00	6	802.11b, 22 MHz Bandwidth	DSSS	Right	Cheek	1	0.811	0.756	1.07	N/A	N/A	N/A	N/A
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 13-2
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio	
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)		
1900	1880.00	600	PCS CDMA	EVDO Rev. 0	bottom	10 mm	1.090	1.050	1.04	N/A	N/A	N/A	N/A	
1750	1720.00	132072	LTE Band 66 (AWS), 20 MHz Bandwidth	QPSK, 1 RB, 50 RB Offset	bottom	10 mm	0.985	0.908	1.08	N/A	N/A	N/A	N/A	
2600	2549.50	40185	LTE Band 41, 20 MHz Bandwidth	QPSK, 1 RB, 0 RB Offset	bottom	10 mm	0.957	0.906	1.06	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 13-3
Phablet SAR Measurement Variability Results

PHABLET VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	# of Time Slots	Side	Spacing	Measured SAR (10g)	1st Repeated SAR (10g)	Ratio	2nd Repeated SAR (10g)	Ratio	3rd Repeated SAR (10g)	Ratio
	MHz	Ch.						(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1900	1909.80	810	GSM 1900	GPRS	3	bottom	0 mm	2.780	2.720	1.02	N/A	N/A	N/A	N/A
2450	2506.00	39750	LTE Band 41, 20 MHz Bandwidth	QPSK, 1 RB, 99 RB Offset	N/A	bottom	0 mm	3.130	2.930	1.07	N/A	N/A	N/A	N/A
2600	2593.00	40620	LTE Band 41, 20 MHz Bandwidth	QPSK, 1 RB, 99 RB Offset	N/A	bottom	0 mm	2.650	2.680	1.01	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Phablet** **4.0 W/kg (mW/g)** averaged over 10 grams							

13.2 Measurement Uncertainty

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

14 ADDITIONAL TESTING PER FCC GUIDANCE

14.1 LTE Band 41 Power Class 2 and Power Class 3 Linearity

This device supports Power Class 2 and Power Class 3 operations for LTE Band 41. The highest available duty cycle for Power Class 2 operations is 43.3 % using UL-DL configuration 1. Per May 2017 TCB Workshop Notes based on the device behavior, all SAR tests were performed using Power Class 3. SAR with Power Class 2 at the highest power and available duty factor was additionally performed for the Power Class 3 configuration with the highest SAR for each exposure condition. The linearity between the Power Class 2 and Power Class 3 SAR results and the respective frame averaged powers was calculated to determine that the results were linear. Per May 2017 TCB Workshop, no additional SAR measurements were required since the linearity between power classes was < 10% and all reported SAR values were < 1.4 W/kg for 1g and < 3.5 W/kg for 10g.

LTE Band 41 SAR testing with power class 2 at the highest power and available duty factor was additionally performed for the power class 3 configuration with the highest SAR for each exposure condition.

Table 14-1
LTE Band 41 Head Linearity Data

	LTE Band 41 PC3	LTE Band 41 PC2
Maximum Allowed Output Power (dBm)	25.00	27.70
Measured Output Power (dBm)	24.04	27.48
Measured SAR (W/kg)	0.067	0.106
Measured Power (mW)	253.51	559.76
Duty Cycle	63.3%	43.3%
Frame Averaged Output Power (mW)	160.47	242.38
% deviation from expected linearity		4.75%

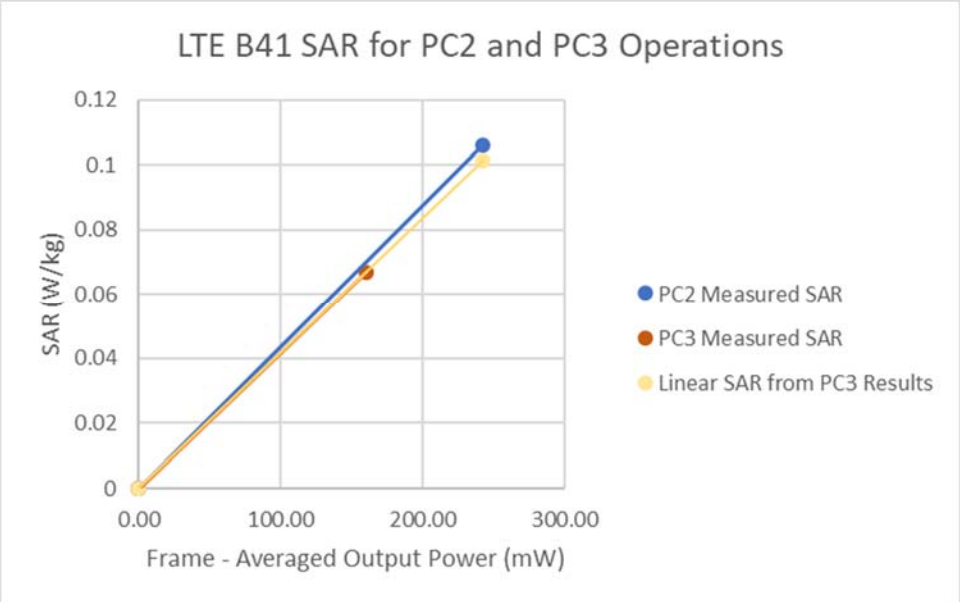

Figure 14-1
LTE Band 41 Head Linearity

Table 14-2
LTE Band 41 Body-Worn Linearity Data

	LTE Band 41 PC3	LTE Band 41 PC2
Maximum Allowed Output Power (dBm)	25.00	27.70
Measured Output Power (dBm)	24.04	27.48
Measured SAR (W/kg)	0.350	0.555
Measured Power (mW)	253.51	559.76
Duty Cycle	63.3%	43.3%
Frame Averaged Output Power (mW)	160.47	242.38
% deviation from expected linearity		4.99%

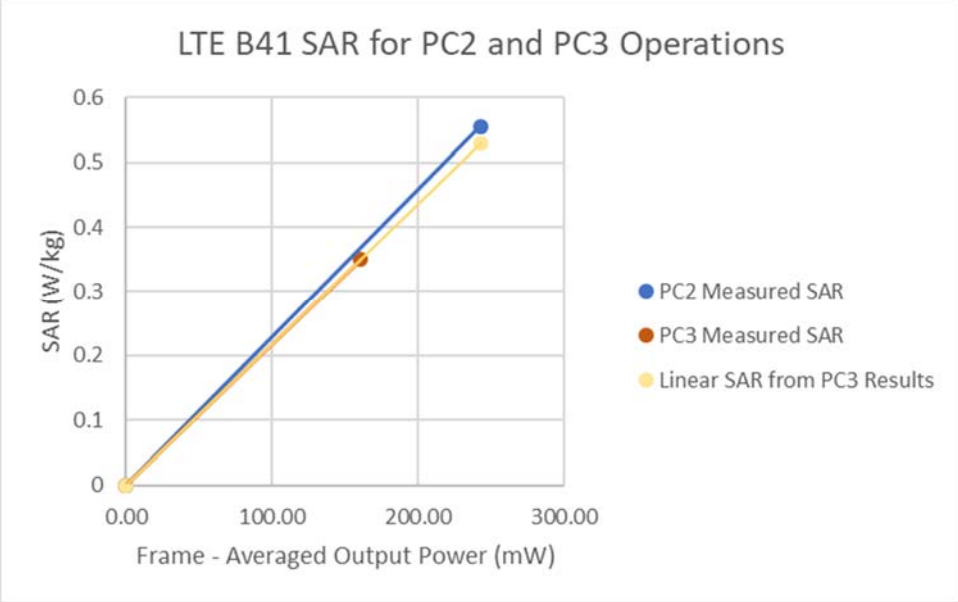

Figure 14-2
LTE Band 41 Body-Worn Linearity

Table 14-3
LTE Band 41 Hotspot Linearity Data

	LTE Band 41 PC3	LTE Band 41 PC2
Maximum Allowed Output Power (dBm)	25.00	27.70
Measured Output Power (dBm)	24.04	27.48
Measured SAR (W/kg)	0.635	0.906
Measured Power (mW)	253.51	559.76
Duty Cycle	63.3%	43.3%
Frame Averaged Output Power (mW)	160.47	242.38
% deviation from expected linearity		-5.54%

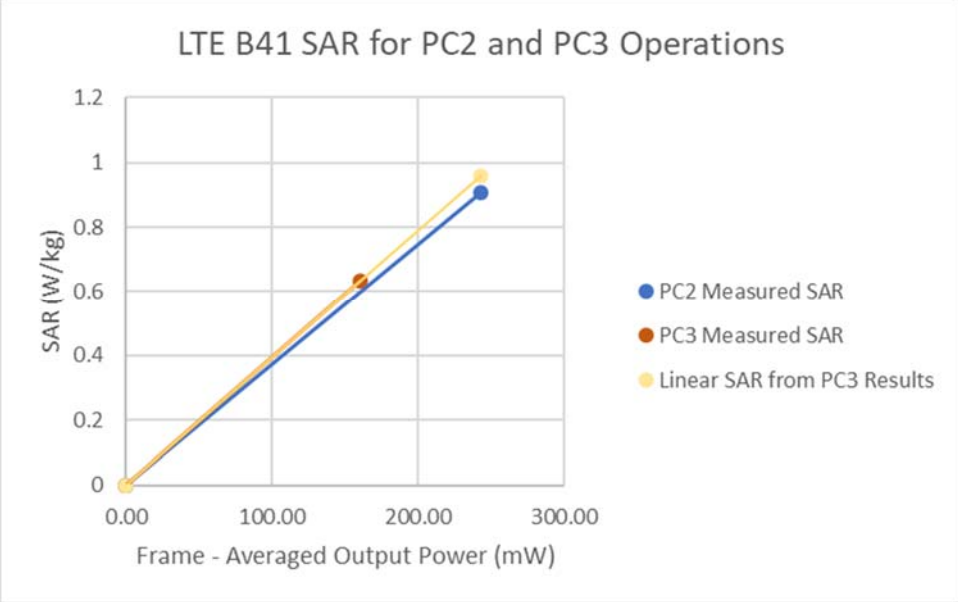

Figure 14-3
LTE Band 41 Hotspot Linearity

Table 14-4
LTE Band 41 Phablet Linearity Data

	LTE Band 41 PC3	LTE Band 41 PC2
Maximum Allowed Output Power (dBm)	24.00	25.70
Measured Output Power (dBm)	23.50	25.70
Measured SAR (W/kg)	2.84	2.93
Measured Power (mW)	223.87	371.54
Duty Cycle	63.3%	43.3%
Frame Averaged Output Power (mW)	141.71	160.87
% deviation from expected linearity		-9.12%

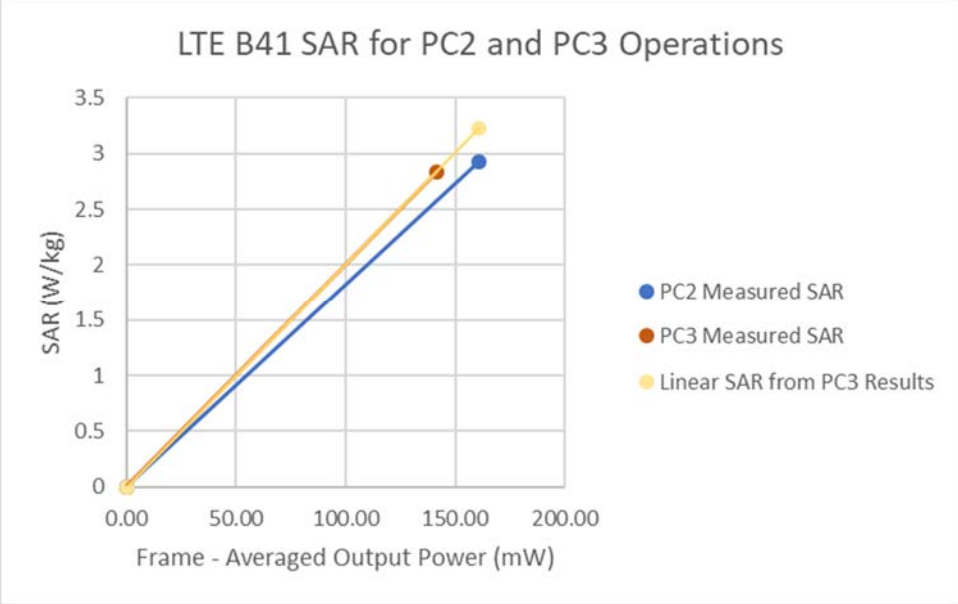

Figure 14-4
LTE Band 41 Phablet Linearity

15 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	85033E	3.5mm Standard Calibration Kit	8/13/2018	Annual	8/13/2019	MY53402352
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	CBT	N/A	CBT	3051A00187
Agilent	8753E	(30kHz-6GHz) Network Analyzer	9/28/2018	Annual	9/28/2019	JP38020182
Agilent	8753ES	S-Parameter Network Analyzer	7/30/2018	Annual	7/30/2019	MY40000670
Agilent	8753ES	S-Parameter Vector Network Analyzer	8/30/2018	Annual	8/30/2019	MY40003841
Agilent	E4438C	ESG Vector Signal Generator	6/22/2018	Annual	6/22/2019	MY53401181
Agilent	E4438C	ESG Vector Signal Generator	3/8/2019	Biennial	3/8/2021	MY42082385
Agilent	E4440A	PSA Series Spectrum Analyzer	11/14/2018	Annual	11/14/2019	MY46186272
Agilent	E5515C	8960 Series 10 Wireless Communications Test Set	12/18/2018	Annual	12/18/2019	GB42230325
Agilent	E5515C	Wireless Communications Test Set	2/28/2018	Biennial	2/28/2020	GB41450275
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46170464
Agilent	N5182A	MXG Vector Signal Generator	6/15/2018	Annual	6/15/2019	MY47420837
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/25/2018	Annual	5/25/2019	MY52350166
Amplifier Research	150A100C	Amplifier	CBT	N/A	CBT	350132
Amplifier Research	1S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	MA24106A	USB Power Sensor	7/17/2018	Annual	7/17/2019	1827527
Anritsu	MA24106A	USB Power Sensor	6/5/2018	Annual	6/5/2019	1231538
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	1244515
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1126066
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1207470
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Anritsu	ML2495A	Power Meter	11/20/2018	Annual	11/20/2019	1039008
Anritsu	MT8820C	Radio Communication Analyzer	6/27/2018	Annual	6/27/2019	6201240328
Anritsu	MT8821C	Radio Communication Analyzer	7/24/2018	Annual	7/24/2019	6201664756
Anritsu	MT8821C	Radio Communication Analyzer	7/26/2018	Annual	7/26/2019	6201144418
Anritsu	MT8862A	Wireless Connectivity Test Set	7/3/2018	Annual	7/3/2019	6261782395
Control Company	4040	Therm./ Clock/ Humidity Monitor	1/8/2019	Annual	1/8/2020	160473909
Control Company	4040	Therm./ Clock/ Humidity Monitor	1/8/2019	Annual	1/8/2020	160574418
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330144
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
Keysight Technologies	AT/N6705B	DC Power Supply	CBT	N/A	CBT	MY53001315
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
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+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mitutoyo	CD-6"CSX	Digital Caliper	4/18/2018	Biennial	4/18/2020	13264165
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	NC-100	Torque Wrench	11/1/2017	Biennial	11/1/2019	N/A
Pasternack	NC-100	Torque Wrench	11/7/2017	Biennial	11/7/2019	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
RME	Fireface UC	Soundcheck Acoustic Analyzer External Audio Interface	9/6/2018	Biennial	9/6/2020	23792992
Rohde & Schwarz	CMU200	Base Station Simulator	5/18/2018	Annual	5/18/2019	109892
Rohde & Schwarz	CMW500	Radio Communication Tester	6/8/2018	Annual	6/8/2019	112347
Rohde & Schwarz	CMW500	Radio Communication Tester	6/9/2018	Annual	6/9/2019	108843
SPEAG	D1750V2	1750 MHz SAR Dipole	5/9/2017	Biennial	5/9/2019	1148
SPEAG	D1750V2	1750 MHz SAR Dipole	10/22/2018	Annual	10/22/2019	1150
SPEAG	D1765V2	1765 MHz SAR Dipole	5/23/2018	Annual	5/23/2019	1008
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Annual	10/23/2019	5d080
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Annual	10/23/2019	5d149
SPEAG	D2450V2	2450 MHz SAR Dipole	8/16/2018	Annual	8/16/2019	981
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	6/7/2017	Biennial	6/7/2019	1064
SPEAG	D2600V2	2600 MHz SAR Dipole	9/13/2016	Triennial	9/13/2019	1071
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/16/2018	Biennial	1/16/2020	1057
SPEAG	D750V3	750 MHz SAR Dipole	10/19/2018	Annual	10/19/2019	1161
SPEAG	D750V3	750 MHz SAR Dipole	1/15/2018	Biennial	1/15/2020	1003
SPEAG	D835V2	835 MHz SAR Dipole	10/19/2018	Annual	10/19/2019	4d133
SPEAG	D835V2	835 MHz SAR Dipole	1/22/2019	Annual	1/22/2020	4d132
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2018	Annual	6/18/2019	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2018	Annual	7/11/2019	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/22/2018	Annual	8/22/2019	1450
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/3/2018	Annual	10/3/2019	1558
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/15/2019	Annual	1/15/2020	1530
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/13/2019	Annual	2/13/2020	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/14/2019	Annual	2/14/2020	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/18/2019	Annual	4/18/2020	1407
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/11/2018	Annual	9/11/2019	1091
SPEAG	EX3DV4	SAR Probe	6/25/2018	Annual	6/25/2019	7409
SPEAG	EX3DV4	SAR Probe	7/20/2018	Annual	7/20/2019	7410
SPEAG	EX3DV4	SAR Probe	8/23/2018	Annual	8/23/2019	7308
SPEAG	EX3DV4	SAR Probe	1/24/2019	Annual	1/24/2020	7488
SPEAG	EX3DV4	SAR Probe	1/25/2019	Annual	1/25/2020	3589
SPEAG	EX3DV4	SAR Probe	2/19/2019	Annual	2/19/2020	3914
SPEAG	EX3DV4	SAR Probe	2/19/2019	Annual	2/19/2020	7417
SPEAG	EX3DV4	SAR Probe	4/24/2019	Annual	4/24/2020	7357

All equipment was used solely within its calibration period.

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.

16 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	

17 CONCLUSION

17.1 Measurement Conclusion

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

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

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APPENDIX A: SAR TEST DATA

DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

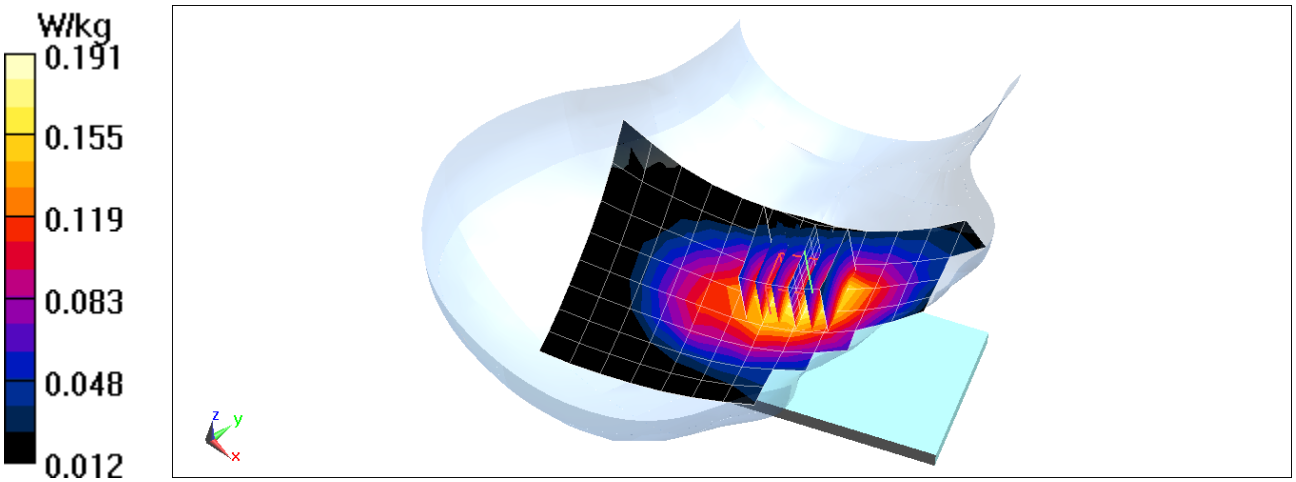
Communication System: UID 0, Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 820.1 MHz; σ = 0.931 S/m; ε_r = 41.94; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-24-2019; Ambient Temp: 23.1°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN3914; ConvF(9.5, 9.5, 9.5) @ 820.1 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/14/2019
Phantom: Left For Head SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1687
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: Cell. EVDO Rev. A, Rule Part 90S, 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 = 13.42 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.209 W/kg
SAR(1 g) = 0.161 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

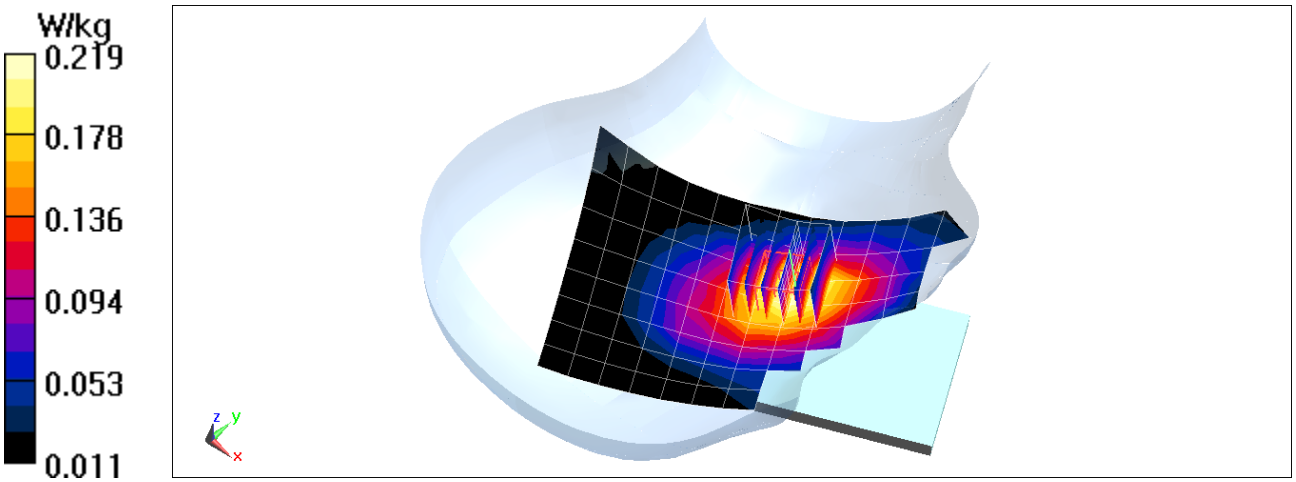
Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 836.52 MHz; σ = 0.937 S/m; ε_r = 41.887; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-24-2019; Ambient Temp: 23.1°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN3914; ConvF(9.5, 9.5, 9.5) @ 836.52 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/14/2019
Phantom: Left For Head SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1687
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: Cell. CDMA, Rule Part 22H, 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 = 14.40 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.241 W/kg
SAR(1 g) = 0.185 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00751

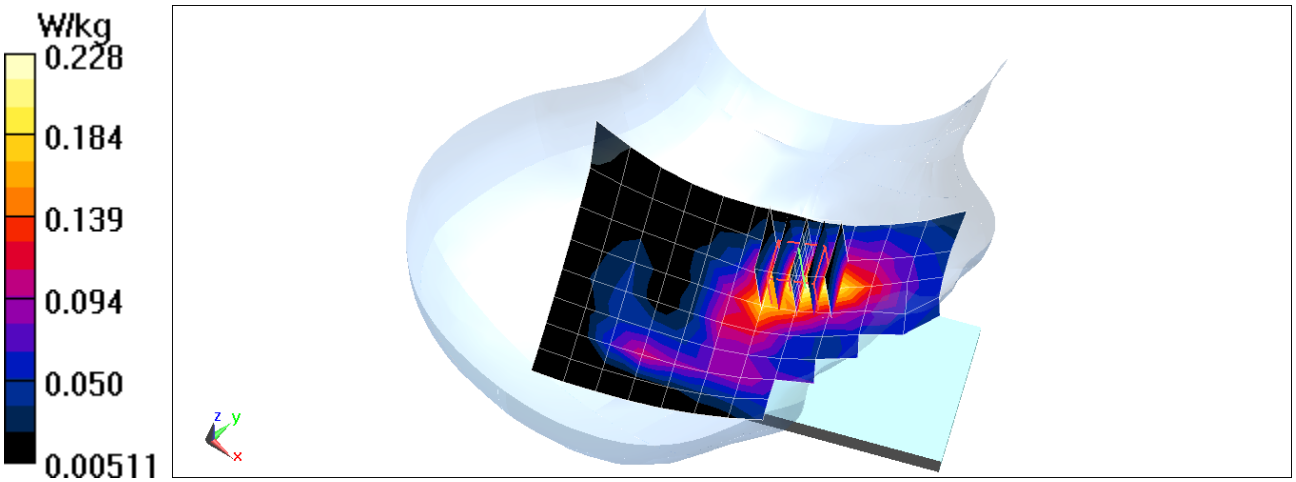
Communication System: UID 0, CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.45 S/m; ε_r = 39.748; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-28-2019; Ambient Temp: 23.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(8.05, 8.05, 8.05) @ 1880 MHz; Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM 30 with CRP v5.0 right; Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: PCS EVDO Rev A, Right 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 = 11.17 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.266 W/kg
SAR(1 g) = 0.170 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

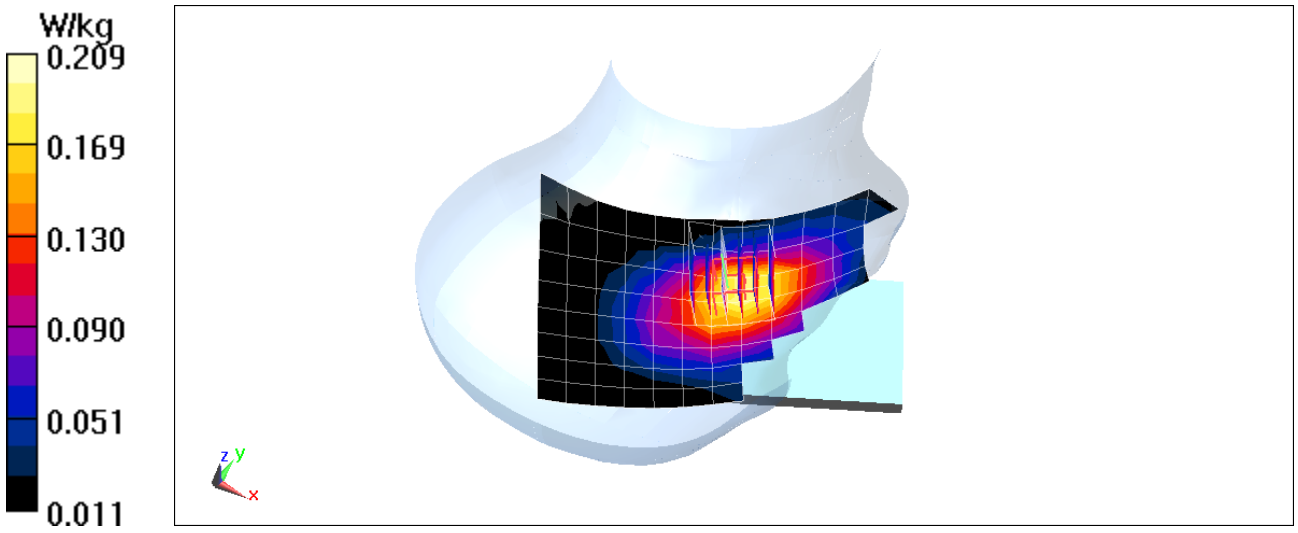
Communication System: UID 0, GSM GPRS; 3 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.76
Medium: 835 Head Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.921$ S/m; $\varepsilon_r = 41.954$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 04-15-2019; Ambient Temp: 22.4°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN3914; ConvF(9.5, 9.5, 9.5) @ 836.6 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/14/2019
Phantom: Left For Head SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1687
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 850, Right Head, Cheek, Mid.ch, 3 Tx slots

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.18 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.231 W/kg
SAR(1 g) = 0.175 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

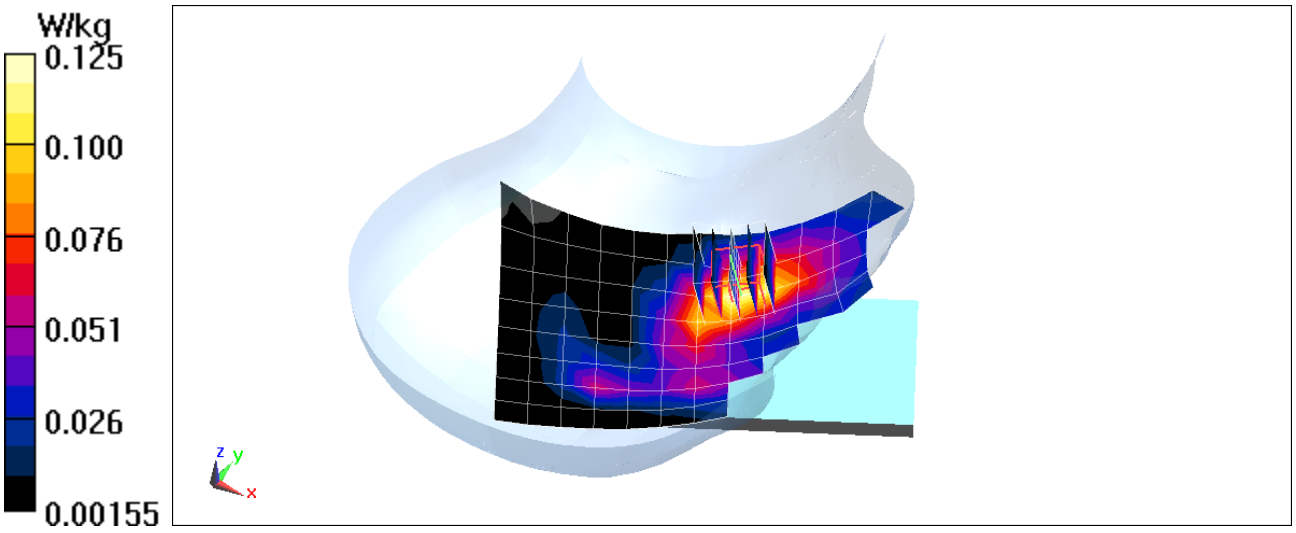
Communication System: UID 0, GSM GPRS; 3 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.76
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.402 S/m; ε_r = 38.932; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-17-2019; Ambient Temp: 23.9°C; Tissue Temp: 20.0°C

Probe: EX3DV4 - SN7409; ConvF(8.05, 8.05, 8.05) @ 1880 MHz; Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM 30 with CRP v5.0 right; Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 1900, Right Head, Cheek, Mid.ch, 3 Tx slots

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.504 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.148 W/kg
SAR(1 g) = 0.095 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

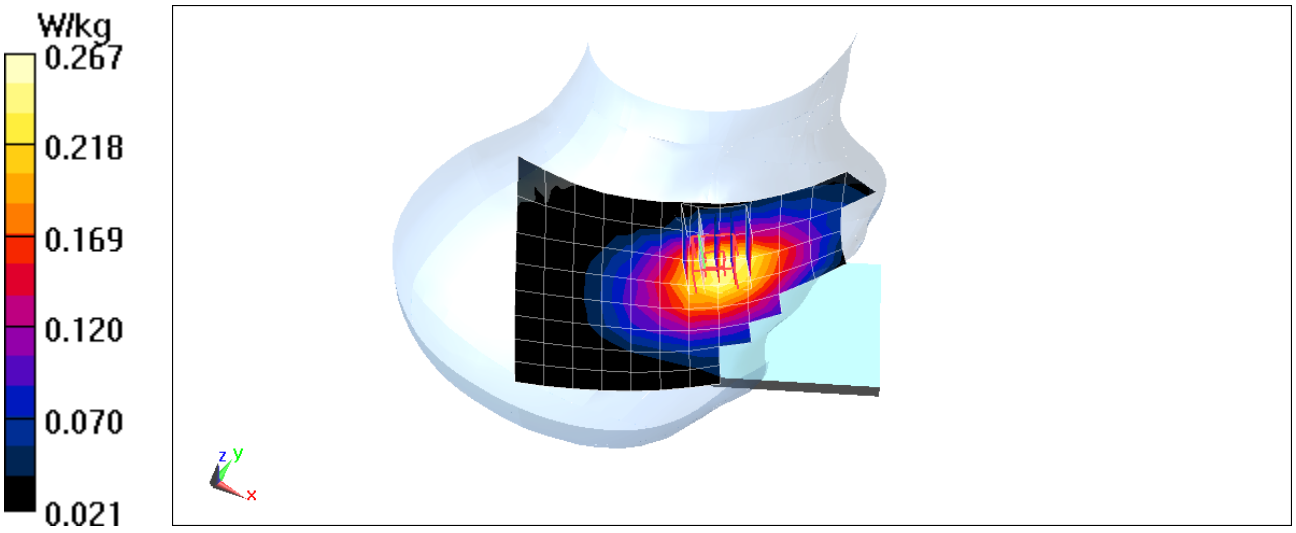
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.921$ S/m; $\varepsilon_r = 41.954$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 04-15-2019; Ambient Temp: 22.4°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN3914; ConvF(9.5, 9.5, 9.5) @ 836.6 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/14/2019
Phantom: Left For Head SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1687
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.10 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.298 W/kg
SAR(1 g) = 0.225 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

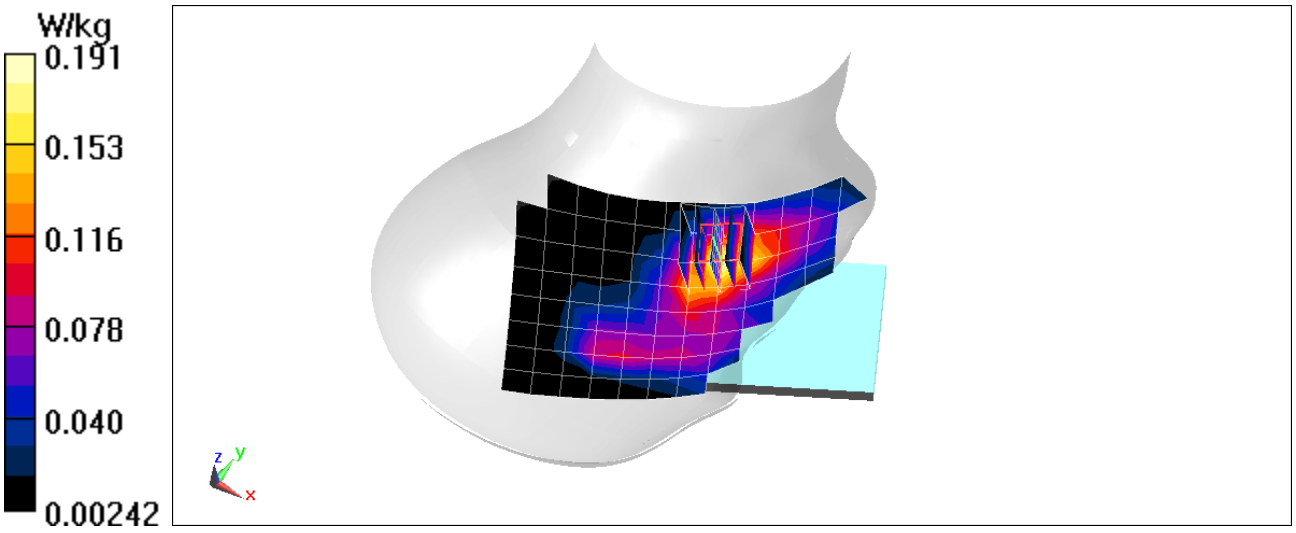
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.339 S/m; ε_r = 38.69; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-10-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7308; ConvF(8.66, 8.66, 8.66) @ 1732.4 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1966
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.68 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.226 W/kg
SAR(1 g) = 0.147 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

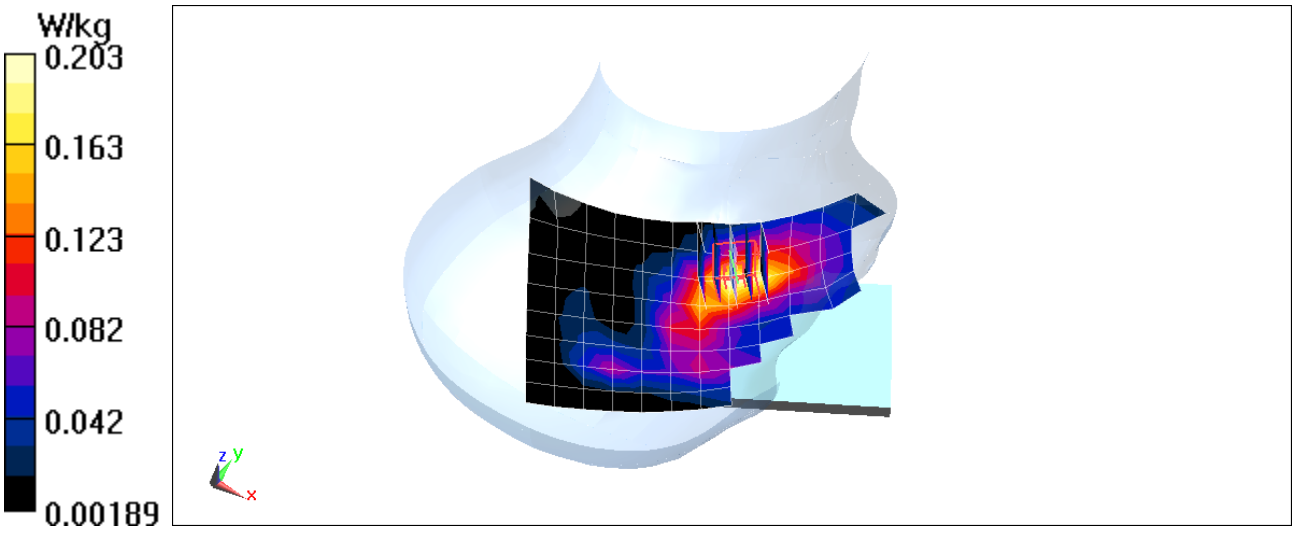
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.402 S/m; ε_r = 38.932; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-17-2019; Ambient Temp: 23.9°C; Tissue Temp: 20.0°C

Probe: EX3DV4 - SN7409; ConvF(8.05, 8.05, 8.05) @ 1880 MHz; Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM 30 with CRP v5.0 right; Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.88 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.243 W/kg
SAR(1 g) = 0.154 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00777

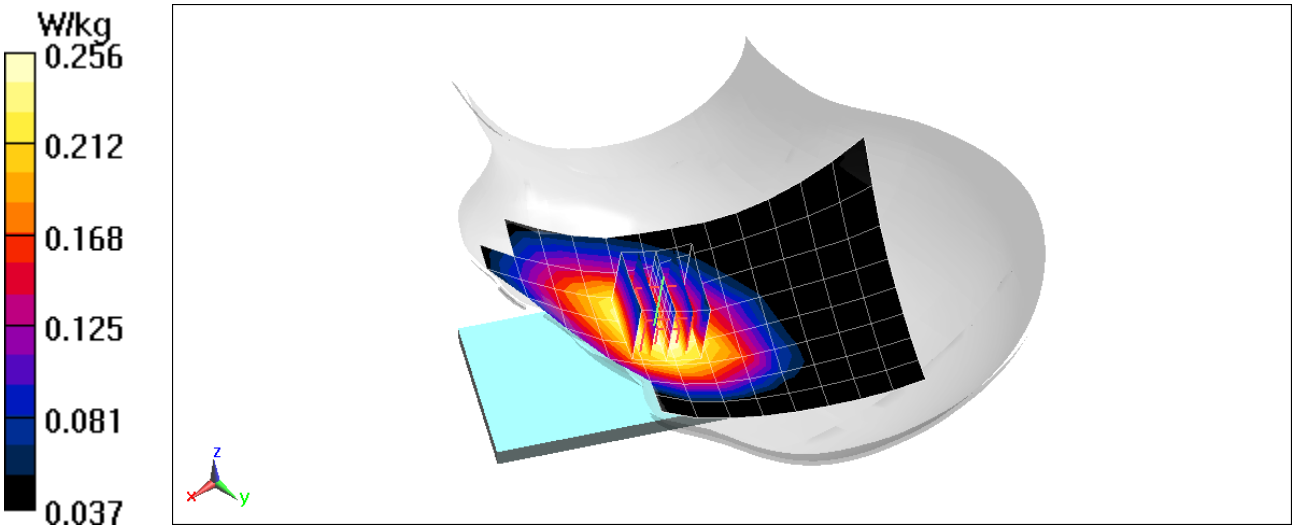
Communication System: UID 0, LTE Band 71; Frequency: 680.5 MHz; Duty Cycle: 1:1
Medium: 750 HEAD Medium parameters used (interpolated):
$f = 680.5$ MHz; $\sigma = 0.896$ S/m; $\varepsilon_r = 42.381$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 04-05-2019; Ambient Temp: 24.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN3589; ConvF(8.67, 8.67, 8.67) @ 680.5 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 71, 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 (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.74 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.273 W/kg
SAR(1 g) = 0.229 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00777

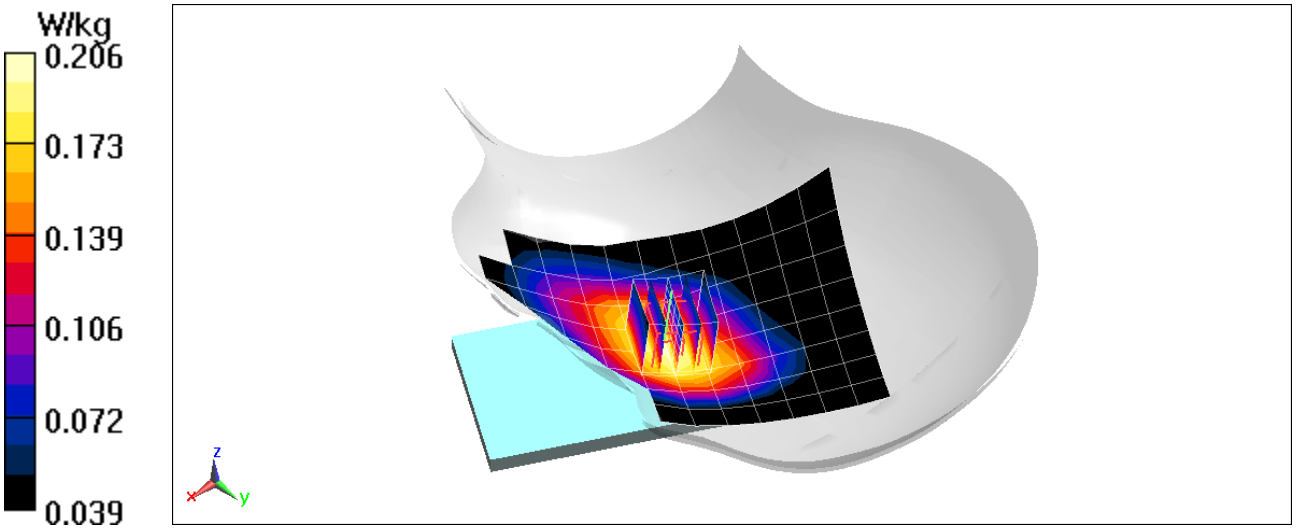
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 HEAD Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.876 S/m; ε_r = 41.795; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 04-08-2019; Ambient Temp: 23.3°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN3589; ConvF(8.67, 8.67, 8.67) @ 707.5 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 12, Left Head, Cheek, Mid.ch,
QPSK, 10 MHz Bandwidth, 1 RB, 25 RB Offset

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.19 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.216 W/kg
SAR(1 g) = 0.180 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00777

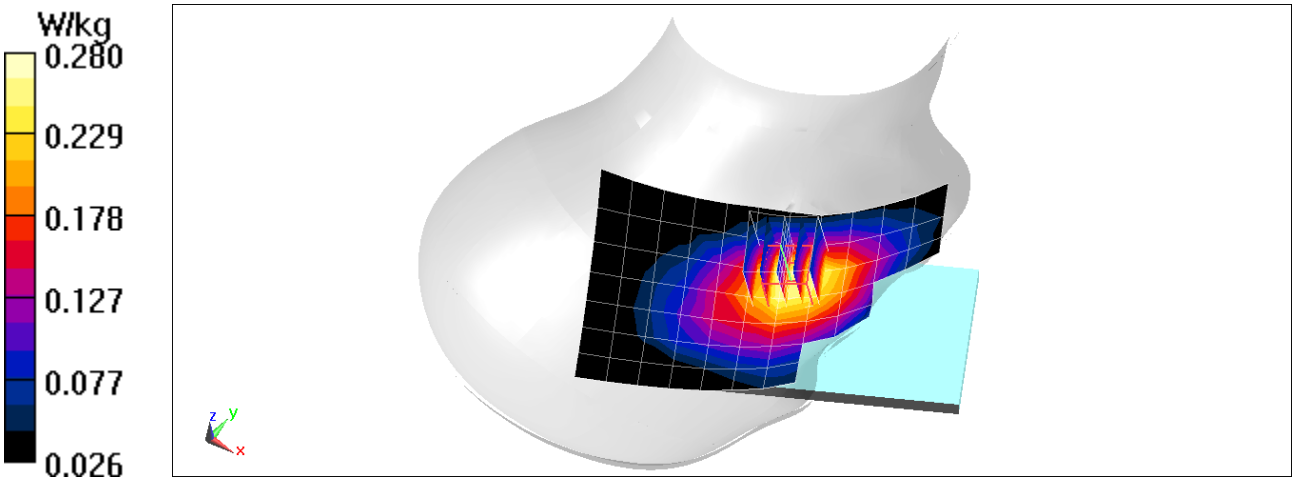
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 HEAD Medium parameters used (interpolated):
f = 782 MHz; σ = 0.902 S/m; ε_r = 41.552; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-08-2019; Ambient Temp: 23.3°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN3589; ConvF(8.67, 8.67, 8.67) @ 782 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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

Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.27 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.300 W/kg
SAR(1 g) = 0.235 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00777

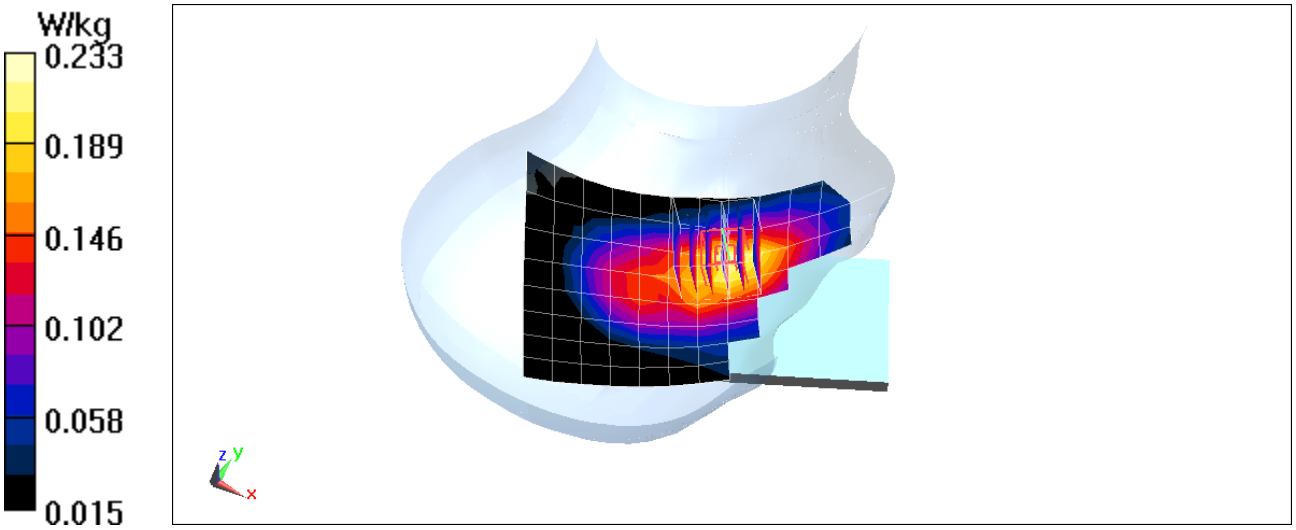
Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 831.5 MHz; σ = 0.886 S/m; ε_r = 39.891; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-04-2019; Ambient Temp: 22.7°C; Tissue Temp:23.4°C

Probe: EX3DV4 - SN7357; ConvF(10.11, 10.11, 10.11) @ 831.5 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 (2);SEMCAD X Version 14.6.12 (7450)

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 = 15.81 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.258 W/kg
SAR(1 g) = 0.196 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00777

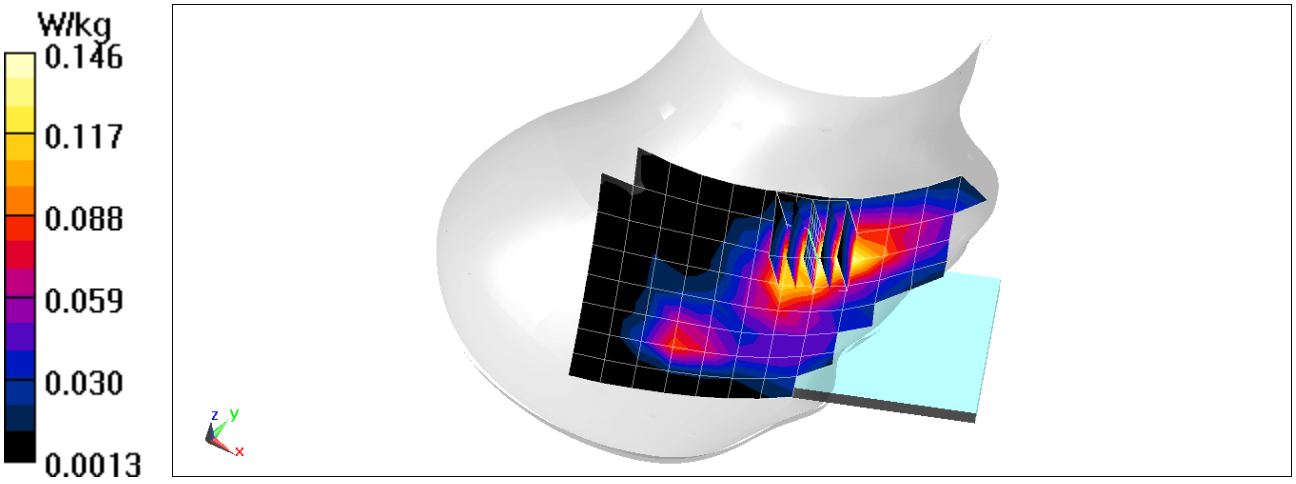
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1745 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
$f = 1745$ MHz; $\sigma = 1.347$ S/m; $\varepsilon_r = 38.669$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 04-10-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7308; ConvF(8.66, 8.66, 8.66) @ 1745 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1966
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 66 (AWS), Right 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 = 9.891 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.173 W/kg
SAR(1 g) = 0.110 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00785

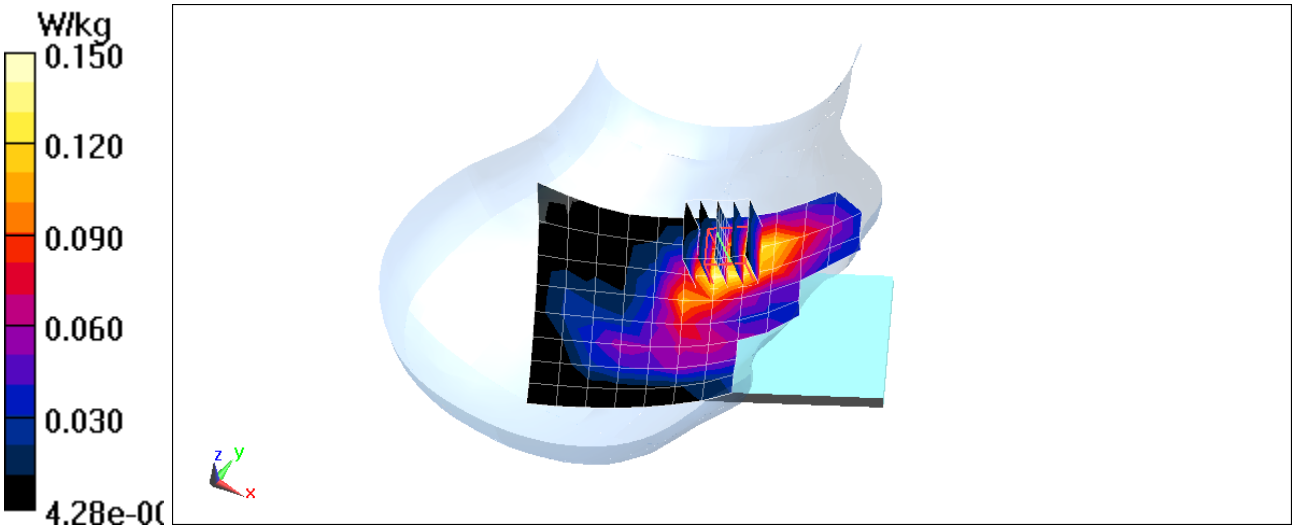
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1905 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1905 MHz; σ = 1.451 S/m; ε_r = 41.026; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-10-2019; Ambient Temp: 23.7°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7357; ConvF(8.47, 8.47, 8.47) @ 1905 MHz; Calibrated: 4/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2018
Phantom: Left For Head SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1687
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.442 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.176 W/kg
SAR(1 g) = 0.113 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00785

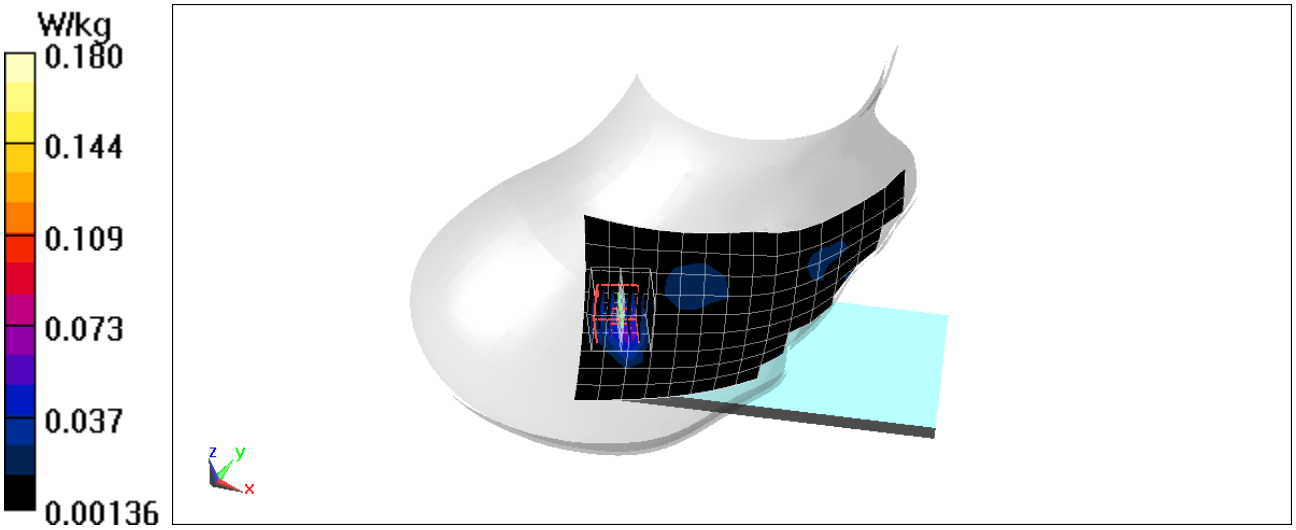
Communication System: UID 0, _LTE Band 41 (Class 2); Frequency: 2549.5 MHz; Duty Cycle: 1:2.31
Medium: 2450 Head Medium parameters used:
f = 2550 MHz; σ = 1.909 S/m; ε_r = 38.172; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-16-2019; Ambient Temp: 23.8°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN3589; ConvF(6.25, 6.25, 6.25) @ 2549.5 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41, PC2, Right Head, Tilt, Low-Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.438 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.223 W/kg
SAR(1 g) = 0.106 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00876

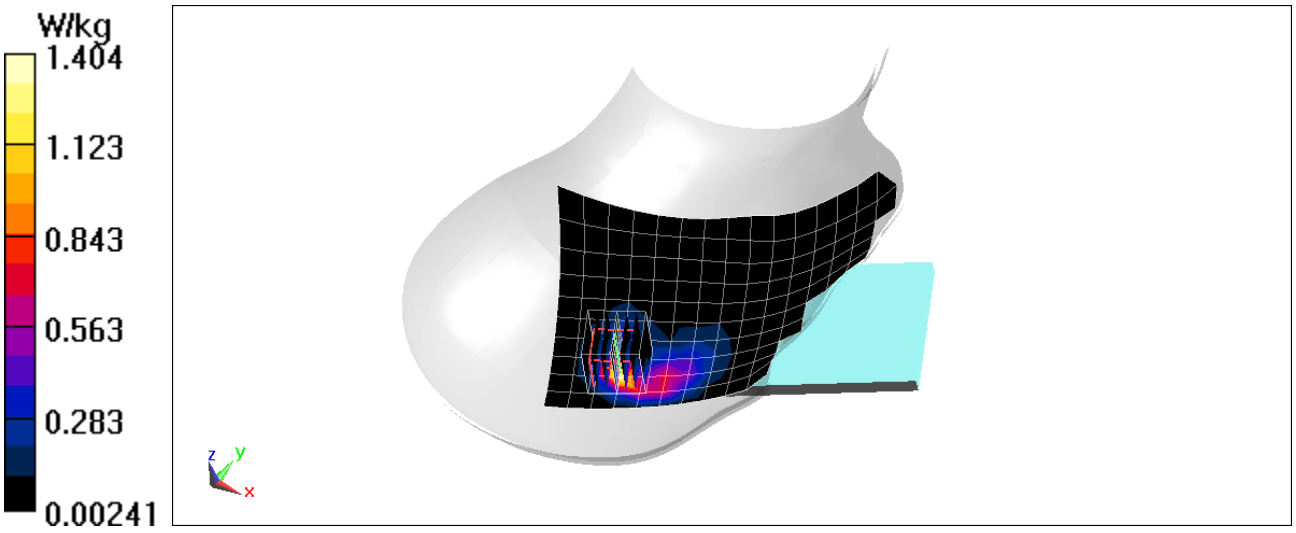
Communication System: UID 0, _IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
$f = 2437$ MHz; $\sigma = 1.817$ S/m; $\varepsilon_r = 38.346$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 04-16-2019; Ambient Temp: 23.8°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN3589; ConvF(6.46, 6.46, 6.46) @ 2437 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.292 V/m; Power Drift = 0.21 dB
Peak SAR (extrapolated) = 1.88 W/kg
SAR(1 g) = 0.811 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00876

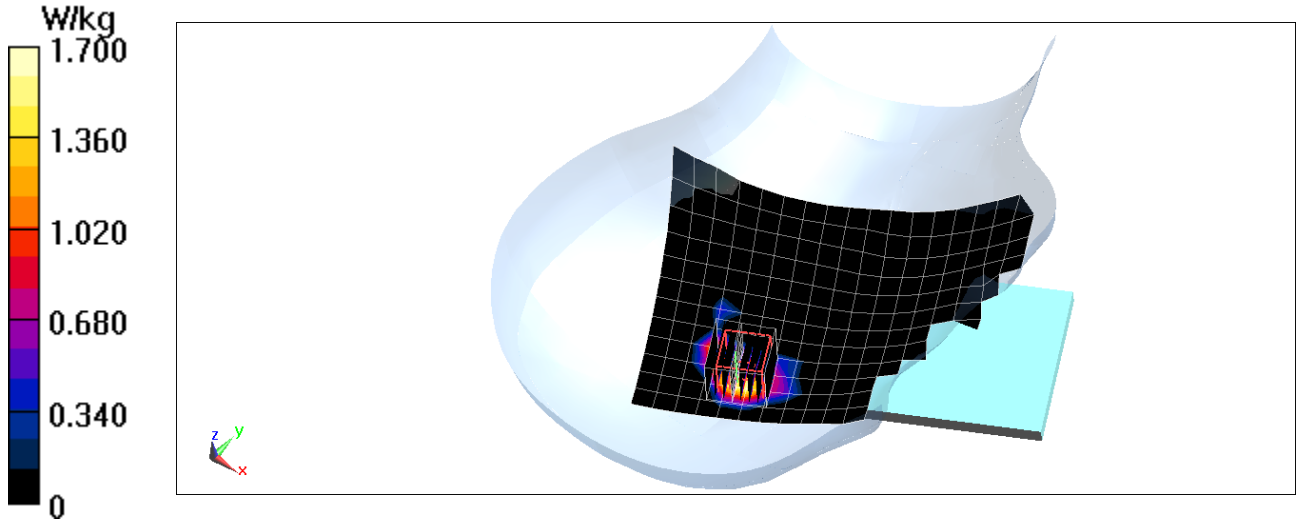
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1
Medium: 5GHz Head Medium parameters used:
f = 5785 MHz; σ = 5.212 S/m; ε_r = 34.665; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-08-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN7409; ConvF(4.82, 4.82, 4.82) @ 5785 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 (2);SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11a, U-NII-3, 20 MHz Bandwidth, Right Head, Cheek, Ch 157, 6 Mbps

Area Scan (13x11x1): 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 = 2.514 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 3.08 W/kg
SAR(1 g) = 0.607 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

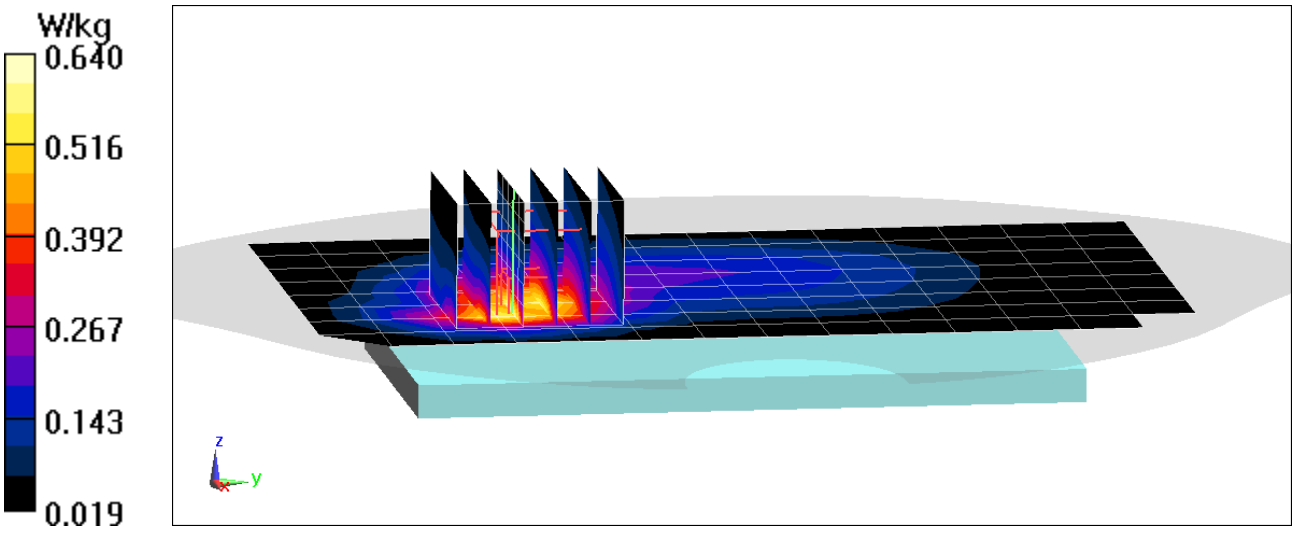
Communication System: UID 0, CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 820.1$ MHz; $\sigma = 0.995$ S/m; $\varepsilon_r = 52.856$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-01-2019; Ambient Temp: 23.3°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7488; ConvF(11.03, 11.03, 11.03) @ 820.1 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: Cell. CDMA BC10, Rule Part 90S, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.99 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.782 W/kg
SAR(1 g) = 0.444 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

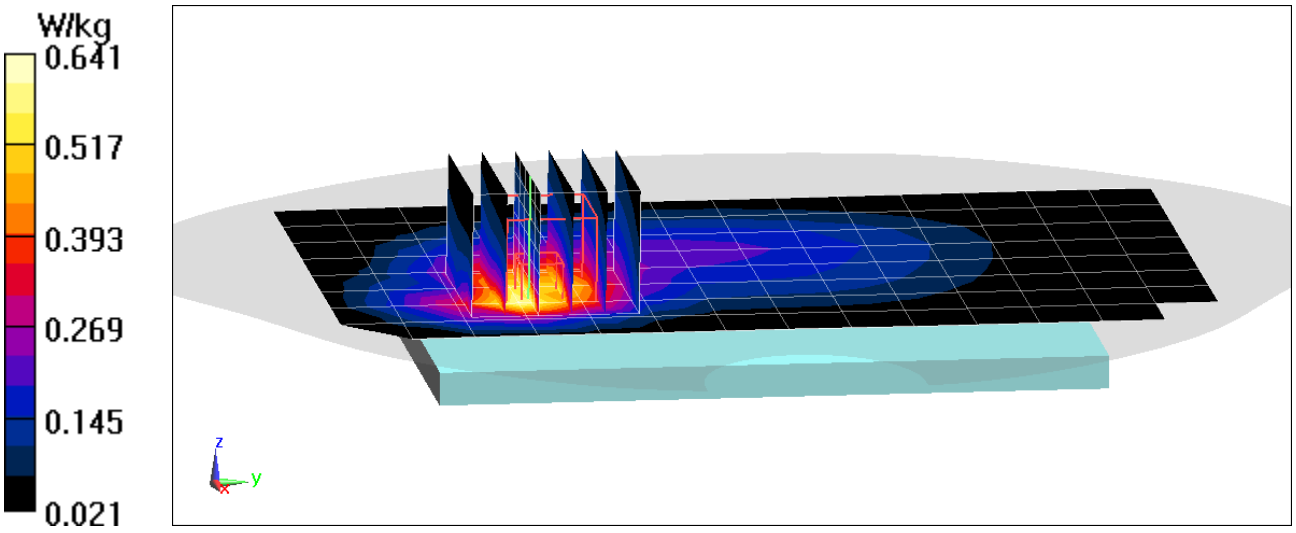
Communication System: UID 0, CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 820.1$ MHz; $\sigma = 0.995$ S/m; $\varepsilon_r = 52.856$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-01-2019; Ambient Temp: 23.3°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7488; ConvF(11.03, 11.03, 11.03) @ 820.1 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: Cell. EVDO BC10, Rule Part 90S, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.01 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.767 W/kg
SAR(1 g) = 0.444 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

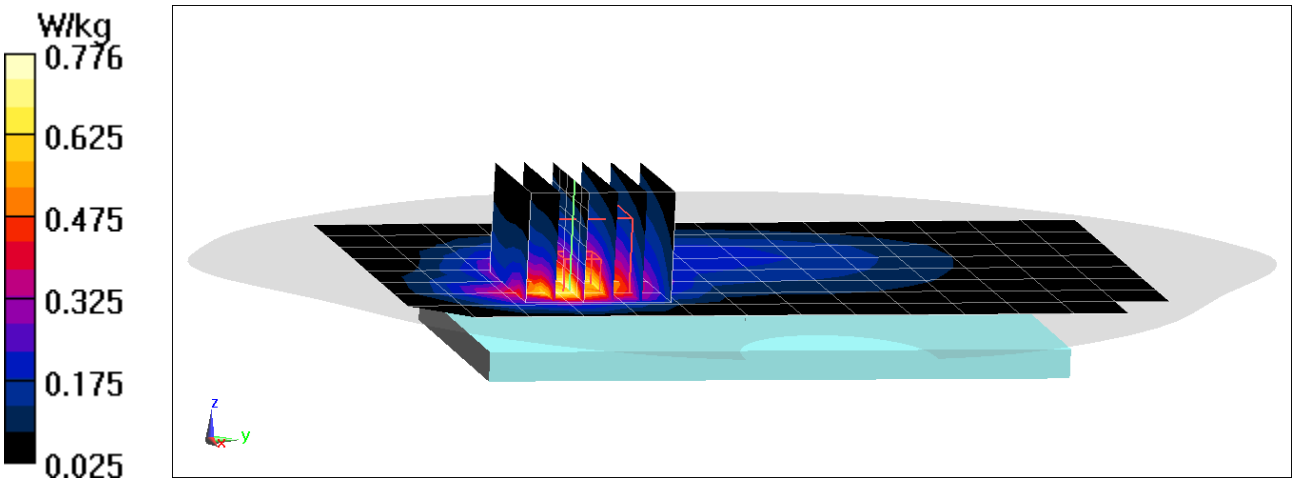
Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.52$ MHz; $\sigma = 1.002$ S/m; $\varepsilon_r = 52.819$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-01-2019; Ambient Temp: 23.3°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7488; ConvF(11.03, 11.03, 11.03) @ 836.52 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: Cell. CDMA, Rule Part 22H, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.78 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.932 W/kg
SAR(1 g) = 0.531 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

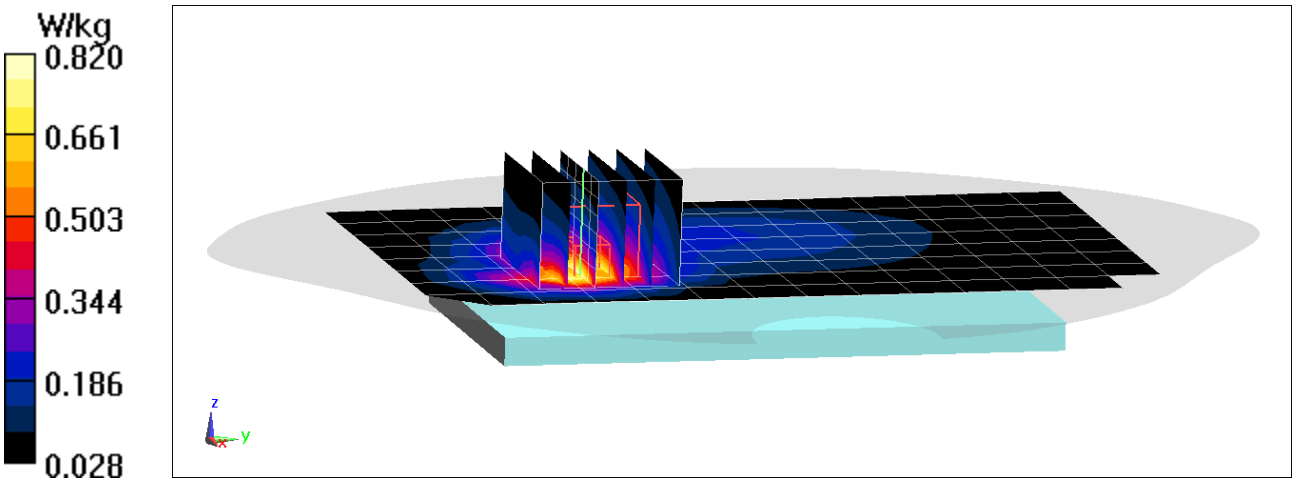
Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.52 MHz; σ = 1.002 S/m; ε_r = 52.819; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-01-2019; Ambient Temp: 23.3°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7488; ConvF(11.03, 11.03, 11.03) @ 836.52 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: Cell. EVDO Rev.0, Rule Part 22H, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.50 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.989 W/kg
SAR(1 g) = 0.565 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

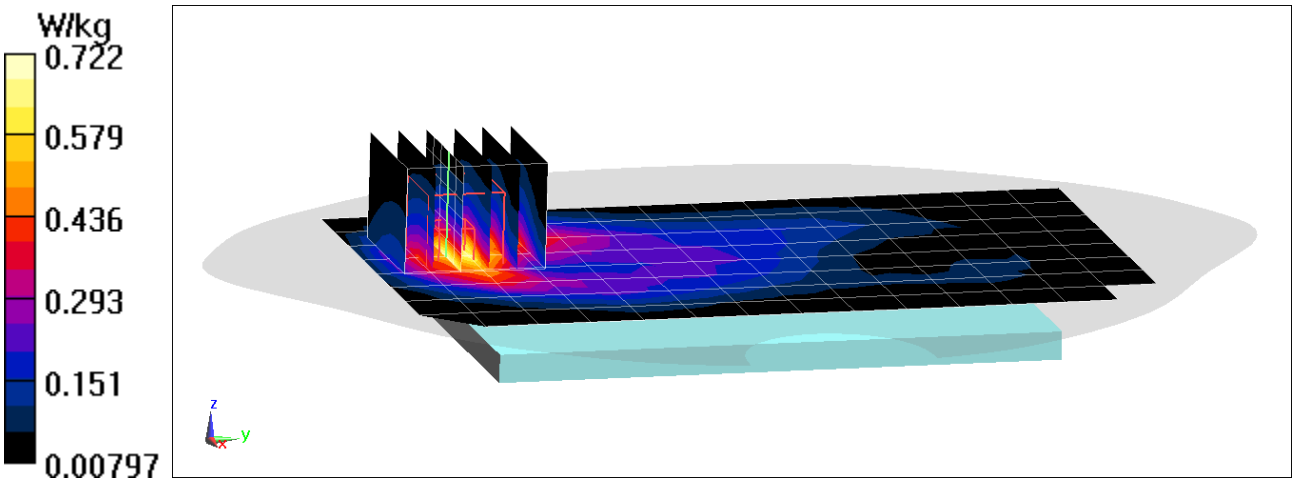
Communication System: UID 0, CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.553 S/m; ε_r = 52.55; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-25-2019; Ambient Temp: 23.4°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7410; ConvF(7.78, 7.78, 7.78) @ 1880 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: PCS CDMA, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.70 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.860 W/kg
SAR(1 g) = 0.498 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

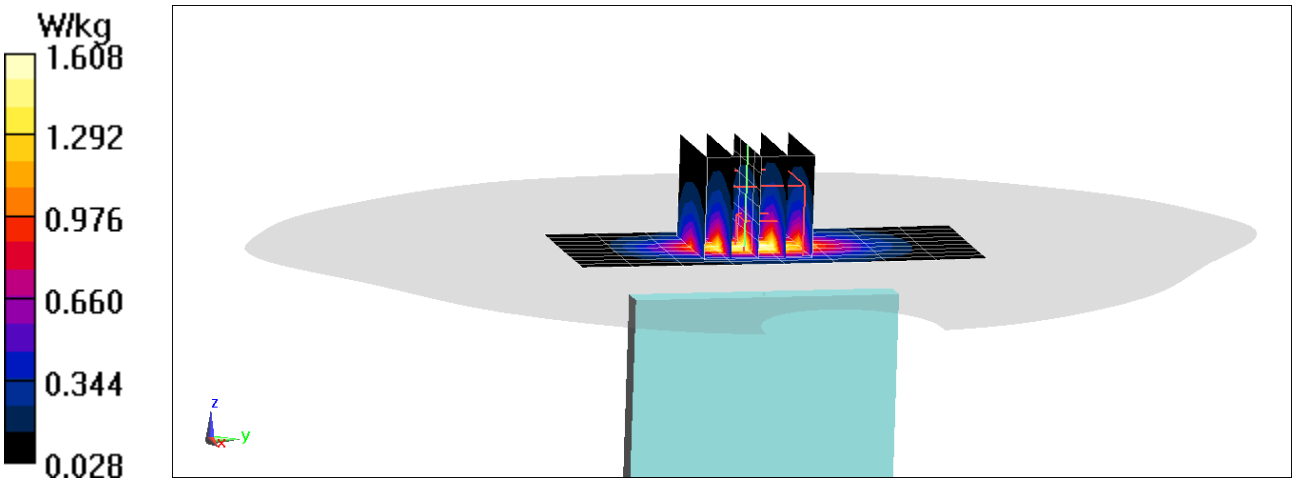
Communication System: UID 0, CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.553 S/m; ε_r = 52.55; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-25-2019; Ambient Temp: 23.4°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7410; ConvF(7.78, 7.78, 7.78) @ 1880 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: PCS EVDO Rev.0, Body SAR, Bottom Edge, Mid.ch

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.93 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.89 W/kg
SAR(1 g) = 1.09 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

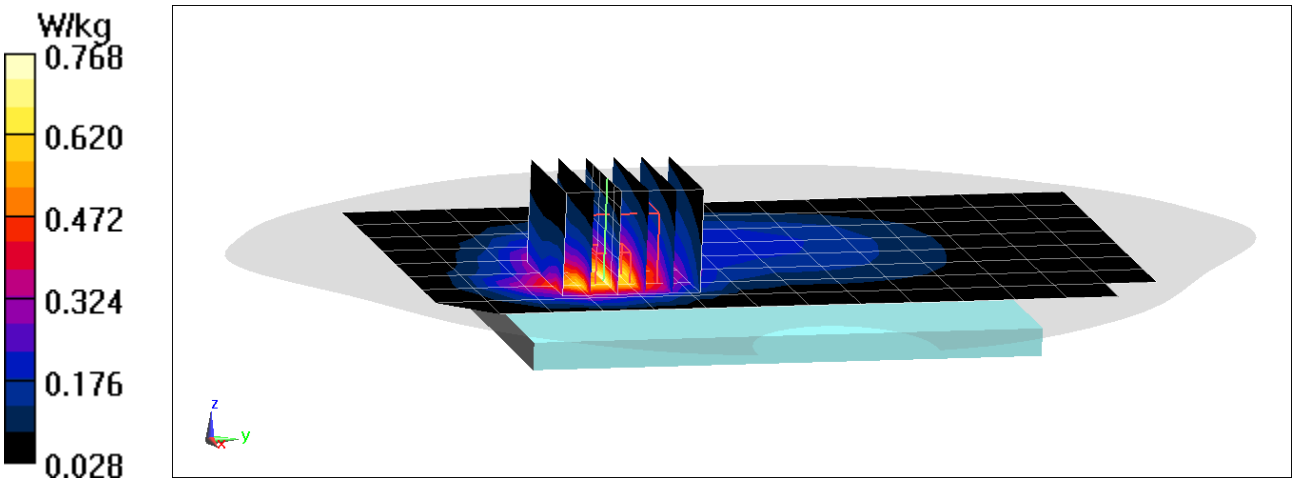
Communication System: UID 0, _GSM GPRS; 3 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 1.01$ S/m; $\varepsilon_r = 53.336$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-18-2019; Ambient Temp: 24.9°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7488; ConvF(11.03, 11.03, 11.03) @ 836.6 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.28 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.917 W/kg
SAR(1 g) = 0.521 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

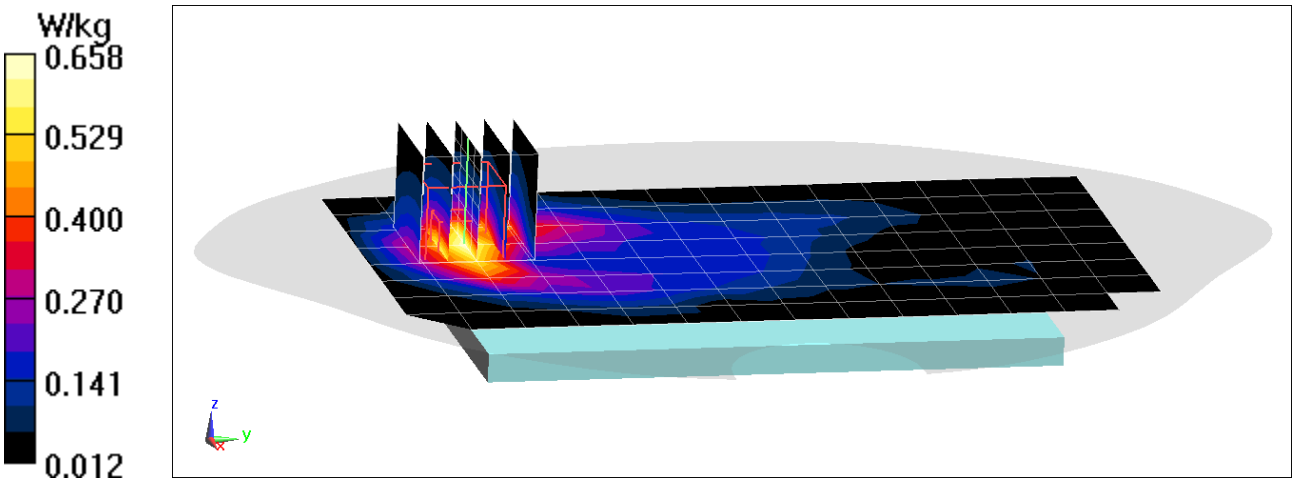
Communication System: UID 0, _GSM GPRS; 3 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.76
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.553 S/m; ε_r = 52.55; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-25-2019; Ambient Temp: 23.4°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7410; ConvF(7.78, 7.78, 7.78) @ 1880 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 1900, Body SAR, Back Side, Mid.ch, Tx Slots

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.05 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.799 W/kg
SAR(1 g) = 0.465 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

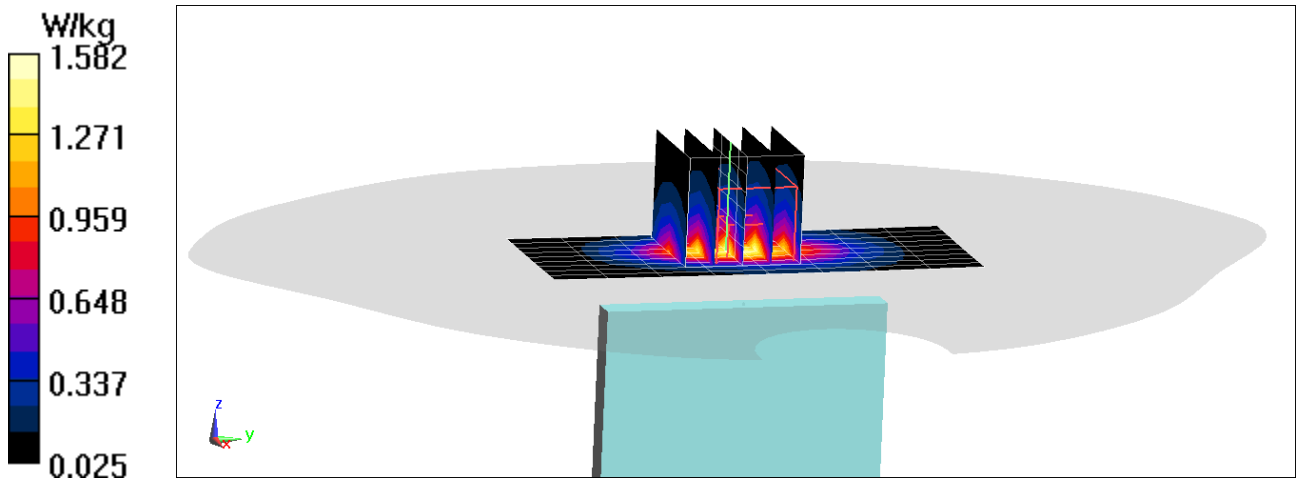
Communication System: UID 0, _GSM GPRS; 3 Tx slots; Frequency: 1909.8 MHz; Duty Cycle: 1:2.76
Medium: 1900 Body Medium parameters used:
f = 1910 MHz; σ = 1.585 S/m; ε_r = 52.474; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-25-2019; Ambient Temp: 23.4°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7410; ConvF(7.78, 7.78, 7.78) @ 1909.8 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 1900, Body SAR, Bottom Edge, High.ch, 3 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 = 27.31 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.87 W/kg
SAR(1 g) = 1.07 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

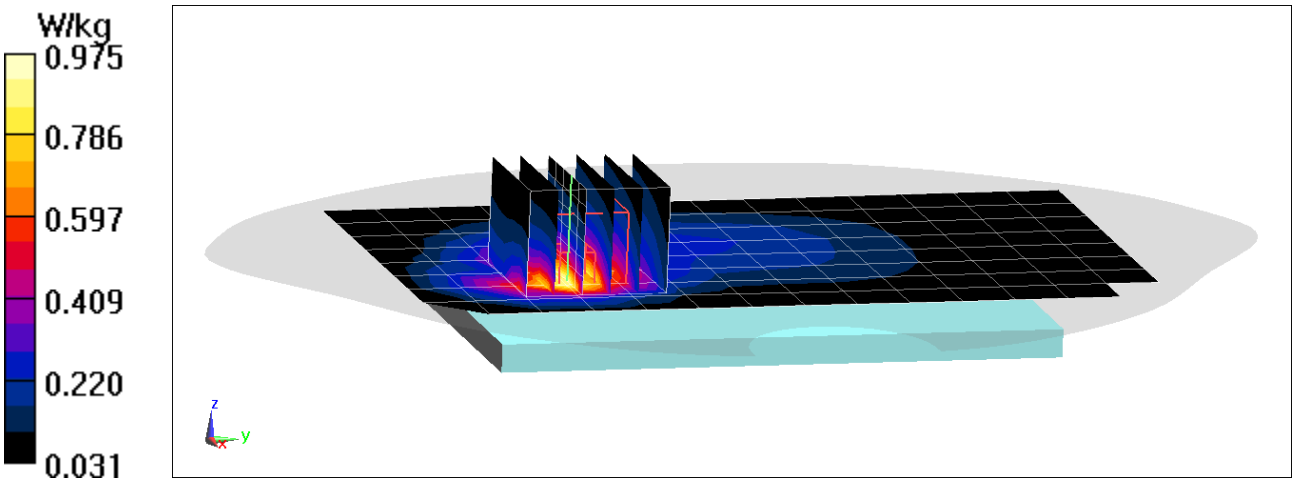
Communication System: UID 0, UMTS; Frequency: 846.6 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 846.6 MHz; σ = 0.993 S/m; ε_r = 54.45; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-16-2019; Ambient Temp: 24.2°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7488; ConvF(11.03, 11.03, 11.03) @ 846.6 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 850, Body SAR, Back side, High.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 = 26.87 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.662 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

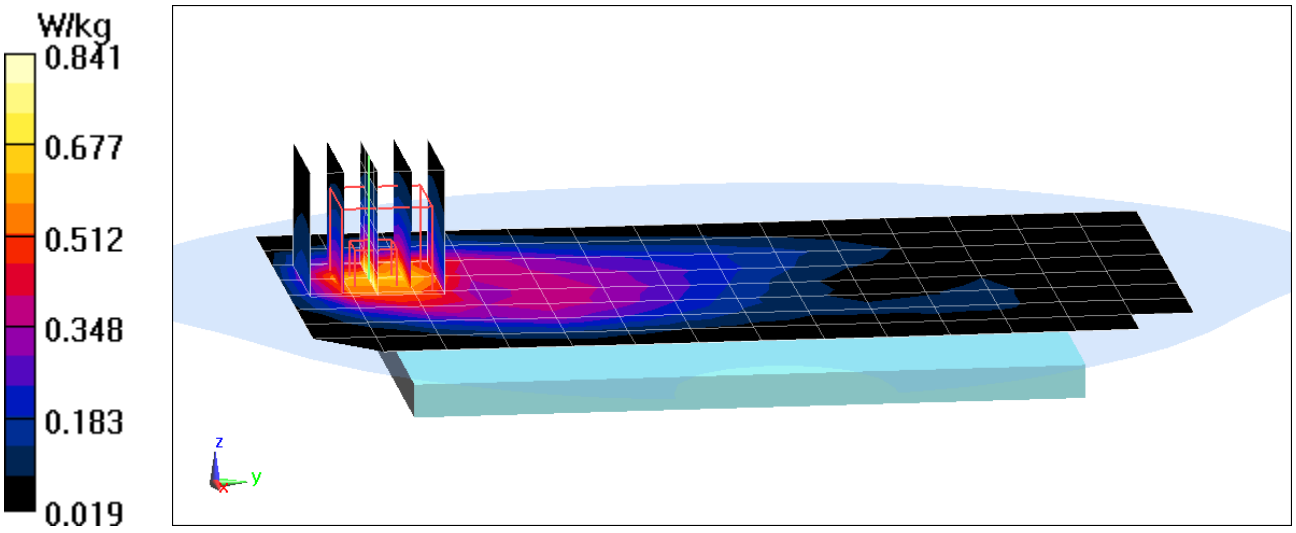
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.463 S/m; ε_r = 51.172; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-08-2019; Ambient Temp: 20.4 °C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7488; ConvF(8.68, 8.68, 8.68) @ 1732.4 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1750, 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 = 21.00 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.987 W/kg
SAR(1 g) = 0.581 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

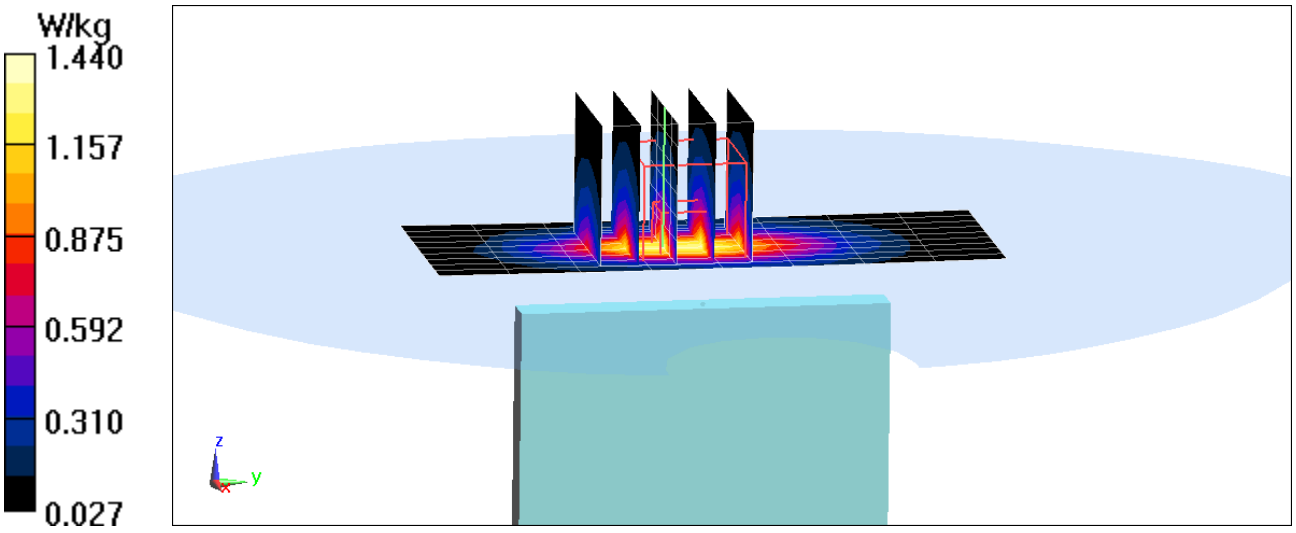
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.463 S/m; ε_r = 51.172; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-08-2019; Ambient Temp: 20.4 °C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7488; ConvF(8.68, 8.68, 8.68) @ 1732.4 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.01 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 0.964 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

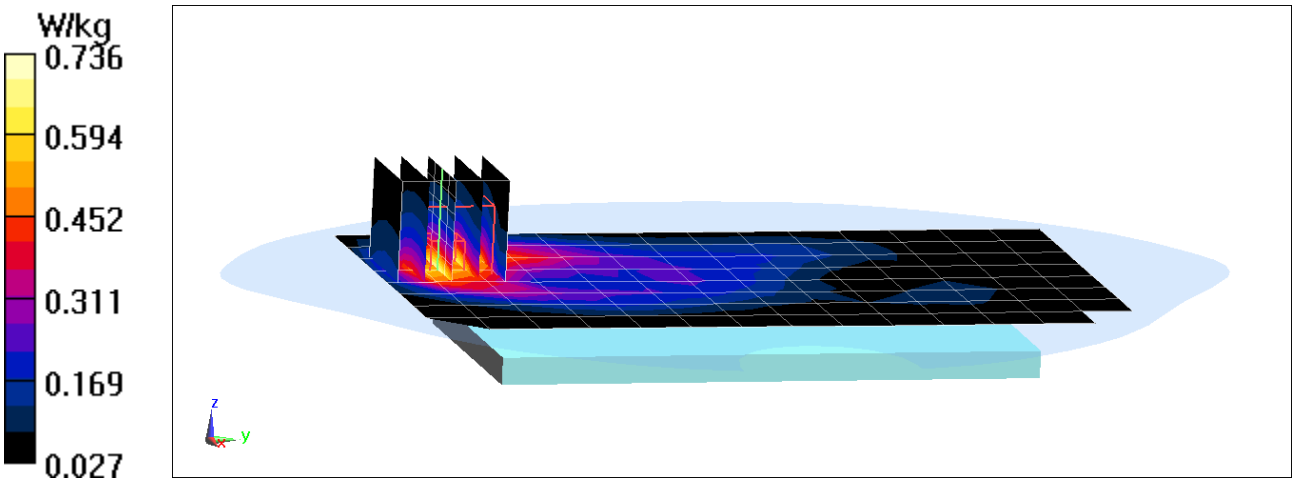
Communication System: UID 0, _UMTS; Frequency: 1852.4 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1852.4 MHz; σ = 1.529 S/m; ε_r = 53.212; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-29-2019; Ambient Temp:21.6 °C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN7410; ConvF(7.78, 7.78, 7.78) @ 1852.4 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 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1900, 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 = 19.28 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.877 W/kg
SAR(1 g) = 0.521 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

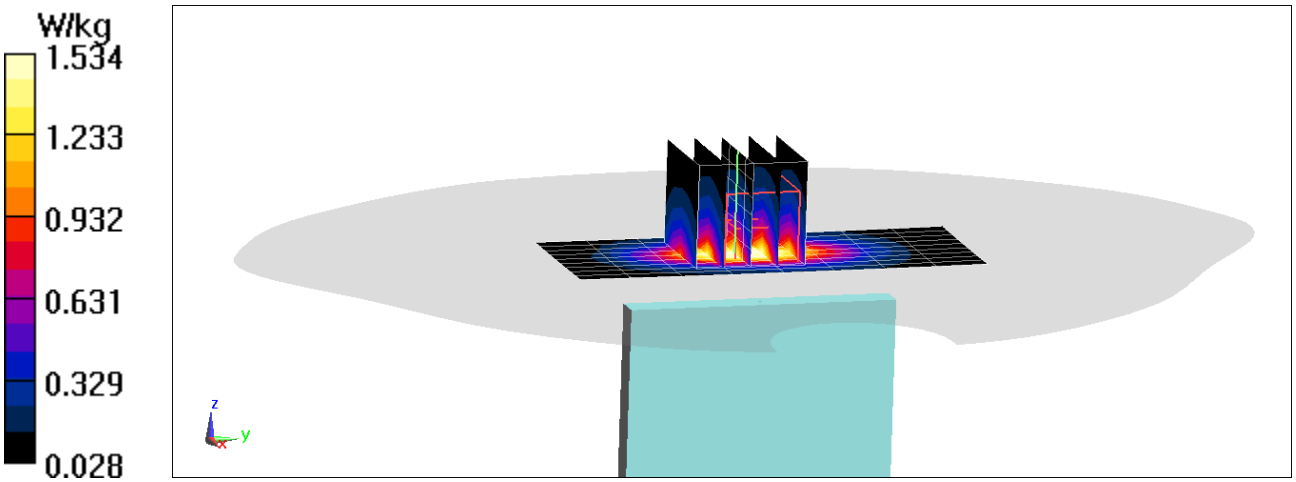
Communication System: UID 0, UMTS; Frequency: 1907.6 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1907.6 MHz; σ = 1.582 S/m; ε_r = 52.48; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-25-2019; Ambient Temp: 23.4°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7410; ConvF(7.78, 7.78, 7.78) @ 1907.6 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.01 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.80 W/kg
SAR(1 g) = 1.05 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00777

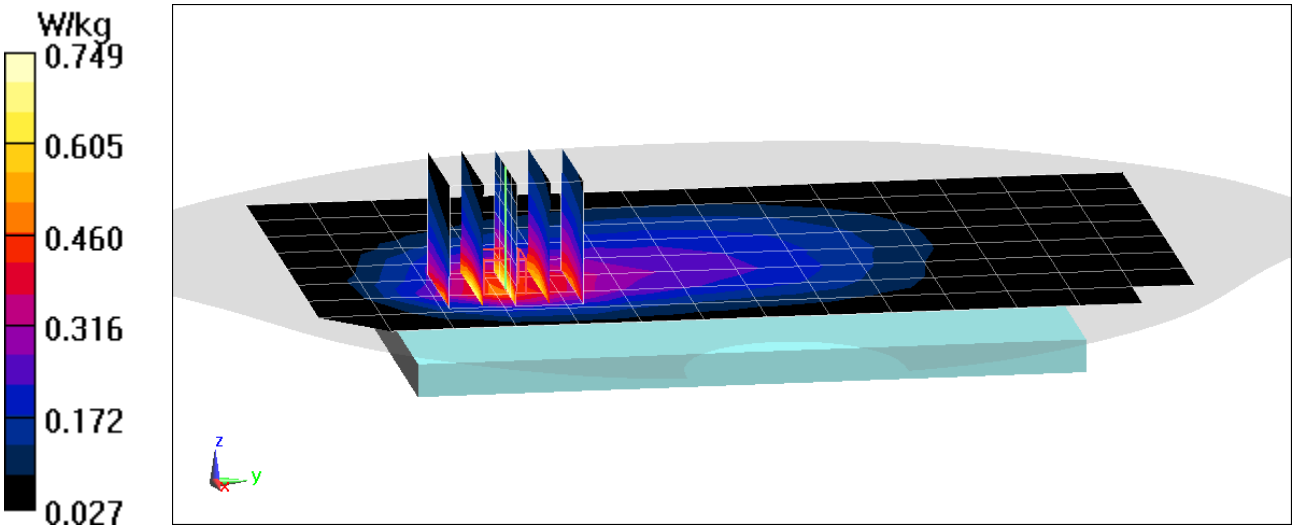
Communication System: UID 0, LTE Band 71; Frequency: 680.5 MHz; Duty Cycle: 1:1
Medium: 750MHz Body Medium parameters used (interpolated):
f = 680.5 MHz; σ = 0.932 S/m; ε_r = 54.012; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-03-2019; Ambient Temp: 21.7°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7308; ConvF(10.38, 10.38, 10.38) @ 680.5 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 71, 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 = 20.86 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.910 W/kg
SAR(1 g) = 0.544 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00777

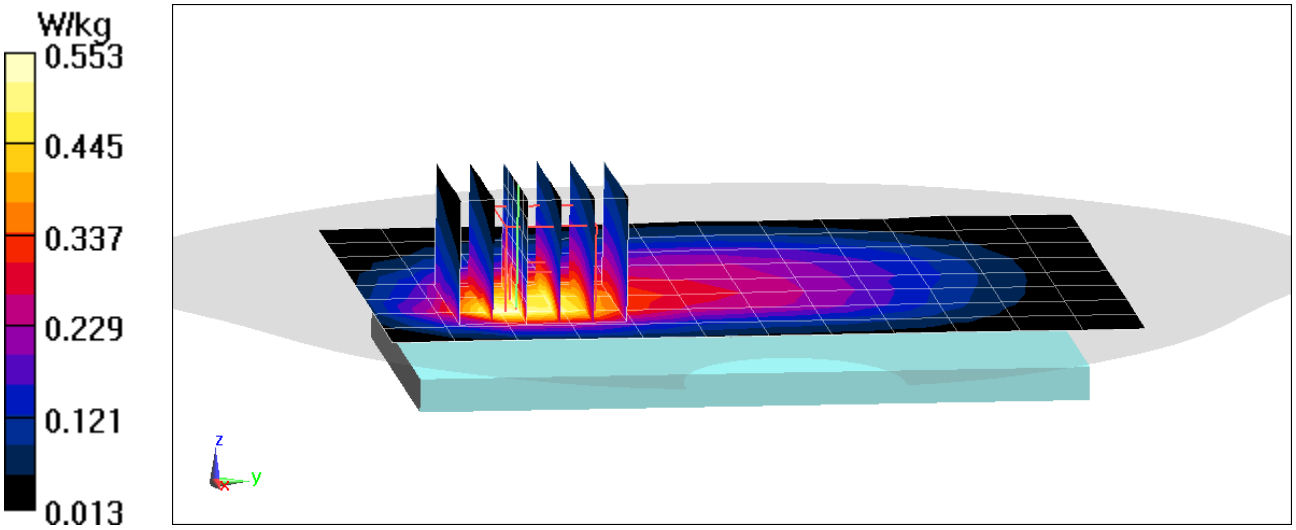
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750MHz Body Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.942 S/m; ε_r = 53.963; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-03-2019; Ambient Temp: 21.7°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7308; ConvF(10.38, 10.38, 10.38) @ 707.5 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 12, Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.54 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.645 W/kg
SAR(1 g) = 0.413 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00777

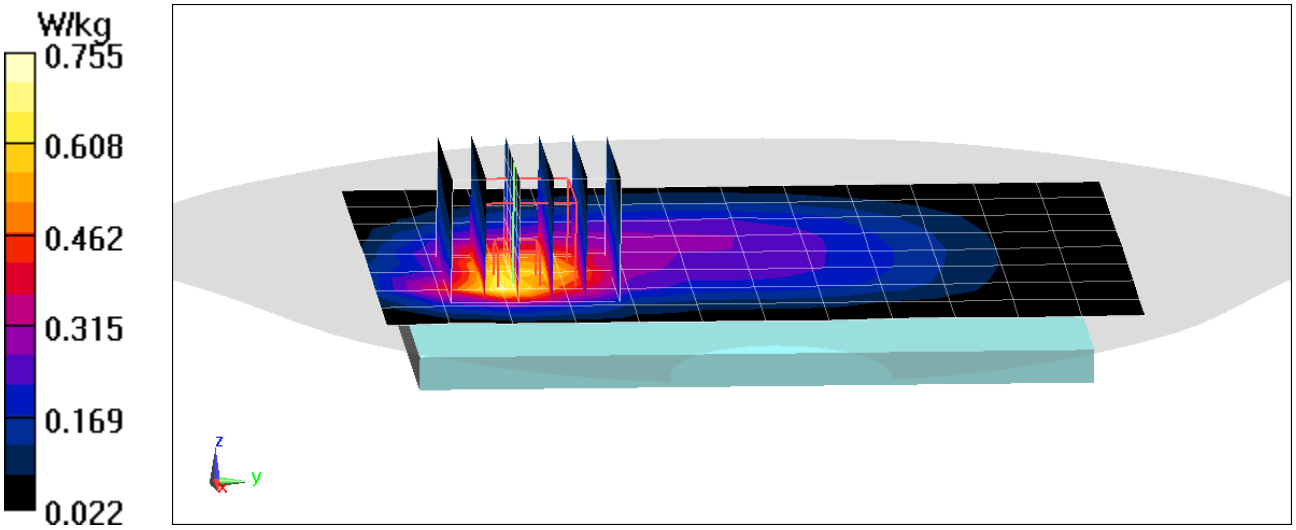
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750MHz Body Medium parameters used (interpolated):
f = 782 MHz; σ = 0.97 S/m; ε_r = 53.772; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-03-2019; Ambient Temp: 21.7°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7308; ConvF(10.38, 10.38, 10.38) @ 782 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 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 (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.90 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.880 W/kg
SAR(1 g) = 0.534 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00785

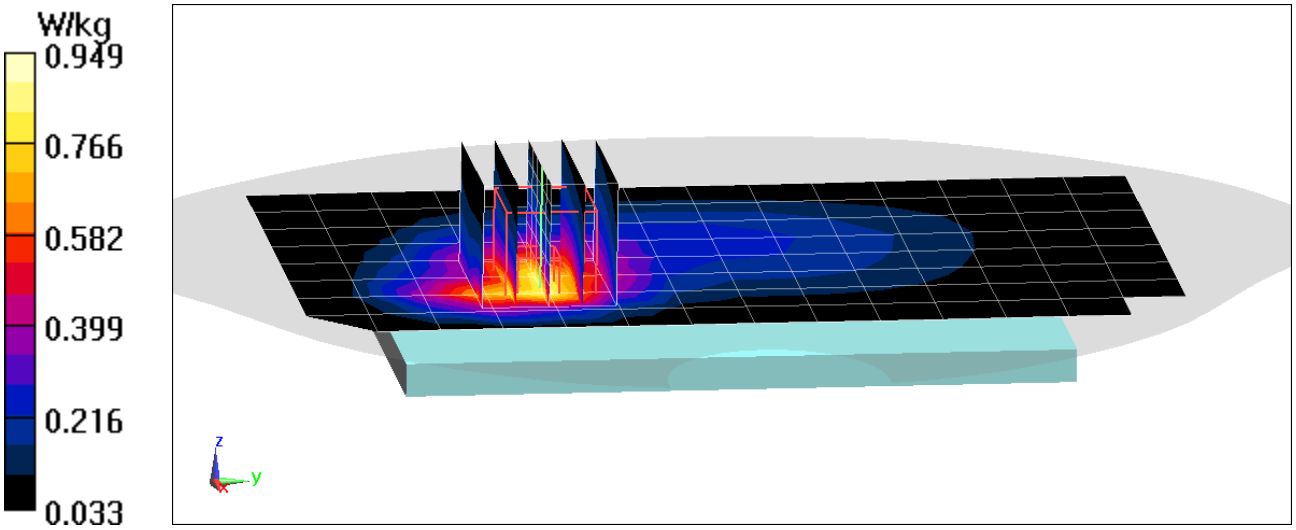
Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 831.5 MHz; σ = 0.987 S/m; ε_r = 54.481; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-16-2019; Ambient Temp: 24.2°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7488; ConvF(11.03, 11.03, 11.03) @ 831.5 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 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 (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.81 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.654 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00785

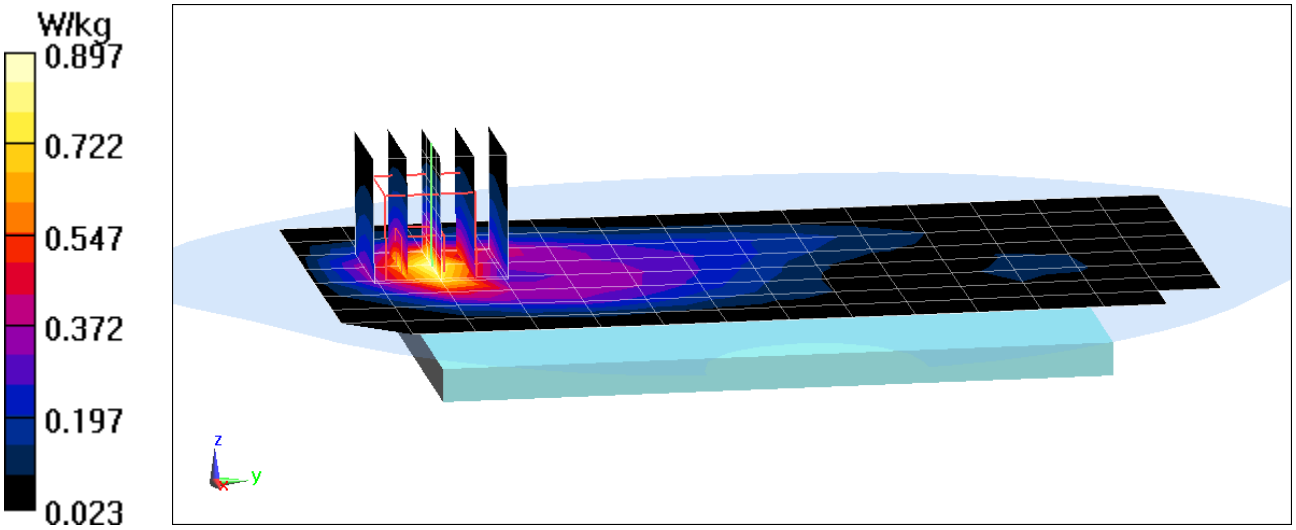
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1745 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
$f = 1745$ MHz; $\sigma = 1.477$ S/m; $\varepsilon_r = 51.122$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-08-2019; Ambient Temp: 20.4 °C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7488; ConvF(8.68, 8.68, 8.68) @ 1745 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.30 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.622 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00785

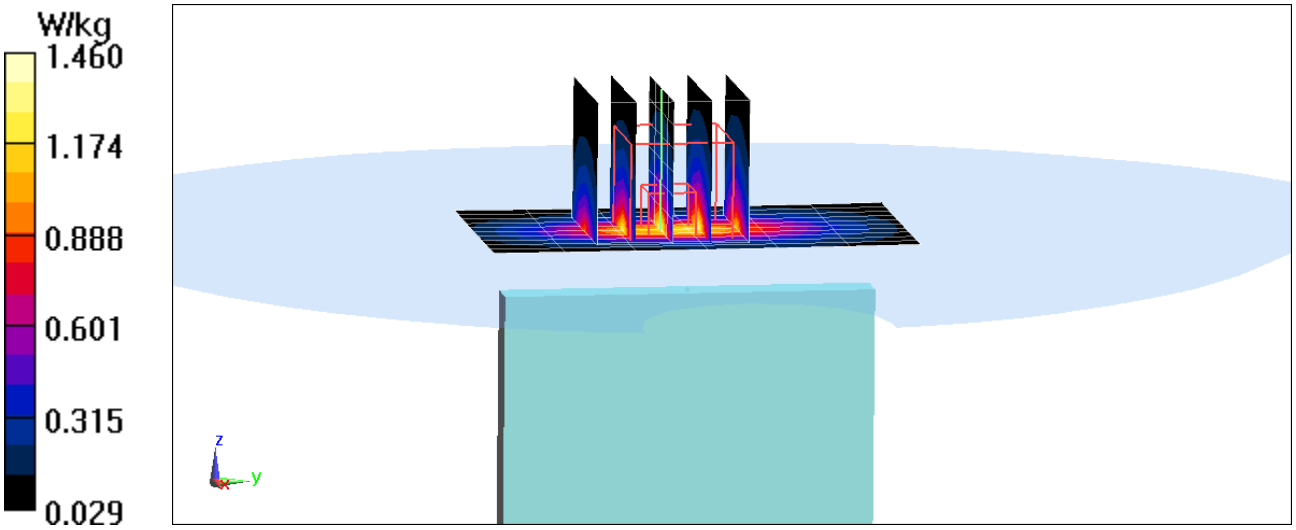
Communication System: UID 0, _LTE Band 66 (AWS); Frequency: 1720 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
$f = 1720$ MHz; $\sigma = 1.449$ S/m; $\varepsilon_r = 51.222$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-08-2019; Ambient Temp: 20.4 °C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7488; ConvF(8.68, 8.68, 8.68) @ 1720 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 66 (AWS), Body SAR, Bottom Edge, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset

Area Scan (11x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.33 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 0.985 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00777

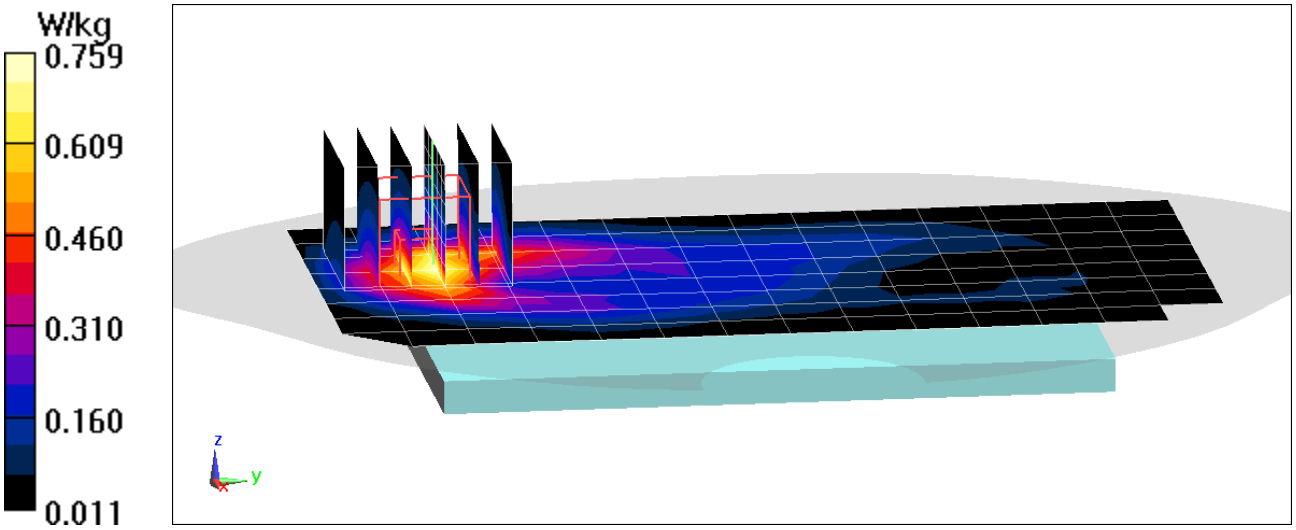
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1905 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1905 MHz; σ = 1.575 S/m; ε_r = 51.912; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-10-2019; Ambient Temp: 22.4°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN7410; ConvF(7.78, 7.78, 7.78) @ 1905 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 25 (PCS), Body SAR, Back side, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.90 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.953 W/kg
SAR(1 g) = 0.546 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00777

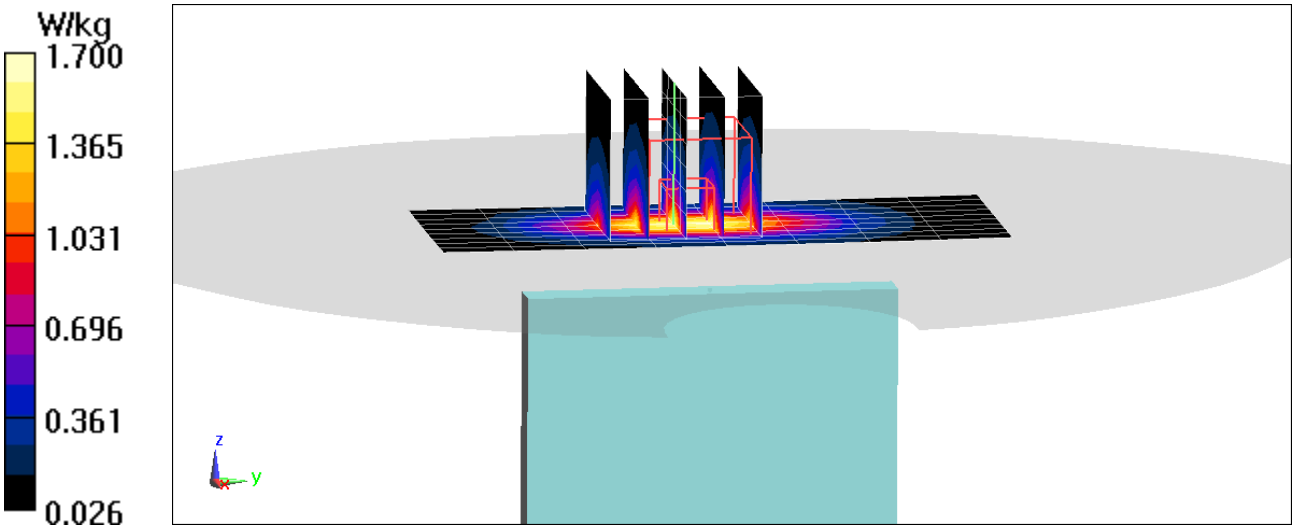
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1905 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1905 MHz; σ = 1.58 S/m; ε_r = 52.487; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-25-2019; Ambient Temp: 23.4°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7410; ConvF(7.78, 7.78, 7.78) @ 1905 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 25 (PCS), Body SAR, Bottom Edge, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.61 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 1.81 W/kg
SAR(1 g) = 1.03 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00785

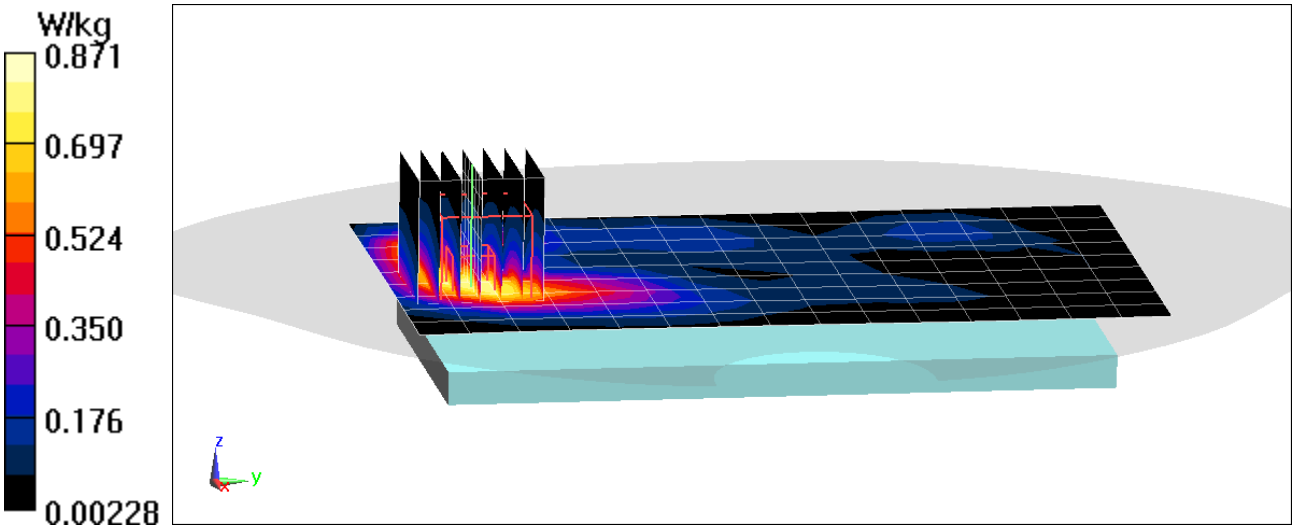
Communication System: UID 0, _LTE Band 41 (Class 2); Frequency: 2549.5 MHz; Duty Cycle: 1:2.31
Medium: 2450 Body Medium parameters used:
f = 2550 MHz; σ = 2.164 S/m; ε_r = 50.719; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-15-2019; Ambient Temp: 22.5°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2549.5 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41, PC2, Body SAR, Back side, Low-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 = 16.51 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.555 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00785

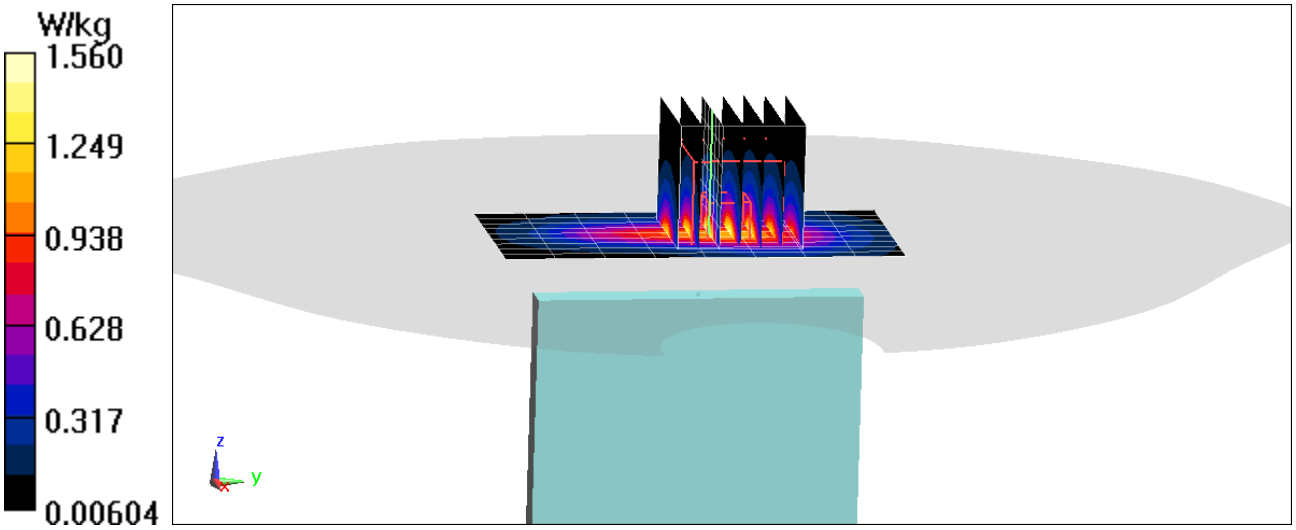
Communication System: UID 0, _LTE Band 41 (Class 2); Frequency: 2549.5 MHz; Duty Cycle: 1:2.31
Medium: 2450 Body Medium parameters used:
f = 2550 MHz; σ = 2.164 S/m; ε_r = 50.719; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-15-2019; Ambient Temp: 22.5°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2549.5 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41, PC2, Body SAR, Bottom Edge, Low-Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.16 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.98 W/kg
SAR(1 g) = 0.957 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00876

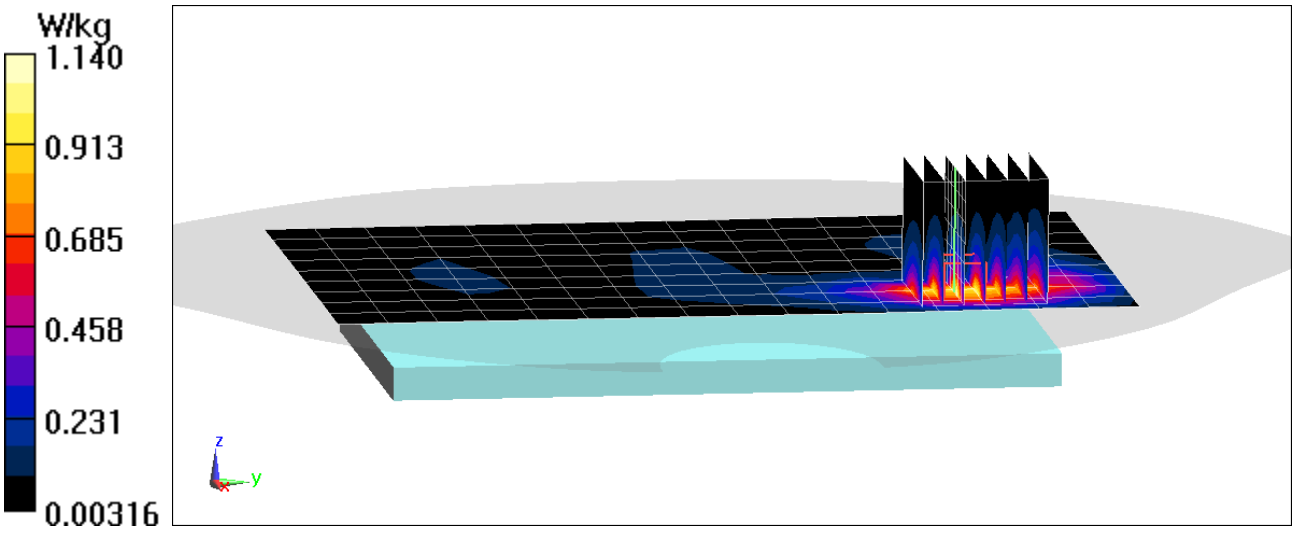
Communication System: UID 0, _IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
$f = 2412$ MHz; $\sigma = 1.996$ S/m; $\varepsilon_r = 52.122$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-08-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.4°C

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

Mode: IEEE 802.11b, 22 MHz Bandwidth, Body SAR, Ch 1, 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 = 6.231 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 0.701 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00876

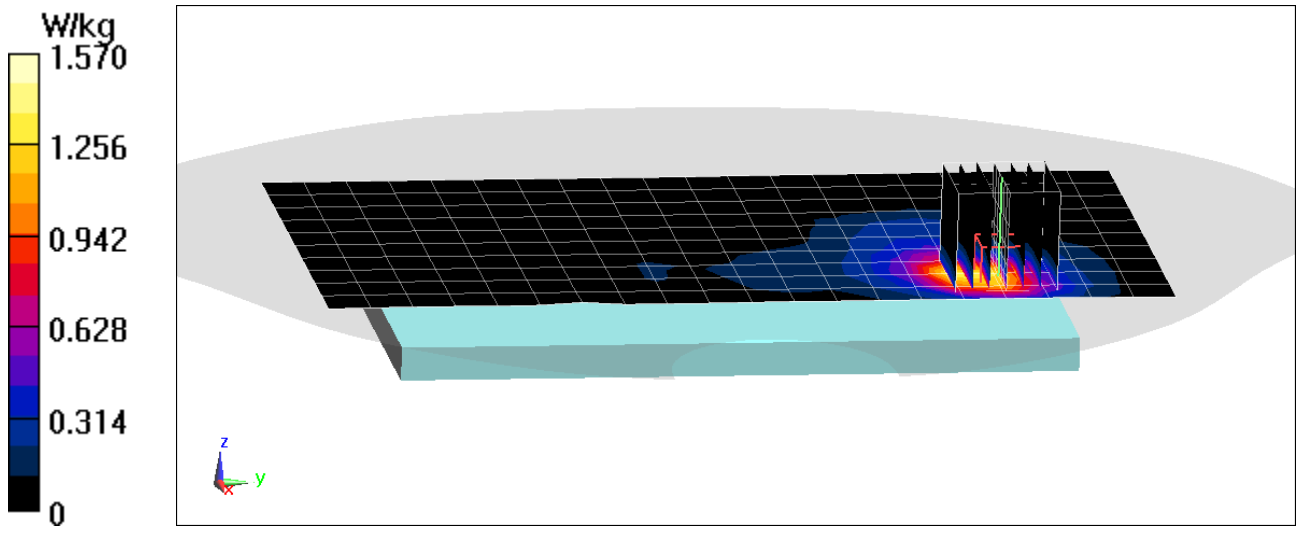
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5785 MHz; σ = 6.159 S/m; ε_r = 46.306; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-14-2019; Ambient Temp: 22.0°C; Tissue Temp: 21.5°C

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

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

Area Scan (12x20x1): 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 = 10.47 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 2.68 W/kg
SAR(1 g) = 0.625 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00876

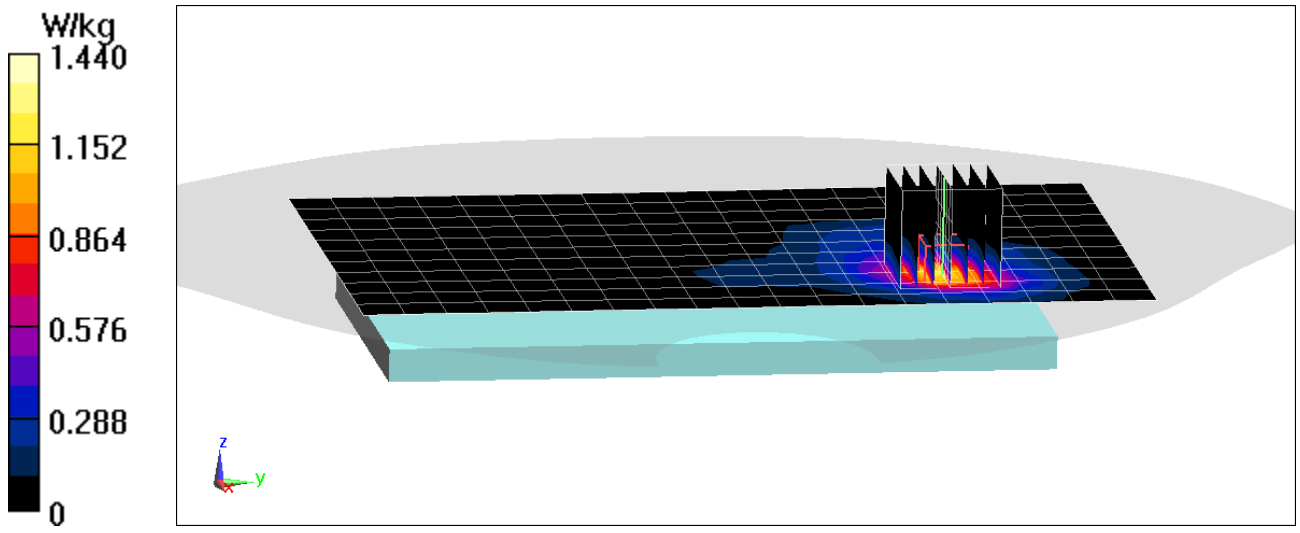
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5220 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5220 MHz; σ = 5.337 S/m; ε_r = 47.394; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-14-2019; Ambient Temp: 22.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7308; ConvF(4.48, 4.48, 4.48) @ 5220 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11a, UNII-1, 20 MHz Bandwidth, Body SAR, Ch 44, 6 Mbps, Back Side

Area Scan(12x20x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 11.66 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 2.25 W/kg
SAR(1 g) = 0.639 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00876

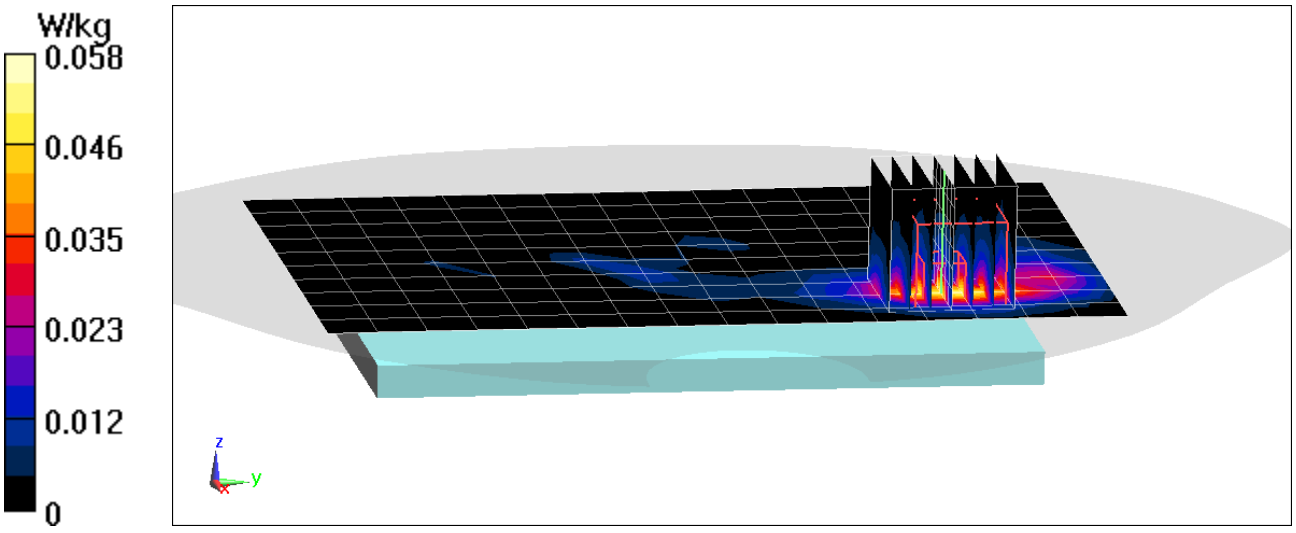
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.297
Medium: 2450 Body Medium parameters used (interpolated):
f = 2441 MHz; σ = 2.023 S/m; ε_r = 52.052; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-11-2019; Ambient Temp: 23.5°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2441 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.440 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.0740 W/kg
SAR(1 g) = 0.034 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00744

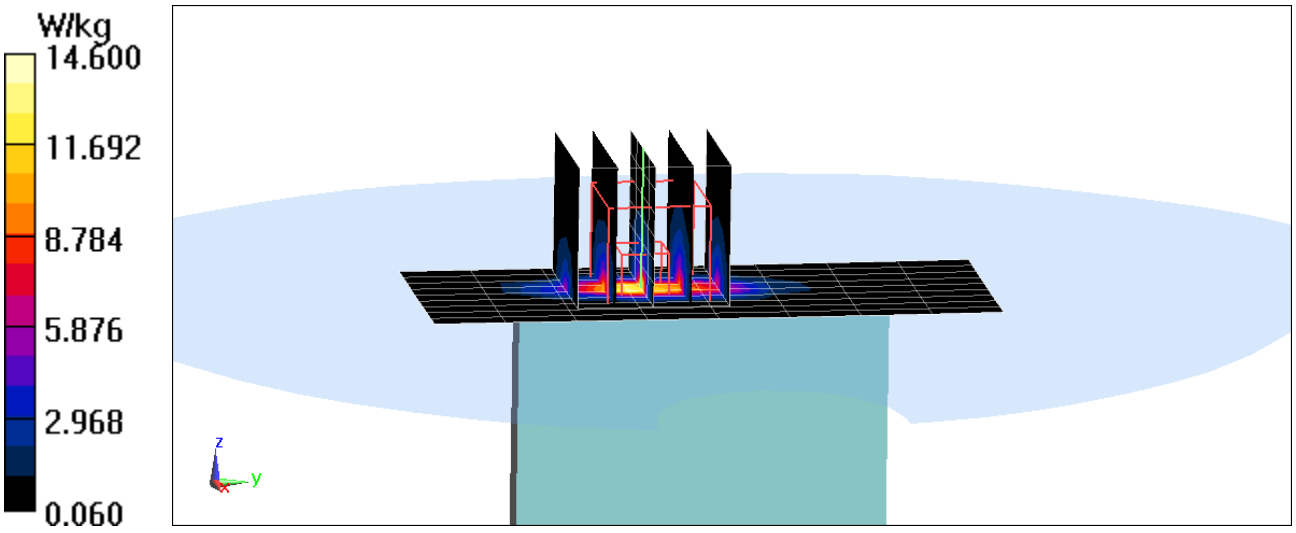
Communication System: UID 0, _GSM GPRS; 3 Tx slots; Frequency: 1909.8 MHz; Duty Cycle: 1:2.76
Medium: 1900 Body Medium parameters used:
f = 1910 MHz; σ = 1.593 S/m; ε_r = 53.005; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 04-29-2019; Ambient Temp:21.6 °C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN7410; ConvF(7.78, 7.78, 7.78) @ 1909.8 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 (2);SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 1900, Phablet SAR, Bottom Edge, High.ch, 3 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 = 72.79 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 17.8 W/kg
SAR(10 g) = 2.78 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00785

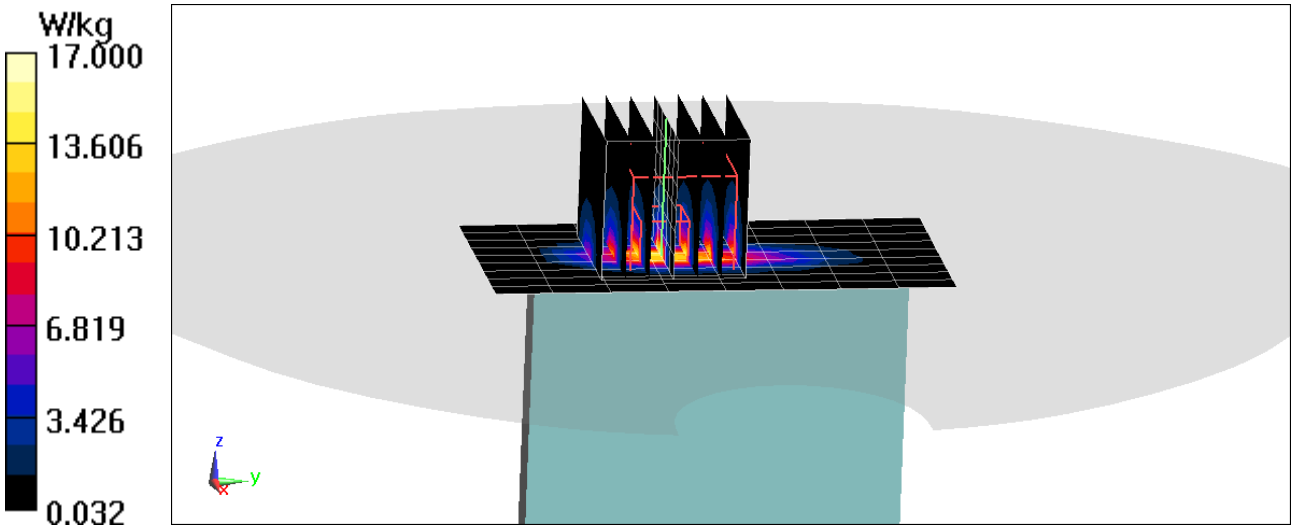
Communication System: UID 0, _LTE Band 41 (Class 2); Frequency: 2506 MHz; Duty Cycle: 1:2.31
Medium: 2450 Body Medium parameters used (interpolated):
f = 2506 MHz; σ = 2.109 S/m; ε_r = 50.954; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 04-29-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2506 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41, PC2, Phablet SAR, Bottom Edge, Low.ch, 20 MHz Bandwidth, QPSK, 1 RB, 99 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 = 66.05 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 26.4 W/kg
SAR(10 g) = 3.13 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00876

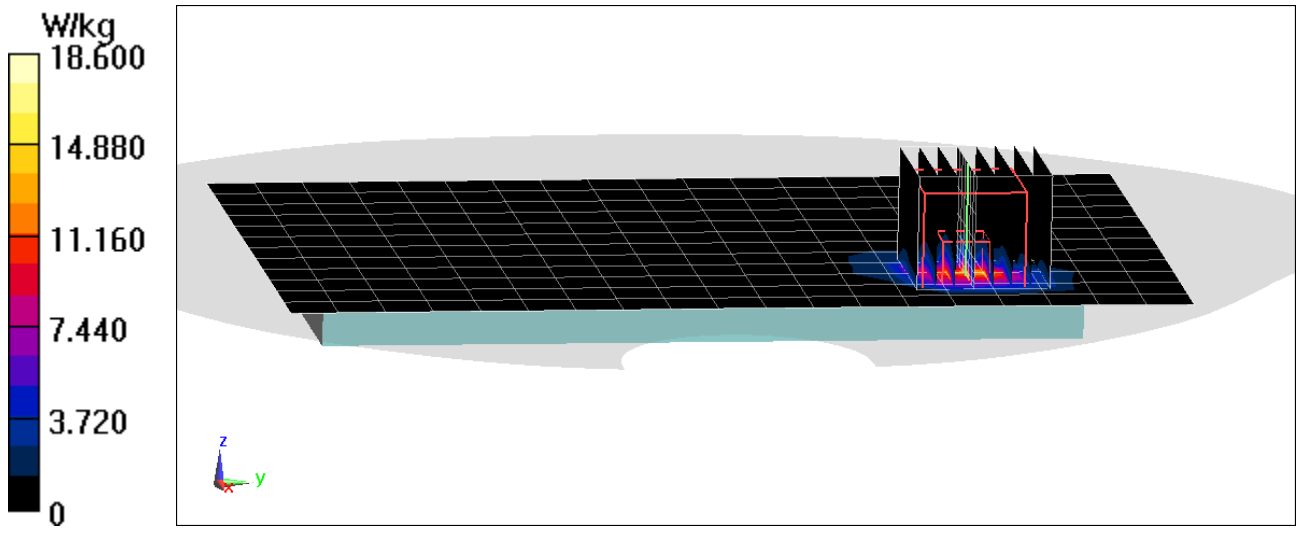
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5280 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5280 MHz; σ = 5.512 S/m; ε_r = 47.489; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 04-30-2019; Ambient Temp: 22.0°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7308; ConvF(4.48, 4.48, 4.48) @ 5280 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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

Area Scan (9x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 35.10 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 25.7 W/kg
SAR(10 g) = 1.61 W/kg



DUT: ZNFQ720TS; Type: Portable Handset; Serial: 00876

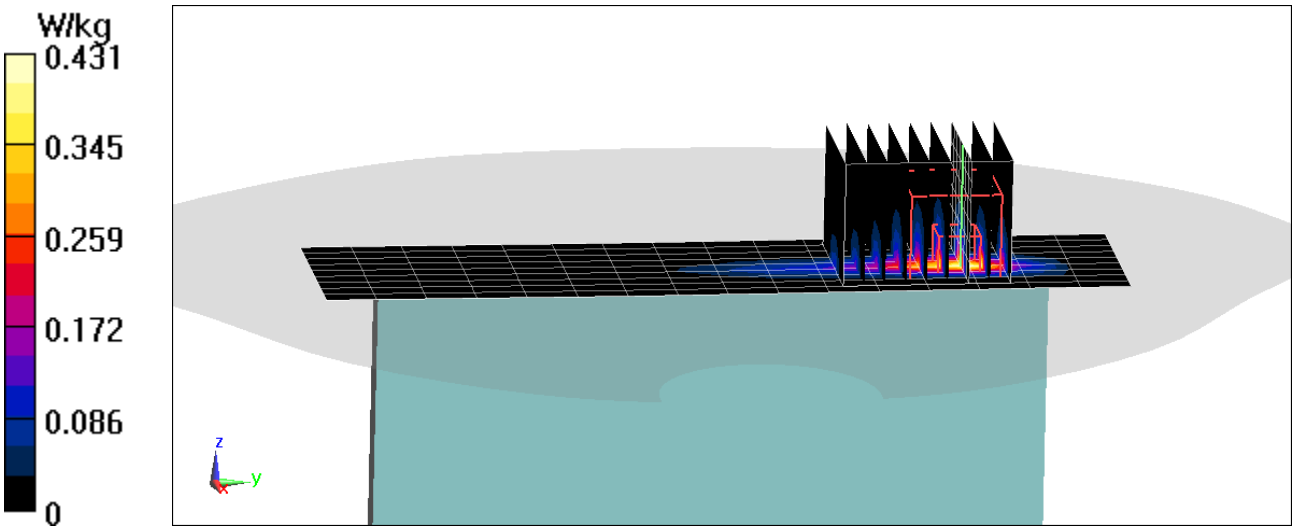
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.297
Medium: 2450 Body Medium parameters used (interpolated):
f = 2441 MHz; σ = 2.02 S/m; ε_r = 52.844; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-02-2019; Ambient Temp: 22.6°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7308; ConvF(7.57, 7.57, 7.57) @ 2441 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: Bluetooth, Phablet SAR, Ch 39, 1 Mbps, Left Edge

Area Scan (10x17x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (8x9x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.4660 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.594 W/kg
SAR(10 g) = 0.074 W/kg



APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

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

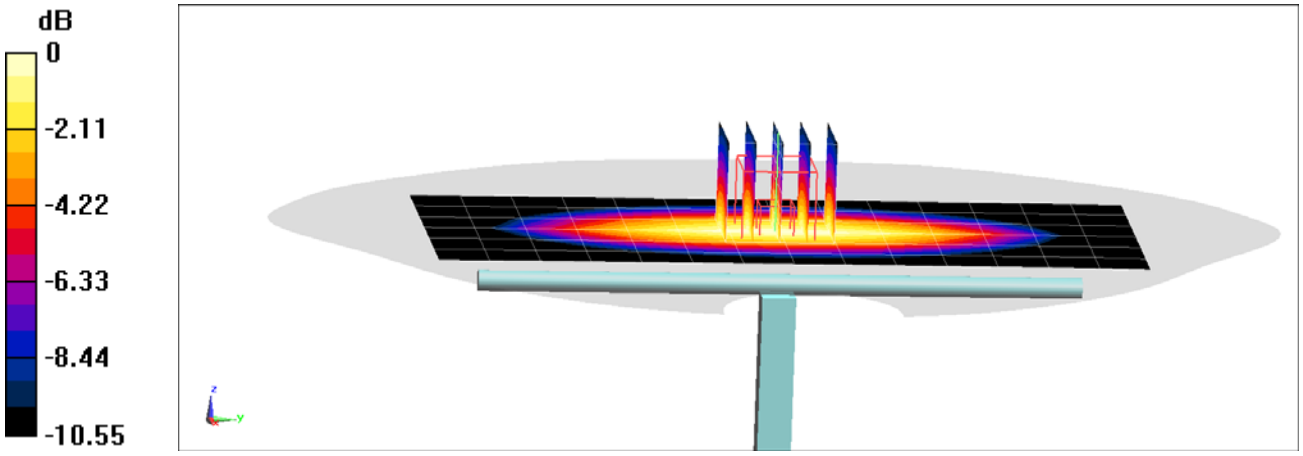
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 HEAD Medium parameters used (interpolated):
f = 750 MHz; σ = 0.919 S/m; ε_r = 42.204; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 04-05-2019; Ambient Temp: 24.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN3589; ConvF(8.67, 8.67, 8.67) @ 750 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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) = 2.29 W/kg
SAR(1 g) = 1.54 W/kg
Deviation(1 g) = -7.00%



0 dB = 2.05 W/kg = 3.12 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

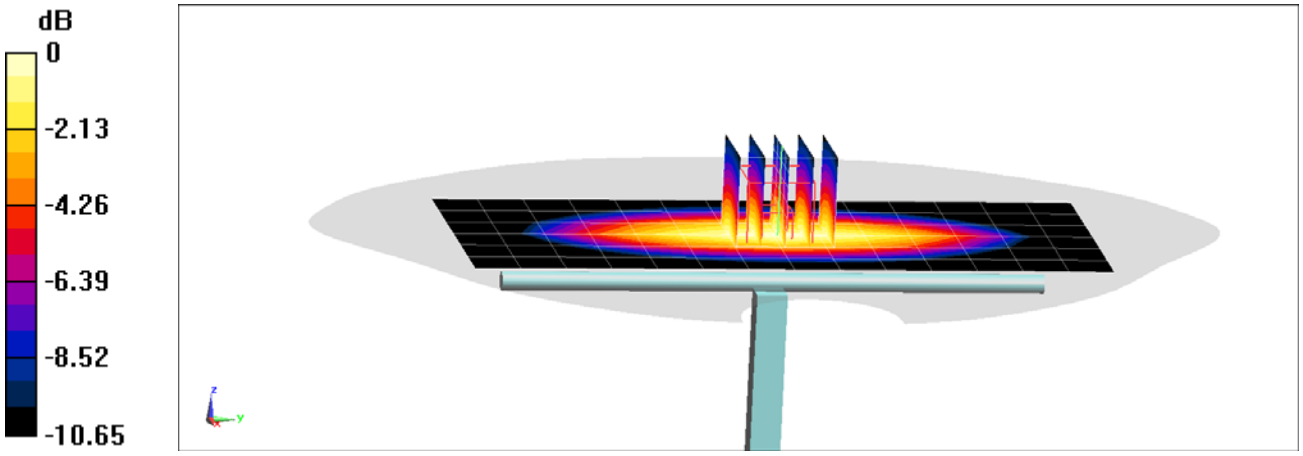
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 HEAD Medium parameters used (interpolated):
f = 750 MHz; σ = 0.89 S/m; ε_r = 41.649; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 04-08-2019; Ambient Temp: 23.3°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN3589; ConvF(8.67, 8.67, 8.67) @ 750 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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) = 2.48 W/kg
SAR(1 g) = 1.61 W/kg
Deviation(1 g) = -2.78%



0 dB = 2.18 W/kg = 3.38 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

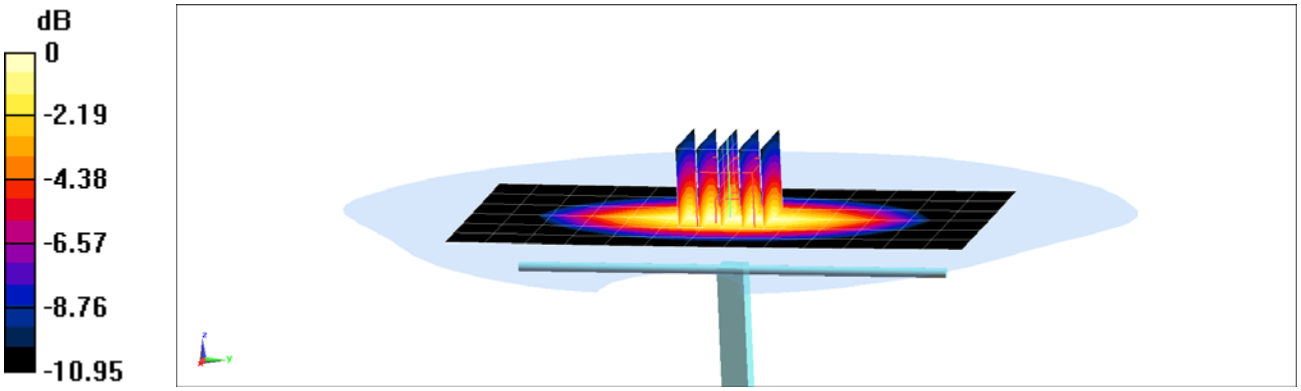
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.89 S/m; ε_r = 39.846; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 04-04-2019; Ambient Temp: 22.7°C; Tissue Temp:23.4°C

Probe: EX3DV4 - SN7357; ConvF(10.11, 10.11, 10.11) @ 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 Left; Type: QD000P40CD; Serial: 1687
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.98 W/kg
SAR(1 g) = 1.94 W/kg
Deviation(1 g) = 2.86%



0 dB = 2.62 W/kg = 4.18 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

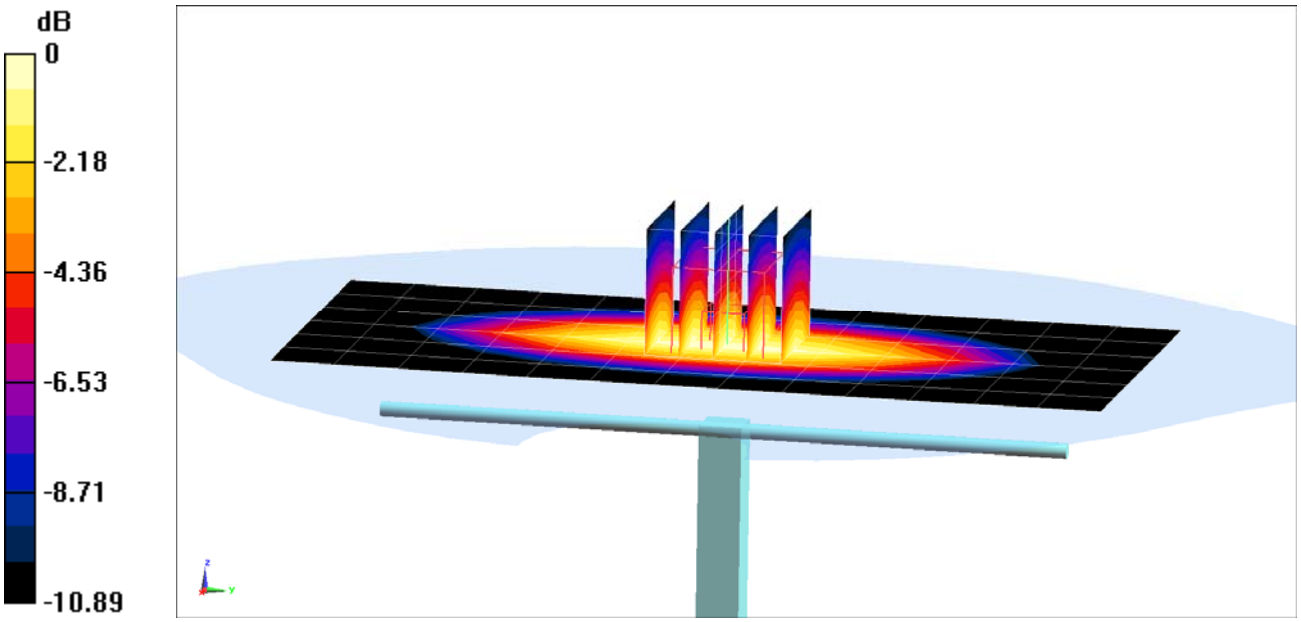
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.92 S/m; ε_r = 41.957; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 04-15-2019; Ambient Temp: 22.4°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN3914; ConvF(9.5, 9.5, 9.5) @ 835 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/14/2019
Phantom: Left For Head SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1687
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.97 W/kg
SAR(1 g) = 1.95 W/kg
Deviation(1 g) = 1.67%



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

PCTEST ENGINEERING LABORATORY, INC.

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

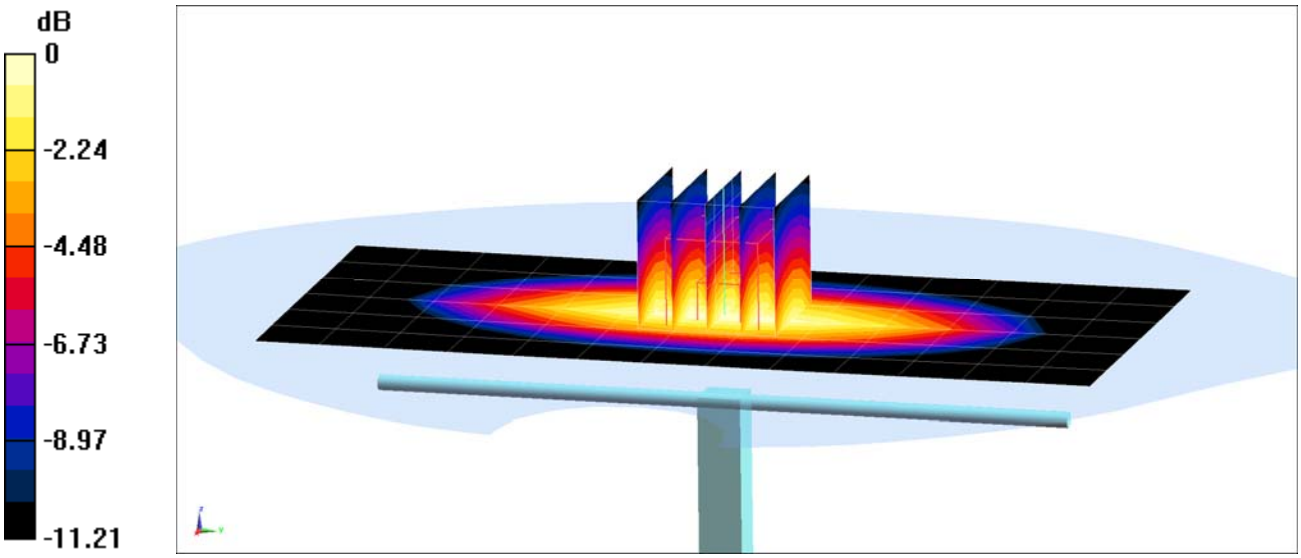
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.936 S/m; ε_r = 41.89; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 04-24-2019; Ambient Temp: 23.1°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN3914; ConvF(9.5, 9.5, 9.5) @ 835 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/14/2019
Phantom: Left For Head SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1687
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 3.04 W/kg
SAR(1 g) = 1.97 W/kg
Deviation(1 g) = 2.71%



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

PCTEST ENGINEERING LABORATORY, INC.

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

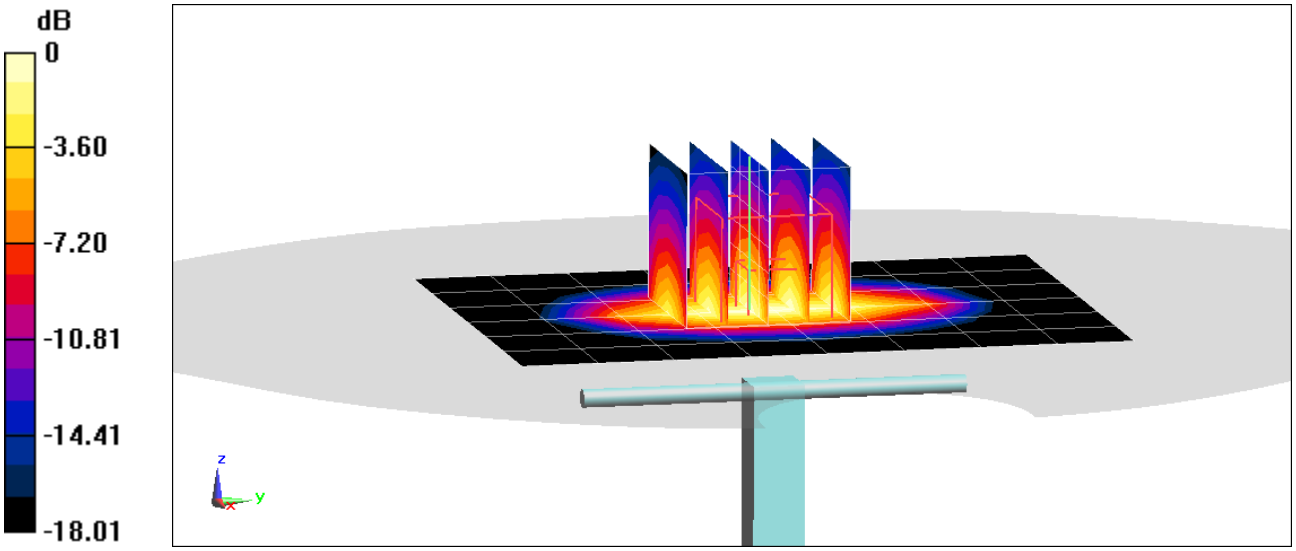
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used:
f = 1750 MHz; σ = 1.35 S/m; ε_r = 38.66; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-10-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7308; ConvF(8.66, 8.66, 8.66) @ 1750 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1966
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.98 W/kg
SAR(1 g) = 3.59 W/kg
Deviation(1 g) = -1.64%



0 dB = 5.63 W/kg = 7.51 dBW/kg

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

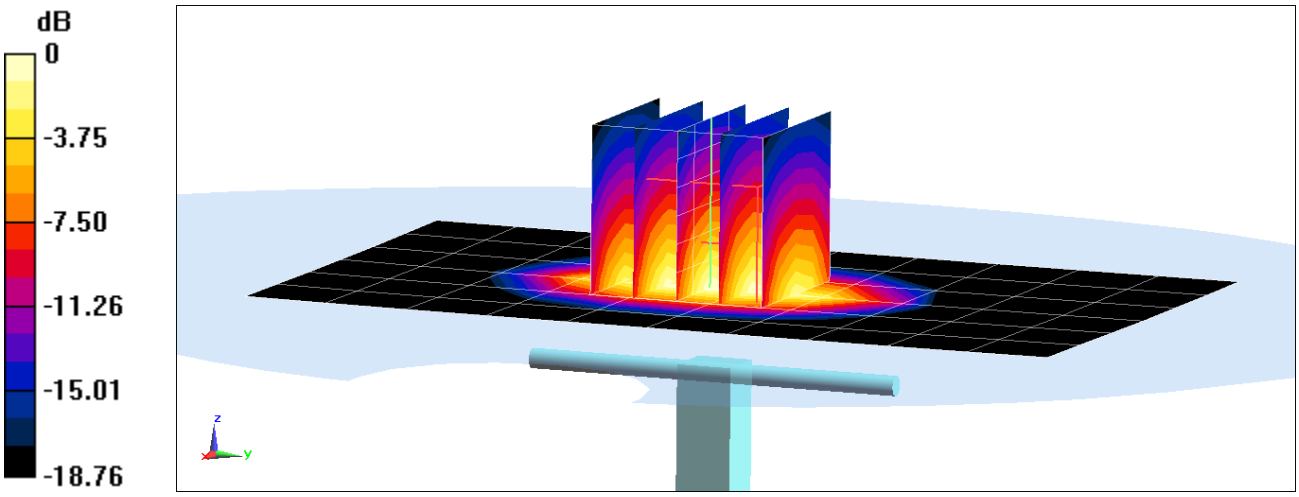
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.446 S/m; ε_r = 41.042; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-10-2019; Ambient Temp: 23.7°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7357; ConvF(8.47, 8.47, 8.47) @ 1900 MHz; Calibrated: 4/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/11/2018
Phantom: Left For Head SAM with CRP v5.0; Type: QD000P40CD; Serial: TP:1687
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 8.37 W/kg
SAR(1 g) = 4.29 W/kg
Deviation(1 g) = 7.79%



0 dB = 6.80 W/kg = 8.33 dBW/kg

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

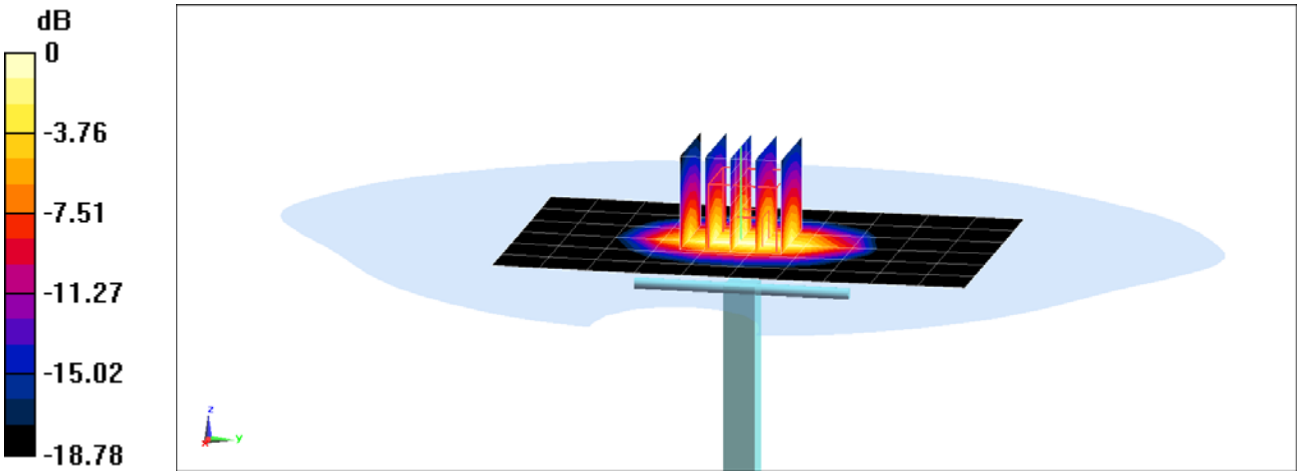
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.415 S/m; ε_r = 38.914; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-17-2019; Ambient Temp: 23.9°C; Tissue Temp: 20.0°C

Probe: EX3DV4 - SN7409; ConvF(8.05, 8.05, 8.05) @ 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 (2);SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 8.09 W/kg
SAR(1 g) = 4.21 W/kg;
Deviation(1 g) = 5.78%;



0 dB = 6.64 W/kg = 8.22 dBW/kg

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

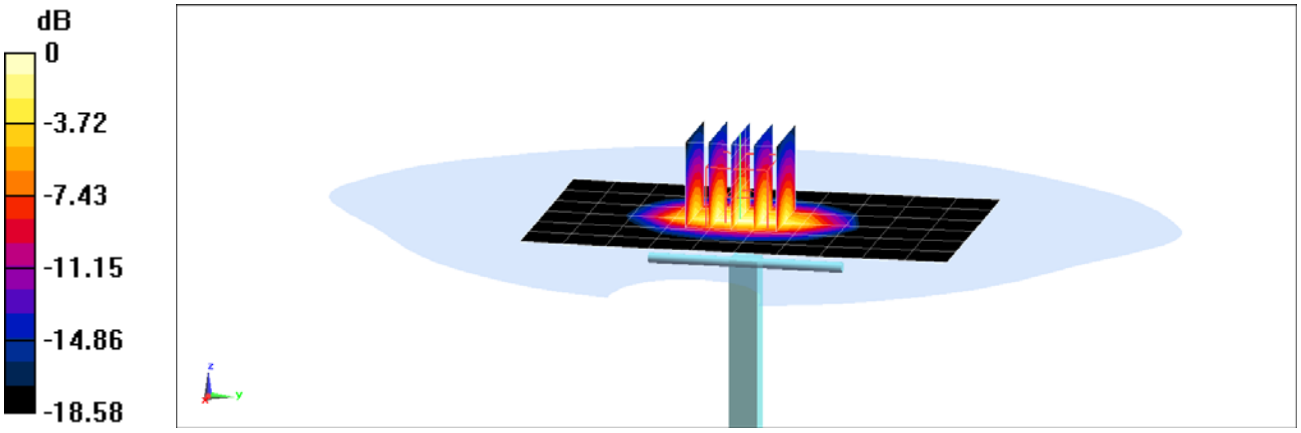
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head; Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.463 S/m; ε_r = 39.705; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-28-2019; Ambient Temp: 23.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(8.05, 8.05, 8.05) @ 1900 MHz; Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM 30 with CRP v5.0 right; Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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) = 8.05 W/kg
SAR(1 g) = 4.25 W/kg
Deviation(1 g) = 6.78%



0 dB = 6.71 W/kg = 8.27 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

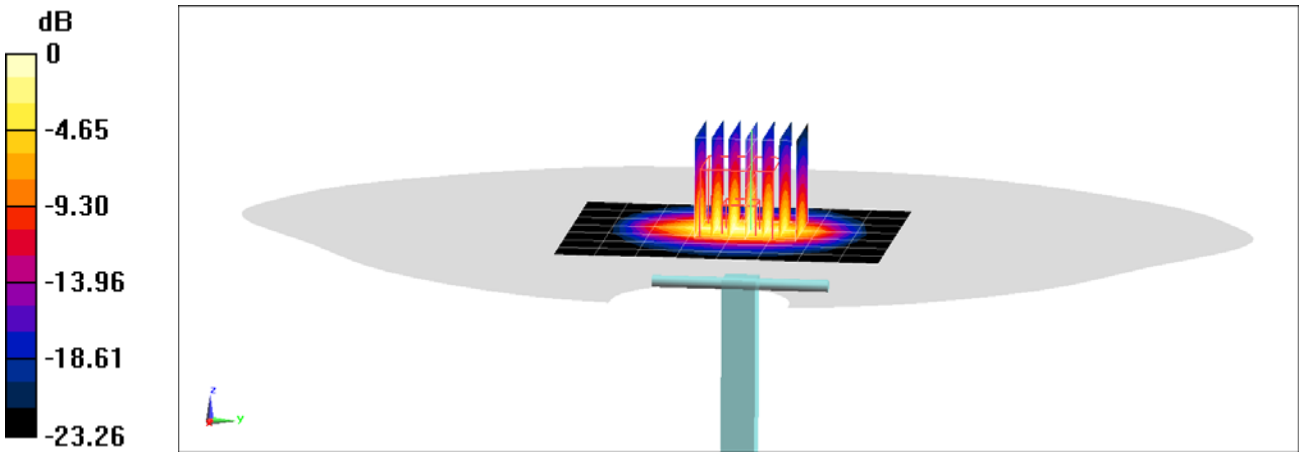
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450-2600 Medium parameters used:
f = 2450 MHz; σ = 1.827 S/m; ε_r = 38.326; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-16-2019; Ambient Temp: 23.8°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN3589; ConvF(6.46, 6.46, 6.46) @ 2450 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.5 W/kg
SAR(1 g) = 5.3 W/kg
Deviation(1 g) = 1.34%



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

PCTEST ENGINEERING LABORATORY, INC.

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

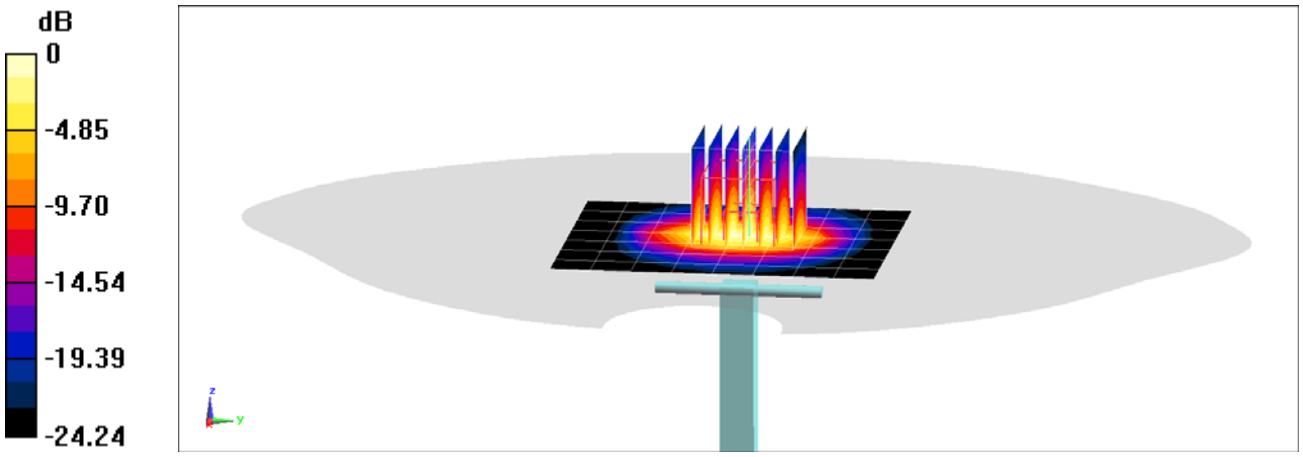
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450-2600 Medium parameters used:
f = 2600 MHz; σ = 1.952 S/m; ε_r = 38.109; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-16-2019; Ambient Temp: 23.8°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN3589; ConvF(6.25, 6.25, 6.25) @ 2600 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 13.8 W/kg
SAR(1 g) = 6.06 W/kg
Deviation(1 g) = 6.32%



0 dB = 10.6 W/kg = 10.25 dBW/kg

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

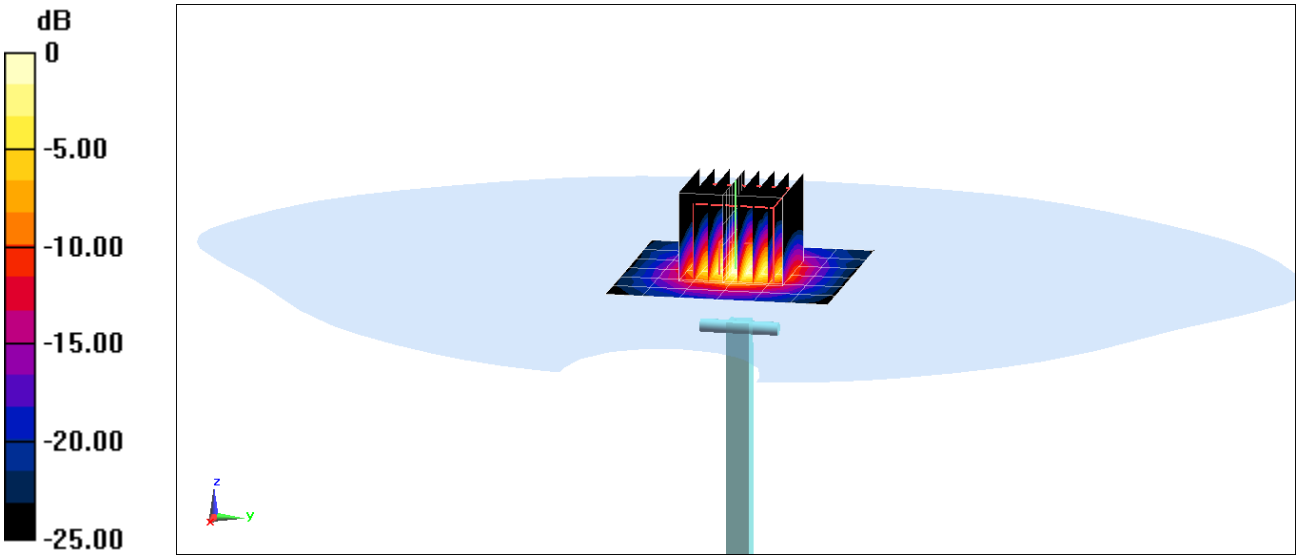
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5GHz Head; Medium parameters used (interpolated):
f = 5250 MHz; σ = 4.599 S/m; ε_r = 35.598; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-08-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.5°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 v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 15.6 W/kg
SAR(1 g) = 3.73 W/kg
Deviation(1 g) = -5.81%



0 dB = 9.08 W/kg = 9.58 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

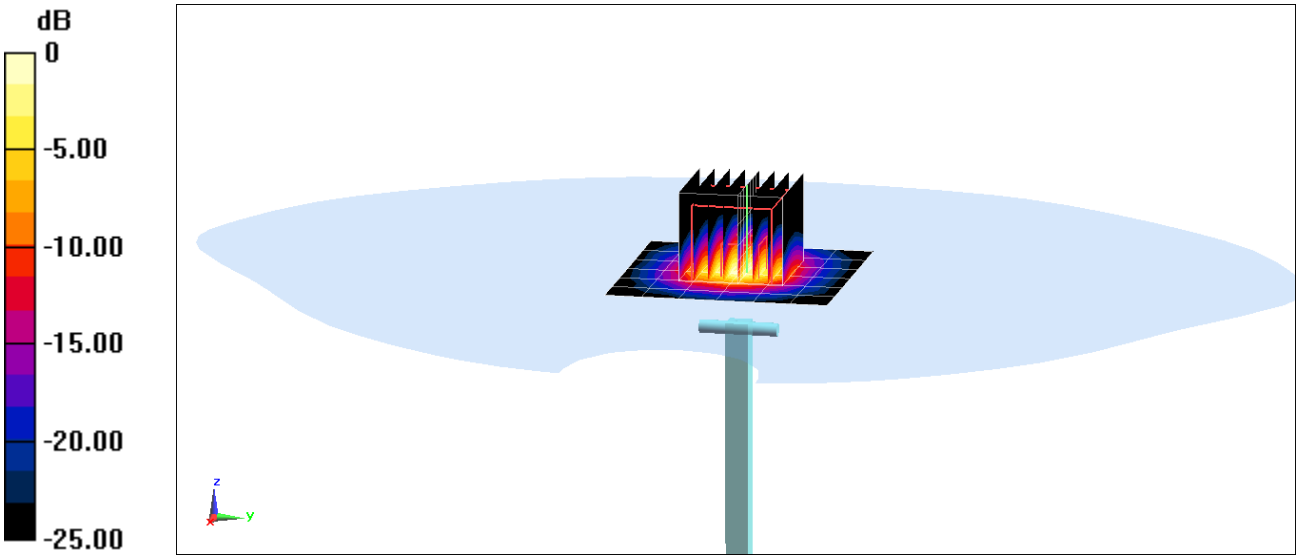
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5GHz Head; Medium parameters used:
f = 5600 MHz; σ = 4.994 S/m; ε_r = 34.982; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-08-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.5°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 v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 18.5 W/kg
SAR(1 g) = 4.05 W/kg
Deviation(1 g) = -3.69%



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

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

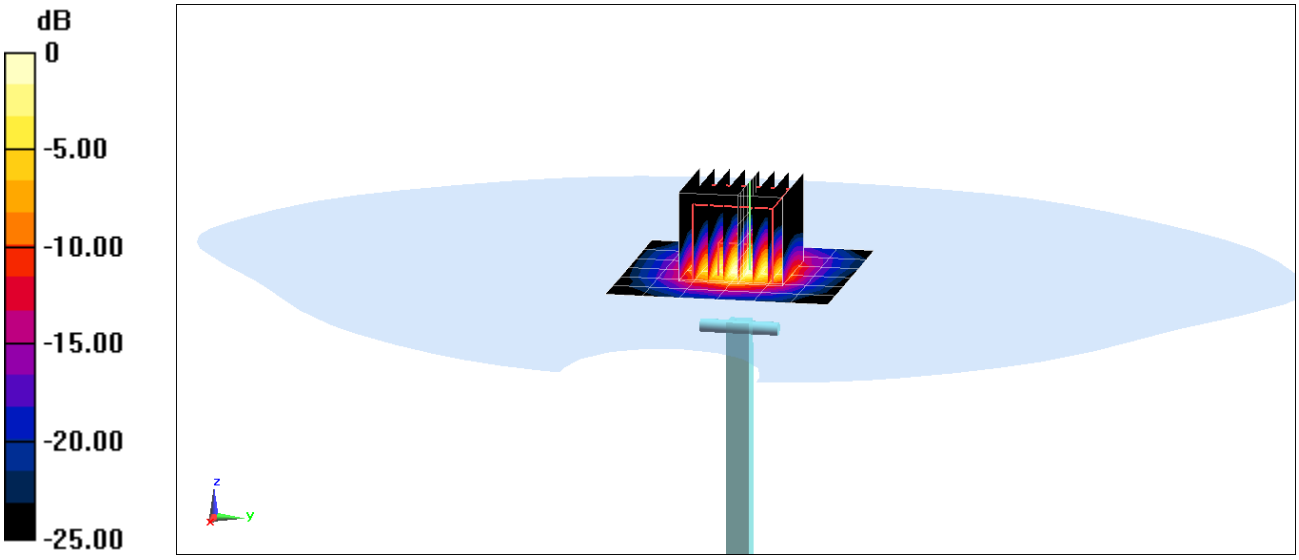
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5GHz Head; Medium parameters used (interpolated):
$f = 5750$ MHz; $\sigma = 5.171$ S/m; $\varepsilon_r = 34.716$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-08-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.5°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 v5.0 (Right); Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 3.76 W/kg
Deviation(1 g) = -6.58%



0 dB = 9.09 W/kg = 9.59 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

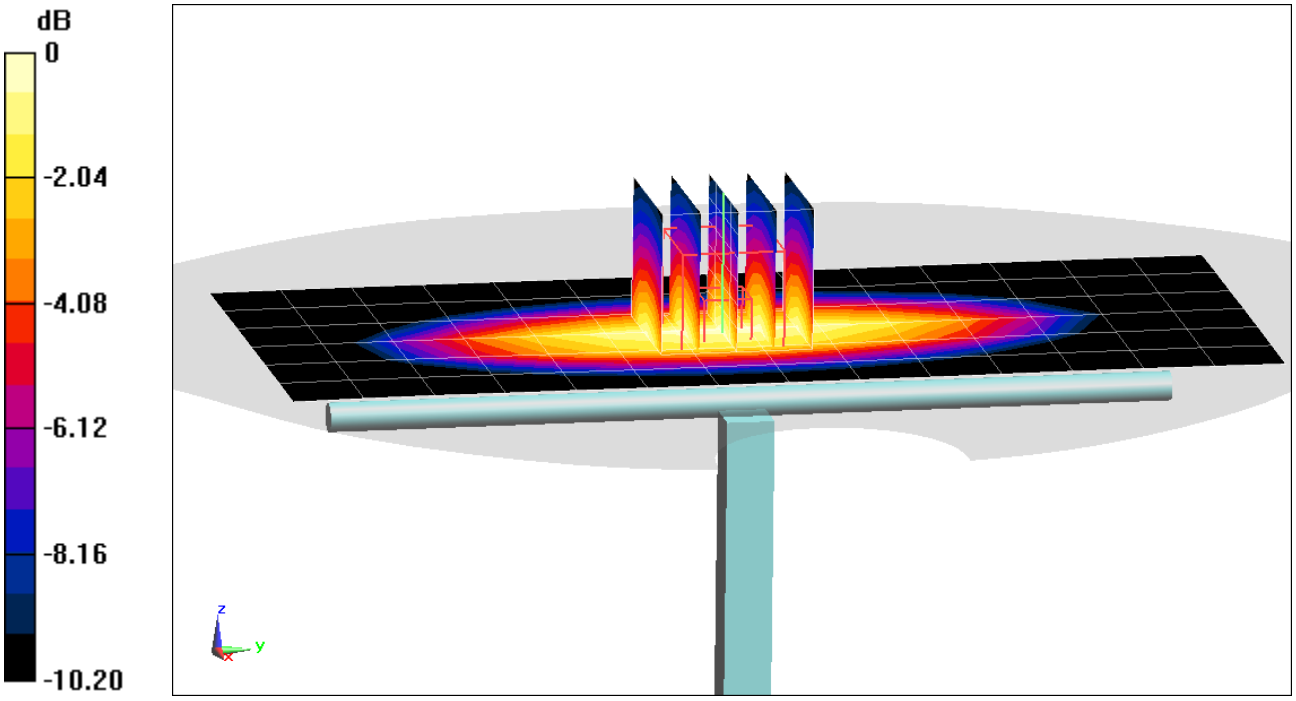
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750MHz Body Medium parameters used (interpolated):
$f = 750$ MHz; $\sigma = 0.958$ S/m; $\varepsilon_r = 53.844$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 04-03-2019; Ambient Temp: 21.7°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7308; ConvF(10.38, 10.38, 10.38) @ 750 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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) = 2.38 W/kg
SAR(1 g) = 1.59 W/kg
Deviation(1 g) = -5.69%



0 dB = 2.12 W/kg = 3.26 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

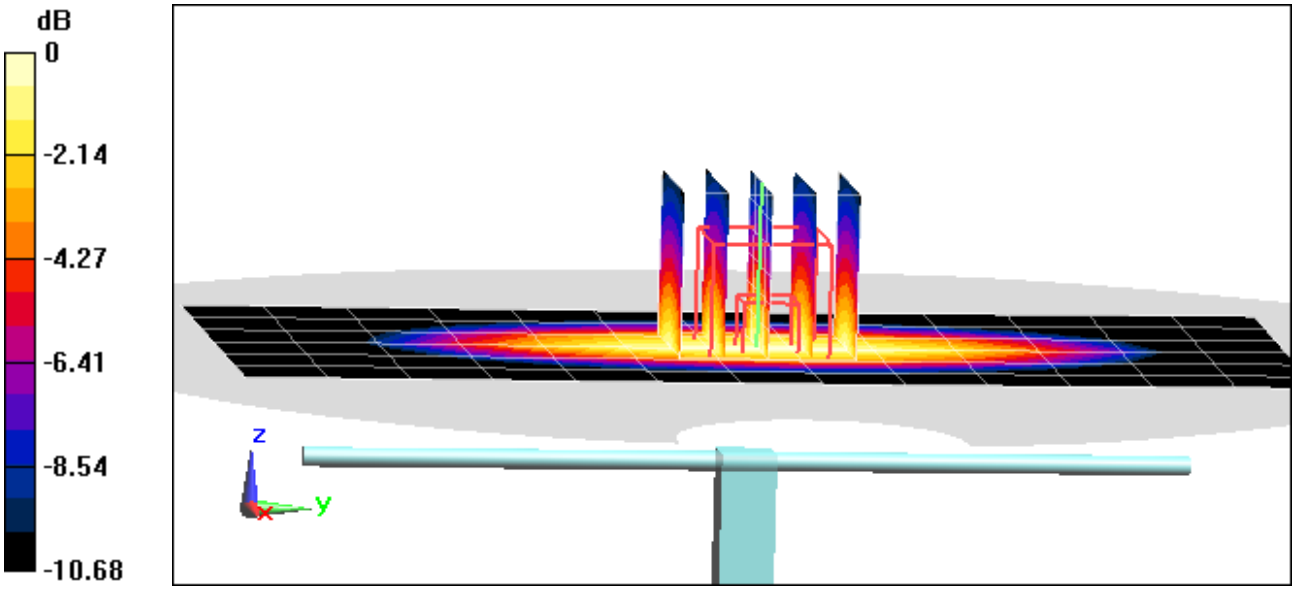
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.988 S/m; ε_r = 54.474; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 04-16-2019; Ambient Temp: 24.2°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7488; ConvF(11.03, 11.03, 11.03) @ 835 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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) = 2.90 W/kg
SAR(1 g) = 1.88 W/kg
Deviation(1 g) = -2.79%



0 dB = 2.53 W/kg = 4.03 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

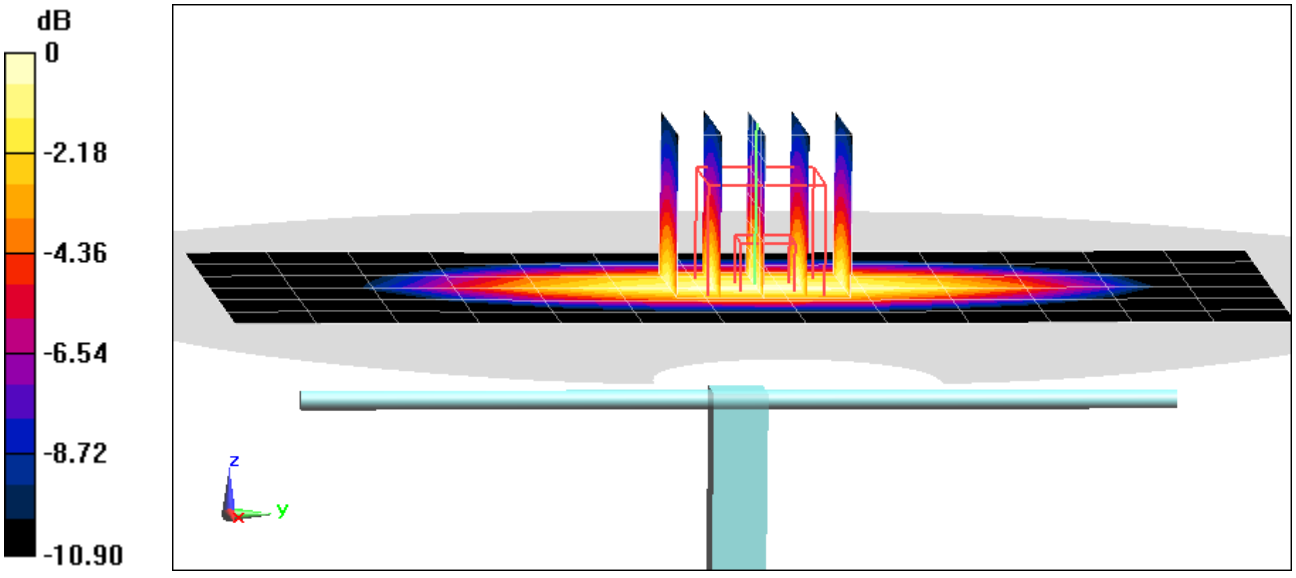
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 1.009 S/m; ε_r = 53.339; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 04-18-2019; Ambient Temp: 24.9°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7488; ConvF(11.03, 11.03, 11.03) @ 835 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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) = 2.94 W/kg
SAR(1 g) = 1.87 W/kg
Deviation(1 g) = -3.31%



0 dB = 2.54 W/kg = 4.05 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

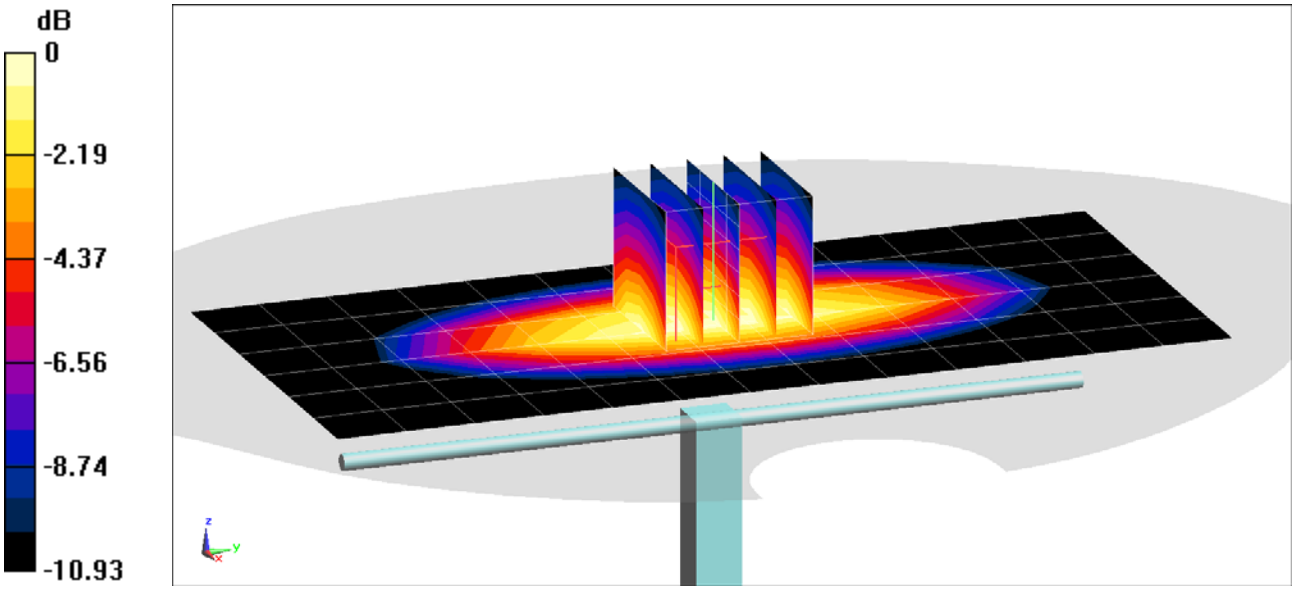
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 1.001 S/m; ε_r = 52.822; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 05-01-2019; Ambient Temp: 23.3°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7488; ConvF(11.03, 11.03, 11.03) @ 835 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1800
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.88 W/kg
SAR(1 g) = 1.87 W/kg
Deviation(1 g) = -3.31%



0 dB = 2.53 W/kg = 4.03 dBW/kg

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

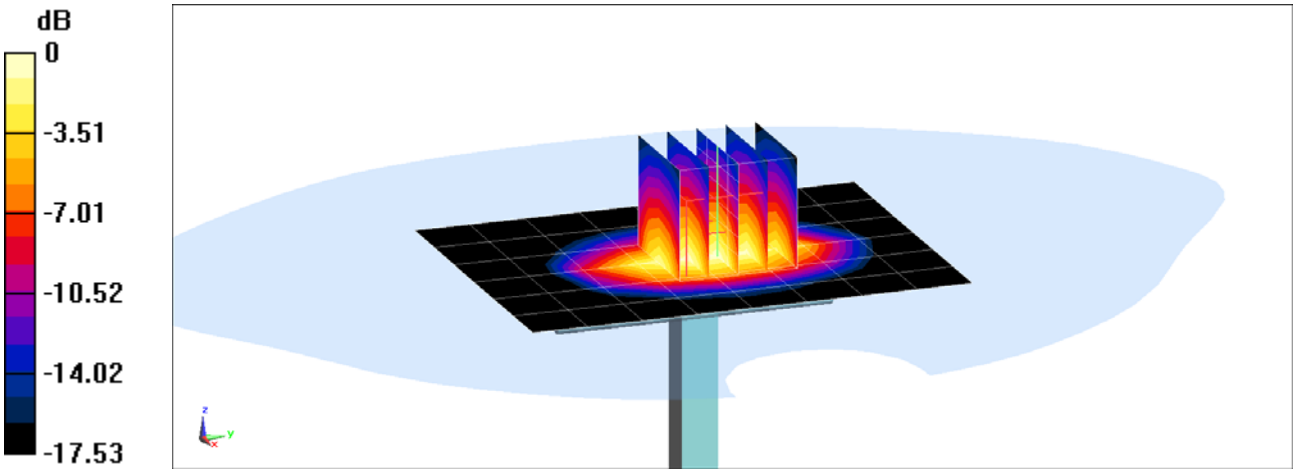
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used:
f = 1750 MHz; σ = 1.483 S/m; ε_r = 51.102; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-08-2019; Ambient Temp: 20.4 °C; Tissue Temp: 19.8°C

Probe: EX3DV4 - SN7488; ConvF(8.68, 8.68, 8.68) @ 1750 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.26 W/kg
SAR(1 g) = 3.51 W/kg
Deviation(1 g) = -5.14%



0 dB = 5.29 W/kg = 7.23 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

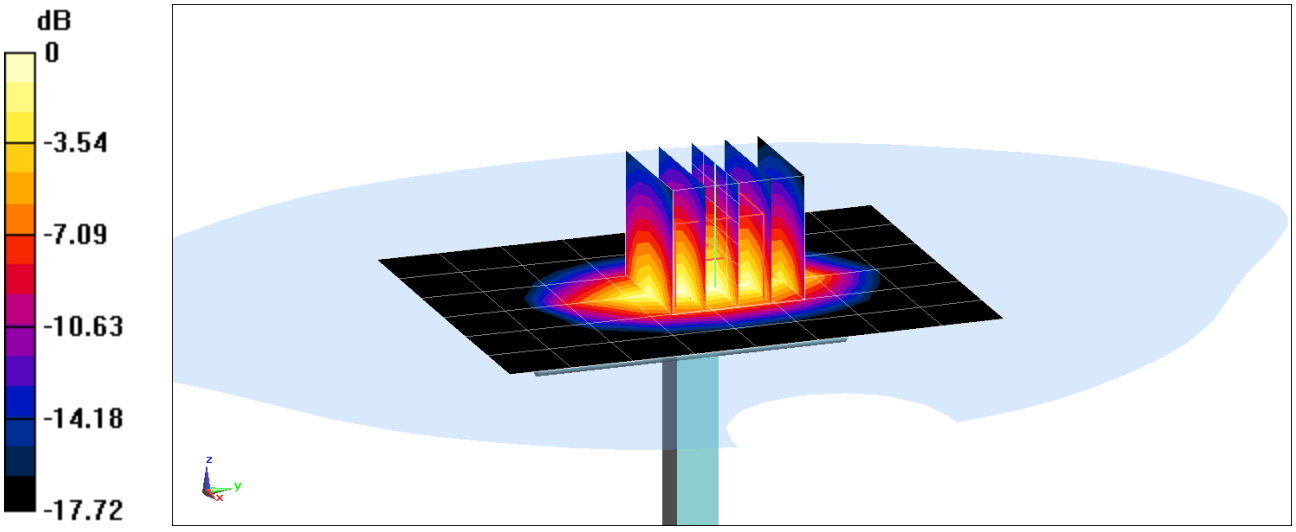
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used:
f = 1750 MHz; σ = 1.495 S/m; ε_r = 51.531; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-11-2019; Ambient Temp: 22.5°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7488; ConvF(8.68, 8.68, 8.68) @ 1750 MHz; Calibrated: 1/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1530; Calibrated: 1/15/2019
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.56 W/kg
SAR(1 g) = 3.6 W/kg
Deviation(1 g) = -3.47%



0 dB = 5.49 W/kg = 7.40 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

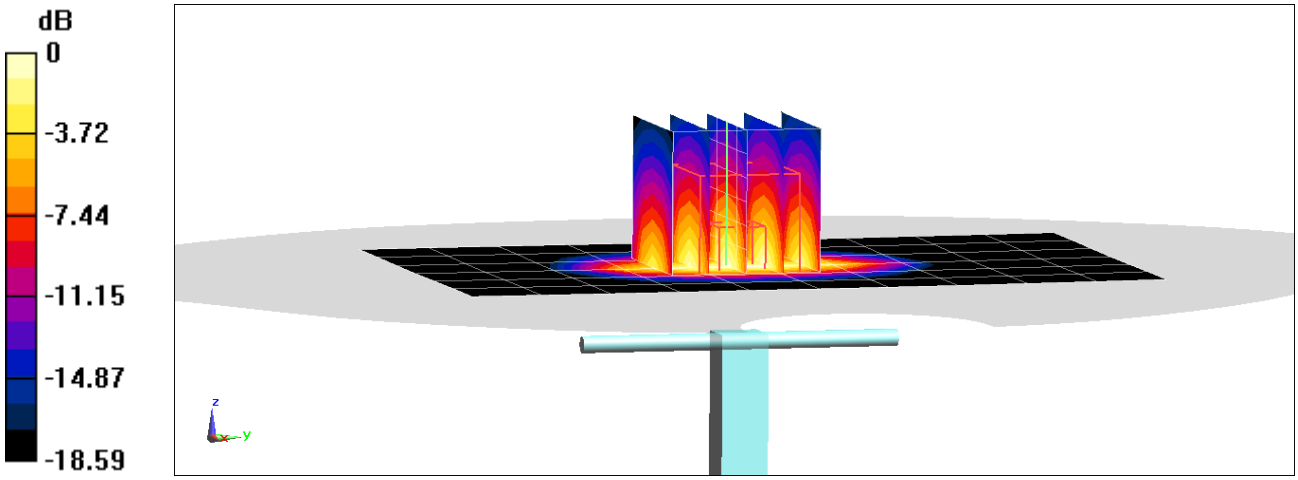
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.569 S/m; ε_r = 51.929; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-10-2019; Ambient Temp: 22.4°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN7410; ConvF(7.78, 7.78, 7.78) @ 1900 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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) = 7.65 W/kg
SAR(1 g) = 4.16 W/kg
Deviation(1 g) = 5.58%



0 dB = 6.43 W/kg = 8.08 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

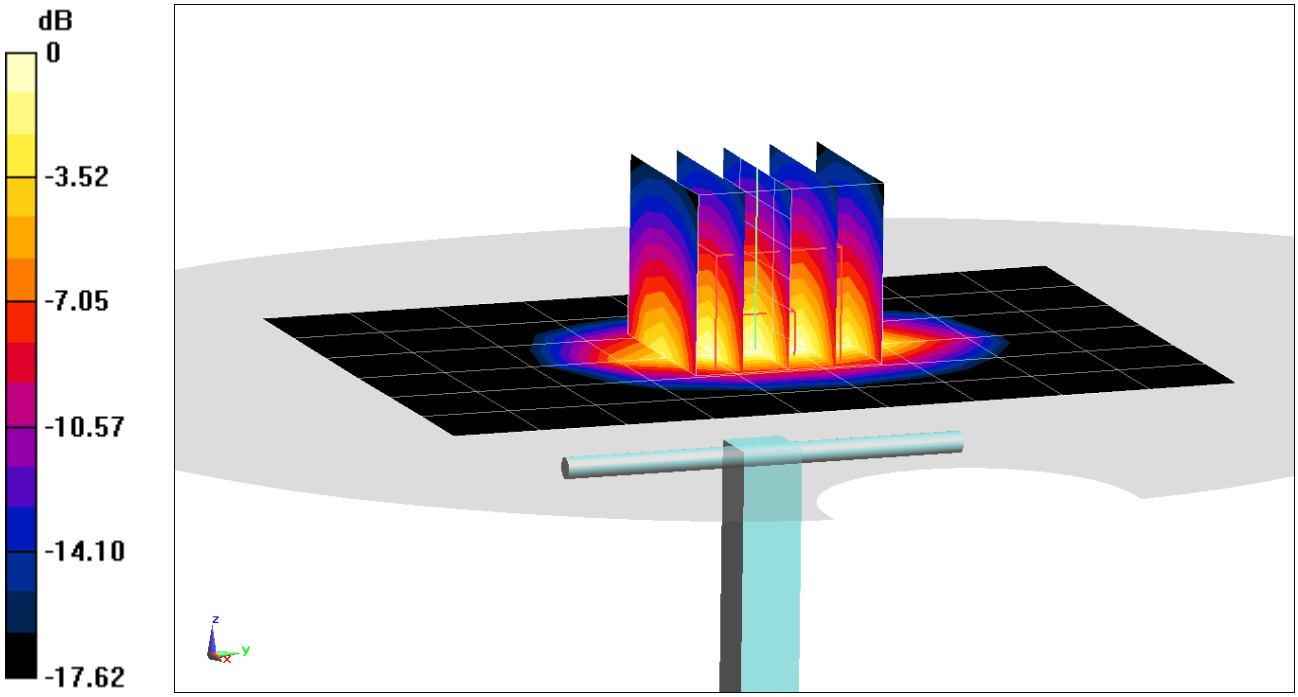
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.574 S/m; ε_r = 52.499; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-25-2019; Ambient Temp: 23.4°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7410; ConvF(7.78, 7.78, 7.78) @ 1900 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/11/2018
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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) = 7.77 W/kg
SAR(1 g) = 4.25 W/kg
Deviation(1 g) = 7.87%



0 dB = 5.42 W/kg = 7.34 dBW/kg

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

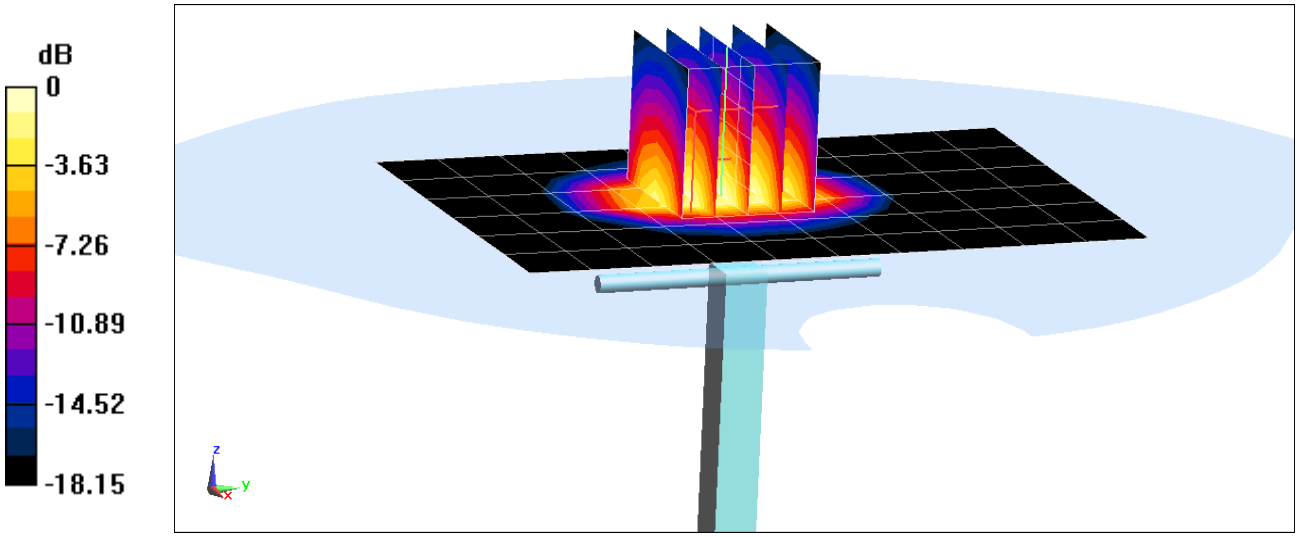
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.582 S/m; ε_r = 53.039; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-29-2019; Ambient Temp:21.6 °C; Tissue Temp: 21.2°C

Probe: EX3DV4 - SN7410; ConvF(7.78, 7.78, 7.78) @ 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 (2);SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.90 W/kg
SAR(1 g) = 4.3 W/kg; SAR(10 g) = 2.21 W/kg
Deviation(1 g) = 9.14%; Deviation(10 g) = 6.76%



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

PCTEST ENGINEERING LABORATORY, INC.

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

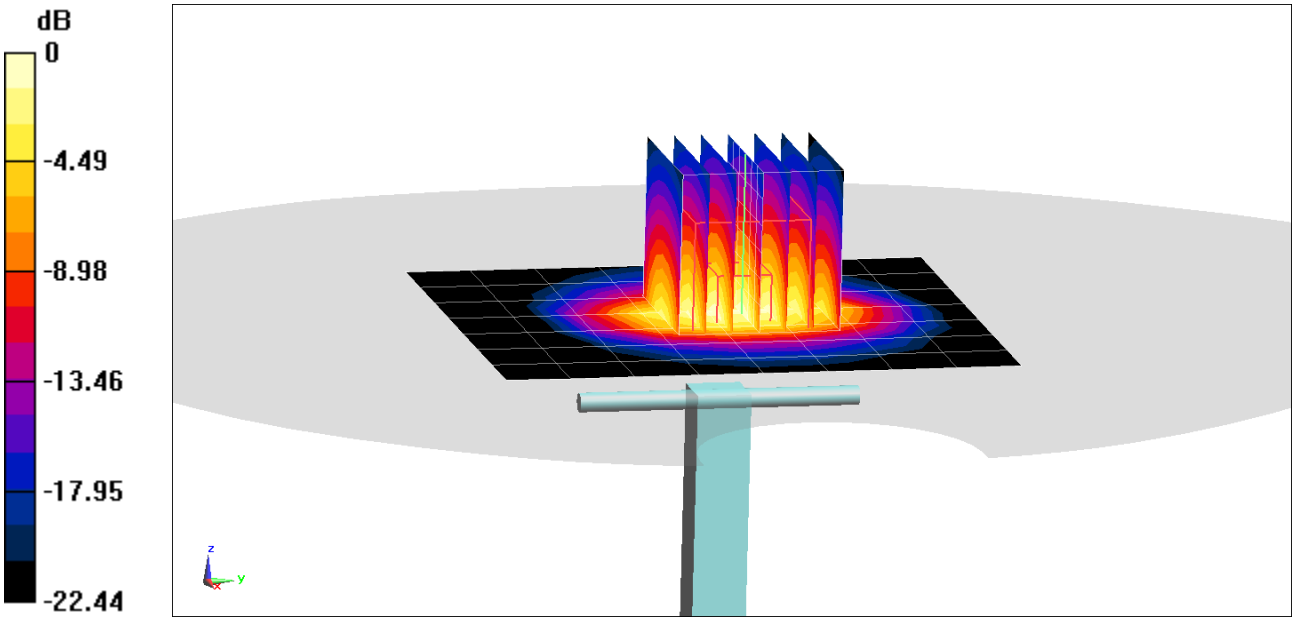
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; σ = 2.04 S/m; ε_r = 52.022; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-08-2019; Ambient Temp: 23.0°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2450 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.4 W/kg
SAR(1 g) = 5.06 W/kg
Deviation(1 g) = -0.98%



0 dB = 8.46 W/kg = 9.27 dBW/kg

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

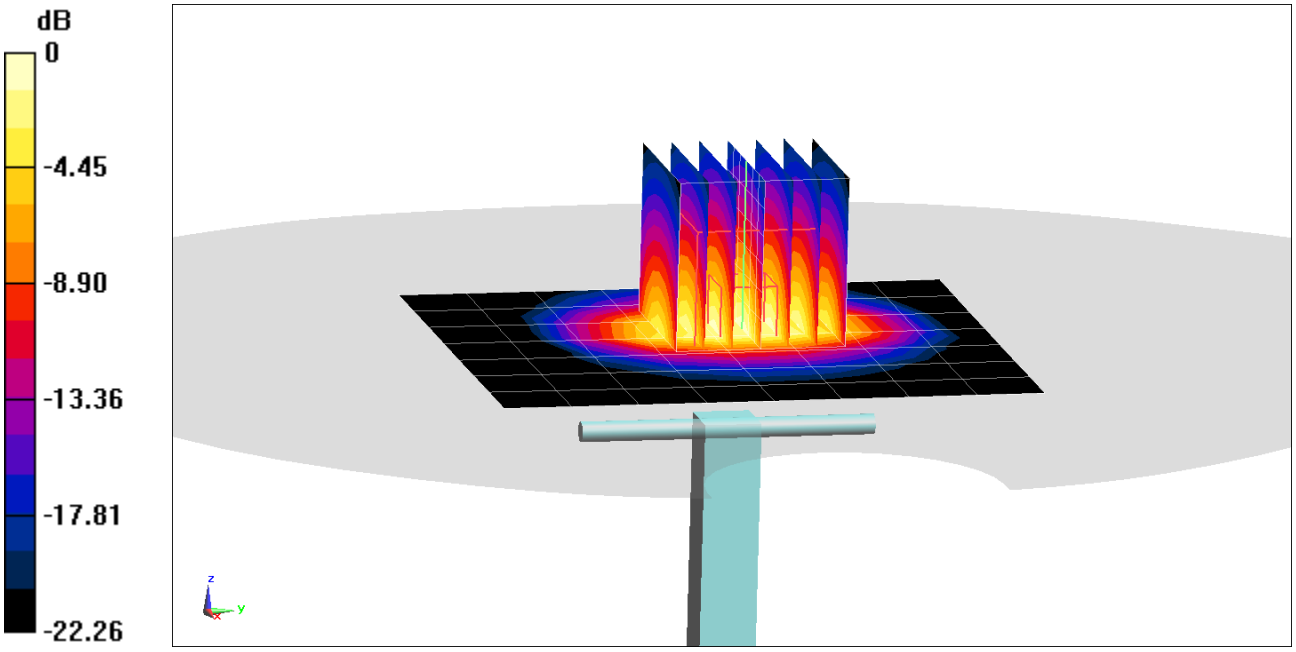
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; σ = 2.033 S/m; ε_r = 52.027; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-11-2019; Ambient Temp: 23.5°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2450 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.8 W/kg
SAR(1 g) = 5.21 W/kg
Deviation(1 g) = 3.99%



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

PCTEST ENGINEERING LABORATORY, INC.

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

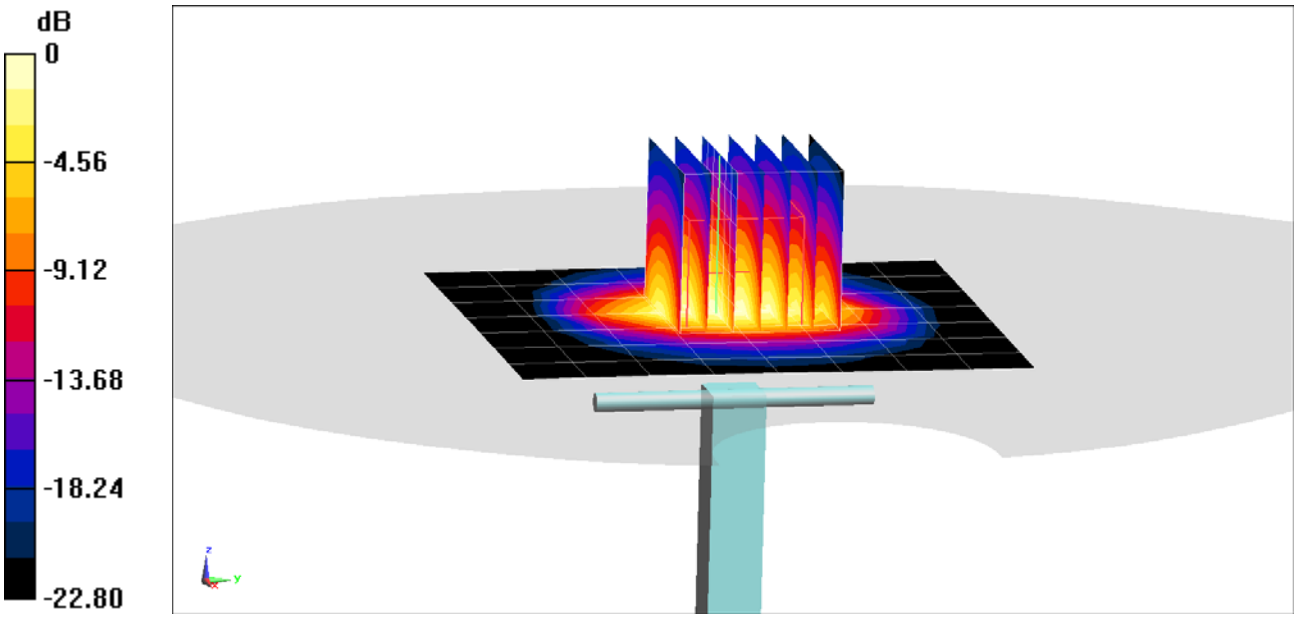
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; σ = 2.046 S/m; ε_r = 50.998; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-15-2019; Ambient Temp: 22.5°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2450 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.8 W/kg
SAR(1 g) = 5.13 W/kg
Deviation(1 g) = 0.39%



0 dB = 8.48 W/kg = 9.28 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

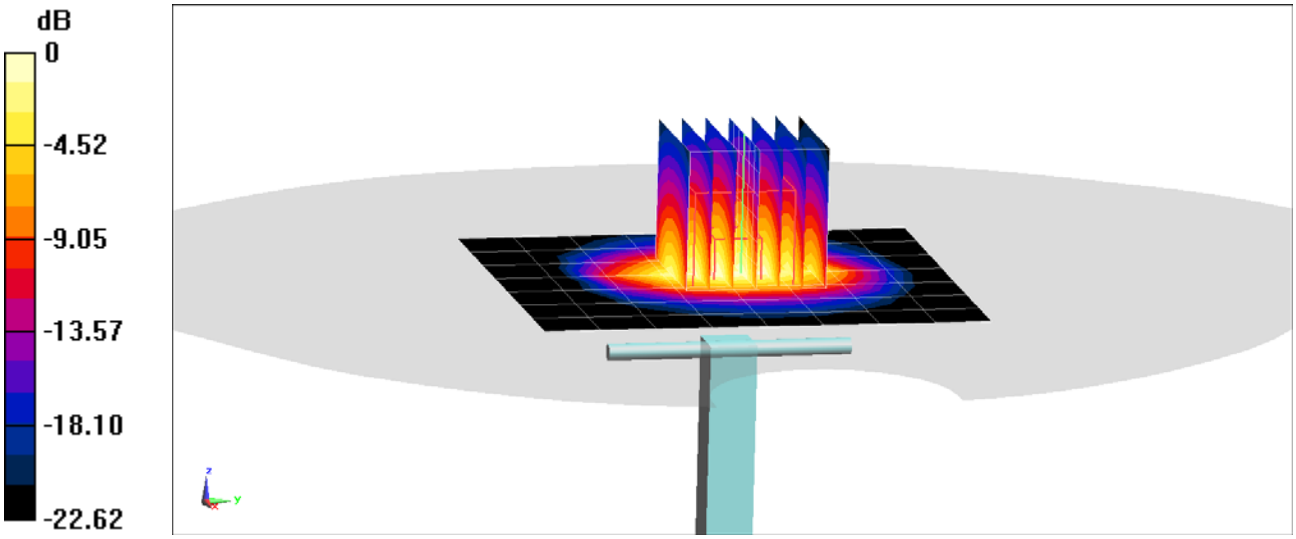
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; σ = 2.042 S/m; ε_r = 51.126; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-29-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2450 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.2 W/kg
SAR(10 g) = 2.23 W/kg
Deviation(10 g) = -7.85%



0 dB = 8.17 W/kg = 9.12 dBW/kg

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

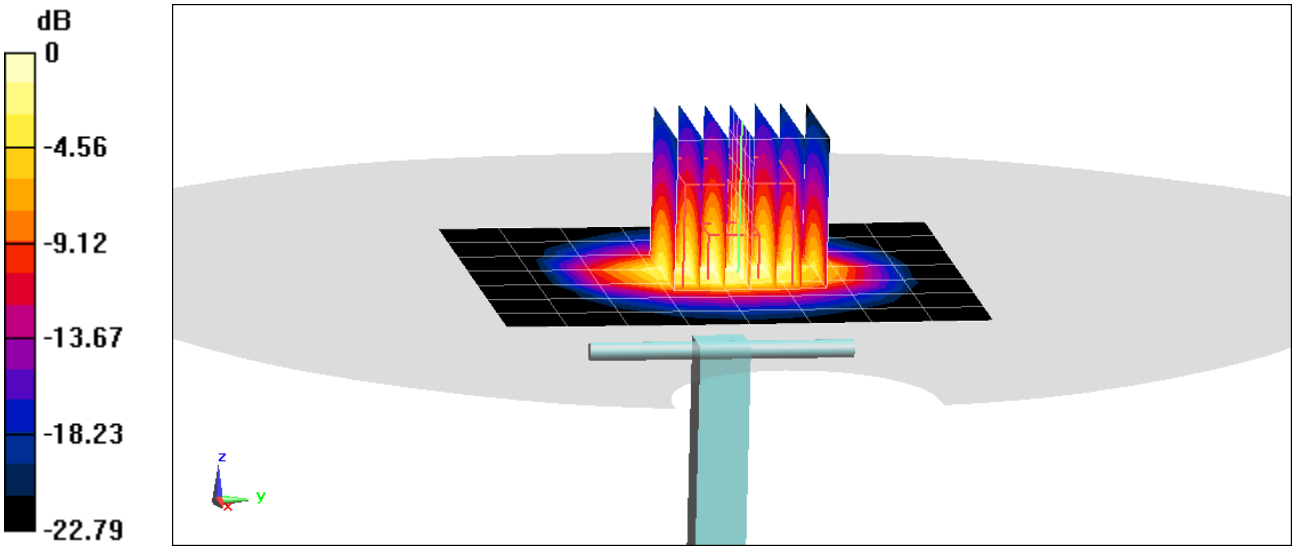
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.028 S/m; ε_r = 52.83; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-02-2019; Ambient Temp: 22.6°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7308; ConvF(7.57, 7.57, 7.57) @ 2450 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

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) = 10.1 W/kg
SAR(10 g) = 2.24 W/kg
Deviation(10 g) = -5.49%



0 dB = 8.10 W/kg = 9.08 dBW/kg

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

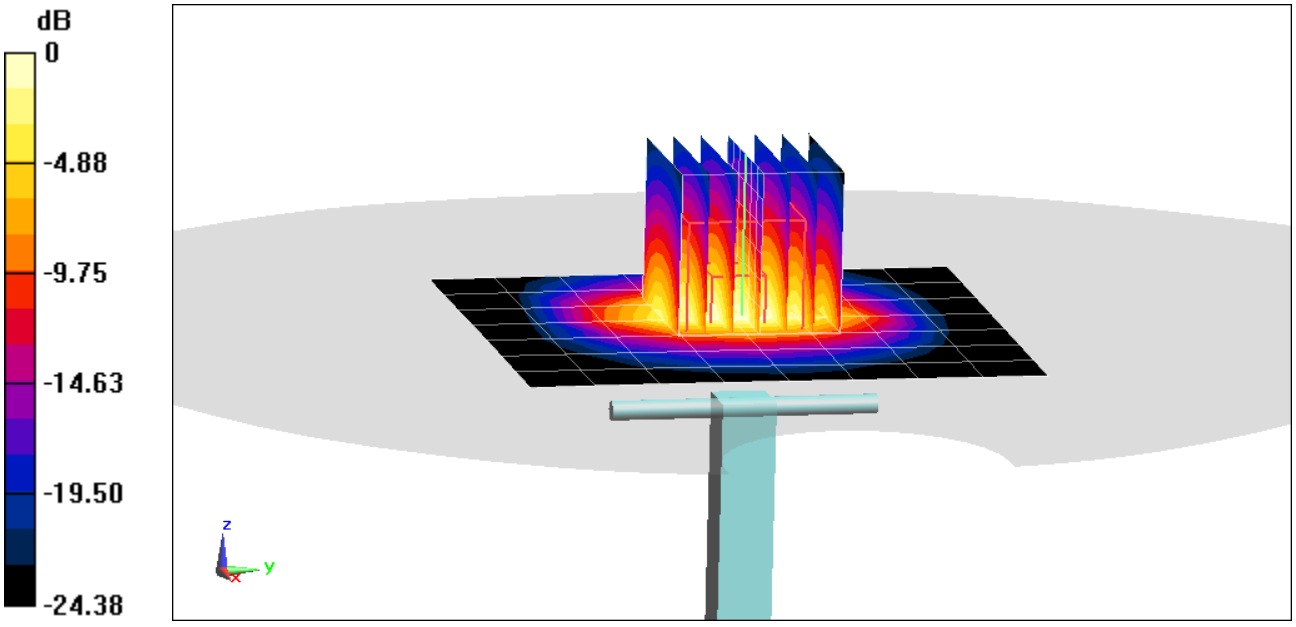
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2600 MHz; σ = 2.224 S/m; ε_r = 50.581; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-15-2019; Ambient Temp: 22.5°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2600 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.9 W/kg
SAR(1 g) = 5.41 W/kg
Deviation(1 g) = -0.18%



0 dB = 9.36 W/kg = 9.71 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

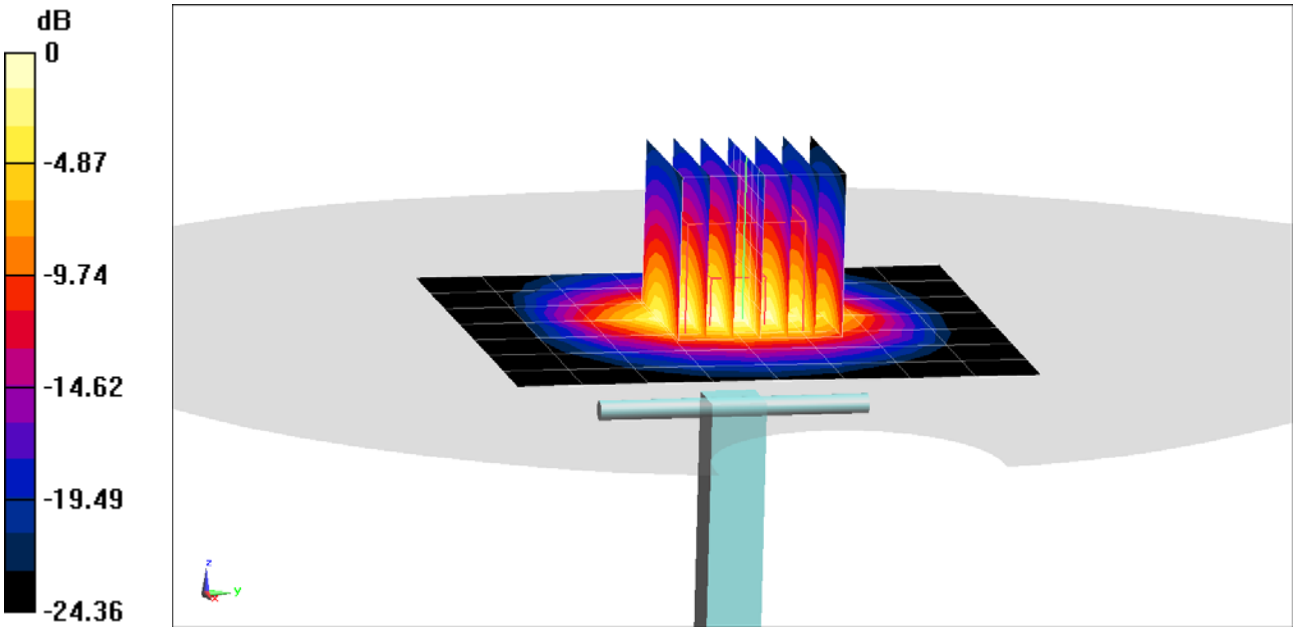
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2600 MHz; σ = 2.139 S/m; ε_r = 50.573; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-18-2019; Ambient Temp: 22.3°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2600 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.4 W/kg
SAR(1 g) = 5.2 W/kg
Deviation(1 g) = -4.06%



0 dB = 8.88 W/kg = 9.48 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

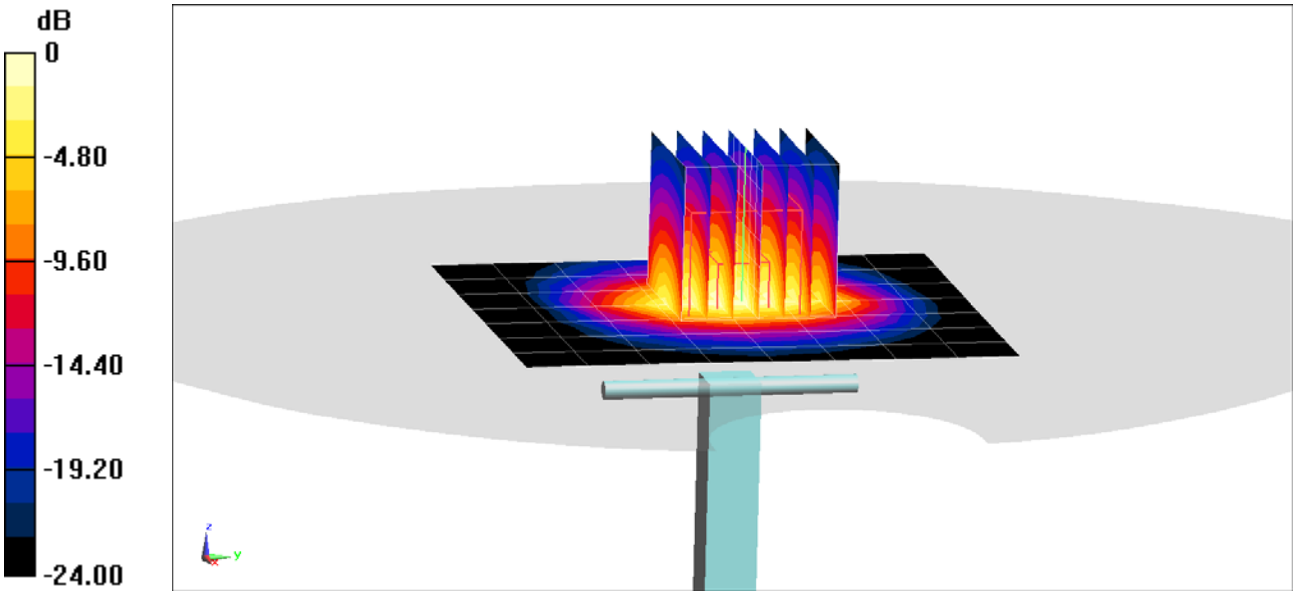
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2600 MHz; σ = 2.225 S/m; ε_r = 50.654; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-29-2019; Ambient Temp: 22.2°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7417; ConvF(7.37, 7.37, 7.37) @ 2600 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.5 W/kg
SAR(10 g) = 2.34 W/kg
Deviation(10 g) = -4.49%



0 dB = 9.14 W/kg = 9.61 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

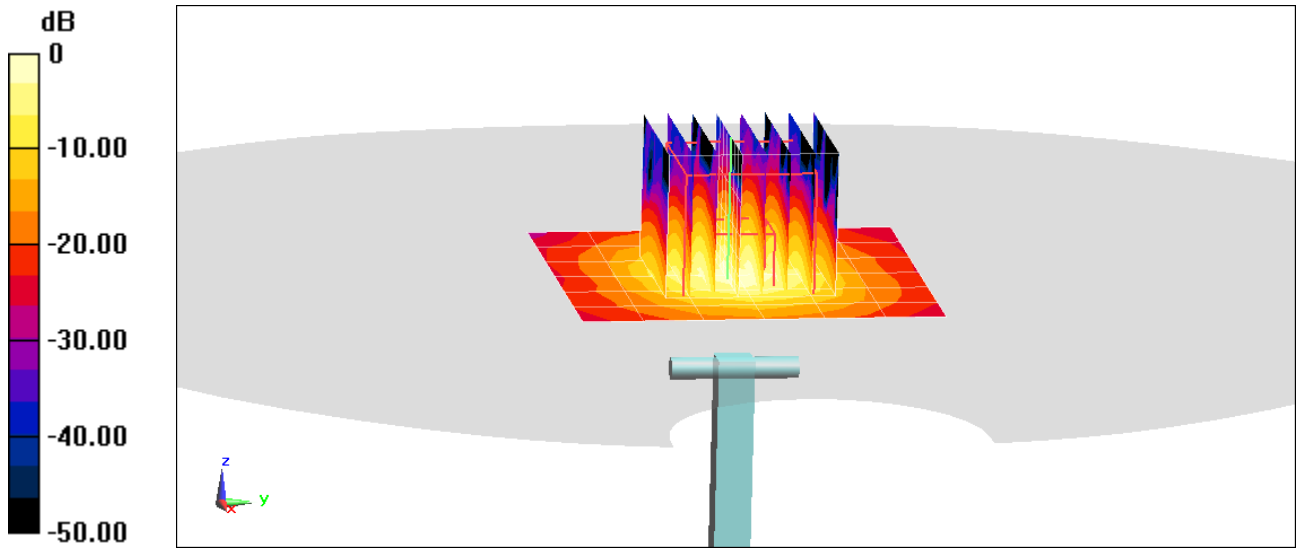
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5250 MHz; σ = 5.38 S/m; ε_r = 47.328; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-14-2019; Ambient Temp: 22.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7308; ConvF(4.48, 4.48, 4.48) @ 5250 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 14.5 W/kg
SAR(1 g) = 3.56 W/kg
Deviation(1 g) = -6.19%



0 dB = 8.55 W/kg = 9.32 dBW/kg

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

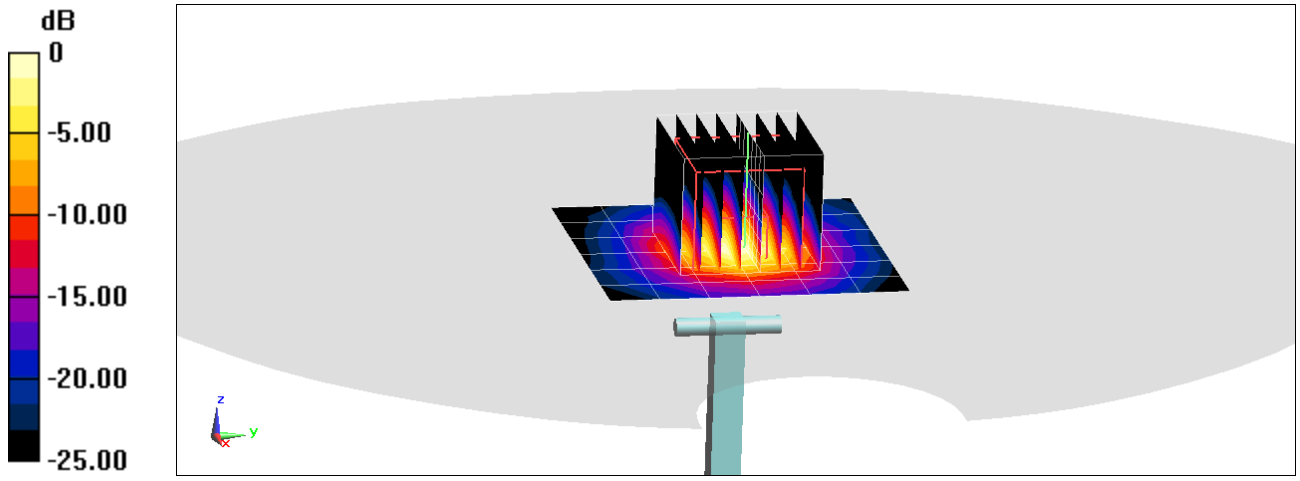
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5250 MHz; σ = 5.475 S/m; ε_r = 47.536; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-30-2019; Ambient Temp: 22.0°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7308; ConvF(4.48, 4.48, 4.48) @ 5250 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 14.7 W/kg
SAR(10 g) = 1.01 W/kg
Deviation(10 g) = -4.27%



0 dB = 8.67 W/kg = 9.38 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

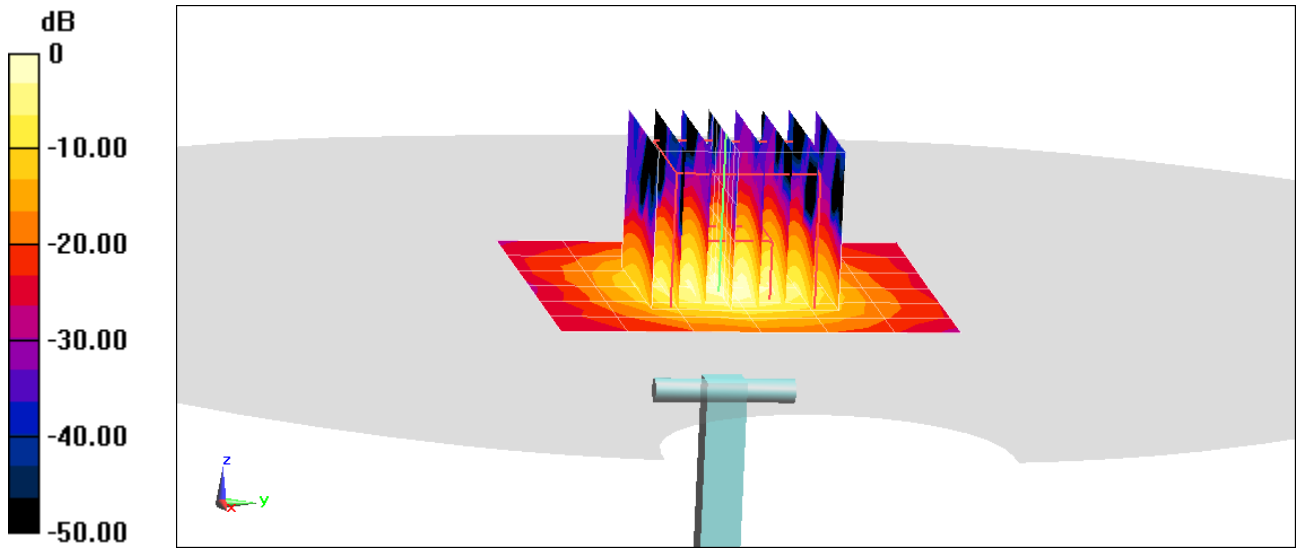
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5600 MHz; σ = 5.876 S/m; ε_r = 46.696; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-14-2019; Ambient Temp: 22.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7308; ConvF(4, 4, 4) @ 5600 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 18.1 W/kg
SAR(1 g) = 4.02 W/kg
Deviation(1 g) = 0.63%



0 dB = 10.2 W/kg = 10.09 dBW/kg

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

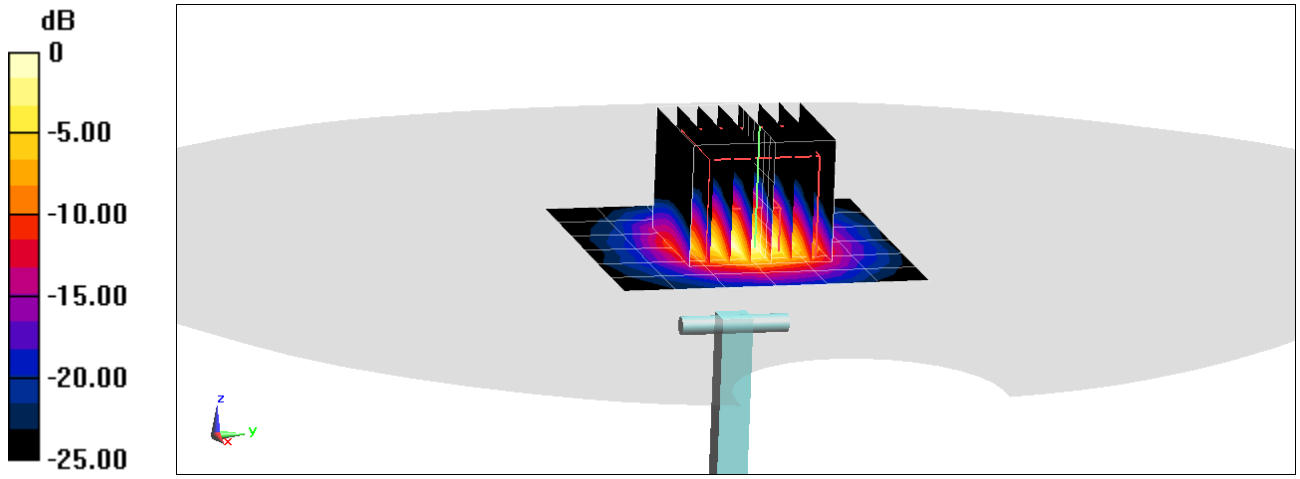
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5600 MHz; σ = 5.984 S/m; ε_r = 46.873; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-30-2019; Ambient Temp: 22.0°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7308; ConvF(4, 4, 4) @ 5600 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 17.2 W/kg
SAR(10 g) = 1.06 W/kg
Deviation(10 g) = -4.93%



0 dB = 9.58 W/kg = 9.81 dBW/kg

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

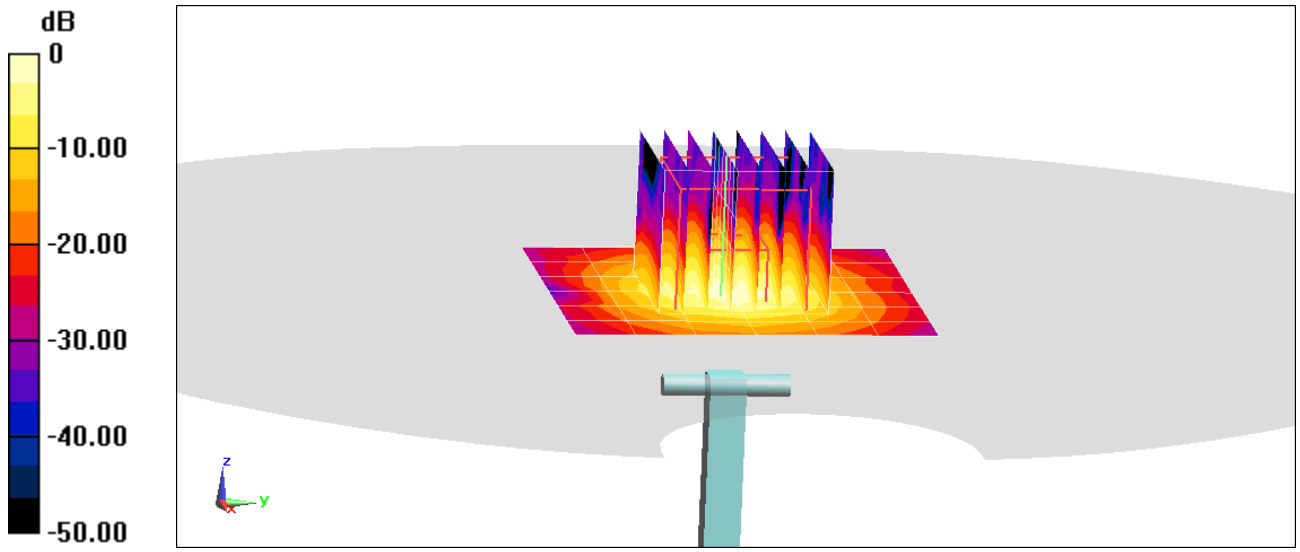
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5750 MHz; σ = 6.103 S/m; ε_r = 46.395; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-14-2019; Ambient Temp: 22.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7308; ConvF(4.18, 4.18, 4.18) @ 5750 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 16.6 W/kg
SAR(1 g) = 3.54 W/kg
Deviation(1 g) = -7.69%



0 dB = 8.88 W/kg = 9.48 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

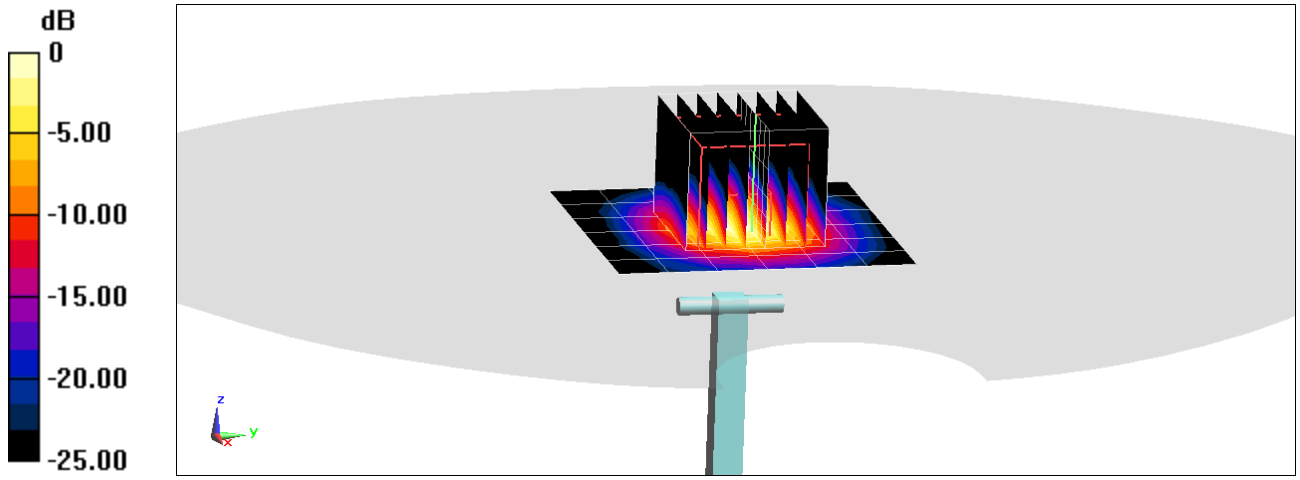
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5750 MHz; σ = 6.212 S/m; ε_r = 46.57; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-30-2019; Ambient Temp: 22.0°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7308; ConvF(4.18, 4.18, 4.18) @ 5750 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 15.9 W/kg
SAR(10 g) = 0.990 W/kg
Deviation(10 g) = -6.60%



0 dB = 8.62 W/kg = 9.36 dBW/kg

APPENDIX C: PROBE CALIBRATION

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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: D5GHzV2-1057_Jan18

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN:1057
Calibration procedure(s)	QA CAL-22.v2 Calibration procedure for dipole validation kits between 3-6 GHz
Calibration date:	January 16, 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.

BN ✓
02/06/2019

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 3503	30-Dec-17 (No. EX3-3503_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 18, 2018

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	36.2 ± 6 %	4.55 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.91 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**79.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.8 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.8 ± 6 %	4.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**84.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.0 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.5 ± 6 %	5.06 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.0 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.3 ± 6 %	5.41 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.36 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**73.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.06 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.4 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.2 ± 6 %	5.48 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5250 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.64 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**75.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.13 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.1 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.6 ± 6 %	5.94 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.05 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**79.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.3 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.3 ± 6 %	6.15 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5750 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.72 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**76.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.2 ± 6 %	6.22 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.68 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**76.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.13 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.1 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	50.0 Ω - 5.5 jΩ
Return Loss	- 25.2 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	54.7 Ω - 2.1 jΩ
Return Loss	- 26.2 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	52.7 Ω + 0.0 jΩ
Return Loss	- 31.5 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	49.3 Ω - 6.7 jΩ
Return Loss	- 23.4 dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	48.4 Ω - 3.9 jΩ
Return Loss	- 27.4 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	55.3 Ω - 1.6 jΩ
Return Loss	- 25.6 dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	52.6 Ω + 1.1 jΩ
Return Loss	- 31.2 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	51.8 Ω - 0.4 jΩ
Return Loss	- 34.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 27, 2006

Appendix (Additional assessments outside the scope of SCS 0108)

Measurement Conditions (f=5200 MHz)

DASY system configuration, as far as not given on page 1 and 3.

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L

SAR result with SAM Head (Top)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.24 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**82.6 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.6 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.54 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**85.6 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.7 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Neck)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.6 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.7 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Ear)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	5.16 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**51.7 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	1.76 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**17.7 W/kg ± 19.9 % (k=2)**

Measurement Conditions (f=5800 MHz)

DASY system configuration, as far as not given on page 1 and 3.

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L

SAR result with SAM Head (Top)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.62 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**86.3 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.1 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.88 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**88.9 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Neck)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.4 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.5 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Ear)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	5.68 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**56.8 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	1.89 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**18.9 W/kg ± 19.9 % (k=2)**

DASY5 Validation Report for Head TSL

Date: 11.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1057

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 4.55 S/m; ε_r = 36.2; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 4.9 S/m; ε_r = 35.8; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 5.06 S/m; ε_r = 35.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.51, 5.51, 5.51); Calibrated: 30.12.2017, ConvF(5.05, 5.05, 5.05); Calibrated: 30.12.2017, ConvF(4.98, 4.98, 4.98); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601 - modified; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

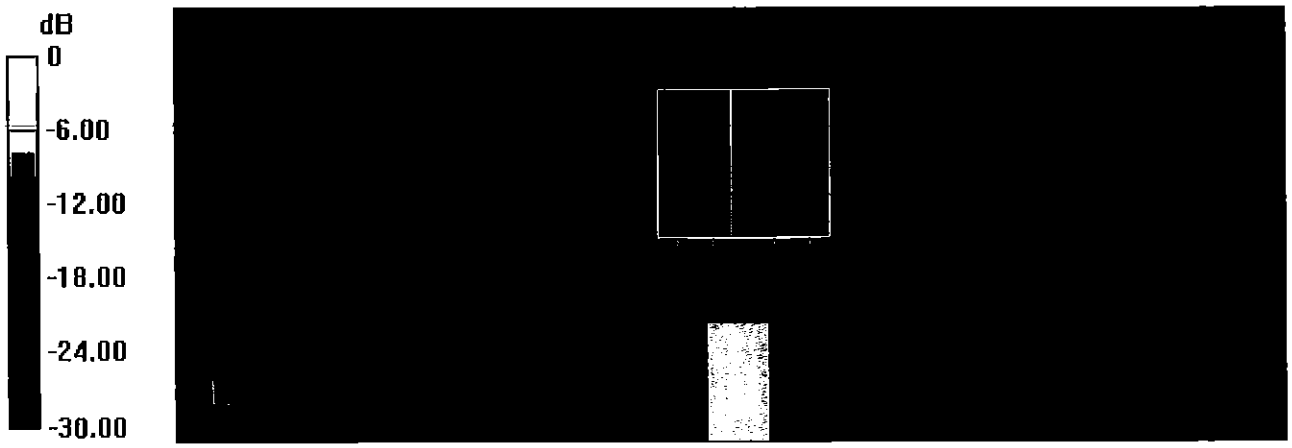
Reference Value = 72.54 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 27.5 W/kg
SAR(1 g) = 7.91 W/kg; SAR(10 g) = 2.28 W/kg
Maximum value of SAR (measured) = 17.7 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 72.77 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 32.2 W/kg
SAR(1 g) = 8.41 W/kg; SAR(10 g) = 2.4 W/kg
Maximum value of SAR (measured) = 19.7 W/kg

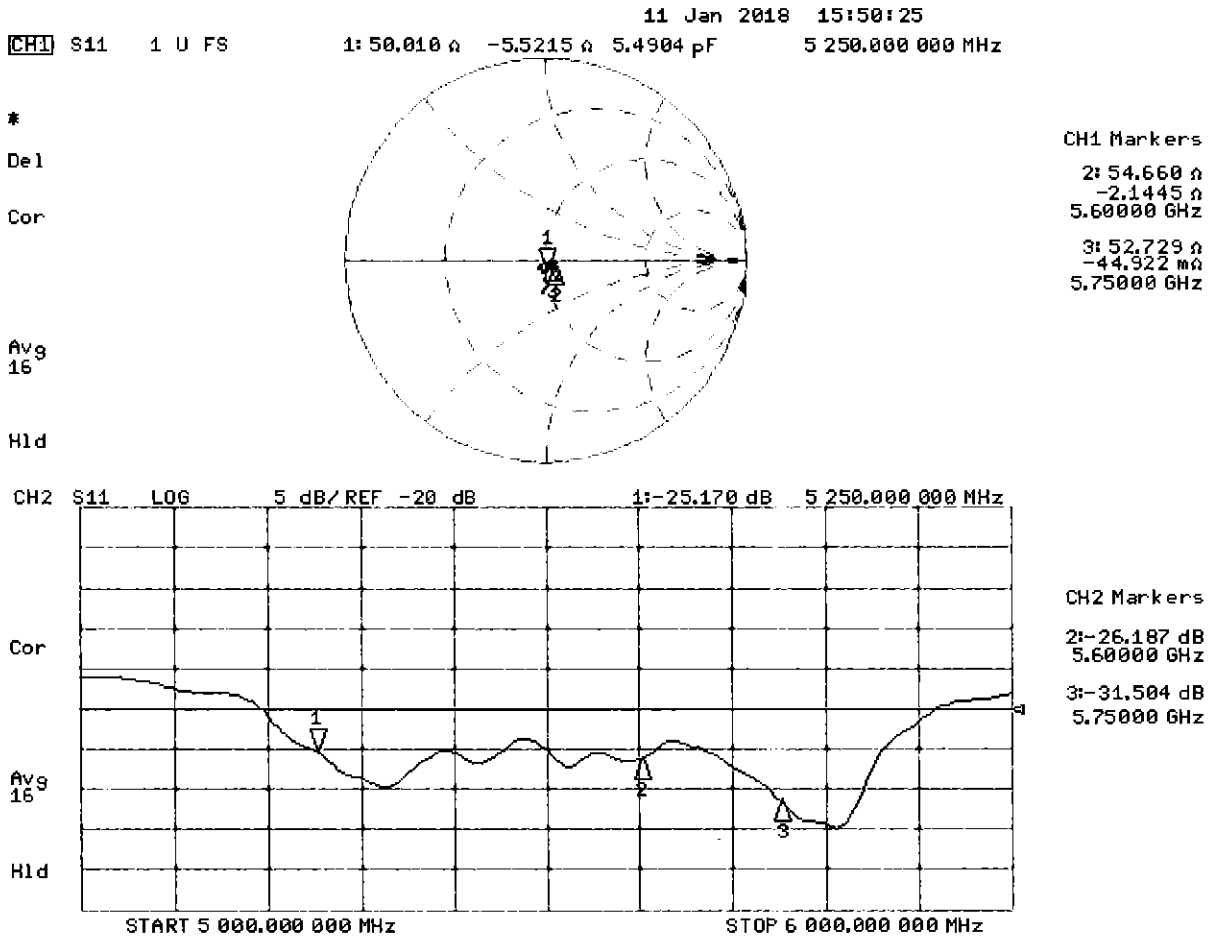
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 70.93 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 31.4 W/kg
SAR(1 g) = 8.06 W/kg; SAR(10 g) = 2.3 W/kg
Maximum value of SAR (measured) = 18.9 W/kg



0 dB = 18.9 W/kg = 12.76 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 10.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1057

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz, Frequency: 5800 MHz
Medium parameters used:f = 5200 MHz; σ = 5.41 S/m; ε_r = 47.3; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5250 MHz; σ = 5.48 S/m; ε_r = 47.2; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 5.94 S/m; ε_r = 46.6; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 6.15 S/m; ε_r = 46.3; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5800 MHz; σ = 6.22 S/m; ε_r = 46.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.35, 5.35, 5.35); Calibrated: 30.12.2017, ConvF(5.26, 5.26, 5.26); Calibrated: 30.12.2017, ConvF(4.65, 4.65, 4.65); Calibrated: 30.12.2017, ConvF(4.57, 4.57, 4.57); Calibrated: 30.12.2017, ConvF(4.53, 4.53, 4.53); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

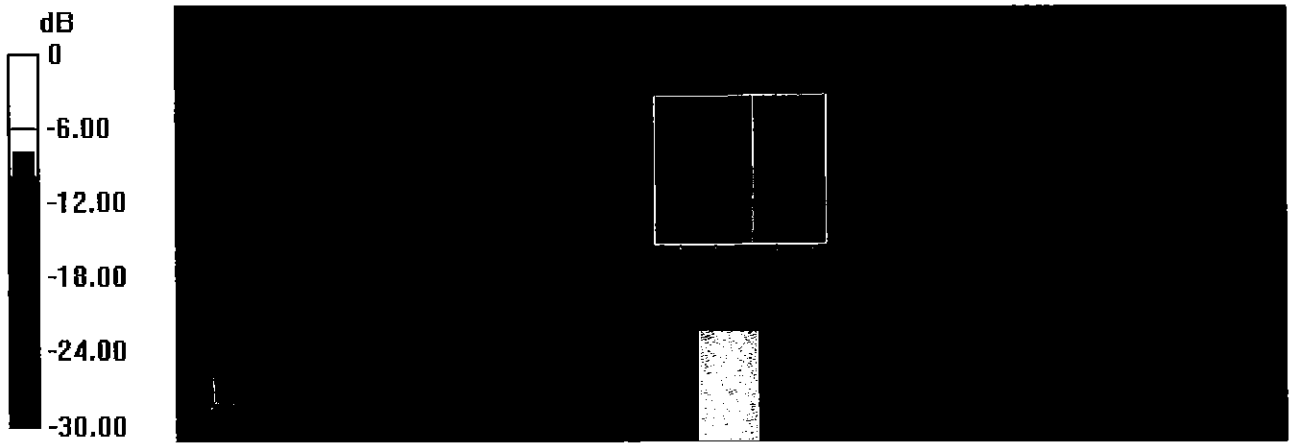
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.05 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 27.6 W/kg
SAR(1 g) = 7.36 W/kg; SAR(10 g) = 2.06 W/kg
Maximum value of SAR (measured) = 17.1 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.53 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 29.4 W/kg
SAR(1 g) = 7.64 W/kg; SAR(10 g) = 2.13 W/kg
Maximum value of SAR (measured) = 17.9 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.09 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 34.0 W/kg
SAR(1 g) = 8.05 W/kg; SAR(10 g) = 2.25 W/kg
Maximum value of SAR (measured) = 19.5 W/kg

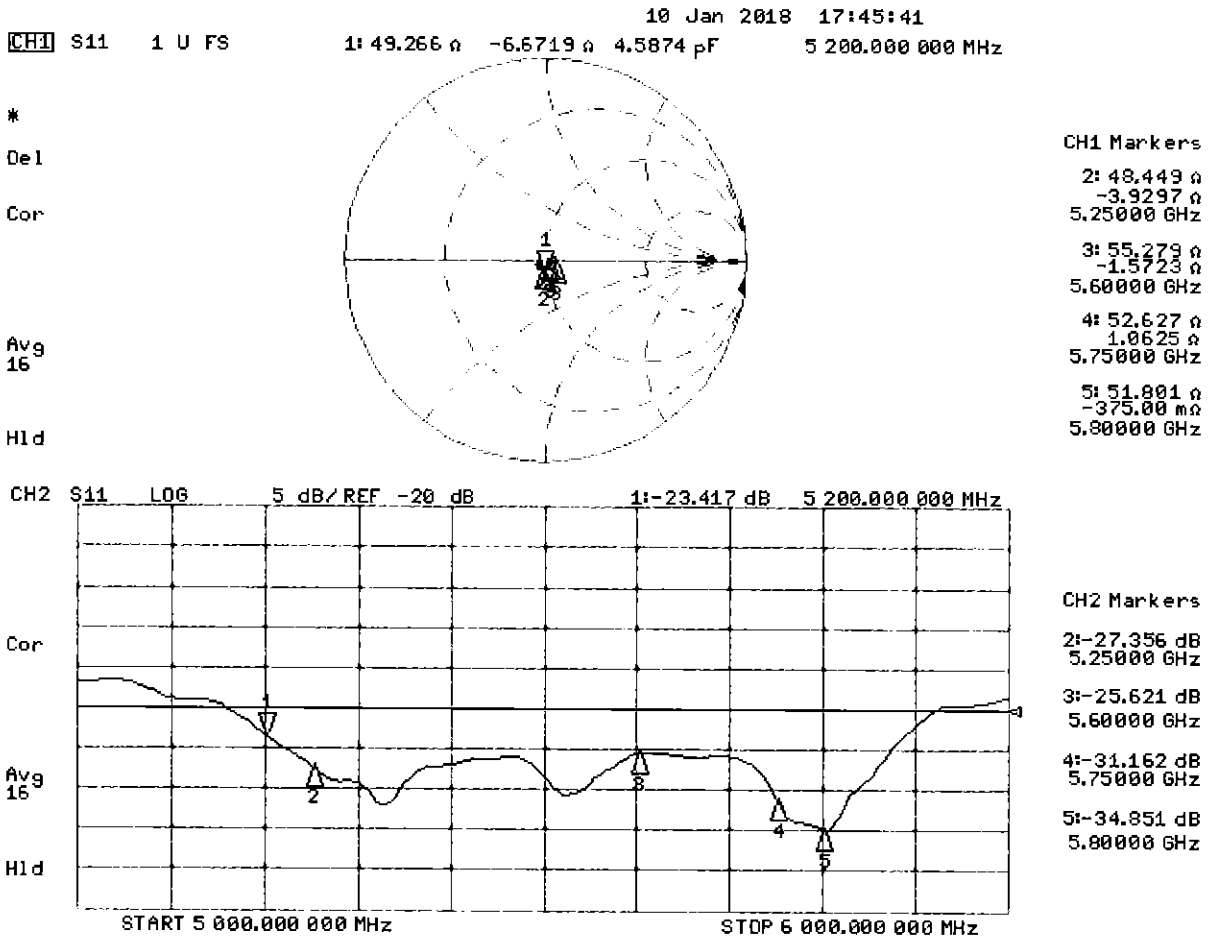
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.45 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 32.9 W/kg
SAR(1 g) = 7.72 W/kg; SAR(10 g) = 2.14 W/kg
Maximum value of SAR (measured) = 18.9 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.14 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 33.3 W/kg
SAR(1 g) = 7.68 W/kg; SAR(10 g) = 2.13 W/kg



0 dB = 18.9 W/kg = 12.76 dBW/kg

Impedance Measurement Plot for Body TSL



DASY5 Validation Report for SAM Head

Date: 16.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 4.59 S/m; εr = 36.5; ρ = 1000 kg/m3 ,
Medium parameters used: f = 5800 MHz; σ = 5.28 S/m; εr = 35.4; ρ = 1000 kg/m3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.75, 5.75, 5.75); Calibrated: 30.12.2017, ConvF(4.96, 4.96, 4.96); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: SAM Head
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

SAM Head/Top - 5200/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.99 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 30.6 W/kg
SAR(1 g) = 8.24 W/kg; SAR(10 g) = 2.35 W/kg
Maximum value of SAR (measured) = 19.7 W/kg

SAM Head/Top - 5800/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 73.00 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 36.5 W/kg
SAR(1 g) = 8.62 W/kg; SAR(10 g) = 2.41 W/kg
Maximum value of SAR (measured) = 21.9 W/kg

SAM Head/Mouth - 5200/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.79 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 29.5 W/kg
SAR(1 g) = 8.54 W/kg; SAR(10 g) = 2.37 W/kg
Maximum value of SAR (measured) = 20.7 W/kg

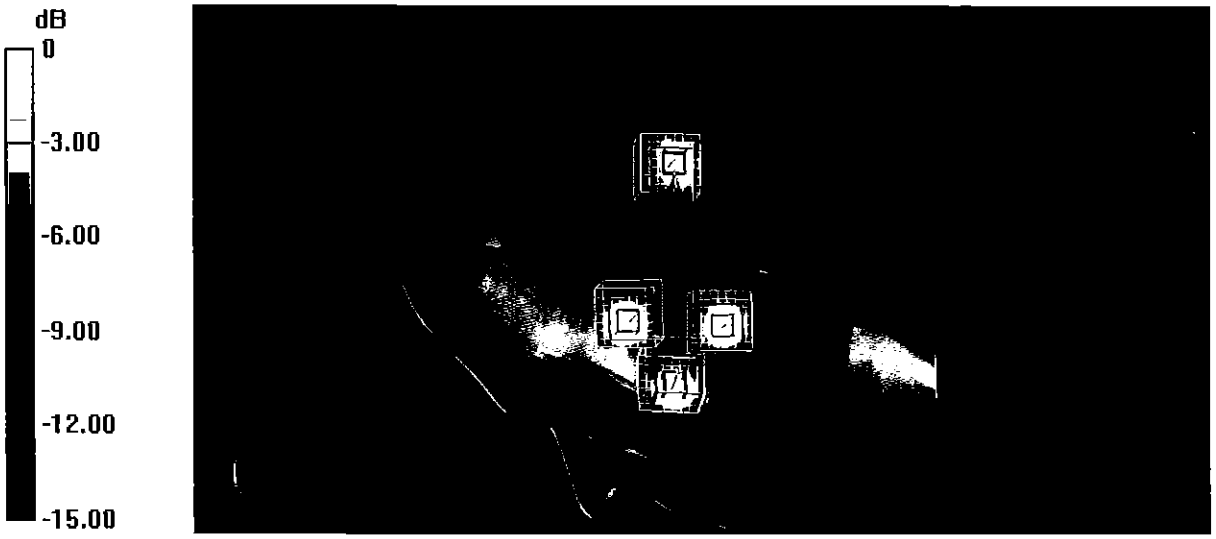
SAM Head/Mouth - 5800/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 71.69 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 34.9 W/kg
SAR(1 g) = 8.88 W/kg; SAR(10 g) = 2.44 W/kg
Maximum value of SAR (measured) = 23.0 W/kg

SAM Head/Neck - 5200/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.48 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 27.9 W/kg
SAR(1 g) = 8.14 W/kg; SAR(10 g) = 2.37 W/kg
Maximum value of SAR (measured) = 19.3 W/kg

SAM Head/Neck - 5800/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.90 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 33.4 W/kg
SAR(1 g) = 8.33 W/kg; SAR(10 g) = 2.35 W/kg
Maximum value of SAR (measured) = 21.8 W/kg

SAM Head/Ear - 5200/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 54.68 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 16.3 W/kg
SAR(1 g) = 5.16 W/kg; SAR(10 g) = 1.76 W/kg
Maximum value of SAR (measured) = 11.1 W/kg

SAM Head/Ear - 5800/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 56.96 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 21.2 W/kg
SAR(1 g) = 5.68 W/kg; SAR(10 g) = 1.89 W/kg
Maximum value of SAR (measured) = 13.8 W/kg



0 dB = 13.8 W/kg = 11.40 dBW/kg

Certification of Calibration

Object	D5GHzV2 – SN: 1057
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extension Calibration date:	1/16/2019
Description:	SAR Validation Dipole at 5250, 5600, and 5750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	2/8/2018	Annual	2/8/2019	US39170122
Agilent	N5182A	MXG Vector Signal Generator	4/18/2018	Annual	4/18/2019	MY47420800
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1207364
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1339018
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Seekonk	NC-100	Torque Wrench	7/11/2018	Annual	7/11/2019	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/3/2018	Annual	10/3/2019	1558
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2018	Annual	6/18/2019	1334
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/11/2018	Annual	9/11/2019	1091
SPEAG	EX3DV4	SAR Probe	8/23/2018	Annual	8/23/2019	7308
SPEAG	EX3DV4	SAR Probe	6/25/2018	Annual	6/25/2019	7409

Measurement Uncertainty = ±23% (k=2)

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

DIPOLE CALIBRATION EXTENSION

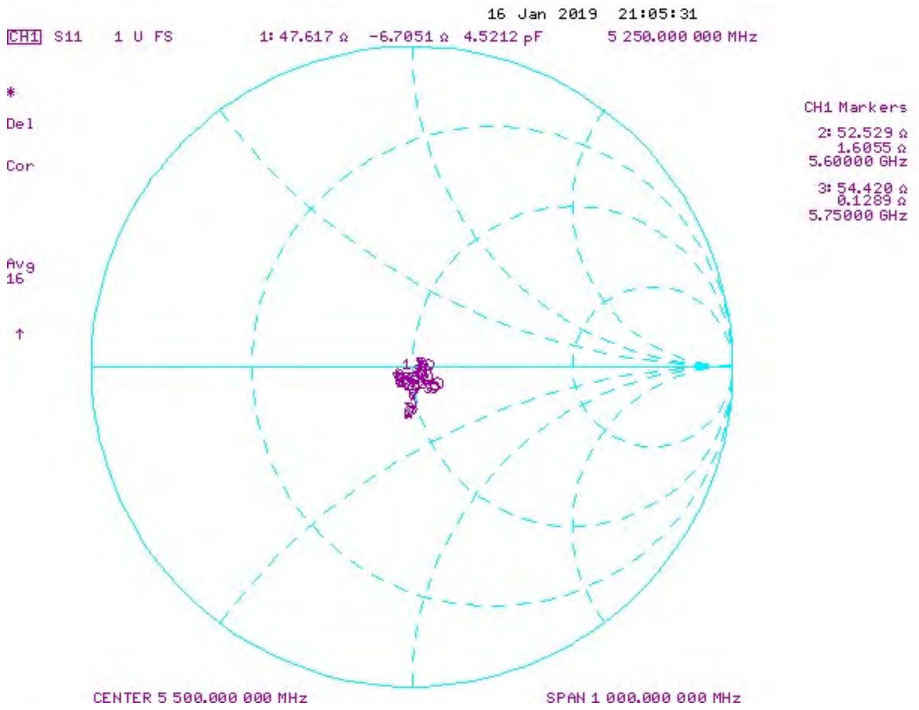
Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

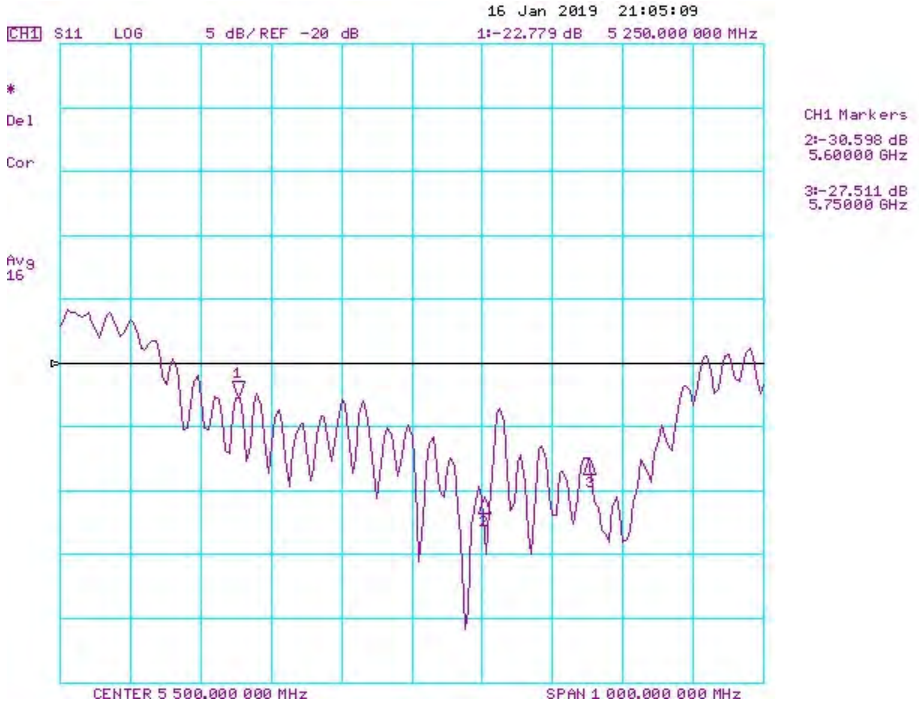
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does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

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

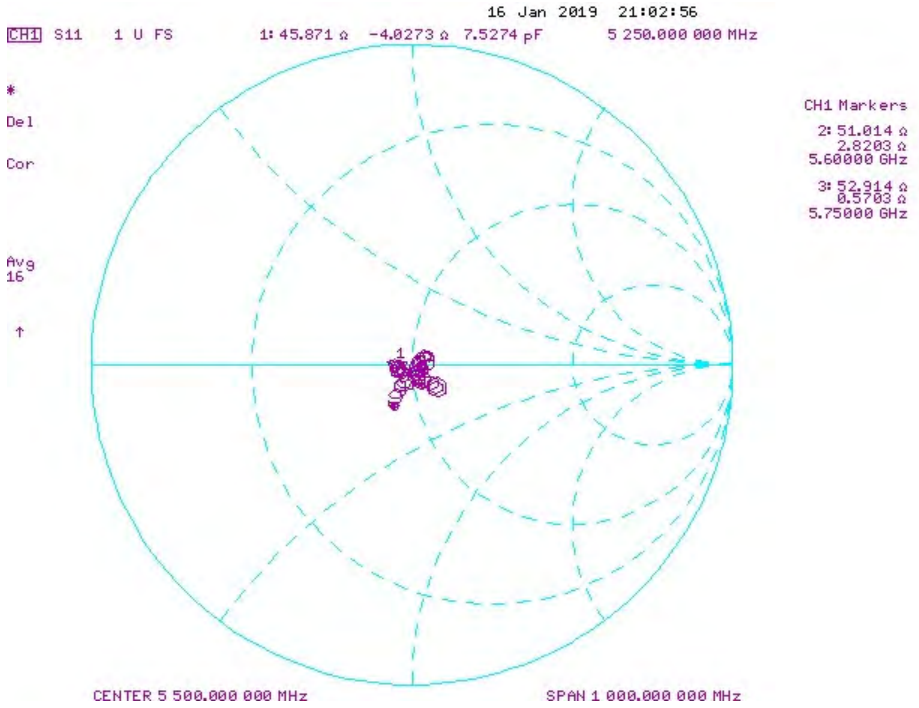
Frequency (MHz)	Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 17.0 dBm	Measured Head SAR (1g) W/kg @ 17.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 17.0 dBm	Measured Head SAR (10g) W/kg @ 17.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
5250	1/16/2018	1/16/2019	1.203	3.96	3.63	-8.33%	1.14	1.04	-8.77%	50	47.6	2.4	-5.5	-6.7	1.2	-25.2	-22.8	9.60%	PASS
5600	1/16/2018	1/16/2019	1.203	4.205	3.84	-8.68%	1.2	1.09	-9.17%	54.7	52.5	2.2	-2.1	1.6	3.7	-26.2	-30.6	-16.80%	PASS
5750	1/16/2018	1/16/2019	1.203	4.025	3.76	-6.58%	1.15	1.07	-6.96%	52.7	54.4	1.7	0	0.1	0.1	-31.5	-27.5	12.70%	PASS
Frequency (MHz)	Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 17.0 dBm	Measured Body SAR (1g) W/kg @ 17.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 17.0 dBm	Measured Body SAR (10g) W/kg @ 17.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
5250	1/16/2018	1/16/2019	1.203	3.795	3.73	-1.71%	1.06	1.03	-2.37%	48.4	45.9	2.5	-3.9	-4	0.1	-27.4	-24.5	10.50%	PASS
5600	1/16/2018	1/16/2019	1.203	3.995	4.06	1.63%	1.12	1.12	0.45%	55.3	51	4.3	-1.6	2.8	4.4	-25.6	-30.7	-20.00%	PASS
5750	1/16/2018	1/16/2019	1.203	3.835	3.65	-4.82%	1.06	1.02	-3.77%	52.6	52.9	0.3	1.1	0.6	0.5	-31.2	-30.7	1.60%	PASS

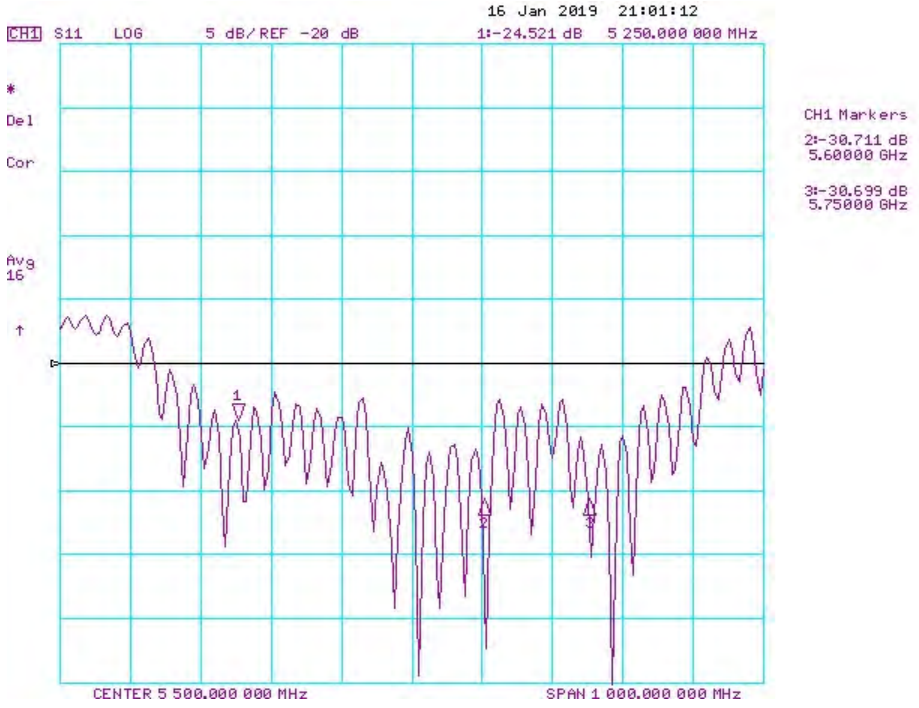
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





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

S Schweizerischer Kalibrierdienst
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. BN ✓
02/06/2019

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 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

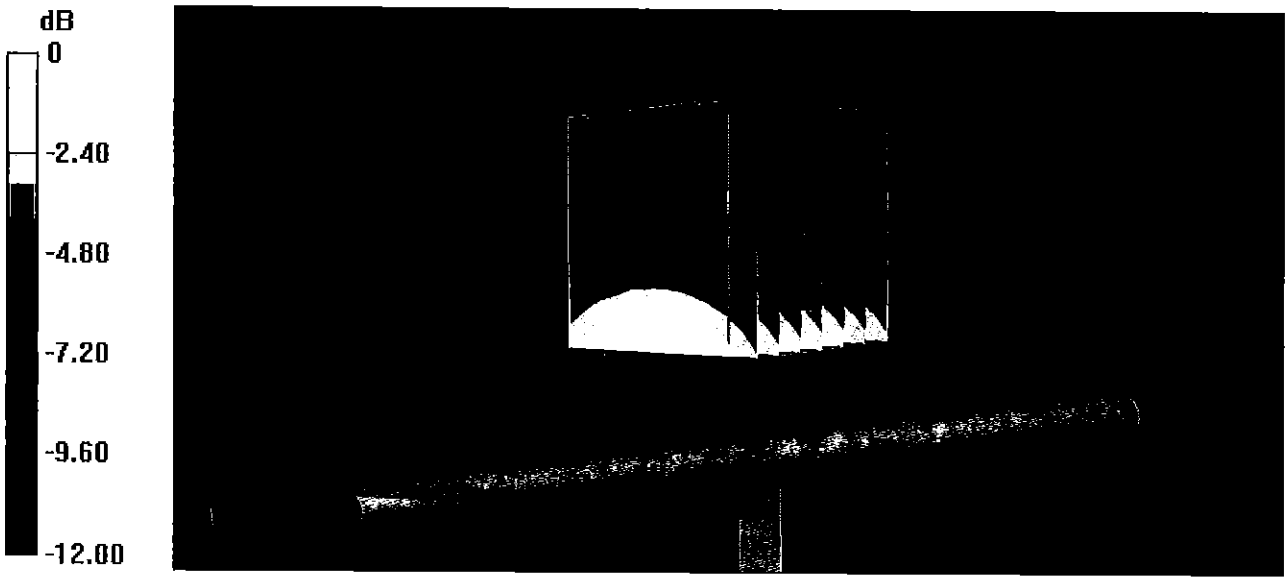
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.9 S/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

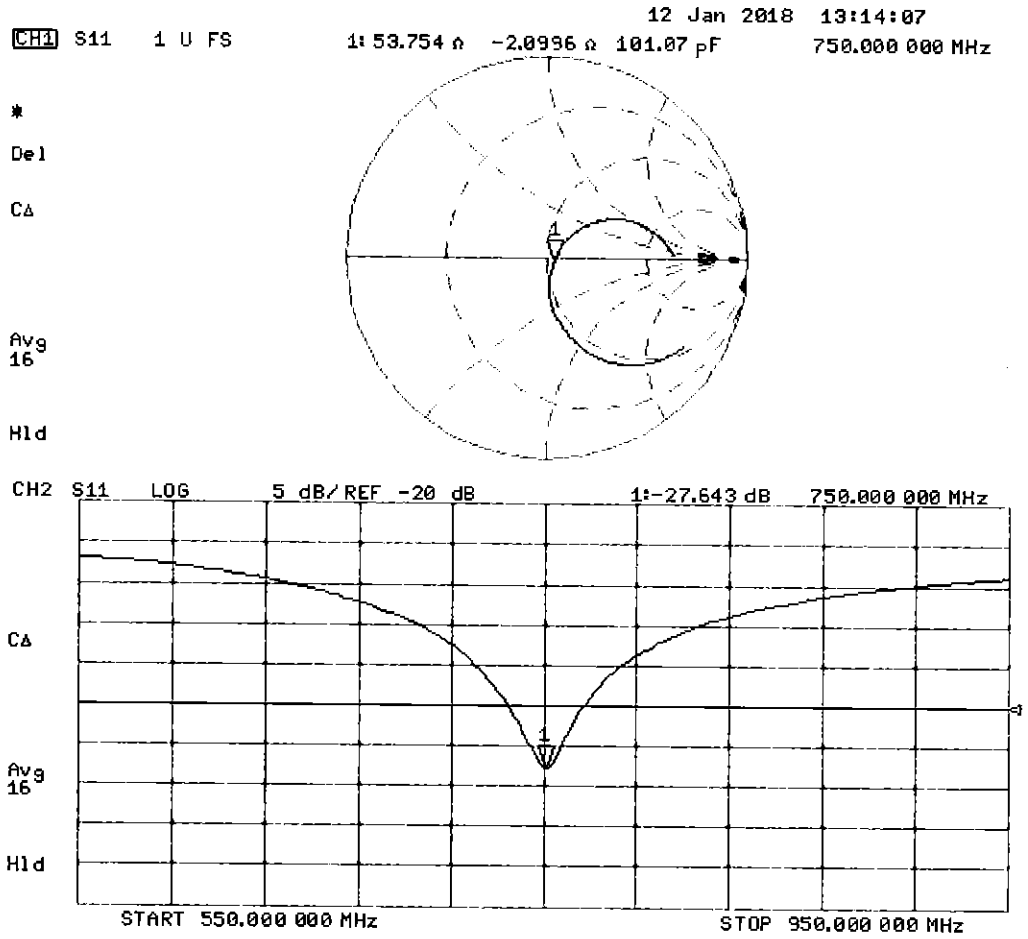
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

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

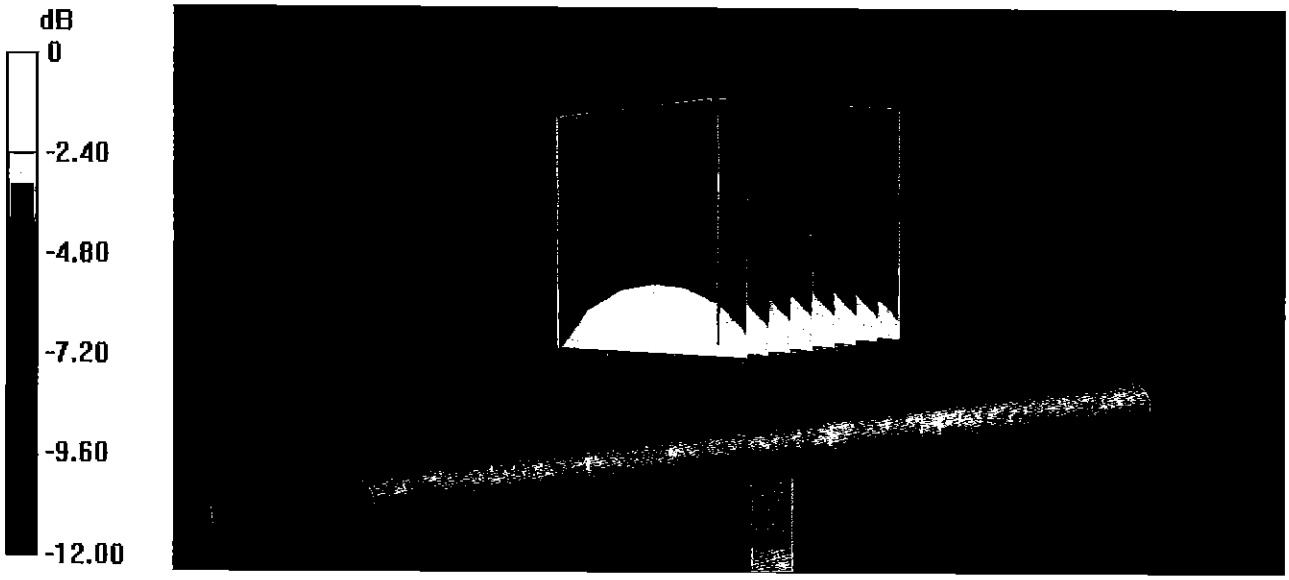
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.96 S/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

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)

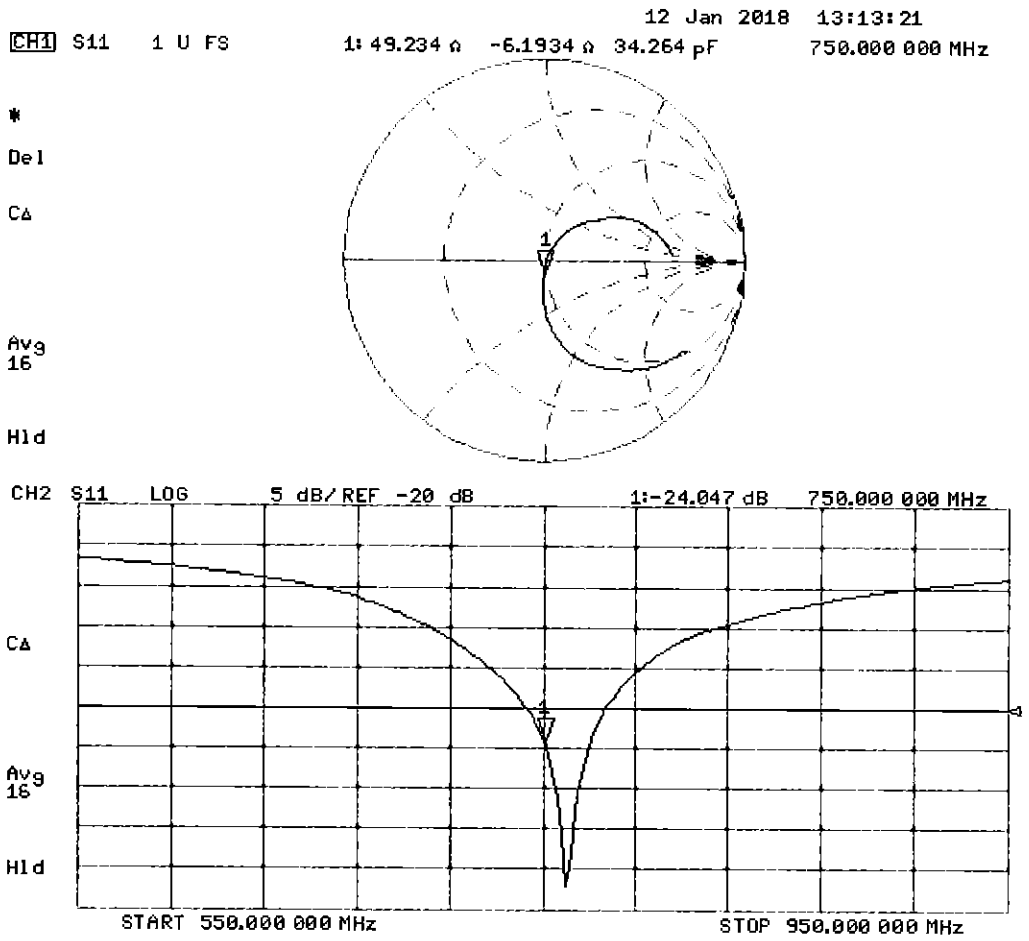
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x8x7)/Cube 0:

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:

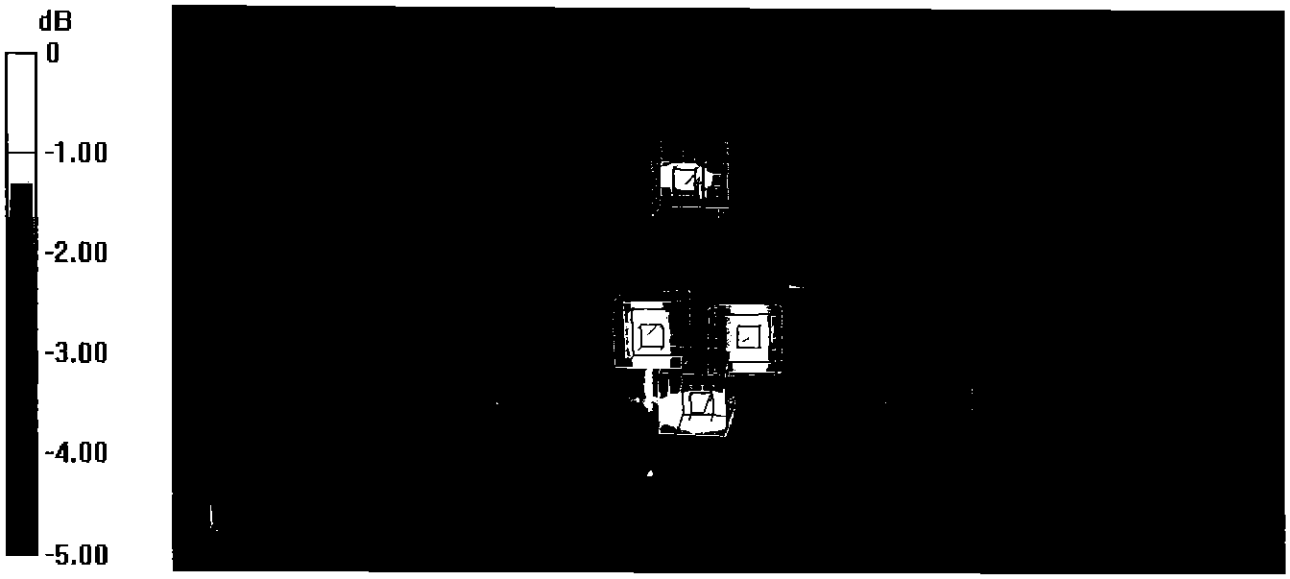
- Probe: EX3DV4 - SN7349; ConvF(10.22, 10.22, 10.22); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: SAM Head
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

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

Certification of Calibration

Object	D750V3 – SN: 1003
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extension Calibration date:	1/15/2019
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	2/8/2018	Annual	2/8/2019	US39170122
Agilent	N5182A	MXG Vector Signal Generator	4/18/2018	Annual	4/18/2019	MY47420800
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1207364
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1339018
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Seekonk	NC-100	Torque Wrench	7/11/2018	Annual	7/11/2019	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/3/2018	Annual	10/3/2019	1558
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2018	Annual	6/18/2019	1334
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/11/2018	Annual	9/11/2019	1091
SPEAG	EX3DV4	SAR Probe	8/23/2018	Annual	8/23/2019	7308
SPEAG	EX3DV4	SAR Probe	6/25/2018	Annual	6/25/2019	7409

Measurement Uncertainty = ±23% (k=2)

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

DIPOLE CALIBRATION EXTENSION

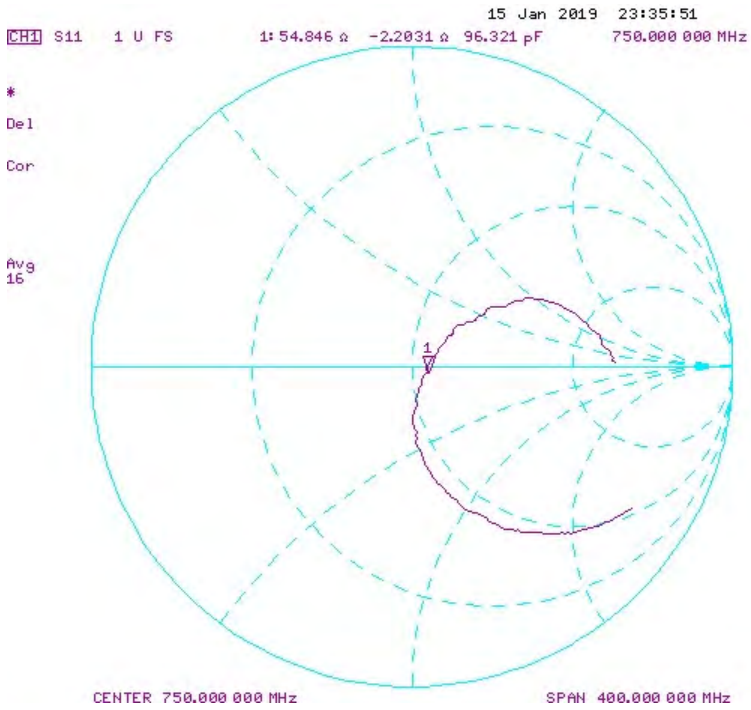
Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

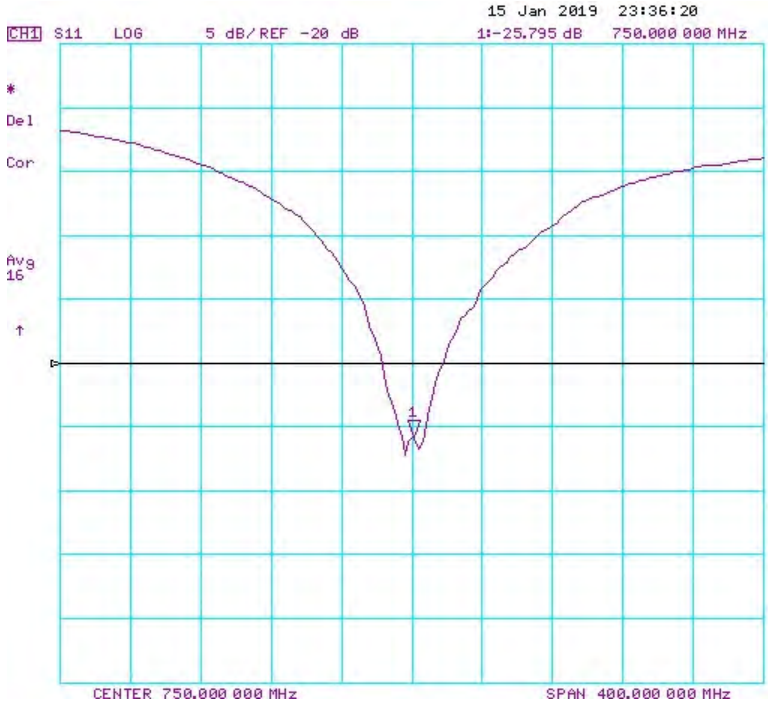
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does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

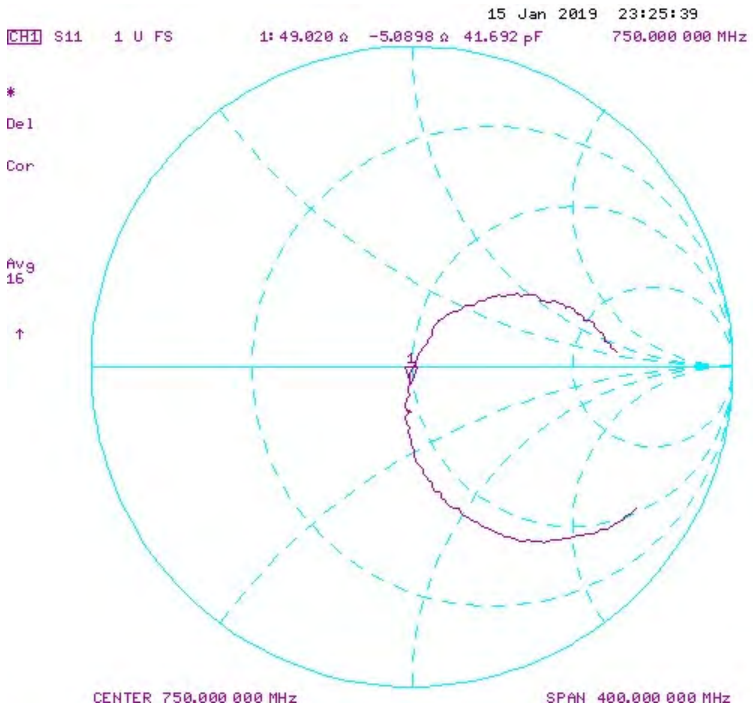
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 23.0 dBm	Measured Head SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 23.0 dBm	Measured Head SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance 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
1/15/2018	1/15/2019	1.043	1.656	1.75	5.68%	1.08	1.15	6.09%	53.8	54.8	1	-2.1	-2.2	0.1	-27.6	-25.8	6.50%	PASS
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	Measured Body SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
1/15/2018	1/15/2019	1.043	1.716	1.84	7.23%	1.14	1.23	7.71%	49.2	49	0.2	-6.2	-5.1	1.1	-24	-25.6	-6.80%	PASS

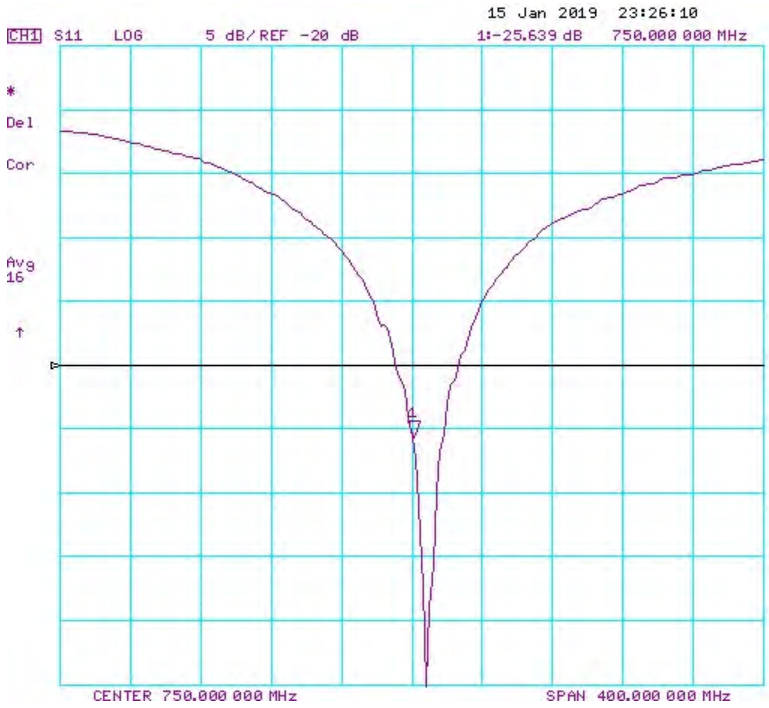
Impedance & Return-Loss Measurement Plot for Head TSL





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_Oct18

CALIBRATION CERTIFICATE

Object: D750V3 - SN:1161

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: October 19, 2018

BN ✓
10-30-2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Manu Seitz	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 22, 2018

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	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	40.8 ± 6 %	0.89 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	2.02 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.03 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.26 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 %	0.96 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	2.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.43 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.39 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.55 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 - 1.9 jΩ
Return Loss	- 25.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.6 Ω - 4.2 jΩ
Return Loss	- 27.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.032 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: 19.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

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

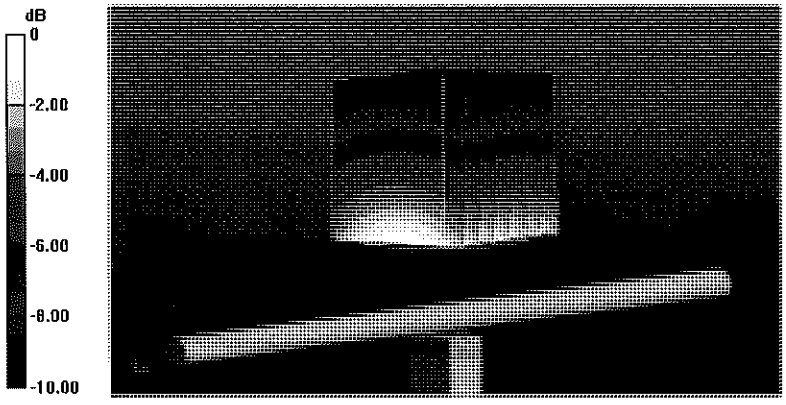
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.89 S/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.22, 10.22, 10.22) @ 750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

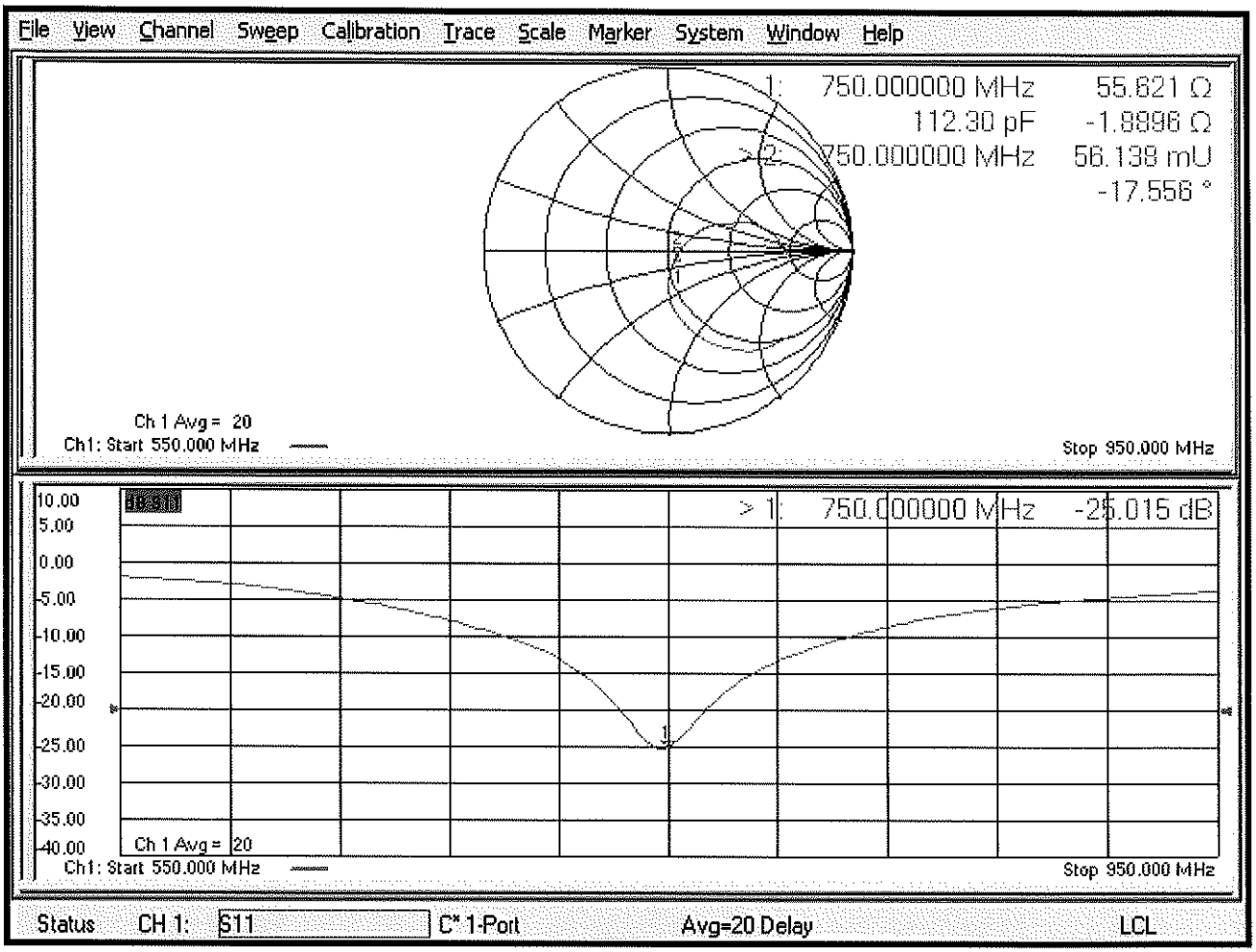
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.51 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.04 W/kg
SAR(1 g) = 2.02 W/kg; SAR(10 g) = 1.32 W/kg
Maximum value of SAR (measured) = 2.70 W/kg



0 dB = 2.70 W/kg = 4.31 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 19.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

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

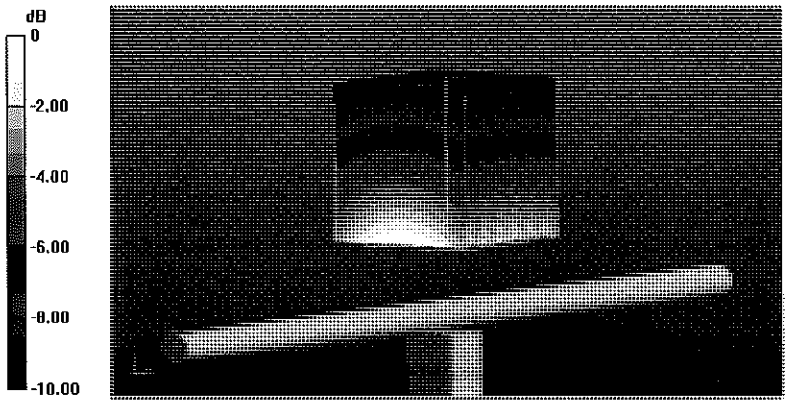
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.96 S/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.19, 10.19, 10.19) @ 750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

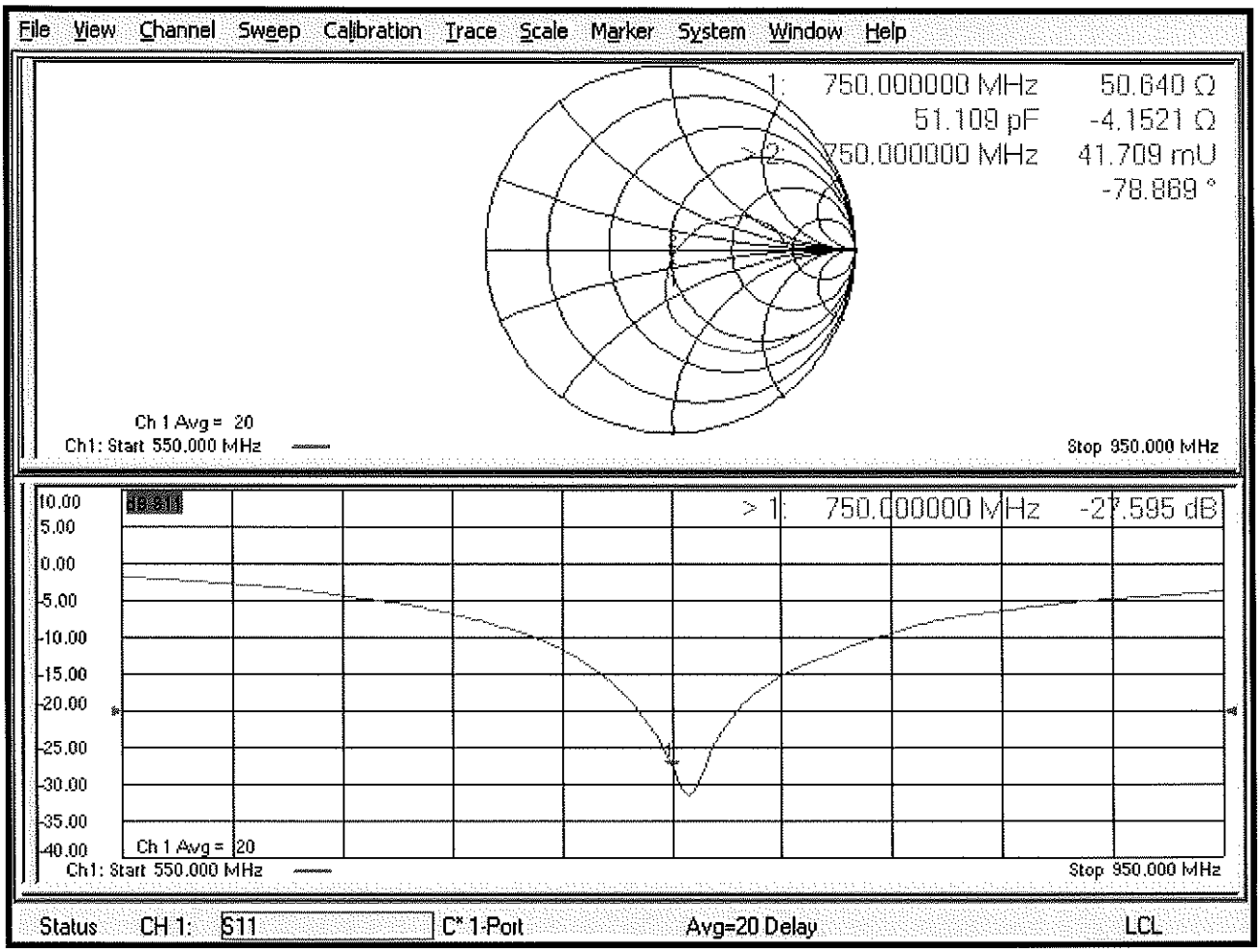
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.57 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.18 W/kg
SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.39 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



Calibration Laboratory of
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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **PC Test** **Certificate No: D835V2-4d132_Jan19**

CALIBRATION CERTIFICATE

Object D835V2 - SN:4d132

Calibration procedure(s) QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

BN ✓ 02/06/2019

Calibration date: January 22, 2019

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	31-Dec-18 (No. EX3-7349_Dec18)	Dec-19
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 22, 2019

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5.0 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.3 ± 6 %	0.92 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.59 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 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	**6.23 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.6 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.46 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.67 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.61 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.35 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.6 Ω - 3.6 jΩ
Return Loss	- 28.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.4 Ω - 6.2 jΩ
Return Loss	- 23.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.387 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

Appendix (Additional assessments outside the scope of SCS 0108)

Measurement Conditions

DASY system configuration, as far as not given on page 1 and 3.

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L

SAR result with SAM Head (Top)

SAR averaged over 1 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	**9.38 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.57 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.26 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Mouth)

SAR averaged over 1 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	**9.86 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.65 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.58 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Neck)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.42 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.60 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.38 W/kg ± 16.9 % (k=2)**

SAR result with SAM Head (Ear)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.02 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.06 W/kg ± 17.5 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.42 W/kg ± 16.9 % (k=2)**

DASY5 Validation Report for Head TSL

Date: 17.01.2019

Test Laboratory: SPEAG, Zurich, Switzerland

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

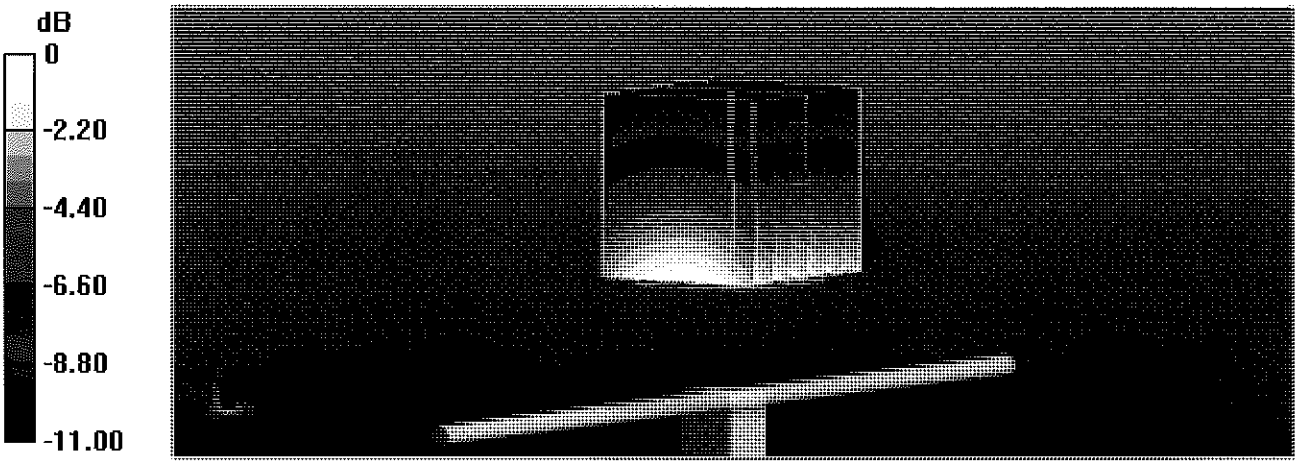
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.92 S/m; ε_r = 41.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10, 10, 10) @ 835 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

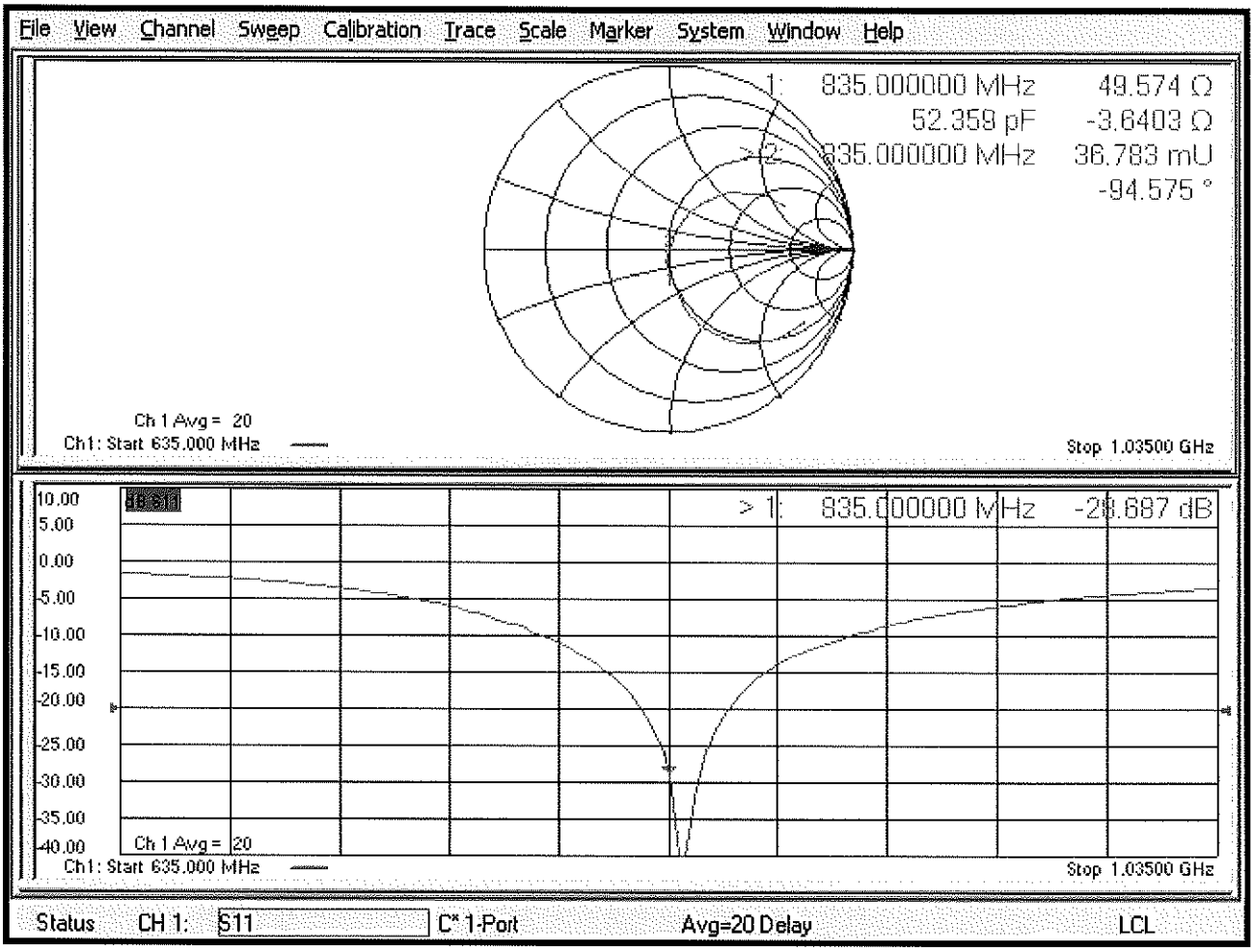
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 34.24 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 3.73 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.58 W/kg
Maximum value of SAR (measured) = 3.28 W/kg



0 dB = 3.28 W/kg = 5.16 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 17.01.2019

Test Laboratory: SPEAG, Zurich, Switzerland

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

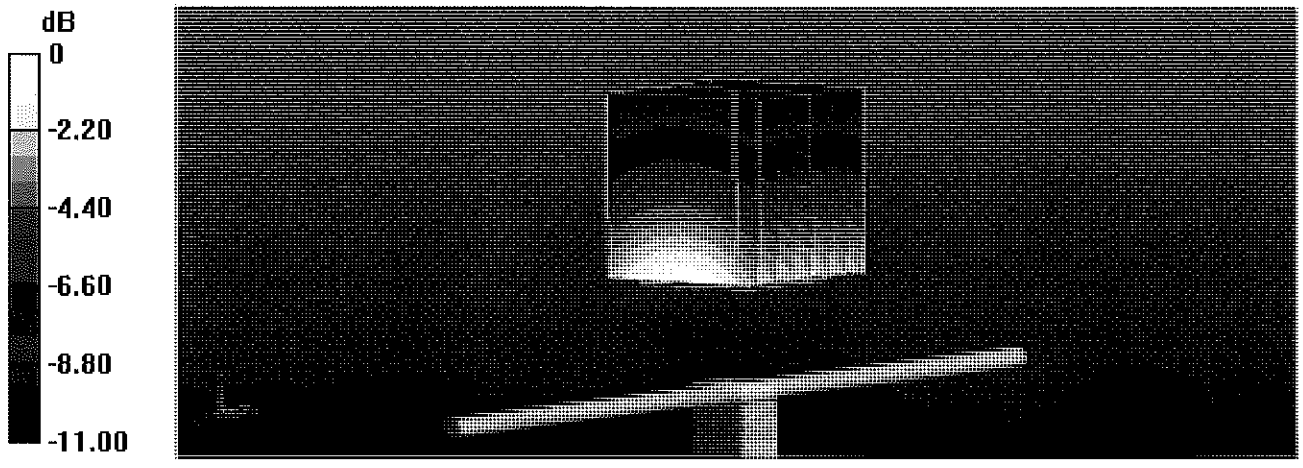
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.99 S/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.15, 10.15, 10.15) @ 835 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

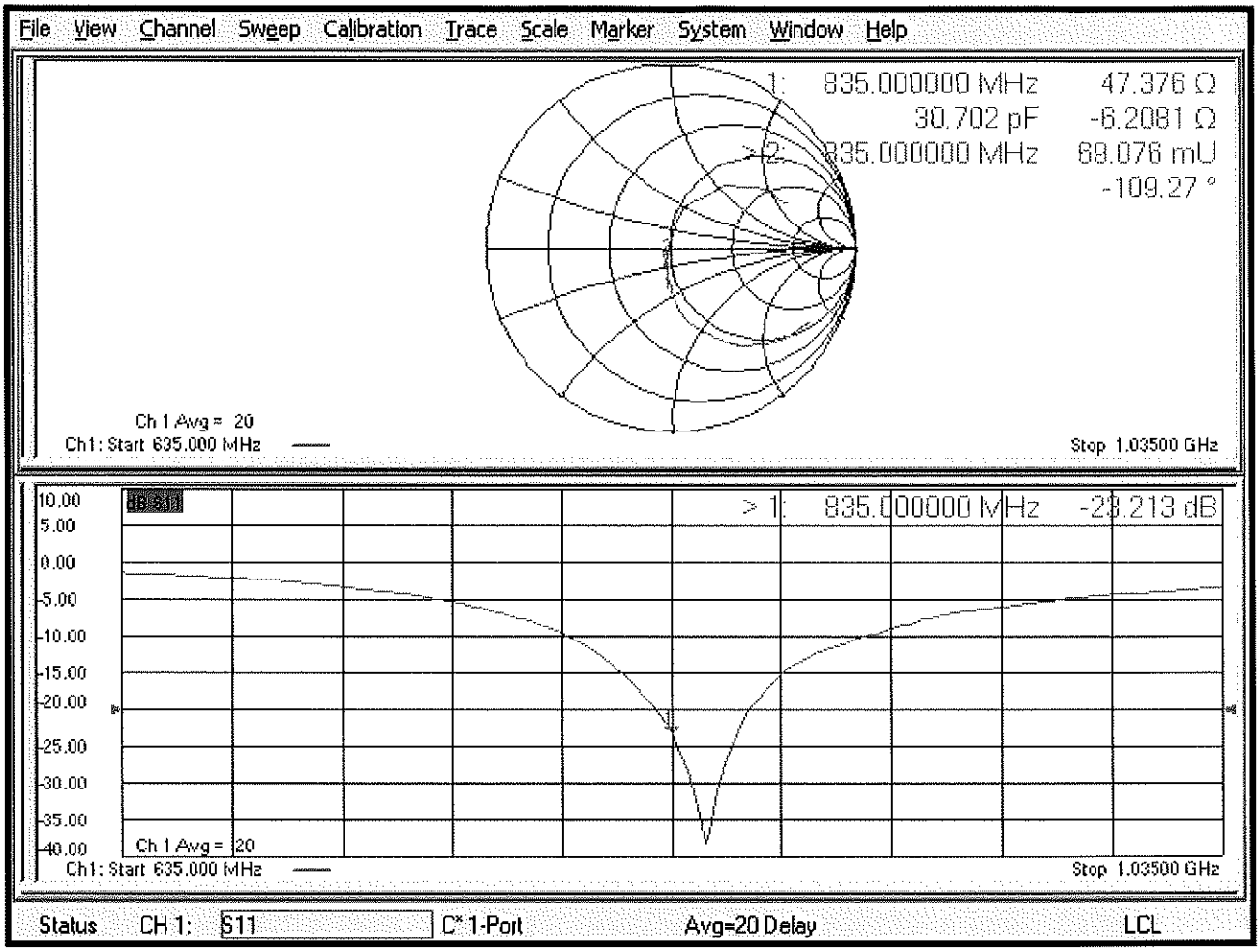
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 63.32 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 3.64 W/kg
SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.61 W/kg
Maximum value of SAR (measured) = 3.26 W/kg



0 dB = 3.26 W/kg = 5.13 dBW/kg

Impedance Measurement Plot for Body TSL



DASY5 Validation Report for SAM Head

Date: 22.01.2019

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.92 S/m; ε_r = 44.4; ρ = 1000 kg/m^3
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

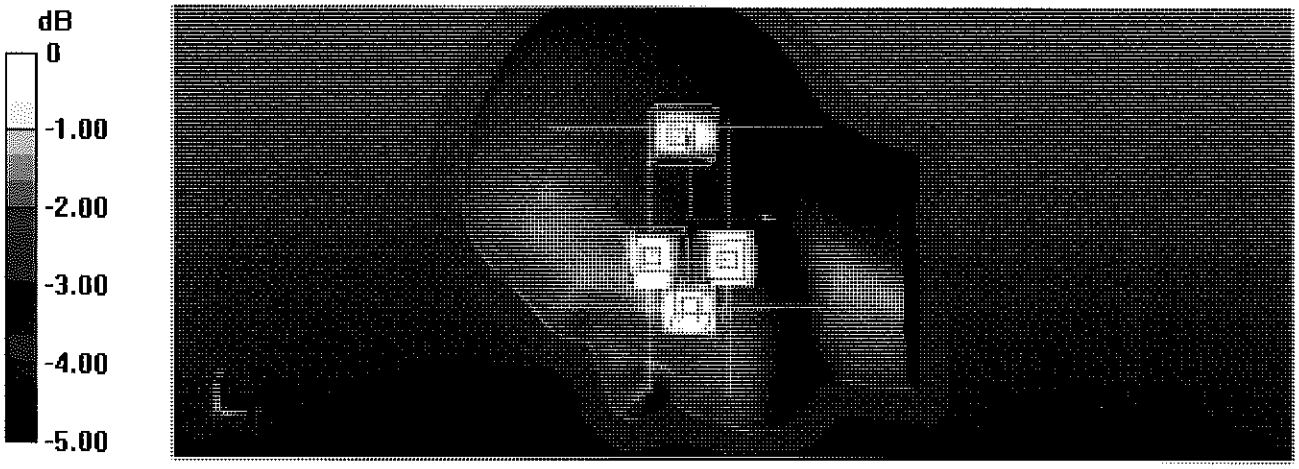
- Probe: EX3DV4 - SN7349; ConvF(10, 10, 10) @ 835 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: SAM Head
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

SAM/Head/Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.32 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.51 W/kg
SAR(1 g) = 2.35 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 3.12 W/kg

SAM/Head/Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 62.25 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.67 W/kg
SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.65 W/kg
Maximum value of SAR (measured) = 3.24 W/kg

SAM/Head/Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.69 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 3.43 W/kg
SAR(1 g) = 2.36 W/kg; SAR(10 g) = 1.6 W/kg
Maximum value of SAR (measured) = 3.08 W/kg

SAM/Head/Ear/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.79 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.94 W/kg
SAR(1 g) = 2.02 W/kg; SAR(10 g) = 1.36 W/kg
Maximum value of SAR (measured) = 2.62 W/kg



0 dB = 2.62 W/kg = 4.18 dBW/kg

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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_Oct18

CALIBRATION CERTIFICATE

Object: D835V2 - SN:4d133

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

BN ✓
10/30/2018

Calibration date: October 19, 2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Manu Seitz	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 22, 2018

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.6 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 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	**9.43 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	54.9 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.46 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.75 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.61 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.40 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.6 Ω - 2.4 jΩ
Return Loss	- 32.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.0 Ω - 6.7 jΩ
Return Loss	- 21.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.397 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 22, 2011

DASY5 Validation Report for Head TSL

Date: 19.10.2018

Test Laboratory: The name of your organization

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

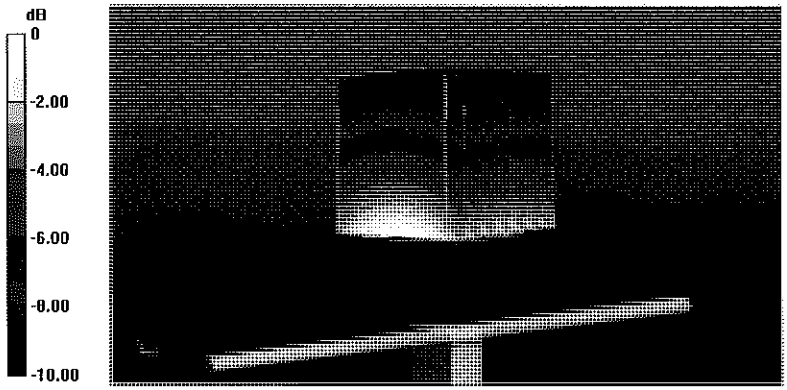
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.91 S/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.9, 9.9, 9.9) @ 835 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 63.02 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.68 W/kg
SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.54 W/kg
Maximum value of SAR (measured) = 3.24 W/kg



0 dB = 3.24 W/kg = 5.11 dBW/kg

Impedance Measurement Plot for Head TSL