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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:
04/21/19 - 05/02/19
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M1904090058-01-R2.ZNF

FCC ID: **ZNFX420AS8**

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

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model: LM-X420AS8
Additional Model(s): LMX420AS8, X420AS8, LM-X420CS, LMX420CS, X420CS

Equipment Class	Band & Mode	Tx Frequency	SAR			
			1g Head (W/kg)	1g Body-Worn (W/kg)	1g Hotspot (W/kg)	10g Phablet (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.44	0.50	0.50	N/A
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	0.25	0.40	0.40	N/A
PCE	UMTS 850	826.40 - 846.60 MHz	0.38	0.47	0.53	N/A
PCE	UMTS 1750	1712.4 - 1752.6 MHz	0.48	0.86	0.86	2.62
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.49	0.89	0.89	2.71
PCE	LTE Band 12	699.7 - 715.3 MHz	0.31	0.53	0.53	N/A
PCE	LTE Band 14	790.5 - 795.5 MHz	0.26	0.35	0.43	N/A
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.36	0.42	0.43	N/A
PCE	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.44	0.99	0.99	3.20
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	0.46	0.81	0.81	3.14
PCE	LTE Band 30	2307.5 - 2312.5 MHz	0.26	0.66	0.80	1.80
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.77	0.16	0.16	N/A
DSS/DTS	Bluetooth	2402 - 2480 MHz	0.20	N/A	N/A	N/A
Simultaneous SAR per KDB 690783 D01v01r03:			1.26	1.20	1.20	3.37

Note: This revised Test Report (S/N: 1M1904090058-01-R2.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.

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 1.7 of this report; for North American frequency bands only.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.

Randy Ortanez
President

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

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 14	Voice/Data	790.5 - 795.5 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 30	Voice/Data	2307.5 - 2312.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2462 MHz
Bluetooth	Data	2402 - 2480 MHz

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.

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*	*1 TX Slots*	*2 TX Slots*
GSM/GPRS/EDGE 850	Maximum	**32.7**	**32.7**	**30.7**	**27.2**	**25.7**
	Nominal	**32.2**	**32.2**	**30.2**	**26.7**	**25.2**
GSM/GPRS/EDGE 1900	Maximum	**29.7**	**29.7**	**28.2**	**26.7**	**24.7**
	Nominal	**29.2**	**29.2**	**27.7**	**26.2**	**24.2**

Mode / Band		Modulated Average (dBm)
		3GPP WCDMA
UMTS Band 5 (850 MHz)	Maximum	**25.2**
	Nominal	**24.7**
UMTS Band 4 (1750 MHz)	Maximum	**24.2**
	Nominal	**23.7**
UMTS Band 2 (1900 MHz)	Maximum	**24.4**
	Nominal	**23.9**

UMTS Band 5		Modulated Average (dBm)	
		Nominal	Maximum
HSDPA	Subtest 1	**23.7**	**24.2**
	Subtest 2	**23.7**	**24.2**
	Subtest 3	**23.2**	**23.7**
	Subtest 4	**23.2**	**23.7**
HSUPA	Subtest 1	**21.7**	**22.2**
	Subtest 2	**21.7**	**22.2**
	Subtest 3	**22.7**	**23.2**
	Subtest 4	**21.2**	**21.7**
	Subtest 5	**22.7**	**23.2**

UMTS Band 4		Modulated Average (dBm)	
		Nominal	Maximum
HSDPA	Subtest 1	**22.7**	**23.2**
	Subtest 2	**22.7**	**23.2**
	Subtest 3	**22.2**	**22.7**
	Subtest 4	**22.2**	**22.7**
HSUPA	Subtest 1	**20.7**	**21.2**
	Subtest 2	**20.7**	**21.2**
	Subtest 3	**21.7**	**22.2**
	Subtest 4	**20.2**	**20.7**
	Subtest 5	**21.7**	**22.2**

UMTS Band 2		Modulated Average (dBm)	
		Nominal	Maximum
HSDPA	Subtest 1	**22.9**	**23.4**
	Subtest 2	**22.9**	**23.4**
	Subtest 3	**22.4**	**22.9**
	Subtest 4	**22.4**	**22.9**
HSUPA	Subtest 1	**20.9**	**21.4**
	Subtest 2	**20.9**	**21.4**
	Subtest 3	**21.9**	**22.4**
	Subtest 4	**20.4**	**20.9**
	Subtest 5	**21.9**	**22.4**

Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	**25.2**
	Nominal	**24.7**
LTE Band 14	Maximum	**23.2**
	Nominal	**22.7**
LTE Band 5 (Cell)	Maximum	**25.2**
	Nominal	**24.7**
LTE Band 66 (AWS)	Maximum	**24.4**
	Nominal	**23.9**
LTE Band 4 (AWS)	Maximum	**24.4**
	Nominal	**23.9**
LTE Band 2 (PCS)	Maximum	**24.4**
	Nominal	**23.9**
LTE Band 30	Maximum	**23.7**
	Nominal	**23.2**

Mode / Band		Modulated Average - Single Tx Chain (dBm)		
	Channel	1	2 - 10	11
IEEE 802.11b (2.4 GHz)	Maximum	**15.0**	**15.0**	**15.0**
	Nominal	**14.0**	**14.0**	**14.0**
IEEE 802.11g (2.4 GHz)	Maximum	**12.5**	**14.5**	**12.5**
	Nominal	**11.5**	**13.5**	**11.5**
IEEE 802.11n (2.4 GHz)	Maximum	**12.5**	**13.5**	**12.5**
	Nominal	**11.5**	**12.5**	**11.5**

Mode / Band		Modulated Average (dBm)
Bluetooth	Maximum	**10.0**
	Nominal	**9.0**
Bluetooth LE	Maximum	**-0.5**
	Nominal	**-1.5**

1.3.1 Reduced Output Power

Mode / Band		Modulated Average (dBm)
		3GPP WCDMA
UMTS Band 4 (1750 MHz)	Maximum	**22.7**
	Nominal	**22.2**
UMTS Band 2 (1900 MHz)	Maximum	**22.9**
	Nominal	**22.4**

UMTS Band 4		Modulated Average (dBm)	
		Nominal	Maximum
HSDPA	Subtest 1	**22.2**	**22.7**
	Subtest 2	**22.2**	**22.7**
	Subtest 3	**22.2**	**22.7**
	Subtest 4	**22.2**	**22.7**
HSUPA	Subtest 1	**20.7**	**21.2**
	Subtest 2	**20.7**	**21.2**
	Subtest 3	**21.7**	**22.2**
	Subtest 4	**20.2**	**20.7**
	Subtest 5	**21.7**	**22.2**

UMTS Band 2		Modulated Average (dBm)	
		Nominal	Maximum
HSDPA	Subtest 1	**22.4**	**22.9**
	Subtest 2	**22.4**	**22.9**
	Subtest 3	**22.4**	**22.9**
	Subtest 4	**22.4**	**22.9**
HSUPA	Subtest 1	**20.9**	**21.4**
	Subtest 2	**20.9**	**21.4**
	Subtest 3	**21.9**	**22.4**
	Subtest 4	**20.4**	**20.9**
	Subtest 5	**21.9**	**22.4**

Mode / Band		Modulated Average (dBm)
LTE Band 66 (AWS)	Maximum	**22.9**
	Nominal	**22.4**
LTE Band 4 (AWS)	Maximum	**22.9**
	Nominal	**22.4**
LTE Band 2 (PCS)	Maximum	**22.9**
	Nominal	**22.4**
LTE Band 30	Maximum	**22.2**
	Nominal	**21.7**

1.4 DUT Antenna Locations

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

Table 1-1
Device Edges/Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850	Yes	Yes	No	Yes	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	No	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	Yes
UMTS 1750	Yes	Yes	No	Yes	No	Yes
UMTS 1900	Yes	Yes	No	Yes	No	Yes
LTE Band 12	Yes	Yes	No	Yes	Yes	Yes
LTE Band 14	Yes	Yes	No	Yes	Yes	Yes
LTE Band 5 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 66 (AWS)	Yes	Yes	No	Yes	No	Yes
LTE Band 2 (PCS)	Yes	Yes	No	Yes	No	Yes
LTE Band 30	Yes	Yes	No	Yes	Yes	Yes
2.4 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.

1.5 Simultaneous Transmission Capabilities

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

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

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Phablet	Notes
1	GSM voice + 2.4 GHz WI-FI	Yes	Yes	N/A	Yes	
2	GSM voice + 2.4 GHz Bluetooth	Yes^	Yes	N/A	Yes	^ Bluetooth Tethering is considered
3	UMTS + 2.4 GHz WI-FI	Yes	Yes	Yes	Yes	
4	UMTS + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
5	LTE + 2.4 GHz WI-FI	Yes	Yes	Yes	Yes	
6	LTE + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
7	GPRS/EDGE + 2.4 GHz WI-FI	Yes*	Yes*	Yes	Yes	* Pre-installed VOIP applications are considered
8	GPRS/EDGE + 2.4 GHz Bluetooth	Yes*^	Yes*	Yes^	Yes	* Pre-installed VOIP applications are considered ^ Bluetooth Tethering is considered

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

1.6 Miscellaneous SAR Test Considerations

(A) WIFI/BT

Per FCC KDB 447498 D01v06, the 1g SAR exclusion threshold for distances <50mm is defined by the following equation:

$$\frac{Max\ Power\ of\ Channel\ (mW)}{Test\ Separation\ Dist\ (mm)} * \sqrt{Frequency(GHz)} \leq 3.0$$

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, body Bluetooth SAR was not required; [(10/10)* √2.480] = 1.6< 3.0. Per KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.

Per FCC KDB 447498 D01v06, the 10g SAR exclusion threshold for distances <50mm is defined by the following equation:

$$\frac{Max\ Power\ of\ Channel\ (mW)}{Test\ Separation\ Dist\ (mm)} * \sqrt{Frequency(GHz)} \leq 7.5$$

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, phablet Bluetooth SAR was not required; [(10/ 5)* √2.480] = 3.1< 7.5. Per KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.

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. Phablet SAR was not evaluated for 2.4 GHz WLAN operations since wireless router 1g SAR was < 1.2 W/kg.

(B) Licensed Transmitter(s)

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

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

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

This device supports LTE Carrier Aggregation (CA) in the downlink only. All uplink communications are identical to Release 8 specifications. Per FCC KDB Publication 941225 D05A v01r02, SAR for LTE CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive. The downlink carrier aggregation exclusion analysis can be found in Appendix H.

Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg.

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.

1.7 Guidance Applied

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

1.8 Device Serial Numbers

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

2 LTE INFORMATION

LTE Information			
Form Factor	Portable Handset		
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)		
	LTE Band 14 (790.5 - 795.5 MHz)		
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)		
	LTE Band 66 (AWS) (1710.7 - 1779.3 MHz)		
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)		
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)		
	LTE Band 30 (2307.5 - 2312.5 MHz)		
Channel Bandwidths	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz		
	LTE Band 14: 5 MHz, 10 MHz		
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz		
	LTE Band 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz		
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz		
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz		
	LTE Band 30: 5 MHz, 10 MHz		
Channel Numbers and Frequencies (MHz)	Low	Mid	High
LTE Band 12: 1.4 MHz	699.7 (23017)	707.5 (23095)	715.3 (23173)
LTE Band 12: 3 MHz	700.5 (23025)	707.5 (23095)	714.5 (23165)
LTE Band 12: 5 MHz	701.5 (23035)	707.5 (23095)	713.5 (23155)
LTE Band 12: 10 MHz	704 (23060)	707.5 (23095)	711 (23130)
LTE Band 14: 5 MHz	790.5 (23305)	793 (23330)	795.5 (23355)
LTE Band 14: 10 MHz	N/A	793 (23330)	N/A
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)	836.5 (20525)	848.3 (20643)
LTE Band 5 (Cell): 3 MHz	825.5 (20415)	836.5 (20525)	847.5 (20635)
LTE Band 5 (Cell): 5 MHz	826.5 (20425)	836.5 (20525)	846.5 (20625)
LTE Band 5 (Cell): 10 MHz	829 (20450)	836.5 (20525)	844 (20600)
LTE Band 66 (AWS): 1.4 MHz	1710.7 (131979)	1745 (132322)	1779.3 (132665)
LTE Band 66 (AWS): 3 MHz	1711.5 (131987)	1745 (132322)	1778.5 (132657)
LTE Band 66 (AWS): 5 MHz	1712.5 (131997)	1745 (132322)	1777.5 (132647)
LTE Band 66 (AWS): 10 MHz	1715 (132022)	1745 (132322)	1775 (132622)
LTE Band 66 (AWS): 15 MHz	1717.5 (132047)	1745 (132322)	1772.5 (132597)
LTE Band 66 (AWS): 20 MHz	1720 (132072)	1745 (132322)	1770 (132572)
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)	1732.5 (20175)	1754.3 (20393)
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)	1732.5 (20175)	1753.5 (20385)
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)	1732.5 (20175)	1752.5 (20375)
LTE Band 4 (AWS): 10 MHz	1715 (20000)	1732.5 (20175)	1750 (20350)
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)	1732.5 (20175)	1747.5 (20325)
LTE Band 4 (AWS): 20 MHz	1720 (20050)	1732.5 (20175)	1745 (20300)
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)	1880 (18900)	1909.3 (19193)
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)	1880 (18900)	1908.5 (19185)
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)	1880 (18900)	1907.5 (19175)
LTE Band 2 (PCS): 10 MHz	1855 (18650)	1880 (18900)	1905 (19150)
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)	1880 (18900)	1902.5 (19125)
LTE Band 2 (PCS): 20 MHz	1860 (18700)	1880 (18900)	1900 (19100)
LTE Band 30: 5 MHz	2307.5 (27685)	2310 (27710)	2312.5 (27735)
LTE Band 30: 10 MHz	N/A	2310 (27710)	N/A
UE Category	6		
Modulations Supported in UL	QPSK, 16QAM		
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 11. It supports carrier aggregation features as shown in Appendix H. All other uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 11 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:

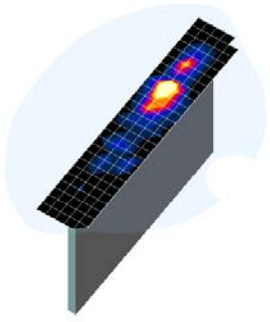


Figure 4-1
Sample SAR Area Scan

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].

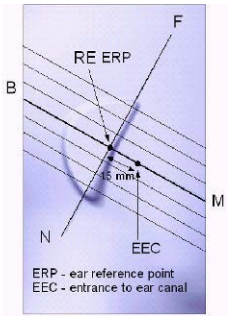


Figure 5-1
Close-Up Side view of ERP

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.

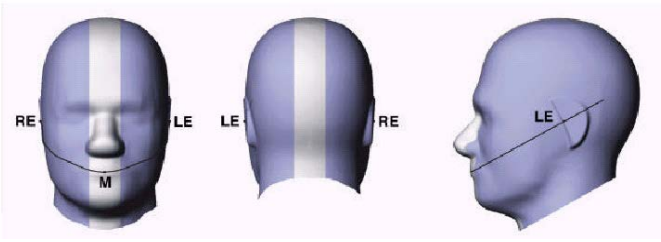


Figure 5-2
Front, back and side view of SAM Twin Phantom

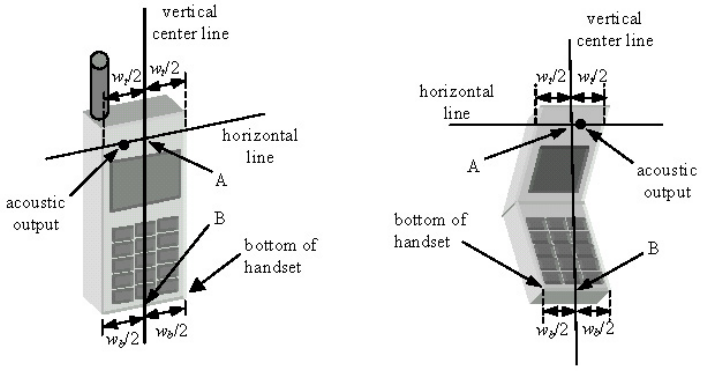


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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).

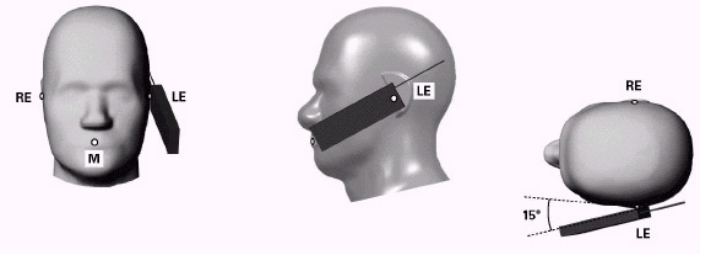


Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

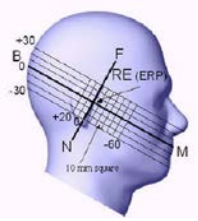


Figure 6-3
Side view w/ relevant markings

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.

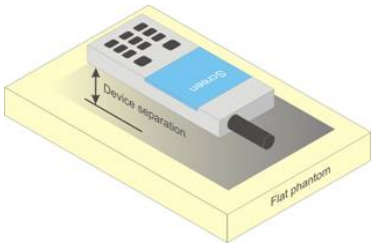


Figure 6-4
Sample Body-Worn Diagram

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 Configurations

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

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

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

7 RF EXPOSURE LIMITS

7.1 Uncontrolled Environment

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

7.2 Controlled Environment

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

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

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

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

8 FCC MEASUREMENT PROCEDURES

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

8.1 Measured and Reported SAR

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

8.2 3G SAR Test Reduction Procedure

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

8.3 Procedures Used to Establish RF Signal for SAR

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

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

8.4 SAR Measurement Conditions for UMTS

8.4.1 Output Power Verification

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

8.4.2 Head SAR Measurements

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

8.4.3 Body SAR Measurements

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

8.4.4 SAR Measurements with Rel 5 HSDPA

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

8.4.5 SAR Measurements with Rel 6 HSUPA

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

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

8.5 SAR Measurement Conditions for LTE

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

8.5.1 Spectrum Plots for RB Configurations

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

8.5.2 MPR

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

8.5.3 A-MPR

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

8.5.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r04:

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

8.5.5 Downlink Only Carrier Aggregation

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

8.6 SAR Testing with 802.11 Transmitters

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

8.6.1 General Device Setup

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

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

8.6.2 Initial Test Position Procedure

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

8.6.3 2.4 GHz SAR Test Requirements

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

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

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

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

8.6.4 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, 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11g then 802.11n, is used for SAR measurement. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

8.6.5 Initial Test Configuration Procedure

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

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements (See Section 8.6.4). When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.6 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 GSM Conducted Powers

Table 9-1
Maximum Conducted Power

Maximum Burst-Averaged Output Power						
		Voice	*GPRS/EDGE Data (GMSK)*		*EDGE Data (8-PSK)*	
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 850	128	32.49	32.50	**30.56**	27.16	25.59
	190	32.48	32.49	**30.55**	27.10	25.64
	251	32.45	32.47	**30.54**	27.12	25.62
GSM 1900	512	29.70	29.70	**28.19**	26.70	24.63
	661	29.58	29.68	**28.20**	26.67	24.70
	810	29.58	29.46	**27.97**	26.69	24.69

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**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 850	128	23.46	23.47	**24.54**	18.13	19.57
	190	23.45	23.46	**24.53**	18.07	19.62
	251	23.42	23.44	**24.52**	18.09	19.60
GSM 1900	512	20.67	20.67	**22.17**	17.67	18.61
	661	20.55	20.65	**22.18**	17.64	18.68
	810	20.55	20.43	**21.95**	17.66	18.67

GSM 850	**Frame Avg.Targets:**	23.17	23.17	**24.18**	17.67	19.18
GSM 1900		20.17	20.17	**21.68**	17.17	18.18

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: 10 (Max 2 Tx uplink slots)
EDGE Multislot class: 10 (Max 2 Tx uplink slots)
DTM Multislot Class: N/A

Figure 9-1
Power Measurement Setup

9.2 UMTS Conducted Powers

Table 9-2
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	25.18	25.12	25.14	24.14	24.14	24.06	24.28	24.15	24.12	-
99		12.2 kbps AMR	25.20	25.13	25.16	24.18	24.12	24.06	24.23	24.21	24.11	-
6	HSDPA	Subtest 1	24.10	24.05	24.09	23.19	23.12	23.11	23.04	23.02	23.06	0
6		Subtest 2	24.07	23.99	24.05	23.17	23.10	23.06	22.98	22.97	22.92	0
6		Subtest 3	23.70	23.68	23.68	22.66	22.63	22.60	22.50	22.45	22.49	0.5
6		Subtest 4	23.69	23.67	23.70	22.67	22.60	22.59	22.50	22.48	22.48	0.5
6	HSUPA	Subtest 1	22.20	22.19	22.17	21.10	21.05	21.03	20.94	20.93	20.94	0
6		Subtest 2	22.17	22.19	22.18	21.09	21.03	21.02	20.98	20.94	20.95	2
6		Subtest 3	23.06	23.00	23.05	22.10	22.04	22.02	21.95	21.93	21.96	1
6		Subtest 4	21.69	21.70	21.67	20.61	20.62	20.55	20.45	20.50	20.45	2
6		Subtest 5	23.07	23.03	23.03	21.81	21.77	21.72	21.62	21.60	21.67	0

Table 9-3
Reduced Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	22.51	22.55	22.51	22.63	22.65	22.58	-
99		12.2 kbps AMR	22.59	22.49	22.41	22.61	22.59	22.57	-
6	HSDPA	Subtest 1	22.64	22.66	22.63	22.80	22.78	22.67	0
6		Subtest 2	22.68	22.63	22.55	22.75	22.74	22.62	0
6		Subtest 3	22.12	21.99	21.96	22.23	22.24	22.18	0.5
6		Subtest 4	22.16	22.12	22.04	22.24	22.20	22.15	0.5
6	HSUPA	Subtest 1	21.10	21.05	21.03	20.94	20.93	20.94	0
6		Subtest 2	21.09	21.03	21.02	20.98	20.94	20.95	2
6		Subtest 3	22.10	22.04	22.02	21.95	21.93	21.96	1
6		Subtest 4	20.61	20.62	20.55	20.45	20.50	20.45	2
6		Subtest 5	21.81	21.77	21.72	21.62	21.60	21.67	0

Note: It is expected by the manufacturer that MPR for some HSUPA subtests may deviate from the expected MPR targets specified by 3GPP.

This device does not support DC-HSDPA.

Figure 9-2
Power Measurement Setup

9.3 LTE Conducted Powers

9.3.1 LTE Band 12

Table 9-4
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	25.01	0	0
	1	25	25.05		0
	1	49	**25.13**		0
	25	0	**24.20**	0-1	1
	25	12	24.19		1
	25	25	24.15		1
	50	0	24.10		1
16QAM	1	0	24.20	0-1	1
	1	25	24.09		1
	1	49	24.10		1
	25	0	23.00	0-2	2
	25	12	23.05		2
	25	25	22.99		2
	50	0	22.97		2

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 9-5
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	24.65	24.75	24.75	0	0
	1	12	24.86	24.97	24.97		0
	1	24	24.62	24.73	24.67		0
	12	0	23.78	23.74	23.81	0-1	1
	12	6	23.82	23.82	23.83		1
	12	13	23.83	23.69	23.73		1
	25	0	23.81	23.70	23.75		1
16QAM	1	0	23.85	24.00	23.72	0-1	1
	1	12	24.13	24.15	24.00		1
	1	24	23.90	23.86	23.75		1
	12	0	22.75	22.91	22.77	0-2	2
	12	6	22.83	22.93	22.81		2
	12	13	22.85	22.82	22.72		2
	25	0	22.85	22.67	22.80		2

Table 9-6
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	24.83	24.75	24.78	0	0
	1	7	24.92	24.86	24.88		0
	1	14	24.76	24.74	24.72		0
	8	0	23.80	23.80	23.80	0-1	1
	8	4	23.86	23.82	23.82		1
	8	7	23.81	23.78	23.74		1
	15	0	23.80	23.74	23.78		1
16QAM	1	0	24.15	24.05	24.19	0-1	1
	1	7	24.20	24.10	24.18		1
	1	14	24.16	23.91	24.15		1
	8	0	22.90	22.87	22.94	0-2	2
	8	4	22.96	22.88	22.95		2
	8	7	22.91	22.81	22.89		2
	15	0	22.87	22.80	22.89		2

Table 9-7
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	24.70	24.69	24.82	0	0
	1	2	24.84	24.84	24.92		0
	1	5	24.74	24.71	24.76		0
	3	0	24.79	24.72	24.88		0
	3	2	24.85	24.80	24.90		0
	3	3	24.84	24.75	24.88		0
	6	0	23.82	23.84	23.72	0-1	1
16QAM	1	0	23.78	23.90	23.95	0-1	1
	1	2	23.88	24.02	24.00		1
	1	5	23.80	23.90	23.97		1
	3	0	23.83	23.75	24.00		1
	3	2	23.88	23.71	24.02		1
	3	3	23.90	23.68	24.03		1
	6	0	22.75	22.78	22.92	0-2	2

9.3.2 LTE Band 14

Table 9-8
LTE Band 14 Conducted Powers - 10 MHz Bandwidth

LTE Band 14 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23330 (793.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	23.09	0	0
	1	25	**23.20**		0
	1	49	23.15		0
	25	0	**22.20**	0-1	1
	25	12	22.19		1
	25	25	22.18		1
	50	0	22.16		1
16QAM	1	0	22.10	0-1	1
	1	25	22.20		1
	1	49	22.18		1
	25	0	21.20	0-2	2
	25	12	21.19		2
	25	25	21.18		2
	50	0	21.20		2

Table 9-9
LTE Band 14 Conducted Powers - 5 MHz Bandwidth

LTE Band 14 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23330 (793.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	22.89	0	0
	1	12	23.10		0
	1	24	22.79		0
	12	0	21.94	0-1	1
	12	6	21.97		1
	12	13	21.95		1
	25	0	21.92		1
16QAM	1	0	21.95	0-1	1
	1	12	22.17		1
	1	24	21.94		1
	12	0	20.95	0-2	2
	12	6	20.98		2
	12	13	20.96		2
	25	0	21.03		2

Note: LTE Band 14 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

9.3.3 LTE Band 5 (Cell)

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

LTE Band 5 (Cell) 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20525 (836.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	25.16	0	0
	1	25	**25.19**		0
	1	49	24.98		0
	25	0	**24.20**	0-1	1
	25	12	24.19		1
	25	25	24.18		1
	50	0	24.19		1
16QAM	1	0	24.11	0-1	1
	1	25	24.20		1
	1	49	24.12		1
	25	0	23.18	0-2	2
	25	12	23.19		2
	25	25	23.20		2
	50	0	23.18		2

Note: LTE Band 5 (Cell) at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 9-11
LTE Band 5 (Cell) Conducted Powers - 5 MHz Bandwidth

LTE Band 5 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20425 (826.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20625 (846.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.84	24.86	24.75	0	0
	1	12	25.06	25.05	24.95		0
	1	24	24.83	24.82	24.79		0
	12	0	23.90	23.91	23.90	0-1	1
	12	6	23.93	23.95	23.88		1
	12	13	23.85	23.88	23.80		1
	25	0	23.90	23.90	23.83		1
16QAM	1	0	23.77	24.10	23.88	0-1	1
	1	12	24.00	24.17	24.02		1
	1	24	23.85	24.02	23.82		1
	12	0	22.82	23.05	22.82	0-2	2
	12	6	22.87	23.08	22.82		2
	12	13	22.81	23.02	22.74		2
	25	0	22.87	22.88	22.82		2

Table 9-12
LTE Band 5 (Cell) Conducted Powers - 3 MHz Bandwidth

LTE Band 5 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20415 (825.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20635 (847.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.89	24.86	24.81	0	0
	1	7	24.98	24.97	24.91		0
	1	14	24.86	24.87	24.89		0
	8	0	23.87	23.87	23.87	0-1	1
	8	4	23.95	23.89	23.92		1
	8	7	23.87	23.85	23.86		1
	15	0	23.84	23.90	23.87		1
16QAM	1	0	24.12	23.95	23.70	0-1	1
	1	7	24.15	24.06	23.76		1
	1	14	24.11	23.90	23.58		1
	8	0	22.96	22.88	22.80	0-2	2
	8	4	23.00	22.92	22.88		2
	8	7	22.95	22.85	22.80		2
	15	0	22.88	22.80	22.76		2

Table 9-13
LTE Band 5 (Cell) Conducted Powers -1.4 MHz Bandwidth

LTE Band 5 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20407 (824.7 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20643 (848.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.78	24.93	24.80	0	0
	1	2	24.88	25.02	24.97		0
	1	5	24.80	24.92	24.88		0
	3	0	24.92	24.99	24.88		0
	3	2	24.95	25.01	24.92		0
	3	3	24.91	24.95	24.87		0
	6	0	23.80	23.80	23.81	0-1	1
16QAM	1	0	24.00	24.04	23.74	0-1	1
	1	2	24.07	24.10	23.85		1
	1	5	24.05	24.04	23.74		1
	3	0	23.80	24.04	23.81		1
	3	2	23.81	24.03	23.86		1
	3	3	23.77	24.01	23.85		1
	6	0	22.89	23.01	22.80	0-2	2

9.3.4 LTE Band 66 (AWS)

Table 9-14
LTE Band 66 (AWS) Conducted Powers - 20 MHz Bandwidth

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132072 (1720.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132572 (1770.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.16	24.10	24.05	0	0
	1	50	24.34	**24.36**	24.18		0
	1	99	24.09	24.04	24.21		0
	50	0	23.27	23.35	23.38	0-1	1
	50	25	23.33	23.34	23.26		1
	50	50	23.39	**23.40**	23.23		1
	100	0	23.34	23.37	23.31		1
16QAM	1	0	22.83	22.87	22.83	0-1	1
	1	50	23.14	23.11	23.06		1
	1	99	22.86	22.81	22.87		1
	50	0	22.34	22.40	22.34	0-2	2
	50	25	22.39	22.40	22.34		2
	50	50	22.40	22.40	22.27		2
	100	0	22.37	22.39	22.35		2

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

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.27	24.30	24.20	0	0
	1	36	24.24	24.40	24.24		0
	1	74	24.19	24.33	24.19		0
	36	0	23.34	23.37	23.33	0-1	1
	36	18	23.33	23.30	23.33		1
	36	37	23.39	23.26	23.37		1
	75	0	23.37	23.30	23.30		1
16QAM	1	0	22.98	23.20	23.00	0-1	1
	1	36	23.02	23.21	23.08		1
	1	74	23.03	23.18	22.98		1
	36	0	22.31	22.38	22.37	0-2	2
	36	18	22.36	22.38	22.34		2
	36	37	22.38	22.35	22.37		2
	75	0	22.40	22.36	22.39		2

Table 9-16
LTE Band 66 (AWS) Conducted Powers - 10 MHz Bandwidth

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.25	24.33	24.30	0	0
	1	25	24.39	24.39	24.37		0
	1	49	24.35	24.25	24.33		0
	25	0	23.20	23.19	23.18	0-1	1
	25	12	23.20	23.21	23.20		1
	25	25	23.22	23.27	23.21		1
	50	0	23.23	23.25	23.22		1
16QAM	1	0	22.67	22.66	22.67	0-1	1
	1	25	22.73	22.80	22.82		1
	1	49	22.66	22.70	22.76		1
	25	0	22.28	22.26	22.25	0-2	2
	25	12	22.25	22.28	22.26		2
	25	25	22.32	22.37	22.33		2
	50	0	22.28	22.29	22.25		2

Table 9-17
LTE Band 66 (AWS) Conducted Powers - 5 MHz Bandwidth

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.20	24.08	24.03	0	0
	1	12	24.37	24.39	24.34		0
	1	24	24.12	24.07	24.14		0
	12	0	23.22	23.19	23.20	0-1	1
	12	6	23.25	23.26	23.29		1
	12	13	23.16	23.21	23.17		1
	25	0	23.10	23.19	23.17		1
16QAM	1	0	22.72	22.63	22.63	0-1	1
	1	12	23.37	23.36	23.39		1
	1	24	22.60	22.60	22.72		1
	12	0	22.24	22.24	22.25	0-2	2
	12	6	22.30	22.34	22.33		2
	12	13	22.20	22.27	22.28		2
	25	0	22.22	22.27	22.24		2

Table 9-18
LTE Band 66 (AWS) Conducted Powers - 3 MHz Bandwidth

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131987 (1711.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132657 (1778.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.35	24.29	24.27	0	0
	1	7	24.40	24.39	24.38		0
	1	14	24.37	24.25	24.31		0
	8	0	23.19	23.15	23.21	0-1	1
	8	4	23.21	23.17	23.22		1
	8	7	23.10	23.08	23.13		1
	15	0	23.16	23.12	23.17		1
16QAM	1	0	22.71	23.10	23.17	0-1	1
	1	7	23.15	23.21	23.34		1
	1	14	22.66	23.06	23.16		1
	8	0	22.22	22.08	22.16	0-2	2
	8	4	22.27	22.09	22.12		2
	8	7	22.16	22.02	22.08		2
	15	0	22.08	22.20	22.25		2

Table 9-19
LTE Band 66 (AWS) Conducted Powers -1.4 MHz Bandwidth

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131979 (1710.7 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132665 (1779.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.23	24.16	24.15	0	0
	1	2	24.37	24.25	24.25		0
	1	5	24.20	24.13	24.20		0
	3	0	24.25	24.23	24.25		0
	3	2	24.25	24.25	24.25		0
	3	3	24.25	24.20	24.20		0
	6	0	23.09	22.96	23.08	0-1	1
16QAM	1	0	22.65	22.72	22.74	0-1	1
	1	2	22.79	22.86	22.87		1
	1	5	22.65	22.75	22.75		1
	3	0	22.74	22.81	22.82		1
	3	2	22.83	22.86	22.90		1
	3	3	22.68	22.69	22.70		1
	6	0	22.25	22.30	22.31	0-2	2

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

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132072 (1720.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132572 (1770.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.63	22.60	22.64	0	0
	1	50	**22.85**	22.76	22.80		0
	1	99	22.66	22.63	22.62		0
	50	0	22.77	22.80	22.80	0-1	0
	50	25	22.80	22.81	22.78		0
	50	50	**22.86**	22.83	22.71		0
	100	0	22.83	22.84	22.80		0
16QAM	1	0	22.90	22.87	22.69	0-1	0
	1	50	22.85	22.90	22.90		0
	1	99	22.90	22.86	22.89		0
	50	0	22.35	22.40	22.40	0-2	0.5
	50	25	22.38	22.39	22.32		0.5
	50	50	22.40	22.40	22.26		0.5
	100	0	22.39	22.40	22.23		0.5

Table 9-21
LTE Band 66 (AWS) Reduced Conducted Powers - 15 MHz Bandwidth

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.51	22.48	22.50	0	0
	1	36	22.59	22.71	22.62		0
	1	74	22.44	22.59	22.54		0
	36	0	22.51	22.66	22.59	0-1	0
	36	18	22.55	22.63	22.54		0
	36	37	22.69	22.68	22.57		0
	75	0	22.59	22.63	22.51		0
16QAM	1	0	22.61	22.64	22.85	0-1	0
	1	36	22.87	22.71	22.89		0
	1	74	22.69	22.63	22.90		0
	36	0	22.16	22.08	22.05	0-2	0.5
	36	18	22.20	22.18	22.04		0.5
	36	37	22.22	22.23	22.13		0.5
	75	0	22.34	22.14	22.06		0.5

Table 9-22
LTE Band 66 (AWS) Reduced Conducted Powers - 10 MHz Bandwidth

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.50	22.53	22.47	0	0
	1	25	22.60	22.65	22.55		0
	1	49	22.53	22.53	22.48		0
	25	0	22.59	22.56	22.50	0-1	0
	25	12	22.56	22.57	22.50		0
	25	25	22.58	22.64	22.51		0
	50	0	22.62	22.64	22.56		0
16QAM	1	0	22.75	22.81	22.68	0-1	0
	1	25	22.88	22.90	22.82		0
	1	49	22.85	22.81	22.69		0
	25	0	22.16	22.12	22.10	0-2	0.5
	25	12	22.15	22.13	22.07		0.5
	25	25	22.18	22.21	22.07		0.5
	50	0	22.19	22.17	22.08		0.5

Table 9-23
LTE Band 66 (AWS) Reduced Conducted Powers - 5 MHz Bandwidth

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.41	22.44	22.34	0	0
	1	12	22.62	22.68	22.63		0
	1	24	22.37	22.40	22.37		0
	12	0	22.52	22.52	22.47	0-1	0
	12	6	22.55	22.58	22.54		0
	12	13	22.49	22.55	22.48		0
	25	0	22.53	22.53	22.48		0
16QAM	1	0	22.64	22.69	22.52	0-1	0
	1	12	22.88	22.84	22.90		0
	1	24	22.65	22.73	22.63		0
	12	0	22.06	22.09	22.05	0-2	0.5
	12	6	22.11	22.15	22.07		0.5
	12	13	22.07	22.12	22.06		0.5
	25	0	22.09	22.12	22.05		0.5

Table 9-24
LTE Band 66 (AWS) Reduced Conducted Powers - 3 MHz Bandwidth

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131987 (1711.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132657 (1778.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.50	22.51	22.42	0	0
	1	7	22.64	22.70	22.61		0
	1	14	22.46	22.50	22.42		0
	8	0	22.51	22.51	22.47	0-1	0
	8	4	22.54	22.55	22.51		0
	8	7	22.47	22.51	22.46		0
	15	0	22.50	22.49	22.44		0
16QAM	1	0	22.73	22.80	22.70	0-1	0
	1	7	22.86	22.90	22.87		0
	1	14	22.70	22.77	22.76		0
	8	0	22.13	22.15	22.10	0-2	0.5
	8	4	22.16	22.19	22.13		0.5
	8	7	22.10	22.14	22.09		0.5
	15	0	22.07	22.09	22.05		0.5

Table 9-25
LTE Band 66 (AWS) Reduced Conducted Powers -1.4 MHz Bandwidth

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131979 (1710.7 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132665 (1779.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.51	22.52	22.48	0	0
	1	2	22.65	22.65	22.61		0
	1	5	22.50	22.50	22.49		0
	3	0	22.59	22.59	22.56		0
	3	2	22.60	22.60	22.57		0
	3	3	22.62	22.60	22.53		0
	6	0	22.63	22.58	22.57	0-1	0
16QAM	1	0	22.77	22.86	22.73	0-1	0
	1	2	22.86	22.89	22.83		0
	1	5	22.70	22.82	22.74		0
	3	0	22.54	22.56	22.51		0
	3	2	22.56	22.62	22.54		0
	3	3	22.55	22.54	22.52		0
	6	0	22.23	22.25	22.21	0-2	0.5

9.3.5 LTE Band 2 (PCS)

Table 9-26
LTE Band 2 (PCS) Conducted Powers - 20 MHz Bandwidth

LTE Band 2 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18700 (1860.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19100 (1900.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.16	24.06	24.09	0	0
	1	50	**24.32**	24.25	24.27		0
	1	99	24.15	24.11	24.13		0
	50	0	23.30	23.39	23.24	0-1	1
	50	25	23.31	23.36	23.39		1
	50	50	**23.40**	23.36	23.17		1
	100	0	23.39	23.38	23.23		1
16QAM	1	0	22.79	22.77	23.03	0-1	1
	1	50	23.07	23.04	23.00		1
	1	99	23.00	22.84	22.82		1
	50	0	22.29	22.40	22.25	0-2	2
	50	25	22.40	22.35	22.37		2
	50	50	22.39	22.33	22.16		2
	100	0	22.38	22.33	22.22		2

Table 9-27
LTE Band 2 (PCS) Conducted Powers - 15 MHz Bandwidth

LTE Band 2 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18675 (1857.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19125 (1902.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.24	24.14	24.21	0	0
	1	36	24.28	24.28	24.37		0
	1	74	24.24	24.18	24.33		0
	36	0	23.25	23.32	23.25	0-1	1
	36	18	23.28	23.36	23.24		1
	36	37	23.21	23.39	23.25		1
	75	0	23.32	23.33	23.24		1
16QAM	1	0	23.36	23.30	22.93	0-1	1
	1	36	23.23	23.28	23.01		1
	1	74	23.29	23.27	22.94		1
	36	0	22.34	22.40	22.22	0-2	2
	36	18	22.34	22.34	22.22		2
	36	37	22.39	22.38	22.24		2
	75	0	22.31	22.30	22.24		2

Table 9-28
LTE Band 2 (PCS) Conducted Powers - 10 MHz Bandwidth

LTE Band 2 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18650 (1855.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19150 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.26	24.07	24.07	0	0
	1	25	24.37	24.25	24.34		0
	1	49	24.12	23.99	24.16		0
	25	0	23.25	23.31	23.33	0-1	1
	25	12	23.26	23.22	23.21		1
	25	25	23.30	23.18	23.22		1
	50	0	23.30	23.24	23.29		1
16QAM	1	0	23.02	22.67	22.66	0-1	1
	1	25	23.23	22.98	22.84		1
	1	49	23.11	22.78	22.67		1
	25	0	22.33	22.39	22.37	0-2	2
	25	12	22.36	22.31	22.28		2
	25	25	22.38	22.31	22.23		2
	50	0	22.32	22.27	22.32		2

Table 9-29
LTE Band 2 (PCS) Conducted Powers - 5 MHz Bandwidth

LTE Band 2 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18625 (1852.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19175 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.26	24.09	24.06	0	0
	1	12	24.38	24.36	24.29		0
	1	24	24.16	24.08	24.06		0
	12	0	23.22	23.18	23.19	0-1	1
	12	6	23.30	23.27	23.28		1
	12	13	23.25	23.15	23.22		1
	25	0	23.23	23.16	23.23		1
16QAM	1	0	22.69	22.85	22.69	0-1	1
	1	12	22.90	23.07	22.98		1
	1	24	22.66	22.85	22.72		1
	12	0	22.18	22.37	22.20	0-2	2
	12	6	22.27	22.39	22.29		2
	12	13	22.25	22.35	22.26		2
	25	0	22.28	22.24	22.31		2

Table 9-30
LTE Band 2 (PCS) Conducted Powers - 3 MHz Bandwidth

LTE Band 2 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18615 (1851.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19185 (1908.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.19	24.12	24.22	0	0
	1	7	24.29	24.23	24.33		0
	1	14	24.16	24.10	24.24		0
	8	0	23.30	23.19	23.26	0-1	1
	8	4	23.29	23.20	23.29		1
	8	7	23.26	23.16	23.25		1
	15	0	23.25	23.17	23.19		1
16QAM	1	0	22.93	22.74	22.99	0-1	1
	1	7	23.00	22.86	23.16		1
	1	14	22.84	22.68	23.01		1
	8	0	22.36	22.20	22.31	0-2	2
	8	4	22.37	22.23	22.35		2
	8	7	22.32	22.19	22.31		2
	15	0	22.28	22.14	22.26		2

Table 9-31
LTE Band 2 (PCS) Conducted Powers -1.4 MHz Bandwidth

LTE Band 2 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18607 (1850.7 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19193 (1909.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.19	24.26	24.15	0	0
	1	2	24.33	24.37	24.33		0
	1	5	24.17	24.30	24.16		0
	3	0	24.27	24.26	24.25		0
	3	2	24.36	24.31	24.27		0
	3	3	24.31	24.25	24.26		0
	6	0	23.39	23.22	23.27	0-1	1
16QAM	1	0	22.89	22.84	22.67	0-1	1
	1	2	22.97	22.92	22.81		1
	1	5	22.91	22.87	22.70		1
	3	0	22.75	22.88	22.86		1
	3	2	22.76	22.90	22.89		1
	3	3	22.72	22.90	22.91		1
	6	0	22.34	22.35	22.18	0-2	2

Table 9-32
LTE Band 2 (PCS) Reduced Conducted Powers - 20 MHz Bandwidth

LTE Band 2 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18700 (1860.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19100 (1900.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.71	22.66	22.61	0	0
	1	50	22.75	**22.90**	22.74		0
	1	99	22.67	22.57	22.63		0
	50	0	22.75	**22.89**	22.53	0-1	0
	50	25	22.78	22.88	22.80		0
	50	50	22.88	22.83	22.78		0
	100	0	22.86	22.88	22.64		0
16QAM	1	0	22.75	22.85	22.89	0-1	0
	1	50	22.90	22.90	22.90		0
	1	99	22.85	22.90	22.66		0
	50	0	22.25	22.39	22.20	0-2	0.5
	50	25	22.35	22.40	22.10		0.5
	50	50	22.40	22.35	22.32		0.5
	100	0	22.36	22.40	22.08		0.5

Table 9-33
LTE Band 2 (PCS) Reduced Conducted Powers - 15 MHz Bandwidth

LTE Band 2 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18675 (1857.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19125 (1902.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.73	22.51	22.48	0	0
	1	36	22.82	22.63	22.57		0
	1	74	22.73	22.47	22.43		0
	36	0	22.68	22.66	22.51	0-1	0
	36	18	22.69	22.67	22.62		0
	36	37	22.76	22.71	22.61		0
	75	0	22.72	22.64	22.63		0
16QAM	1	0	22.87	22.81	22.70	0-1	0
	1	36	22.87	22.90	22.67		0
	1	74	22.86	22.80	22.49		0
	36	0	22.14	22.18	22.09	0-2	0.5
	36	18	22.22	22.19	22.13		0.5
	36	37	22.23	22.17	22.01		0.5
	75	0	22.21	22.21	22.12		0.5

Table 9-34
LTE Band 2 (PCS) Reduced Conducted Powers - 10 MHz Bandwidth

LTE Band 2 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18650 (1855.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19150 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.71	22.58	22.51	0	0
	1	25	22.83	22.74	22.61		0
	1	49	22.65	22.52	22.45		0
	25	0	22.64	22.71	22.69	0-1	0
	25	12	22.73	22.70	22.61		0
	25	25	22.88	22.73	22.46		0
	50	0	22.80	22.69	22.58		0
16QAM	1	0	22.86	22.71	22.77	0-1	0
	1	25	22.90	22.82	22.87		0
	1	49	22.88	22.67	22.61		0
	25	0	22.25	22.27	22.30	0-2	0.5
	25	12	22.32	22.31	22.23		0.5
	25	25	22.33	22.30	22.04		0.5
	50	0	22.30	22.25	22.16		0.5

Table 9-35
LTE Band 2 (PCS) Reduced Conducted Powers - 5 MHz Bandwidth

LTE Band 2 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18625 (1852.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19175 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.65	22.55	22.42	0	0
	1	12	22.88	22.78	22.64		0
	1	24	22.60	22.51	22.38		0
	12	0	22.66	22.66	22.60	0-1	0
	12	6	22.77	22.73	22.62		0
	12	13	22.79	22.66	22.47		0
	25	0	22.76	22.67	22.57		0
16QAM	1	0	22.87	22.64	22.59	0-1	0
	1	12	22.90	22.86	22.84		0
	1	24	22.89	22.60	22.56		0
	12	0	22.32	22.19	22.08	0-2	0.5
	12	6	22.36	22.24	22.11		0.5
	12	13	22.33	22.17	21.99		0.5
	25	0	22.24	22.23	22.12		0.5

Table 9-36
LTE Band 2 (PCS) Reduced Conducted Powers - 3 MHz Bandwidth

LTE Band 2 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18615 (1851.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19185 (1908.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.67	22.62	22.52	0	0
	1	7	22.82	22.72	22.70		0
	1	14	22.68	22.58	22.53		0
	8	0	22.73	22.64	22.63	0-1	0
	8	4	22.75	22.68	22.67		0
	8	7	22.68	22.60	22.60		0
	15	0	22.72	22.67	22.58		0
16QAM	1	0	22.80	22.87	22.60	0-1	0
	1	7	22.84	22.90	22.71		0
	1	14	22.88	22.84	22.56		0
	8	0	22.34	22.31	22.12	0-2	0.5
	8	4	22.36	22.33	22.13		0.5
	8	7	22.31	22.28	22.06		0.5
	15	0	22.32	22.27	22.00		0.5

Table 9-37
LTE Band 2 (PCS) Reduced Conducted Powers -1.4 MHz Bandwidth

LTE Band 2 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18607 (1850.7 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19193 (1909.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.73	22.56	22.43	0	0
	1	2	22.82	22.66	22.56		0
	1	5	22.73	22.57	22.45		0
	3	0	22.78	22.74	22.64		0
	3	2	22.81	22.77	22.72		0
	3	3	22.76	22.71	22.66		0
	6	0	22.72	22.61	22.67	0-1	0
16QAM	1	0	22.83	22.68	22.61	0-1	0
	1	2	22.87	22.78	22.71		0
	1	5	22.84	22.68	22.60		0
	3	0	22.83	22.77	22.52		0
	3	2	22.87	22.82	22.53		0
	3	3	22.84	22.83	22.48		0
	6	0	22.32	22.14	22.07	0-2	0.5

9.3.6 LTE Band 30

Table 9-38
LTE Band 30 Conducted Powers - 10 MHz Bandwidth

LTE Band 30 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	23.62	0	0
	1	25	**23.70**		0
	1	49	23.62		0
	25	0	**22.70**	0-1	1
	25	12	22.68		1
	25	25	22.67		1
	50	0	22.69		1
16QAM	1	0	22.36	0-1	1
	1	25	22.46		1
	1	49	22.27		1
	25	0	21.60	0-2	2
	25	12	21.70		2
	25	25	21.69		2
	50	0	21.68		2

Table 9-39
LTE Band 30 Conducted Powers - 5 MHz Bandwidth

LTE Band 30 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	23.46	0	0
	1	12	23.55		0
	1	24	23.47		0
	12	0	22.55	0-1	1
	12	6	22.62		1
	12	13	22.57		1
	25	0	22.55		1
16QAM	1	0	22.18	0-1	1
	1	12	22.22		1
	1	24	22.05		1
	12	0	21.56	0-2	2
	12	6	21.66		2
	12	13	21.55		2
	25	0	21.62		2

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

Table 9-40
LTE Band 30 Reduced Conducted Powers - 10 MHz Bandwidth

LTE Band 30 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	22.04	0	0
	1	25	**22.20**		0
	1	49	22.06		0
	25	0	22.04	0-1	0
	25	12	**22.09**		0
	25	25	22.07		0
	50	0	22.08		0
16QAM	1	0	22.13	0-1	0
	1	25	22.19		0
	1	49	22.20		0
	25	0	21.61	0-2	0.5
	25	12	21.63		0.5
	25	25	21.66		0.5
	50	0	21.62		0.5

Table 9-41
LTE Band 30 Reduced Conducted Powers - 5 MHz Bandwidth

LTE Band 30 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	22.04	0	0
	1	12	22.19		0
	1	24	22.01		0
	12	0	22.09	0-1	0
	12	6	22.13		0
	12	13	22.07		0
	25	0	22.10		0
16QAM	1	0	21.92	0-1	0
	1	12	21.87		0
	1	24	21.95		0
	12	0	21.62	0-2	0.5
	12	6	21.65		0.5
	12	13	21.60		0.5
	25	0	21.68		0.5

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

9.4 WLAN Conducted Powers

Table 9-42
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	14.86	11.74	11.53
2417	2	N/A	13.81	12.70
2437	6	14.51	14.23	13.14
2457	10	N/A	14.07	12.84
2462	11	14.19	11.80	11.61

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

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

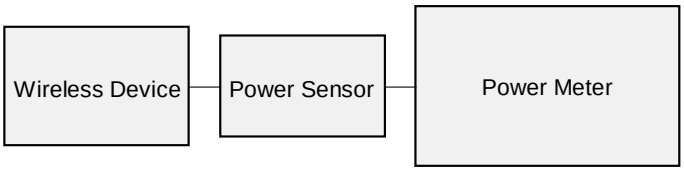


Figure 9-3
Power Measurement Setup

9.5 Bluetooth Conducted Powers

Table 9-43
Bluetooth Average RF Power

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
			[dBm]	[mW]
2402	1.0	0	9.39	8.693
2441	1.0	39	9.67	9.278
2480	1.0	78	8.58	7.211
2402	2.0	0	5.65	3.675
2441	2.0	39	6.65	4.626
2480	2.0	78	5.07	3.216
2402	3.0	0	5.66	3.682
2441	3.0	39	6.43	4.397
2480	3.0	78	5.10	3.233

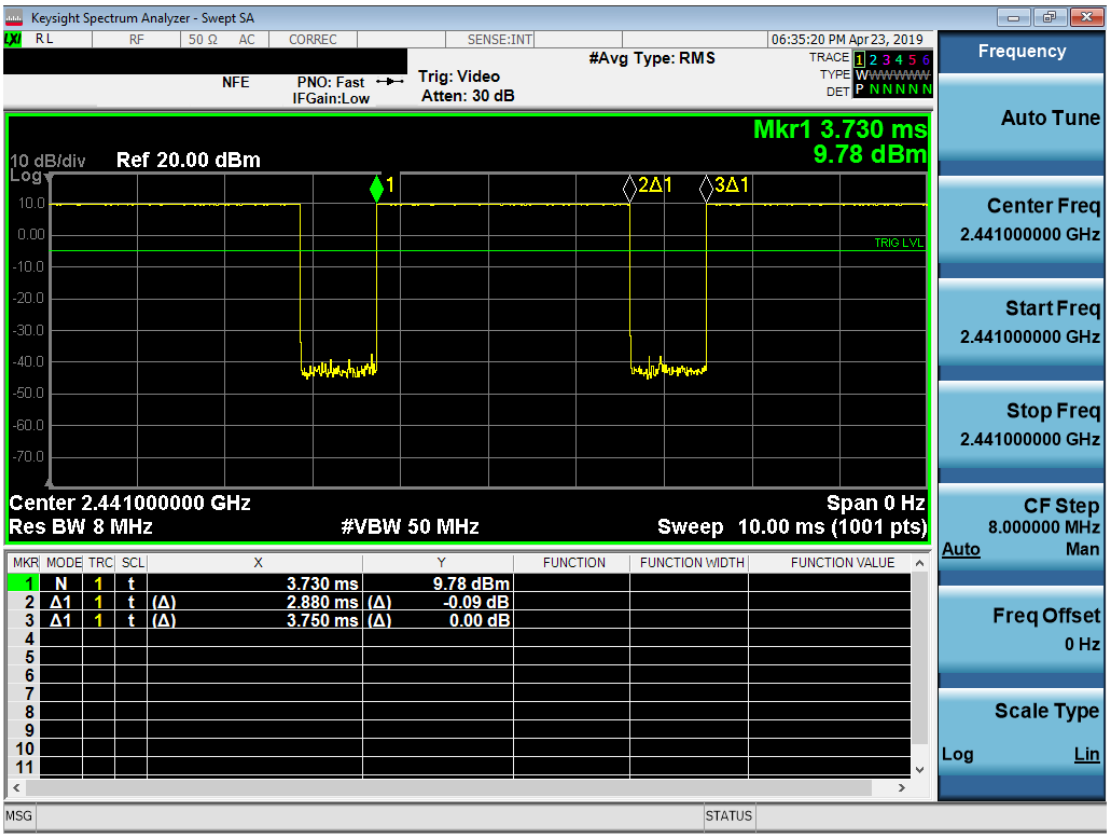


Figure 9-4
Bluetooth Transmission Plot

Equation 9-1
Bluetooth Duty Cycle Calculation

$$\boldsymbol{Duty\ Cycle} = \frac{\boldsymbol{Pulse\ Width}}{\boldsymbol{Period}} * \mathbf{100\%} = \frac{\mathbf{2.88}\boldsymbol{ms}}{\mathbf{3.75}\boldsymbol{ms}} * \mathbf{100\%} = \mathbf{76.8\%}$$

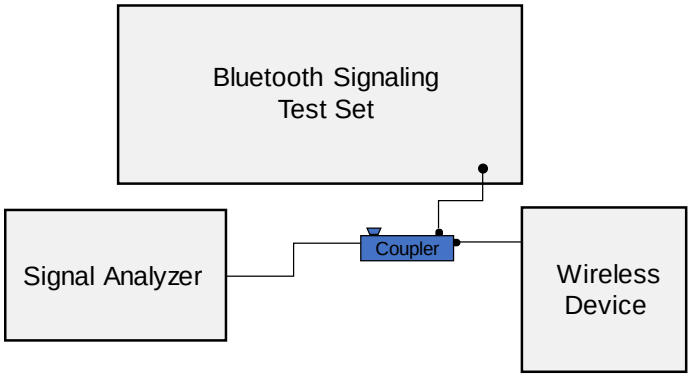


Figure 9-5
Power Measurement Setup

10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
4/22/2019	750H	21.5	700	0.888	40.708	0.889	42.201	-0.11%	-3.54%
			710	0.891	40.674	0.890	42.149	0.11%	-3.50%
			740	0.903	40.566	0.893	41.994	1.12%	-3.40%
			755	0.908	40.509	0.894	41.916	1.57%	-3.36%
			785	0.919	40.413	0.896	41.760	2.57%	-3.23%
			800	0.924	40.368	0.897	41.682	3.01%	-3.15%
4/21/2019	835H	23.5	820	0.938	42.822	0.899	41.578	4.34%	2.99%
			835	0.942	42.780	0.900	41.500	4.67%	3.08%
			850	0.945	42.738	0.916	41.500	3.17%	2.98%
4/28/2019	1750H	21.5	1710	1.343	40.035	1.348	40.142	-0.37%	-0.27%
			1750	1.367	39.973	1.371	40.079	-0.29%	-0.26%
			1790	1.392	39.914	1.394	40.016	-0.14%	-0.25%
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%
5/1/2019	1900H	22.3	1850	1.434	40.786	1.400	40.000	2.43%	1.97%
			1880	1.452	40.754	1.400	40.000	3.71%	1.88%
			1910	1.469	40.715	1.400	40.000	4.93%	1.79%
5/2/2019	2300H	22.0	2300	1.703	38.234	1.670	39.500	1.98%	-3.21%
			2310	1.710	38.218	1.679	39.480	1.85%	-3.20%
			2320	1.718	38.203	1.687	39.460	1.84%	-3.19%
4/29/2019	2450H	19.9	2400	1.782	37.853	1.756	39.289	1.48%	-3.65%
			2450	1.820	37.749	1.800	39.200	1.11%	-3.70%
			2500	1.861	37.672	1.855	39.136	0.32%	-3.74%
4/24/2019	750B	21.0	700	0.943	54.721	0.959	55.726	-1.67%	-1.80%
			710	0.947	54.697	0.960	55.687	-1.35%	-1.78%
			740	0.958	54.621	0.963	55.570	-0.52%	-1.71%
			755	0.964	54.585	0.964	55.512	0.00%	-1.67%
			785	0.975	54.522	0.966	55.395	0.93%	-1.58%
			800	0.981	54.492	0.967	55.336	1.45%	-1.53%
4/29/2019	835B	19.8	820	0.990	52.995	0.969	55.258	2.17%	-4.10%
			835	0.996	52.959	0.970	55.200	2.68%	-4.06%
			850	1.002	52.927	0.988	55.154	1.42%	-4.04%
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%
4/22/2019	1750B	20.6	1710	1.479	52.362	1.463	53.537	1.09%	-2.19%
			1750	1.506	52.300	1.488	53.432	1.21%	-2.12%
			1790	1.533	52.223	1.514	53.326	1.25%	-2.07%
4/24/2019	1750B	22.7	1710	1.476	52.158	1.463	53.537	0.89%	-2.58%
			1750	1.505	52.108	1.488	53.432	1.14%	-2.48%
			1790	1.535	52.039	1.514	53.326	1.39%	-2.41%
4/26/2019	1750B	19.6	1710	1.490	51.699	1.463	53.537	1.85%	-3.43%
			1750	1.517	51.618	1.488	53.432	1.95%	-3.39%
			1790	1.546	51.544	1.514	53.326	2.11%	-3.34%
4/29/2019	1750B	19.9	1710	1.484	52.043	1.463	53.537	1.44%	-2.79%
			1750	1.529	51.886	1.488	53.432	2.76%	-2.89%
			1790	1.575	51.742	1.514	53.326	4.03%	-2.97%
4/29/2019	1900B	23.1	1850	1.529	51.953	1.520	53.300	0.59%	-2.53%
			1880	1.562	51.834	1.520	53.300	2.76%	-2.75%
			1910	1.595	51.740	1.520	53.300	4.93%	-2.93%
5/2/2019	1900B	23.8	1850	1.450	51.558	1.520	53.300	-4.61%	-3.27%
			1880	1.480	51.473	1.520	53.300	-2.63%	-3.43%
			1910	1.512	51.390	1.520	53.300	-0.53%	-3.58%
5/2/2019	2300B	20.8	2300	1.888	53.066	1.809	52.900	4.37%	0.31%
			2310	1.897	53.053	1.816	52.887	4.46%	0.31%
			2320	1.907	53.040	1.826	52.873	4.44%	0.32%
5/2/2019	2450B	23.3	2400	1.981	50.680	1.902	52.767	4.15%	-3.96%
			2450	2.038	50.525	1.950	52.700	4.51%	-4.13%
			2500	2.094	50.369	2.021	52.636	3.61%	-4.31%

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

10.2 Test System Verification

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

Table 10-2
System Verification Results – 1g

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	$Deviation_{1g}$ (%)
H	750	HEAD	04/22/2019	22.3	21.5	0.200	1003	7409	1.720	8.280	8.600	3.86%
D	835	HEAD	04/21/2019	22.3	22.1	0.200	4d132	3914	2.070	9.590	10.350	7.92%
H	1750	HEAD	04/28/2019	20.2	21.5	0.100	1148	7409	3.670	36.400	36.700	0.82%
H	1900	HEAD	04/28/2019	23.0	21.5	0.100	5d080	7409	4.250	39.800	42.500	6.78%
H	1900	HEAD	05/01/2019	23.2	22.3	0.100	5d080	7409	4.190	39.800	41.900	5.28%
E	2300	HEAD	05/02/2019	24.2	22.3	0.100	1064	3589	4.710	47.600	47.100	-1.05%
L	2450	HEAD	04/29/2019	20.1	19.9	0.100	719	7308	5.180	51.900	51.800	-0.19%
L	750	BODY	04/24/2019	21.7	20.5	0.200	1161	7308	1.730	8.430	8.650	2.61%
J	835	BODY	04/29/2019	18.8	19.8	0.200	4d132	7488	1.910	9.670	9.550	-1.24%
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	04/22/2019	21.7	20.6	0.100	1148	7488	3.750	37.000	37.500	1.35%
J	1750	BODY	04/24/2019	23.3	22.7	0.100	1148	7488	3.700	37.000	37.000	0.00%
D	1750	BODY	04/29/2019	20.7	19.9	0.100	1148	3914	3.840	37.000	38.400	3.78%
I	1900	BODY	04/29/2019	20.0	21.1	0.100	5d080	7357	4.070	39.200	40.700	3.83%
I	1900	BODY	05/02/2019	22.3	23.8	0.100	5d149	7357	4.150	39.400	41.500	5.33%
L	2300	BODY	05/02/2019	22.6	20.8	0.100	1073	7308	4.680	47.700	46.800	-1.89%
K	2450	BODY	05/02/2019	23.2	21.5	0.100	797	7417	5.140	51.100	51.400	0.59%

Table 10-3
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)	$Deviation_{10g}$ (%)
J	1750	BODY	04/26/2019	21.1	19.6	0.100	1148	7488	2.120	19.800	21.200	7.07%
D	1750	BODY	04/29/2019	20.7	19.9	0.100	1148	3914	2.020	19.800	20.200	2.02%
I	1900	BODY	04/29/2019	20.0	21.1	0.100	5d080	7357	2.070	20.600	20.700	0.49%
I	1900	BODY	05/02/2019	22.3	23.8	0.100	5d149	7357	2.120	20.700	21.200	2.42%
L	2300	BODY	05/02/2019	22.6	20.8	0.100	1073	7308	2.230	23.200	22.300	-3.88%

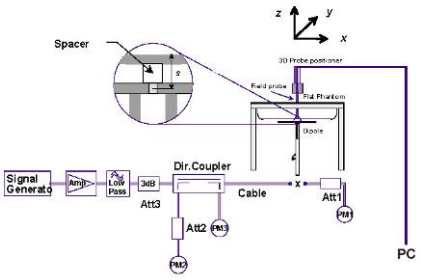


Figure 10-1
System Verification Setup Diagram

Figure 10-2
System Verification Setup Photo

11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
GSM 850 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	# 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	32.7	32.48	0.02	Right	Cheek	53791	1	1:8.3	0.328	1.052	0.345	
836.60	190	GSM 850	GSM	32.7	32.48	-0.04	Right	Tilt	53791	1	1:8.3	0.164	1.052	0.173	
836.60	190	GSM 850	GSM	32.7	32.48	0.06	Left	Cheek	53791	1	1:8.3	0.283	1.052	0.298	
836.60	190	GSM 850	GSM	32.7	32.48	0.09	Left	Tilt	53791	1	1:8.3	0.178	1.052	0.187	
836.60	190	GSM 850	GPRS	30.7	30.55	0.07	Right	Cheek	53791	2	1:4.15	0.426	1.035	0.441	A1
836.60	190	GSM 850	GPRS	30.7	30.55	-0.05	Right	Tilt	53791	2	1:4.15	0.224	1.035	0.232	
836.60	190	GSM 850	GPRS	30.7	30.55	-0.02	Left	Cheek	53791	2	1:4.15	0.341	1.035	0.353	
836.60	190	GSM 850	GPRS	30.7	30.55	0.00	Left	Tilt	53791	2	1:4.15	0.204	1.035	0.211	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-2
GSM 1900 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	# 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	29.7	29.58	-0.04	Right	Cheek	53791	1	1:8.3	0.131	1.028	0.135	
1880.00	661	GSM 1900	GSM	29.7	29.58	0.08	Right	Tilt	53791	1	1:8.3	0.083	1.028	0.085	
1880.00	661	GSM 1900	GSM	29.7	29.58	-0.04	Left	Cheek	53791	1	1:8.3	0.177	1.028	0.182	
1880.00	661	GSM 1900	GSM	29.7	29.58	-0.09	Left	Tilt	53791	1	1:8.3	0.060	1.028	0.062	
1880.00	661	GSM 1900	GPRS	28.2	28.20	0.04	Right	Cheek	53791	2	1:4.15	0.186	1.000	0.186	
1880.00	661	GSM 1900	GPRS	28.2	28.20	0.07	Right	Tilt	53791	2	1:4.15	0.119	1.000	0.119	
1880.00	661	GSM 1900	GPRS	28.2	28.20	-0.05	Left	Cheek	53791	2	1:4.15	0.250	1.000	0.250	A2
1880.00	661	GSM 1900	GPRS	28.2	28.20	0.09	Left	Tilt	53791	2	1:4.15	0.089	1.000	0.089	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-3
UMTS 850 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	25.2	25.12	0.04	Right	Cheek	53791	1:1	0.376	1.019	0.383	A3
836.60	4183	UMTS 850	RMC	25.2	25.12	-0.04	Right	Tilt	53791	1:1	0.225	1.019	0.229	
836.60	4183	UMTS 850	RMC	25.2	25.12	0.09	Left	Cheek	53791	1:1	0.339	1.019	0.345	
836.60	4183	UMTS 850	RMC	25.2	25.12	0.10	Left	Tilt	53791	1:1	0.252	1.019	0.257	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-4
UMTS 1750 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1732.40	1412	UMTS 1750	RMC	24.2	24.14	0.01	Right	Cheek	53775	1:1	0.306	1.014	0.310	
1732.40	1412	UMTS 1750	RMC	24.2	24.14	0.06	Right	Tilt	53775	1:1	0.351	1.014	0.356	
1732.40	1412	UMTS 1750	RMC	24.2	24.14	-0.04	Left	Cheek	53775	1:1	0.472	1.014	0.479	A4
1732.40	1412	UMTS 1750	RMC	24.2	24.14	-0.18	Left	Tilt	53775	1:1	0.263	1.014	0.267	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-5
UMTS 1900 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	9400	UMTS 1900	RMC	24.4	24.15	-0.16	Right	Cheek	53809	1:1	0.277	1.059	0.293	
1880.00	9400	UMTS 1900	RMC	24.4	24.15	-0.03	Right	Tilt	53809	1:1	0.174	1.059	0.184	
1880.00	9400	UMTS 1900	RMC	24.4	24.15	-0.02	Left	Cheek	53809	1:1	0.459	1.059	**0.486**	A5
1880.00	9400	UMTS 1900	RMC	24.4	24.15	-0.13	Left	Tilt	53809	1:1	0.177	1.059	0.187	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-6
LTE Band 12 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.2	25.13	-0.12	0	Right	Cheek	QPSK	1	49	53775	1:1	0.295	1.016	0.300	
707.50	23095	Mid	LTE Band 12	10	24.2	24.20	0.05	1	Right	Cheek	QPSK	25	0	53775	1:1	0.229	1.000	0.229	
707.50	23095	Mid	LTE Band 12	10	25.2	25.13	0.06	0	Right	Tilt	QPSK	1	49	53775	1:1	0.157	1.016	0.160	
707.50	23095	Mid	LTE Band 12	10	24.2	24.20	0.05	1	Right	Tilt	QPSK	25	0	53775	1:1	0.121	1.000	0.121	
707.50	23095	Mid	LTE Band 12	10	25.2	25.13	0.04	0	Left	Cheek	QPSK	1	49	53775	1:1	0.300	1.016	0.305	A6
707.50	23095	Mid	LTE Band 12	10	24.2	24.20	0.09	1	Left	Cheek	QPSK	25	0	53775	1:1	0.198	1.000	0.198	
707.50	23095	Mid	LTE Band 12	10	25.2	25.13	0.04	0	Left	Tilt	QPSK	1	49	53775	1:1	0.184	1.016	0.187	
707.50	23095	Mid	LTE Band 12	10	24.2	24.20	0.04	1	Left	Tilt	QPSK	25	0	53775	1:1	0.114	1.000	0.114	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-7
LTE Band 14 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)	
793.00	23330	Mid	LTE Band 14	10	23.2	23.20	-0.08	0	Right	Cheek	QPSK	1	25	53775	1:1	0.263	1.000	0.263	A7
793.00	23330	Mid	LTE Band 14	10	22.2	22.20	0.04	1	Right	Cheek	QPSK	25	0	53775	1:1	0.198	1.000	0.198	
793.00	23330	Mid	LTE Band 14	10	23.2	23.20	-0.10	0	Right	Tilt	QPSK	1	25	53775	1:1	0.163	1.000	0.163	
793.00	23330	Mid	LTE Band 14	10	22.2	22.20	-0.01	1	Right	Tilt	QPSK	25	0	53775	1:1	0.129	1.000	0.129	
793.00	23330	Mid	LTE Band 14	10	23.2	23.20	0.04	0	Left	Cheek	QPSK	1	25	53775	1:1	0.205	1.000	0.205	
793.00	23330	Mid	LTE Band 14	10	22.2	22.20	-0.01	1	Left	Cheek	QPSK	25	0	53775	1:1	0.160	1.000	0.160	
793.00	23330	Mid	LTE Band 14	10	23.2	23.20	-0.04	0	Left	Tilt	QPSK	1	25	53775	1:1	0.138	1.000	0.138	
793.00	23330	Mid	LTE Band 14	10	22.2	22.20	0.14	1	Left	Tilt	QPSK	25	0	53775	1:1	0.109	1.000	0.109	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-8
LTE Band 5 (Cell) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.19	-0.04	0	Right	Cheek	QPSK	1	25	53775	1:1	0.360	1.002	0.361	A8
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	0.19	1	Right	Cheek	QPSK	25	0	53775	1:1	0.289	1.000	0.289	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.19	0.01	0	Right	Tilt	QPSK	1	25	53775	1:1	0.228	1.002	0.228	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	0.02	1	Right	Tilt	QPSK	25	0	53775	1:1	0.187	1.000	0.187	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.19	-0.05	0	Left	Cheek	QPSK	1	25	53775	1:1	0.330	1.002	0.331	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	0.07	1	Left	Cheek	QPSK	25	0	53775	1:1	0.261	1.000	0.261	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.19	0.08	0	Left	Tilt	QPSK	1	25	53775	1:1	0.256	1.002	0.257	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	0.00	1	Left	Tilt	QPSK	25	0	53775	1:1	0.211	1.000	0.211	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-9
LTE Band 66 (AWS) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	0.06	0	Right	Cheek	QPSK	1	50	53775	1:1	0.250	1.009	0.252	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.40	0.07	1	Right	Cheek	QPSK	50	50	53775	1:1	0.211	1.000	0.211	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	-0.12	0	Right	Tilt	QPSK	1	50	53775	1:1	0.275	1.009	0.277	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.40	0.07	1	Right	Tilt	QPSK	50	50	53775	1:1	0.234	1.000	0.234	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	0.12	0	Left	Cheek	QPSK	1	50	53775	1:1	0.431	1.009	0.435	A9
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.40	-0.01	1	Left	Cheek	QPSK	50	50	53775	1:1	0.359	1.000	0.359	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	-0.05	0	Left	Tilt	QPSK	1	50	53775	1:1	0.207	1.009	0.209	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.40	0.04	1	Left	Tilt	QPSK	50	50	53775	1:1	0.189	1.000	0.189	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

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

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.4	24.32	-0.01	0	Right	Cheek	QPSK	1	50	53809	1:1	0.235	1.019	0.239	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.40	0.06	1	Right	Cheek	QPSK	50	50	53809	1:1	0.171	1.000	0.171	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.4	24.32	0.03	0	Right	Tilt	QPSK	1	50	53809	1:1	0.227	1.019	0.231	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.40	0.08	1	Right	Tilt	QPSK	50	50	53809	1:1	0.168	1.000	0.168	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.4	24.32	0.00	0	Left	Cheek	QPSK	1	50	53809	1:1	0.449	1.019	0.458	A10
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.40	0.07	1	Left	Cheek	QPSK	50	50	53809	1:1	0.340	1.000	0.340	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.4	24.32	0.06	0	Left	Tilt	QPSK	1	50	53809	1:1	0.193	1.019	0.197	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.40	0.03	1	Left	Tilt	QPSK	50	50	53809	1:1	0.141	1.000	0.141	
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 30 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)	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	0.05	0	Right	Cheek	QPSK	1	25	53791	1:1	0.255	1.000	0.255	A11
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	0.16	1	Right	Cheek	QPSK	25	0	53791	1:1	0.201	1.000	0.201	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	0.14	0	Right	Tilt	QPSK	1	25	53791	1:1	0.104	1.000	0.104	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	0.17	1	Right	Tilt	QPSK	25	0	53791	1:1	0.067	1.000	0.067	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	-0.03	0	Left	Cheek	QPSK	1	25	53791	1:1	0.153	1.000	0.153	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	0.18	1	Left	Cheek	QPSK	25	0	53791	1:1	0.111	1.000	0.111	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	0.17	0	Left	Tilt	QPSK	1	25	53791	1:1	0.103	1.000	0.103	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	0.04	1	Left	Tilt	QPSK	25	0	53791	1:1	0.070	1.000	0.070	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-12
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	15.0	14.86	0.04	Right	Cheek	53858	1	99.0	1.040	0.738	1.033	1.010	**0.770**	A12
2437	6	802.11b	DSSS	22	15.0	14.51	0.02	Right	Cheek	53858	1	99.0	0.874	0.600	1.119	1.010	0.678	
2462	11	802.11b	DSSS	22	15.0	14.19	0.14	Right	Cheek	53858	1	99.0	0.783	0.538	1.205	1.010	0.655	
2412	1	802.11b	DSSS	22	15.0	14.86	0.00	Right	Tilt	53858	1	99.0	0.858	0.511	1.033	1.010	0.533	
2412	1	802.11b	DSSS	22	15.0	14.86	0.14	Left	Cheek	53858	1	99.0	0.533	-	1.033	1.010	-	
2412	1	802.11b	DSSS	22	15.0	14.86	0.03	Left	Tilt	53858	1	99.0	0.511	-	1.033	1.010	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**								**Head** **1.6 W/kg (mW/g)** averaged over 1 gram										

Table 11-13
DSS Head SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441.00	39	Bluetooth	FHSS	10.0	9.67	0.04	Right	Cheek	53858	1	76.8	0.143	1.079	1.302	**0.201**	A13
2441.00	39	Bluetooth	FHSS	10.0	9.67	0.04	Right	Tilt	53858	1	76.8	0.103	1.079	1.302	0.145	
2441.00	39	Bluetooth	FHSS	10.0	9.67	0.15	Left	Cheek	53858	1	76.8	0.068	1.079	1.302	0.096	
2441.00	39	Bluetooth	FHSS	10.0	9.67	0.10	Left	Tilt	53858	1	76.8	0.066	1.079	1.302	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									

11.2 Standalone Body-Worn SAR Data

Table 11-14
GSM/UMTS Body-Worn SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	32.7	32.48	0.00	10 mm	53791	1:8.3	back	0.390	1.052	0.410	
836.60	190	GSM 850	GPRS	30.7	30.55	-0.07	10 mm	53791	1:4.15	back	0.481	1.035	0.498	A14
1880.00	661	GSM 1900	GSM	29.7	29.58	-0.01	10 mm	53809	1:8.3	back	0.251	1.028	0.258	
1880.00	661	GSM 1900	GPRS	28.2	28.20	0.03	10 mm	53809	1:4.15	back	0.395	1.000	0.395	A15
836.60	4183	UMTS 850	RMC	25.2	25.12	-0.13	10 mm	53791	1:1	back	0.465	1.019	0.474	A16
1712.40	1312	UMTS 1750	RMC	24.2	24.14	-0.04	10 mm	53791	1:1	back	0.844	1.014	0.856	
1732.40	1412	UMTS 1750	RMC	24.2	24.14	-0.03	10 mm	53791	1:1	back	0.848	1.014	0.860	A18
1752.60	1513	UMTS 1750	RMC	24.2	24.06	-0.01	10 mm	53791	1:1	back	0.780	1.033	0.806	
1852.40	9262	UMTS 1900	RMC	24.4	24.28	0.02	10 mm	53809	1:1	back	0.798	1.028	0.820	
1880.00	9400	UMTS 1900	RMC	24.4	24.15	-0.08	10 mm	53809	1:1	back	0.832	1.059	0.881	
1907.60	9538	UMTS 1900	RMC	24.4	24.12	-0.04	10 mm	53809	1:1	back	0.838	1.067	0.894	A19
1907.60	9538	UMTS 1900	RMC	24.4	24.12	-0.18	10 mm	53809	1:1	back	0.830	1.067	0.886	
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 indicated variability measurement.

Table 11-15
LTE Body-Worn SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.2	25.13	-0.03	0	53783	QPSK	1	49	10 mm	back	1:1	0.520	1.016	0.528	A20
707.50	23095	Mid	LTE Band 12	10	24.2	24.20	0.01	1	53783	QPSK	25	0	10 mm	back	1:1	0.372	1.000	0.372	
793.00	23330	Mid	LTE Band 14	10	23.2	23.20	-0.03	0	53783	QPSK	1	25	10 mm	back	1:1	0.350	1.000	0.350	A21
793.00	23330	Mid	LTE Band 14	10	22.2	22.20	-0.05	1	53783	QPSK	25	0	10 mm	back	1:1	0.287	1.000	0.287	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.19	-0.08	0	53783	QPSK	1	25	10 mm	back	1:1	0.419	1.002	0.420	A23
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	-0.02	1	53783	QPSK	25	0	10 mm	back	1:1	0.333	1.000	0.333	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.4	24.34	-0.03	0	53791	QPSK	1	50	10 mm	back	1:1	0.975	1.014	**0.989**	A25
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	0.07	0	53791	QPSK	1	50	10 mm	back	1:1	0.886	1.009	0.894	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.4	24.21	-0.06	0	53791	QPSK	1	99	10 mm	back	1:1	0.817	1.045	0.854	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.40	-0.02	1	53791	QPSK	50	50	10 mm	back	1:1	0.718	1.000	0.718	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.37	-0.01	1	53791	QPSK	100	0	10 mm	back	1:1	0.703	1.007	0.708	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.4	24.34	-0.07	0	53791	QPSK	1	50	10 mm	back	1:1	0.956	1.014	0.969	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.4	24.32	0.01	0	53775	QPSK	1	50	10 mm	back	1:1	0.721	1.019	0.735	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.4	24.25	-0.04	0	53775	QPSK	1	50	10 mm	back	1:1	0.770	1.035	0.797	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.4	24.27	-0.02	0	53775	QPSK	1	50	10 mm	back	1:1	0.783	1.030	0.806	A26
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.40	0.02	1	53775	QPSK	50	50	10 mm	back	1:1	0.541	1.000	0.541	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.39	0.03	1	53775	QPSK	100	0	10 mm	back	1:1	0.561	1.002	0.562	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	-0.18	0	53783	QPSK	1	25	10 mm	back	1:1	0.656	1.000	0.656	A27
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	0.04	1	53783	QPSK	25	0	10 mm	back	1:1	0.446	1.000	0.446	
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 indicated variability measurement.

Table 11-16
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	15.0	14.86	-0.01	10 mm	53866	1	back	99.0	0.230	0.152	1.033	1.010	**0.159**	A29
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 11-17
GPRS/UMTS Hotspot SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of GPRS Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GPRS	30.7	30.55	-0.07	10 mm	53791	2	1:4.15	back	0.481	1.035	0.498	A14
836.60	190	GSM 850	GPRS	30.7	30.55	0.00	10 mm	53791	2	1:4.15	front	0.445	1.035	0.461	
836.60	190	GSM 850	GPRS	30.7	30.55	0.05	10 mm	53791	2	1:4.15	bottom	0.239	1.035	0.247	
836.60	190	GSM 850	GPRS	30.7	30.55	0.02	10 mm	53791	2	1:4.15	right	0.466	1.035	0.482	
836.60	190	GSM 850	GPRS	30.7	30.55	-0.16	10 mm	53791	2	1:4.15	left	0.260	1.035	0.269	
1880.00	661	GSM 1900	GPRS	28.2	28.20	0.03	10 mm	53809	2	1:4.15	back	0.395	1.000	0.395	A15
1880.00	661	GSM 1900	GPRS	28.2	28.20	-0.19	10 mm	53809	2	1:4.15	front	0.296	1.000	0.296	
1880.00	661	GSM 1900	GPRS	28.2	28.20	0.02	10 mm	53809	2	1:4.15	bottom	0.246	1.000	0.246	
1880.00	661	GSM 1900	GPRS	28.2	28.20	0.01	10 mm	53809	2	1:4.15	left	0.393	1.000	0.393	
836.60	4183	UMTS 850	RMC	25.2	25.12	-0.13	10 mm	53791	N/A	1:1	back	0.465	1.019	0.474	
836.60	4183	UMTS 850	RMC	25.2	25.12	-0.07	10 mm	53791	N/A	1:1	front	0.426	1.019	0.434	
836.60	4183	UMTS 850	RMC	25.2	25.12	0.04	10 mm	53791	N/A	1:1	bottom	0.261	1.019	0.266	
836.60	4183	UMTS 850	RMC	25.2	25.12	-0.09	10 mm	53791	N/A	1:1	right	0.520	1.019	0.530	A17
836.60	4183	UMTS 850	RMC	25.2	25.12	0.03	10 mm	53791	N/A	1:1	left	0.222	1.019	0.226	
1712.40	1312	UMTS 1750	RMC	24.2	24.14	-0.04	10 mm	53791	N/A	1:1	back	0.844	1.014	0.856	
1732.40	1412	UMTS 1750	RMC	24.2	24.14	-0.03	10 mm	53791	N/A	1:1	back	0.848	1.014	0.860	A18
1752.60	1513	UMTS 1750	RMC	24.2	24.06	-0.01	10 mm	53791	N/A	1:1	back	0.780	1.033	0.806	
1732.40	1412	UMTS 1750	RMC	24.2	24.14	-0.14	10 mm	53791	N/A	1:1	front	0.741	1.014	0.751	
1732.40	1412	UMTS 1750	RMC	24.2	24.14	0.05	10 mm	53791	N/A	1:1	bottom	0.225	1.014	0.228	
1732.40	1412	UMTS 1750	RMC	24.2	24.14	0.01	10 mm	53791	N/A	1:1	left	0.690	1.014	0.700	
1852.40	9262	UMTS 1900	RMC	24.4	24.28	0.02	10 mm	53809	N/A	1:1	back	0.798	1.028	0.820	
1880.00	9400	UMTS 1900	RMC	24.4	24.15	-0.08	10 mm	53809	N/A	1:1	back	0.832	1.059	0.881	
1907.60	9538	UMTS 1900	RMC	24.4	24.12	-0.04	10 mm	53809	N/A	1:1	back	0.838	1.067	0.894	A19
1880.00	9400	UMTS 1900	RMC	24.4	24.15	0.13	10 mm	53809	N/A	1:1	front	0.682	1.059	0.722	
1880.00	9400	UMTS 1900	RMC	24.4	24.15	0.04	10 mm	53809	N/A	1:1	bottom	0.425	1.059	0.450	
1880.00	9400	UMTS 1900	RMC	24.4	24.15	0.09	10 mm	53809	N/A	1:1	left	0.640	1.059	0.678	
1907.60	9538	UMTS 1900	RMC	24.4	24.12	-0.18	10 mm	53809	N/A	1:1	back	0.830	1.067	0.886	
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 indicated variability measurement.

Table 11-18
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	25.2	25.13	-0.03	0	53783	QPSK	1	49	10 mm	back	1:1	0.520	1.016	0.528	A20
707.50	23095	Mid	LTE Band 12	10	24.2	24.20	0.01	1	53783	QPSK	25	0	10 mm	back	1:1	0.372	1.000	0.372	
707.50	23095	Mid	LTE Band 12	10	25.2	25.13	-0.05	0	53783	QPSK	1	49	10 mm	front	1:1	0.457	1.016	0.464	
707.50	23095	Mid	LTE Band 12	10	24.2	24.20	-0.06	1	53783	QPSK	25	0	10 mm	front	1:1	0.339	1.000	0.339	
707.50	23095	Mid	LTE Band 12	10	25.2	25.13	-0.01	0	53783	QPSK	1	49	10 mm	bottom	1:1	0.156	1.016	0.158	
707.50	23095	Mid	LTE Band 12	10	24.2	24.20	-0.08	1	53783	QPSK	25	0	10 mm	bottom	1:1	0.104	1.000	0.104	
707.50	23095	Mid	LTE Band 12	10	25.2	25.13	-0.01	0	53783	QPSK	1	49	10 mm	right	1:1	0.474	1.016	0.482	
707.50	23095	Mid	LTE Band 12	10	24.2	24.20	0.01	1	53783	QPSK	25	0	10 mm	right	1:1	0.379	1.000	0.379	
707.50	23095	Mid	LTE Band 12	10	25.2	25.13	0.03	0	53783	QPSK	1	49	10 mm	left	1:1	0.312	1.016	0.317	
707.50	23095	Mid	LTE Band 12	10	24.2	24.20	-0.04	1	53783	QPSK	25	0	10 mm	left	1:1	0.238	1.000	0.238	
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 Band 14 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)	
793.00	23330	Mid	LTE Band 14	10	23.2	23.20	-0.03	0	53783	QPSK	1	25	10 mm	back	1:1	0.350	1.000	0.350	
793.00	23330	Mid	LTE Band 14	10	22.2	22.20	-0.05	1	53783	QPSK	25	0	10 mm	back	1:1	0.287	1.000	0.287	
793.00	23330	Mid	LTE Band 14	10	23.2	23.20	0.00	0	53783	QPSK	1	25	10 mm	front	1:1	0.305	1.000	0.305	
793.00	23330	Mid	LTE Band 14	10	22.2	22.20	0.02	1	53783	QPSK	25	0	10 mm	front	1:1	0.248	1.000	0.248	
793.00	23330	Mid	LTE Band 14	10	23.2	23.20	0.04	0	53783	QPSK	1	25	10 mm	bottom	1:1	0.135	1.000	0.135	
793.00	23330	Mid	LTE Band 14	10	22.2	22.20	-0.07	1	53783	QPSK	25	0	10 mm	bottom	1:1	0.109	1.000	0.109	
793.00	23330	Mid	LTE Band 14	10	23.2	23.20	-0.04	0	53783	QPSK	1	25	10 mm	right	1:1	0.428	1.000	0.428	A24
793.00	23330	Mid	LTE Band 14	10	22.2	22.20	0.00	1	53783	QPSK	25	0	10 mm	right	1:1	0.349	1.000	0.349	
793.00	23330	Mid	LTE Band 14	10	23.2	23.20	-0.14	0	53783	QPSK	1	25	10 mm	left	1:1	0.239	1.000	0.239	
793.00	23330	Mid	LTE Band 14	10	22.2	22.20	0.01	1	53783	QPSK	25	0	10 mm	left	1:1	0.202	1.000	0.202	
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 5 (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)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.19	-0.08	0	53783	QPSK	1	25	10 mm	back	1:1	0.419	1.002	0.420	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	-0.02	1	53783	QPSK	25	0	10 mm	back	1:1	0.333	1.000	0.333	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.19	-0.12	0	53783	QPSK	1	25	10 mm	front	1:1	0.350	1.002	0.351	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	0.08	1	53783	QPSK	25	0	10 mm	front	1:1	0.277	1.000	0.277	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.19	-0.05	0	53783	QPSK	1	25	10 mm	bottom	1:1	0.205	1.002	0.205	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	-0.05	1	53783	QPSK	25	0	10 mm	bottom	1:1	0.173	1.000	0.173	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.19	-0.01	0	53783	QPSK	1	25	10 mm	right	1:1	0.427	1.002	0.428	A24
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	0.06	1	53783	QPSK	25	0	10 mm	right	1:1	0.364	1.000	0.364	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.19	-0.14	0	53783	QPSK	1	25	10 mm	left	1:1	0.221	1.002	0.221	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	-0.12	1	53783	QPSK	25	0	10 mm	left	1:1	0.188	1.000	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 11-21
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	24.4	24.34	-0.03	0	53791	QPSK	1	50	10 mm	back	1:1	0.975	1.014	**0.989**	A25
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	0.07	0	53791	QPSK	1	50	10 mm	back	1:1	0.886	1.009	0.894	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.4	24.21	-0.06	0	53791	QPSK	1	99	10 mm	back	1:1	0.817	1.045	0.854	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.40	-0.02	1	53791	QPSK	50	50	10 mm	back	1:1	0.718	1.000	0.718	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.37	-0.01	1	53791	QPSK	100	0	10 mm	back	1:1	0.703	1.007	0.708	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.4	24.34	0.09	0	53791	QPSK	1	50	10 mm	front	1:1	0.808	1.014	0.819	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	0.09	0	53791	QPSK	1	50	10 mm	front	1:1	0.797	1.009	0.804	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.4	24.21	0.16	0	53791	QPSK	1	99	10 mm	front	1:1	0.703	1.045	0.735	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.40	0.09	1	53791	QPSK	50	50	10 mm	front	1:1	0.652	1.000	0.652	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.37	-0.03	1	53791	QPSK	100	0	10 mm	front	1:1	0.611	1.007	0.615	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	-0.01	0	53791	QPSK	1	50	10 mm	bottom	1:1	0.257	1.009	0.259	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.40	-0.09	1	53791	QPSK	50	50	10 mm	bottom	1:1	0.201	1.000	0.201	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	0.01	0	53791	QPSK	1	50	10 mm	left	1:1	0.675	1.009	0.681	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.40	0.03	1	53791	QPSK	50	50	10 mm	left	1:1	0.559	1.000	0.559	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.4	24.34	-0.07	0	53791	QPSK	1	50	10 mm	back	1:1	0.956	1.014	0.969	
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 indicated variability measurement.

Table 11-22
LTE Band 2 (PCS) Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.4	24.32	0.01	0	53775	QPSK	1	50	10 mm	back	1:1	0.721	1.019	0.735	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.4	24.25	-0.04	0	53775	QPSK	1	50	10 mm	back	1:1	0.770	1.035	0.797	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.4	24.27	-0.02	0	53775	QPSK	1	50	10 mm	back	1:1	0.783	1.030	0.806	A26
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.40	0.02	1	53775	QPSK	50	50	10 mm	back	1:1	0.541	1.000	0.541	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.39	0.03	1	53775	QPSK	100	0	10 mm	back	1:1	0.561	1.002	0.562	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.4	24.32	0.06	0	53775	QPSK	1	50	10 mm	front	1:1	0.582	1.019	0.593	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.40	0.06	1	53775	QPSK	50	50	10 mm	front	1:1	0.440	1.000	0.440	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.4	24.32	0.03	0	53775	QPSK	1	50	10 mm	bottom	1:1	0.530	1.019	0.540	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.40	0.02	1	53775	QPSK	50	50	10 mm	bottom	1:1	0.421	1.000	0.421	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.4	24.32	0.02	0	53775	QPSK	1	50	10 mm	left	1:1	0.695	1.019	0.708	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.40	0.02	1	53775	QPSK	50	50	10 mm	left	1:1	0.512	1.000	0.512	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-23
LTE Band 30 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)	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	-0.18	0	53783	QPSK	1	25	10 mm	back	1:1	0.656	1.000	0.656	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	0.04	1	53783	QPSK	25	0	10 mm	back	1:1	0.446	1.000	0.446	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	0.11	0	53783	QPSK	1	25	10 mm	front	1:1	0.590	1.000	0.590	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	-0.07	1	53783	QPSK	25	0	10 mm	front	1:1	0.475	1.000	0.475	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	-0.19	0	53783	QPSK	1	25	10 mm	bottom	1:1	0.802	1.000	0.802	A28
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	-0.14	1	53783	QPSK	25	0	10 mm	bottom	1:1	0.598	1.000	0.598	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.69	-0.17	1	53783	QPSK	50	0	10 mm	bottom	1:1	0.597	1.002	0.598	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	0.00	0	53783	QPSK	1	25	10 mm	right	1:1	0.260	1.000	0.260	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	-0.03	1	53783	QPSK	25	0	10 mm	right	1:1	0.202	1.000	0.202	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	-0.01	0	53783	QPSK	1	25	10 mm	left	1:1	0.096	1.000	0.096	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	0.09	1	53783	QPSK	25	0	10 mm	left	1:1	0.074	1.000	0.074	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	-0.04	0	53783	QPSK	1	25	10 mm	bottom	1:1	0.761	1.000	0.761	
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 indicated variability measurement.

Table 11-24
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	15.0	14.86	-0.01	10 mm	53866	1	back	99.0	0.230	0.152	1.033	1.010	**0.159**	A29
2412	1	802.11b	DSSS	22	15.0	14.86	0.19	10 mm	53866	1	front	99.0	0.204	-	1.033	1.010	-	
2412	1	802.11b	DSSS	22	15.0	14.86	0.12	10 mm	53866	1	top	99.0	0.161	-	1.033	1.010	-	
2412	1	802.11b	DSSS	22	15.0	14.86	0.13	10 mm	53866	1	left	99.0	0.127	-	1.033	1.010	-	

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 11-25
UMTS Phablet SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1732.40	1412	UMTS 1750	RMC	24.2	24.14	-0.01	3 mm	53791	1:1	back	1.260	1.014	1.278	
1732.40	1412	UMTS 1750	RMC	24.2	24.14	0.15	3 mm	53791	1:1	front	1.220	1.014	1.237	
1732.40	1412	UMTS 1750	RMC	24.2	24.14	-0.03	4 mm	53791	1:1	bottom	0.352	1.014	0.357	
1712.40	1312	UMTS 1750	RMC	24.2	24.14	-0.11	0 mm	53791	1:1	left	2.530	1.014	2.565	
1732.40	1412	UMTS 1750	RMC	24.2	24.14	-0.04	0 mm	53791	1:1	left	2.540	1.014	2.576	A30
1752.60	1513	UMTS 1750	RMC	24.2	24.06	-0.01	0 mm	53791	1:1	left	2.530	1.033	2.613	
1712.40	1312	UMTS 1750	RMC	22.7	22.51	-0.01	0 mm	53791	1:1	back	2.510	1.045	2.623	
1732.40	1412	UMTS 1750	RMC	22.7	22.55	0.01	0 mm	53791	1:1	back	2.520	1.035	2.608	
1752.60	1513	UMTS 1750	RMC	22.7	22.51	0.00	0 mm	53791	1:1	back	2.510	1.045	2.623	
1712.40	1312	UMTS 1750	RMC	22.7	22.51	0.13	0 mm	53791	1:1	front	2.210	1.045	2.309	
1732.40	1412	UMTS 1750	RMC	22.7	22.55	0.11	0 mm	53791	1:1	front	2.310	1.035	2.391	
1752.60	1513	UMTS 1750	RMC	22.7	22.51	0.13	0 mm	53791	1:1	front	2.350	1.045	2.456	
1732.40	1412	UMTS 1750	RMC	22.7	22.55	-0.01	0 mm	53791	1:1	bottom	0.703	1.035	0.728	
1880.00	9400	UMTS 1900	RMC	24.4	24.15	0.00	3 mm	53809	1:1	back	1.660	1.059	1.758	
1880.00	9400	UMTS 1900	RMC	24.4	24.15	0.09	3 mm	53809	1:1	front	1.360	1.059	1.440	
1880.00	9400	UMTS 1900	RMC	24.4	24.15	-0.02	4 mm	53809	1:1	bottom	0.720	1.059	0.762	
1852.40	9262	UMTS 1900	RMC	24.4	24.28	0.09	0 mm	53809	1:1	left	2.360	1.028	2.426	
1880.00	9400	UMTS 1900	RMC	24.4	24.15	-0.03	0 mm	53809	1:1	left	2.400	1.059	2.542	
1907.60	9538	UMTS 1900	RMC	24.4	24.12	0.09	0 mm	53809	1:1	left	2.410	1.067	2.571	
1852.40	9262	UMTS 1900	RMC	22.9	22.63	0.00	0 mm	53809	1:1	back	2.450	1.064	2.607	
1880.00	9400	UMTS 1900	RMC	22.9	22.65	0.00	0 mm	53809	1:1	back	2.460	1.059	2.605	
1907.60	9538	UMTS 1900	RMC	22.9	22.58	0.01	0 mm	53809	1:1	back	2.520	1.076	2.712	A31
1852.40	9262	UMTS 1900	RMC	22.9	22.63	0.00	0 mm	53809	1:1	front	2.320	1.064	2.468	
1880.00	9400	UMTS 1900	RMC	22.9	22.65	-0.01	0 mm	53809	1:1	front	2.330	1.059	2.467	
1907.60	9538	UMTS 1900	RMC	22.9	22.58	0.01	0 mm	53809	1:1	front	2.390	1.076	2.572	
1880.00	9400	UMTS 1900	RMC	22.9	22.65	-0.01	0 mm	53809	1:1	bottom	0.782	1.059	0.828	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Phablet 4.0 W/kg (mW/g) averaged over 10 grams							

Table 11-26
LTE Band 66 Phablet SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	0.02	0	53783	QPSK	1	50	3 mm	back	1:1	1.700	1.009	1.715	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.40	-0.03	1	53783	QPSK	50	50	3 mm	back	1:1	1.440	1.000	1.440	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	-0.18	0	53783	QPSK	1	50	3 mm	front	1:1	1.090	1.009	1.100	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.40	0.18	1	53783	QPSK	50	50	3 mm	front	1:1	0.940	1.000	0.940	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	0.02	0	53783	QPSK	1	50	4 mm	bottom	1:1	0.596	1.009	0.601	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.40	0.01	1	53783	QPSK	50	50	4 mm	bottom	1:1	0.477	1.000	0.477	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.4	24.34	0.06	0	53783	QPSK	1	50	0 mm	left	1:1	3.150	1.014	3.194	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	0.04	0	53783	QPSK	1	50	0 mm	left	1:1	3.170	1.009	**3.199**	A32
1770.00	132572	High	LTE Band 66 (AWS)	20	24.4	24.21	0.12	0	53783	QPSK	1	99	0 mm	left	1:1	3.010	1.045	3.145	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.4	23.39	-0.17	1	53783	QPSK	50	50	0 mm	left	1:1	2.430	1.002	2.435	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.40	0.05	1	53783	QPSK	50	50	0 mm	left	1:1	2.530	1.000	2.530	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.4	23.38	-0.14	1	53783	QPSK	50	0	0 mm	left	1:1	2.530	1.005	2.543	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.4	23.37	0.04	1	53783	QPSK	100	0	0 mm	left	1:1	2.520	1.007	2.538	
1720.00	132072	Low	LTE Band 66 (AWS)	20	22.9	22.85	0.13	0	53783	QPSK	1	50	0 mm	back	1:1	2.550	1.012	2.581	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	22.9	22.76	0.01	0	53783	QPSK	1	50	0 mm	back	1:1	2.600	1.033	2.686	
1770.00	132572	High	LTE Band 66 (AWS)	20	22.9	22.80	-0.01	0	53783	QPSK	1	50	0 mm	back	1:1	2.600	1.023	2.660	
1720.00	132072	Low	LTE Band 66 (AWS)	20	22.9	22.86	0.00	0	53783	QPSK	50	50	0 mm	back	1:1	2.630	1.009	2.654	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	22.9	22.83	-0.01	0	53783	QPSK	50	50	0 mm	back	1:1	2.640	1.016	2.682	
1770.00	132572	High	LTE Band 66 (AWS)	20	22.9	22.80	-0.01	0	53783	QPSK	50	0	0 mm	back	1:1	2.510	1.023	2.568	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	22.9	22.84	-0.03	0	53783	QPSK	100	0	0 mm	back	1:1	2.690	1.014	2.728	
1720.00	132072	Low	LTE Band 66 (AWS)	20	22.9	22.85	0.13	0	53783	QPSK	1	50	0 mm	front	1:1	1.890	1.012	1.913	
1720.00	132072	Low	LTE Band 66 (AWS)	20	22.9	22.86	0.14	0	53783	QPSK	50	50	0 mm	front	1:1	1.910	1.009	1.927	
1720.00	132072	Low	LTE Band 66 (AWS)	20	22.9	22.85	-0.02	0	53783	QPSK	1	50	0 mm	bottom	1:1	1.050	1.012	1.063	
1720.00	132072	Low	LTE Band 66 (AWS)	20	22.9	22.86	-0.07	0	53783	QPSK	50	50	0 mm	bottom	1:1	1.070	1.009	1.080	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.4	24.36	0.05	0	53783	QPSK	1	50	0 mm	left	1:1	3.160	1.009	3.188	
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 indicated variability measurement.

Table 11-27
LTE Band 2 Phablet SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.4	24.32	0.00	0	53775	QPSK	1	50	3 mm	back	1:1	1.680	1.019	1.712	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.40	-0.01	1	53775	QPSK	50	50	3 mm	back	1:1	1.340	1.000	1.340	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.4	24.32	-0.02	0	53775	QPSK	1	50	3 mm	front	1:1	1.320	1.019	1.345	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.40	-0.02	1	53775	QPSK	50	50	3 mm	front	1:1	1.050	1.000	1.050	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.4	24.32	0.01	0	53775	QPSK	1	50	4 mm	bottom	1:1	0.836	1.019	0.852	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.40	-0.01	1	53775	QPSK	50	50	4 mm	bottom	1:1	0.688	1.000	0.688	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.4	24.32	-0.01	0	53775	QPSK	1	50	0 mm	left	1:1	2.920	1.019	2.975	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.4	24.25	0.04	0	53775	QPSK	1	50	0 mm	left	1:1	2.940	1.035	3.043	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.4	24.27	0.01	0	53775	QPSK	1	50	0 mm	left	1:1	3.050	1.030	3.142	A33
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.40	-0.02	1	53775	QPSK	50	50	0 mm	left	1:1	2.420	1.000	2.420	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.4	23.39	0.02	1	53775	QPSK	50	0	0 mm	left	1:1	2.450	1.002	2.455	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.4	23.39	-0.01	1	53775	QPSK	50	25	0 mm	left	1:1	2.460	1.002	2.465	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.4	23.39	-0.01	1	53775	QPSK	100	0	0 mm	left	1:1	2.430	1.002	2.435	
1860.00	18700	Low	LTE Band 2 (PCS)	20	22.9	22.75	0.00	0	53775	QPSK	1	50	0 mm	back	1:1	2.370	1.035	2.453	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.9	22.90	0.00	0	53775	QPSK	1	50	0 mm	back	1:1	2.530	1.000	2.530	
1900.00	19100	High	LTE Band 2 (PCS)	20	22.9	22.74	-0.01	0	53775	QPSK	1	50	0 mm	back	1:1	2.600	1.038	2.699	
1860.00	18700	Low	LTE Band 2 (PCS)	20	22.9	22.88	-0.03	0	53775	QPSK	50	50	0 mm	back	1:1	2.410	1.005	2.422	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.9	22.89	-0.03	0	53775	QPSK	50	0	0 mm	back	1:1	2.600	1.002	2.605	
1900.00	19100	High	LTE Band 2 (PCS)	20	22.9	22.80	0.00	0	53775	QPSK	50	25	0 mm	back	1:1	2.610	1.023	2.670	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.9	22.88	0.00	0	53775	QPSK	100	0	0 mm	back	1:1	2.550	1.005	2.563	
1860.00	18700	Low	LTE Band 2 (PCS)	20	22.9	22.75	-0.19	0	53775	QPSK	1	50	0 mm	front	1:1	2.180	1.035	2.256	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.9	22.90	-0.01	0	53775	QPSK	1	50	0 mm	front	1:1	2.250	1.000	2.250	
1900.00	19100	High	LTE Band 2 (PCS)	20	22.9	22.74	0.01	0	53775	QPSK	1	50	0 mm	front	1:1	2.260	1.038	2.346	
1860.00	18700	Low	LTE Band 2 (PCS)	20	22.9	22.88	0.00	0	53775	QPSK	50	50	0 mm	front	1:1	2.280	1.005	2.291	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.9	22.89	0.01	0	53775	QPSK	50	0	0 mm	front	1:1	2.140	1.002	2.144	
1900.00	19100	High	LTE Band 2 (PCS)	20	22.9	22.80	0.17	0	53775	QPSK	50	25	0 mm	front	1:1	2.260	1.023	2.312	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.9	22.88	0.00	0	53775	QPSK	100	0	0 mm	front	1:1	2.220	1.005	2.231	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.9	22.90	-0.05	0	53775	QPSK	1	50	0 mm	bottom	1:1	0.769	1.000	0.769	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.9	22.89	-0.06	0	53775	QPSK	50	0	0 mm	bottom	1:1	0.776	1.002	0.778	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.4	24.27	0.12	0	53775	QPSK	1	50	0 mm	left	1:1	2.880	1.030	2.966	
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 indicated variability measurement.

Table 11-28
LTE Band 30 Phablet SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	-0.17	0	53783	QPSK	1	25	3 mm	back	1:1	1.200	1.000	1.200	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	-0.15	1	53783	QPSK	25	0	3 mm	back	1:1	0.892	1.000	0.892	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	-0.07	0	53783	QPSK	1	25	3 mm	front	1:1	1.030	1.000	1.030	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	-0.16	1	53783	QPSK	25	0	3 mm	front	1:1	0.892	1.000	0.892	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	-0.12	0	53783	QPSK	1	25	4 mm	bottom	1:1	0.920	1.000	0.920	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	-0.02	1	53783	QPSK	25	0	4 mm	bottom	1:1	0.721	1.000	0.721	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	-0.07	0	53783	QPSK	1	25	0 mm	right	1:1	0.692	1.000	0.692	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	-0.03	1	53783	QPSK	25	0	0 mm	right	1:1	0.554	1.000	0.554	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.70	0.00	0	53783	QPSK	1	25	0 mm	left	1:1	0.244	1.000	0.244	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.70	0.18	1	53783	QPSK	25	0	0 mm	left	1:1	0.171	1.000	0.171	
2310.00	27710	Mid	LTE Band 30	10	22.2	22.20	-0.10	0	53783	QPSK	1	25	0 mm	back	1:1	1.410	1.000	1.410	
2310.00	27710	Mid	LTE Band 30	10	22.2	22.09	0.09	0	53783	QPSK	25	12	0 mm	back	1:1	1.510	1.026	1.549	
2310.00	27710	Mid	LTE Band 30	10	22.2	22.20	0.02	0	53783	QPSK	1	25	0 mm	front	1:1	1.750	1.000	1.750	
2310.00	27710	Mid	LTE Band 30	10	22.2	22.09	-0.07	0	53783	QPSK	25	12	0 mm	front	1:1	1.750	1.026	1.796	A34
2310.00	27710	Mid	LTE Band 30	10	22.2	22.20	-0.15	0	53783	QPSK	1	25	0 mm	bottom	1:1	0.895	1.000	0.895	
2310.00	27710	Mid	LTE Band 30	10	22.2	22.09	-0.18	0	53783	QPSK	25	12	0 mm	bottom	1:1	0.895	1.026	0.918	
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.

11. This device utilizes power reduction for some wireless modes and technologies, as outlined in Section 1.3. The maximum output power allowed for each transmitter and exposure condition was evaluated for SAR compliance based on expected use conditions and simultaneous transmission scenarios.
12. Unless otherwise noted, when 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds below.
13. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information).

GSM Test Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
2. Justification for reduced test configurations per KDB Publication 941225 D01v03r01 and October 2013 TCB Workshop Notes: The source-based frame-averaged output power was evaluated for all GPRS/EDGE slot configurations. The configuration with the highest target frame averaged output power was evaluated for hotspot SAR. When the maximum frame-averaged powers are equivalent across two or more slots (within 0.25 dB), the configuration with the most number of time slots was tested.
3. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g evaluations then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.
4. GPRS was additionally evaluated for head and body-worn exposure conditions to address possible VoIP scenarios.

UMTS Notes:

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

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r04. The general test procedures used for testing can be found in Section 8.5.4.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).
4. Per KDB Publication 941225 D05Av01r02, SAR for downlink only LTE CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.

WLAN Notes:

1. For held-to-ear and hotspot 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 operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 8.6.3 for more information.
3. 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.
4. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated EMC test reports.

Bluetooth Notes

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

12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 Introduction

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

12.2 Simultaneous Transmission Procedures

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

When standalone SAR is not required to be measured, per FCC KDB 447498 D01v06 4.3.2 b), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(GHz)}}{7.5} * \frac{(\text{Max Power of channel, mW})}{\text{Min. Separation Distance, mm}}$$

When standalone SAR is not required to be measured, per FCC KDB 447498 D01v06 4.3.2 b), the following equation must be used to estimate the standalone 10g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(GHz)}}{18.75} * \frac{(\text{Max Power of channel, mW})}{\text{Min. Separation Distance, mm}}$$

Table 12-1
Estimated SAR

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated SAR (Body)	Separation Distance (Phablet)	Estimated SAR (Phablet)
	[MHz]	[dBm]	[mm]	[W/kg]	[mm]	[W/kg]
Bluetooth	2480	10.00	10	0.210	5	0.168

Note: Per KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.

12.3 Head SAR Simultaneous Transmission Analysis

Table 12-2
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	GSM/GPRS 850	0.441	0.770	1.211
	GSM/GPRS 1900	0.250	0.770	1.020
	UMTS 850	0.383	0.770	1.153
	UMTS 1750	0.479	0.770	1.249
	UMTS 1900	0.486	0.770	**1.256**
	LTE Band 12	0.305	0.770	1.075
	LTE Band 14	0.263	0.770	1.033
	LTE Band 5 (Cell)	0.361	0.770	1.131
	LTE Band 66 (AWS)	0.435	0.770	1.205
	LTE Band 2 (PCS)	0.458	0.770	1.228
	LTE Band 30	0.255	0.770	1.025

Table 12-3
Simultaneous Transmission Scenario with Bluetooth (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM/GPRS 850	0.441	0.201	0.642
	GSM/GPRS 1900	0.250	0.201	0.451
	UMTS 850	0.383	0.201	0.584
	UMTS 1750	0.479	0.201	0.680
	UMTS 1900	0.486	0.201	**0.687**
	LTE Band 12	0.305	0.201	0.506
	LTE Band 14	0.263	0.201	0.464
	LTE Band 5 (Cell)	0.361	0.201	0.562
	LTE Band 66 (AWS)	0.435	0.201	0.636
	LTE Band 2 (PCS)	0.458	0.201	0.659
	LTE Band 30	0.255	0.201	0.456

12.4 Body-Worn Simultaneous Transmission Analysis

Table 12-4
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	GSM/GPRS 850	0.498	0.159	0.657
	GSM/GPRS 1900	0.395	0.159	0.554
	UMTS 850	0.474	0.159	0.633
	UMTS 1750	0.860	0.159	1.019
	UMTS 1900	0.894	0.159	1.053
	LTE Band 12	0.528	0.159	0.687
	LTE Band 14	0.350	0.159	0.509
	LTE Band 5 (Cell)	0.420	0.159	0.579
	LTE Band 66 (AWS)	0.989	0.159	**1.148**
	LTE Band 2 (PCS)	0.806	0.159	0.965
	LTE Band 30	0.656	0.159	0.815

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	GSM/GPRS 850	0.498	0.210	0.708
	GSM/GPRS 1900	0.395	0.210	0.605
	UMTS 850	0.474	0.210	0.684
	UMTS 1750	0.860	0.210	1.070
	UMTS 1900	0.894	0.210	1.104
	LTE Band 12	0.528	0.210	0.738
	LTE Band 14	0.350	0.210	0.560
	LTE Band 5 (Cell)	0.420	0.210	0.630
	LTE Band 66 (AWS)	0.989	0.210	**1.199**
	LTE Band 2 (PCS)	0.806	0.210	1.016
	LTE Band 30	0.656	0.210	0.866

Note: Bluetooth SAR was not required to be measured per FCC KDB Publication 447498 D01v06. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

12.5 Hotspot SAR Simultaneous Transmission Analysis

Table 12-6
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	GPRS 850	0.498	0.159	0.657
	GPRS 1900	0.395	0.159	0.554
	UMTS 850	0.530	0.159	0.689
	UMTS 1750	0.860	0.159	1.019
	UMTS 1900	0.894	0.159	1.053
	LTE Band 12	0.528	0.159	0.687
	LTE Band 14	0.428	0.159	0.587
	LTE Band 5 (Cell)	0.428	0.159	0.587
	LTE Band 66 (AWS)	0.989	0.159	**1.148**
	LTE Band 2 (PCS)	0.806	0.159	0.965
	LTE Band 30	0.802	0.159	0.961

Table 12-7
Simultaneous Transmission Scenario with Bluetooth (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.498	0.210	0.708
	GPRS 1900	0.395	0.210	0.605
	UMTS 850	0.530	0.210	0.740
	UMTS 1750	0.860	0.210	1.070
	UMTS 1900	0.894	0.210	1.104
	LTE Band 12	0.528	0.210	0.738
	LTE Band 14	0.428	0.210	0.638
	LTE Band 5 (Cell)	0.428	0.210	0.638
	LTE Band 66 (AWS)	0.989	0.210	**1.199**
	LTE Band 2 (PCS)	0.806	0.210	1.016
	LTE Band 30	0.802	0.210	1.012

Note: Bluetooth SAR was not required to be measured per FCC KDB Publication 447498 D01v06. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

12.6 Phablet Simultaneous Transmission Analysis

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

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

Table 12-8
Simultaneous Transmission Scenario with Bluetooth (Phablet)

Exposure Condition	Mode	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	UMTS 1750	2.623	0.168	2.791
	UMTS 1900	2.712	0.168	2.880
	LTE Band 66 (AWS)	3.199	0.168	**3.367**
	LTE Band 2 (PCS)	3.142	0.168	3.310
	LTE Band 30	1.796	0.168	1.964

Note: Bluetooth SAR was not required to be measured per FCC KDB Publication 447498 D01v06. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

12.7 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013 Section 6.3.4.1.2.

13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

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

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

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

Table 13-1
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1750	1720.00	132072	LTE Band 66 (AWS), 20 MHz Bandwidth	QPSK, 1 RB, 50 RB Offset	back	10 mm	0.975	0.956	1.02	N/A	N/A	N/A	N/A
1900	1907.60	9538	UMTS 1900	RMC	back	10 mm	0.838	0.830	1.01	N/A	N/A	N/A	N/A
2300	2310.00	27710	LTE Band 30, 10 MHz Bandwidth	QPSK, 1 RB, 25 RB Offset	bottom	10 mm	0.802	0.761	1.05	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 13-2
Phablet SAR Measurement Variability Results

PHABLET VARIABILITY RESULTS													
Band	FREQUENCY		Mode	Service	Side	Spacing	Measured SAR (10g)	1st Repeated SAR (10g)	Ratio	2nd Repeated SAR (10g)	Ratio	3rd Repeated SAR (10g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1750	1745.00	132322	LTE Band 66 (AWS), 20 MHz Bandwidth	QPSK, 1 RB, 50 RB Offset	left	0 mm	3.170	3.160	1.00	N/A	N/A	N/A	N/A
1900	1900.00	19100	LTE Band 2 (PCS), 20 MHz Bandwidth	QPSK, 1 RB, 50 RB Offset	left	0 mm	3.050	2.880	1.06	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**						**Phablet** **4.0 W/kg (mW/g)** averaged over 10 grams							

13.2 Measurement Uncertainty

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

14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	E4438C	ESG Vector Signal Generator	3/8/2019	Biennial	3/8/2021	MY42082385
Agilent	N9020A	MXA Signal Analyzer	4/20/2019	Annual	4/20/2020	US46470561
Agilent	N5182A	MXG Vector Signal Generator	11/28/2018	Annual	11/28/2019	MY47420603
Agilent	N5182A-506	MXG Vector Signal Generator	6/19/2018	Annual	6/19/2019	MY48180366
Agilent	8753ES	S-Parameter Network Analyzer	7/30/2018	Annual	7/30/2019	MY40000670
Agilent	8753ES	S-Parameter Vector Network Analyzer	8/30/2018	Annual	8/30/2019	MY40003841
Agilent	E5515C	Wireless Communications Test Set	5/22/2018	Biennial	5/22/2020	GB43193563
Agilent	E5515C	Wireless Communications Test Set	2/7/2018	Triennial	2/7/2021	GB43304447
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB44450273
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46170464
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433972
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433974
Anritsu	ML2496A	Power Meter	6/19/2018	Annual	6/19/2019	1306009
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1126066
Anritsu	MT8821C	Radio Communication Analyzer	11/6/2018	Annual	11/6/2019	6200901190
Anritsu	MT8821C	Radio Communication Analyzer	7/26/2018	Annual	7/26/2019	6201144418
Anritsu	MA24106A	USB Power Sensor	6/5/2018	Annual	6/5/2019	1231535
Anritsu	MA24106A	USB Power Sensor	6/5/2018	Annual	6/5/2019	1231538
Anritsu	MA24106A	USB Power Sensor	6/5/2018	Annual	6/5/2019	1244515
Anritsu	MA24106A	USB Power Sensor	6/21/2018	Annual	6/21/2019	1244524
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1S5A00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Control Company	4040	Therm./ Clock/ Humidity Monitor	10/9/2018	Biennial	10/9/2020	181647802
Control Company	4040	Therm./ Clock/ Humidity Monitor	10/9/2018	Biennial	10/9/2020	181647811
Control Company	4352	Ultra Long Stem Thermometer	11/29/2018	Biennial	11/29/2020	181766816
Control Company	4352	Ultra Long Stem Thermometer	11/29/2018	Biennial	11/29/2020	181766817
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
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
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mitutoyo	CD-6"CSX	Digital Caliper	4/18/2018	Biennial	4/18/2020	13264165
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	NC-100	Torque Wrench	11/1/2017	Biennial	11/1/2019	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
Rohde & Schwarz	CMW500	Radio Communication Tester	6/8/2018	Annual	6/8/2019	112347
Rohde & Schwarz	CMW500	Radio Communication Tester	11/5/2018	Annual	11/5/2019	140148
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	5/29/2018	Annual	5/29/2019	161662
Rohde & Schwarz	CMU200	Base Station Simulator	5/18/2018	Annual	5/18/2019	109892
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	2/19/2019	Annual	2/19/2020	3914
SPEAG	EX3DV4	SAR Probe	1/25/2019	Annual	1/25/2020	3589
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	4/24/2019	Annual	4/24/2020	7357
SPEAG	EX3DV4	SAR Probe	2/19/2019	Annual	2/19/2020	7417
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2018	Annual	6/18/2019	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/14/2019	Annual	2/14/2020	1272
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	4/18/2019	Annual	4/18/2020	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/13/2019	Annual	2/13/2020	665
SPEAG	D750V3	750 MHz SAR Dipole	1/15/2018	Biennial	1/15/2020	1003
SPEAG	D835V2	835 MHz SAR Dipole	1/22/2019	Annual	1/22/2020	4d132
SPEAG	D1750V2	1750 MHz SAR Dipole	5/9/2017	Biennial	5/9/2019	1148
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Annual	10/23/2019	5d080
SPEAG	D2300V2	2300 MHz SAR Dipole	11/8/2017	Biennial	11/8/2019	1064
SPEAG	D2450V2	2450 MHz SAR Dipole	8/17/2017	Biennial	8/17/2019	719
SPEAG	D750V3	750 MHz SAR Dipole	10/19/2018	Annual	10/19/2019	1161
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Annual	10/23/2019	5d149
SPEAG	D2300V2	2300 MHz SAR Dipole	8/13/2018	Annual	8/13/2019	1073
SPEAG	D2450V2	2450 MHz SAR Dipole	9/11/2017	Biennial	9/11/2019	797

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

15 MEASUREMENT UNCERTAINTIES

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

16 CONCLUSION

16.1 Measurement Conclusion

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

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

17 REFERENCES

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

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

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

[4] ANSI/IEEE C95.3-2002, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave, New York: IEEE, December 2002.

[5] IEEE Standards Coordinating Committee 39 –Standards Coordinating Committee 34 – IEEE Std. 1528-2013, IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

[6] NCRP, National Council on Radiation Protection and Measurements, Biological Effects and Exposure Criteria for RadioFrequency Electromagnetic Fields, NCRP Report No. 86, 1986. Reprinted Feb. 1995.

[7] T. Schmid, O. Egger, N. Kuster, Automated E-field scanning system for dosimetric assessments, IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.

[8] K. Pokovic, T. Schmid, N. Kuster, Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies, ICECOM97, Oct. 1997, pp. 1 -124.

[9] K. Pokovic, T. Schmid, and N. Kuster, E-field Probe with improved isotropy in brain simulating liquids, Proceedings of the ELMAR, Zadar, Croatia, June 23-25, 1996, pp. 172-175.

[10] Schmid & Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.

[11] V. Hombach, K. Meier, M. Burkhardt, E. Kuhn, N. Kuster, The Dependence of EM Energy Absorption upon Human Modeling at 900 MHz, IEEE Transaction on Microwave Theory and Techniques, vol. 44 no. 10, Oct. 1996, pp. 1865-1873.

[12] N. Kuster and Q. Balzano, Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300MHz, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.

[13] G. Hartsgrove, A. Kraszewski, A. Surowiec, Simulated Biological Materials for Electromagnetic Radiation Absorption Studies, University of Ottawa, Bioelectromagnetics, Canada: 1987, pp. 29-36.

[14] Q. Balzano, O. Garay, T. Manning Jr., Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.

[15] W. Gander, Computermathematick, Birkhaeuser, Basel, 1992.

[16] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, Numerical Recipes in C, The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.

[17] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.

[18] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), Human Exposure to Electromagnetic Fields High-frequency: 10kHz-300GHz, Jan. 1995.

[19] Prof. Dr. Niels Kuster, ETH, Eidgenössische Technische Hoschschule Zürich, Dosimetric Evaluation of the Cellular Phone.

[20] IEC 62209-1, Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Part 1: Devices used next to the ear (Frequency range of 300 MHz to 6 GHz), July 2016.

[21] Innovation, Science, Economic Development Canada RSS-102 Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) Issue 5, March 2015.

[22] Health Canada Safety Code 6 Limits of Human Exposure to Radio Frequency Electromagnetic Fields in the Frequency Range from 3 kHz – 300 GHz, 2015

[23] FCC SAR Test Procedures for 2G-3G Devices, Mobile Hotspot and UMPC Devices KDB Publications 941225, D01-D07

[24] SAR Measurement Guidance for IEEE 802.11 Transmitters, KDB Publication 248227 D01

[25] FCC SAR Considerations for Handsets with Multiple Transmitters and Antennas, KDB Publications 648474 D03-D04

[26] FCC SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers, FCC KDB Publication 616217 D04

[27] FCC SAR Measurement and Reporting Requirements for 100MHz – 6 GHz, KDB Publications 865664 D01-D02

[28] FCC General RF Exposure Guidance and SAR Procedures for Dongles, KDB Publication 447498, D01-D02

[29] Anexo à Resolução No. 533, de 10 de Septembro de 2009.

[30] IEC 62209-2, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 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), Mar. 2010.

APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53791

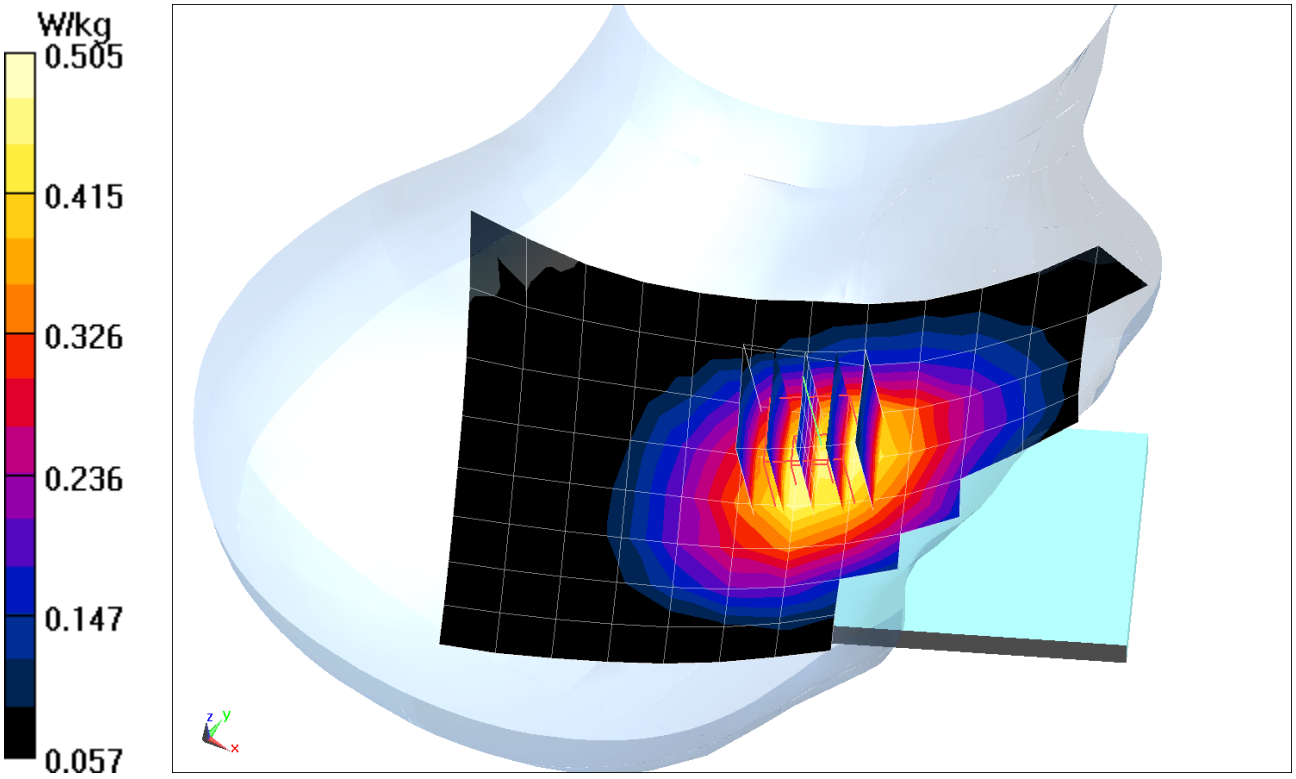
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium: 835 Head Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.942 S/m; ε_r = 42.776; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-21-2019; Ambient Temp: 22.3°C; Tissue Temp: 22.1°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, 2 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 = 21.64 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.551 W/kg
SAR(1 g) = 0.426 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53791

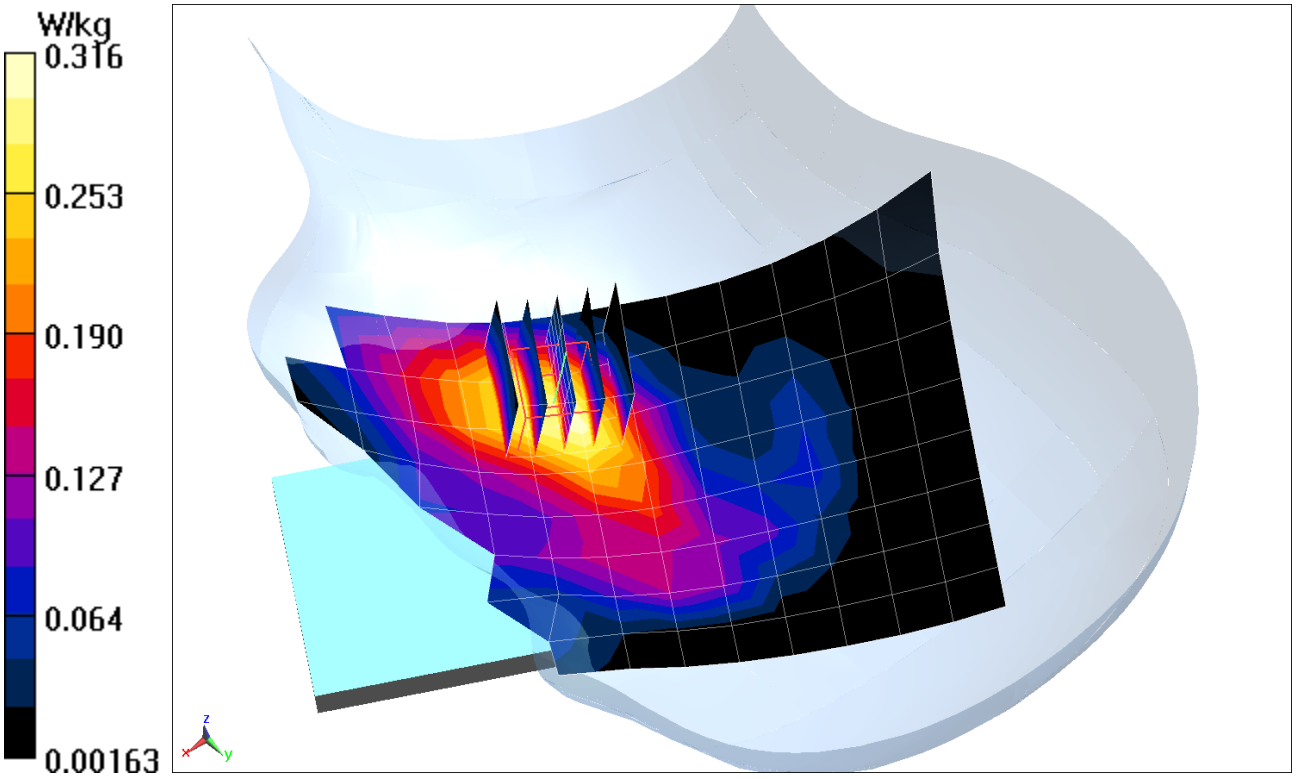
Communication System: UID 0, _GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.452 S/m; ε_r = 40.754; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 05-01-2019; Ambient Temp: 23.2°C; Tissue Temp: 22.3°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, Left Head, Cheek, Mid.ch, 2 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 = 13.64 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.356 W/kg
SAR(1 g) = 0.250 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53791

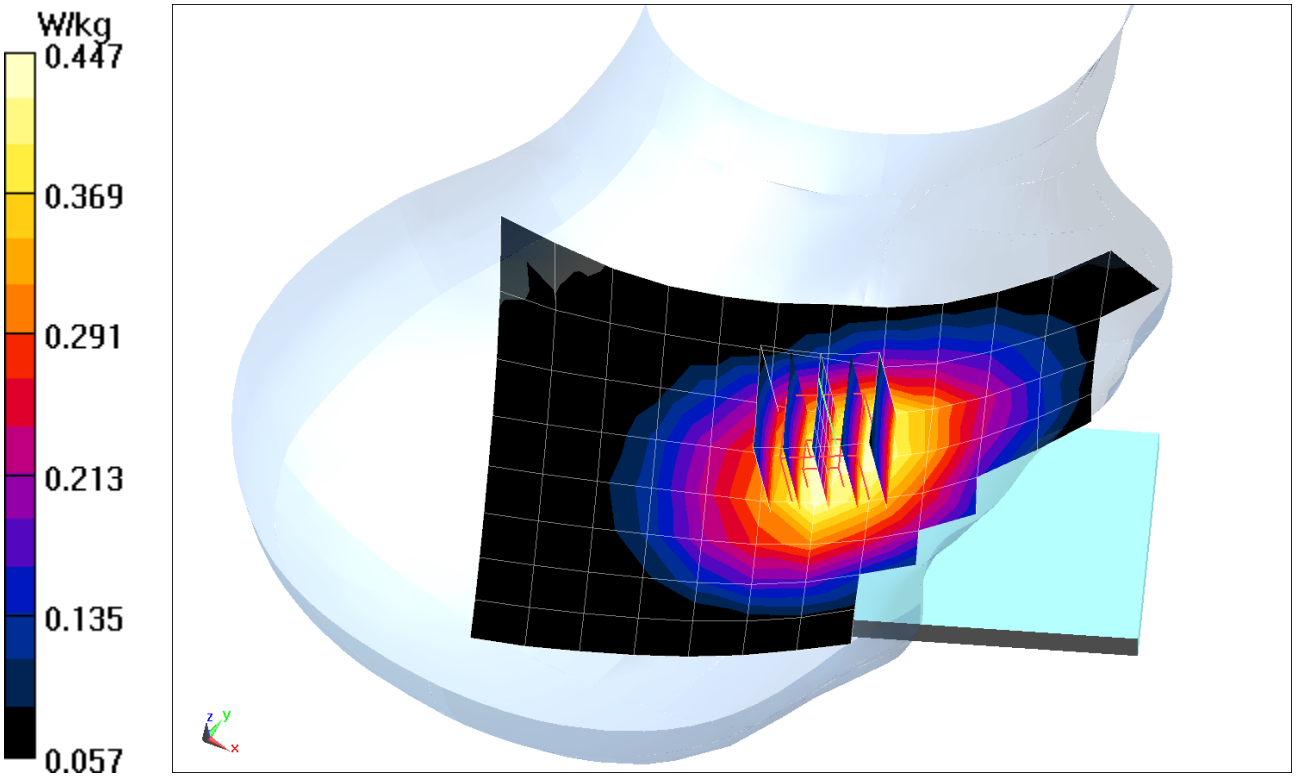
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.942$ S/m; $\varepsilon_r = 42.776$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 04-21-2019; Ambient Temp: 22.3°C; Tissue Temp: 22.1°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 = 20.58 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.489 W/kg
SAR(1 g) = 0.376 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53775

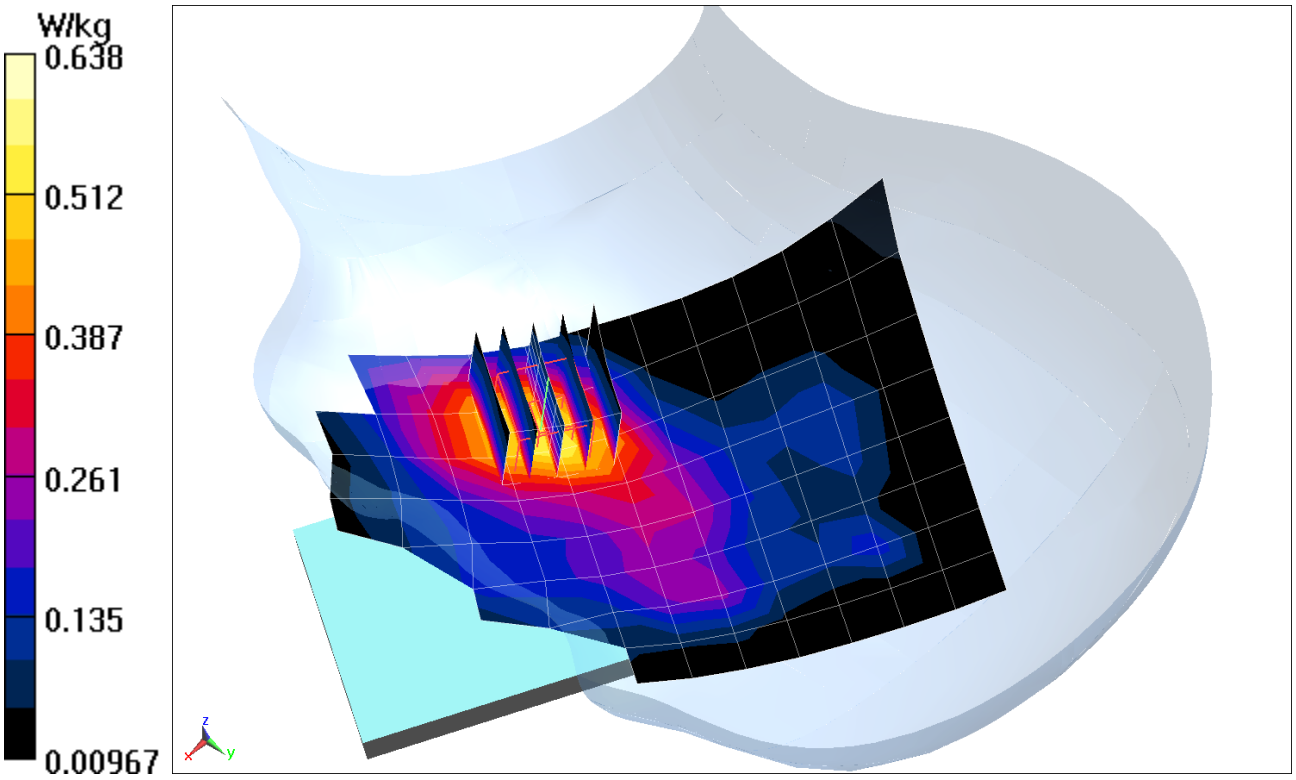
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.356 S/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 04-28-2019; Ambient Temp: 20.2°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(8.43, 8.43, 8.43) @ 1732.4 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 1750, Left Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.35 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.728 W/kg
SAR(1 g) = 0.472 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53809

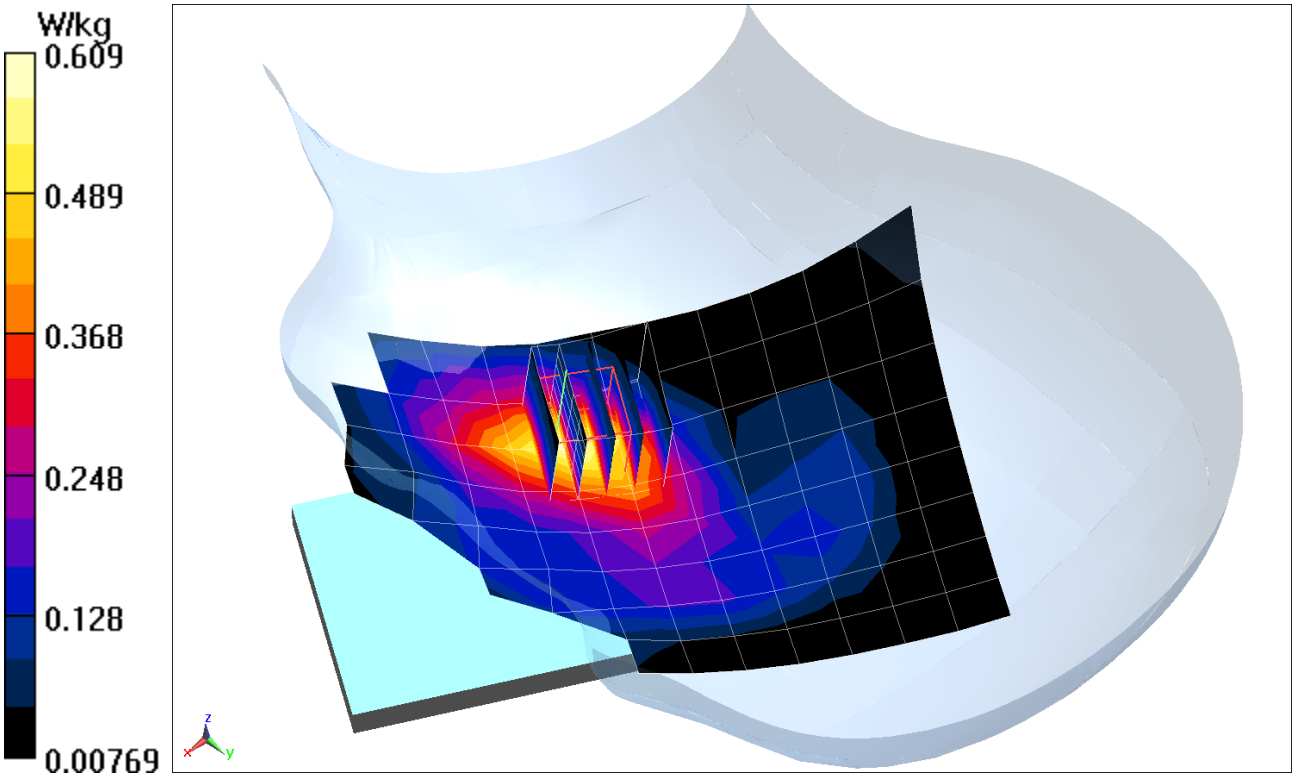
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.452 S/m; ε_r = 40.754; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 05-01-2019; Ambient Temp: 23.2°C; Tissue Temp: 22.3°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, Left Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.30 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.729 W/kg
SAR(1 g) = 0.459 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53775

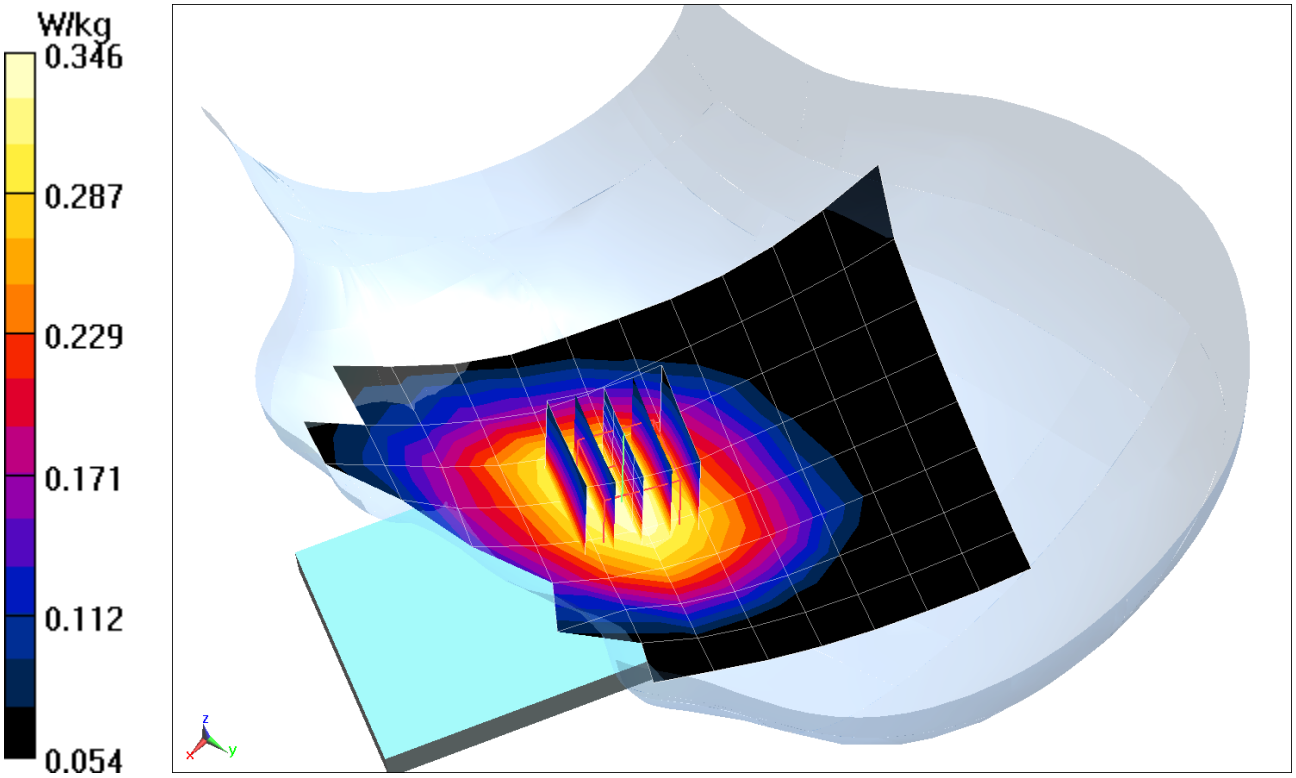
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Head Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.89 S/m; ε_r = 40.682; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 04-22-2019; Ambient Temp: 22.3°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(9.91, 9.91, 9.91) @ 707.5 MHz; Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM 30 with CRP v5.0 right; Type: QD000P40CD; Serial: TP:1759
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 12, Left Head, Cheek, Mid.ch, QPSK,
10 MHz Bandwidth, 1 RB, 49 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 = 19.28 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.371 W/kg
SAR(1 g) = 0.300 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53775

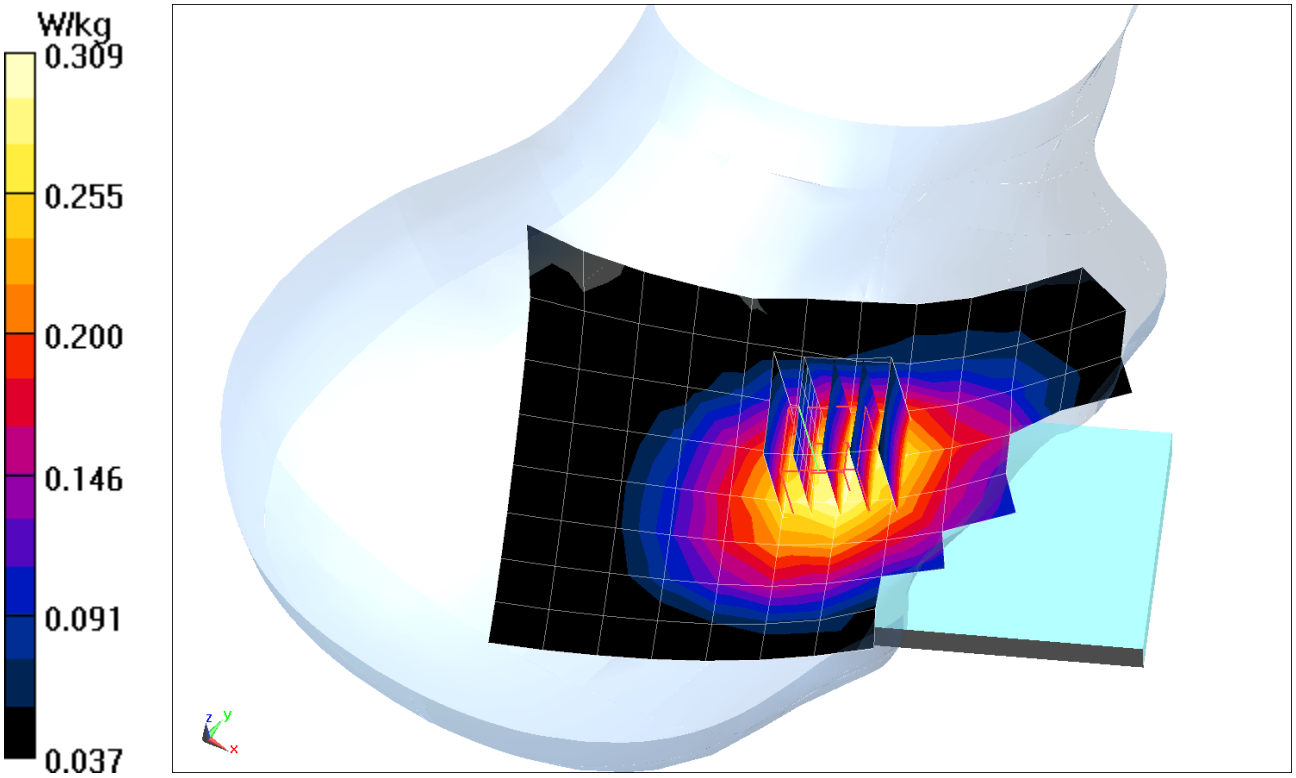
Communication System: UID 0, LTE Band 14; Frequency: 793 MHz; Duty Cycle: 1:1
Medium: 750 Head Medium parameters used (interpolated):
f = 793 MHz; σ = 0.922 S/m; ε_r = 40.389; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-22-2019; Ambient Temp: 22.3°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(9.91, 9.91, 9.91) @ 793 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: LTE Band 14, Right Head, Cheek, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.76 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.338 W/kg
SAR(1 g) = 0.263 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53775

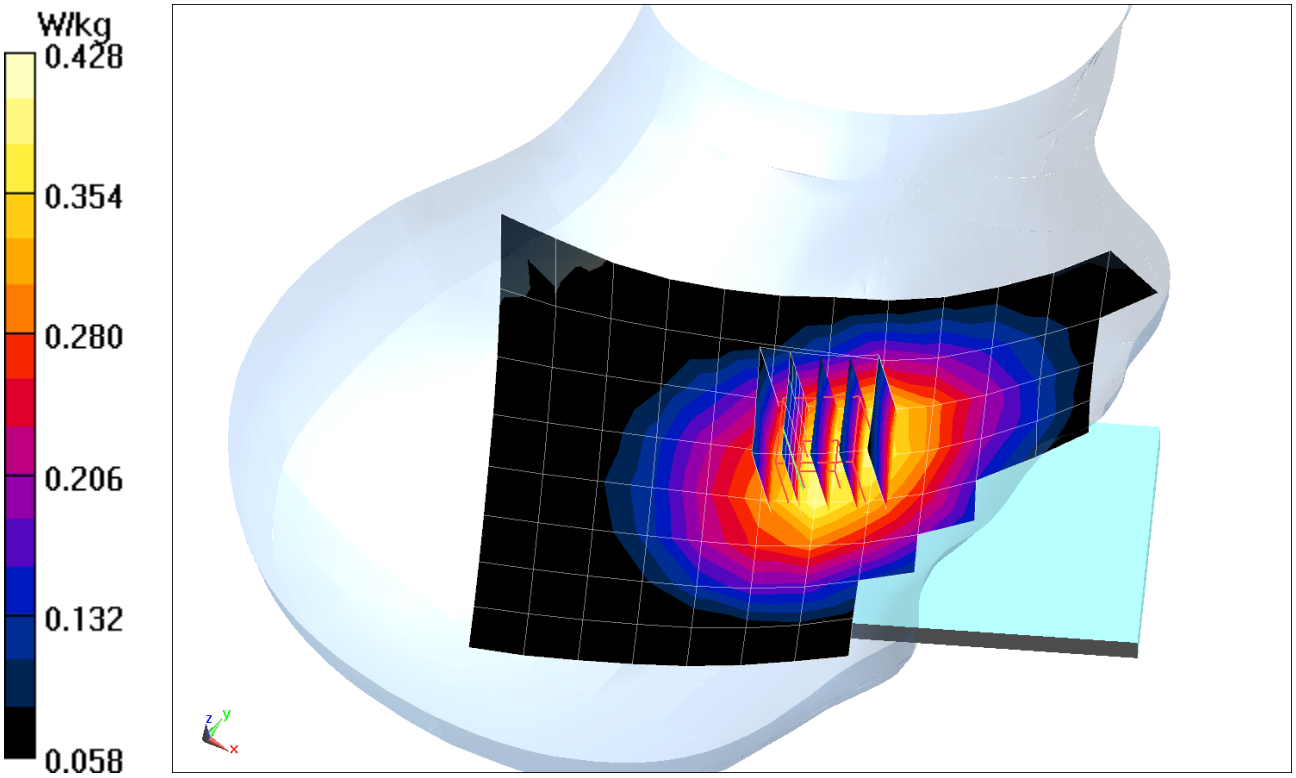
Communication System: UID 0, LTE Band 5 (Cell.); Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
$f = 836.5$ MHz; $\sigma = 0.942$ S/m; $\varepsilon_r = 42.776$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 04-21-2019; Ambient Temp: 22.3°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN3914; ConvF(9.5, 9.5, 9.5) @ 836.5 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: LTE Band 5 (Cell.), Right Head, Cheek, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 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 = 20.48 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.469 W/kg
SAR(1 g) = 0.360 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53775

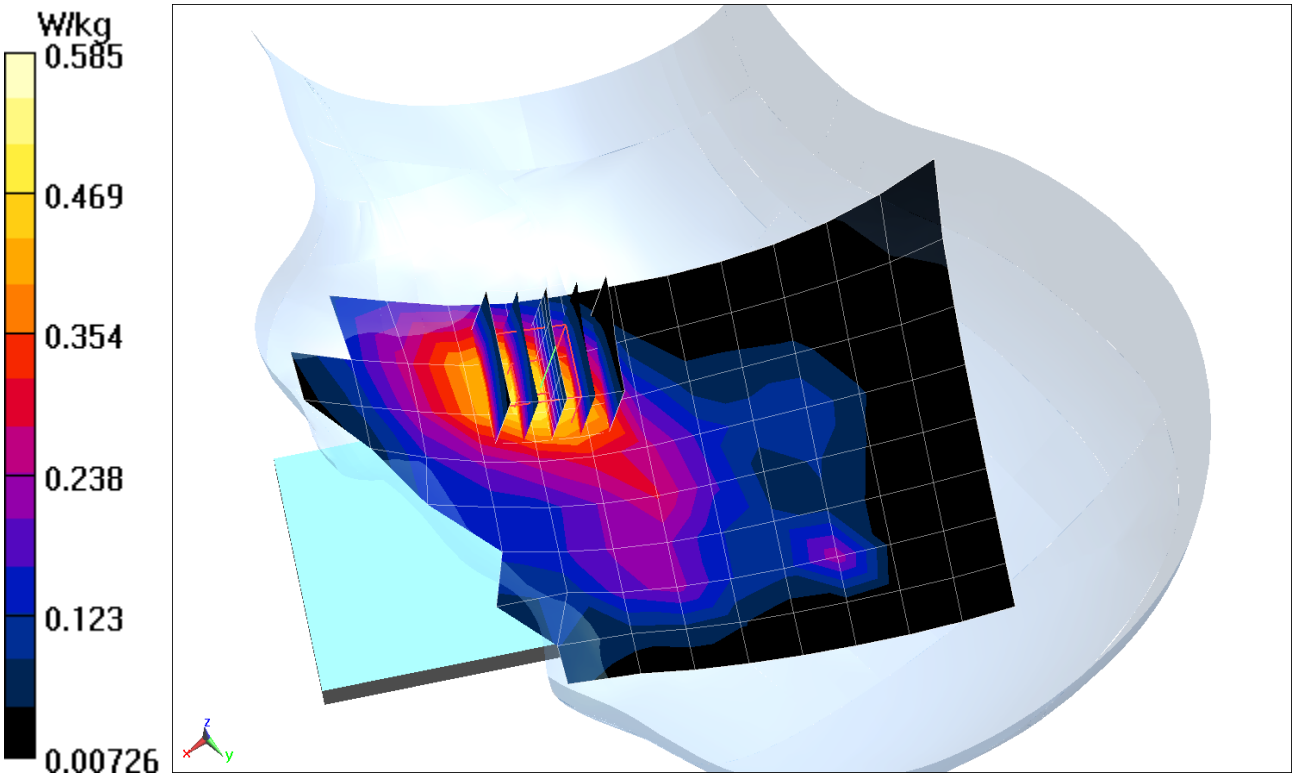
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1745 MHz; Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
f = 1745 MHz; σ = 1.364 S/m; ε_r = 39.981; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 04-28-2019; Ambient Temp: 20.2°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(8.43, 8.43, 8.43) @ 1745 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: LTE Band 66 (AWS), Left Head, Cheek, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.94 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.667 W/kg
SAR(1 g) = 0.431 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53809

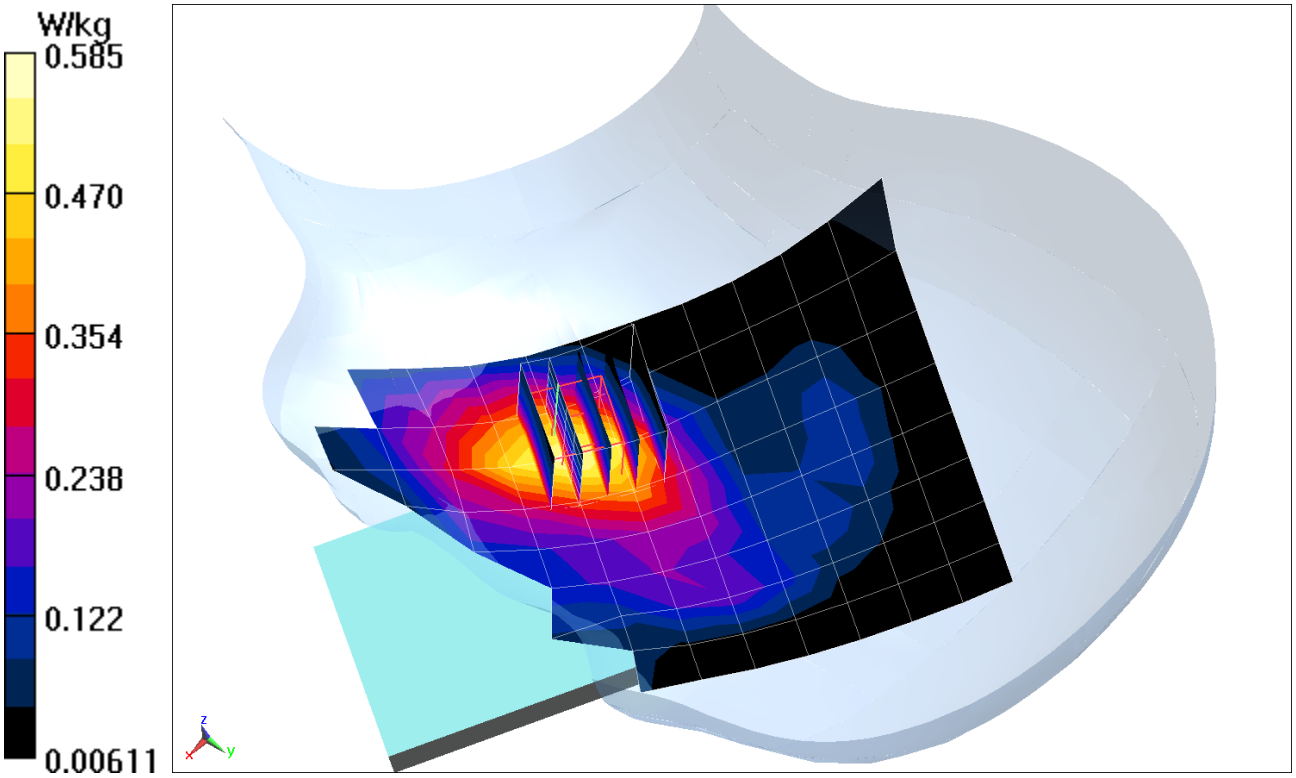
Communication System: UID 0, _LTE Band 2 (PCS); Frequency: 1860 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1860 MHz; σ = 1.437 S/m; ε_r = 39.778; ρ = 1000 kg/m^3
Phantom section: Left Section

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) @ 1860 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: LTE Band 2 (PCS), Left Head, Cheek, Low.ch, 20 MHz Bandwidth, QPSK, 1 RB, 50 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 = 18.85 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.705 W/kg
SAR(1 g) = 0.449 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53791

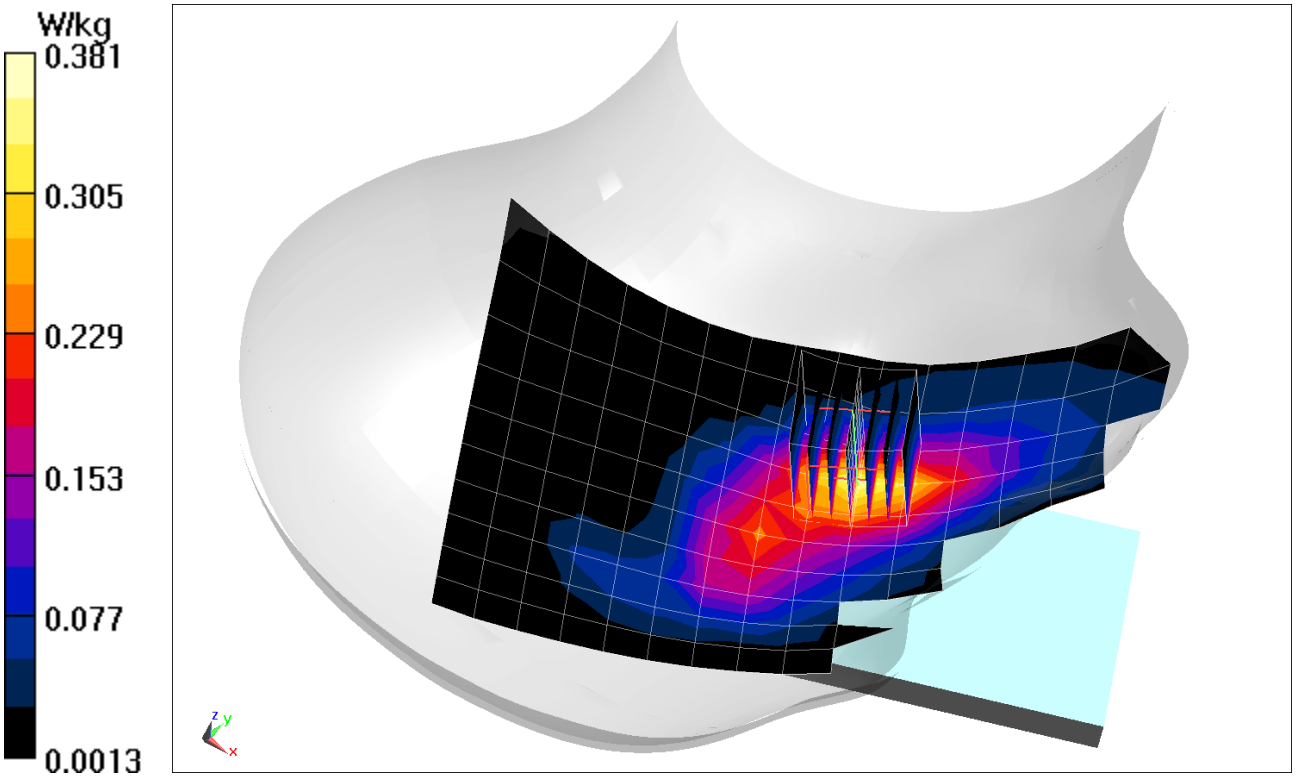
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2310 MHz; σ = 1.71 S/m; ε_r = 38.218; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 05-02-2019; Ambient Temp: 24.2°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3589; ConvF(6.77, 6.77, 6.77) @ 2310 MHz; Calibrated: 1/25/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/22/2018
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 30, Right Head, Cheek, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.47 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.456 W/kg
SAR(1 g) = 0.255 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53858

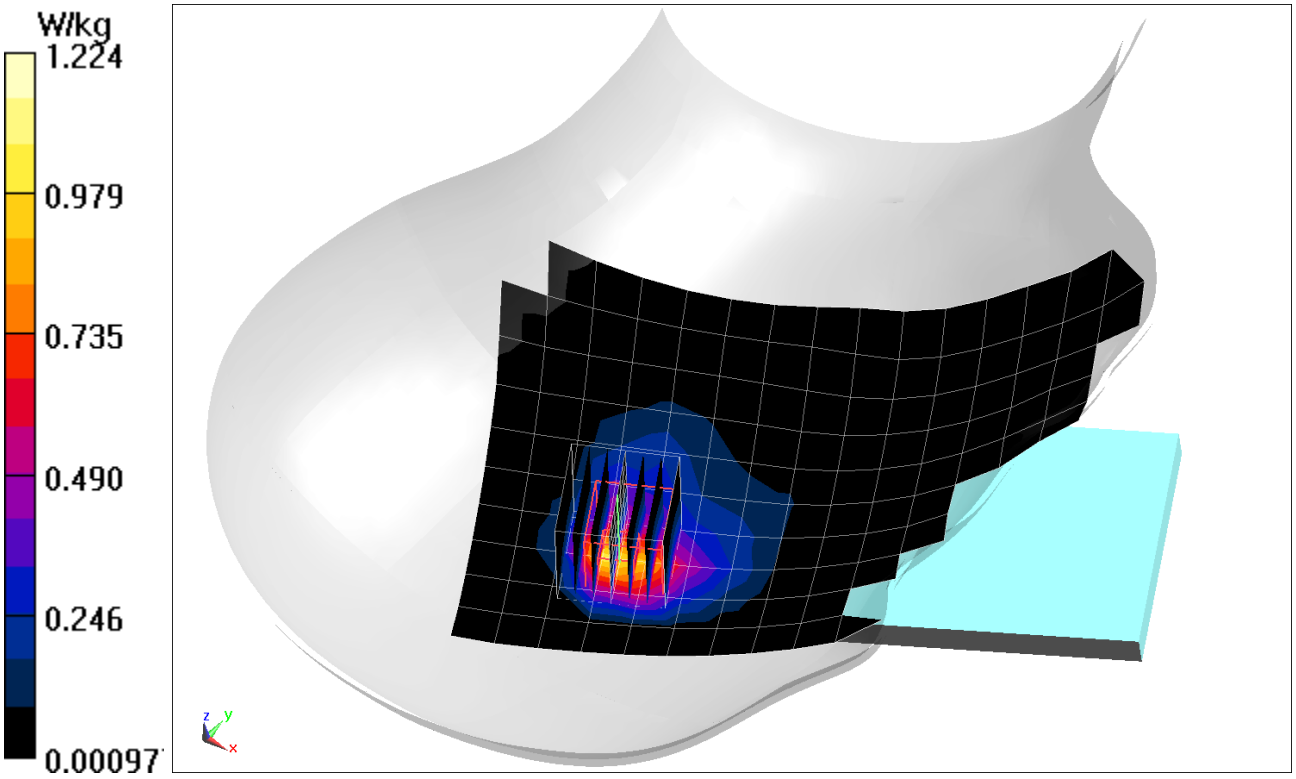
Communication System: UID 0, _IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2412 MHz; σ = 1.791 S/m; ε_r = 37.828; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-29-2019; Ambient Temp: 20.1°C; Tissue Temp: 19.9°C

Probe: EX3DV4 - SN7308; ConvF(7.45, 7.45, 7.45) @ 2412 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: IEEE 802.11b, 22 MHz Bandwidth, Right Head, Cheek, Ch 1, 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 = 12.18 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.66 W/kg
SAR(1 g) = 0.738 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53858

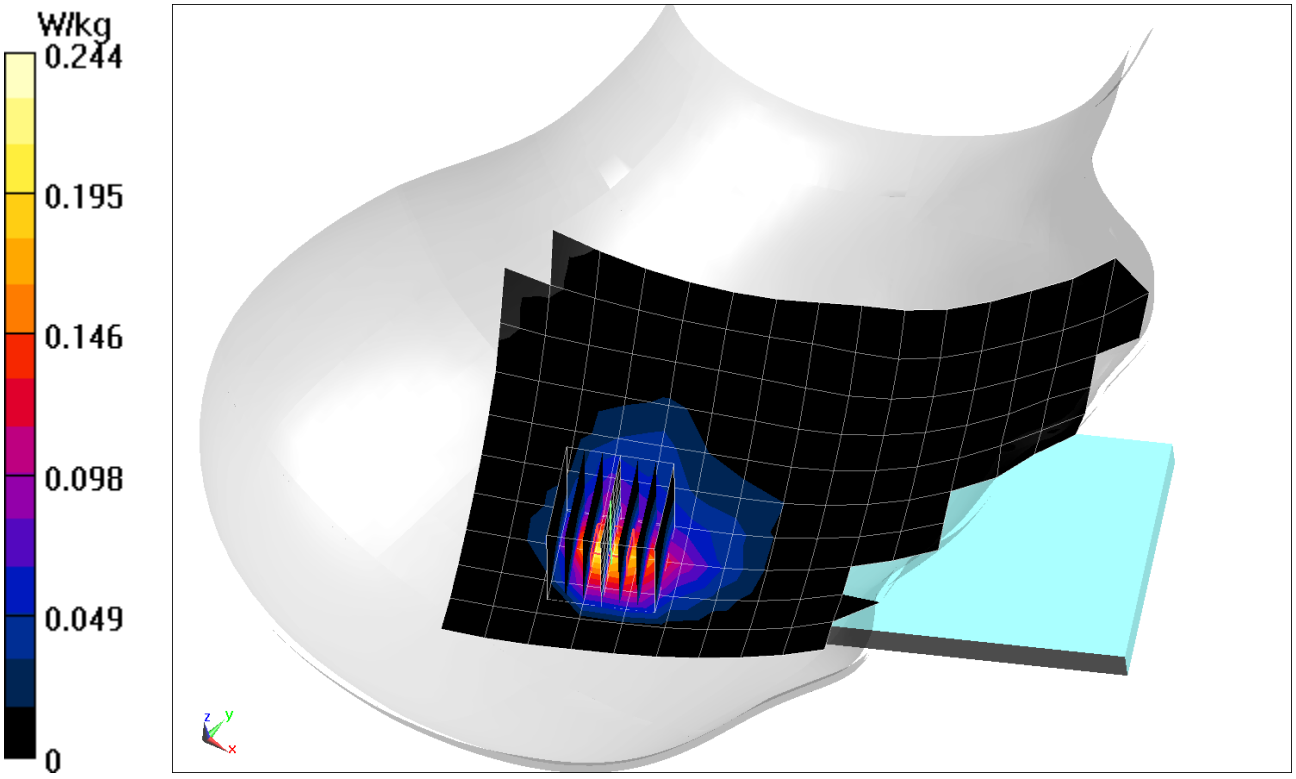
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.302
Medium: 2450 Head Medium parameters used (interpolated):
f = 2441 MHz; σ = 1.813 S/m; ε_r = 37.768; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 04-29-2019; Ambient Temp: 20.1°C; Tissue Temp: 19.9°C

Probe: EX3DV4 - SN7308; ConvF(7.45, 7.45, 7.45) @ 2441 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: Bluetooth, Right Head, Cheek, Ch 39, 1 Mbps

Area Scan (11x19x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.434 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.325 W/kg
SAR(1 g) = 0.143 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53791

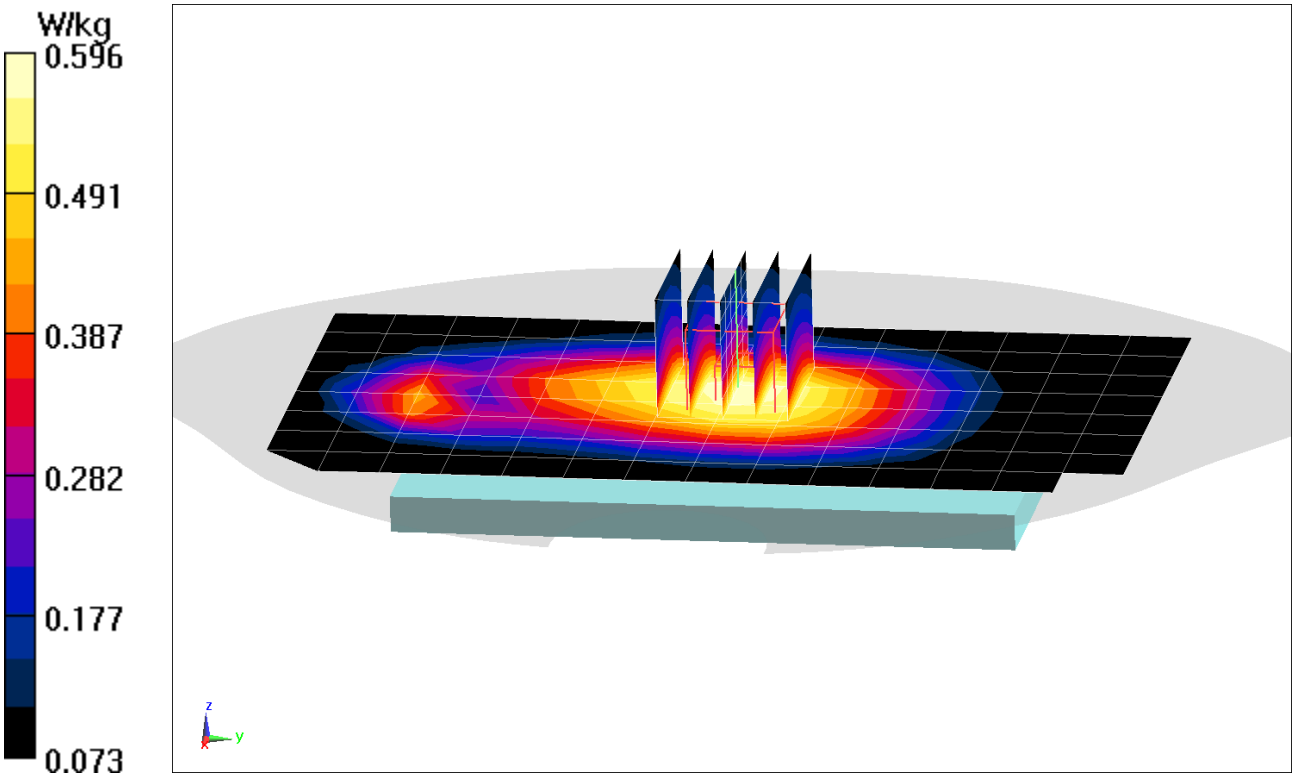
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.997 S/m; ε_r = 52.956; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 4-29-2019; Ambient Temp: 18.8°C; Tissue Temp: 19.8°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, 2 Tx Slots

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.31 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.662 W/kg
SAR(1 g) = 0.481 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53809

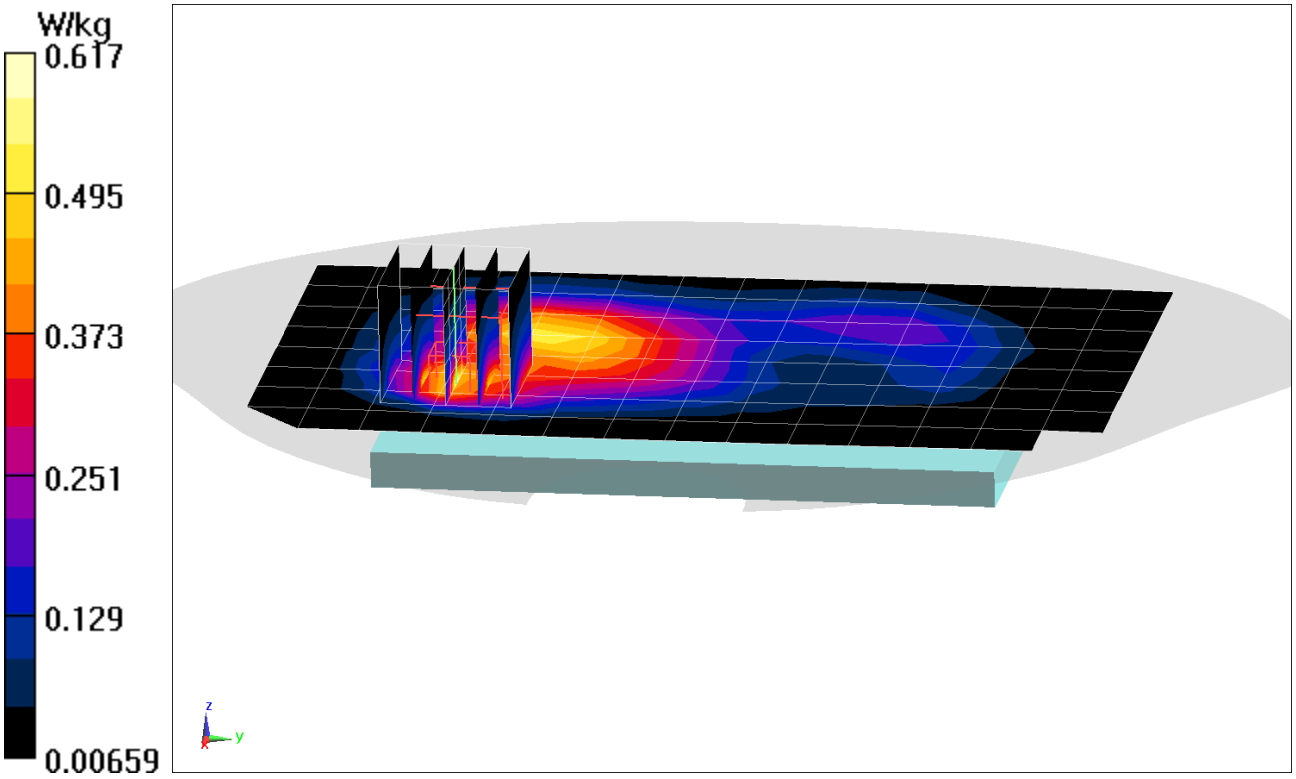
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.562 S/m; ε_r = 51.834; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-29-2019; Ambient Temp: 20.0°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7357; ConvF(7.93, 7.93, 7.93) @ 1880 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 1900, Body SAR, Back side, Mid.ch, 2 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 = 16.79 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.755 W/kg
SAR(1 g) = 0.395 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53791

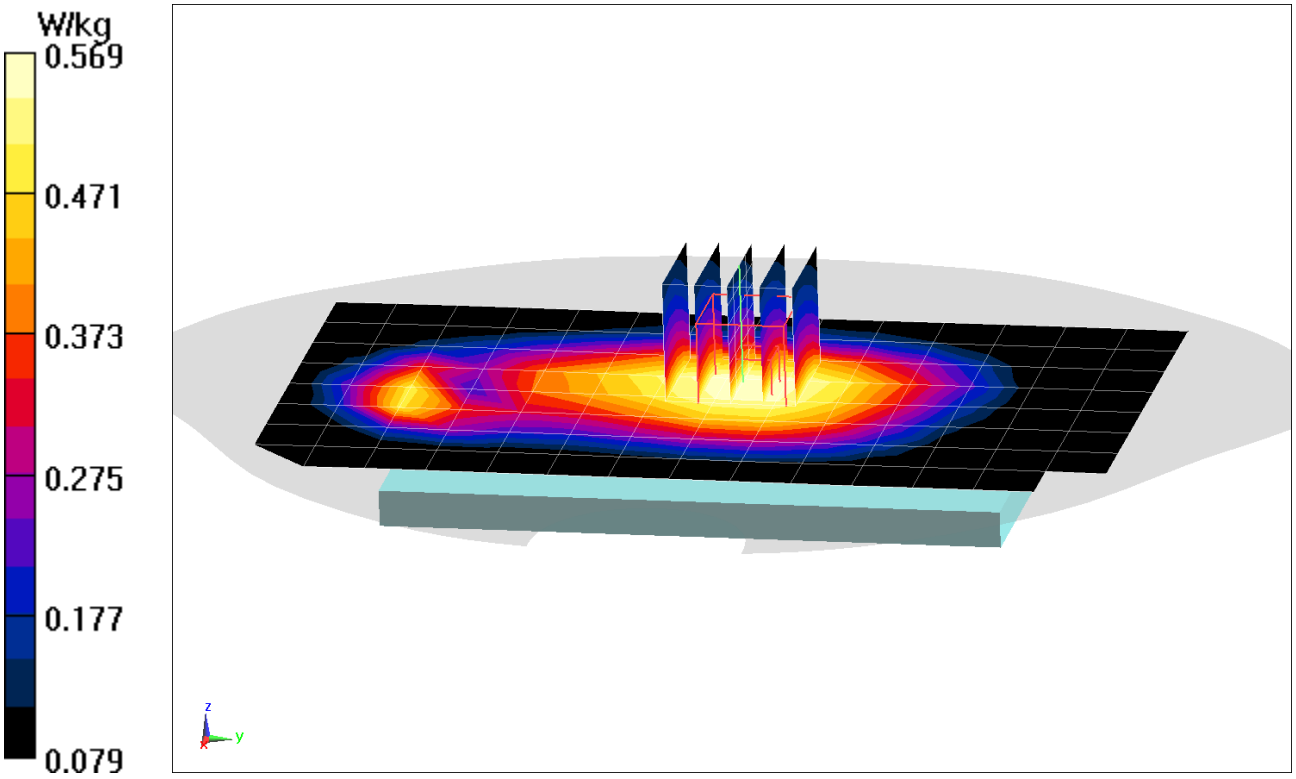
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.997 S/m; ε_r = 52.956; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 4-29-2019; Ambient Temp: 18.8°C; Tissue Temp: 19.8°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: UMTS 850, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.06 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.633 W/kg
SAR(1 g) = 0.465 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53791

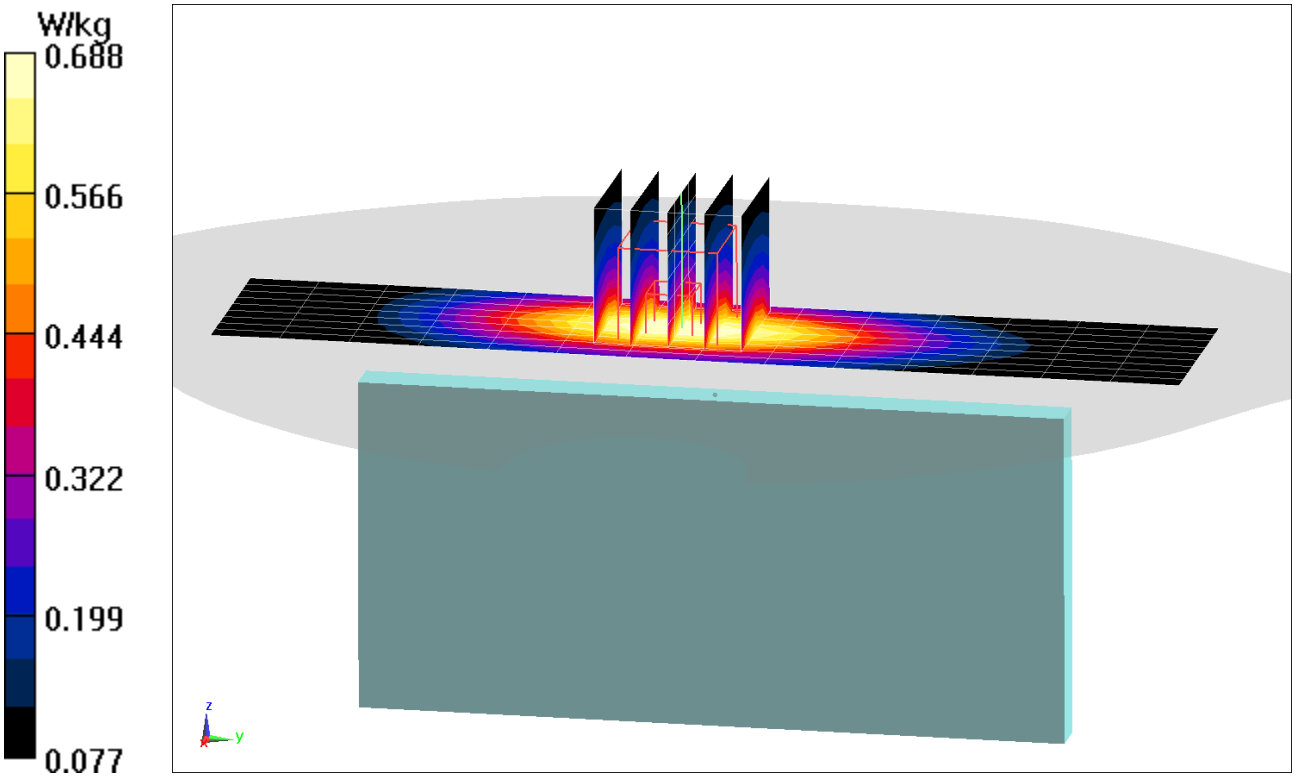
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.997 S/m; ε_r = 52.956; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 4-29-2019; Ambient Temp: 18.8°C; Tissue Temp: 19.8°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: UMTS 850, Body SAR, Right Edge, Mid.ch

Area Scan (10x15x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.56 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.779 W/kg
SAR(1 g) = 0.520 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53791

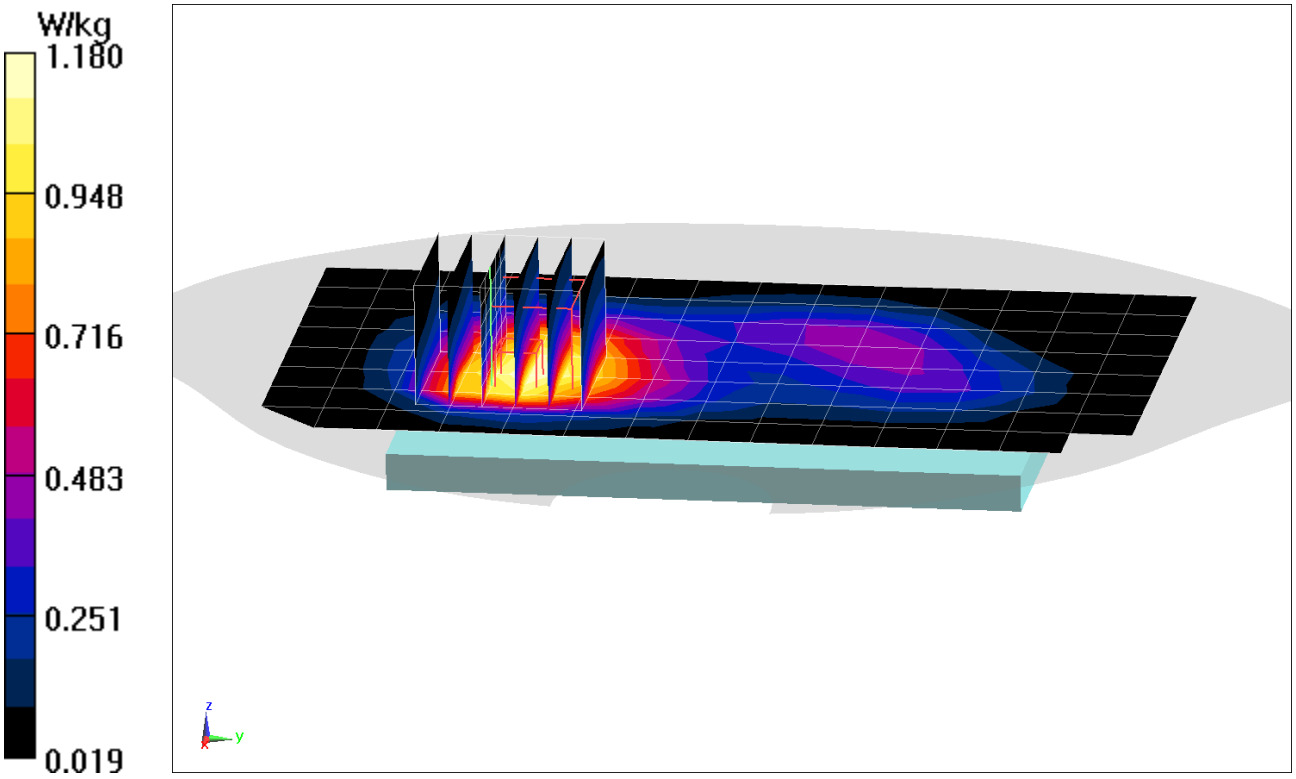
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.494 S/m; ε_r = 52.327; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-22-2019; Ambient Temp: 21.7°C; Tissue Temp: 20.6°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: 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 1750, 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 = 24.27 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.848 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53809

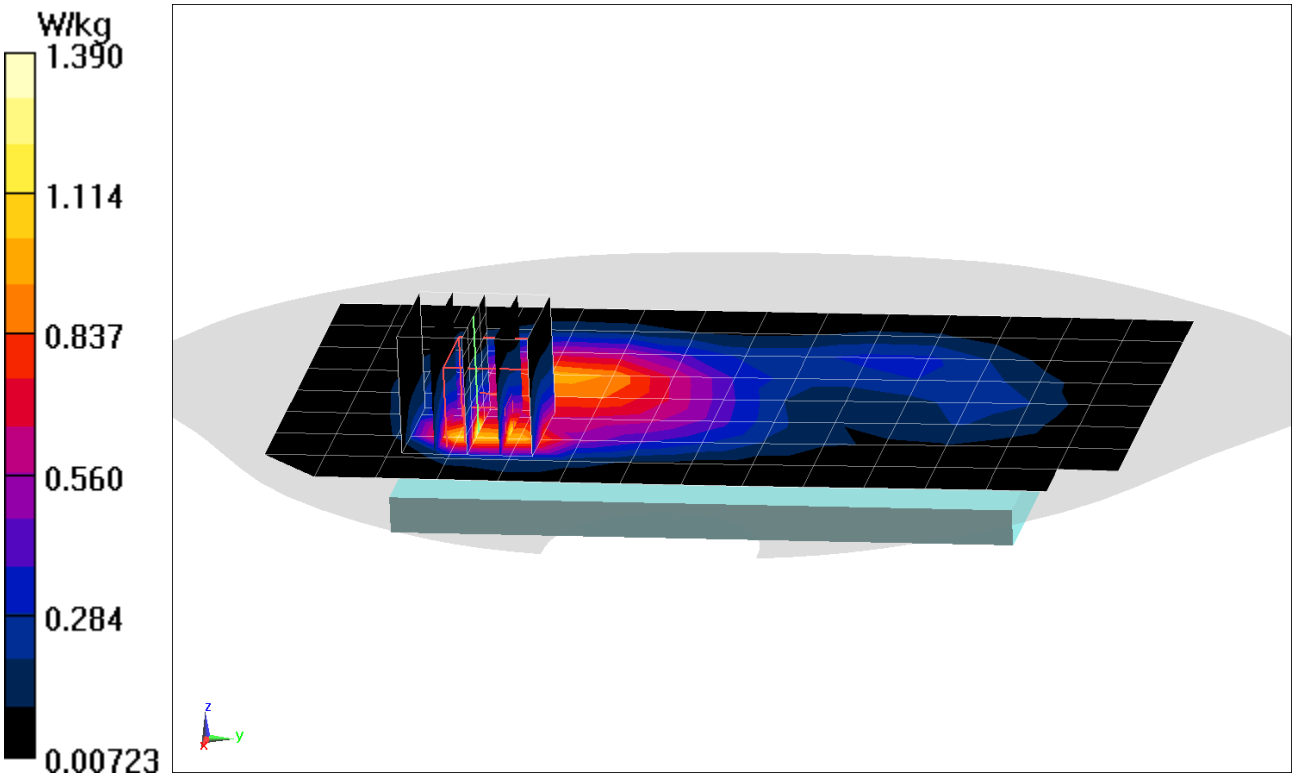
Communication System: UID 0, UMTS; Frequency: 1907.6 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1907.6 MHz; σ = 1.592 S/m; ε_r = 51.748; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-29-2019; Ambient Temp: 20.0°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7357; ConvF(7.93, 7.93, 7.93) @ 1907.6 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.39 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.74 W/kg
SAR(1 g) = 0.838 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53783

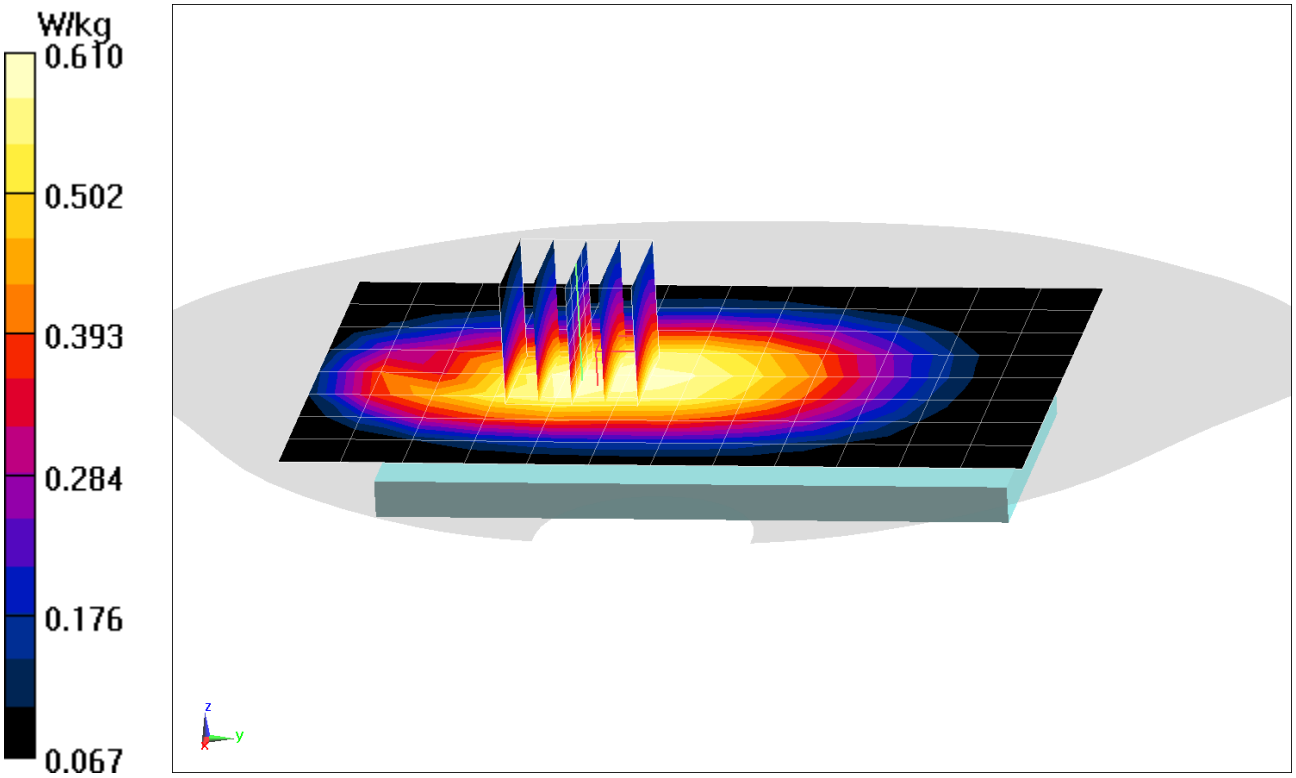
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750MHz Body Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.946 S/m; ε_r = 54.703; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-24-2019; Ambient Temp: 21.7°C; Tissue Temp: 20.5°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, 49 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.68 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.659 W/kg
SAR(1 g) = 0.520 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53783

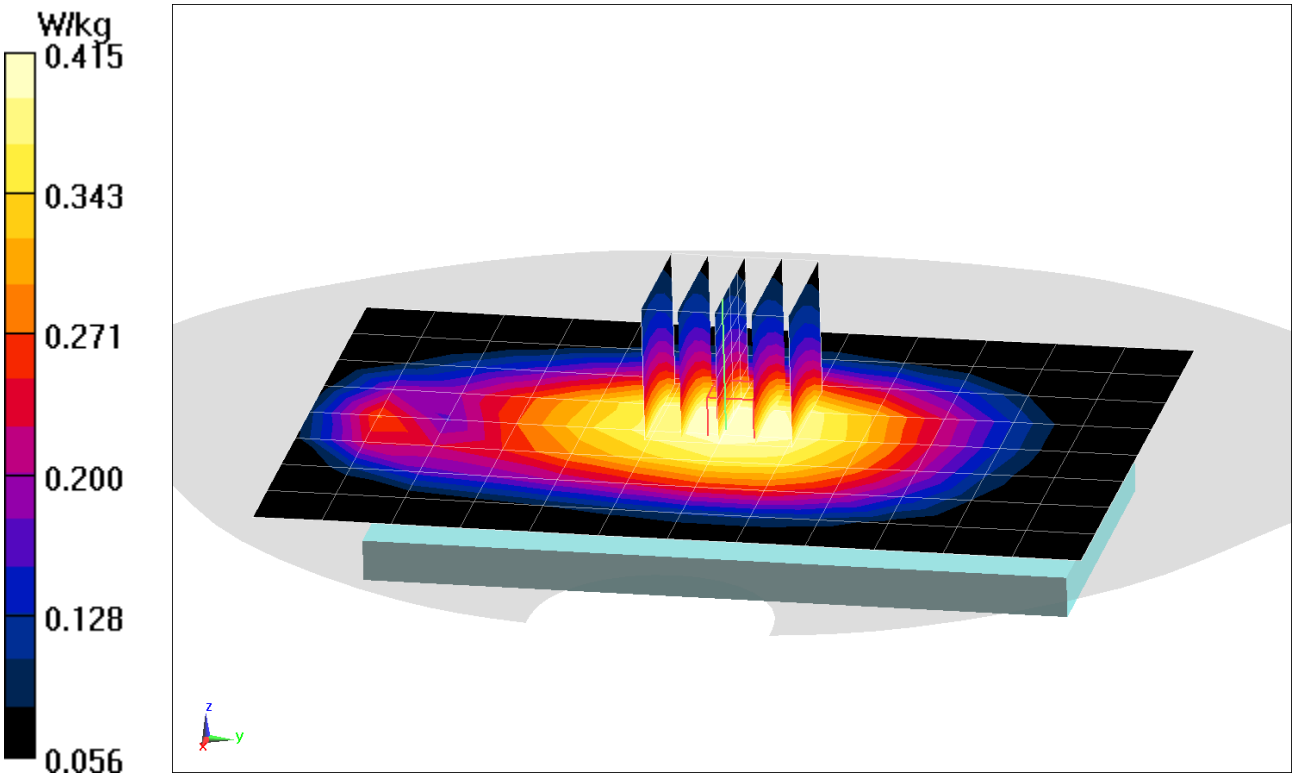
Communication System: UID 0, LTE Band 14; Frequency: 793 MHz; Duty Cycle: 1:1
Medium: 750MHz Body Medium parameters used (interpolated):
f = 793 MHz; σ = 0.978 S/m; ε_r = 54.506; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-24-2019; Ambient Temp: 21.7°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN7308; ConvF(10.38, 10.38, 10.38) @ 793 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 14, 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 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.15 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.449 W/kg
SAR(1 g) = 0.350 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53783

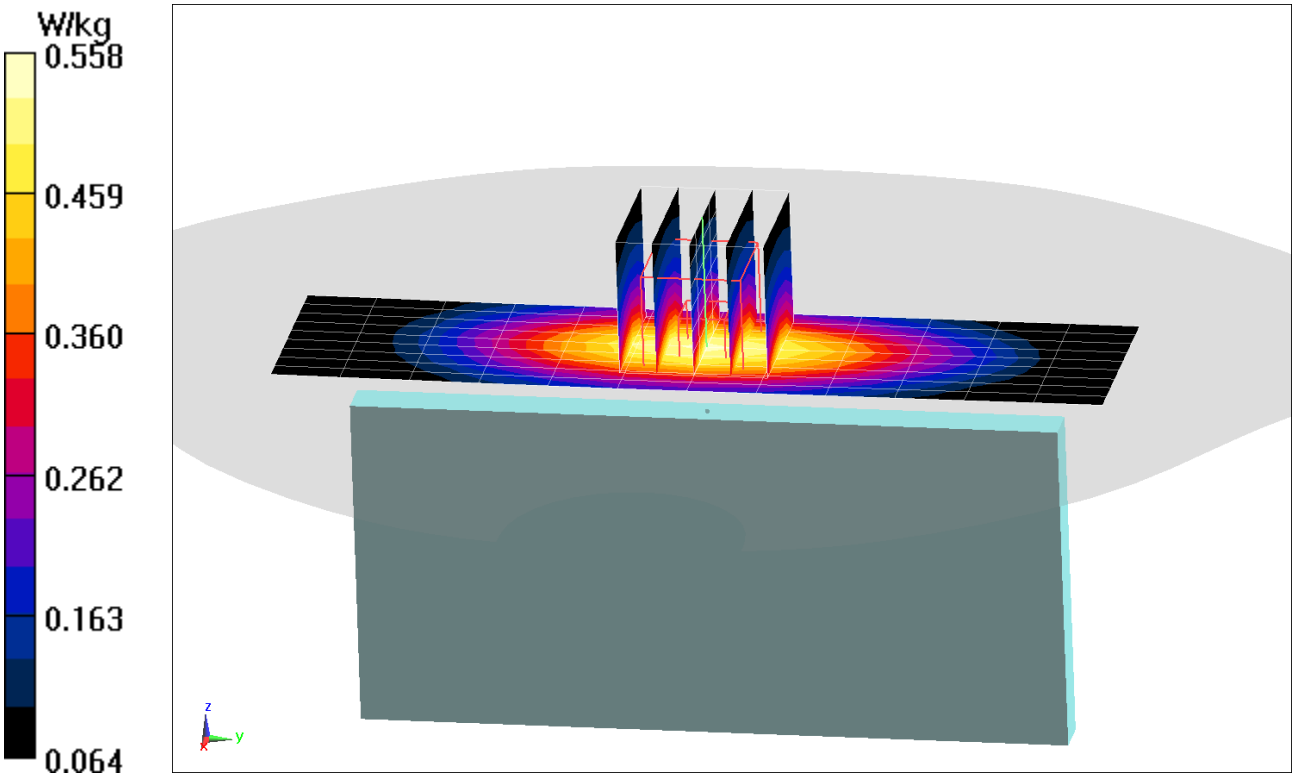
Communication System: UID 0, LTE Band 14; Frequency: 793 MHz; Duty Cycle: 1:1
Medium: 750MHz Body Medium parameters used (interpolated):
f = 793 MHz; σ = 0.978 S/m; ε_r = 54.506; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-24-2019; Ambient Temp: 21.7°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN7308; ConvF(10.38, 10.38, 10.38) @ 793 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 14, Body SAR, Right Edge, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (10x13x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.50 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.623 W/kg
SAR(1 g) = 0.428 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53783

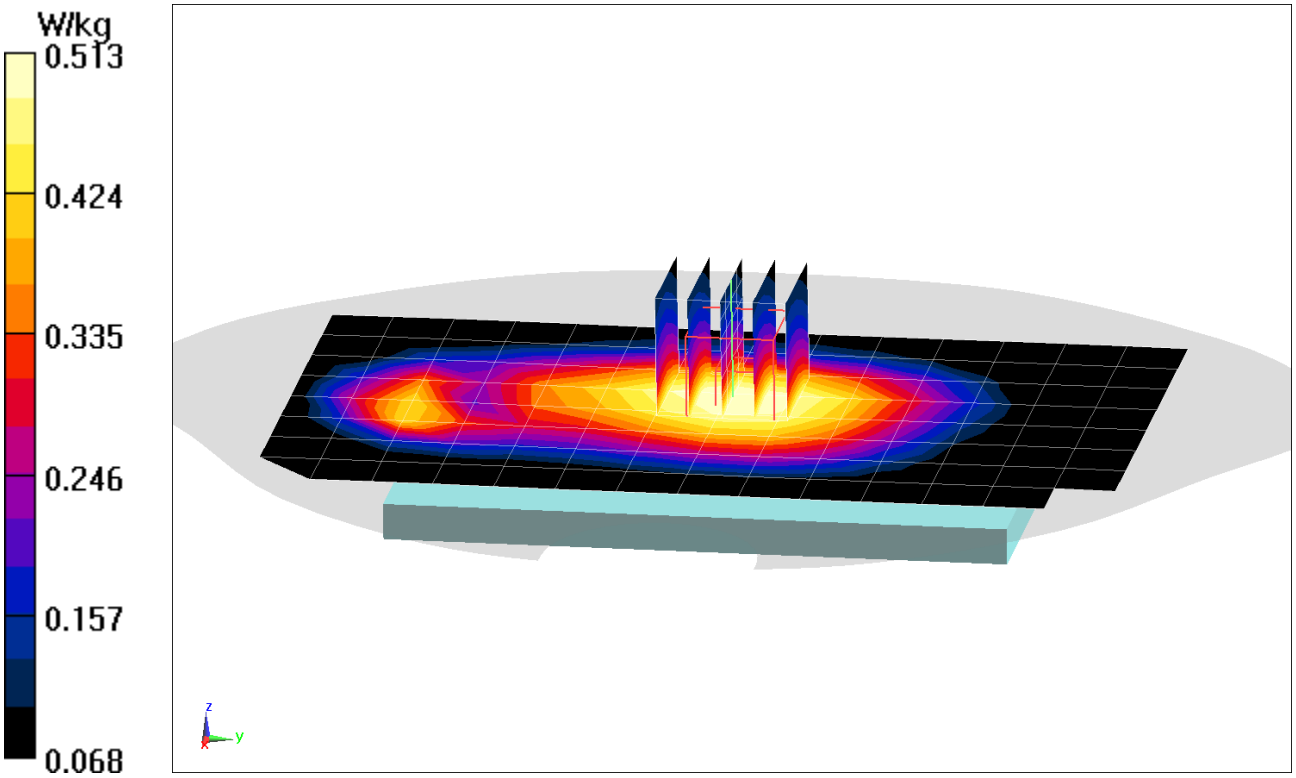
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.5 MHz; σ = 1.001 S/m; ε_r = 52.819; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

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) @ 836.5 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 5 (Cell.), Body SAR, Back side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 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 = 20.84 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.566 W/kg
SAR(1 g) = 0.419 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53783

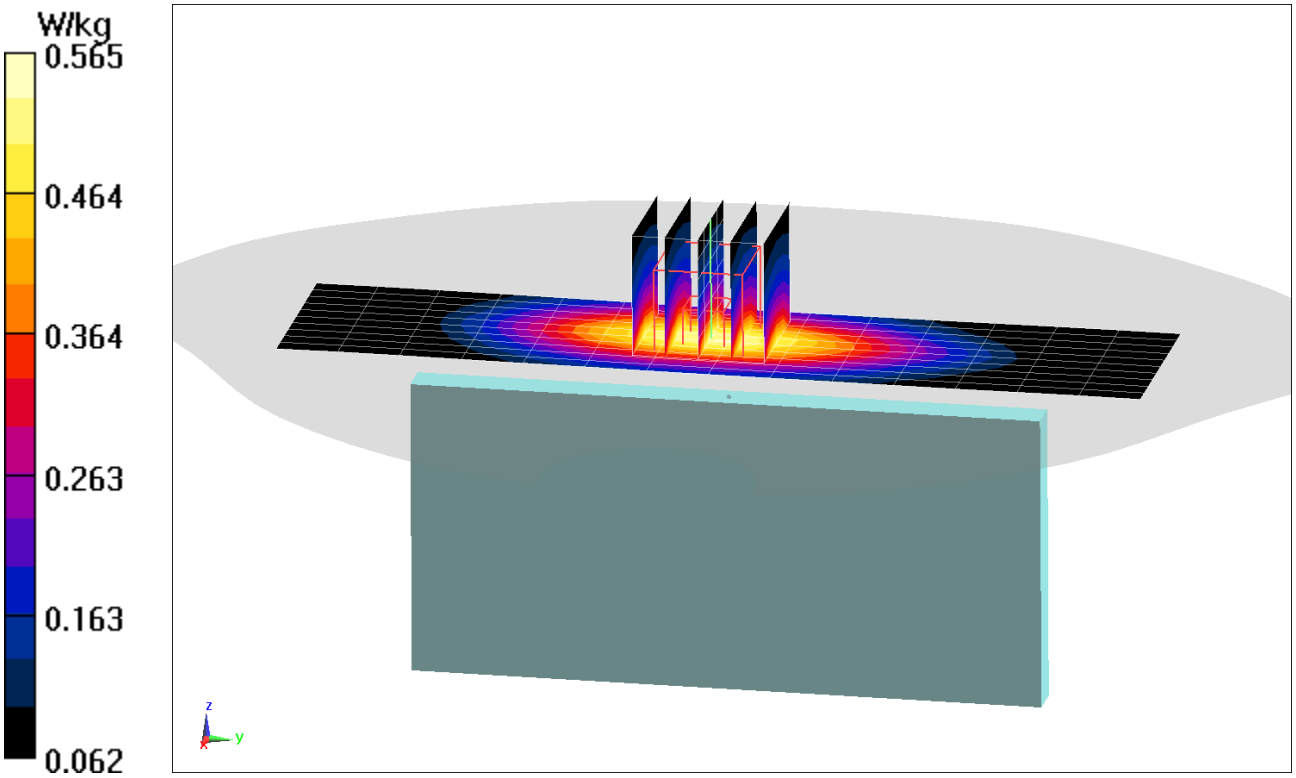
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.5 MHz; σ = 1.001 S/m; ε_r = 52.819; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

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) @ 836.5 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 5 (Cell.), Body SAR, Right Edge, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (11x15x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.20 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.641 W/kg
SAR(1 g) = 0.427 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53791

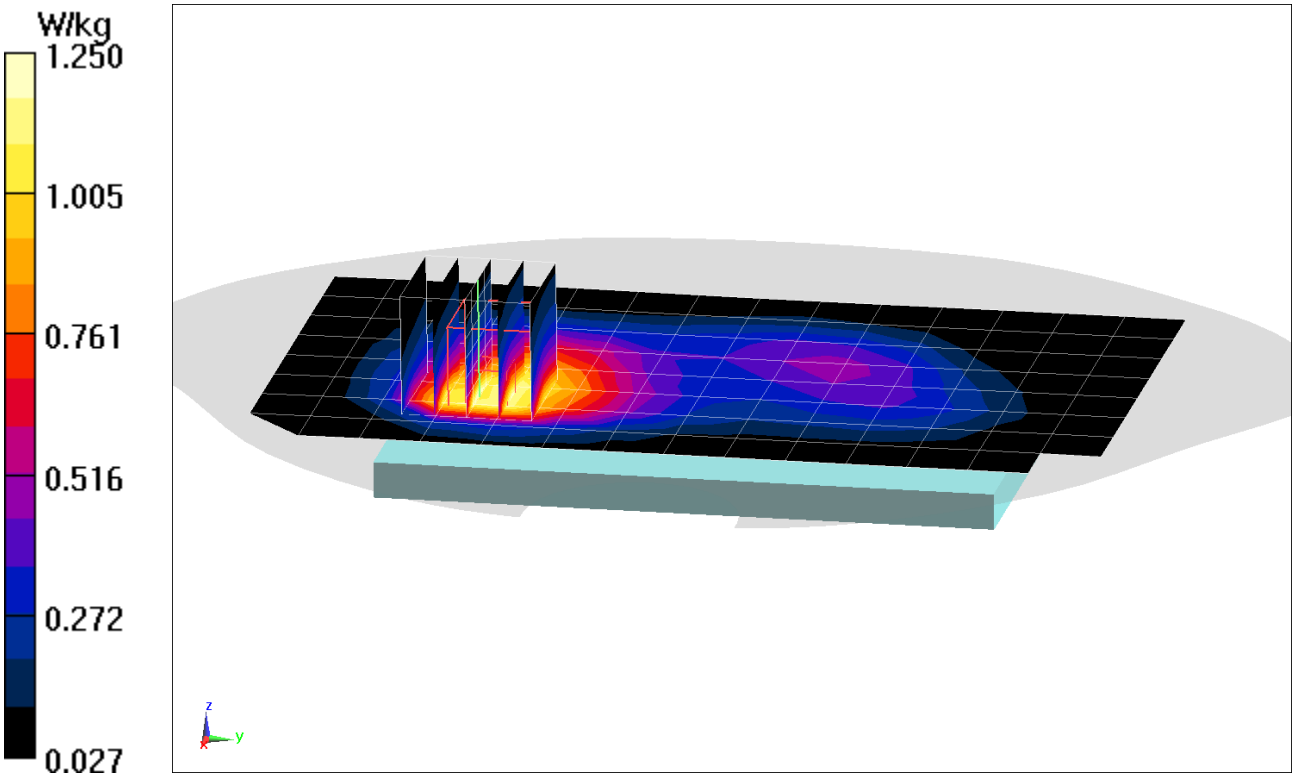
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1720 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1720 MHz; σ = 1.483 S/m; ε_r = 52.145; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-24-2019; Ambient Temp: 23.3°C; Tissue Temp: 22.7°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: 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 66 (AWS), Body SAR, Back side, Low.ch. 20 MHz Bandwidth, QPSK, 1RB, 50 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 = 26.68 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.65 W/kg
SAR(1 g) = 0.975 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53775

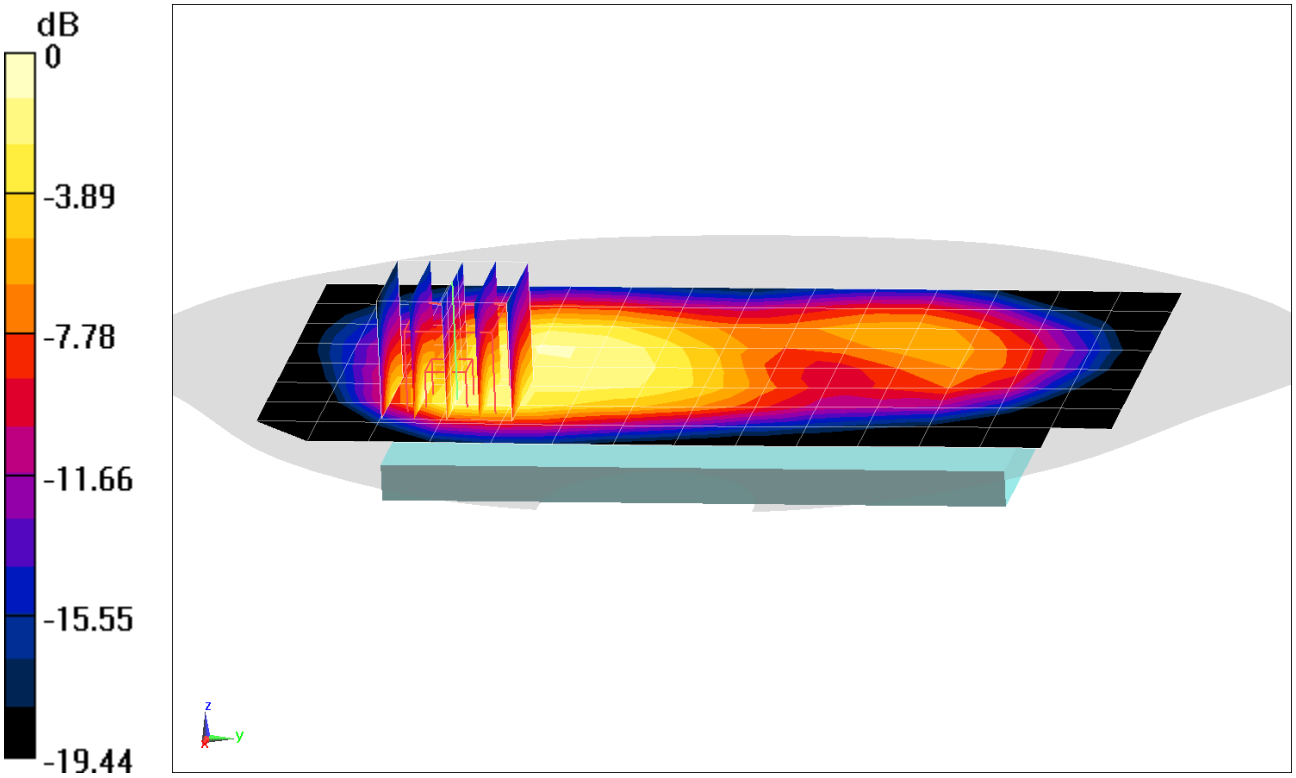
Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.584 S/m; ε_r = 51.771; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-29-2019; Ambient Temp: 20.0°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7357; ConvF(7.93, 7.93, 7.93) @ 1900 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 2 (PCS), Body SAR, Back side, High.ch, 20 MHz Bandwidth, QPSK, 1 RB, 50 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 = 23.59 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 0.783 W/kg



0 dB = 1.22 W/kg = 0.86 dBW/kg

DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53783

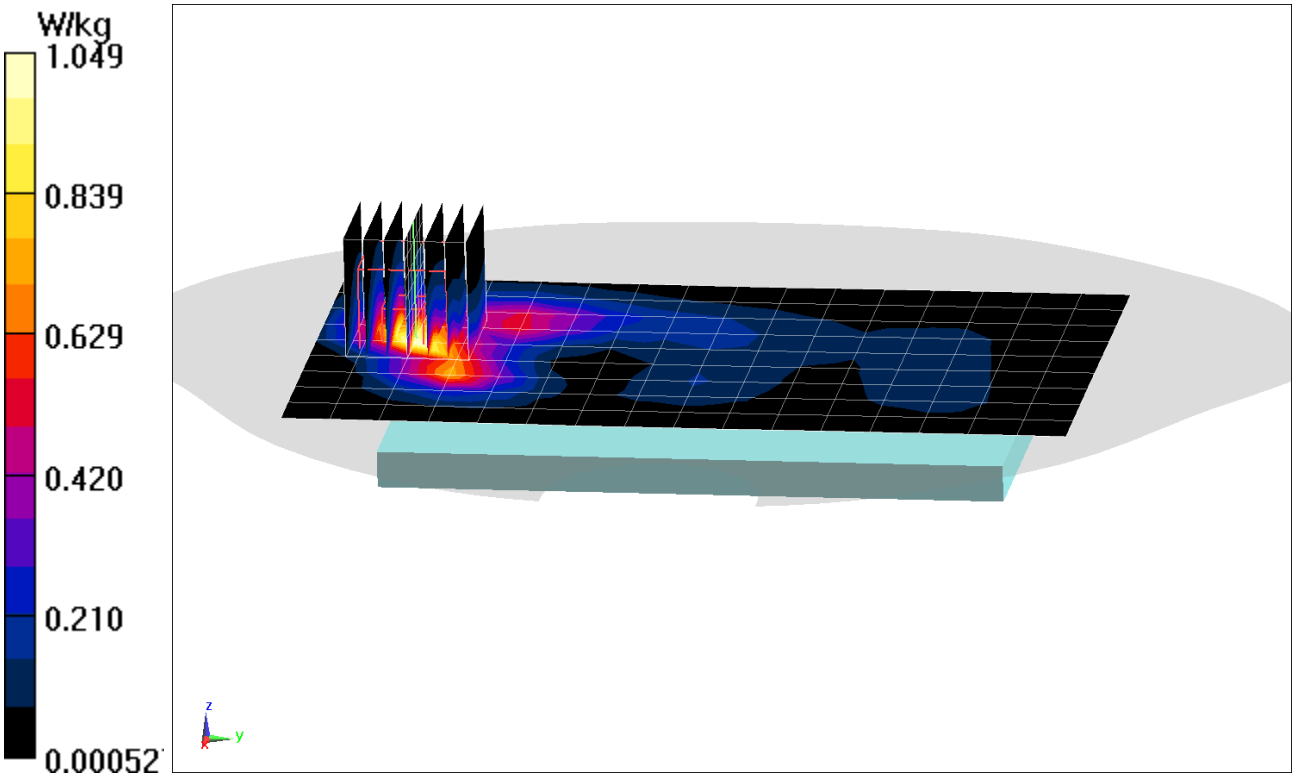
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2310 MHz; σ = 1.897 S/m; ε_r = 53.053; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

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

Probe: EX3DV4 - SN7308; ConvF(7.73, 7.73, 7.73) @ 2310 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 30, Body SAR, Back side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 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 = 19.76 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.656 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53783

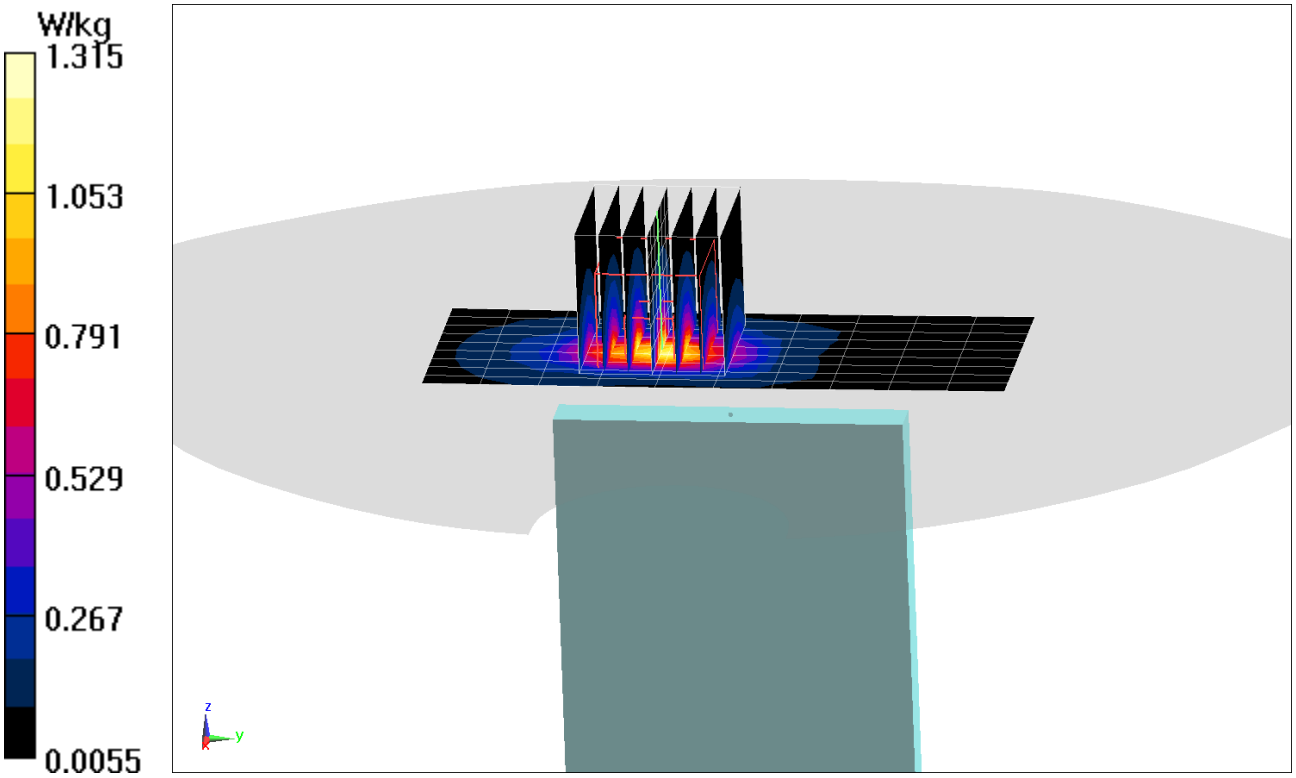
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2310 MHz; σ = 1.897 S/m; ε_r = 53.053; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

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

Probe: EX3DV4 - SN7308; ConvF(7.73, 7.73, 7.73) @ 2310 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 30, Body SAR, Bottom Edge, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset

Area Scan (10x11x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.11 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 1.62 W/kg
SAR(1 g) = 0.802 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53866

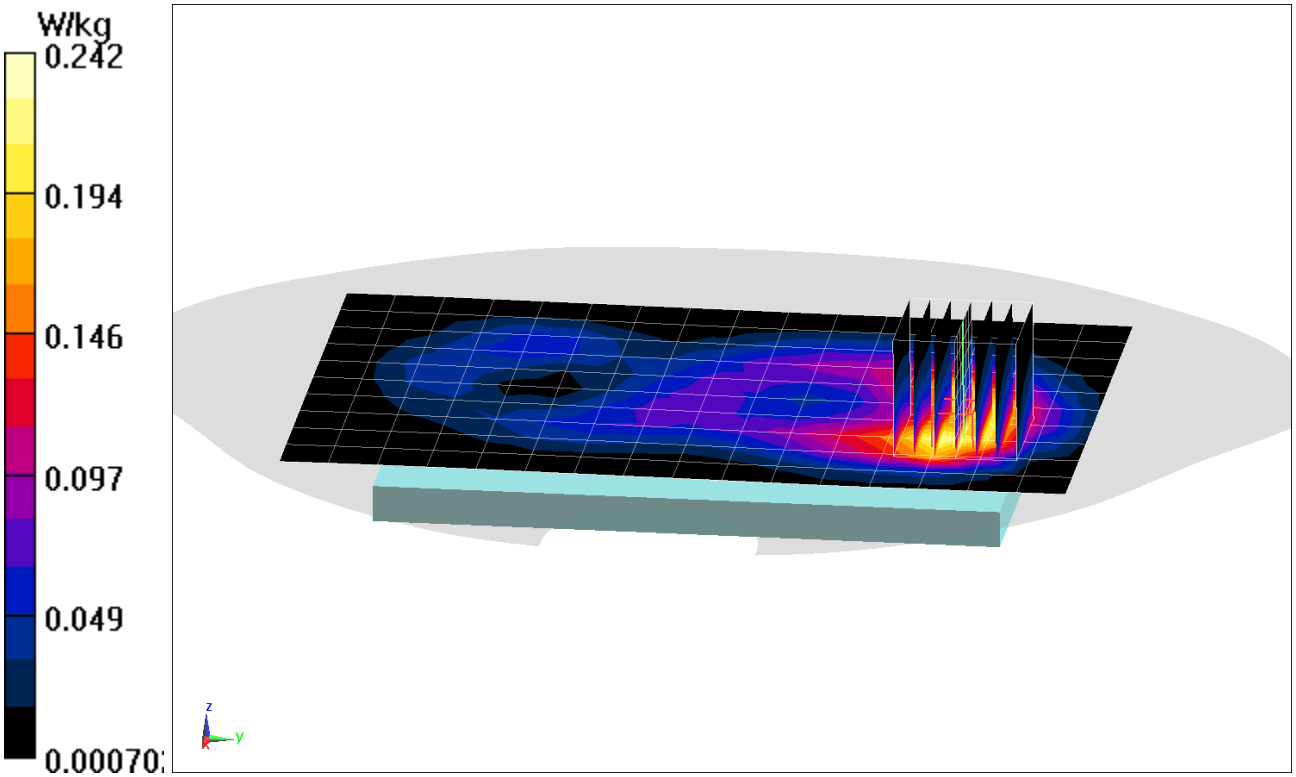
Communication System: UID 0, _IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2412 MHz; σ = 1.995 S/m; ε_r = 50.643; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 5-2-2019; Ambient Temp: 23.2°C; Tissue Temp: 21.5°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: 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: IEEE 802.11b, 22 MHz Bandwidth, Body SAR, Ch 1, 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 = 9.100 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.315 W/kg
SAR(1 g) = 0.152 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53791

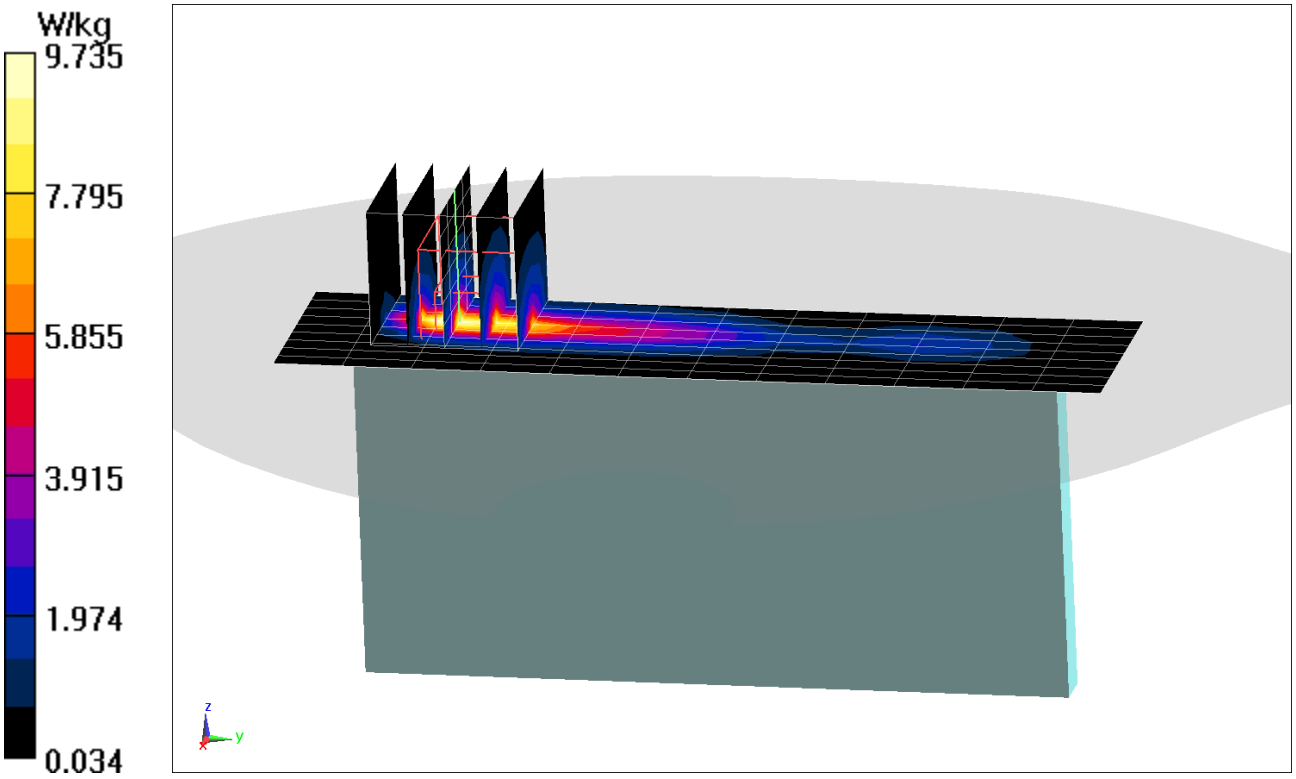
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.505 S/m; ε_r = 51.654; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0 cm

Test Date: 4-26-2019; Ambient Temp: 21.1°C; Tissue Temp: 19.6°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: 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 1750, Phablet SAR, Left Edge, Mid.ch

Area Scan (10x13x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 65.25 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 13.9 W/kg
SAR(10 g) = 2.54 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53809

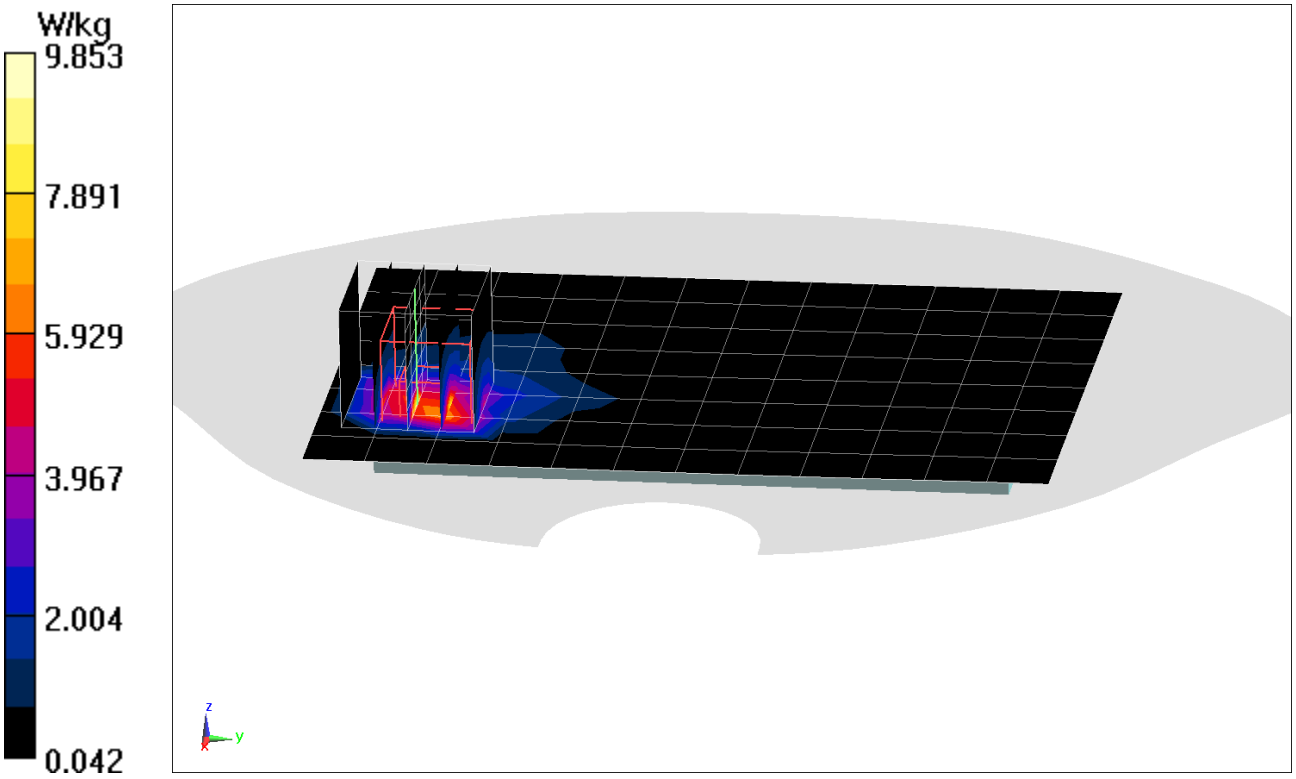
Communication System: UID 0, UMTS; Frequency: 1907.6 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1907.6 MHz; σ = 1.509 S/m; ε_r = 51.397; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0 cm

Test Date: 05-02-2019; Ambient Temp: 22.3°C; Tissue Temp: 23.8°C

Probe: EX3DV4 - SN7357; ConvF(7.93, 7.93, 7.93) @ 1907.6 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1900, Phablet SAR, Back side, High.ch

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 62.91 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 13.4 W/kg
SAR(10 g) = 2.52 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53783

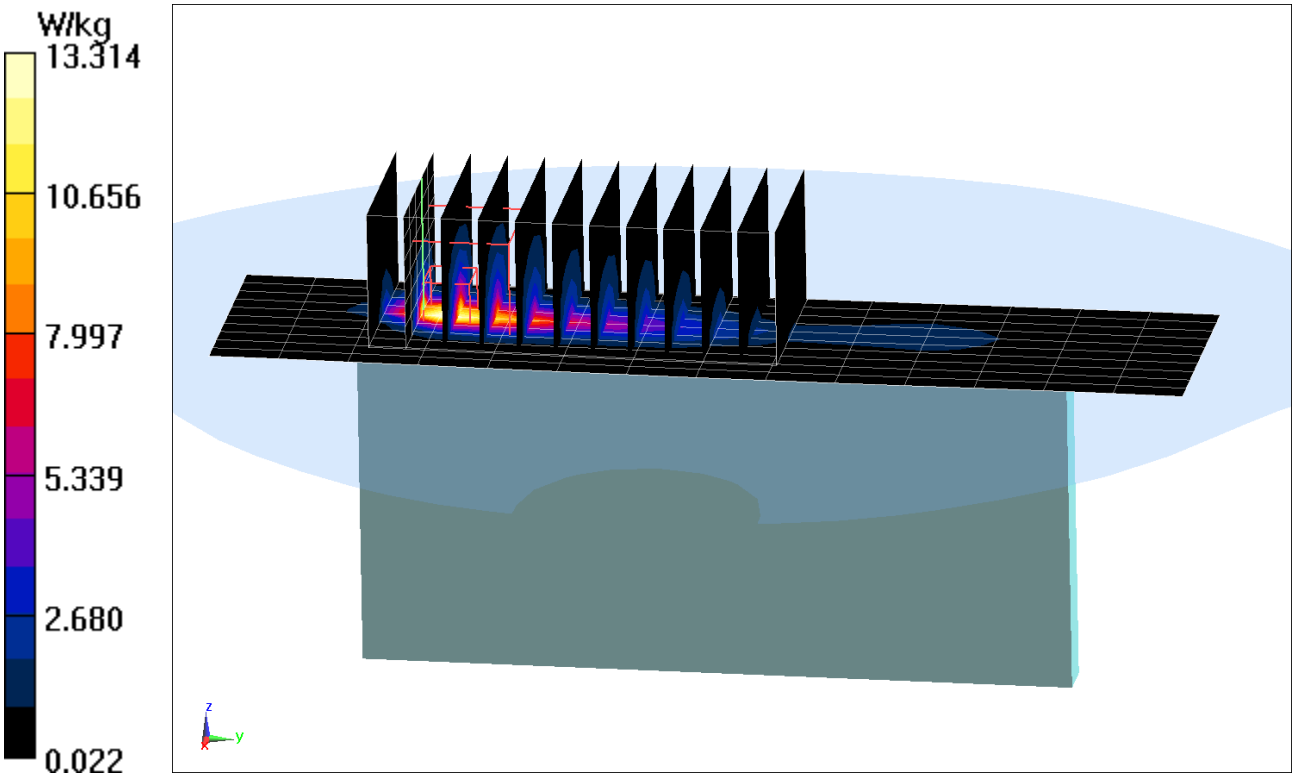
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1745 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
$f = 1745$ MHz; $\sigma = 1.523$ S/m; $\varepsilon_r = 51.906$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0 cm

Test Date: 04-29-2019; Ambient Temp: 20.7°C; Tissue Temp: 19.9°C

Probe: EX3DV4 - SN3914; ConvF(7.89, 7.89, 7.89) @ 1745 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/14/2019
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 66 (AWS), Phablet SAR, Left Edge, Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset

Area Scan (11x15x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (6x12x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 73.58 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 18.6 W/kg
SAR(10 g) = 3.17 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53775

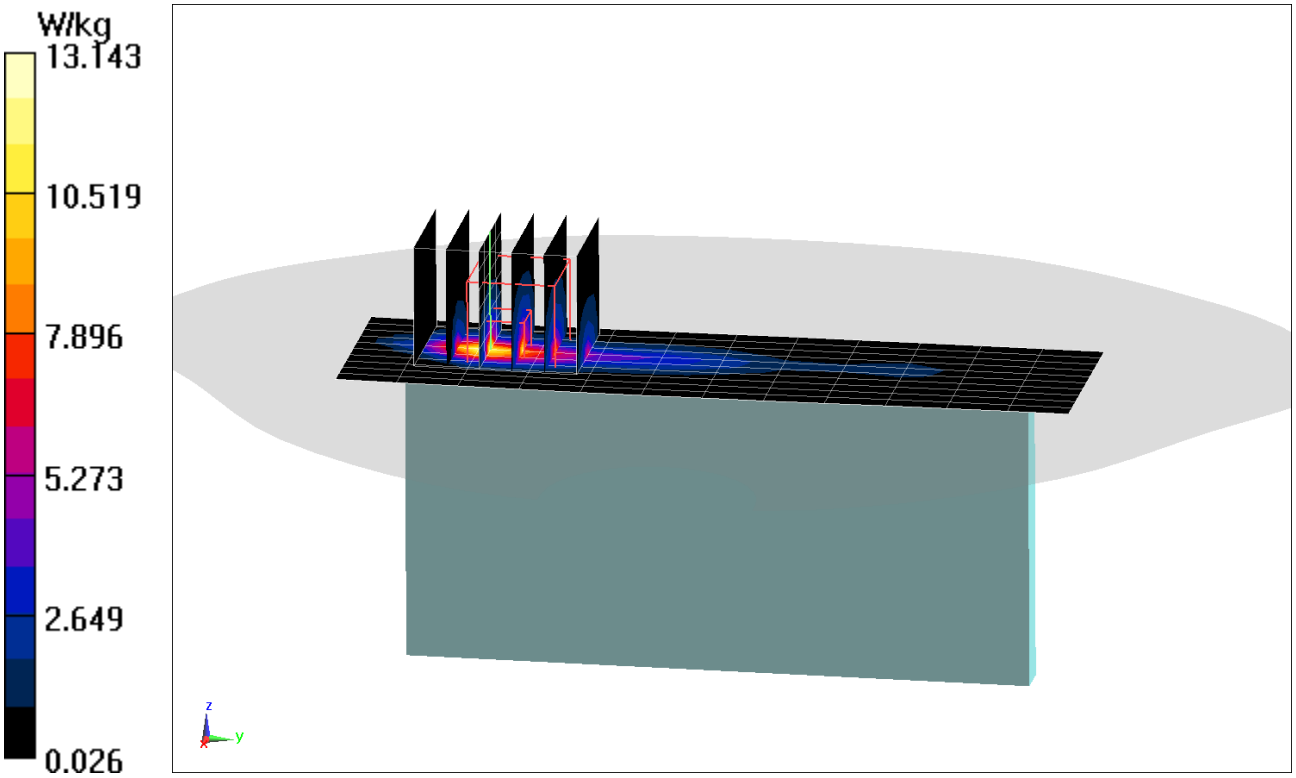
Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.584 S/m; ε_r = 51.771; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0 cm

Test Date: 04-29-2019; Ambient Temp: 20.0°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7357; ConvF(7.93, 7.93, 7.93) @ 1900 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 2 (PCS), Phablet SAR, Left Edge, High.ch, 20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset

Area Scan (11x13x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 70.66 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 17.8 W/kg
SAR(10 g) = 3.05 W/kg



DUT: ZNFX420AS8; Type: Portable Handset; Serial: 53783

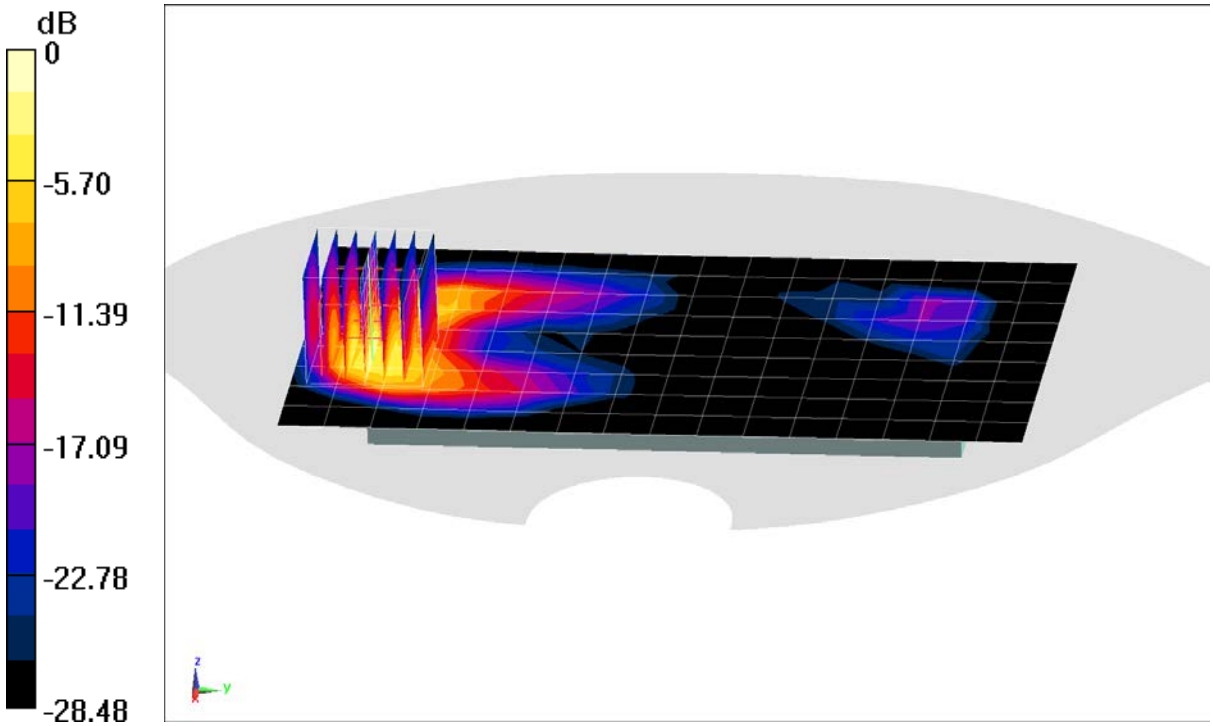
Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2310 MHz; σ = 1.897 S/m; ε_r = 53.053; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

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

Probe: EX3DV4 - SN7308; ConvF(7.73, 7.73, 7.73) @ 2310 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 30, Phablet SAR, Front side, Mid.ch, 10 MHz Bandwidth, QPSK, 25 RB, 12 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 = 58.73 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 15.3 W/kg
SAR(10 g) = 1.75 W/kg



0 dB = 11.4 W/kg = 10.57 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

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

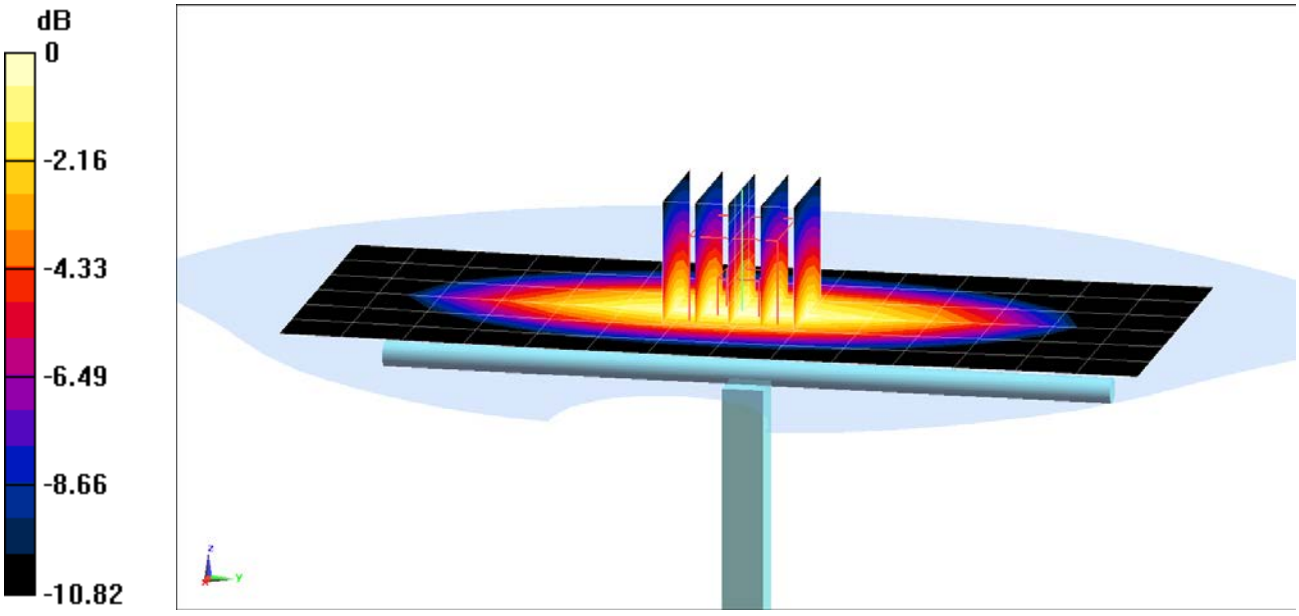
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Head; Medium parameters used (interpolated):
f = 750 MHz; σ = 0.906 S/m; ε_r = 40.528; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 04-22-2019; Ambient Temp: 22.3°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(9.91, 9.91, 9.91) @ 750 MHz; Calibrated: 6/25/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2018
Phantom: SAM 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)

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) = 2.70 W/kg
SAR(1 g) = 1.72 W/kg
Deviation(1 g) = 3.86%



0 dB = 2.35 W/kg = 3.71 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

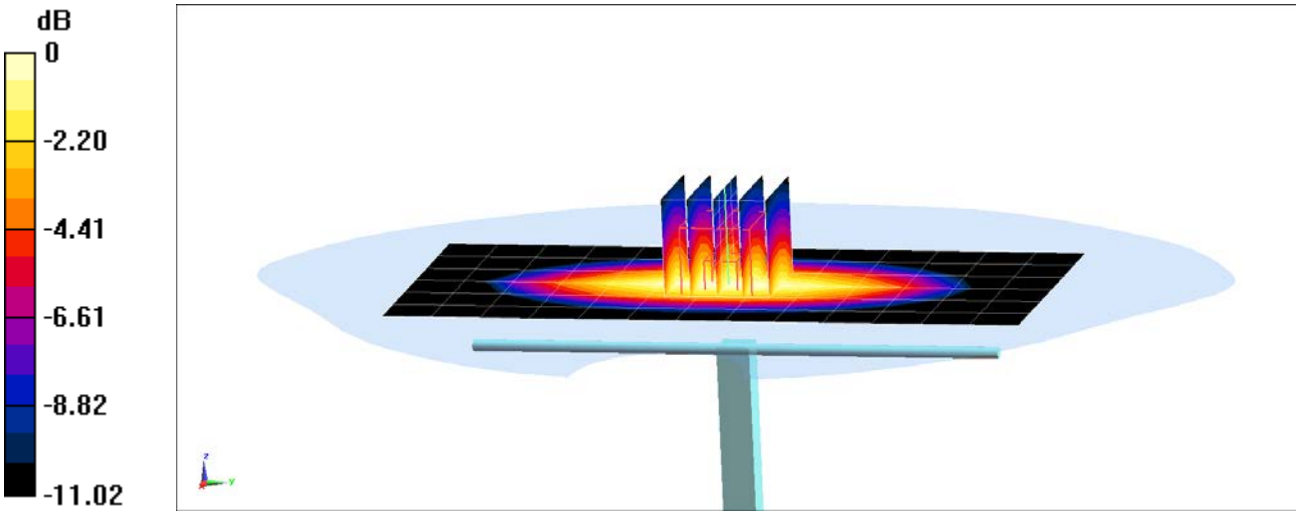
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.942 S/m; ε_r = 42.78; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 04-21-2019; Ambient Temp: 22.3°C; Tissue Temp: 22.1°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) = 3.19 W/kg
SAR(1 g) = 2.07 W/kg
Deviation(1 g) = 7.92%



0 dB = 2.82 W/kg = 4.50 dBW/kg

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

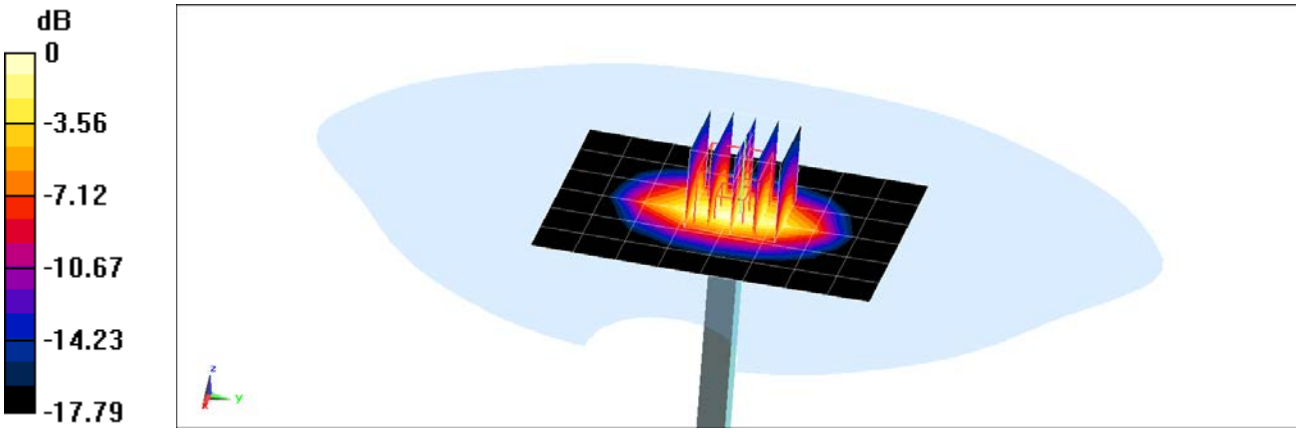
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Head; Medium parameters used:
f = 1750 MHz; σ = 1.367 S/m; ε_r = 39.973; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-28-2019; Ambient Temp: 20.2°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(8.43, 8.43, 8.43) @ 1750 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)

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) = 6.83 W/kg
SAR(1 g) = 3.67 W/kg
Deviation(1 g) = 0.82%



0 dB = 5.67 W/kg = 7.54 dBW/kg

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

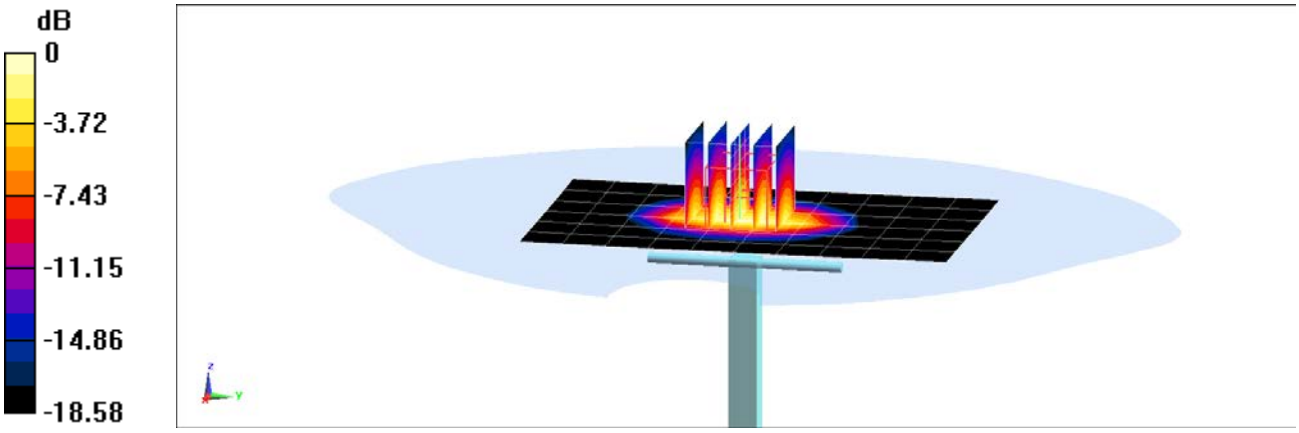
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head; Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.463 S/m; ε_r = 39.705; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

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

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1064

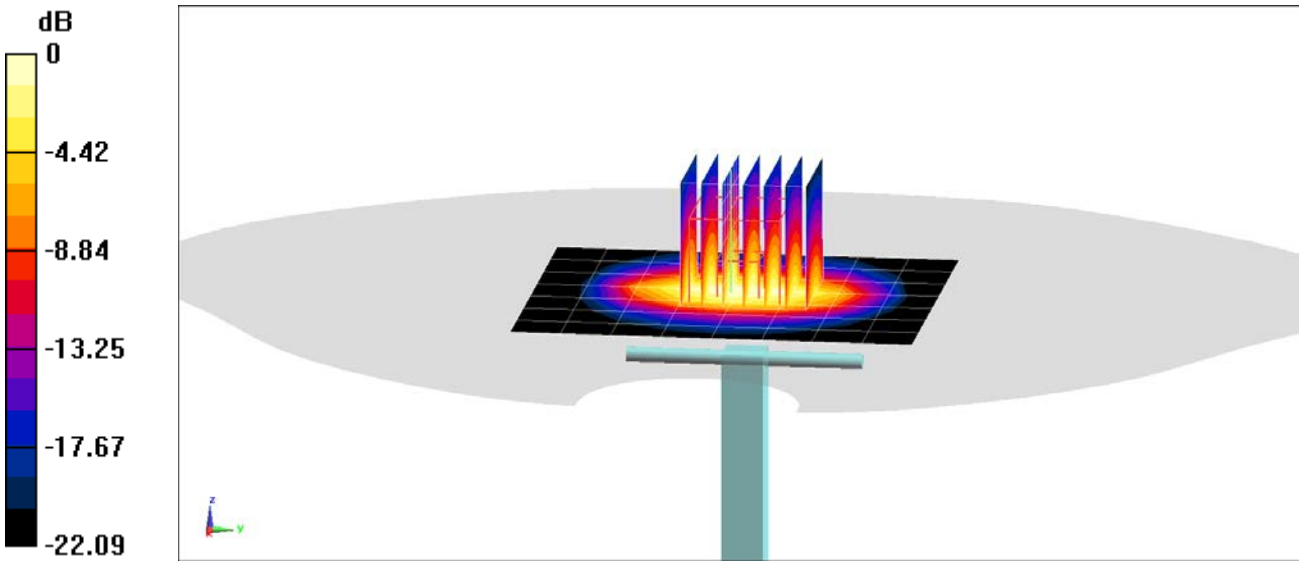
Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2300 MHz; σ = 1.703 S/m; ε_r = 38.234; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-02-2019; Ambient Temp: 24.2°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3589; ConvF(6.77, 6.77, 6.77) @ 2300 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)

2300 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.2 W/kg
SAR(1 g) = 4.71 W/kg
Deviation(1 g) = -1.05%



0 dB = 7.90 W/kg = 8.98 dBW/kg

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

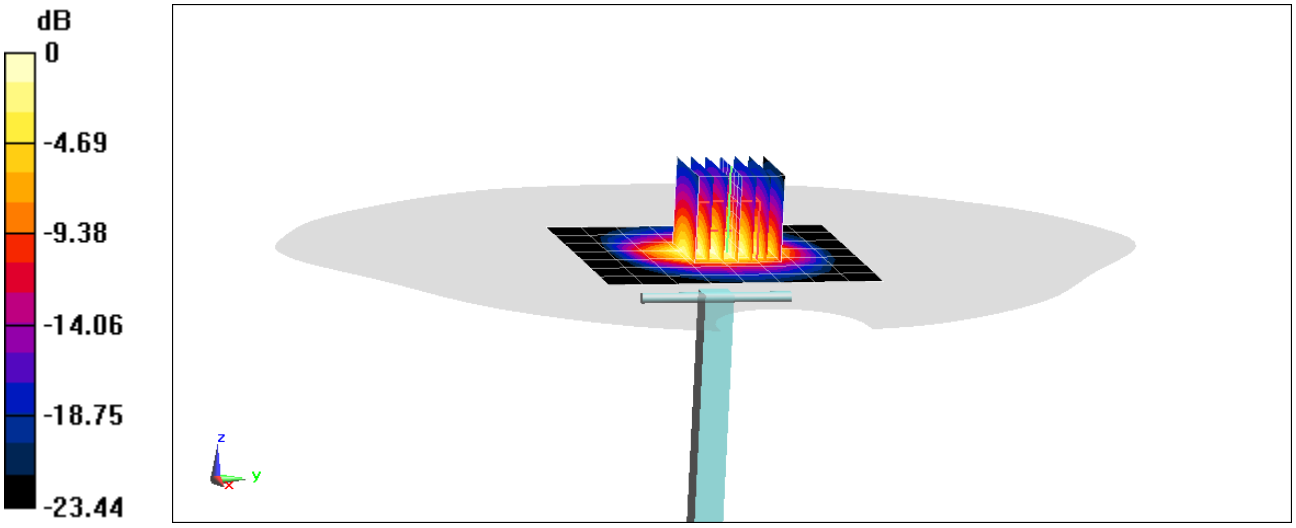
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.82 S/m; ε_r = 37.749; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-29-2019; Ambient Temp: 20.1°C; Tissue Temp: 19.9°C

Probe: EX3DV4 - SN7308; ConvF(7.45, 7.45, 7.45) @ 2450 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)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.1 W/kg
SAR(1 g) = 5.18 W/kg
Deviation(1 g) = -0.19%



0 dB = 8.73 W/kg = 9.41 dBW/kg

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

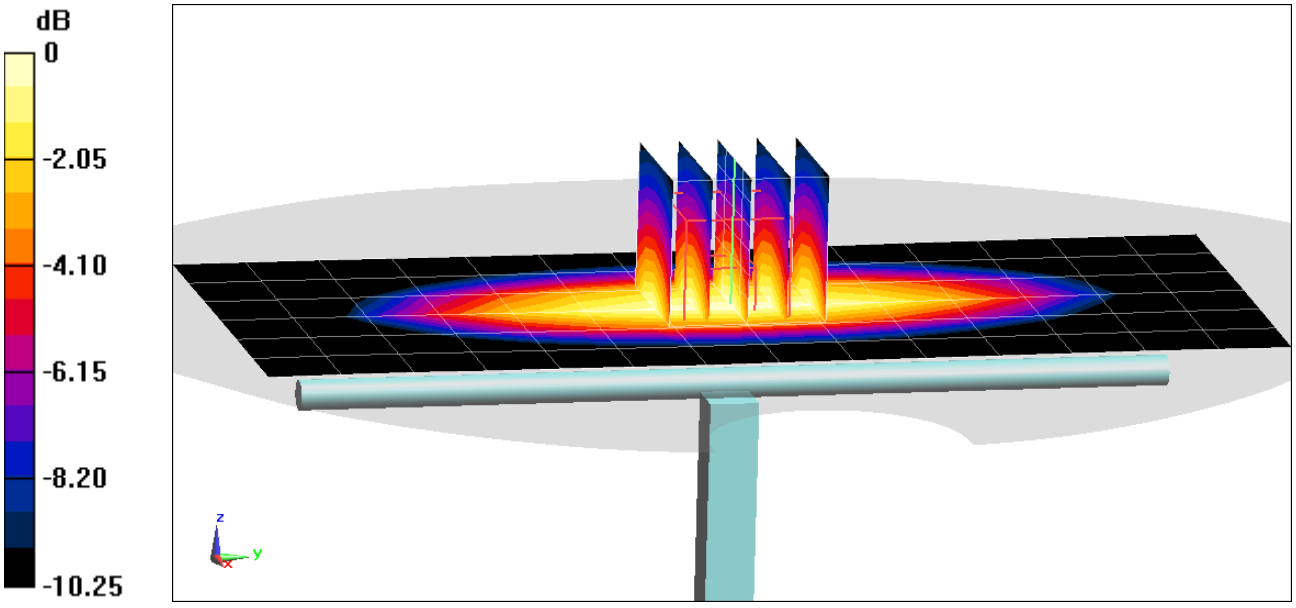
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750MHz Body Medium parameters used (interpolated):
f = 750 MHz; σ = 0.962 S/m; ε_r = 54.597; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 04-24-2019; Ambient Temp: 21.7°C; Tissue Temp: 20.5°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) = 2.63 W/kg
SAR(1 g) = 1.73 W/kg
Deviation(1 g) = 2.61%



0 dB = 2.32 W/kg = 3.65 dBW/kg

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

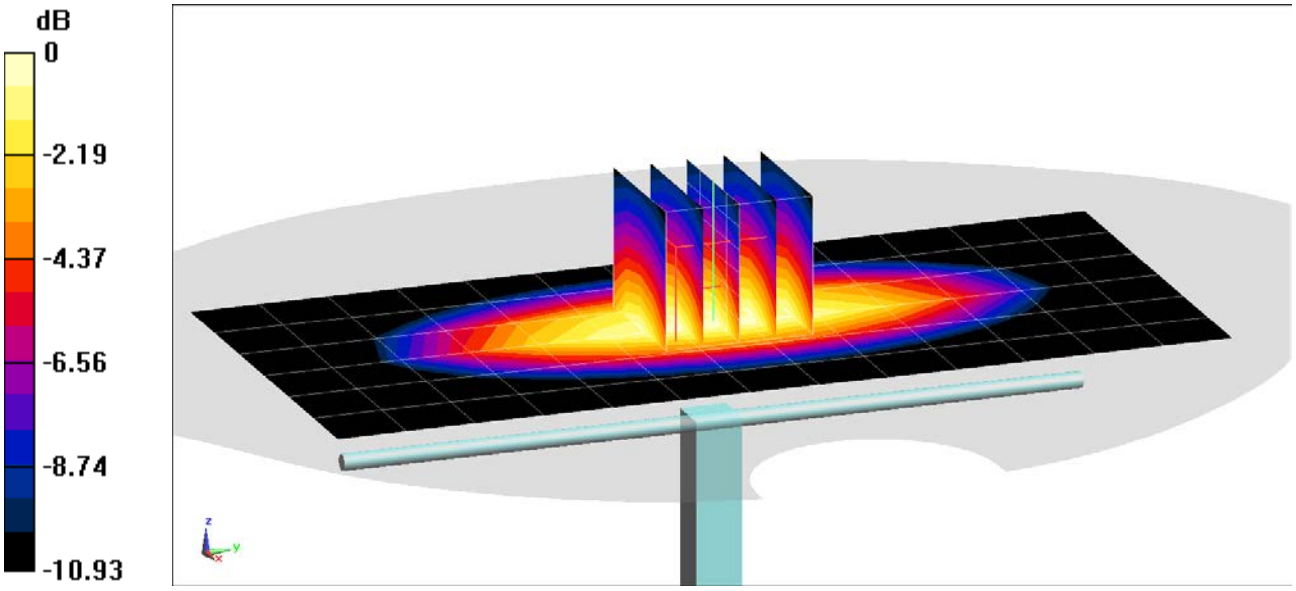
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 1.001 S/m; ε_r = 52.822; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

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

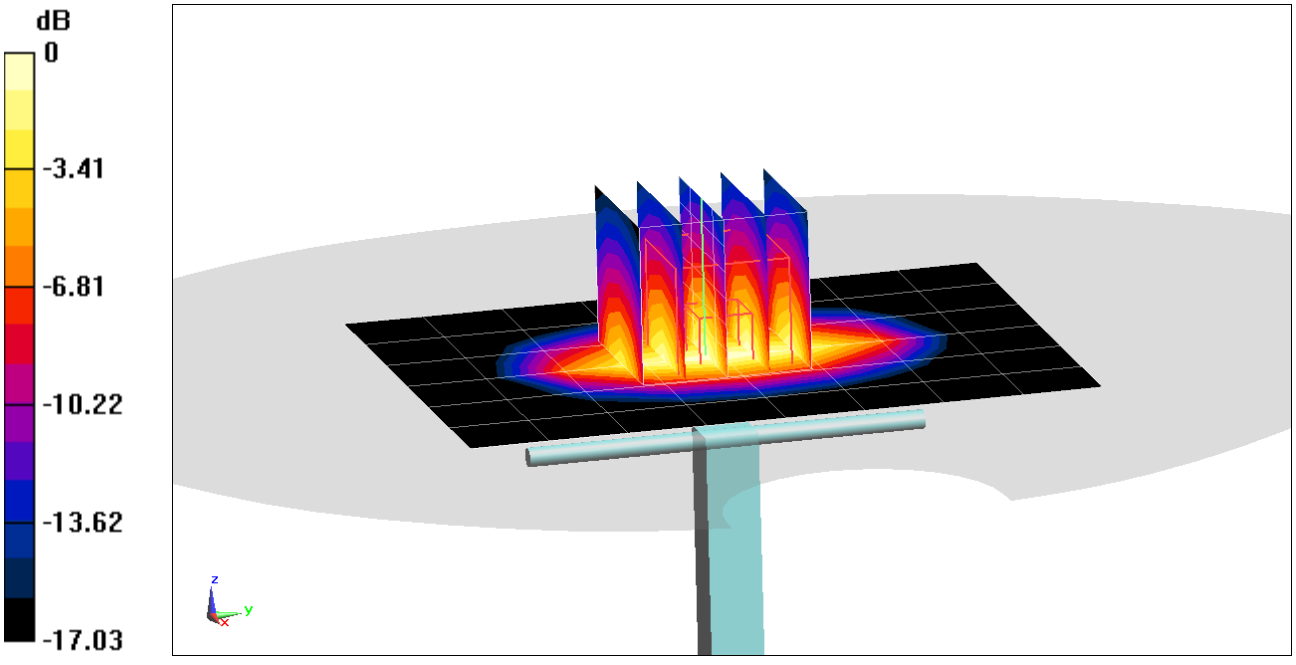
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used:
f = 1750 MHz; σ = 1.506 S/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-22-2019; Ambient Temp: 21.7°C; Tissue Temp: 20.6°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: 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)

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) = 6.66 W/kg
SAR(1 g) = 3.75 W/kg
Deviation(1 g) = 1.35%



0 dB = 5.60 W/kg = 7.48 dBW/kg

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

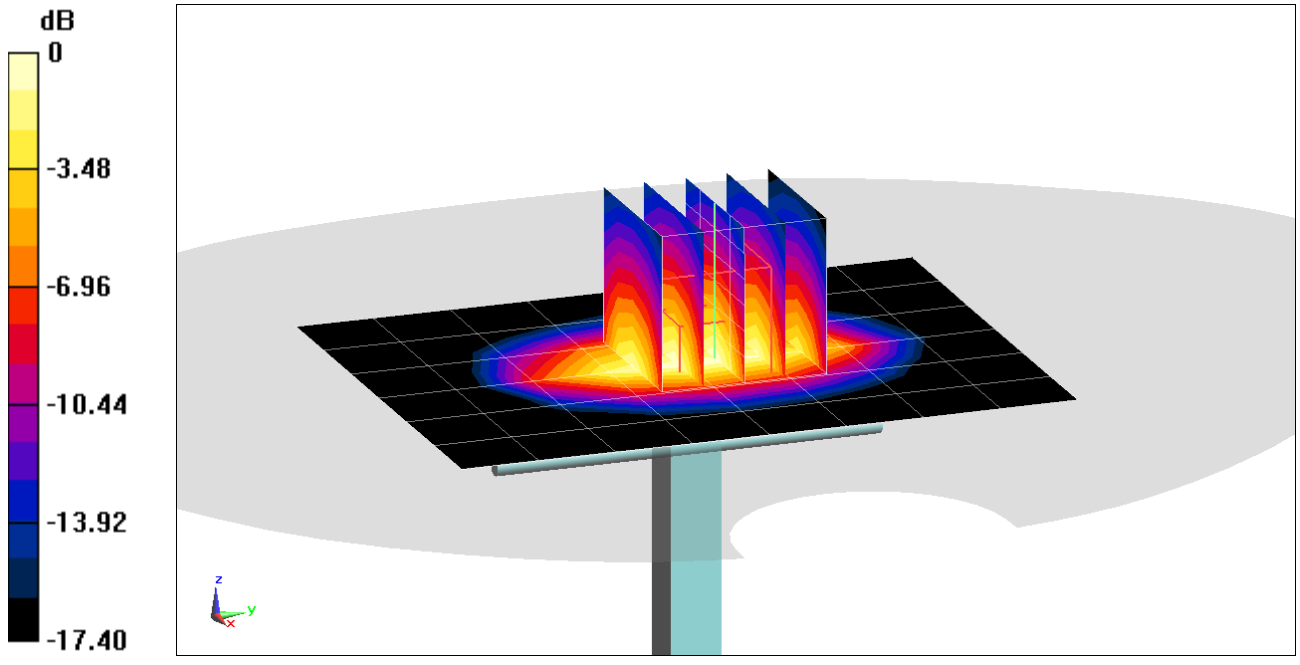
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used:
f = 1750 MHz; σ = 1.517 S/m; ε_r = 51.618; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 4-26-2019; Ambient Temp: 21.1°C; Tissue Temp: 19.6°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: 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)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.16 W/kg
SAR(10 g) = 2.12 W/kg
Deviation(10 g) = 7.07%



0 dB = 6.00 W/kg = 7.78 dBW/kg

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

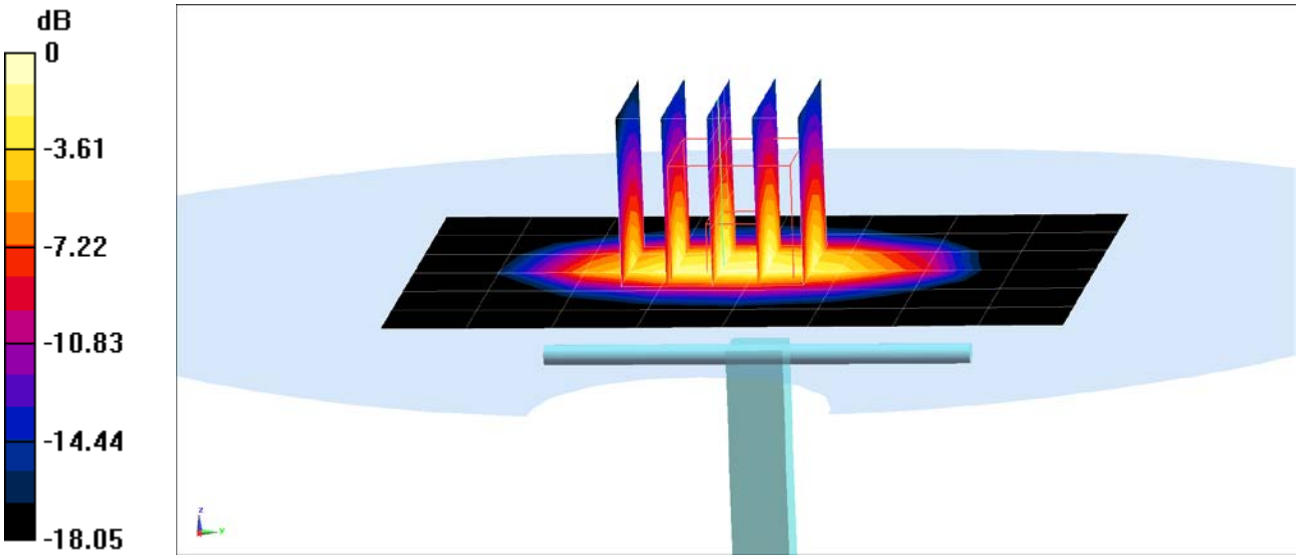
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used:
f = 1750 MHz; σ = 1.529 S/m; ε_r = 51.886; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-29-2019; Ambient Temp: 20.7°C; Tissue Temp: 19.9°C

Probe: EX3DV4 - SN3914; ConvF(7.89, 7.89, 7.89) @ 1750 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/14/2019
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.13 W/kg
SAR(1 g) = 3.84 W/kg; SAR(10 g) = 2.02 W/kg
Deviation(1 g) = 3.78%; Deviation(10 g) = 2.02%



0 dB = 5.93 W/kg = 7.73 dBW/kg

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

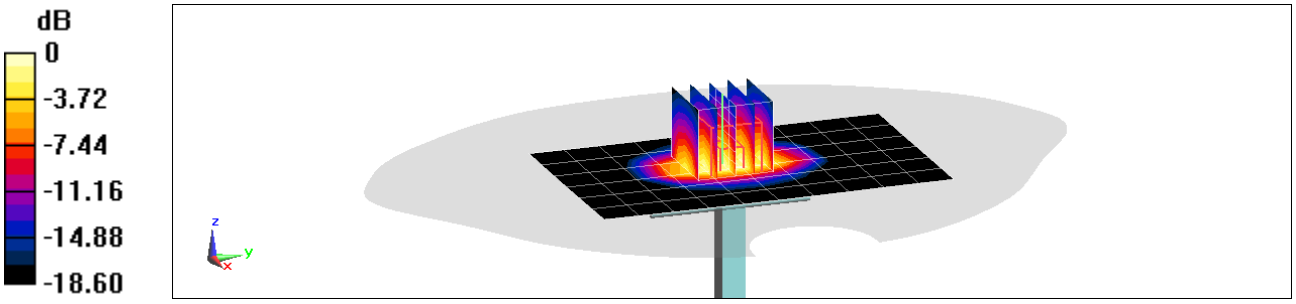
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.584 S/m; ε_r = 51.771; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-29-2019; Ambient Temp: 20.0°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7357; ConvF(7.93, 7.93, 7.93) @ 1900 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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) = 7.79 W/kg
SAR(1 g) = 4.07 W/kg; SAR(10 g) = 2.07 W/kg
Deviation(1 g) = 3.83%; Deviation(10 g) = 0.49%



0 dB = 6.46 W/kg = 8.10 dBW/kg

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

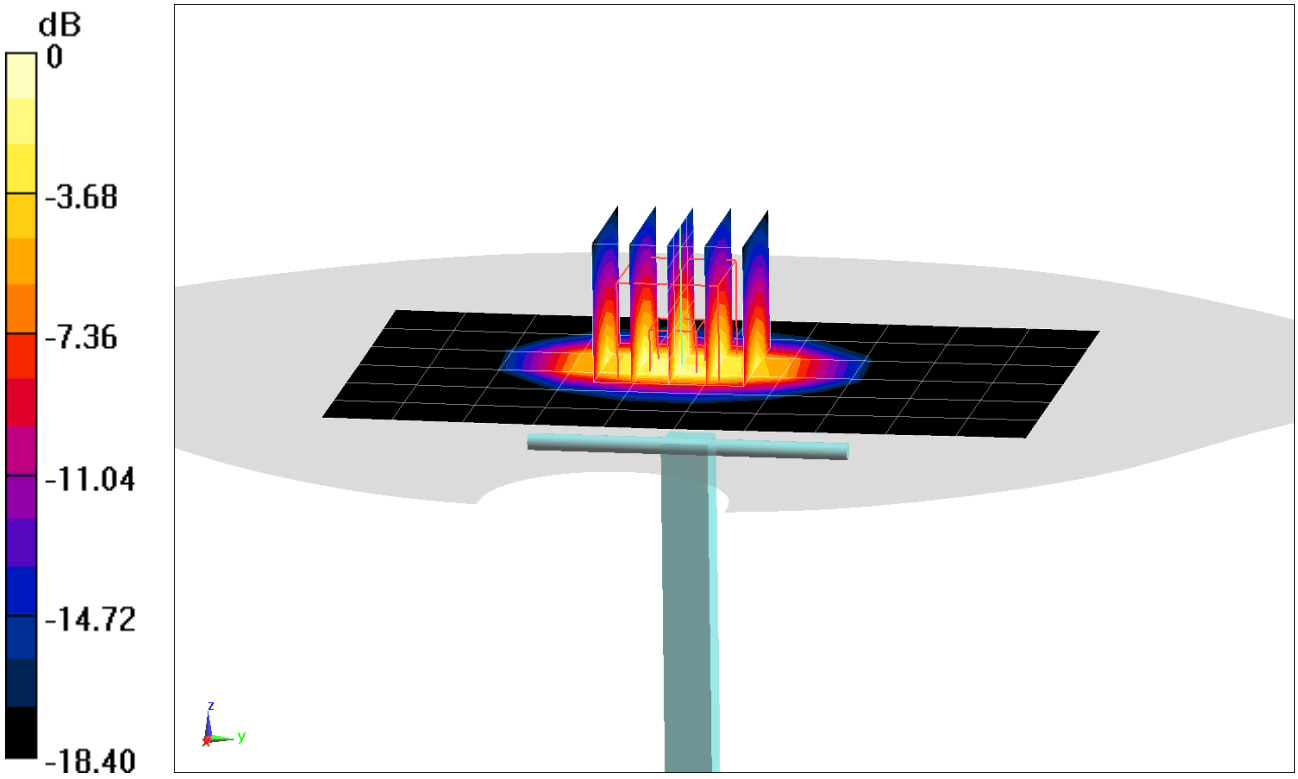
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.501 S/m; ε_r = 51.418; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-02-2019; Ambient Temp: 22.3°C; Tissue Temp: 23.8°C

Probe: EX3DV4 - SN7357; ConvF(7.93, 7.93, 7.93) @ 1900 MHz; Calibrated: 4/24/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/18/2019
Phantom: Twin-SAM V4.0 Front Right; Type: QD 000 P40 CC; Serial: 1167
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

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) = 7.76 W/kg
SAR(1 g) = 4.15 W/kg; SAR(10 g) = 2.12 W/kg
Deviation(1 g) = 5.33%; Deviation(10 g) = 2.42%



0 dB = 6.54 W/kg = 8.16 dBW/kg

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1073

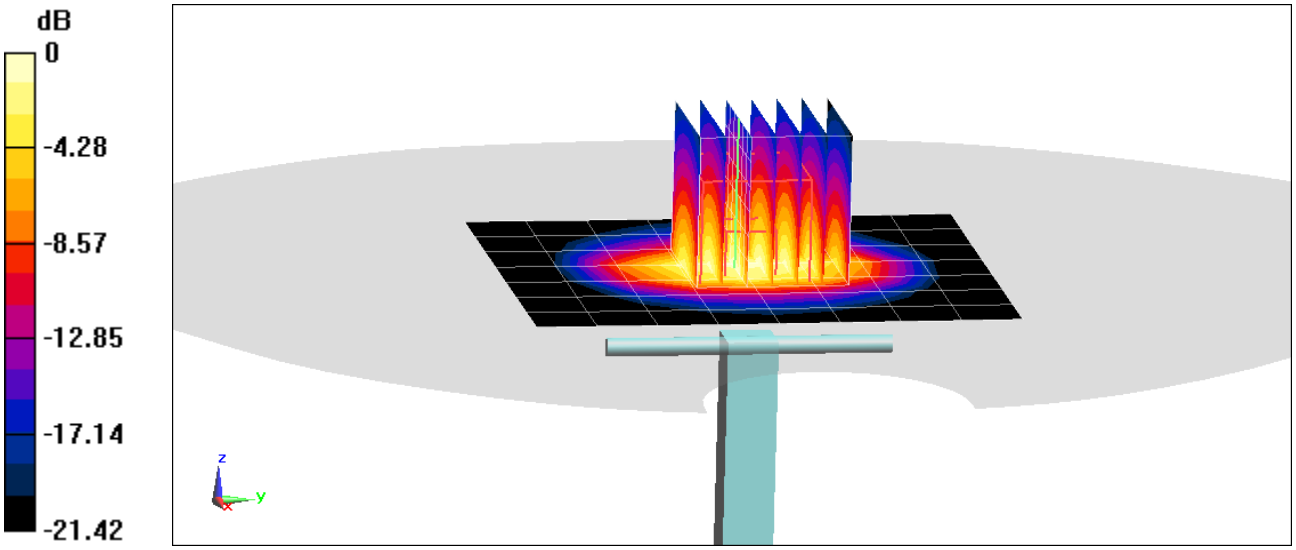
Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2300 MHz; σ = 1.888 S/m; ε_r = 53.066; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

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

Probe: EX3DV4 - SN7308; ConvF(7.73, 7.73, 7.73) @ 2300 MHz; Calibrated: 8/23/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 10/3/2018
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1630
Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

2300 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 9.44 W/kg
SAR(1 g) = 4.68 W/kg; SAR(10 g) = 2.23 W/kg
Deviation(1 g) = -1.89%; Deviation(10 g) = -3.88%



0 dB = 7.61 W/kg = 8.81 dBW/kg

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

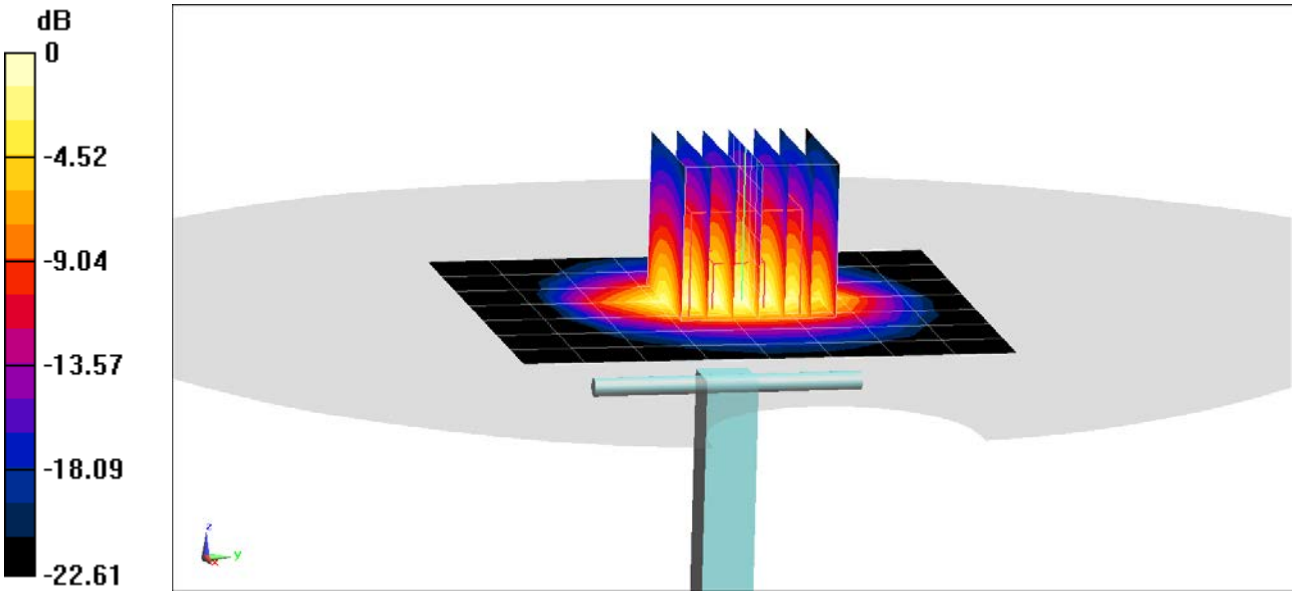
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; σ = 2.038 S/m; ε_r = 50.525; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 5-2-2019; Ambient Temp: 23.2°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7417; ConvF(7.51, 7.51, 7.51) @ 2450 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/13/2019
Phantom: 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) = 10.7 W/kg
SAR(1 g) = 5.14 W/kg
Deviation(1 g) = 0.59%



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

APPENDIX C: PROBE CALIBRATION

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

S Schweizerischer Kalibrierdienst
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S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **PC Test** **Certificate No: EX3-7409_Jun18**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:7409
Calibration procedure(s)	QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	June 25, 2018

BN ✓ 07/16/2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

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: S5277 (20x)	04-Apr-18 (No. 217-02682)	Apr-19
Reference Probe ES3DV2	SN: 3013	30-Dec-17 (No. ES3-3013_Dec17)	Dec-18
DAE4	SN: 660	21-Dec-17 (No. DAE4-660_Dec17)	Dec-18
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 26, 2018

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

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Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

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"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe EX3DV4

SN:7409

Manufactured: November 24, 2015
Calibrated: June 25, 2018

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7409

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.38	0.33	0.38	± 10.1 %
DCP (mV)[B]	100.8	102.3	97.7	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	157.1	±2.2 %
		Y	0.0	0.0	1.0		172.6	
		Z	0.0	0.0	1.0		175.7	

Note: For details on UID parameters see Appendix.

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $ms.V^{-2}$	T2 $ms.V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	15.40	116.5	36.38	2.655	0.140	4.978	0.000	0.017	1.008
Y	27.94	206.6	35.20	4.338	0.095	4.989	1.642	0.000	1.004
Z	31.47	244.0	37.99	3.819	0.313	5.030	0.103	0.363	1.006

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%.

[A] The uncertainties of Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7409

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	9.91	9.91	9.91	0.44	0.90	± 12.0 %
835	41.5	0.90	9.67	9.67	9.67	0.46	0.85	± 12.0 %
1750	40.1	1.37	8.43	8.43	8.43	0.38	0.80	± 12.0 %
1900	40.0	1.40	8.05	8.05	8.05	0.38	0.84	± 12.0 %
2300	39.5	1.67	7.57	7.57	7.57	0.32	0.80	± 12.0 %
2450	39.2	1.80	7.23	7.23	7.23	0.34	0.86	± 12.0 %
2600	39.0	1.96	6.98	6.98	6.98	0.39	0.86	± 12.0 %
5250	35.9	4.71	5.20	5.20	5.20	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.77	4.77	4.77	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.82	4.82	4.82	0.40	1.80	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7409

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	9.82	9.82	9.82	0.52	0.84	± 12.0 %
835	55.2	0.97	9.63	9.63	9.63	0.48	0.80	± 12.0 %
1750	53.4	1.49	7.91	7.91	7.91	0.36	0.93	± 12.0 %
1900	53.3	1.52	7.60	7.60	7.60	0.44	0.80	± 12.0 %
2300	52.9	1.81	7.36	7.36	7.36	0.38	0.88	± 12.0 %
2450	52.7	1.95	7.24	7.24	7.24	0.33	0.89	± 12.0 %
2600	52.5	2.16	7.07	7.07	7.07	0.32	0.96	± 12.0 %
5250	48.9	5.36	4.67	4.67	4.67	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.25	4.25	4.25	0.50	1.90	± 13.1 %
5750	48.3	5.94	4.32	4.32	4.32	0.50	1.90	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.