PCTEST ENGINEERING LABORATORY, INC.
7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. +1.410.290.6652 / Fax +1.410.290.6654
http://www.pctestlab.com

SAR EVALUATION REPORT

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

Date of Testing:
01/20/17 - 01/31/17
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M1701180035-01-R5.ZNF

FCC ID: **ZNFVS988**

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

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model: LG-VS988
Additional Model(s): LGVS988, VS988, LG-US997, LGUS997, US997, LG-VS988P, LG-VS988T, LG-VS988B, LG-VS988W, LG-VS988G

Equipment Class	Band & Mode	Tx Frequency	SAR		
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.18	0.65	0.65
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	0.16	0.46	0.52
PCE	UMTS 850	826.40 - 846.60 MHz	0.10	0.49	0.49
PCE	UMTS 1750	1712.4 - 1752.6 MHz	0.17	0.95	0.95
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.20	0.68	0.71
PCE	Cell. CDMA/EVDO	824.70 - 848.31 MHz	0.17	0.61	0.64
PCE	PCS CDMA/EVDO	1851.25 - 1908.75 MHz	0.24	1.01	1.23
PCE	LTE Band 12	699.7 - 715.3 MHz	0.17	0.65	0.69
PCE	LTE Band 17	706.5 - 713.5 MHz	N/A	N/A	N/A
PCE	LTE Band 13	779.5 - 784.5 MHz	0.19	0.62	0.62
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.20	0.70	0.70
PCE	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.26	1.14	1.14
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A
PCE	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.22	0.87	1.06
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	N/A	N/A	N/A
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.65	0.20	0.20
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	0.38
NII	U-NII-2A	5260 - 5320 MHz	0.29	0.43	N/A
NII	U-NII-2C	5500 - 5720 MHz	0.30	0.49	N/A
NII	U-NII-3	5745 - 5825 MHz	< 0.1	0.48	0.48
DSS/DTS	Bluetooth	2402 - 2480 MHz	N/A	< 0.1	N/A
Simultaneous SAR per KDB 690783 D01v01r03:			1.45	1.59	1.59

Note: This revised Test Report (S/N: 1M1701180035-01-R5.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 1.8 of this report; for North American frequency bands only.

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

Randy Ortanez
President

The SAR Tick is an initiative of the Mobile Manufacturers Forum (MMF). While a product may be considered eligible, use of the SAR Tick logo requires an agreement with the MMF. Further details can be obtained by emailing: sartick@mmfai.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
Cell. CDMA/EVDO	Voice/Data	824.70 - 848.31 MHz
PCS CDMA/EVDO	Voice/Data	1851.25 - 1908.75 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 17	Voice/Data	706.5 - 713.5 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 25 (PCS)	Voice/Data	1850.7 - 1914.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2462 MHz
U-NII-1	Voice/Data	5180 - 5240 MHz
U-NII-2A	Voice/Data	5260 - 5320 MHz
U-NII-2C	Voice/Data	5500 - 5720 MHz
U-NII-3	Voice/Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz

1.2 Power Reduction for SAR

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

1.3 Nominal and Maximum Output Power Specifications

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

A. Maximum 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	**33.2**	**33.2**	**32.2**	**27.2**	**27.2**
	Nominal	**32.7**	**32.7**	**31.7**	**26.7**	**26.7**
GSM/GPRS/EDGE 1900	Maximum	**30.2**	**30.2**	**29.2**	**26.2**	**26.2**
	Nominal	**29.7**	**29.7**	**28.7**	**25.7**	**25.7**

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

Mode / Band		Modulated Average (dBm)
Cell. CDMA/EVDO	Maximum	**25.5**
	Nominal	**25.0**
PCS CDMA/EVDO	Maximum	**25.2**
	Nominal	**24.7**

Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	**25.5**
	Nominal	**25.0**
LTE Band 17	Maximum	**25.5**
	Nominal	**25.0**
LTE Band 13	Maximum	**25.5**
	Nominal	**25.0**
LTE Band 5 (Cell)	Maximum	**25.5**
	Nominal	**25.0**
LTE Band 66 (AWS)	Maximum	**25.2**
	Nominal	**24.7**
LTE Band 4 (AWS)	Maximum	**25.2**
	Nominal	**24.7**
LTE Band 25 (PCS)	Maximum	**25.2**
	Nominal	**24.7**
LTE Band 2 (PCS)	Maximum	**25.2**
	Nominal	**24.7**

Mode / Band		Modulated Average - Single Tx Chain (Primary Ant) (dBm)	
		Ch. 1-2	Ch. 3-11
IEEE 802.11b (2.4 GHz)	Maximum	**16.5**	**17.0**
	Nominal	**15.5**	**16.0**
IEEE 802.11g (2.4 GHz)	Maximum	**15.0**	**15.5**
	Nominal	**14.0**	**14.5**
IEEE 802.11n (2.4 GHz)	Maximum	**15.0**	**15.5**
	Nominal	**14.0**	**14.5**
IEEE 802.11ac (2.4 GHz)	Maximum	**15.0**	**15.5**
	Nominal	**14.0**	**14.5**

Mode / Band		Modulated Average - Single Tx Chain (Secondary Ant) (dBm)	
		Ch. 1-2	Ch. 3-11
IEEE 802.11b (2.4 GHz)	Maximum	**16.5**	**17.0**
	Nominal	**15.5**	**16.0**
IEEE 802.11g (2.4 GHz)	Maximum	**15.0**	**15.5**
	Nominal	**14.0**	**14.5**
IEEE 802.11n (2.4 GHz)	Maximum	**15.0**	**15.5**
	Nominal	**14.0**	**14.5**
IEEE 802.11ac (2.4 GHz)	Maximum	**15.0**	**15.5**
	Nominal	**14.0**	**14.5**

Mode / Band		Modulated Average - Single Tx Chain (Primary Ant) (dBm)					
		20 MHz Bandwidth		40 MHz Bandwidth		80 MHz Bandwidth	
		Ch. 36, 64, 100, 165	Ch. 40-60, 104-161	Ch. 38, 62, 102	Ch. 46-54, 110-159	Ch. 42-106	Ch. 138-155
IEEE 802.11a (5 GHz)	Maximum	12.5	16.5				
	Nominal	11.5	15.5				
IEEE 802.11n (5 GHz)	Maximum	12.5	16.5	9.5	13.5		
	Nominal	11.5	15.5	8.5	12.5		
IEEE 802.11ac (5 GHz)	Maximum	12.5	16.5	9.5	13.5	8.5	11.5
	Nominal	11.5	15.5	8.5	12.5	7.5	10.5

Mode / Band		Modulated Average - Single Tx Chain (Secondary Ant) (dBm)					
		20 MHz Bandwidth		40 MHz Bandwidth		80 MHz Bandwidth	
		Ch. 36, 64, 100, 165	Ch. 40-60, 104-161	Ch. 38, 62, 102	Ch. 46-54, 110-159	Ch. 42-106	Ch. 138-155
IEEE 802.11a (5 GHz)	Maximum	12.5	16.5				
	Nominal	11.5	15.5				
IEEE 802.11n (5 GHz)	Maximum	12.5	16.5	9.5	13.5		
	Nominal	11.5	15.5	8.5	12.5		
IEEE 802.11ac (5 GHz)	Maximum	12.5	16.5	9.5	13.5	8.5	11.5
	Nominal	11.5	15.5	8.5	12.5	7.5	10.5

Mode / Band		Modulated Average - MIMO (dBm)	
		20 MHz Bandwidth	
		Ch. 1-2	Ch. 3-11
IEEE 802.11g (2.4 GHz)	Maximum	18.0	18.5
	Nominal	17.0	17.5
IEEE 802.11n (2.4 GHz)	Maximum	18.0	18.5
	Nominal	17.0	17.5
IEEE 802.11ac (2.4 GHz)	Maximum	18.0	18.5
	Nominal	17.0	17.5

Mode / Band		Modulated Average - MIMO (dBm)					
		20 MHz Bandwidth		40 MHz Bandwidth		80 MHz Bandwidth	
		Ch. 36, 64, 100, 165	Ch. 40-60, 104-161	Ch. 38, 62, 102	Ch. 46-54, 110-159	Ch. 42-106	Ch. 138-155
IEEE 802.11a (5 GHz)	Maximum	15.5	19.5				
	Nominal	14.5	18.5				
IEEE 802.11n (5 GHz)	Maximum	15.5	19.5	12.5	16.5		
	Nominal	14.5	18.5	11.5	15.5		
IEEE 802.11ac (5 GHz)	Maximum	15.5	19.5	12.5	16.5	11.5	14.5
	Nominal	14.5	18.5	11.5	15.5	10.5	13.5

Mode / Band		Modulated Average (dBm)
Bluetooth	Maximum	12.5
	Nominal	11.5
Bluetooth LE	Maximum	8.0
	Nominal	7.0

B. Reduced Power

Mode / Band		Modulated Average - Single Tx Chain (Primary Ant) (dBm)	
		Ch. 1-2	Ch. 3-11
IEEE 802.11b (2.4 GHz)	Maximum	**15.0**	**15.5**
	Nominal	**14.0**	**14.5**
Mode / Band		Modulated Average - Single Tx Chain (Secondary Ant) (dBm)	
		Ch. 1-2	Ch. 3-11
IEEE 802.11b (2.4 GHz)	Maximum	**15.0**	**15.5**
	Nominal	**14.0**	**14.5**
Mode / Band		Modulated Average - Single Tx Chain (Primary Ant) (dBm)	
		20 MHz Bandwidth	
		Ch. 36, 64, 100, 165	Ch. 40-60, 104-161
IEEE 802.11a (5 GHz)	Maximum	**12.5**	**14.5**
	Nominal	**11.5**	**13.5**
IEEE 802.11n (5 GHz)	Maximum	**12.5**	**14.5**
	Nominal	**11.5**	**13.5**
IEEE 802.11ac (5 GHz)	Maximum	**12.5**	**14.5**
	Nominal	**11.5**	**13.5**
Mode / Band		Modulated Average - Single Tx Chain (Secondary Ant) (dBm)	
		20 MHz Bandwidth	
		Ch. 36, 64, 100, 165	Ch. 40-60, 104-161
IEEE 802.11a (5 GHz)	Maximum	**12.5**	**14.5**
	Nominal	**11.5**	**13.5**
IEEE 802.11n (5 GHz)	Maximum	**12.5**	**14.5**
	Nominal	**11.5**	**13.5**
IEEE 802.11ac (5 GHz)	Maximum	**12.5**	**14.5**
	Nominal	**11.5**	**13.5**
Mode / Band		Modulated Average - MIMO (dBm)	
		20 MHz Bandwidth	
		Ch. 36, 64, 100, 165	Ch. 40-60, 104-161
IEEE 802.11a (5 GHz)	Maximum	**15.5**	**17.5**
	Nominal	**14.5**	**16.5**
IEEE 802.11n (5 GHz)	Maximum	**15.5**	**17.5**
	Nominal	**14.5**	**16.5**
IEEE 802.11ac (5 GHz)	Maximum	**15.5**	**17.5**
	Nominal	**14.5**	**16.5**

1.4 DUT Antenna Locations

The overall dimensions of this device are > 9 x 5 cm. The overall diagonal dimension of the device is ≤160 mm and the diagonal display is ≤150 mm. A diagram showing the location of the device antennas can be found in Appendix F.

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
Cell. EVDO	Yes	Yes	No	Yes	Yes	Yes
PCS EVDO	Yes	Yes	No	Yes	No	Yes
LTE Band 12	Yes	Yes	No	Yes	Yes	Yes
LTE Band 13	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 25 (PCS)	Yes	Yes	No	Yes	No	Yes
2.4 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
2.4 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes

Note: Particular DUT edges were not required to be evaluated for wireless router SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v02r01 Section III. The distances between the transmit antennas and the edges of the device are included in the filing.

1.5 Near Field Communications (NFC) Antenna

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

1.6 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 1-1 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

Figure 1-1
Simultaneous Transmission Paths

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	Notes
1	1x CDMA voice + 2.4 GHz WI-FI	Yes	Yes	N/A	
2	1x CDMA voice + 5 GHz WI-FI	Yes	Yes	N/A	
3	1x CDMA voice + 2.4 GHz Bluetooth	N/A	Yes	N/A	
4	1x CDMA voice + 2.4 GHz WI-FI MIMO	Yes	Yes	N/A	
5	1x CDMA voice + 5 GHz WI-FI MIMO	Yes	Yes	N/A	
6	1x CDMA voice + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	N/A	
7	GSM voice + 2.4 GHz WI-FI	Yes	Yes	N/A	
8	GSM voice + 5 GHz WI-FI	Yes	Yes	N/A	
9	GSM voice + 2.4 GHz Bluetooth	N/A	Yes	N/A	
10	GSM voice + 2.4 GHz WI-FI MIMO	Yes	Yes	N/A	
11	GSM voice + 5 GHz WI-FI MIMO	Yes	Yes	N/A	
12	GSM voice + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	N/A	
13	UMTS + 2.4 GHz WI-FI	Yes	Yes	Yes	
14	UMTS + 5 GHz WI-FI	Yes	Yes	Yes	
15	UMTS + 2.4 GHz Bluetooth	N/A	Yes	N/A	
16	UMTS + 2.4 GHz WI-FI MIMO	Yes	Yes	Yes	
17	UMTS + 5 GHz WI-FI MIMO	Yes	Yes	Yes	
18	UMTS + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	Yes	
19	LTE + 2.4 GHz WI-FI	Yes	Yes	Yes	
20	LTE + 5 GHz WI-FI	Yes	Yes	Yes	
21	LTE + 2.4 GHz Bluetooth	N/A	Yes	N/A	
22	LTE + 2.4 GHz WI-FI MIMO	Yes	Yes	Yes	
23	LTE + 5 GHz WI-FI MIMO	Yes	Yes	Yes	
24	LTE + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes	Yes	Yes	
25	CDMA/EVDO data + 2.4 GHz WI-FI	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
26	CDMA/EVDO data + 5 GHz WI-FI	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
27	CDMA/EVDO data + 2.4 GHz Bluetooth	N/A	Yes*	N/A	*-Pre-installed VOIP applications are considered.
28	CDMA/EVDO data + 2.4 GHz WI-FI MIMO	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
29	CDMA/EVDO data + 5 GHz WI-FI MIMO	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
30	CDMA/EVDO data + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
31	GPRS/EDGE + 2.4 GHz WI-FI	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
32	GPRS/EDGE + 5 GHz WI-FI	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
33	GPRS/EDGE + 2.4 GHz Bluetooth	N/A	Yes*	N/A	*-Pre-installed VOIP applications are considered.
34	GPRS/EDGE + 2.4 GHz WI-FI MIMO	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
35	GPRS/EDGE + 5 GHz WI-FI MIMO	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.
36	GPRS/EDGE + 2.4 GHz WI-FI + 5 GHz WI-FI	Yes*	Yes*	Yes	*-Pre-installed VOIP applications are considered.

1. All unlicensed modes cannot transmit from the same antenna simultaneously.

2. All licensed modes share the same antenna path and cannot transmit simultaneously.
3. When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.
4. Per the manufacturer, WIFI Direct is expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Simultaneous transmission scenarios involving WIFI are listed in the above table.
5. 5 GHz Wireless Router is supported for the U-NII-1 and U-NII-3 by S/W, therefore U-NII2A and U-NII2C were not evaluated for wireless router conditions.
6. This device supports 2x2 MIMO Tx for WLAN 802.11n/ac. Each WLAN antenna can transmit independently or together when operating with MIMO.
7. This device supports VoLTE.
8. This device supports VoWIFI.

1.7 Miscellaneous SAR Test Considerations

(A) WIFI/BT

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

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

This device supports IEEE 802.11ac with the following features:
a) Up to 80 MHz Bandwidth only
b) No aggregate channel configurations
c) 2 Tx antenna output
d) 256 QAM is supported
e) Band gap channels are supported

(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 D05v02r05.

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.

This device supports 64QAM on the uplink for LTE Operations. Conducted powers for 64QAM uplink configurations were measured per Section 5.1 of FCC KDB Publication 941225 D05v02r05. SAR was not

required for 64QAM since the highest maximum output power for 64QAM is ≤ ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg, per Section 5.2.4 of FCC KDB Publication 941225 D05v02r05.

This device supports both LTE B12 and LTE B17. Since the supported frequency span for LTE B17 falls completely within the supported frequency span for LTE B12, both LTE bands have the same target power, and both LTE bands share the same transmission path, SAR was only assessed for LTE B12.

This device supports both LTE B66 (AWS) and LTE B4 (AWS). Since the supported frequency span for LTE B4 (AWS) falls completely within the supported frequency span for LTE B66 (AWS), both LTE bands have the same target power, and both LTE bands share the same transmission path, SAR was only assessed for LTE B66 (AWS).

This device supports both LTE B25 (PCS) and LTE B2 (PCS). Since the supported frequency span for LTE B2 (PCS) falls completely within the supported frequency span for LTE B25 (PCS), both LTE bands have the same target power, and both LTE bands share the same transmission path, SAR was only assessed for LTE B25 (PCS).

1.8 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 941225 D01v03r01, D05v02r05, 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)
- October 2013 TCB Workshop Notes (GPRS Testing Considerations)
- October 2016 TCB Workshopt Notes (DUT Holder)

1.9 Device Serial Numbers

Several samples with identical hardware were used to support SAR testing. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.

	Head Serial Number	Body-Worn Serial Number	Hotspot Serial Number
GSM/GPRS/EDGE 850	06855	06848	06848
GSM/GPRS/EDGE 1900	06855	06848	06848
UMTS 850	06855	06848	06848
UMTS 1750	06848	06848	06848
UMTS 1900	06848	06848	06848
Cell. CDMA/EVDO	06848	06848	06848
PCS CDMA/EVDO	06855	06855	06855
LTE Band 12	06863	06863	06863
LTE Band 13	06863	06863	06863
LTE Band 5 (Cell)	06897	06871	06871
LTE Band 66 (AWS)	06863	06863	06863
LTE Band 25 (PCS)	06871	06863	06863
2.4 GHz WLAN	07036	06996	06996
5 GHz WLAN	07036	07036	07036
Bluetooth	-	06996	-

2 LTE INFORMATION

LTE Information					
FCC ID	**ZNFVS988**				
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 17 (706.5 - 713.5 MHz)				
	LTE Band 13 (779.5 - 784.5 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 66 (AWS) (1710.7 - 1779.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)				
	LTE Band 25 (PCS) (1850.7 - 1914.3 MHz)				
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)				
Channel Bandwidths	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 17: 5 MHz, 10 MHz				
	LTE Band 13: 5 MHz, 10 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 25 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 12: 1.4 MHz	699.7 (23017)		707.5 (23095)	715.3 (23173)	
LTE Band 12: 3 MHz	700.5 (23025)		707.5 (23095)	714.5 (23165)	
LTE Band 12: 5 MHz	701.5 (23035)		707.5 (23095)	713.5 (23155)	
LTE Band 12: 10 MHz	704 (23060)		707.5 (23095)	711 (23130)	
LTE Band 17: 5 MHz	706.5 (23755)		710 (23790)	713.5 (23825)	
LTE Band 17: 10 MHz	709 (23780)		710 (23790)	711 (23800)	
LTE Band 13: 5 MHz	779.5 (23205)		782 (23230)	784.5 (23255)	
LTE Band 13: 10 MHz	N/A		782 (23230)	N/A	
LTE Band 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)	1733.6 (132208)	N/A	1756.4 (132436)	1779.3 (132665)
LTE Band 66 (AWS): 3 MHz	1711.5 (131987)		1745 (132322)	1778.5 (132657)	
LTE Band 66 (AWS): 5 MHz	1712.5 (131997)		1745 (132322)	1777.5 (132647)	
LTE Band 66 (AWS): 10 MHz	1715 (132022)		1745 (132322)	1775 (132622)	
LTE Band 66 (AWS): 15 MHz	1717.5 (132047)		1745 (132322)	1772.5 (132597)	
LTE Band 66 (AWS): 20 MHz	1720 (132072)		1745 (132322)	1770 (132572)	
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)		1732.5 (20175)	1754.3 (20393)	
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)		1732.5 (20175)	1753.5 (20385)	
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)		1732.5 (20175)	1752.5 (20375)	
LTE Band 4 (AWS): 10 MHz	1715 (20000)		1732.5 (20175)	1750 (20350)	
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)		1732.5 (20175)	1747.5 (20325)	
LTE Band 4 (AWS): 20 MHz	1720 (20050)		1732.5 (20175)	1745 (20300)	
LTE Band 25 (PCS): 1.4 MHz	1850.7 (26047)		1882.5 (26365)	1914.3 (26683)	
LTE Band 25 (PCS): 3 MHz	1851.5 (26055)		1882.5 (26365)	1913.5 (26675)	
LTE Band 25 (PCS): 5 MHz	1852.5 (26065)		1882.5 (26365)	1912.5 (26665)	
LTE Band 25 (PCS): 10 MHz	1855 (26090)		1882.5 (26365)	1910 (26640)	
LTE Band 25 (PCS): 15 MHz	1857.5 (26115)		1882.5 (26365)	1907.5 (26615)	
LTE Band 25 (PCS): 20 MHz	1860 (26140)		1882.5 (26365)	1905 (26590)	
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)		1880 (18900)	1909.3 (19193)	
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)		1880 (18900)	1908.5 (19185)	
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)		1880 (18900)	1907.5 (19175)	
LTE Band 2 (PCS): 10 MHz	1855 (18650)		1880 (18900)	1905 (19150)	
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)		1880 (18900)	1902.5 (19125)	
LTE Band 2 (PCS): 20 MHz	1860 (18700)		1880 (18900)	1900 (19100)	
UE Category	9				
Modulations Supported in UL	QPSK, 16QAM, 64QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	YES				
A-MPR (Additional MPR) disabled for SAR Testing?	YES				
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations				
LTE Release 11 Additional Information	This device does not support full CA features on 3GPP Release 11. All 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, MDH, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

3 INTRODUCTION

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

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

3.1 SAR Definition

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

Equation 3-1
SAR Mathematical Equation

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

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

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

where:

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

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

4 DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

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

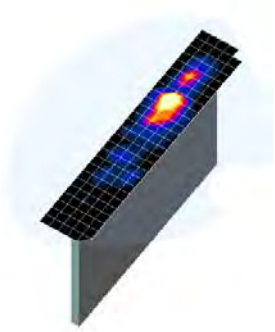


Figure 4-1
Sample SAR Area Scan

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

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

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

   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

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

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

*Also compliant to IEEE 1528-2013 Table 6

5 DEFINITION OF REFERENCE POINTS

5.1 EAR REFERENCE POINT

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

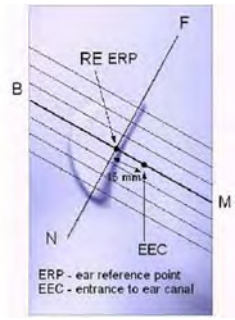


Figure 5-1
Close-Up Side view of ERP

5.2 HANDSET REFERENCE POINTS

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

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

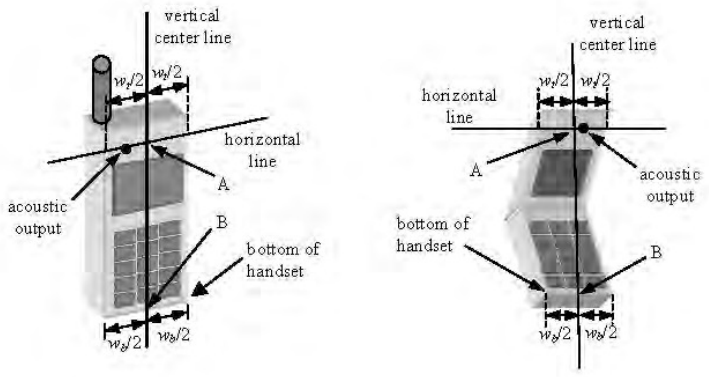


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

6 TEST CONFIGURATION POSITIONS

6.1 Device Holder

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

6.2 Positioning for Cheek

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

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

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

6.3 Positioning for Ear / 15º Tilt

With the test device aligned in the “Cheek Position”:

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

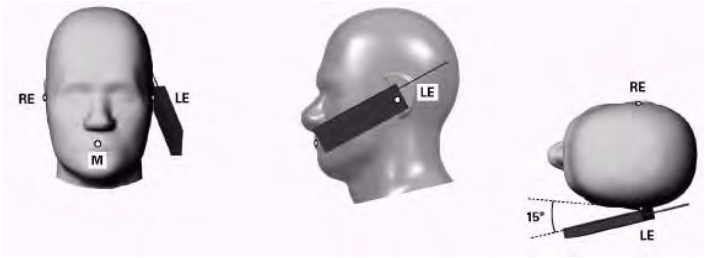


Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

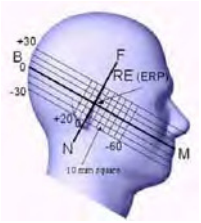


Figure 6-3
Side view w/ relevant markings

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

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

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

6.5 Body-Worn Accessory Configurations

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

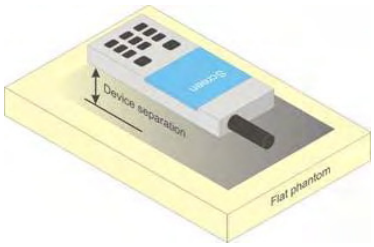


Figure 6-4
Sample Body-Worn Diagram

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that

dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

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

6.6 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1-g body and 10-g 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.

7 RF EXPOSURE LIMITS

7.1 Uncontrolled Environment

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

7.2 Controlled Environment

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

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

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

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

8 FCC MEASUREMENT PROCEDURES

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

8.1 Measured and Reported SAR

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

8.2 3G SAR Test Reduction Procedure

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

8.3 Procedures Used to Establish RF Signal for SAR

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

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

8.4 SAR Measurement Conditions for CDMA2000

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

8.4.1 Output Power Verification

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

1. If the mobile station (MS) supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9600 bps data rate only.

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

Table 8-1
Parameters for Max. Power for RC1

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

Table 8-2
Parameters for Max. Power for RC3

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

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

8.4.2 Head SAR Measurements

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

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

8.4.3 Body-worn SAR Measurements

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

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

8.4.4 Body-worn SAR Measurements for EVDO Devices

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

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

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

8.4.5 Body SAR Measurements for EVDO Hotspot

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

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

8.5 SAR Measurement Conditions for UMTS

8.5.1 Output Power Verification

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

8.5.2 Head SAR Measurements

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

8.5.3 Body SAR Measurements

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

8.5.4 SAR Measurements with Rel 5 HSDPA

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

8.5.5 SAR Measurements with Rel 6 HSUPA

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

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

8.6 SAR Measurement Conditions for LTE

LTE modes are tested according to FCC KDB 941225 D05v02r05 publication. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 or Anritsu MT8820C simulators are used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

8.6.1 Spectrum Plots for RB Configurations

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

8.6.2 MPR

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

8.6.3 A-MPR

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

8.6.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r05:

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

8.6.5 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. For every supported combination of downlink only carrier aggregation, 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 carrier aggregation configurations when the average output power with downlink only carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink only carrier aggregation inactive.

8.7 SAR Testing with 802.11 Transmitters

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

8.7.1 General Device Setup

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

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

8.7.2 U-NII-1 and U-NII-2A

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

8.7.3 U-NII-2C and U-NII-3

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

8.7.4 Initial Test Position Procedure

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

8.7.5 2.4 GHz SAR Test Requirements

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

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

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

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

8.7.6 OFDM Transmission Mode and SAR Test Channel Selection

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

8.7.7 Initial Test Configuration Procedure

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

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements (See Section 8.7.6).

8.7.8 Subsequent Test Configuration Procedures

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

9 RF CONDUCTED POWERS

9.1 CDMA Conducted Powers

Band	Channel	Rule Part	Frequency	SO55 [dBm]	SO55 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
	F-RC		MHz	RC1	RC3	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	1013	22H	824.7	25.35	25.30	25.40	25.43	25.40	25.40
	384	22H	836.52	25.50	25.50	25.50	25.50	25.45	25.48
	777	22H	848.31	25.45	25.47	25.50	25.50	25.50	25.50
PCS	25	24E	1851.25	25.18	25.20	25.17	25.20	25.20	25.17
	600	24E	1880	25.20	25.20	25.20	25.20	25.20	25.20
	1175	24E	1908.75	25.16	25.20	25.16	25.20	25.18	25.20

Note: RC1 is only applicable for IS-95 compatibility.

Figure 9-1
Power Measurement Setup

9.2 GSM Conducted Powers

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	33.14	33.13	**32.18**	27.18	27.17
	190	33.20	33.18	**32.20**	27.20	27.20
	251	33.20	33.20	**32.18**	27.20	27.20
GSM 1900	512	30.18	30.18	**29.15**	25.85	25.80
	661	30.20	30.20	**29.17**	25.90	25.95
	810	30.20	30.17	**29.20**	25.80	25.85
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	24.11	24.10	**26.16**	18.15	21.15
	190	24.17	24.15	**26.18**	18.17	21.18
	251	24.17	24.17	**26.16**	18.17	21.18
GSM 1900	512	21.15	21.15	**23.13**	16.82	19.78
	661	21.17	21.17	**23.15**	16.87	19.93
	810	21.17	21.14	**23.18**	16.77	19.83

GSM 850	**Frame Avg.Targets:**	23.67	23.67	**25.68**	17.67	20.68
GSM 1900		20.67	20.67	**22.68**	16.67	19.68

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 9-2
Power Measurement Setup

9.3 UMTS Conducted Powers

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	24.68	24.70	24.68	24.68	24.68	24.67	24.68	24.68	24.70	-
99		12.2 kbps AMR	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	24.70	-
6	HSDPA	Subtest 1	24.66	24.70	24.66	24.65	24.65	24.65	24.55	24.58	24.55	0
6		Subtest 2	24.64	24.70	24.65	24.68	24.65	24.67	24.57	24.55	24.58	0
6		Subtest 3	24.12	24.15	24.12	24.15	24.18	24.15	24.10	24.06	24.20	0.5
6		Subtest 4	24.10	24.15	24.17	24.15	24.20	24.15	24.08	24.10	24.17	0.5
6	HSUPA	Subtest 1	24.55	24.60	24.56	24.60	24.62	24.60	24.50	24.50	24.60	0
6		Subtest 2	22.60	22.50	22.60	22.60	22.63	22.61	22.52	22.53	22.60	2
6		Subtest 3	23.55	23.52	23.53	23.53	23.50	23.55	23.44	23.40	23.43	1
6		Subtest 4	22.58	22.50	22.60	22.62	22.63	22.60	22.53	22.50	22.58	2
6		Subtest 5	24.61	24.60	24.62	24.60	24.62	24.60	24.51	24.60	24.60	0

This device does not support DC-HSDPA.

Figure 9-3
Power Measurement Setup

9.4 LTE Conducted Powers

9.4.1 LTE Band 12

Table 9-1
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	**25.50**	0	0
	1	25	25.45		0
	1	49	25.44		0
	25	0	24.41	0-1	1
	25	12	**24.50**		1
	25	25	24.48		1
	50	0	24.35		1
16QAM	1	0	24.50	0-1	1
	1	25	24.50		1
	1	49	24.50		1
	25	0	23.50	0-2	2
	25	12	23.48		2
	25	25	23.49		2
	50	0	23.50		2
64QAM	1	0	23.46	0-2	2
	1	25	23.39		2
	1	49	23.45		2
	25	0	22.45	0-3	3
	25	12	22.39		3
	25	25	22.30		3
	50	0	22.41		3

Note: LTE Band 12 at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 9-2
LTE Band 12 Conducted Powers - 5 MHz Bandwidth

LTE Band 12 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23035 (701.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23155 (713.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	25.47	25.50	25.50	0	0
	1	12	25.42	25.43	25.46		0
	1	24	25.50	25.50	25.46		0
	12	0	24.42	24.43	24.44	0-1	1
	12	6	24.47	24.50	24.45		1
	12	13	24.42	24.48	24.50		1
	25	0	24.43	24.47	24.50		1
16QAM	1	0	24.48	24.50	24.50	0-1	1
	1	12	24.50	24.50	24.48		1
	1	24	24.50	24.50	24.50		1
	12	0	23.45	23.48	23.45	0-2	2
	12	6	23.47	23.50	23.49		2
	12	13	23.50	23.50	23.50		2
	25	0	23.50	23.47	23.46		2
64QAM	1	0	23.47	23.48	23.29	0-2	2
	1	12	23.41	23.50	23.48		2
	1	24	23.47	23.42	23.37		2
	12	0	22.38	22.38	22.40	0-3	3
	12	6	22.42	22.34	22.34		3
	12	13	22.27	22.37	22.36		3
	25	0	22.49	22.36	22.43		3

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

LTE Band 12 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23025 (700.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23165 (714.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	25.45	25.48	25.48	0	0
	1	7	25.50	25.50	25.50		0
	1	14	25.47	25.45	25.50		0
	8	0	24.45	24.48	24.49	0-1	1
	8	4	24.45	24.50	24.50		1
	8	7	24.42	24.45	24.42		1
	15	0	24.43	24.47	24.49		1
16QAM	1	0	24.50	24.50	24.50	0-1	1
	1	7	24.50	24.50	24.50		1
	1	14	24.50	24.48	24.48		1
	8	0	23.50	23.50	23.50	0-2	2
	8	4	23.50	23.50	23.49		2
	8	7	23.48	23.48	23.50		2
	15	0	23.45	23.47	23.50		2
64QAM	1	0	23.47	23.36	23.40	0-2	2
	1	7	23.35	23.40	23.50		2
	1	14	23.36	23.39	23.49		2
	8	0	22.42	22.20	22.30	0-3	3
	8	4	22.47	22.36	22.32		3
	8	7	22.31	22.41	22.40		3
	15	0	22.23	22.47	22.45		3

Table 9-4
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	25.46	25.42	25.40	0	0
	1	2	25.45	25.45	25.42		0
	1	5	25.42	25.47	25.40		0
	3	0	25.50	25.48	25.43		0
	3	2	25.45	25.50	25.45		0
	3	3	25.48	25.48	25.42		0
	6	0	24.43	24.45	24.35	0-1	1
16QAM	1	0	24.50	24.50	24.48	0-1	1
	1	2	24.50	24.50	24.50		1
	1	5	24.50	24.47	24.45		1
	3	0	24.47	24.50	24.50		1
	3	2	24.47	24.50	24.50		1
	3	3	24.45	24.50	24.48		1
	6	0	23.40	23.48	23.50	0-2	2
64QAM	1	0	23.35	23.31	23.43	0-2	2
	1	2	23.40	23.49	23.50		2
	1	5	23.40	23.40	23.50		2
	3	0	23.44	23.46	23.40		2
	3	2	23.30	23.38	23.43		2
	3	3	23.24	23.46	23.48		2
	6	0	22.29	22.35	22.40	0-3	3

9.4.2 LTE Band 13

Table 9-5
LTE Band 13 Conducted Powers - 10 MHz Bandwidth

LTE Band 13 10 MHzBandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**25.50**	0	0
	1	25	25.48		0
	1	49	25.30		0
	25	0	**24.50**	0-1	1
	25	12	24.46		1
	25	25	24.44		1
	50	0	24.48		1
16QAM	1	0	24.50	0-1	1
	1	25	24.50		1
	1	49	24.32		1
	25	0	23.50	0-2	2
	25	12	23.48		2
	25	25	23.50		2
	50	0	23.50		2
64QAM	1	0	23.40	0-2	2
	1	25	23.16		2
	1	49	23.18		2
	25	0	22.27	0-3	3
	25	12	22.29		3
	25	25	22.16		3
	50	0	22.10		3

Table 9-6
LTE Band 13 Conducted Powers - 5 MHz Bandwidth

LTE Band 13 5 MHzBandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	25.48	0	0
	1	12	25.50		0
	1	24	25.30		0
	12	0	24.35	0-1	1
	12	6	24.36		1
	12	13	24.25		1
	25	0	24.45		1
16QAM	1	0	24.50	0-1	1
	1	12	24.36		1
	1	24	24.50		1
	12	0	23.45	0-2	2
	12	6	23.50		2
	12	13	23.48		2
	25	0	23.44		2
64QAM	1	0	23.31	0-2	2
	1	12	23.16		2
	1	24	23.22		2
	12	0	22.13	0-3	3
	12	6	22.30		3
	12	13	22.40		3
	25	0	22.13		3

Note: LTE Band 13 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

9.4.3 LTE Band 5 (Cell)

Table 9-7
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	25.48	0	0
	1	25	**25.50**		0
	1	49	25.00		0
	25	0	**24.48**	0-1	1
	25	12	24.46		1
	25	25	24.43		1
	50	0	24.39		1
16QAM	1	0	24.50	0-1	1
	1	25	24.48		1
	1	49	24.49		1
	25	0	23.46	0-2	2
	25	12	23.47		2
	25	25	23.45		2
	50	0	23.48		2
64QAM	1	0	23.44	0-2	2
	1	25	23.44		2
	1	49	23.41		2
	25	0	22.32	0-3	3
	25	12	22.34		3
	25	25	22.45		3
	50	0	22.39		3

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

Table 9-8
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	25.50	25.50	25.50	0	0
	1	12	25.50	25.48	25.50		0
	1	24	25.50	25.50	25.48		0
	12	0	24.50	24.50	24.50	0-1	1
	12	6	24.45	24.48	24.48		1
	12	13	24.48	24.50	24.50		1
	25	0	24.50	24.50	24.46		1
16QAM	1	0	24.50	24.50	24.50	0-1	1
	1	12	24.50	24.50	24.50		1
	1	24	24.50	24.50	24.50		1
	12	0	23.50	23.48	23.46	0-2	2
	12	6	23.48	23.46	23.48		2
	12	13	23.50	23.45	23.50		2
	25	0	23.47	23.48	23.48		2
64QAM	1	0	23.40	23.41	23.35	0-2	2
	1	12	23.05	23.49	23.35		2
	1	24	23.37	23.06	23.42		2
	12	0	22.43	22.49	22.10	0-3	3
	12	6	22.34	22.25	22.45		3
	12	13	22.39	22.33	22.29		3
	25	0	22.26	22.33	22.46		3

Table 9-9
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	25.50	25.50	25.50	0	0
	1	7	25.50	25.50	25.48		0
	1	14	25.48	25.50	25.49		0
	8	0	24.50	24.50	24.50	0-1	1
	8	4	24.48	24.50	24.48		1
	8	7	24.50	24.48	24.46		1
	15	0	24.49	24.49	24.50		1
16QAM	1	0	24.50	24.50	24.50	0-1	1
	1	7	24.48	24.50	24.50		1
	1	14	24.50	24.50	24.50		1
	8	0	23.50	23.50	23.50	0-2	2
	8	4	23.48	23.48	23.48		2
	8	7	23.49	23.49	23.46		2
	15	0	23.50	23.48	23.50		2
64QAM	1	0	23.37	23.47	23.33	0-2	2
	1	7	23.35	23.12	23.45		2
	1	14	23.40	23.30	23.47		2
	8	0	22.16	22.47	22.50	0-3	3
	8	4	22.47	22.47	22.35		3
	8	7	22.37	22.31	22.42		3
	15	0	22.34	22.37	22.47		3

Table 9-10
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	25.47	25.50	25.30	0	0
	1	2	25.50	25.50	25.30		0
	1	5	25.50	25.50	25.23		0
	3	0	25.50	25.50	25.10		0
	3	2	25.48	25.48	25.20		0
	3	3	25.48	25.50	25.20		0
	6	0	24.48	24.50	24.45	0-1	1
16QAM	1	0	24.50	24.50	24.50	0-1	1
	1	2	24.48	24.46	24.47		1
	1	5	24.50	24.50	24.50		1
	3	0	24.50	24.50	24.50		1
	3	2	24.50	24.47	24.46		1
	3	3	24.47	24.50	24.47		1
	6	0	23.50	23.46	23.47	0-2	2
64QAM	1	0	23.29	23.49	23.36	0-2	2
	1	2	23.48	23.37	23.30		2
	1	5	23.43	23.44	23.40		2
	3	0	23.50	23.31	23.50		2
	3	2	23.46	23.49	23.36		2
	3	3	23.29	23.39	23.45		2
	6	0	22.42	22.33	22.34	0-3	3

9.4.4 LTE Band 66 (AWS)

Table 9-11
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	**25.20**	25.16	**25.20**	0	0
	1	50	25.12	25.19	25.16		0
	1	99	25.11	25.16	25.19		0
	50	0	24.16	24.13	**24.20**	0-1	1
	50	25	24.17	24.18	24.17		1
	50	50	24.10	24.10	24.15		1
	100	0	24.11	24.15	24.13		1
16QAM	1	0	24.20	24.20	24.20	0-1	1
	1	50	24.16	24.15	24.17		1
	1	99	24.17	24.20	24.20		1
	50	0	23.20	23.20	23.18	0-2	2
	50	25	23.17	23.18	23.17		2
	50	50	23.20	23.18	23.18		2
	100	0	23.20	23.20	23.20		2
64QAM	1	0	22.95	23.08	23.06	0-2	2
	1	50	22.93	23.06	23.01		2
	1	99	23.19	22.95	23.06		2
	50	0	22.02	22.16	21.95	0-3	3
	50	25	22.14	21.97	21.92		3
	50	50	22.01	21.99	22.02		3
	100	0	22.09	22.00	22.09		3

Table 9-12
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	25.15	25.20	25.20	0	0
	1	36	25.14	25.20	25.13		0
	1	74	25.20	25.20	25.20		0
	36	0	24.16	24.20	24.20	0-1	1
	36	18	24.12	24.15	24.13		1
	36	37	24.14	24.15	24.20		1
	75	0	24.12	24.12	24.12		1
16QAM	1	0	24.20	24.20	24.20	0-1	1
	1	36	24.15	24.14	24.20		1
	1	74	24.20	24.20	24.20		1
	36	0	23.20	23.20	23.13	0-2	2
	36	18	23.12	23.12	23.10		2
	36	37	23.20	23.13	23.20		2
	75	0	23.14	23.20	23.10		2
64QAM	1	0	23.12	23.02	23.12	0-2	2
	1	36	22.94	23.12	22.94		2
	1	74	22.98	23.10	23.12		2
	36	0	22.01	22.19	22.13	0-3	3
	36	18	21.97	22.05	22.06		3
	36	37	22.08	22.08	21.90		3
	75	0	22.14	21.88	22.06		3

Table 9-13
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	25.18	25.20	25.20	0	0
	1	25	25.20	25.20	25.11		0
	1	49	25.15	25.16	25.13		0
	25	0	24.20	24.16	24.20	0-1	1
	25	12	24.15	24.16	24.15		1
	25	25	24.14	24.17	24.15		1
	50	0	24.20	24.13	24.12		1
16QAM	1	0	24.20	24.20	24.15	0-1	1
	1	25	24.15	24.15	24.20		1
	1	49	24.13	24.20	24.20		1
	25	0	23.14	23.12	23.16	0-2	2
	25	12	23.12	23.10	23.16		2
	25	25	23.13	23.16	23.12		2
	50	0	23.20	23.20	23.20		2
64QAM	1	0	23.14	23.18	23.16	0-2	2
	1	25	23.15	23.04	23.15		2
	1	49	23.04	22.94	23.12		2
	25	0	21.96	22.08	21.95	0-3	3
	25	12	22.17	21.93	22.19		3
	25	25	22.01	21.92	21.85		3
	50	0	22.08	22.04	21.89		3

Table 9-14
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	25.16	25.20	25.20	0	0
	1	12	25.12	25.17	25.14		0
	1	24	25.20	25.12	25.10		0
	12	0	24.20	24.13	24.14	0-1	1
	12	6	24.10	24.17	24.13		1
	12	13	24.20	24.20	24.10		1
	25	0	24.14	24.20	24.10		1
16QAM	1	0	24.15	24.20	24.20	0-1	1
	1	12	24.20	24.20	24.14		1
	1	24	24.20	24.18	24.19		1
	12	0	23.20	23.15	23.15	0-2	2
	12	6	23.10	23.17	23.20		2
	12	13	23.12	23.20	23.15		2
	25	0	23.05	23.20	23.20		2
64QAM	1	0	22.96	23.16	23.09	0-2	2
	1	12	22.98	23.05	23.13		2
	1	24	23.10	22.95	23.10		2
	12	0	22.15	22.09	22.08	0-3	3
	12	6	22.08	21.96	22.03		3
	12	13	21.90	22.01	22.02		3
	25	0	21.92	21.95	21.88		3

Table 9-15
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	25.20	25.16	25.16	0	0
	1	7	25.20	25.20	25.20		0
	1	14	25.12	25.10	25.13		0
	8	0	24.10	24.12	24.13	0-1	1
	8	4	24.10	24.18	24.10		1
	8	7	24.04	24.12	24.20		1
	15	0	24.13	24.14	24.20		1
16QAM	1	0	24.20	24.20	24.16	0-1	1
	1	7	24.20	24.20	24.15		1
	1	14	24.20	24.14	24.20		1
	8	0	23.18	23.20	23.20	0-2	2
	8	4	23.13	23.20	23.20		2
	8	7	23.20	23.20	23.16		2
	15	0	23.14	23.14	23.16		2
64QAM	1	0	23.09	23.10	22.86	0-2	2
	1	7	23.06	22.97	23.09		2
	1	14	22.96	22.92	23.20		2
	8	0	22.08	22.18	22.18	0-3	3
	8	4	22.12	22.07	22.06		3
	8	7	22.16	22.13	22.03		3
	15	0	21.86	21.89	21.92		3

Table 9-16
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)	Low-Mid Channel 132208 (1733.6 MHz)	Mid-High 132436 (1756.4 MHz)	High Channel 132665 (1779.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]					
QPSK	1	0	25.15	25.15	25.10	25.19	0	0
	1	2	25.13	25.17	25.13	25.09		0
	1	5	25.10	25.08	25.05	24.96		0
	3	0	25.13	25.00	25.10	25.05		0
	3	2	25.12	25.10	25.12	25.10		0
	3	3	25.10	25.00	25.13	25.20		0
	6	0	24.10	24.03	24.00	24.01	0-1	1
16QAM	1	0	24.18	24.15	24.13	24.19	0-1	1
	1	2	24.17	24.20	24.15	24.15		1
	1	5	24.15	24.20	24.10	24.07		1
	3	0	24.16	24.14	24.00	24.00		1
	3	2	24.16	24.20	23.98	23.88		1
	3	3	24.13	24.16	23.99	23.89		1
	6	0	23.20	23.13	23.00	23.08	0-2	2
64QAM	1	0	23.02	23.04	22.94	23.19	0-2	2
	1	2	23.00	23.20	22.99	22.89		2
	1	5	22.99	23.03	22.84	22.96		2
	3	0	23.13	22.86	22.79	22.81		2
	3	2	22.98	23.02	22.77	22.81		2
	3	3	23.10	23.09	22.88	22.71		2
	6	0	22.00	22.04	21.82	22.06	0-3	3

Note: Per FCC KDB Publication 447498 D01v06 Section 4.1g) 4 channels are required for LTE Band 66 with 1.4 MHz Bandwidth.

9.4.5 LTE Band 25 (PCS)

Table 9-17
LTE Band 25 (PCS) Conducted Powers - 20 MHz Bandwidth

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26140 (1860.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26590 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	25.15	25.11	25.10	0	0
	1	50	25.07	25.18	25.05		0
	1	99	25.17	**25.19**	25.10		0
	50	0	24.10	24.10	24.15	0-1	1
	50	25	24.12	24.09	24.13		1
	50	50	**24.16**	24.10	24.15		1
	100	0	24.11	24.11	24.13		1
16QAM	1	0	24.12	24.11	24.11	0-1	1
	1	50	24.09	24.11	24.09		1
	1	99	24.14	24.08	24.16		1
	50	0	23.17	23.16	23.10	0-2	2
	50	25	23.10	23.11	23.07		2
	50	50	23.10	23.13	23.15		2
	100	0	23.14	23.12	23.10		2
64QAM	1	0	23.00	22.99	22.98	0-2	2
	1	50	22.92	22.91	23.19		2
	1	99	23.19	23.08	23.05		2
	50	0	21.99	22.11	21.85	0-3	3
	50	25	21.85	22.14	22.07		3
	50	50	22.12	21.88	22.11		3
	100	0	22.18	22.02	22.16		3

Table 9-18
LTE Band 25 (PCS) Conducted Powers - 15 MHz Bandwidth

LTE Band 25 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26115 (1857.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26615 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	25.20	25.20	25.20	0	0
	1	36	25.12	25.10	25.05		0
	1	74	25.20	25.20	25.20		0
	36	0	24.14	24.20	24.17	0-1	1
	36	18	24.12	24.14	24.13		1
	36	37	24.20	24.15	24.16		1
	75	0	24.18	24.18	24.10		1
16QAM	1	0	24.20	24.20	24.20	0-1	1
	1	36	24.20	24.20	24.20		1
	1	74	24.20	24.20	24.20		1
	36	0	23.20	23.20	23.13	0-2	2
	36	18	23.17	23.17	23.05		2
	36	37	23.20	23.18	23.07		2
	75	0	23.20	23.17	23.10		2
64QAM	1	0	23.04	23.11	22.94	0-2	2
	1	36	23.16	23.13	23.04		2
	1	74	23.15	22.90	22.99		2
	36	0	22.15	22.03	21.93	0-3	3
	36	18	22.01	22.04	21.92		3
	36	37	22.13	22.10	22.02		3
	75	0	22.17	22.11	22.18		3

Table 9-19
LTE Band 25 (PCS) Conducted Powers - 10 MHz Bandwidth

LTE Band 25 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26090 (1855.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26640 (1910.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	25.20	25.20	25.18	0	0
	1	25	25.12	25.18	25.10		0
	1	49	25.20	25.16	25.13		0
	25	0	24.17	24.20	24.12	0-1	1
	25	12	24.15	24.15	24.15		1
	25	25	24.16	24.17	24.12		1
	50	0	24.20	24.15	24.12		1
16QAM	1	0	24.20	24.20	24.20	0-1	1
	1	25	24.20	24.20	24.20		1
	1	49	24.20	24.20	24.20		1
	25	0	23.16	23.20	23.16	0-2	2
	25	12	23.17	23.18	23.15		2
	25	25	23.13	23.20	23.14		2
	50	0	23.18	23.13	23.10		2
64QAM	1	0	23.04	23.09	23.07	0-2	2
	1	25	23.04	22.94	23.09		2
	1	49	23.09	22.98	23.09		2
	25	0	22.05	21.94	22.14	0-3	3
	25	12	22.10	22.13	21.82		3
	25	25	21.86	22.14	21.94		3
	50	0	21.99	22.16	21.88		3

Table 9-20
LTE Band 25 (PCS) Conducted Powers - 5 MHz Bandwidth

LTE Band 25 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26065 (1852.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26665 (1912.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	25.15	25.20	25.18	0	0
	1	12	25.05	25.14	25.10		0
	1	24	25.03	25.18	25.08		0
	12	0	24.10	24.18	24.13	0-1	1
	12	6	24.05	24.17	24.10		1
	12	13	24.00	24.13	24.10		1
	25	0	24.10	24.20	24.05		1
16QAM	1	0	24.20	24.20	24.20	0-1	1
	1	12	24.20	24.20	24.20		1
	1	24	24.18	24.18	24.19		1
	12	0	23.20	23.20	23.18	0-2	2
	12	6	23.14	23.20	23.17		2
	12	13	23.05	23.18	23.15		2
	25	0	23.08	23.20	23.07		2
64QAM	1	0	23.16	23.17	23.06	0-2	2
	1	12	23.12	23.07	22.98		2
	1	24	23.16	23.03	23.01		2
	12	0	22.09	22.06	22.02	0-3	3
	12	6	22.16	21.95	22.01		3
	12	13	21.97	22.15	21.99		3
	25	0	21.89	22.06	22.09		3

Table 9-21
LTE Band 25 (PCS) Conducted Powers - 3 MHz Bandwidth

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26055 (1851.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26675 (1913.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	25.15	25.15	25.15	0	0
	1	7	25.20	25.20	25.20		0
	1	14	25.13	25.05	25.10		0
	8	0	24.10	24.10	24.10	0-1	1
	8	4	24.13	24.18	24.08		1
	8	7	24.06	24.10	24.07		1
	15	0	24.10	24.14	24.14		1
16QAM	1	0	24.20	24.20	24.16	0-1	1
	1	7	24.20	24.20	24.20		1
	1	14	24.18	24.20	24.15		1
	8	0	23.18	23.18	23.20	0-2	2
	8	4	23.20	23.20	23.18		2
	8	7	23.18	23.20	23.16		2
	15	0	23.13	23.14	23.17		2
64QAM	1	0	23.18	22.87	23.15	0-2	2
	1	7	22.98	22.99	23.12		2
	1	14	22.94	23.02	22.97		2
	8	0	22.07	22.10	22.20	0-3	3
	8	4	22.14	21.96	22.11		3
	8	7	22.09	21.81	21.91		3
	15	0	22.16	22.00	21.93		3

Table 9-22
LTE Band 25 (PCS) Conducted Powers -1.4 MHz Bandwidth

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26047 (1850.7 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26683 (1914.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	25.05	25.05	25.08	0	0
	1	2	25.10	25.10	25.10		0
	1	5	25.05	25.08	25.05		0
	3	0	25.13	25.05	25.10		0
	3	2	25.10	25.15	25.08		0
	3	3	25.10	25.08	25.13		0
	6	0	24.10	24.03	24.00	0-1	1
16QAM	1	0	24.18	24.15	24.13	0-1	1
	1	2	24.20	24.20	24.15		1
	1	5	24.13	24.20	24.10		1
	3	0	24.20	24.12	24.08		1
	3	2	24.20	24.20	24.08		1
	3	3	24.18	24.16	24.15		1
	6	0	23.20	23.10	23.10	0-2	2
64QAM	1	0	23.15	23.18	23.00	0-2	2
	1	2	23.10	23.08	23.04		2
	1	5	22.87	22.78	22.88		2
	3	0	22.95	22.96	22.87		2
	3	2	23.16	22.97	22.99		2
	3	3	23.14	22.93	23.10		2
	6	0	22.02	22.02	22.04	0-3	3

9.4.6 LTE Carrier Aggregation Conducted Powers

Table 9-23
LTE Carrier Aggregation Conducted Powers- 2CC

PCC									SCC				Power	
PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B4	20	2175	2132.5	25.49	25.50
LTE B12	10	23095	707.5	QPSK	1	0	5095	737.5	LTE B4	20	2175	2132.5	25.46	25.50
LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B2	20	900	1960	25.20	25.20
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B5	10	2525	881.5	25.11	25.20
LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B66	20	66786	2145	25.41	25.50
LTE B5	10	20525	836.5	QPSK	1	25	2525	881.5	LTE B66	20	66786	2145	25.46	25.50
LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B13	10	5230	751	25.13	25.20
LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B12	10	5095	737.5	25.13	25.20
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B4	20	2175	2132.5	25.13	25.20
LTE B5	10	20525	836.5	QPSK	1	25	2525	881.5	LTE B2	20	900	1960	25.50	25.50
LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B13	10	5230	751	25.08	25.20
LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B5	10	2525	881.5	25.11	25.20
LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B5	10	2525	881.5	25.19	25.20
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B66	20	66786	2145	25.18	25.20
LTE B5	10	20525	836.5	QPSK	1	25	2525	881.5	LTE B4	20	2175	2132.5	25.44	25.50
LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B2	20	900	1960	25.18	25.20
LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B2	20	900	1960	25.50	25.50
LTE B12	10	23095	707.5	QPSK	1	0	5095	737.5	LTE B2	20	900	1960	25.49	25.50
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B13	10	5230	751	25.12	25.20
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B12	10	5095	737.5	25.18	25.20
LTE B12	5	23035	701.5	QPSK	1	24	5035	731.5	LTE B12	10	5107	738.7	25.33	25.50
LTE B66	15	132047	1717.5	QPSK	1	74	66511	2117.5	LTE B66	5	66610	2127.4	25.18	25.20
LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B66	20	66734	2139.8	25.20	25.20
LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B4	5	2375	2152.5	25.17	25.20
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B2	5	1175	1987.5	25.20	25.20
LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B66	5	67311	2197.5	25.11	25.20

Table 9-24
LTE Carrier Aggregation Conducted Powers- 3CC

PCC									SCC 1				SCC 2				Power	
PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B4	20	2175	2132.5	LTE B13	10	5230	751	25.11	25.20
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B2	5	1175	1987.5	LTE B13	10	5230	751	25.15	25.20
LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B4	5	2375	2152.5	LTE B5	10	2525	881.5	25.17	25.20
LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B2	20	900	1960	LTE B12	10	5095	737.5	25.11	25.20
LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B2	20	900	1960	LTE B66	20	66786	2145	25.43	25.50
LTE B5	10	20525	836.5	QPSK	1	25	2525	881.5	LTE B2	20	900	1960	LTE B66	20	66786	2145	25.49	25.50
LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B2	20	900	1960	LTE B13	10	5230	751	25.17	25.20
LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B2	20	900	1960	LTE B2	5	1175	1987.5	25.38	25.50
LTE B5	10	20525	836.5	QPSK	1	25	2525	881.5	LTE B4	20	2175	2132.5	LTE B4	5	2375	2152.5	25.43	25.50
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	25.09	25.20
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B13	10	5230	751	LTE B66	20	66786	2145	25.18	25.20
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B5	10	2525	881.5	LTE B66	20	66786	2145	25.08	25.20
LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	25.38	25.50
LTE B12	10	23095	707.5	QPSK	1	0	5095	737.5	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	25.48	25.50
LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B2	20	900	1960	LTE B13	10	5230	751	25.10	25.20
LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B2	20	900	1960	LTE B5	10	2525	881.5	25.17	25.20
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B4	20	2175	2132.5	LTE B5	10	2525	881.5	25.14	25.20
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B2	5	1175	1987.5	LTE B5	10	2525	881.5	25.10	25.20
LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B4	5	2375	2152.5	LTE B13	10	5230	751	25.19	25.20
LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B2	20	900	1960	LTE B5	10	2525	881.5	25.19	25.20
LTE B5	10	20525	836.5	QPSK	1	25	2525	881.5	LTE B2	20	900	1960	LTE B2	5	1175	1987.5	25.40	25.50
LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B4	20	2175	2132.5	LTE B4	5	2375	2152.5	25.49	25.50
LTE B5	10	20525	836.5	QPSK	1	25	2525	881.5	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	25.41	25.50
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B12	5	5095	737.5	LTE B12	5	5047	732.7	25.10	25.20
LTE B12	5	23095	707.5	QPSK	1	0	5095	737.5	LTE B2	20	900	1960	LTE B12	5	5047	732.7	25.45	25.50
LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B12	5	5095	737.5	LTE B12	5	5047	732.7	25.15	25.20
LTE B12	5	23095	707.5	QPSK	1	0	5095	737.5	LTE B4	20	2175	2132.5	LTE B12	5	5047	732.7	25.39	25.50
LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B66	20	66734	2139.8	LTE B66	5	67311	2197.5	25.15	25.20
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B66	20	66786	2145	LTE B66	20	66588	2125.2	25.14	25.20
LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B66	20	66734	2139.8	LTE B2	20	900	1960	25.17	25.20
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B66	15	66786	2145	LTE B66	5	66687	2135.1	25.18	25.20
LTE B66	15	132047	1717.5	QPSK	1	74	66511	2117.5	LTE B66	5	66610	2127.4	LTE B2	20	900	1960	25.18	25.20
LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B66	15	66786	2145	LTE B66	5	66687	2135.1	25.46	25.50
LTE B66	15	132047	1717.5	QPSK	1	74	66511	2117.5	LTE B66	5	66610	2127.4	LTE B13	10	5230	751	25.19	25.20
LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B66	20	66786	2145	LTE B66	20	66588	2125.2	25.45	25.50
LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B66	20	66734	2139.8	LTE B13	10	5230	751	25.19	25.20
LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B66	20	66786	2145	LTE B66	5	67311	2197.5	25.48	25.50
LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B66	5	67311	2197.5	LTE B13	10	5230	751	24.17	25.20
LTE B2	15	18675	1857.5	QPSK	1	0	675	1937.5	LTE B2	5	1175	1987.5	LTE B12	10	5095	737.5	25.19	25.20
LTE B12	10	23095	707.5	QPSK	1	0	5095	737.5	LTE B2	20	900	1960	LTE B2	5	1175	1987.5	25.42	25.50
LTE B5	10	20525	836.5	QPSK	1	25	2525	881.5	LTE B66	15	66786	2145	LTE B66	5	66687	2135.1	25.45	25.50
LTE B66	15	132047	1717.5	QPSK	1	74	66511	2117.5	LTE B66	5	66610	2127.4	LTE B5	10	2525	881.5	25.18	25.20
LTE B5	10	20525	836.5	QPSK	1	25	2525	881.5	LTE B66	20	66786	2145	LTE B66	20	66588	2125.2	25.46	25.50
LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B66	20	66734	2139.8	LTE B5	10	2525	881.5	25.14	25.20
LTE B5	10	20525	836.5	QPSK	1	25	2525	881.5	LTE B66	15	66786	2145	LTE B66	5	67311	2197.5	25.49	25.50
LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B66	5	67311	2197.5	LTE B5	10	2525	881.5	25.17	25.20

Notes:

1. The device only supports downlink Carrier Aggregation. Uplink Carrier Aggregation is not supported. For every supported combination of downlink carrier aggregation, power measurements were performed 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.
2. All control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
3. Per FCC guidance, LTE Band 66 standalone powers were used to select measurement configurations for LTE Band 4, and LTE Band 25 standalone powers were used to select measurement configurations for LTE Band 2.
4. For downlink carrier aggregation combinations, PCC uplink channel was selected based on section C)3)b)ii) of KBD 941225 D05 V01r02. The downlink PCC channel was paired with the selected PCC uplink channel according to normal configurations without carrier aggregation. For inter-band CA, the SCC downlink channels were selected near the middle of their transmission bands. For contiguous intraband CA, the downlink channel spacing between the component carriers was set to multiple of 300 kHz less than the nominal channel spacing defined in section 5.4.1A of 3GPP TS 36.521. For non-contiguous intra-band CA, the downlink channel spacing between the component carriers was set to be larger than the nominal channel spacing and provided maximum separation between the component carriers. All selected downlink channels remained fully within the downlink transmission band of the respective component carrier.

Figure 9-4
Power Measurement Setup

9.5 WLAN Conducted Powers

Table 9-25
2.4 GHz WLAN Reduced Average RF Power (Held-to-Ear)- Primary Ant

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]
		IEEE Transmission Mode
		802.11b
2412	1	14.88
2422	3	15.42
2437	6	**15.49**
2462	11	15.46

Table 9-26
2.4 GHz WLAN Reduced Average RF Power (Held-to-Ear)- Secondary Ant

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]
		IEEE Transmission Mode
		802.11b
2412	1	14.70
2422	3	15.13
2437	6	**15.19**
2462	11	15.15

Table 9-27
2.4 GHz WLAN Maximum Average RF Power- Primary Ant

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]			
		IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ac
2412	1	16.24	14.76	14.81	14.80
2422	3	16.15	15.16	14.91	14.69
2437	6	**16.85**	15.24	15.02	14.98
2462	11	16.21	15.08	14.83	14.77

Table 9-28
2.4 GHz WLAN Maximum Average RF Power- Secondary Ant

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]			
		IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ac
2412	1	15.98	14.71	14.70	14.73
2422	3	16.38	14.85	14.97	14.96
2437	6	**16.81**	15.29	14.95	14.98
2462	11	16.42	14.92	14.91	14.95

Table 9-29
5 GHz WLAN Reduced Average RF Power (Held-to-Ear)- Primary Ant

Freq [MHz]	Channel	5GHz (20MHz) Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	12.24	12.08	12.04
5200	40	14.15	14.12	14.00
5220	44	14.08	14.23	14.21
5240	48	14.06	14.23	14.16
5260	52	14.08	14.17	14.19
5280	56	14.03	14.02	14.18
5300	60	**14.10**	14.17	14.18
5320	64	12.06	11.80	11.80
5500	100	12.12	11.99	12.01
5580	116	**14.03**	14.21	14.10
5660	132	13.88	13.91	13.95
5720	144	13.91	13.95	13.90
5745	149	**14.04**	14.04	14.24
5785	157	14.02	14.15	14.22
5825	165	11.83	11.88	11.88

Table 9-30
5 GHz WLAN Reduced Average RF Power (Held-to-Ear)- Secondary Ant

Freq [MHz]	Channel	5GHz (20MHz) Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	11.88	12.18	11.65
5200	40	14.08	14.08	14.15
5220	44	14.22	14.10	14.03
5240	48	14.15	14.09	14.10
5260	52	**14.20**	14.05	14.06
5280	56	14.05	14.00	14.02
5300	60	14.17	14.24	14.16
5320	64	11.64	11.82	11.55
5500	100	11.81	11.85	11.59
5580	116	**14.11**	14.10	14.15
5660	132	13.96	13.87	13.85
5720	144	13.84	13.78	13.80
5745	149	14.06	14.23	14.16
5785	157	**14.06**	14.06	14.12
5825	165	11.82	11.62	11.71

Table 9-31
5 GHz WLAN Maximum Average RF Power- Primary Ant

Freq [MHz]	Channel	5GHz (20MHz) Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	12.24	12.08	12.04
5200	40	16.02	15.82	15.92
5220	44	**16.20**	15.96	15.94
5240	48	16.07	15.97	15.95
5260	52	**16.11**	15.91	15.74
5280	56	15.97	15.79	15.86
5300	60	15.87	15.78	15.89
5320	64	12.06	11.80	11.80
5500	100	12.12	11.99	12.01
5580	116	**15.95**	15.80	15.78
5660	132	15.87	15.60	15.64
5720	144	15.77	15.66	15.58
5745	149	**16.19**	16.12	16.16
5785	157	15.90	15.93	15.93
5825	165	11.83	11.88	11.88

Table 9-32
5 GHz WLAN Maximum Average RF Power- Secondary Ant

Freq [MHz]	Channel	5GHz (20MHz) Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	11.88	12.18	11.65
5200	40	15.76	15.88	15.77
5220	44	**15.81**	15.93	15.64
5240	48	15.76	15.91	15.65
5260	52	15.85	15.87	15.68
5280	56	15.78	15.92	15.69
5300	60	**15.87**	15.78	15.61
5320	64	11.64	11.82	11.55
5500	100	11.81	11.85	11.59
5580	116	**15.59**	15.54	15.61
5660	132	15.16	15.01	14.97
5720	144	14.65	14.59	14.57
5745	149	**15.90**	15.70	15.89
5785	157	15.85	15.69	15.69
5825	165	11.82	11.62	11.71

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

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

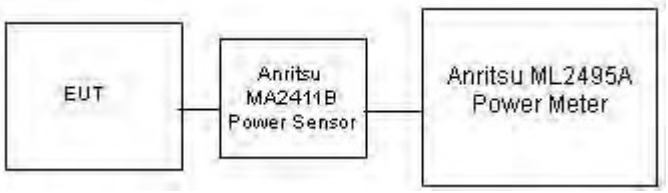


Figure 9-5
Power Measurement Setup

9.6 Bluetooth Conducted Powers

Table 9-33
Bluetooth Average RF Powers

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
			[dBm]	[mW]
2402	1.0	0	10.60	11.471
2441	1.0	39	**11.13**	12.969
2480	1.0	78	9.55	9.008
2402	2.0	0	8.55	7.161
2441	2.0	39	9.39	8.681
2480	2.0	78	7.96	6.248
2402	3.0	0	8.63	7.291
2441	3.0	39	9.47	8.847
2480	3.0	78	8.03	6.356

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

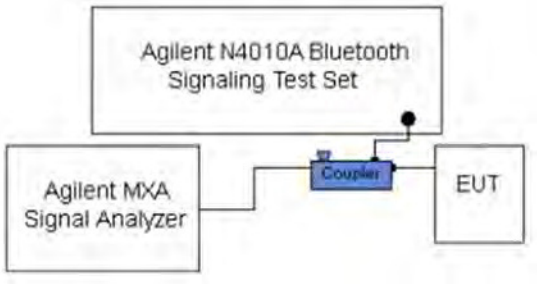


Figure 9-6
Power Measurement Setup

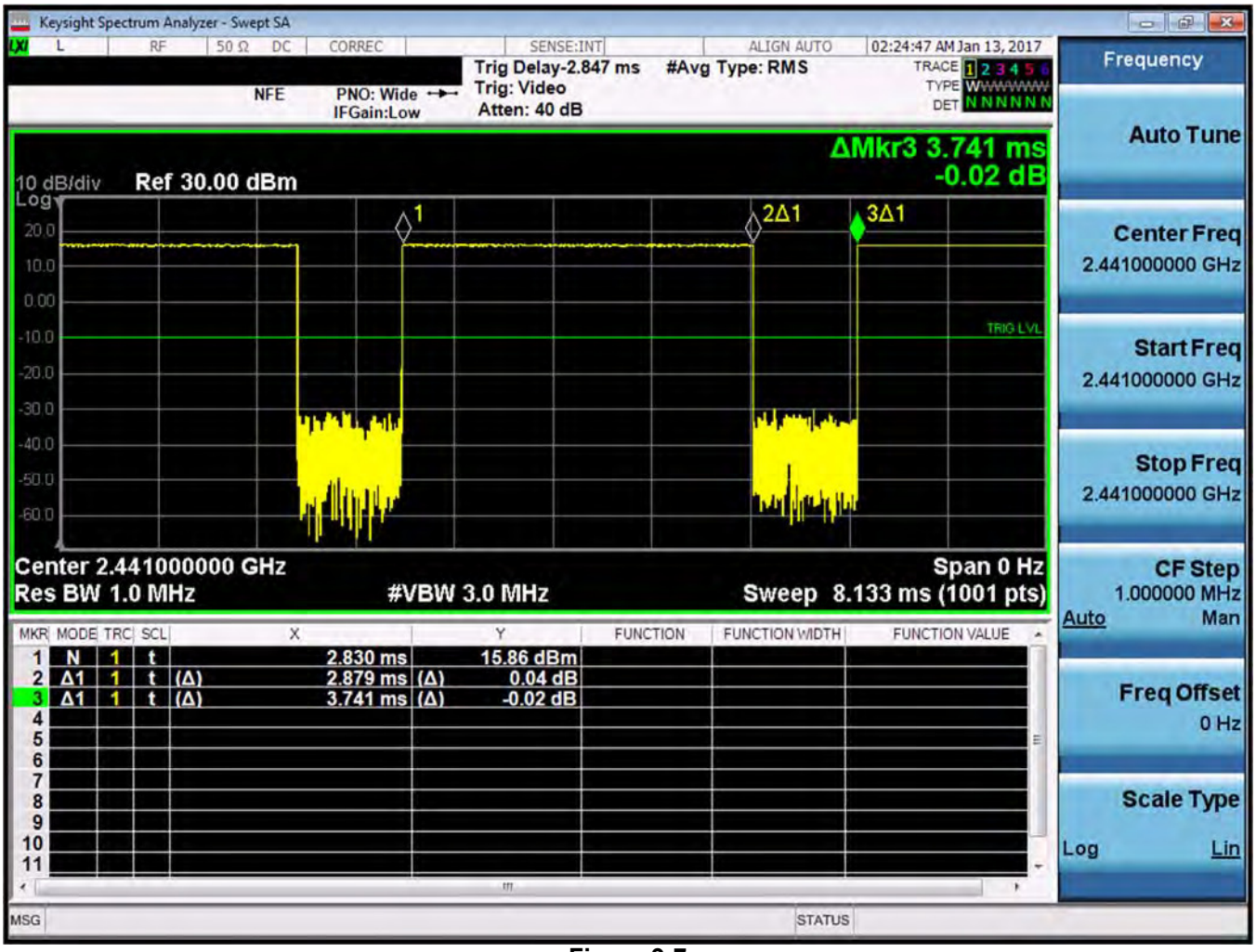


Figure 9-7
Bluetooth Transmission Plot

Equation 9-1
Bluetooth Duty Cycle Calculation

$$Duty\ Cycle = \frac{PulseWidth}{Period} * 100\% = \frac{2.879ms}{3.741ms} * 100\% = 77.0\%$$

10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Head Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	%dev σ	%dev ε
1/25/2017	750H	22.2	700	0.859	42.900	0.889	42.201	-3.37%	1.66%
			710	0.869	42.739	0.890	42.149	-2.36%	1.40%
			740	0.897	42.315	0.893	41.994	0.45%	0.76%
			755	0.910	42.124	0.894	41.916	1.79%	0.50%
			770	0.924	41.938	0.895	41.838	3.24%	0.24%
			785	0.938	41.734	0.896	41.760	4.69%	-0.06%
1/31/2017	835H	22.1	820	0.897	43.193	0.899	41.578	-0.22%	3.88%
			835	0.912	43.015	0.900	41.500	1.33%	3.65%
			850	0.927	42.828	0.916	41.500	1.20%	3.20%
1/27/2017	1750H	22.0	1710	1.325	39.024	1.348	40.142	-1.71%	-2.79%
			1750	1.360	38.821	1.371	40.079	-0.80%	-3.14%
			1790	1.398	38.651	1.394	40.016	0.29%	-3.41%
1/27/2017	1900H	21.9	1850	1.396	38.474	1.400	40.000	-0.29%	-3.82%
			1880	1.427	38.328	1.400	40.000	1.93%	-4.18%
			1910	1.460	38.197	1.400	40.000	4.29%	-4.51%
1/30/2017	1900H	21.3	1850	1.395	38.408	1.400	40.000	-0.36%	-3.98%
			1880	1.430	38.258	1.400	40.000	2.14%	-4.35%
			1910	1.464	38.120	1.400	40.000	4.57%	-4.70%
1/20/2017	2450H	24.5	2400	1.828	39.570	1.756	39.289	4.10%	0.72%
			2450	1.878	39.433	1.800	39.200	4.33%	0.59%
			2500	1.935	39.193	1.855	39.136	4.31%	0.15%
01/23/2017	5200H-5800H	20.3	5240	4.554	34.993	4.696	35.940	-3.02%	-2.63%
			5260	4.590	34.983	4.717	35.917	-2.69%	-2.60%
			5300	4.613	34.928	4.758	35.871	-3.05%	-2.63%
			5580	4.883	34.540	5.045	35.551	-3.21%	-2.84%
			5600	4.914	34.502	5.065	35.529	-2.98%	-2.89%
			5745	5.070	34.326	5.214	35.363	-2.76%	-2.93%
			5765	5.085	34.297	5.234	35.340	-2.85%	-2.95%
			5785	5.101	34.275	5.255	35.317	-2.93%	-2.95%

Table 10-2
Measured Body Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (˚C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
1/30/2017	750B	20.8	700	0.913	55.104	0.959	55.726	-4.80%	-1.12%
			710	0.923	54.953	0.960	55.687	-3.85%	-1.32%
			740	0.952	54.559	0.963	55.570	-1.14%	-1.82%
			755	0.966	54.398	0.964	55.512	0.21%	-2.01%
			770	0.981	54.248	0.965	55.453	1.66%	-2.17%
			785	0.996	54.069	0.966	55.395	3.11%	-2.39%
1/26/2017	835B	21.4	820	0.989	56.595	0.969	55.258	2.06%	2.42%
			835	1.004	56.440	0.970	55.200	3.51%	2.25%
			850	1.019	56.294	0.988	55.154	3.14%	2.07%
1/30/2017	835B	21.1	820	0.986	55.671	0.969	55.258	1.75%	0.75%
			835	0.999	55.523	0.970	55.200	2.99%	0.59%
			850	1.019	55.358	0.988	55.154	3.14%	0.37%
1/23/2017	1750B	22.0	1710	1.464	51.733	1.463	53.537	0.07%	-3.37%
			1750	1.506	51.573	1.488	53.432	1.21%	-3.48%
			1790	1.550	51.401	1.514	53.326	2.38%	-3.61%
1/27/2017	1750B	21.4	1710	1.444	52.390	1.463	53.537	-1.30%	-2.14%
			1750	1.488	52.205	1.488	53.432	0.00%	-2.30%
			1790	1.533	52.023	1.514	53.326	1.25%	-2.44%
1/25/2017	1900B	22.9	1850	1.504	52.304	1.520	53.300	-1.05%	-1.87%
			1880	1.536	52.210	1.520	53.300	1.05%	-2.05%
			1910	1.570	52.121	1.520	53.300	3.29%	-2.21%
1/30/2017	1900B	23.0	1850	1.517	53.391	1.520	53.300	-0.20%	0.17%
			1880	1.547	53.261	1.520	53.300	1.78%	-0.07%
			1910	1.588	53.189	1.520	53.300	4.47%	-0.21%
1/24/2017	2450B	23.0	2400	1.908	51.547	1.902	52.767	0.32%	-2.31%
			2450	1.973	51.355	1.950	52.700	1.18%	-2.55%
			2500	2.043	51.151	2.021	52.636	1.09%	-2.82%
01/22/2017	5200B-5800B	21.9	5220	5.470	47.912	5.323	48.987	2.76%	-2.19%
			5240	5.489	47.916	5.346	48.960	2.67%	-2.13%
			5260	5.515	47.894	5.369	48.933	2.72%	-2.12%
			5300	5.575	47.792	5.416	48.879	2.94%	-2.22%
			5580	5.949	47.365	5.743	48.499	3.59%	-2.34%
			5600	5.972	47.325	5.766	48.471	3.57%	-2.36%
			5745	6.172	47.057	5.936	48.275	3.98%	-2.52%
			5765	6.196	47.001	5.959	48.248	3.98%	-2.58%

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

10.2 Test System Verification

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

Table 10-3
System Verification Results

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	$Deviation_{1g}$ (%)
I	750	HEAD	01/25/2017	22.3	22.2	0.200	1161	3209	1.570	8.170	7.850	-3.92%
K	835	HEAD	01/31/2017	23.1	22.1	0.200	4d047	7409	1.730	9.130	8.650	-5.26%
I	1750	HEAD	01/27/2017	24.0	23.0	0.100	1148	3209	3.370	36.200	33.700	-6.91%
F	1900	HEAD	01/27/2017	22.9	21.9	0.100	5d149	3332	3.880	40.100	38.800	-3.24%
F	1900	HEAD	01/30/2017	22.5	21.5	0.100	5d149	3332	3.890	40.100	38.900	-2.99%
G	2450	HEAD	01/20/2017	24.1	23.1	0.100	797	3287	5.500	52.100	55.000	5.57%
J	5250	HEAD	01/23/2017	20.9	20.3	0.050	1191	7357	3.880	78.900	77.600	-1.65%
J	5600	HEAD	01/23/2017	20.9	20.3	0.050	1191	7357	4.120	83.600	82.400	-1.44%
J	5750	HEAD	01/23/2017	20.9	20.3	0.050	1191	7357	3.910	79.100	78.200	-1.14%
I	750	BODY	01/30/2017	22.7	20.8	0.200	1161	3209	1.760	8.430	8.800	4.39%
H	835	BODY	01/26/2017	22.8	21.4	0.200	4d047	3319	2.020	9.570	10.100	5.54%
H	835	BODY	01/30/2017	22.8	21.1	0.200	4d047	3319	1.950	9.570	9.750	1.88%
I	1750	BODY	01/23/2017	23.6	23.0	0.100	1148	3209	3.930	37.100	39.300	5.93%
D	1750	BODY	01/27/2017	23.2	21.6	0.100	1148	3213	3.570	37.100	35.700	-3.77%
K	1900	BODY	01/25/2017	24.0	21.5	0.100	5d080	7409	3.980	39.100	39.800	1.79%
K	1900	BODY	01/30/2017	22.3	22.8	0.100	5d080	7409	4.090	39.100	40.900	4.60%
E	2450	BODY	01/24/2017	24.0	23.0	0.100	981	7406	4.940	50.800	49.400	-2.76%
D	5250	BODY	01/22/2017	21.9	21.4	0.050	1237	3914	3.490	74.800	69.800	-6.68%
D	5600	BODY	01/22/2017	21.9	21.4	0.050	1237	3914	3.950	77.000	79.000	2.60%
D	5750	BODY	01/22/2017	21.9	21.4	0.050	1237	3914	3.430	75.400	68.600	-9.02%

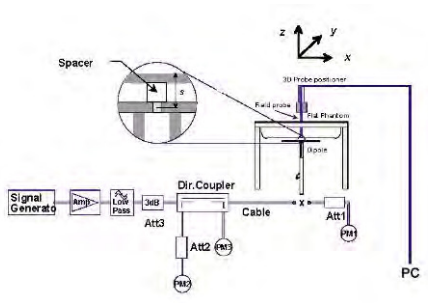


Figure 10-1
System Verification Setup Diagram

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	33.2	33.20	0.09	Right	Cheek	06855	1	1:8.3	0.075	1.000	0.075	
836.60	190	GSM 850	GSM	33.2	33.20	-0.10	Right	Tilt	06855	1	1:8.3	0.047	1.000	0.047	
836.60	190	GSM 850	GSM	33.2	33.20	0.04	Left	Cheek	06855	1	1:8.3	0.109	1.000	0.109	
836.60	190	GSM 850	GSM	33.2	33.20	-0.20	Left	Tilt	06855	1	1:8.3	0.048	1.000	0.048	
836.60	190	GSM 850	GPRS	32.2	32.20	0.09	Right	Cheek	06855	2	1:4.15	0.131	1.000	0.131	
836.60	190	GSM 850	GPRS	32.2	32.20	0.09	Right	Tilt	06855	2	1:4.15	0.080	1.000	0.080	
836.60	190	GSM 850	GPRS	32.2	32.20	0.05	Left	Cheek	06855	2	1:4.15	0.183	1.000	0.183	A1
836.60	190	GSM 850	GPRS	32.2	32.20	0.05	Left	Tilt	06855	2	1:4.15	0.075	1.000	0.075	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-2
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	30.2	30.20	0.05	Right	Cheek	06855	1	1:8.3	0.112	1.000	0.112	
1880.00	661	GSM 1900	GSM	30.2	30.20	-0.16	Right	Tilt	06855	1	1:8.3	0.047	1.000	0.047	
1880.00	661	GSM 1900	GSM	30.2	30.20	0.14	Left	Cheek	06855	1	1:8.3	0.109	1.000	0.109	
1880.00	661	GSM 1900	GSM	30.2	30.20	0.12	Left	Tilt	06855	1	1:8.3	0.047	1.000	0.047	
1880.00	661	GSM 1900	GPRS	29.2	29.17	-0.17	Right	Cheek	06855	2	1:4.15	0.154	1.007	0.155	A2
1880.00	661	GSM 1900	GPRS	29.2	29.17	0.01	Right	Tilt	06855	2	1:4.15	0.064	1.007	0.064	
1880.00	661	GSM 1900	GPRS	29.2	29.17	-0.17	Left	Cheek	06855	2	1:4.15	0.142	1.007	0.143	
1880.00	661	GSM 1900	GPRS	29.2	29.17	-0.17	Left	Tilt	06855	2	1:4.15	0.063	1.007	0.063	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-3
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	24.7	24.70	-0.02	Right	Cheek	06855	1:1	0.081	1.000	0.081	
836.60	4183	UMTS 850	RMC	24.7	24.70	0.13	Right	Tilt	06855	1:1	0.038	1.000	0.038	
836.60	4183	UMTS 850	RMC	24.7	24.70	0.06	Left	Cheek	06855	1:1	0.098	1.000	0.098	A3
836.60	4183	UMTS 850	RMC	24.7	24.70	0.11	Left	Tilt	06855	1:1	0.040	1.000	0.040	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-4
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	24.7	24.68	0.15	Right	Cheek	06848	1:1	0.134	1.005	0.135	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	0.03	Right	Tilt	06848	1:1	0.107	1.005	0.108	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	0.07	Left	Cheek	06848	1:1	0.173	1.005	0.174	A4
1732.40	1412	UMTS 1750	RMC	24.7	24.68	0.21	Left	Tilt	06848	1:1	0.091	1.005	0.091	
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	24.7	24.68	0.17	Right	Cheek	06848	1:1	0.199	1.005	0.200	A5
1880.00	9400	UMTS 1900	RMC	24.7	24.68	0.06	Right	Tilt	06848	1:1	0.087	1.005	0.087	
1880.00	9400	UMTS 1900	RMC	24.7	24.68	0.03	Left	Cheek	06848	1:1	0.195	1.005	0.196	
1880.00	9400	UMTS 1900	RMC	24.7	24.68	0.04	Left	Tilt	06848	1:1	0.092	1.005	0.092	
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
Cell. CDMA Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.52	384	Cell. CDMA	RC3 / SO55	25.5	25.50	-0.14	Right	Cheek	06848	1:1	0.086	1.000	0.086	
836.52	384	Cell. CDMA	RC3 / SO55	25.5	25.50	0.19	Right	Tilt	06848	1:1	0.046	1.000	0.046	
836.52	384	Cell. CDMA	RC3 / SO55	25.5	25.50	-0.12	Left	Cheek	06848	1:1	0.113	1.000	0.113	
836.52	384	Cell. CDMA	RC3 / SO55	25.5	25.50	0.14	Left	Tilt	06848	1:1	0.044	1.000	0.044	
836.52	384	Cell. CDMA	EVDO Rev. A	25.5	25.48	0.00	Right	Cheek	06848	1:1	0.114	1.005	0.115	
836.52	384	Cell. CDMA	EVDO Rev. A	25.5	25.48	-0.05	Right	Tilt	06848	1:1	0.081	1.005	0.081	
836.52	384	Cell. CDMA	EVDO Rev. A	25.5	25.48	0.03	Left	Cheek	06848	1:1	0.171	1.005	0.172	A6
836.52	384	Cell. CDMA	EVDO Rev. A	25.5	25.48	-0.06	Left	Tilt	06848	1:1	0.075	1.005	0.075	

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

Table 11-7
PCS CDMA Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	600	PCS CDMA	RC3 / SO55	25.2	25.20	0.00	Right	Cheek	06855	1:1	0.209	1.000	0.209	
1880.00	600	PCS CDMA	RC3 / SO55	25.2	25.20	0.03	Right	Tilt	06855	1:1	0.088	1.000	0.088	
1880.00	600	PCS CDMA	RC3 / SO55	25.2	25.20	0.04	Left	Cheek	06855	1:1	0.236	1.000	0.236	
1880.00	600	PCS CDMA	RC3 / SO55	25.2	25.20	-0.02	Left	Tilt	06855	1:1	0.126	1.000	0.126	
1880.00	600	PCS CDMA	EVDO Rev. A	25.2	25.20	-0.01	Right	Cheek	06855	1:1	0.243	1.000	0.243	A7
1880.00	600	PCS CDMA	EVDO Rev. A	25.2	25.20	-0.02	Right	Tilt	06855	1:1	0.081	1.000	0.081	
1880.00	600	PCS CDMA	EVDO Rev. A	25.2	25.20	0.13	Left	Cheek	06855	1:1	0.236	1.000	0.236	
1880.00	600	PCS CDMA	EVDO Rev. A	25.2	25.20	0.09	Left	Tilt	06855	1:1	0.112	1.000	0.112	

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

Table 11-8
LTE Band 12 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.5	25.50	0.01	0	Right	Cheek	QPSK	1	0	06863	1:1	0.129	1.000	0.129	
707.50	23095	Mid	LTE Band 12	10	24.5	24.50	0.02	1	Right	Cheek	QPSK	25	12	06863	1:1	0.113	1.000	0.113	
707.50	23095	Mid	LTE Band 12	10	25.5	25.50	0.12	0	Right	Tilt	QPSK	1	0	06863	1:1	0.094	1.000	0.094	
707.50	23095	Mid	LTE Band 12	10	24.5	24.50	0.04	1	Right	Tilt	QPSK	25	12	06863	1:1	0.081	1.000	0.081	
707.50	23095	Mid	LTE Band 12	10	25.5	25.50	0.03	0	Left	Cheek	QPSK	1	0	06863	1:1	0.169	1.000	0.169	A8
707.50	23095	Mid	LTE Band 12	10	24.5	24.50	0.06	1	Left	Cheek	QPSK	25	12	06863	1:1	0.141	1.000	0.141	
707.50	23095	Mid	LTE Band 12	10	25.5	25.50	0.10	0	Left	Tilt	QPSK	1	0	06863	1:1	0.088	1.000	0.088	
707.50	23095	Mid	LTE Band 12	10	24.5	24.50	0.06	1	Left	Tilt	QPSK	25	12	06863	1:1	0.076	1.000	0.076	
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 13 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
782.00	23230	Mid	LTE Band 13	10	25.5	25.50	0.05	0	Right	Cheek	QPSK	1	0	06863	1:1	0.132	1.000	0.132	
782.00	23230	Mid	LTE Band 13	10	24.5	24.50	0.10	1	Right	Cheek	QPSK	25	0	06863	1:1	0.107	1.000	0.107	
782.00	23230	Mid	LTE Band 13	10	25.5	25.50	0.08	0	Right	Tilt	QPSK	1	0	06863	1:1	0.089	1.000	0.089	
782.00	23230	Mid	LTE Band 13	10	24.5	24.50	0.12	1	Right	Tilt	QPSK	25	0	06863	1:1	0.077	1.000	0.077	
782.00	23230	Mid	LTE Band 13	10	25.5	25.50	0.08	0	Left	Cheek	QPSK	1	0	06863	1:1	0.193	1.000	0.193	A9
782.00	23230	Mid	LTE Band 13	10	24.5	24.50	0.06	1	Left	Cheek	QPSK	25	0	06863	1:1	0.161	1.000	0.161	
782.00	23230	Mid	LTE Band 13	10	25.5	25.50	0.06	0	Left	Tilt	QPSK	1	0	06863	1:1	0.088	1.000	0.088	
782.00	23230	Mid	LTE Band 13	10	24.5	24.50	0.06	1	Left	Tilt	QPSK	25	0	06863	1:1	0.074	1.000	0.074	
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 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	25.5	25.50	0.09	0	Right	Cheek	QPSK	1	25	06897	1:1	0.122	1.000	0.122	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.48	0.04	1	Right	Cheek	QPSK	25	0	06897	1:1	0.102	1.005	0.103	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.50	0.17	0	Right	Tilt	QPSK	1	25	06897	1:1	0.077	1.000	0.077	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.48	0.03	1	Right	Tilt	QPSK	25	0	06897	1:1	0.066	1.005	0.066	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.50	-0.01	0	Left	Cheek	QPSK	1	25	06897	1:1	0.198	1.000	0.198	A10
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.48	0.14	1	Left	Cheek	QPSK	25	0	06897	1:1	0.164	1.005	0.165	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.50	0.10	0	Left	Tilt	QPSK	1	25	06897	1:1	0.080	1.000	0.080	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.48	0.14	1	Left	Tilt	QPSK	25	0	06897	1:1	0.063	1.005	0.063	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Head 1.6 W/kg (mW/g) averaged over 1 gram					

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

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.2	25.20	0.09	0	Right	Cheek	QPSK	1	0	06863	1:1	0.243	1.000	0.243	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.20	0.01	1	Right	Cheek	QPSK	50	0	06863	1:1	0.167	1.000	0.167	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.2	25.20	0.06	0	Right	Tilt	QPSK	1	0	06863	1:1	0.121	1.000	0.121	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.20	-0.04	1	Right	Tilt	QPSK	50	0	06863	1:1	0.088	1.000	0.088	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.2	25.20	0.21	0	Left	Cheek	QPSK	1	0	06863	1:1	0.263	1.000	**0.263**	A11
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.20	0.08	1	Left	Cheek	QPSK	50	0	06863	1:1	0.204	1.000	0.204	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.2	25.20	0.00	0	Left	Tilt	QPSK	1	0	06863	1:1	0.133	1.000	0.133	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.20	0.00	1	Left	Tilt	QPSK	50	0	06863	1:1	0.096	1.000	0.096	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-12
LTE Band 25 (PCS) Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.2	25.19	-0.03	0	Right	Cheek	QPSK	1	99	06871	1:1	0.222	1.002	0.222	A12
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.2	24.16	-0.02	1	Right	Cheek	QPSK	50	50	06871	1:1	0.168	1.009	0.170	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.2	25.19	-0.06	0	Right	Tilt	QPSK	1	99	06871	1:1	0.091	1.002	0.091	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.2	24.16	0.01	1	Right	Tilt	QPSK	50	50	06871	1:1	0.071	1.009	0.072	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.2	25.19	-0.03	0	Left	Cheek	QPSK	1	99	06871	1:1	0.212	1.002	0.212	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.2	24.16	-0.02	1	Left	Cheek	QPSK	50	50	06871	1:1	0.149	1.009	0.150	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.2	25.19	0.14	0	Left	Tilt	QPSK	1	99	06871	1:1	0.127	1.002	0.127	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.2	24.16	0.07	1	Left	Tilt	QPSK	50	50	06871	1:1	0.078	1.009	0.079	
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
DTS Head SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	15.5	15.49	0.20	Right	Cheek	Primary	07036	1	99.9	0.540	0.538	1.002	1.001	0.540	
2437	6	802.11b	DSSS	22	15.5	15.49	0.18	Right	Tilt	Primary	07036	1	99.9	0.242	0.186	1.002	1.001	0.187	
2437	6	802.11b	DSSS	22	15.5	15.49	0.12	Left	Cheek	Primary	07036	1	99.9	0.175	-	1.002	1.001	-	
2437	6	802.11b	DSSS	22	15.5	15.49	0.07	Left	Tilt	Primary	07036	1	99.9	0.065	-	1.002	1.001	-	
2437	6	802.11b	DSSS	22	15.5	15.19	0.12	Right	Cheek	Secondary	07036	1	99.9	0.732	0.604	1.074	1.001	**0.649**	A13
2437	6	802.11b	DSSS	22	15.5	15.19	-0.03	Right	Tilt	Secondary	07036	1	99.9	0.701	0.573	1.074	1.001	0.616	
2437	6	802.11b	DSSS	22	15.5	15.19	-0.19	Left	Cheek	Secondary	07036	1	99.9	0.605	-	1.074	1.001	-	
2437	6	802.11b	DSSS	22	15.5	15.19	0.05	Left	Tilt	Secondary	07036	1	99.9	0.582	-	1.074	1.001	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-14
NII Head SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5300	60	802.11a	OFDM	20	14.5	14.10	0.21	Right	Cheek	Primary	07036	6	99.3	0.152	0.039	1.096	1.007	0.043	
5300	60	802.11a	OFDM	20	14.5	14.10	0.15	Right	Tilt	Primary	07036	6	99.3	0.065	-	1.096	1.007	-	
5300	60	802.11a	OFDM	20	14.5	14.10	0.20	Left	Cheek	Primary	07036	6	99.3	0.080	-	1.096	1.007	-	
5300	60	802.11a	OFDM	20	14.5	14.10	0.19	Left	Tilt	Primary	07036	6	99.3	0.036	-	1.096	1.007	-	
5260	52	802.11a	OFDM	20	14.5	14.20	0.18	Right	Cheek	Secondary	07036	6	99.3	0.599	0.266	1.072	1.007	0.287	
5260	52	802.11a	OFDM	20	14.5	14.20	0.19	Right	Tilt	Secondary	07036	6	99.3	0.544	-	1.072	1.007	-	
5260	52	802.11a	OFDM	20	14.5	14.20	0.12	Left	Cheek	Secondary	07036	6	99.3	0.317	-	1.072	1.007	-	
5260	52	802.11a	OFDM	20	14.5	14.20	0.15	Left	Tilt	Secondary	07036	6	99.3	0.289	-	1.072	1.007	-	
5580	116	802.11a	OFDM	20	14.5	14.03	0.21	Right	Cheek	Primary	07036	6	99.3	0.109	0.032	1.114	1.007	0.036	
5580	116	802.11a	OFDM	20	14.5	14.03	-0.15	Right	Tilt	Primary	07036	6	99.3	0.054	-	1.114	1.007	-	
5580	116	802.11a	OFDM	20	14.5	14.03	0.13	Left	Cheek	Primary	07036	6	99.3	0.024	-	1.114	1.007	-	
5580	116	802.11a	OFDM	20	14.5	14.03	0.21	Left	Tilt	Primary	07036	6	99.3	0.024	-	1.114	1.007	-	
5580	116	802.11a	OFDM	20	14.5	14.11	0.21	Right	Cheek	Secondary	07036	6	99.3	0.425	0.275	1.094	1.007	**0.303**	A14
5580	116	802.11a	OFDM	20	14.5	14.11	0.20	Right	Tilt	Secondary	07036	6	99.3	0.354	-	1.094	1.007	-	
5580	116	802.11a	OFDM	20	14.5	14.11	0.13	Left	Cheek	Secondary	07036	6	99.3	0.415	-	1.094	1.007	-	
5580	116	802.11a	OFDM	20	14.5	14.11	0.11	Left	Tilt	Secondary	07036	6	99.3	0.289	-	1.094	1.007	-	
5745	149	802.11a	OFDM	20	14.5	14.04	0.16	Right	Cheek	Primary	07036	6	99.3	0.230	0.059	1.112	1.007	0.066	
5745	149	802.11a	OFDM	20	14.5	14.04	0.21	Right	Tilt	Primary	07036	6	99.3	0.058	-	1.112	1.007	-	
5745	149	802.11a	OFDM	20	14.5	14.04	0.15	Left	Cheek	Primary	07036	6	99.3	0.035	-	1.112	1.007	-	
5745	149	802.11a	OFDM	20	14.5	14.04	0.14	Left	Tilt	Primary	07036	6	99.3	0.027	-	1.112	1.007	-	
5785	157	802.11a	OFDM	20	14.5	14.06	0.21	Right	Cheek	Secondary	07036	6	99.3	0.050	0.010	1.107	1.007	0.011	
5785	157	802.11a	OFDM	20	14.5	14.06	0.14	Right	Tilt	Secondary	07036	6	99.3	0.041	-	1.107	1.007	-	
5785	157	802.11a	OFDM	20	14.5	14.06	0.18	Left	Cheek	Secondary	07036	6	99.3	0.045	-	1.107	1.007	-	
5785	157	802.11a	OFDM	20	14.5	14.06	0.20	Left	Tilt	Secondary	07036	6	99.3	0.034	-	1.107	1.007	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram											

11.2 Standalone Body-Worn SAR Data

Table 11-15
GSM/UMTS/CDMA Body-Worn SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.2	33.20	-0.01	10 mm	06848	1	1:8.3	back	0.388	1.000	0.388	
836.60	190	GSM 850	GPRS	32.2	32.20	-0.12	10 mm	06848	2	1:4.15	back	0.649	1.000	0.649	A15
1880.00	661	GSM 1900	GSM	30.2	30.20	0.07	10 mm	06848	1	1:8.3	back	0.385	1.000	0.385	
1880.00	661	GSM 1900	GPRS	29.2	29.17	-0.01	10 mm	06848	2	1:4.15	back	0.455	1.007	0.458	A16
836.60	4183	UMTS 850	RMC	24.7	24.70	-0.02	10 mm	06848	N/A	1:1	back	0.486	1.000	0.486	A18
1712.40	1312	UMTS 1750	RMC	24.7	24.68	-0.02	10 mm	06848	N/A	1:1	back	0.812	1.005	0.816	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	-0.04	10 mm	06848	N/A	1:1	back	0.908	1.005	0.913	
1752.60	1513	UMTS 1750	RMC	24.7	24.67	0.01	10 mm	06848	N/A	1:1	back	0.941	1.007	0.948	A19
1880.00	9400	UMTS 1900	RMC	24.7	24.68	-0.04	10 mm	06848	N/A	1:1	back	0.673	1.005	0.676	A20
836.52	384	Cell. CDMA	TDSO / SO32	25.5	25.50	0.04	10 mm	06848	N/A	1:1	back	0.612	1.000	0.612	A22
1851.25	25	PCS CDMA	TDSO / SO32	25.2	25.20	-0.02	10 mm	06855	N/A	1:1	back	1.010	1.000	1.010	A24
1880.00	600	PCS CDMA	TDSO / SO32	25.2	25.20	0.03	10 mm	06855	N/A	1:1	back	0.912	1.000	0.912	
1908.75	1175	PCS CDMA	TDSO / SO32	25.2	25.20	0.11	10 mm	06855	N/A	1:1	back	0.886	1.000	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			

Table 11-16
LTE Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.5	25.50	0.01	0	06863	QPSK	1	0	10 mm	back	1:1	0.648	1.000	0.648	A26
707.50	23095	Mid	LTE Band 12	10	24.5	24.50	-0.01	1	06863	QPSK	25	12	10 mm	back	1:1	0.494	1.000	0.494	
782.00	23230	Mid	LTE Band 13	10	25.5	25.50	-0.01	0	06863	QPSK	1	0	10 mm	back	1:1	0.619	1.000	0.619	A28
782.00	23230	Mid	LTE Band 13	10	24.5	24.50	-0.02	1	06863	QPSK	25	0	10 mm	back	1:1	0.535	1.000	0.535	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.50	0.00	0	06871	QPSK	1	25	10 mm	back	1:1	0.702	1.000	0.702	A29
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.48	-0.01	1	06871	QPSK	25	0	10 mm	back	1:1	0.589	1.005	0.592	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.2	25.20	0.01	0	06863	QPSK	1	0	10 mm	back	1:1	1.140	1.000	**1.140**	A30
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.19	0.08	0	06863	QPSK	1	50	10 mm	back	1:1	1.030	1.002	1.032	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.2	25.20	-0.06	0	06863	QPSK	1	0	10 mm	back	1:1	1.110	1.000	1.110	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.20	0.00	1	06863	QPSK	50	0	10 mm	back	1:1	0.797	1.000	0.797	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.15	-0.02	1	06863	QPSK	100	0	10 mm	back	1:1	0.874	1.012	0.884	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.2	25.20	-0.03	0	06863	QPSK	1	0	10 mm	back	1:1	1.080	1.000	1.080	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.2	25.17	0.00	0	06863	QPSK	1	99	10 mm	back	1:1	0.842	1.007	0.848	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.2	25.19	0.05	0	06863	QPSK	1	99	10 mm	back	1:1	0.862	1.002	0.864	A31
1905.00	26590	High	LTE Band 25 (PCS)	20	25.2	25.10	-0.02	0	06863	QPSK	1	99	10 mm	back	1:1	0.854	1.023	0.874	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.2	24.16	-0.07	1	06863	QPSK	50	50	10 mm	back	1:1	0.622	1.009	0.628	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.2	24.13	-0.06	1	06863	QPSK	100	0	10 mm	back	1:1	0.611	1.016	0.621	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram					

Note: Blue entry represents variability measurement.

Table 11-17
DTS Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	17.0	16.85	0.02	10 mm	Primary	06996	1	back	99.9	0.212	0.144	1.035	1.001	0.149	
2437	6	802.11b	DSSS	22	17.0	16.81	-0.04	10 mm	Secondary	06996	1	back	99.9	0.262	0.188	1.045	1.001	**0.197**	A33
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**														**Body** **1.6 W/kg (mW/g)** averaged over 1 gram					

Table 11-18
NII Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5260	52	802.11a	OFDM	20	16.5	16.11	0.20	10 mm	Primary	07036	6	back	99.3	0.699	0.388	1.094	1.007	0.427	
5300	60	802.11a	OFDM	20	16.5	15.87	0.21	10 mm	Secondary	07036	6	back	99.3	0.252	0.133	1.156	1.007	0.155	
5580	116	802.11a	OFDM	20	16.5	15.95	-0.12	10 mm	Primary	07036	6	back	99.3	0.863	0.430	1.135	1.007	**0.491**	
5580	116	802.11a	OFDM	20	16.5	15.59	0.03	10 mm	Secondary	07036	6	back	99.3	0.398	0.184	1.233	1.007	0.228	
5745	149	802.11a	OFDM	20	16.5	16.19	-0.21	10 mm	Primary	07036	6	back	99.3	0.928	0.440	1.074	1.007	0.476	A34
5745	149	802.11a	OFDM	20	16.5	15.90	0.14	10 mm	Secondary	07036	6	back	99.3	0.106	0.050	1.148	1.007	0.058	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**														**Body** **1.6 W/kg (mW/g)** averaged over 1 gram					

Table 11-19
DSS Body-Worn SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond. Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	12.5	11.13	0.12	10 mm	06996	1	back	77.0	0.040	1.371	1.299	**0.071**	A35
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**												**Body** **1.6 W/kg (mW/g)** averaged over 1 gram				

11.3 Standalone Hotspot SAR Data

Table 11-20
GPRS/UMTS/CDMA Hotspot SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of GPRS Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GPRS	32.2	32.20	-0.12	10 mm	06848	2	1:4.15	back	0.649	1.000	0.649	A15
836.60	190	GSM 850	GPRS	32.2	32.20	-0.02	10 mm	06848	2	1:4.15	front	0.638	1.000	0.638	
836.60	190	GSM 850	GPRS	32.2	32.20	0.00	10 mm	06848	2	1:4.15	bottom	0.353	1.000	0.353	
836.60	190	GSM 850	GPRS	32.2	32.20	-0.02	10 mm	06848	2	1:4.15	right	0.143	1.000	0.143	
836.60	190	GSM 850	GPRS	32.2	32.20	-0.07	10 mm	06848	2	1:4.15	left	0.322	1.000	0.322	
1880.00	661	GSM 1900	GPRS	29.2	29.17	-0.01	10 mm	06848	2	1:4.15	back	0.455	1.007	0.458	
1880.00	661	GSM 1900	GPRS	29.2	29.17	0.00	10 mm	06848	2	1:4.15	front	0.465	1.007	0.468	
1880.00	661	GSM 1900	GPRS	29.2	29.17	0.07	10 mm	06848	2	1:4.15	bottom	0.515	1.007	0.519	A17
1880.00	661	GSM 1900	GPRS	29.2	29.17	0.00	10 mm	06848	2	1:4.15	left	0.249	1.007	0.251	
836.60	4183	UMTS 850	RMC	24.7	24.70	-0.02	10 mm	06848	N/A	1:1	back	0.486	1.000	0.486	A18
836.60	4183	UMTS 850	RMC	24.7	24.70	0.01	10 mm	06848	N/A	1:1	front	0.483	1.000	0.483	
836.60	4183	UMTS 850	RMC	24.7	24.70	-0.02	10 mm	06848	N/A	1:1	bottom	0.275	1.000	0.275	
836.60	4183	UMTS 850	RMC	24.7	24.70	-0.04	10 mm	06848	N/A	1:1	right	0.115	1.000	0.115	
836.60	4183	UMTS 850	RMC	24.7	24.70	-0.03	10 mm	06848	N/A	1:1	left	0.236	1.000	0.236	
1712.40	1312	UMTS 1750	RMC	24.7	24.68	-0.02	10 mm	06848	N/A	1:1	back	0.812	1.005	0.816	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	-0.04	10 mm	06848	N/A	1:1	back	0.908	1.005	0.913	
1752.60	1513	UMTS 1750	RMC	24.7	24.67	0.01	10 mm	06848	N/A	1:1	back	0.941	1.007	0.948	A19
1732.40	1412	UMTS 1750	RMC	24.7	24.68	0.01	10 mm	06848	N/A	1:1	front	0.695	1.005	0.698	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	0.01	10 mm	06848	N/A	1:1	bottom	0.449	1.005	0.451	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	-0.02	10 mm	06848	N/A	1:1	left	0.279	1.005	0.280	
1880.00	9400	UMTS 1900	RMC	24.7	24.68	-0.04	10 mm	06848	N/A	1:1	back	0.673	1.005	0.676	
1880.00	9400	UMTS 1900	RMC	24.7	24.68	-0.04	10 mm	06848	N/A	1:1	front	0.667	1.005	0.670	
1880.00	9400	UMTS 1900	RMC	24.7	24.68	-0.04	10 mm	06848	N/A	1:1	bottom	0.702	1.005	0.706	A21
1880.00	9400	UMTS 1900	RMC	24.7	24.68	0.01	10 mm	06848	N/A	1:1	left	0.387	1.005	0.389	
836.52	384	Cell. CDMA	EVDO Rev. 0	25.5	25.45	-0.02	10 mm	06848	N/A	1:1	back	0.606	1.012	0.613	
836.52	384	Cell. CDMA	EVDO Rev. 0	25.5	25.45	-0.02	10 mm	06848	N/A	1:1	front	0.627	1.012	0.635	A23
836.52	384	Cell. CDMA	EVDO Rev. 0	25.5	25.45	0.04	10 mm	06848	N/A	1:1	bottom	0.359	1.012	0.363	
836.52	384	Cell. CDMA	EVDO Rev. 0	25.5	25.45	0.00	10 mm	06848	N/A	1:1	right	0.154	1.012	0.156	
836.52	384	Cell. CDMA	EVDO Rev. 0	25.5	25.45	0.01	10 mm	06848	N/A	1:1	left	0.303	1.012	0.307	
1851.25	25	PCS CDMA	EVDO Rev. 0	25.2	25.20	-0.07	10 mm	06855	N/A	1:1	back	0.975	1.000	0.975	
1880.00	600	PCS CDMA	EVDO Rev. 0	25.2	25.20	-0.05	10 mm	06855	N/A	1:1	back	0.808	1.000	0.808	
1908.75	1175	PCS CDMA	EVDO Rev. 0	25.2	25.18	-0.02	10 mm	06855	N/A	1:1	back	0.803	1.005	0.807	
1851.25	25	PCS CDMA	EVDO Rev. 0	25.2	25.20	-0.02	10 mm	06855	N/A	1:1	front	0.972	1.000	0.972	
1880.00	600	PCS CDMA	EVDO Rev. 0	25.2	25.20	0.01	10 mm	06855	N/A	1:1	front	0.875	1.000	0.875	
1908.75	1175	PCS CDMA	EVDO Rev. 0	25.2	25.18	0.00	10 mm	06855	N/A	1:1	front	0.785	1.005	0.789	
1851.25	25	PCS CDMA	EVDO Rev. 0	25.2	25.20	-0.05	10 mm	06855	N/A	1:1	bottom	1.230	1.000	**1.230**	A25
1880.00	600	PCS CDMA	EVDO Rev. 0	25.2	25.20	0.01	10 mm	06855	N/A	1:1	bottom	1.100	1.000	1.100	
1908.75	1175	PCS CDMA	EVDO Rev. 0	25.2	25.18	-0.05	10 mm	06855	N/A	1:1	bottom	0.951	1.005	0.956	
1880.00	600	PCS CDMA	EVDO Rev. 0	25.2	25.20	-0.01	10 mm	06855	N/A	1:1	left	0.538	1.000	0.538	
1851.25	25	PCS CDMA	EVDO Rev. 0	25.2	25.20	-0.01	10 mm	06855	N/A	1:1	bottom	1.210	1.000	1.210	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram			

Note: Blue entry represents variability measurement.

Table 11-21
LTE Band 12 Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.5	25.50	0.01	0	06863	QPSK	1	0	10 mm	back	1:1	0.648	1.000	0.648	
707.50	23095	Mid	LTE Band 12	10	24.5	24.50	-0.01	1	06863	QPSK	25	12	10 mm	back	1:1	0.494	1.000	0.494	
707.50	23095	Mid	LTE Band 12	10	25.5	25.50	0.02	0	06863	QPSK	1	0	10 mm	front	1:1	0.690	1.000	0.690	A27
707.50	23095	Mid	LTE Band 12	10	24.5	24.50	0.00	1	06863	QPSK	25	12	10 mm	front	1:1	0.534	1.000	0.534	
707.50	23095	Mid	LTE Band 12	10	25.5	25.50	-0.02	0	06863	QPSK	1	0	10 mm	bottom	1:1	0.414	1.000	0.414	
707.50	23095	Mid	LTE Band 12	10	24.5	24.50	-0.04	1	06863	QPSK	25	12	10 mm	bottom	1:1	0.304	1.000	0.304	
707.50	23095	Mid	LTE Band 12	10	25.5	25.50	0.01	0	06863	QPSK	1	0	10 mm	right	1:1	0.230	1.000	0.230	
707.50	23095	Mid	LTE Band 12	10	24.5	24.50	-0.01	1	06863	QPSK	25	12	10 mm	right	1:1	0.173	1.000	0.173	
707.50	23095	Mid	LTE Band 12	10	25.5	25.50	-0.01	0	06863	QPSK	1	0	10 mm	left	1:1	0.233	1.000	0.233	
707.50	23095	Mid	LTE Band 12	10	24.5	24.50	0.05	1	06863	QPSK	25	12	10 mm	left	1:1	0.189	1.000	0.189	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																		Body 1.6 W/kg (mW/g) averaged over 1 gram		

Table 11-22
LTE Band 13 Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
782.00	23230	Mid	LTE Band 13	10	25.5	25.50	-0.01	0	06863	QPSK	1	0	10 mm	back	1:1	0.619	1.000	0.619	A28
782.00	23230	Mid	LTE Band 13	10	24.5	24.50	-0.02	1	06863	QPSK	25	0	10 mm	back	1:1	0.535	1.000	0.535	
782.00	23230	Mid	LTE Band 13	10	25.5	25.50	-0.01	0	06863	QPSK	1	0	10 mm	front	1:1	0.614	1.000	0.614	
782.00	23230	Mid	LTE Band 13	10	24.5	24.50	-0.01	1	06863	QPSK	25	0	10 mm	front	1:1	0.552	1.000	0.552	
782.00	23230	Mid	LTE Band 13	10	25.5	25.50	-0.04	0	06863	QPSK	1	0	10 mm	bottom	1:1	0.392	1.000	0.392	
782.00	23230	Mid	LTE Band 13	10	24.5	24.50	0.06	1	06863	QPSK	25	0	10 mm	bottom	1:1	0.328	1.000	0.328	
782.00	23230	Mid	LTE Band 13	10	25.5	25.50	-0.05	0	06863	QPSK	1	0	10 mm	right	1:1	0.167	1.000	0.167	
782.00	23230	Mid	LTE Band 13	10	24.5	24.50	0.01	1	06863	QPSK	25	0	10 mm	right	1:1	0.137	1.000	0.137	
782.00	23230	Mid	LTE Band 13	10	25.5	25.50	0.00	0	06863	QPSK	1	0	10 mm	left	1:1	0.283	1.000	0.283	
782.00	23230	Mid	LTE Band 13	10	24.5	24.50	0.01	1	06863	QPSK	25	0	10 mm	left	1:1	0.263	1.000	0.263	
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 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	25.5	25.50	0.00	0	06871	QPSK	1	25	10 mm	back	1:1	0.702	1.000	0.702	A29
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.48	-0.01	1	06871	QPSK	25	0	10 mm	back	1:1	0.589	1.005	0.592	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.50	0.01	0	06871	QPSK	1	25	10 mm	front	1:1	0.663	1.000	0.663	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.48	0.00	1	06871	QPSK	25	0	10 mm	front	1:1	0.562	1.005	0.565	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.50	-0.01	0	06871	QPSK	1	25	10 mm	bottom	1:1	0.364	1.000	0.364	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.48	-0.02	1	06871	QPSK	25	0	10 mm	bottom	1:1	0.304	1.005	0.306	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.50	-0.01	0	06871	QPSK	1	25	10 mm	right	1:1	0.165	1.000	0.165	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.48	-0.02	1	06871	QPSK	25	0	10 mm	right	1:1	0.133	1.005	0.134	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.50	0.00	0	06871	QPSK	1	25	10 mm	left	1:1	0.284	1.000	0.284	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.48	-0.01	1	06871	QPSK	25	0	10 mm	left	1:1	0.227	1.005	0.228	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																		Body 1.6 W/kg (mW/g) averaged over 1 gram		

Table 11-24
LTE Band 66 (AWS) Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.2	25.20	0.01	0	06863	QPSK	1	0	10 mm	back	1:1	1.140	1.000	1.140	A30
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.19	0.08	0	06863	QPSK	1	50	10 mm	back	1:1	1.030	1.002	1.032	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.2	25.20	-0.06	0	06863	QPSK	1	0	10 mm	back	1:1	1.110	1.000	1.110	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.20	0.00	1	06863	QPSK	50	0	10 mm	back	1:1	0.797	1.000	0.797	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.15	-0.02	1	06863	QPSK	100	0	10 mm	back	1:1	0.874	1.012	0.884	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.2	25.20	-0.08	0	06863	QPSK	1	0	10 mm	front	1:1	0.930	1.000	0.930	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.19	-0.05	0	06863	QPSK	1	50	10 mm	front	1:1	0.864	1.002	0.866	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.2	25.20	-0.03	0	06863	QPSK	1	0	10 mm	front	1:1	0.973	1.000	0.973	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.20	0.01	1	06863	QPSK	50	0	10 mm	front	1:1	0.692	1.000	0.692	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.15	-0.04	1	06863	QPSK	100	0	10 mm	front	1:1	0.769	1.012	0.778	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.2	25.20	-0.18	0	06863	QPSK	1	0	10 mm	bottom	1:1	0.807	1.000	0.807	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.19	-0.03	0	06863	QPSK	1	50	10 mm	bottom	1:1	0.978	1.002	0.980	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.2	25.20	-0.03	0	06863	QPSK	1	0	10 mm	bottom	1:1	1.130	1.000	1.130	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.2	24.17	-0.01	1	06863	QPSK	50	25	10 mm	bottom	1:1	0.733	1.007	0.738	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	-0.07	1	06863	QPSK	50	25	10 mm	bottom	1:1	0.739	1.005	0.743	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.20	0.00	1	06863	QPSK	50	0	10 mm	bottom	1:1	0.841	1.000	0.841	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.15	-0.04	1	06863	QPSK	100	0	10 mm	bottom	1:1	0.840	1.012	0.850	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.2	25.20	-0.06	0	06863	QPSK	1	0	10 mm	left	1:1	0.549	1.000	0.549	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.20	-0.17	1	06863	QPSK	50	0	10 mm	left	1:1	0.378	1.000	0.378	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.2	25.20	-0.03	0	06863	QPSK	1	0	10 mm	back	1:1	1.080	1.000	1.080	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram						

Note: Blue entry represents variability measurement.

Table 11-25
LTE Band 25 (PCS) Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.2	25.17	0.00	0	06863	QPSK	1	99	10 mm	back	1:1	0.842	1.007	0.848	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.2	25.19	0.05	0	06863	QPSK	1	99	10 mm	back	1:1	0.862	1.002	0.864	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.2	25.10	-0.02	0	06863	QPSK	1	99	10 mm	back	1:1	0.854	1.023	0.874	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.2	24.16	-0.07	1	06863	QPSK	50	50	10 mm	back	1:1	0.622	1.009	0.628	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.2	24.13	-0.06	1	06863	QPSK	100	0	10 mm	back	1:1	0.611	1.016	0.621	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.2	25.17	-0.10	0	06863	QPSK	1	99	10 mm	front	1:1	0.857	1.007	0.863	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.2	25.19	-0.05	0	06863	QPSK	1	99	10 mm	front	1:1	0.842	1.002	0.844	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.2	25.10	0.05	0	06863	QPSK	1	99	10 mm	front	1:1	0.785	1.023	0.803	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.2	24.16	-0.03	1	06863	QPSK	50	50	10 mm	front	1:1	0.642	1.009	0.648	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.2	24.13	-0.06	1	06863	QPSK	100	0	10 mm	front	1:1	0.609	1.016	0.619	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.2	25.17	-0.02	0	06863	QPSK	1	99	10 mm	bottom	1:1	1.050	1.007	1.057	A32
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.2	25.19	-0.02	0	06863	QPSK	1	99	10 mm	bottom	1:1	0.914	1.002	0.916	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.2	25.10	0.02	0	06863	QPSK	1	99	10 mm	bottom	1:1	0.905	1.023	0.926	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.2	24.16	0.00	1	06863	QPSK	50	50	10 mm	bottom	1:1	0.816	1.009	0.823	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.2	24.10	0.09	1	06863	QPSK	50	50	10 mm	bottom	1:1	0.674	1.023	0.690	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.2	24.15	0.02	1	06863	QPSK	50	50	10 mm	bottom	1:1	0.644	1.012	0.652	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.2	24.13	0.00	1	06863	QPSK	100	0	10 mm	bottom	1:1	0.670	1.016	0.681	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.2	25.19	0.07	0	06863	QPSK	1	99	10 mm	left	1:1	0.451	1.002	0.452	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.2	24.16	-0.04	1	06863	QPSK	50	50	10 mm	left	1:1	0.344	1.009	0.347	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 11-26
WLAN Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	17.0	16.85	0.02	10 mm	Primary	06996	1	back	99.9	0.212	-	1.035	1.001	-	
2437	6	802.11b	DSSS	22	17.0	16.85	0.18	10 mm	Primary	06996	1	front	99.9	0.198	-	1.035	1.001	-	
2437	6	802.11b	DSSS	22	17.0	16.85	0.21	10 mm	Primary	06996	1	top	99.9	0.050	-	1.035	1.001	-	
2437	6	802.11b	DSSS	22	17.0	16.85	0.03	10 mm	Primary	06996	1	left	99.9	0.236	0.150	1.035	1.001	0.155	
2437	6	802.11b	DSSS	22	17.0	16.81	-0.04	10 mm	Secondary	06996	1	back	99.9	0.262	0.188	1.045	1.001	**0.197**	A33
2437	6	802.11b	DSSS	22	17.0	16.81	0.15	10 mm	Secondary	06996	1	front	99.9	0.270	0.180	1.045	1.001	0.188	
2437	6	802.11b	DSSS	22	17.0	16.81	0.04	10 mm	Secondary	06996	1	top	99.9	0.265	-	1.045	1.001	-	
2437	6	802.11b	DSSS	22	17.0	16.81	0.17	10 mm	Secondary	06996	1	left	99.9	0.019	-	1.045	1.001	-	
5220	44	802.11a	OFDM	20	16.5	16.20	0.05	10 mm	Primary	07036	6	back	99.3	0.747	0.352	1.072	1.007	0.380	
5220	44	802.11a	OFDM	20	16.5	16.20	0.17	10 mm	Primary	07036	6	front	99.3	0.050	-	1.072	1.007	-	
5220	44	802.11a	OFDM	20	16.5	16.20	0.18	10 mm	Primary	07036	6	top	99.3	0.076	-	1.072	1.007	-	
5220	44	802.11a	OFDM	20	16.5	16.20	0.13	10 mm	Primary	07036	6	left	99.3	0.204	-	1.072	1.007	-	
5220	44	802.11a	OFDM	20	16.5	15.81	-0.05	10 mm	Secondary	07036	6	back	99.3	0.256	0.120	1.172	1.007	0.142	
5220	44	802.11a	OFDM	20	16.5	15.81	0.12	10 mm	Secondary	07036	6	front	99.3	0.121	-	1.172	1.007	-	
5220	44	802.11a	OFDM	20	16.5	15.81	0.21	10 mm	Secondary	07036	6	top	99.3	0.167	-	1.172	1.007	-	
5220	44	802.11a	OFDM	20	16.5	15.81	0.21	10 mm	Secondary	07036	6	left	99.3	0.059	-	1.172	1.007	-	
5745	149	802.11a	OFDM	20	16.5	16.19	-0.21	10 mm	Primary	07036	6	back	99.3	0.928	0.440	1.074	1.007	**0.476**	A34
5745	149	802.11a	OFDM	20	16.5	16.19	0.14	10 mm	Primary	07036	6	front	99.3	0.058	0.030	1.074	1.007	0.032	
5745	149	802.11a	OFDM	20	16.5	16.19	0.18	10 mm	Primary	07036	6	top	99.3	0.127	-	1.074	1.007	-	
5745	149	802.11a	OFDM	20	16.5	16.19	0.12	10 mm	Primary	07036	6	left	99.3	0.359	0.174	1.074	1.007	0.188	
5745	149	802.11a	OFDM	20	16.5	15.90	0.14	10 mm	Secondary	07036	6	back	99.3	0.106	0.050	1.148	1.007	0.058	
5745	149	802.11a	OFDM	20	16.5	15.90	0.13	10 mm	Secondary	07036	6	front	99.3	0.019	-	1.148	1.007	-	
5745	149	802.11a	OFDM	20	16.5	15.90	0.21	10 mm	Secondary	07036	6	top	99.3	0.081	-	1.148	1.007	-	
5745	149	802.11a	OFDM	20	16.5	15.90	0.18	10 mm	Secondary	07036	6	left	99.3	0.017	-	1.148	1.007	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram					

11.4 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. When the standalone reported body-worn SAR was ≥ 1.2 W/kg, 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 October 2016 TCB Workshop Notes, DUT holder perturbation verification is required when the highest reported SAR is > 1.2 W/kg. DUT holder perturbation verification was not performed since the DUT was positioned on a foam block to prevent holder perturbation. Test setup photos can be found in Appendix F.

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 then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.
4. GPRS was additionally evaluated for head and body-worn exposure conditions to address possible VoIP scenarios.

CDMA Notes:

1. Head SAR for CDMA2000 mode was tested under RC3/SO55 per FCC KDB Publication 941225 D01v03r01.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. EVDO Rev0 and RevA and TDSO / SO32 FCH+SCH SAR tests were not required per the 3G SAR Test Reduction Procedure in FCC KDB Publication 941225 D01v03r01.
3. CDMA Wireless Router SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 according to KDB 941225 D01v03r01 procedures for data devices. Wireless Router SAR tests for Subtype 2 of Rev.A and 1x RTT configurations were not required per the 3G SAR Test Reduction Policy in KDB Publication 941225 D01v03r01.
4. Head SAR was additionally evaluated using EVDO Rev. A to determine compliance for VoIP operations.
5. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

UMTS Notes:

1. UMTS mode in was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03r01. AMR and HSPA SAR was not required per the 3G Test Reduction Procedure in KDB Publication 941225 D01v03r01.
2. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg 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 D05v02r05. The general test procedures used for testing can be found in Section 8.6.4.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 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 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, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 8.7.5 for more information.
3. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg. See Section 8.7.6 for more information.
4. When the maximum reported 1g averaged SAR is ≤0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg or all test channels were measured.
5. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated EMC test reports.

Bluetooth Notes:

1. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation and Tx Tests test mode type. Per October 2016 TCB Workshop Notes, the reported SAR was scaled to the 100% transmission duty factor to determine compliance. See section 9.6 for the time-domain plot and calculation for the duty factor of the device.

12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 Introduction

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

12.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB Publication 447498 D01v06 4.3.2 and IEEE 1528-2013 Section 6.3.4.1.2, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g 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 1-g or 10-g SAR.

12.3 Head SAR Simultaneous Transmission Analysis

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Primary Ant SAR (W/kg)	2.4 GHz WLAN Secondary Ant SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	GSM/GPRS 850	0.183	0.540	0.649	0.723	0.832	1.372
	GSM/GPRS 1900	0.155	0.540	0.649	0.695	0.804	1.344
	UMTS 850	0.098	0.540	0.649	0.638	0.747	1.287
	UMTS 1750	0.174	0.540	0.649	0.714	0.823	1.363
	UMTS 1900	0.200	0.540	0.649	0.740	0.849	1.389
	Cell. CDMA/EVDO	0.172	0.540	0.649	0.712	0.821	1.361
	PCS CDMA/EVDO	0.243	0.540	0.649	0.783	0.892	1.432
	LTE Band 12	0.169	0.540	0.649	0.709	0.818	1.358
	LTE Band 13	0.193	0.540	0.649	0.733	0.842	1.382
	LTE Band 5 (Cell)	0.198	0.540	0.649	0.738	0.847	1.387
	LTE Band 66 (AWS)	0.263	0.540	0.649	0.803	0.912	**1.452**
	LTE Band 25 (PCS)	0.222	0.540	0.649	0.762	0.871	1.411

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Primary Ant SAR (W/kg)	5 GHz WLAN Secondary Ant SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	GSM/GPRS 850	0.183	0.066	0.303	0.249	0.486	0.552
	GSM/GPRS 1900	0.155	0.066	0.303	0.221	0.458	0.524
	UMTS 850	0.098	0.066	0.303	0.164	0.401	0.467
	UMTS 1750	0.174	0.066	0.303	0.240	0.477	0.543
	UMTS 1900	0.200	0.066	0.303	0.266	0.503	0.569
	Cell. CDMA/EVDO	0.172	0.066	0.303	0.238	0.475	0.541
	PCS CDMA/EVDO	0.243	0.066	0.303	0.309	0.546	0.612
	LTE Band 12	0.169	0.066	0.303	0.235	0.472	0.538
	LTE Band 13	0.193	0.066	0.303	0.259	0.496	0.562
	LTE Band 5 (Cell)	0.198	0.066	0.303	0.264	0.501	0.567
	LTE Band 66 (AWS)	0.263	0.066	0.303	0.329	0.566	**0.632**
	LTE Band 25 (PCS)	0.222	0.066	0.303	0.288	0.525	0.591

Table 12-3
Simultaneous Transmission Scenario with 2.4 GHz Primary Ant and 5 GHz Secondary Ant (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Primary Ant SAR (W/kg)	5 GHz WLAN Secondary Ant SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	GSM/GPRS 850	0.183	0.540	0.303	0.723	0.486	1.026
	GSM/GPRS 1900	0.155	0.540	0.303	0.695	0.458	0.998
	UMTS 850	0.098	0.540	0.303	0.638	0.401	0.941
	UMTS 1750	0.174	0.540	0.303	0.714	0.477	1.017
	UMTS 1900	0.200	0.540	0.303	0.740	0.503	1.043
	Cell. CDMA/EVDO	0.172	0.540	0.303	0.712	0.475	1.015
	PCS CDMA/EVDO	0.243	0.540	0.303	0.783	0.546	1.086
	LTE Band 12	0.169	0.540	0.303	0.709	0.472	1.012
	LTE Band 13	0.193	0.540	0.303	0.733	0.496	1.036
	LTE Band 5 (Cell)	0.198	0.540	0.303	0.738	0.501	1.041
	LTE Band 66 (AWS)	0.263	0.540	0.303	0.803	0.566	**1.106**
	LTE Band 25 (PCS)	0.222	0.540	0.303	0.762	0.525	1.065

Table 12-4
Simultaneous Transmission Scenario with 2.4 GHz Secondary Ant and 5 GHz Primary Ant (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Secondary Ant SAR (W/kg)	5 GHz WLAN Primary Ant SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	GSM/GPRS 850	0.183	0.649	0.066	0.832	0.249	0.898
	GSM/GPRS 1900	0.155	0.649	0.066	0.804	0.221	0.870
	UMTS 850	0.098	0.649	0.066	0.747	0.164	0.813
	UMTS 1750	0.174	0.649	0.066	0.823	0.240	0.889
	UMTS 1900	0.200	0.649	0.066	0.849	0.266	0.915
	Cell. CDMA/EVDO	0.172	0.649	0.066	0.821	0.238	0.887
	PCS CDMA/EVDO	0.243	0.649	0.066	0.892	0.309	0.958
	LTE Band 12	0.169	0.649	0.066	0.818	0.235	0.884
	LTE Band 13	0.193	0.649	0.066	0.842	0.259	0.908
	LTE Band 5 (Cell)	0.198	0.649	0.066	0.847	0.264	0.913
	LTE Band 66 (AWS)	0.263	0.649	0.066	0.912	0.329	**0.978**
	LTE Band 25 (PCS)	0.222	0.649	0.066	0.871	0.288	0.937

12.4 Body-Worn Simultaneous Transmission Analysis

Table 12-5
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 Primary Ant SAR (W/kg)	2.4 GHz WLAN Secondary Ant SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body-Worn	GSM/GPRS 850	0.649	0.149	0.197	0.798	0.846	0.995
	GSM/GPRS 1900	0.458	0.149	0.197	0.607	0.655	0.804
	UMTS 850	0.486	0.149	0.197	0.635	0.683	0.832
	UMTS 1750	0.948	0.149	0.197	1.097	1.145	1.294
	UMTS 1900	0.676	0.149	0.197	0.825	0.873	1.022
	Cell. CDMA	0.612	0.149	0.197	0.761	0.809	0.958
	PCS CDMA	1.010	0.149	0.197	1.159	1.207	1.356
	LTE Band 12	0.648	0.149	0.197	0.797	0.845	0.994
	LTE Band 13	0.619	0.149	0.197	0.768	0.816	0.965
	LTE Band 5 (Cell)	0.702	0.149	0.197	0.851	0.899	1.048
	LTE Band 66 (AWS)	1.140	0.149	0.197	1.289	1.337	**1.486**
	LTE Band 25 (PCS)	0.874	0.149	0.197	1.023	1.071	1.220

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Primary Ant SAR (W/kg)	5 GHz WLAN Secondary Ant SAR (W/kg)	Σ SAR (W/kg)			SPLSR		
		1	2	3	1+2	1+3	1+2+3	1+2	1+3	2+3
Body-Worn	GSM/GPRS 850	0.649	0.491	0.228	1.140	0.877	1.368	N/A	N/A	N/A
	GSM/GPRS 1900	0.458	0.491	0.228	0.949	0.686	1.177	N/A	N/A	N/A
	UMTS 850	0.486	0.491	0.228	0.977	0.714	1.205	N/A	N/A	N/A
	UMTS 1750	0.948	0.491	0.228	1.439	1.176	See Note 1	0.02	0.01	0.02
	UMTS 1900	0.676	0.491	0.228	1.167	0.904	1.395	N/A	N/A	N/A
	Cell. CDMA	0.612	0.491	0.228	1.103	0.840	1.331	N/A	N/A	N/A
	PCS CDMA	1.010	0.491	0.228	1.501	1.238	See Note 1	0.02	0.01	0.02
	LTE Band 12	0.648	0.491	0.228	1.139	0.876	1.367	N/A	N/A	N/A
	LTE Band 13	0.619	0.491	0.228	1.110	0.847	1.338	N/A	N/A	N/A
	LTE Band 5 (Cell)	0.702	0.491	0.228	1.193	0.930	1.421	N/A	N/A	N/A
	LTE Band 66 (AWS)	1.140	0.491	0.228	See Note 1	1.368	See Note 1	0.02	0.01	0.02
	LTE Band 25 (PCS)	0.874	0.491	0.228	1.365	1.102	**1.593**	N/A	N/A	N/A

Table 12-7
Simultaneous Transmission Scenario with 2.4 GHz Primary Ant and 5 GHz Secondary Ant (Body-Worn at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Primary Ant SAR (W/kg)	5 GHz WLAN Secondary Ant SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body-Worn	GSM/GPRS 850	0.649	0.149	0.228	0.798	0.877	1.026
	GSM/GPRS 1900	0.458	0.149	0.228	0.607	0.686	0.835
	UMTS 850	0.486	0.149	0.228	0.635	0.714	0.863
	UMTS 1750	0.948	0.149	0.228	1.097	1.176	1.325
	UMTS 1900	0.676	0.149	0.228	0.825	0.904	1.053
	Cell. CDMA	0.612	0.149	0.228	0.761	0.840	0.989
	PCS CDMA	1.010	0.149	0.228	1.159	1.238	1.387
	LTE Band 12	0.648	0.149	0.228	0.797	0.876	1.025
	LTE Band 13	0.619	0.149	0.228	0.768	0.847	0.996
	LTE Band 5 (Cell)	0.702	0.149	0.228	0.851	0.930	1.079
	LTE Band 66 (AWS)	1.140	0.149	0.228	1.289	1.368	**1.517**
	LTE Band 25 (PCS)	0.874	0.149	0.228	1.023	1.102	1.251

Table 12-8
Simultaneous Transmission Scenario with
2.4 GHz Secondary Ant and 5 GHz Primary Ant (Body-Worn at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Secondary Ant SAR (W/kg)	5 GHz WLAN Primary Ant SAR (W/kg)	Σ SAR (W/kg)			SPLSR		
		1	2	3	1+2	1+3	1+2+3	1+2	1+3	2+3
Body-Worn	GSM/GPRS 850	0.649	0.197	0.491	0.846	1.140	1.337	N/A	N/A	N/A
	GSM/GPRS 1900	0.458	0.197	0.491	0.655	0.949	1.146	N/A	N/A	N/A
	UMTS 850	0.486	0.197	0.491	0.683	0.977	1.174	N/A	N/A	N/A
	UMTS 1750	0.948	0.197	0.491	1.145	1.439	See Note 1	0.01	0.02	0.02
	UMTS 1900	0.676	0.197	0.491	0.873	1.167	1.364	N/A	N/A	N/A
	Cell. CDMA	0.612	0.197	0.491	0.809	1.103	1.300	N/A	N/A	N/A
	PCS CDMA	1.010	0.197	0.491	1.207	1.501	See Note 1	0.01	0.02	0.02
	LTE Band 12	0.648	0.197	0.491	0.845	1.139	1.336	N/A	N/A	N/A
	LTE Band 13	0.619	0.197	0.491	0.816	1.110	1.307	N/A	N/A	N/A
	LTE Band 5 (Cell)	0.702	0.197	0.491	0.899	1.193	1.390	N/A	N/A	N/A
	LTE Band 66 (AWS)	1.140	0.197	0.491	1.337	See Note 1	See Note 1	0.01	0.02	0.02
	LTE Band 25 (PCS)	0.874	0.197	0.491	1.071	1.365	**1.562**	N/A	N/A	N/A

Table 12-9
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	0.649	0.071	0.720
	GSM/GPRS 1900	0.458	0.071	0.529
	UMTS 850	0.486	0.071	0.557
	UMTS 1750	0.948	0.071	1.019
	UMTS 1900	0.676	0.071	0.747
	Cell. CDMA	0.612	0.071	0.683
	PCS CDMA	1.010	0.071	1.081
	LTE Band 12	0.648	0.071	0.719
	LTE Band 13	0.619	0.071	0.690
	LTE Band 5 (Cell)	0.702	0.071	0.773
	LTE Band 66 (AWS)	1.140	0.071	**1.211**
	LTE Band 25 (PCS)	0.874	0.071	0.945

Notes:
1. No evaluation was performed to determine the aggregate 1g SAR for these configurations as the SPLS ratio between the antenna pairs was not greater than 0.04 per FCC KDB 447498 D01v06. See Section 12.6 for detailed SPLS ratio analysis.

12.5 Hotspot SAR Simultaneous Transmission Analysis

Per FCC KDB Publication 941225 D06v02r01, the devices edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR ("-").

Table 12-10
Simultaneous Transmission Scenario (2.4 GHz Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Primary Ant SAR (W/kg)	2.4 GHz WLAN Secondary Ant SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	0.649	0.155	0.197	0.804	0.846	1.001
	GPRS 1900	0.519	0.155	0.197	0.674	0.716	0.871
	UMTS 850	0.486	0.155	0.197	0.641	0.683	0.838
	UMTS 1750	0.948	0.155	0.197	1.103	1.145	1.300
	UMTS 1900	0.706	0.155	0.197	0.861	0.903	1.058
	Cell. EVDO	0.635	0.155	0.197	0.790	0.832	0.987
	PCS EVDO	1.230	0.155	0.197	1.385	1.427	**1.582**
	LTE Band 12	0.690	0.155	0.197	0.845	0.887	1.042
	LTE Band 13	0.619	0.155	0.197	0.774	0.816	0.971
	LTE Band 5 (Cell)	0.702	0.155	0.197	0.857	0.899	1.054
	LTE Band 66 (AWS)	1.140	0.155	0.197	1.295	1.337	1.492
	LTE Band 25 (PCS)	1.057	0.155	0.197	1.212	1.254	1.409

Table 12-11
Simultaneous Transmission Scenario with 5 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Primary Ant SAR (W/kg)	5 GHz WLAN Secondary Ant SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	0.649	0.476	0.142	1.125	0.791	1.267
	GPRS 1900	0.519	0.476	0.142	0.995	0.661	1.137
	UMTS 850	0.486	0.476	0.142	0.962	0.628	1.104
	UMTS 1750	0.948	0.476	0.142	1.424	1.090	**1.566**
	UMTS 1900	0.706	0.476	0.142	1.182	0.848	1.324
	Cell. EVDO	0.635	0.476	0.142	1.111	0.777	1.253
	PCS EVDO	1.230	0.476	0.142	See Table 12-12	1.372	See Table 12-12
	LTE Band 12	0.690	0.476	0.142	1.166	0.832	1.308
	LTE Band 13	0.619	0.476	0.142	1.095	0.761	1.237
	LTE Band 5 (Cell)	0.702	0.476	0.142	1.178	0.844	1.320
	LTE Band 66 (AWS)	1.140	0.476	0.142	See Table 12-12	1.282	See Table 12-12
	LTE Band 25 (PCS)	1.057	0.476	0.142	1.533	1.199	See Table 12-12

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

Simult Tx	Configuration	PCS EVDO SAR (W/kg)	5 GHz WLAN Primary Ant SAR (W/kg)	5 GHz WLAN Secondary Ant SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	Back	0.975	0.476	0.142	1.451	1.117	**1.593**
	Front	0.972	0.032	0.142*	1.004	1.114	1.146
	Top	-	0.476*	0.142*	0.476	0.142	0.618
	Bottom	1.230	-	-	1.230	1.230	1.230
	Left	0.538	0.188	0.142*	0.726	0.680	0.868

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN Primary Ant SAR (W/kg)	5 GHz WLAN Secondary Ant SAR (W/kg)	Σ SAR (W/kg)			SPLSR		
		1	2	3	1+2	1+3	1+2+3	1+2	1+3	2+3
Hotspot SAR	Back	1.140	0.476	0.142	See Note 1	**1.282**	See Note 1	0.02	0.01	0.02
	Front	0.973	0.032	0.142*	1.005	1.115	1.147	N/A	N/A	N/A
	Top	-	0.476*	0.142*	0.476	0.142	0.618	N/A	N/A	N/A
	Bottom	1.130	-	-	1.130	1.130	1.130	N/A	N/A	N/A
	Left	0.549	0.188	0.142*	0.737	0.691	0.879	N/A	N/A	N/A

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN Primary Ant SAR (W/kg)	5 GHz WLAN Secondary Ant SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	Back	0.874	0.476	0.142	1.350	1.016	**1.492**
	Front	0.863	0.032	0.142*	0.895	1.005	1.037
	Top	-	0.476*	0.142*	0.476	0.142	0.618
	Bottom	1.057	-	-	1.057	1.057	1.057
	Left	0.452	0.188	0.142*	0.640	0.594	0.782

Table 12-13
Simultaneous Transmission Scenario with 2.4 GHz Primary Ant and 5 GHz Secondary Ant (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Primary Ant SAR (W/kg)	5 GHz WLAN Secondary Ant SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	0.649	0.155	0.142	0.804	0.791	0.946
	GPRS 1900	0.519	0.155	0.142	0.674	0.661	0.816
	UMTS 850	0.486	0.155	0.142	0.641	0.628	0.783
	UMTS 1750	0.948	0.155	0.142	1.103	1.090	1.245
	UMTS 1900	0.706	0.155	0.142	0.861	0.848	1.003
	Cell. EVDO	0.635	0.155	0.142	0.790	0.777	0.932
	PCS EVDO	1.230	0.155	0.142	1.385	1.372	**1.527**
	LTE Band 12	0.690	0.155	0.142	0.845	0.832	0.987
	LTE Band 13	0.619	0.155	0.142	0.774	0.761	0.916
	LTE Band 5 (Cell)	0.702	0.155	0.142	0.857	0.844	0.999
	LTE Band 66 (AWS)	1.140	0.155	0.142	1.295	1.282	1.437
	LTE Band 25 (PCS)	1.057	0.155	0.142	1.212	1.199	1.354

Table 12-14
Simultaneous Transmission Scenario with
2.4 GHz Secondary Ant and 5 GHz Primary Ant (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Secondary Ant SAR (W/kg)	5 GHz WLAN Primary Ant SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	0.649	0.197	0.476	0.846	1.125	1.322
	GPRS 1900	0.519	0.197	0.476	0.716	0.995	1.192
	UMTS 850	0.486	0.197	0.476	0.683	0.962	1.159
	UMTS 1750	0.948	0.197	0.476	1.145	1.424	See Table 12-15
	UMTS 1900	0.706	0.197	0.476	0.903	1.182	1.379
	Cell. EVDO	0.635	0.197	0.476	0.832	1.111	1.308
	PCS EVDO	1.230	0.197	0.476	1.427	See Table 12-15	See Table 12-15
	LTE Band 12	0.690	0.197	0.476	0.887	1.166	1.363
	LTE Band 13	0.619	0.197	0.476	0.816	1.095	1.292
	LTE Band 5 (Cell)	0.702	0.197	0.476	0.899	1.178	1.375
	LTE Band 66 (AWS)	1.140	0.197	0.476	1.337	See Table 12-15	See Table 12-15
	LTE Band 25 (PCS)	1.057	0.197	0.476	1.254	**1.533**	See Table 12-15

Table 12-15
Simultaneous Transmission Scenario with
2.4 GHz Secondary Ant and 5 GHz Primary Ant (Hotspot at 1.0 cm)

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	2.4 GHz WLAN Secondary Ant SAR (W/kg)	5 GHz WLAN Primary Ant SAR (W/kg)	Σ SAR (W/kg)			SPLSR		
		1	2	3	1+2	1+3	1+2+3	1+2	1+3	2+3
Hotspot SAR	Back	0.948	0.197	0.476	1.145	**1.424**	See Note 1	0.01	0.02	0.02
	Front	0.698	0.188	0.032	0.886	0.730	0.918	N/A	N/A	N/A
	Top	-	0.197*	0.476*	0.197	0.476	0.673	N/A	N/A	N/A
	Bottom	0.451	-	-	0.451	0.451	0.451	N/A	N/A	N/A
	Left	0.280	0.197*	0.188	0.477	0.468	0.665	N/A	N/A	N/A
Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN Secondary Ant SAR (W/kg)	5 GHz WLAN Primary Ant SAR (W/kg)	Σ SAR (W/kg)			SPLSR		
		1	2	3	1+2	1+3	1+2+3	1+2	1+3	2+3
Hotspot SAR	Back	0.975	0.197	0.476	1.172	**1.451**	See Note 1	0.01	0.02	0.02
	Front	0.972	0.188	0.032	1.160	1.004	1.192	N/A	N/A	N/A
	Top	-	0.197*	0.476*	0.197	0.476	0.673	N/A	N/A	N/A
	Bottom	1.230	-	-	1.230	1.230	1.230	N/A	N/A	N/A
	Left	0.538	0.197*	0.188	0.735	0.726	0.923	N/A	N/A	N/A

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	2.4 GHz WLAN Secondary Ant SAR (W/kg)	5 GHz WLAN Primary Ant SAR (W/kg)	Σ SAR (W/kg)			SPLSR		
		1	2	3	1+2	1+3	1+2+3	1+2	1+3	2+3
Hotspot SAR	Back	1.140	0.197	0.476	**1.337**	See Note 1	See Note 1	0.01	0.02	0.02
	Front	0.973	0.188	0.032	1.161	1.005	1.193	N/A	N/A	N/A
	Top	-	0.197*	0.476*	0.197	0.476	0.673	N/A	N/A	N/A
	Bottom	1.130	-	-	1.130	1.130	1.130	N/A	N/A	N/A
	Left	0.549	0.197*	0.188	0.746	0.737	0.934	N/A	N/A	N/A

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	2.4 GHz WLAN Secondary Ant SAR (W/kg)	5 GHz WLAN Primary Ant SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	Back	0.874	0.197	0.476	1.071	1.350	**1.547**
	Front	0.863	0.188	0.032	1.051	0.895	1.083
	Top	-	0.197*	0.476*	0.197	0.476	0.673
	Bottom	1.057	-	-	1.057	1.057	1.057
	Left	0.452	0.197*	0.188	0.649	0.640	0.837

Notes:

1. No evaluation was performed to determine the aggregate 1g SAR for these configurations as the SPLS ratio between the antenna pairs was not greater than 0.04 per FCC KDB 447498 D01v06. See Section 12.6 for detailed SPLS ratio analysis.
2. (*) For test positions that were not required to be evaluated for WLAN SAR per FCC KDB publication 248227, the worst case WLAN SAR result for applicable exposure conditions was used for simultaneous transmission analysis.

12.6 SPLSR Evaluation and Analysis

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

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

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

12.6.1 Back Side SPLSR Evaluation and Analysis

Table 12-16
Peak SAR Locations for Body Back Side (Body-Worn at 1.0 cm)

Mode/Band	x (mm)	y (mm)	Reported SAR (W/kg)
2.4 GHz WLAN Secondary Antenna	-14.60	68.40	0.197
5 GHz WLAN Primary Antenna	9.00	42.00	0.491
5 GHz WLAN Secondary Antenna	1.00	66.00	0.228
UMTS Band 4	-6.50	-57.00	0.948
PCS CDMA	-25.00	-49.00	1.01
LTE Band 66	-11.00	-54.00	1.140

Table 12-17
Back Side SAR to Peak Location Separation Ratio Calculations (Body-Worn at 1.0 cm)

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio	Plot Number
Ant "a"	Ant "b"	a	b	a+b	D_{a-b}	$(a+b)^{1.5}/D_{a-b}$	
UMTS Band 4	5 GHz WLAN Primary Antenna	0.948	0.491	1.439	100.21	0.02	1
UMTS Band 4	5 GHz WLAN Secondary Antenna	0.948	0.228	1.176	123.23	0.01	
5 GHz WLAN Primary Antenna	5 GHz WLAN Secondary Antenna	0.491	0.228	0.719	25.30	0.02	
PCS CDMA	5 GHz WLAN Primary Antenna	1.01	0.491	1.501	97.14	0.02	2
PCS CDMA	5 GHz WLAN Secondary Antenna	1.01	0.228	1.238	117.90	0.01	
5 GHz WLAN Primary Antenna	5 GHz WLAN Secondary Antenna	0.491	0.228	0.719	25.30	0.02	
LTE Band 66	5 GHz WLAN Primary Antenna	1.14	0.491	1.631	98.06	0.02	3
LTE Band 66	5 GHz WLAN Secondary Antenna	1.14	0.228	1.368	120.60	0.01	
5 GHz WLAN Primary Antenna	5 GHz WLAN Secondary Antenna	0.491	0.228	0.719	25.30	0.02	
UMTS Band 4	2.4 GHz WLAN Secondary Antenna	0.948	0.197	1.145	125.66	0.01	4
UMTS Band 4	5 GHz WLAN Primary Antenna	0.948	0.491	1.439	100.21	0.02	
2.4 GHz WLAN Secondary Antenna	5 GHz WLAN Primary Antenna	0.197	0.491	0.688	35.41	0.02	
PCS CDMA	2.4 GHz WLAN Secondary Antenna	1.01	0.197	1.207	117.86	0.01	5
PCS CDMA	5 GHz WLAN Primary Antenna	1.01	0.491	1.501	97.14	0.02	
2.4 GHz WLAN Secondary Antenna	5 GHz WLAN Primary Antenna	0.197	0.491	0.688	35.41	0.02	
LTE Band 66	2.4 GHz WLAN Secondary Antenna	1.14	0.197	1.337	122.45	0.01	6
LTE Band 66	5 GHz WLAN Primary Antenna	1.14	0.491	1.631	98.06	0.02	
2.4 GHz WLAN Secondary Antenna	5 GHz WLAN Primary Antenna	0.197	0.491	0.688	35.41	0.02	

Table 12-18
Back Side SAR to Peak Location Separation Ratio Plots (Body-worn at 1.0)

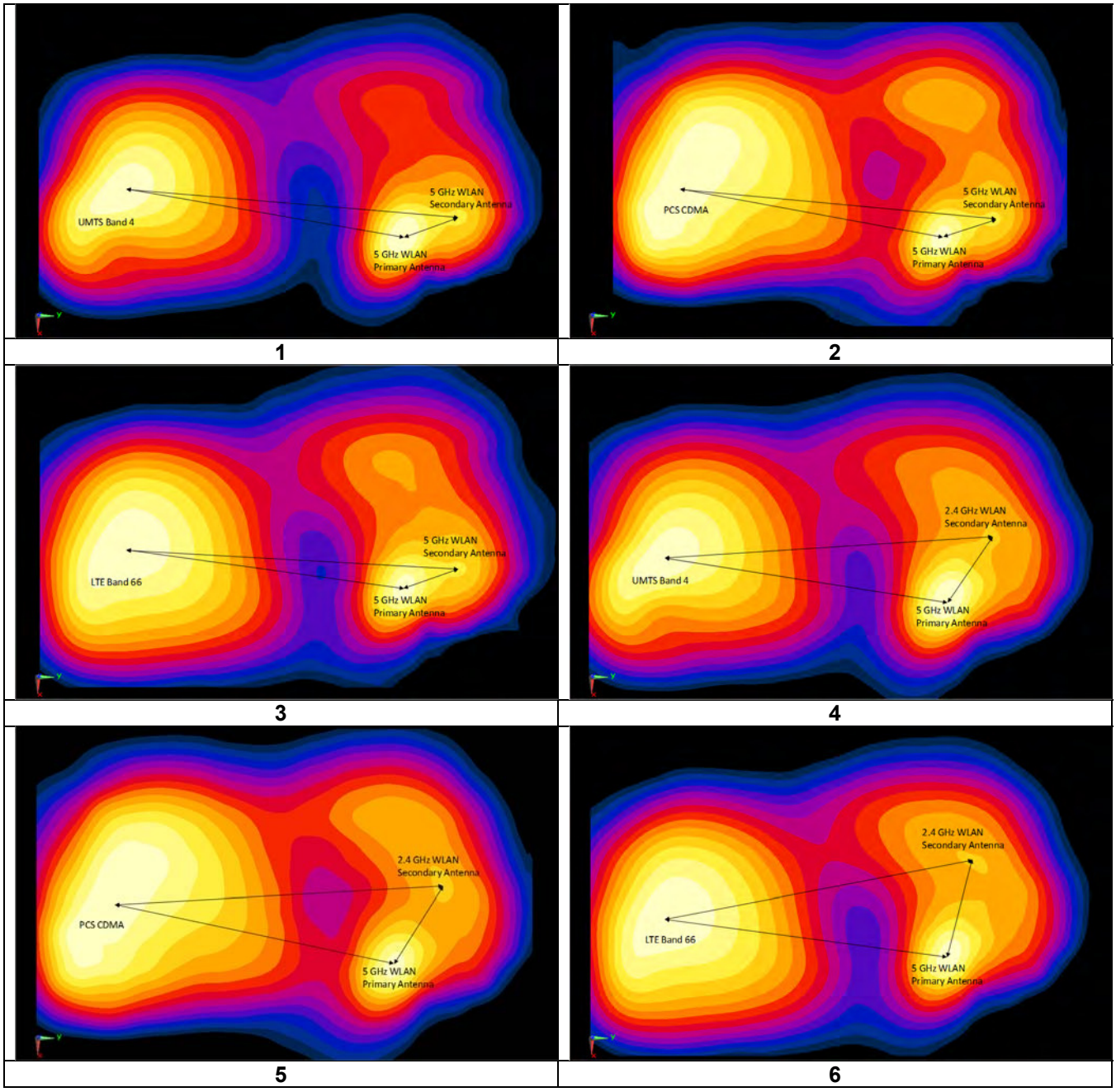


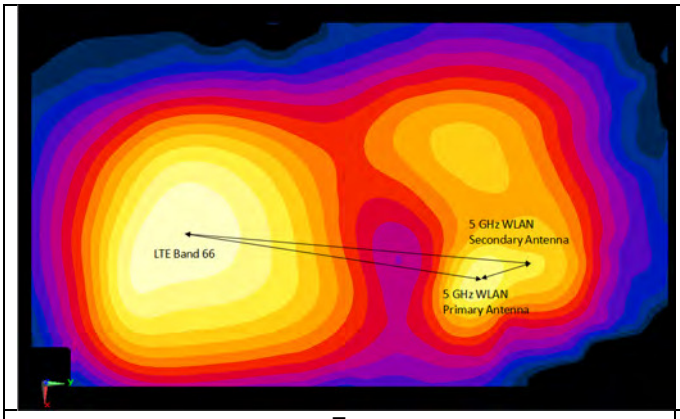
Table 12-19
Peak SAR Locations for Body Back Side (Hotspot at 1.0 cm)

Mode/Band	x (mm)	y (mm)	Reported SAR (W/kg)
2.4 GHz WLAN Secondary Antenna	-14.60	68.40	0.197
5 GHz WLAN Primary Antenna	8.00	42.00	0.476
5 GHz WLAN Secondary Antenna	5.00	67.00	0.142
UMTS Band 4	-6.50	-57.00	0.948
PCS EVDO	-24.50	-53.00	0.975
LTE Band 66	-11.00	-54.00	1.140

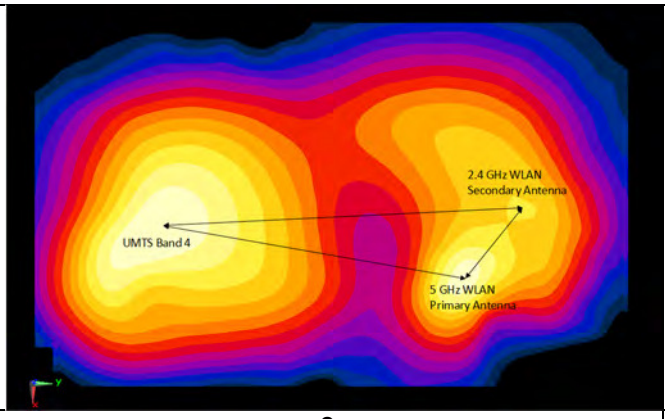
Table 12-20
Back Side SAR to Peak Location Separation Ratio Calculations (Hotspot at 1.0 cm)

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio	Plot Number
Ant "a"	Ant "b"	a	b	a+b	D_{a-b}	$(a+b)^{1.5}/D_{a-b}$	
LTE Band 66	5 GHz WLAN Primary Antenna	1.14	0.476	1.616	97.86	0.02	7
LTE Band 66	5 GHz WLAN Secondary Antenna	1.14	0.142	1.282	122.05	0.01	
5 GHz WLAN Primary Antenna	5 GHz WLAN Secondary Antenna	0.476	0.142	0.618	25.18	0.02	
UMTS Band 4	2.4 GHz WLAN Secondary Antenna	0.948	0.197	1.145	125.66	0.01	8
UMTS Band 4	5 GHz WLAN Primary Antenna	0.948	0.476	1.424	100.06	0.02	
2.4 GHz WLAN Secondary Antenna	5 GHz WLAN Primary Antenna	0.197	0.476	0.673	34.75	0.02	
PCS EVDO	2.4 GHz WLAN Secondary Antenna	0.975	0.197	1.172	121.80	0.01	9
PCS EVDO	5 GHz WLAN Primary Antenna	0.975	0.476	1.451	100.41	0.02	
2.4 GHz WLAN Secondary Antenna	5 GHz WLAN Primary Antenna	0.197	0.476	0.673	34.75	0.02	
LTE Band 66	2.4 GHz WLAN Secondary Antenna	1.14	0.197	1.337	122.45	0.01	10
LTE Band 66	5 GHz WLAN Primary Antenna	1.14	0.476	1.616	97.86	0.02	
2.4 GHz WLAN Secondary Antenna	5 GHz WLAN Primary Antenna	0.197	0.476	0.673	34.75	0.02	

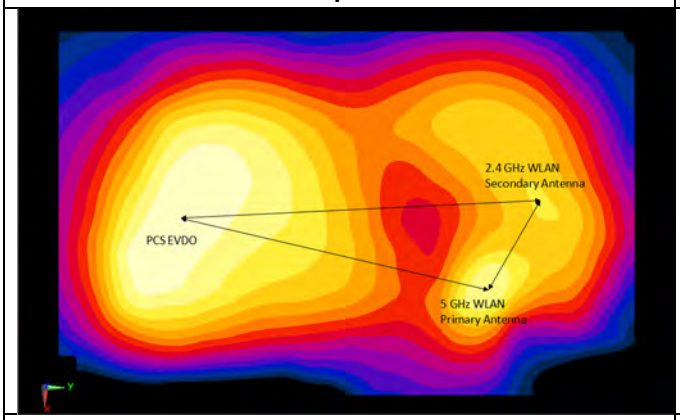
Table 12-21
Back Side SAR to Peak Location Separation Ratio Plots (Hotspot at 1.0 cm)



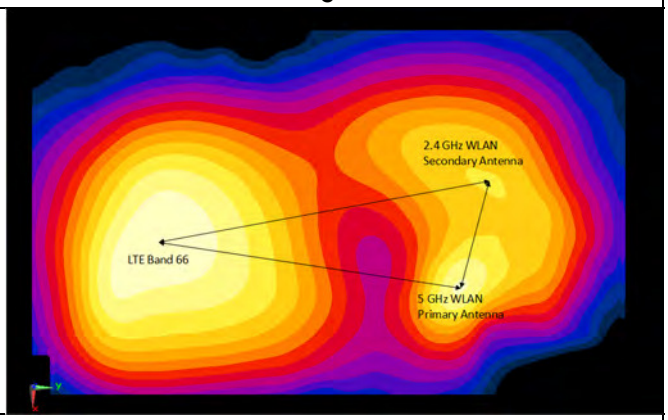
7



8



9



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12.7 Simultaneous Transmission Conclusion

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

13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

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

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

1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g 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

Table 13-1
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS													
Band	FREQUENCY		Mode	Service	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1900	1851.25	25	PCS CDMA	EVDO Rev. 0	bottom	10 mm	1.230	1.210	1.02	N/A	N/A	N/A	N/A
1750	1720.00	132072	LTE Band 66 (AWS), 20 MHz Bandwidth	QPSK, 1 RB, 0 RB Offset	back	10 mm	1.140	1.080	1.06	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram						

13.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg 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	8753E	(30kHz-6GHz) Network Analyzer	3/2/2016	Annual	3/2/2017	JP38020182
Agilent	8753ES	S-Parameter Network Analyzer	3/3/2016	Annual	3/3/2017	US39170122
Agilent	8753ES	S-Parameter Vector Network Analyzer	8/19/2016	Annual	8/19/2017	MY40003841
Agilent	8753ES	S-Parameter Network Analyzer	10/26/2016	Annual	10/26/2017	US39170118
Agilent	E4432B	ESG-D Series Signal Generator	3/5/2016	Annual	3/5/2017	US40053896
Agilent	E4438C	ESG Vector Signal Generator	3/12/2015	Biennial	3/12/2017	MY45090700
Agilent	E5515C	Wireless Communications Test Set	1/8/2015	Triennial	1/8/2018	GB43163447
Agilent	E5515C	8960 Series 10 Wireless Communications Test Set	10/5/2016	Annual	10/5/2017	GB42230325
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/2/2016	Annual	3/2/2017	MY45470194
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46170464
Agilent	N5182A	MXG Vector Signal Generator	2/27/2016	Annual	2/27/2017	MY47420651
Agilent	N9020A	MXA Signal Analyzer	10/28/2016	Annual	10/28/2017	US46470561
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	MA24106A	USB Power Sensor	3/4/2016	Annual	3/4/2017	1344555
Anritsu	MA24106A	USB Power Sensor	3/4/2016	Annual	3/4/2017	1344556
Anritsu	MA2411B	Pulse Power Sensor	8/18/2016	Annual	8/18/2017	1126066
Anritsu	MA2411B	Pulse Power Sensor	8/18/2016	Annual	8/18/2017	1207470
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	941001
Anritsu	ML2496A	Power Meter	3/5/2016	Annual	3/5/2017	1351001
Anritsu	MT8820C	Radio Communication Analyzer	4/14/2016	Annual	4/14/2017	6201240328
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1S5A00-009
Control Company	4040	Digital Thermometer	3/15/2015	Biennial	3/15/2017	150194929
Control Company	4352	Ultra Long Stem Thermometer	3/8/2016	Biennial	3/8/2018	160261701
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
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
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mitutoyo	CD-6"CSX	Digital Caliper	3/2/2016	Biennial	3/2/2018	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
Pasternack	NC-100	Torque Wrench	5/21/2015	Biennial	5/21/2017	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	12/12/2016	Annual	12/12/2017	833855/0010
Rohde & Schwarz	CMW500	Radio Communication Tester	3/25/2016	Annual	3/25/2017	128633
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A
Seekonk	NC-100	Torque Wrench (8" lb)	8/30/2016	Biennial	8/30/2018	N/A
SPEAG	D1750V2	1750 MHz SAR Dipole	5/9/2016	Annual	5/9/2017	1148
SPEAG	D1900V2	1900 MHz SAR Dipole	7/8/2016	Annual	7/8/2017	5d080
SPEAG	D1900V2	1900 MHz SAR Dipole	7/15/2016	Annual	7/15/2017	5d149
SPEAG	D2450V2	2450 MHz SAR Dipole	7/25/2016	Annual	7/25/2017	981
SPEAG	D2450V2	2450 MHz SAR Dipole	9/13/2016	Annual	9/13/2017	797
SPEAG	D5GHzV2	5 GHz SAR Dipole	8/2/2016	Annual	8/2/2017	1237
SPEAG	D5GHzV2	5 GHz SAR Dipole	9/21/2016	Annual	9/21/2017	1191
SPEAG	D750V3	750 MHz SAR Dipole	7/13/2016	Annual	7/13/2017	1161
SPEAG	D835V2	835 MHz SAR Dipole	7/13/2016	Annual	7/13/2017	4d047
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/18/2016	Annual	2/18/2017	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/19/2016	Annual	2/19/2017	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/14/2016	Annual	3/14/2017	1368
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/14/2016	Annual	4/14/2017	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/11/2016	Annual	5/11/2017	859
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/22/2016	Annual	8/22/2017	1364
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/14/2016	Annual	9/14/2017	1408
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/15/2016	Annual	9/15/2017	1333
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/13/2016	Annual	9/13/2017	1091
SPEAG	ES3DV3	SAR Probe	2/19/2016	Annual	2/19/2017	3213
SPEAG	ES3DV3	SAR Probe	3/18/2016	Annual	3/18/2017	3209
SPEAG	ES3DV3	SAR Probe	3/18/2016	Annual	3/18/2017	3319
SPEAG	ES3DV3	SAR Probe	8/25/2016	Annual	8/25/2017	3332
SPEAG	ES3DV3	SAR Probe	9/19/2016	Annual	9/19/2017	3287
SPEAG	EX3DV4	SAR Probe	2/22/2016	Annual	2/22/2017	3914
SPEAG	EX3DV4	SAR Probe	4/19/2016	Annual	4/19/2017	7357
SPEAG	EX3DV4	SAR Probe	4/19/2016	Annual	4/19/2017	7406
SPEAG	EX3DV4	SAR Probe	5/17/2016	Annual	5/17/2017	7409

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

15 MEASUREMENT UNCERTAINTIES

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

16 CONCLUSION

16.1 Measurement Conclusion

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

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

17 REFERENCES

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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFVS988; Type: Portable Handset; Serial: 06855

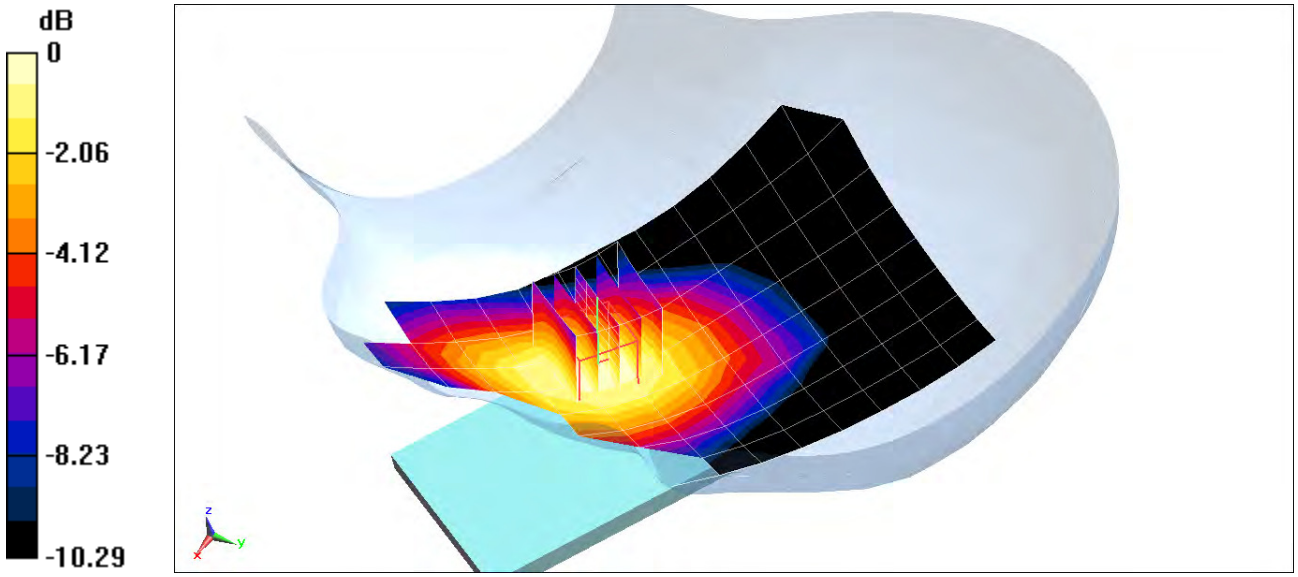
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium: 835 Head; Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.914$ S/m; $\varepsilon_r = 42.995$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 01-31-2017; Ambient Temp: 23.1°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7409; ConvF(10.04, 10.04, 10.04); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 850, 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 = 14.43 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.234 W/kg
SAR(1 g) = 0.183 W/kg



0 dB = 0.216 W/kg = -6.66 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFVS988; Type: Portable Handset; Serial: 06855

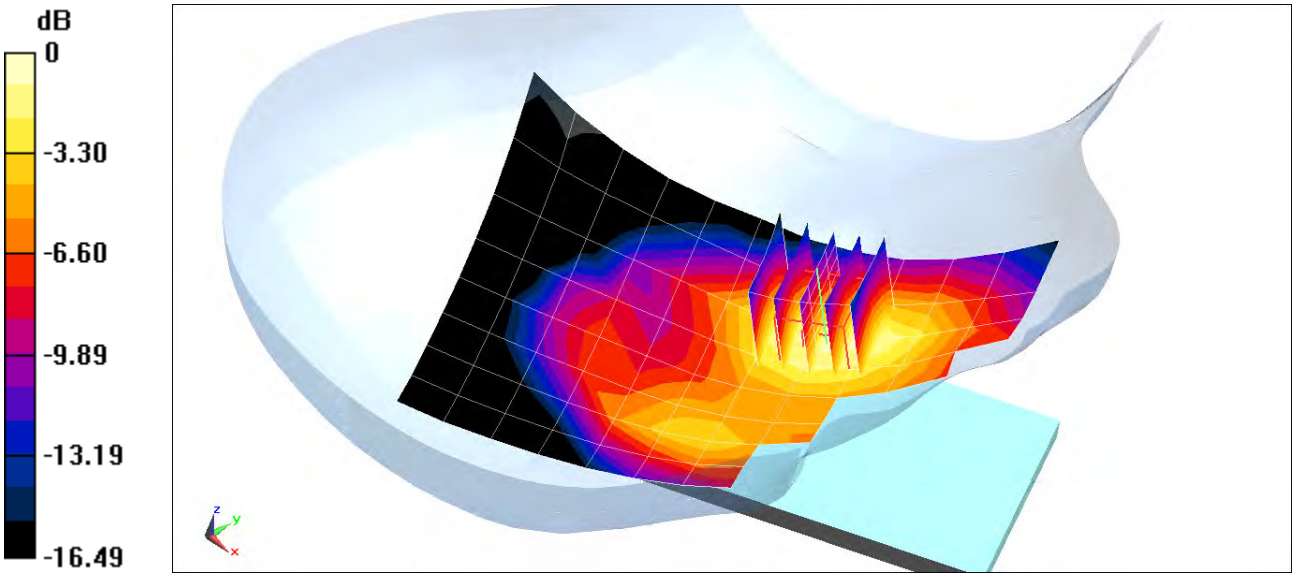
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Head; Medium parameters used:
f = 1880 MHz; σ = 1.43 S/m; ε_r = 38.258; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 01-30-2017; Ambient Temp: 22.5°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3332; ConvF(5.45, 5.45, 5.45); Calibrated: 8/25/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 9/15/2016
Phantom: SAM Left; Type: SAM; Serial: 1688
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 1900, 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 = 11.27 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.239 W/kg
SAR(1 g) = 0.154 W/kg



0 dB = 0.183 W/kg = -7.38 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFVS988; Type: Portable Handset; Serial: 06855

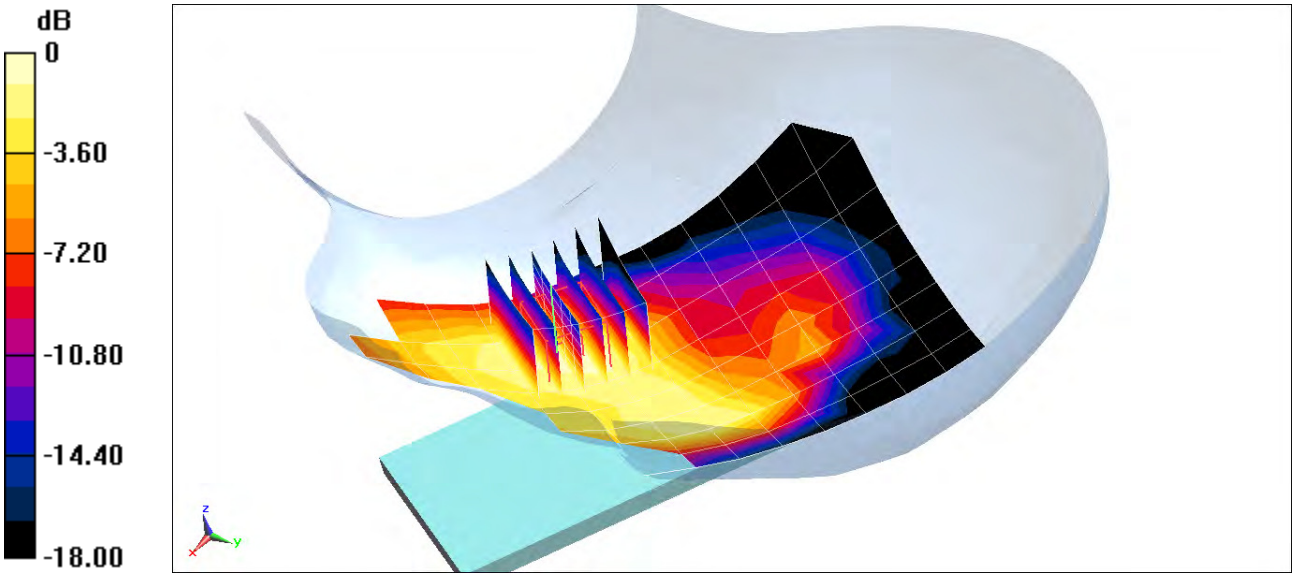
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.914$ S/m; $\varepsilon_r = 42.995$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 01-31-2017; Ambient Temp: 23.1°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7409; ConvF(10.04, 10.04, 10.04); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.42 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.177 W/kg
SAR(1 g) = 0.098 W/kg



0 dB = 0.149 W/kg = -8.27 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06848

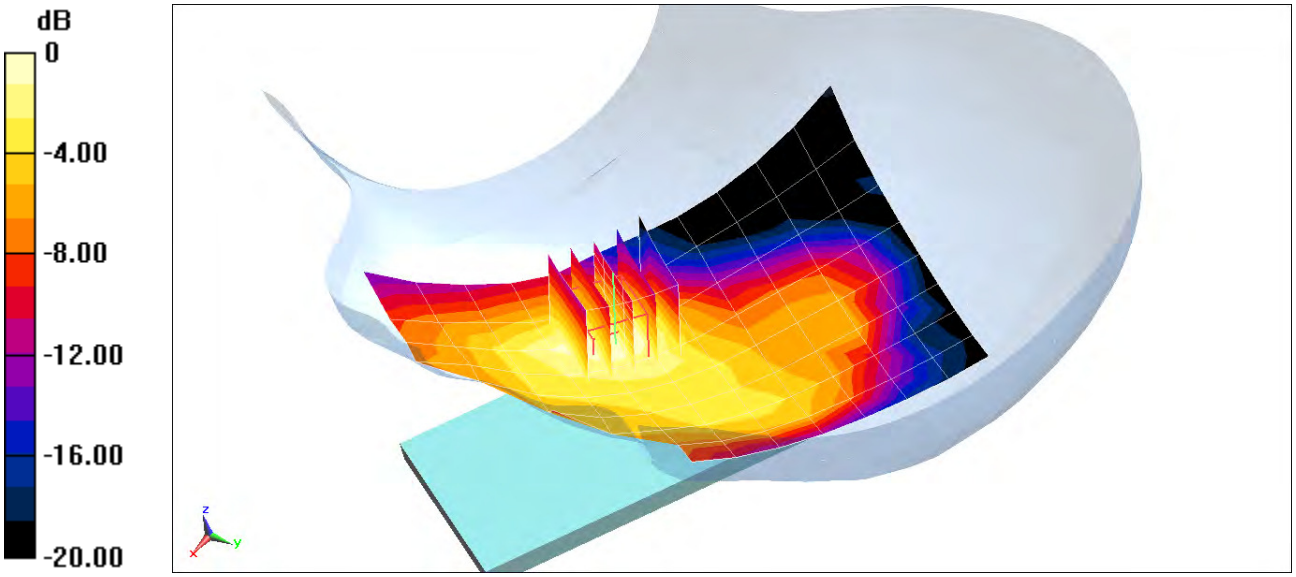
Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium: 1750 Head; Medium parameters used (interpolated):
f = 1732.4 MHz; σ = 1.345 S/m; ε_r = 38.91; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 01-27-2017; Ambient Temp: 24.0°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3209; ConvF(5.28, 5.28, 5.28); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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 = 11.85 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.278 W/kg
SAR(1 g) = 0.173 W/kg



0 dB = 0.200 W/kg = -6.99 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06848

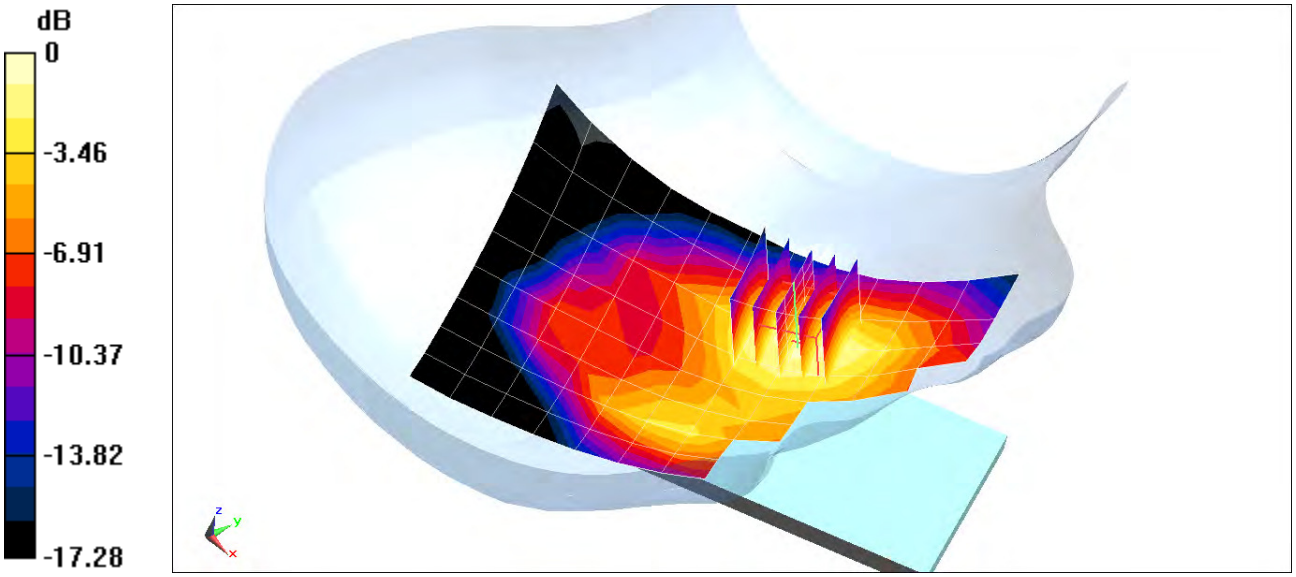
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Head; Medium parameters used:
f = 1880 MHz; σ = 1.43 S/m; ε_r = 38.258; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 01-30-2017; Ambient Temp: 22.5°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3332; ConvF(5.45, 5.45, 5.45); Calibrated: 8/25/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 9/15/2016
Phantom: SAM Left; Type: SAM; Serial: 1688
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.42 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.308 W/kg
SAR(1 g) = 0.199 W/kg



0 dB = 0.235 W/kg = -6.29 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06848

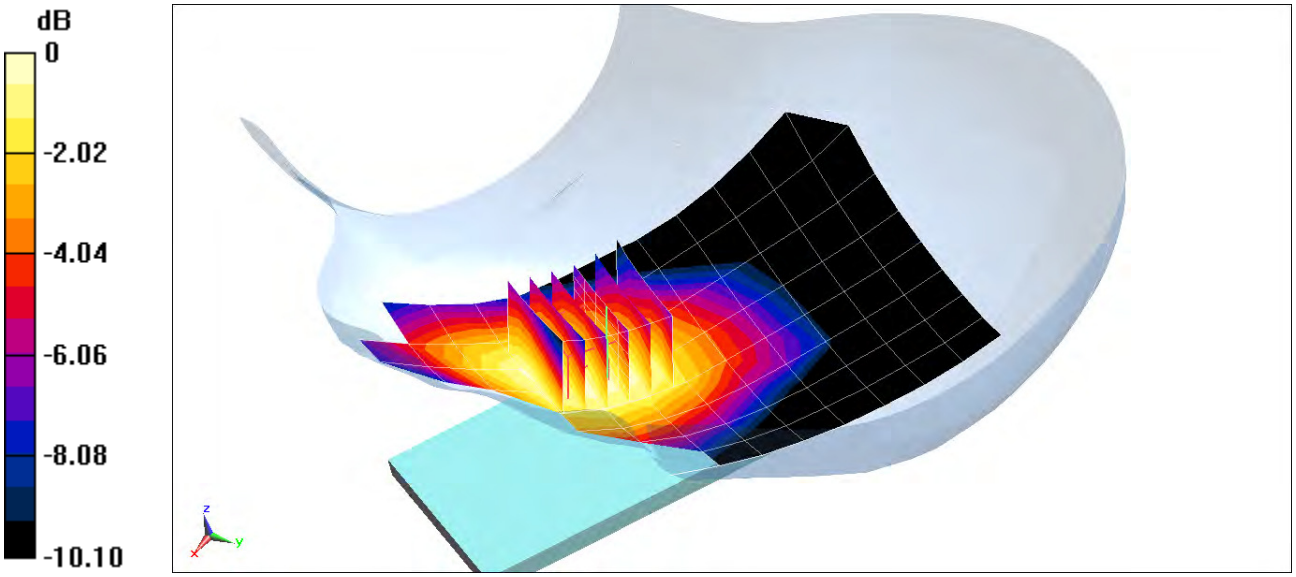
Communication System: UID 0, Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used (interpolated):
f = 836.52 MHz; σ = 0.914 S/m; ε_r = 42.996; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 01-31-2017; Ambient Temp: 23.1°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7409; ConvF(10.04, 10.04, 10.04); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. EVDO Rev. A, Left Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.09 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.210 W/kg
SAR(1 g) = 0.171 W/kg



0 dB = 0.195 W/kg = -7.10 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06855

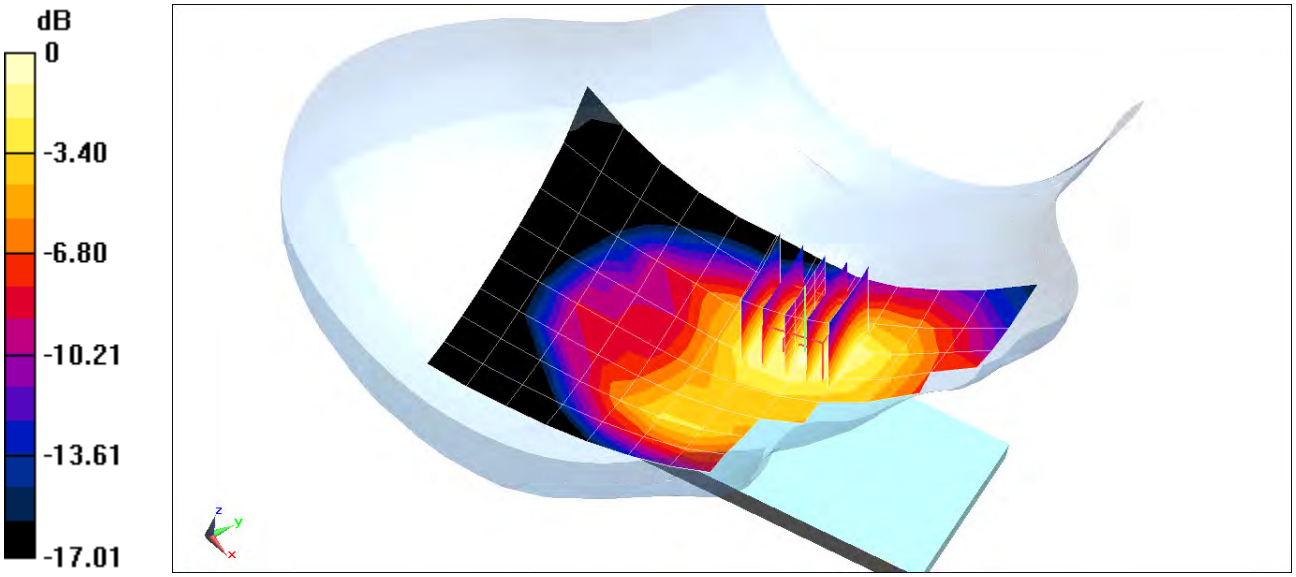
Communication System: UID 0, CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Head; Medium parameters used:
f = 1880 MHz; σ = 1.43 S/m; ε_r = 38.258; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 01-30-2017; Ambient Temp: 22.5°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3332; ConvF(5.45, 5.45, 5.45); Calibrated: 8/25/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 9/15/2016
Phantom: SAM Left; Type: SAM; Serial: 1688
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: PCS EVDO Rev. A, Right Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.97 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.373 W/kg
SAR(1 g) = 0.243 W/kg



0 dB = 0.285 W/kg = -5.45 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06863

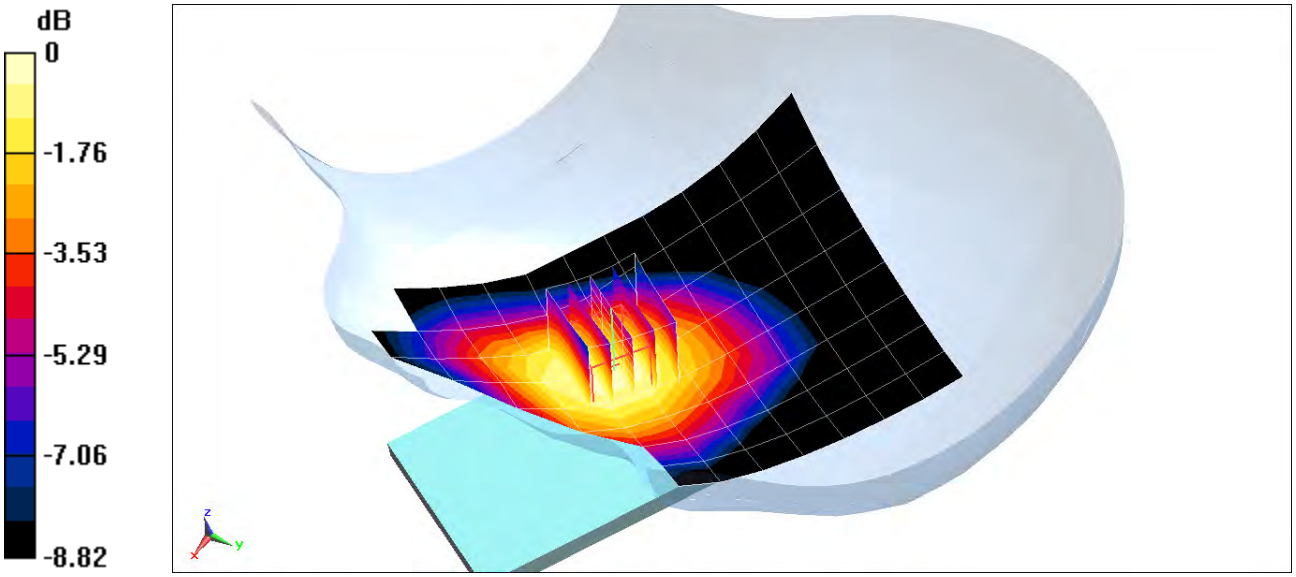
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Head; Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.866 S/m; ε_r = 42.779; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 01-25-2017; Ambient Temp: 22.3°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3209; ConvF(6.6, 6.6, 6.6); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Right; Type: SAM; Serial: 1757
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.06 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.204 W/kg
SAR(1 g) = 0.169 W/kg



0 dB = 0.183 W/kg = -7.38 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06863

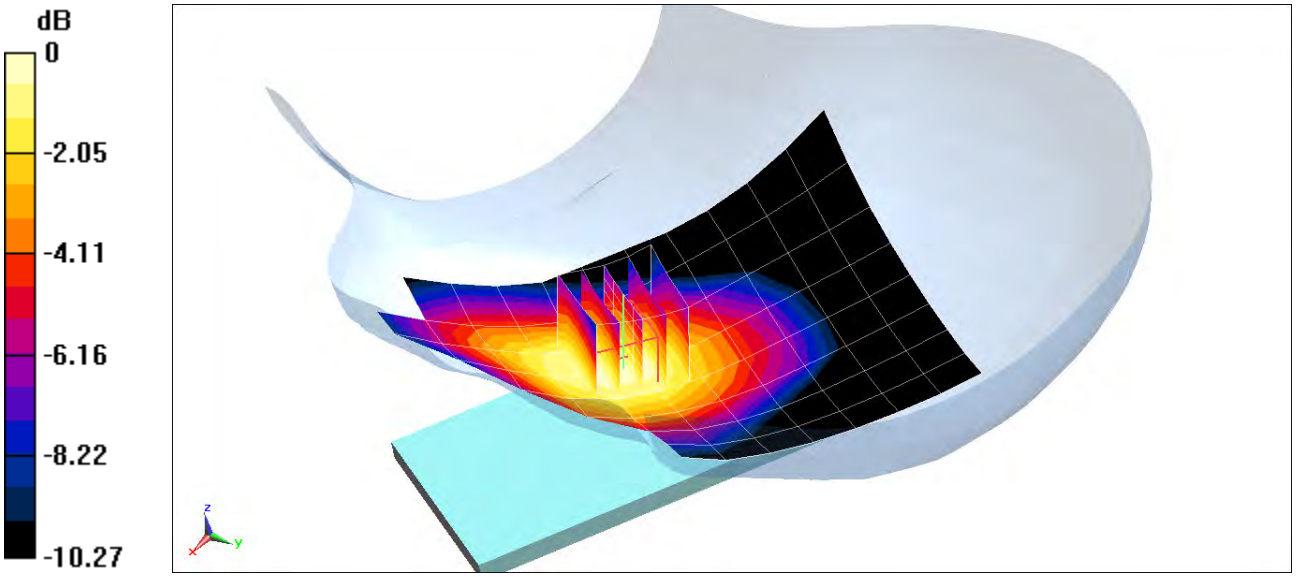
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Head; Medium parameters used (interpolated):
f = 782 MHz; σ = 0.935 S/m; ε_r = 41.775; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 01-25-2017; Ambient Temp: 22.3°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3209; ConvF(6.6, 6.6, 6.6); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Right; Type: SAM; Serial: 1757
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.46 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.246 W/kg
SAR(1 g) = 0.193 W/kg



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

DUT: ZNFVS988; Type: Portable Handset; Serial: 06897

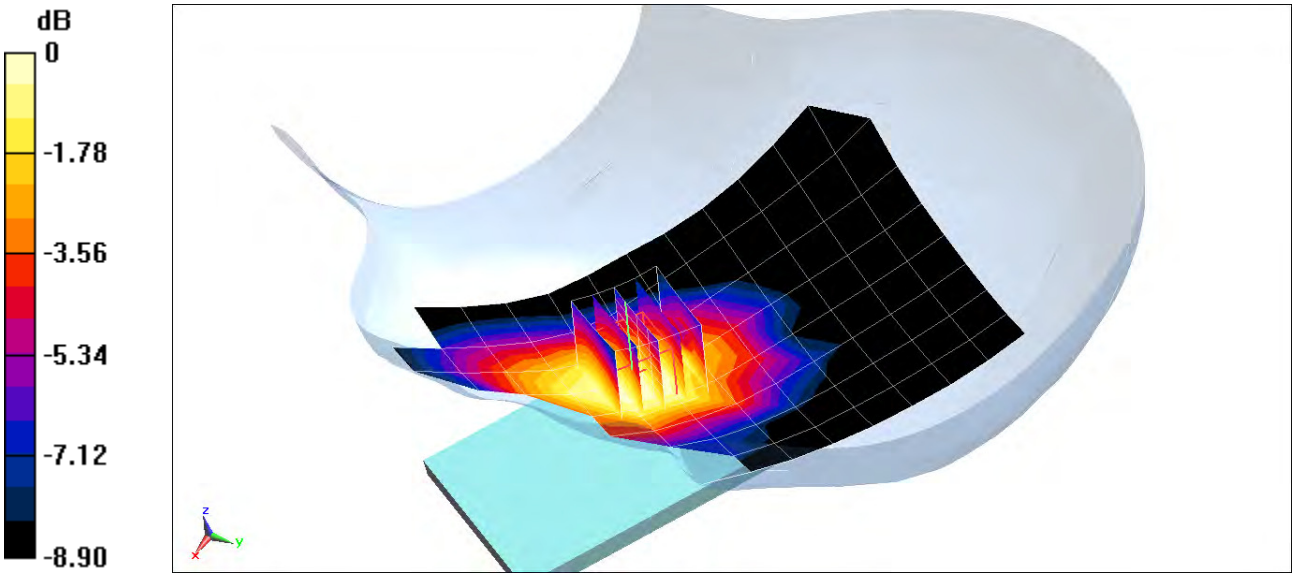
Communication System: UID 0, LTE Band 5 (Cell.); Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used (interpolated):
$f = 836.5$ MHz; $\sigma = 0.914$ S/m; $\varepsilon_r = 42.996$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 01-31-2017; Ambient Temp: 23.1°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7409; ConvF(10.04, 10.04, 10.04); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 5 (Cell.), Left Head, Cheek, Mid.ch, QPSK
10 MHz Bandwidth, 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 = 15.41 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.255 W/kg
SAR(1 g) = 0.198 W/kg



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

DUT: ZNFVS988; Type: Portable Handset; Serial: 06863

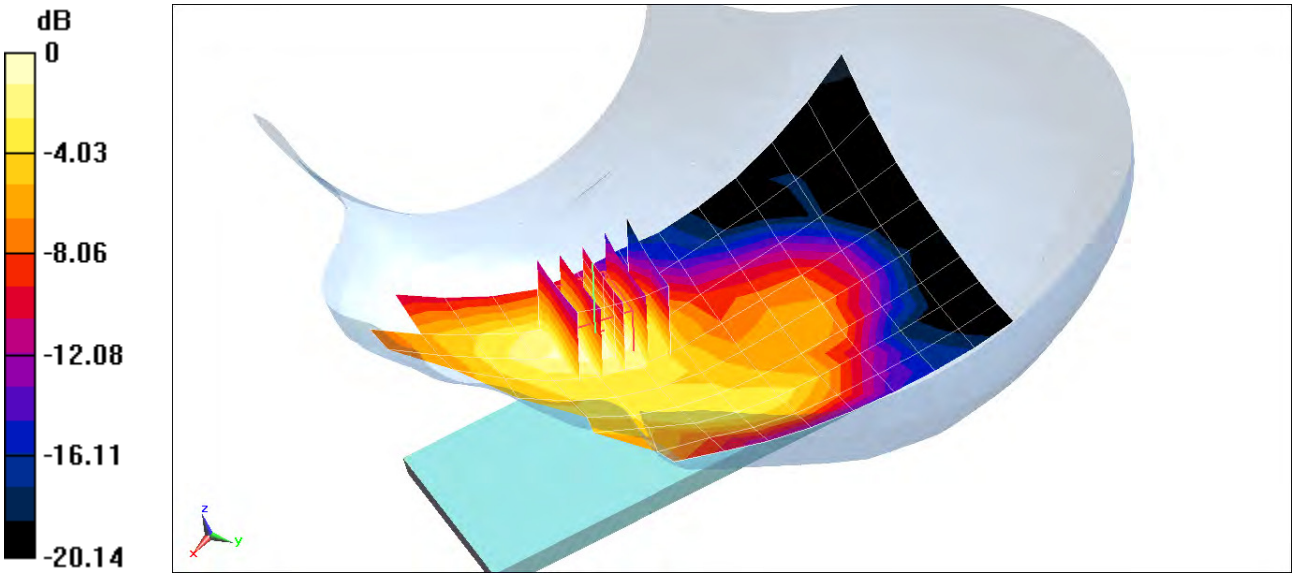
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1770 MHz; Duty Cycle: 1:1
Medium: 1750 Head; Medium parameters used (interpolated):
f = 1770 MHz; σ = 1.379 S/m; ε_r = 38.736; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 01-27-2017; Ambient Temp: 24.0°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3209; ConvF(5.28, 5.28, 5.28); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 66 (AWS), Left Head, Cheek, High.ch
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.60 V/m; Power Drift = 0.21 dB
Peak SAR (extrapolated) = 0.439 W/kg
SAR(1 g) = 0.263 W/kg



0 dB = 0.316 W/kg = -5.00 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06871

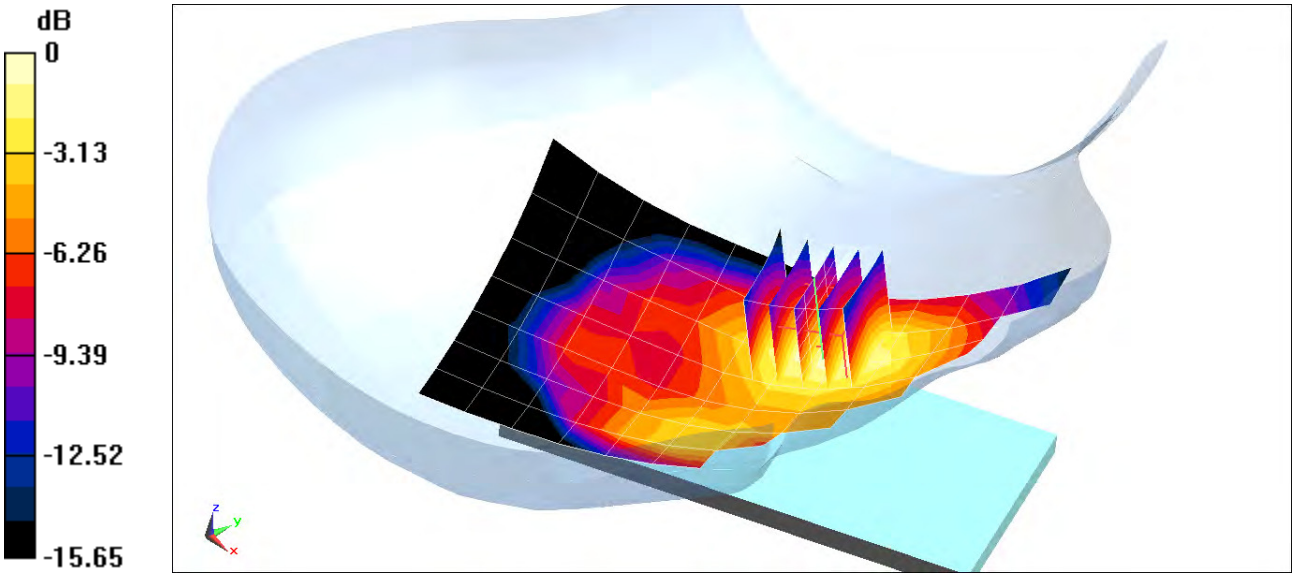
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1882.5 MHz; Duty Cycle: 1:1
Medium: 1900 Head; Medium parameters used (interpolated):
f = 1882.5 MHz; σ = 1.43 S/m; ε_r = 38.317; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 01-27-2017; Ambient Temp: 22.9°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3332; ConvF(5.45, 5.45, 5.45); Calibrated: 8/25/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 9/15/2016
Phantom: SAM Left; Type: SAM; Serial: 1688
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.97 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.338 W/kg
SAR(1 g) = 0.222 W/kg



0 dB = 0.260 W/kg = -5.85 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 07036

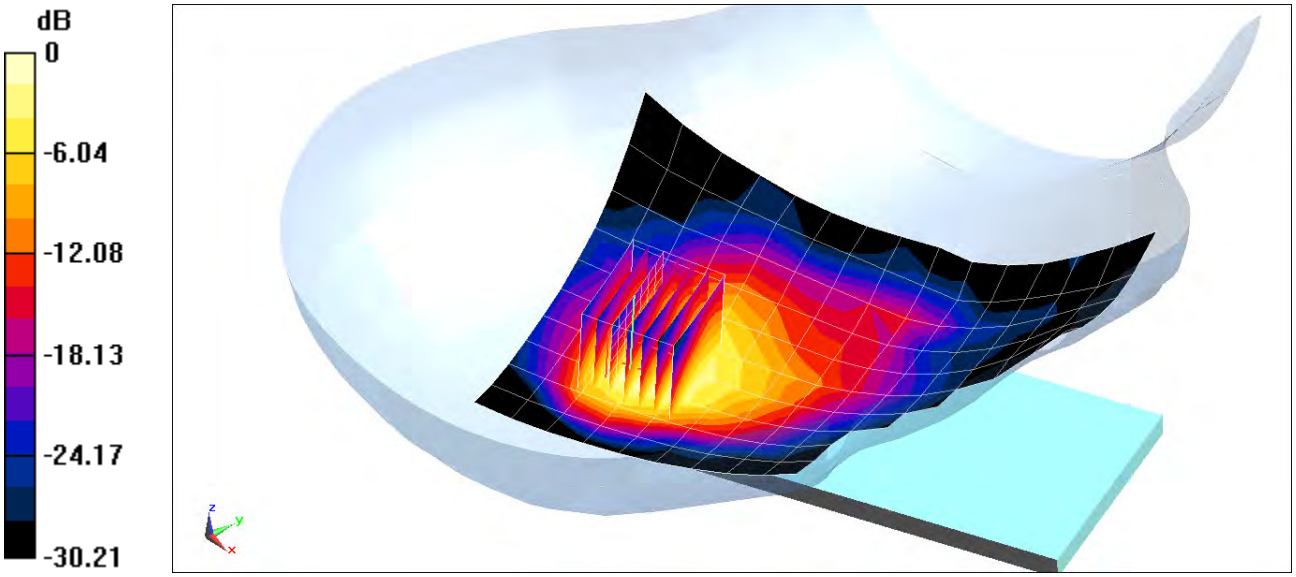
Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Head; Medium parameters used (interpolated):
f = 2437 MHz; σ = 1.865 S/m; ε_r = 39.469; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 01-20-2017; Ambient Temp: 24.1°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3287; ConvF(4.54, 4.54, 4.54); Calibrated: 9/19/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 9/14/2016
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.09 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.604 W/kg



0 dB = 0.821 W/kg = -0.86 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFVS988; Type: Portable Handset; Serial: 07036

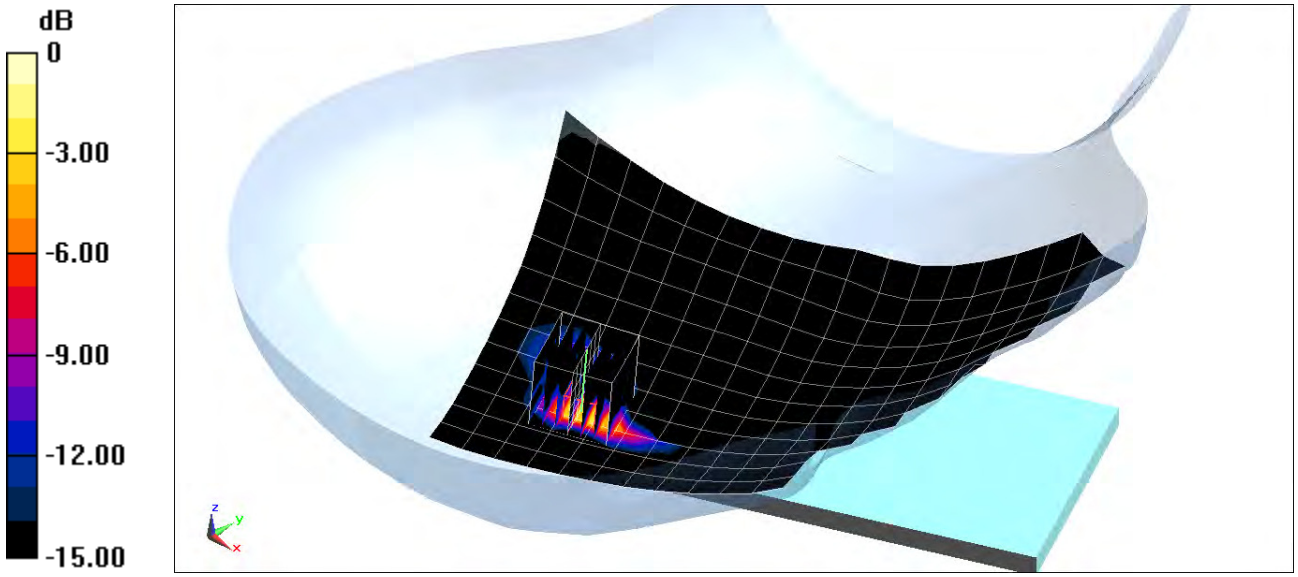
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5580 MHz; Duty Cycle: 1:1
Medium: 5GHz Head; Medium parameters used:
f = 5580 MHz; σ = 4.883 S/m; ε_r = 34.54; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 01-23-2017; Ambient Temp: 20.9°C; Tissue Temp: 20.3°C

Probe: EX3DV4 - SN7357; ConvF(4.41, 4.41, 4.41); Calibrated: 4/19/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/19/2016
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11a, U-NII-2C, Secondary Antenna, 20 MHz Bandwidth
Right Head, Cheek, Ch 116, 6 Mbps

Area Scan (13x22x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 1.004 V/m; Power Drift = 0.21 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.275 W/kg



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

DUT: ZNFVS988; Type: Portable Handset; Serial: 06848

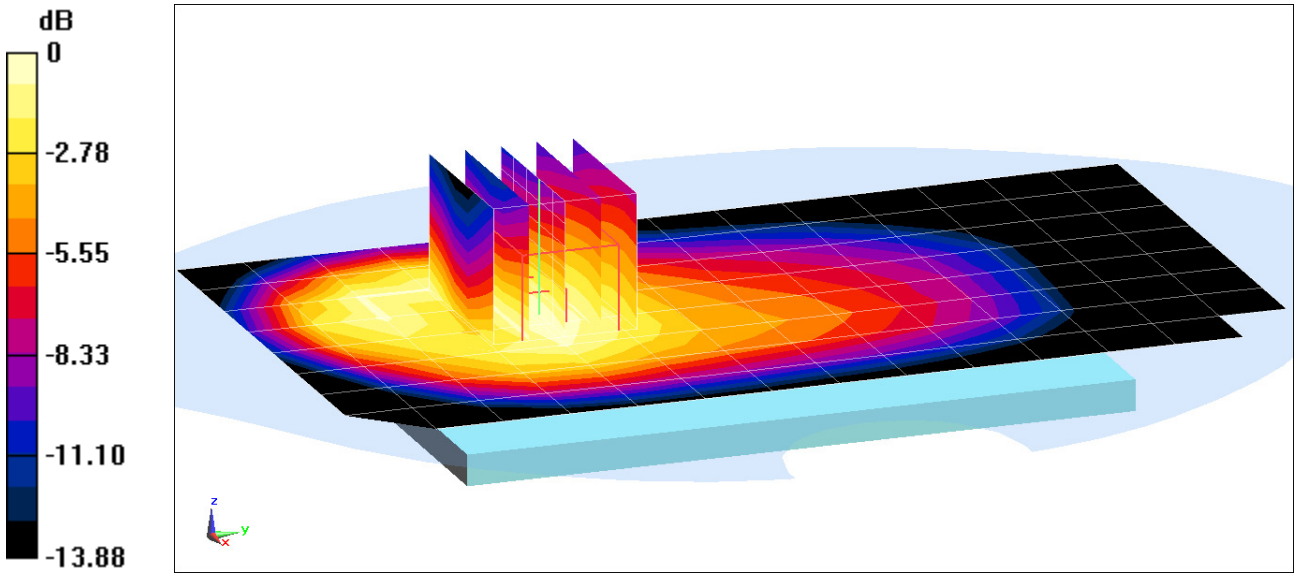
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1.006 S/m; ε_r = 56.424; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2017; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3319; ConvF(6.04, 6.04, 6.04); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/14/2016
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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 = 26.49 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.931 W/kg
SAR(1 g) = 0.649 W/kg



0 dB = 0.742 W/kg = -1.30 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06848

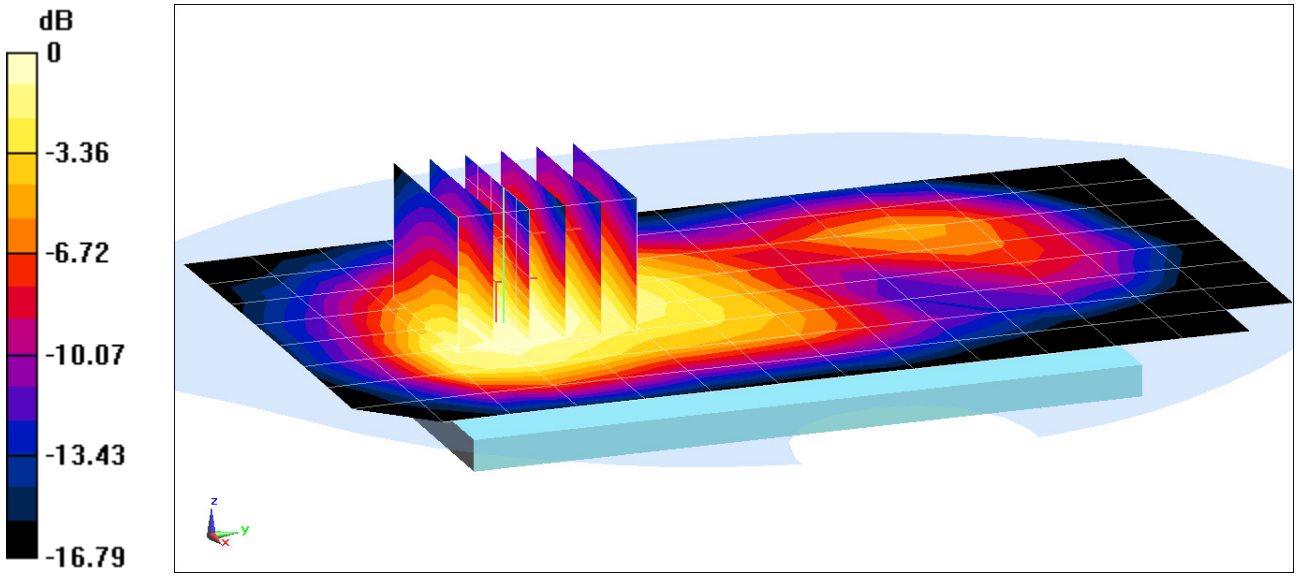
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Body; Medium parameters used:
f = 1880 MHz; σ = 1.536 S/m; ε_r = 52.21; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2017; Ambient Temp: 24.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(7.47, 7.47, 7.47); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 1900, Body SAR, Back side, Mid.ch, 2 Tx Slots

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.79 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.765 W/kg
SAR(1 g) = 0.455 W/kg



0 dB = 0.516 W/kg = -2.87 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06848

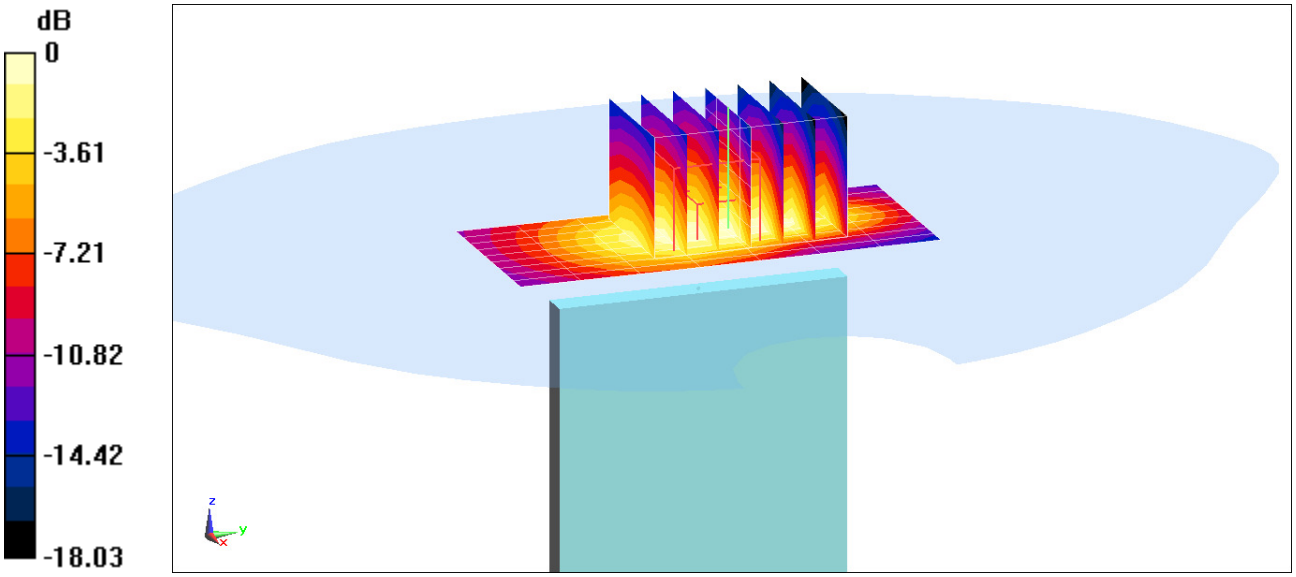
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Body; Medium parameters used:
f = 1880 MHz; σ = 1.536 S/m; ε_r = 52.21; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2017; Ambient Temp: 24.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(7.47, 7.47, 7.47); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.15 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.909 W/kg
SAR(1 g) = 0.515 W/kg



0 dB = 0.754 W/kg = -1.23 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06848

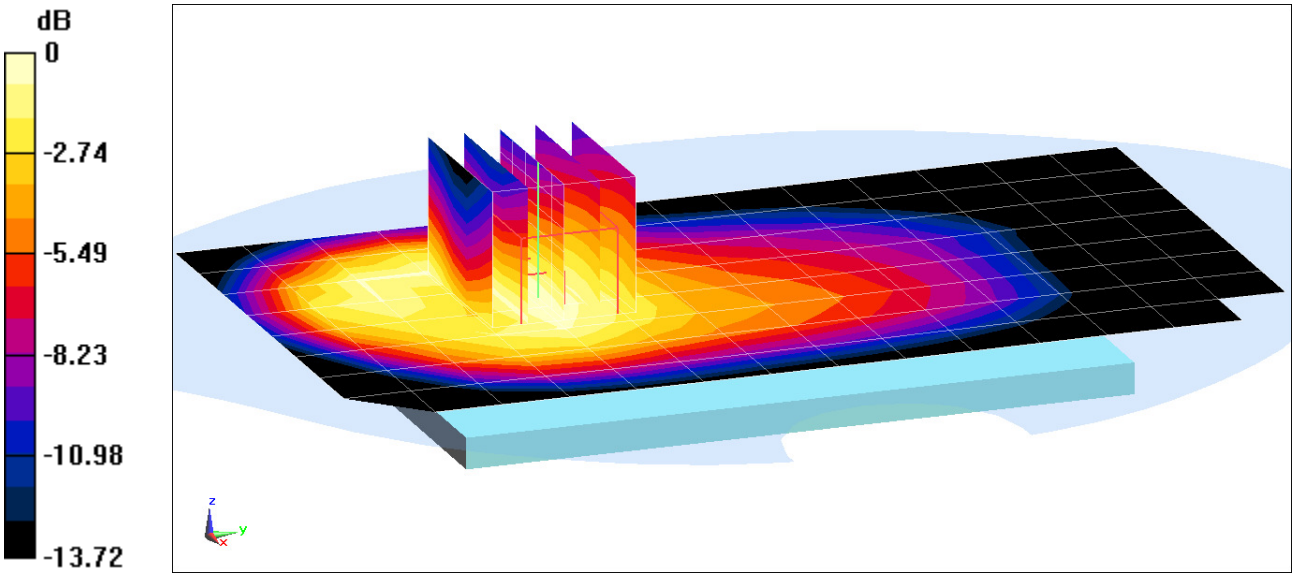
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1.006 S/m; ε_r = 56.424; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2017; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3319; ConvF(6.04, 6.04, 6.04); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/14/2016
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 850, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.89 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.702 W/kg
SAR(1 g) = 0.486 W/kg



0 dB = 0.552 W/kg = -2.58 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06848

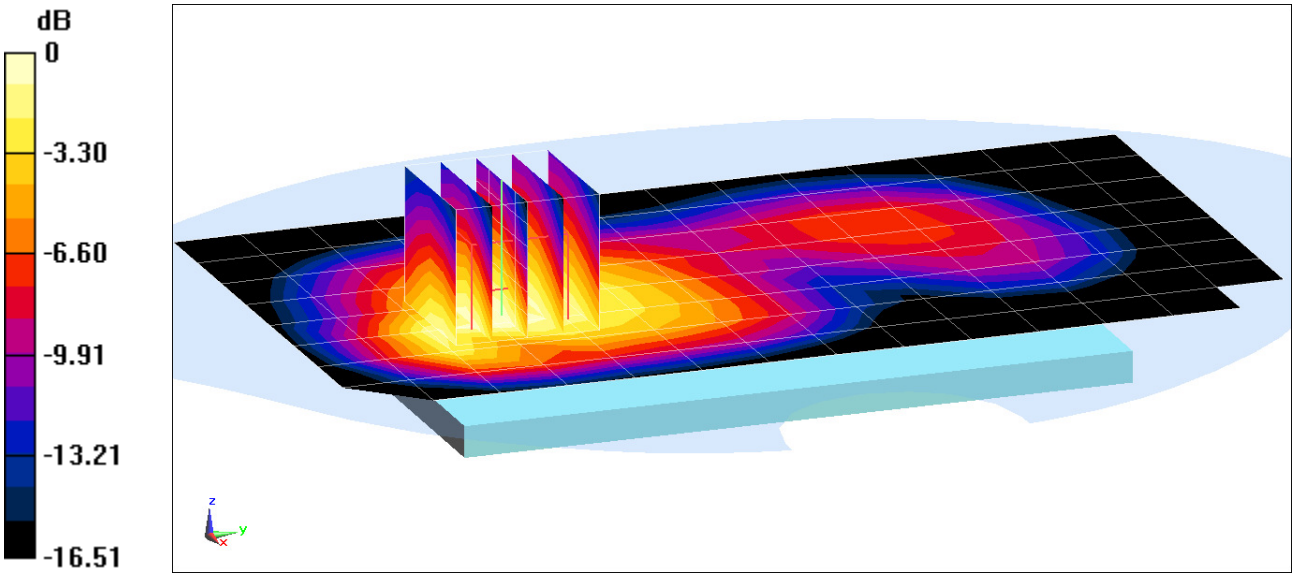
Communication System: UID 0, UMTS; Frequency: 1752.6 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used (interpolated):
f = 1752.6 MHz; σ = 1.509 S/m; ε_r = 51.562; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2017; Ambient Temp: 23.6°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3209; ConvF(4.99, 4.99, 4.99); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: UMTS 1750, 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 = 26.26 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.46 W/kg
SAR(1 g) = 0.941 W/kg



0 dB = 1.09 W/kg = 0.37 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06848

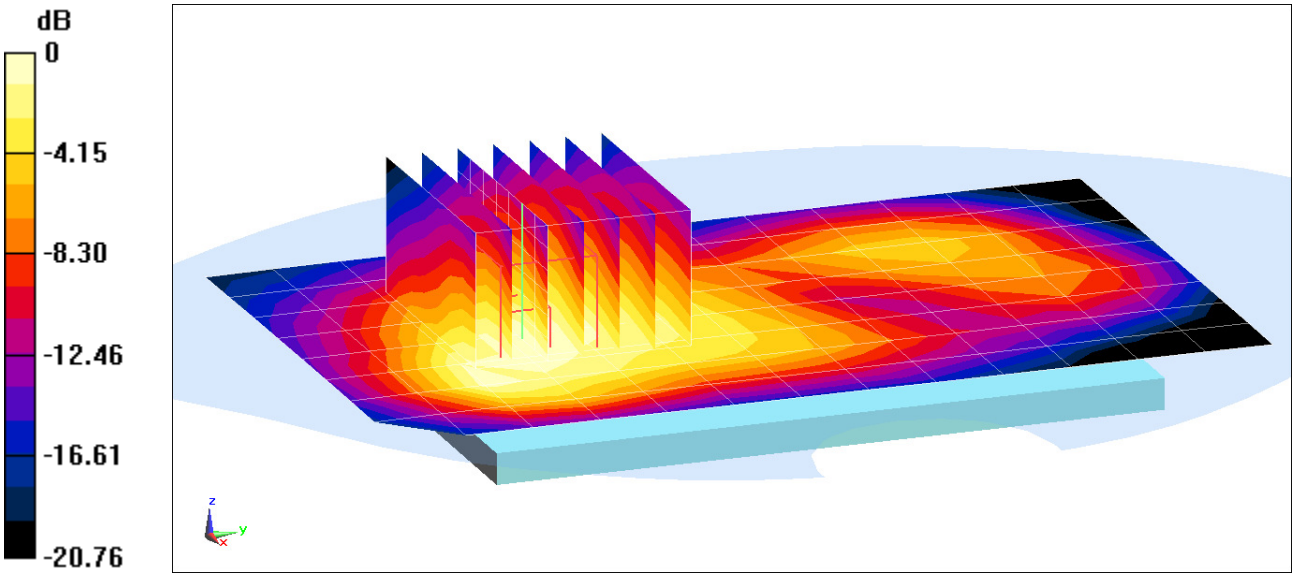
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used:
f = 1880 MHz; σ = 1.536 S/m; ε_r = 52.21; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2017; Ambient Temp: 24.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(7.47, 7.47, 7.47); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (8x7x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.64 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.673 W/kg



0 dB = 0.925 W/kg = -0.34 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06848

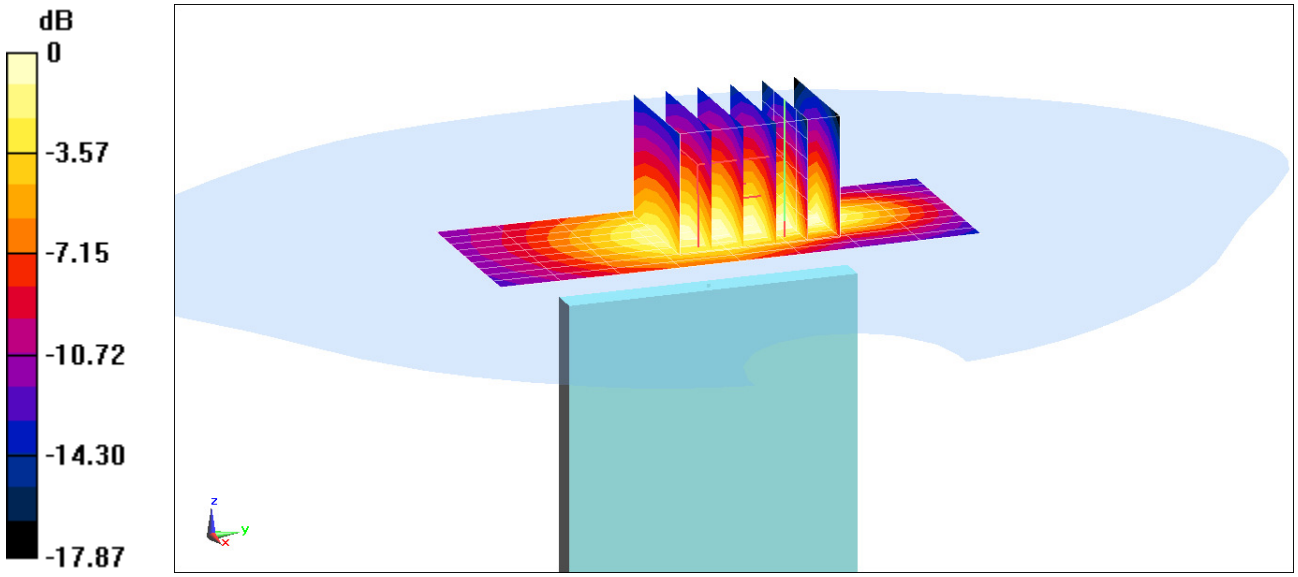
Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used:
f = 1880 MHz; σ = 1.536 S/m; ε_r = 52.21; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2017; Ambient Temp: 24.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(7.47, 7.47, 7.47); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.41 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.702 W/kg



0 dB = 1.04 W/kg = 0.17 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06848

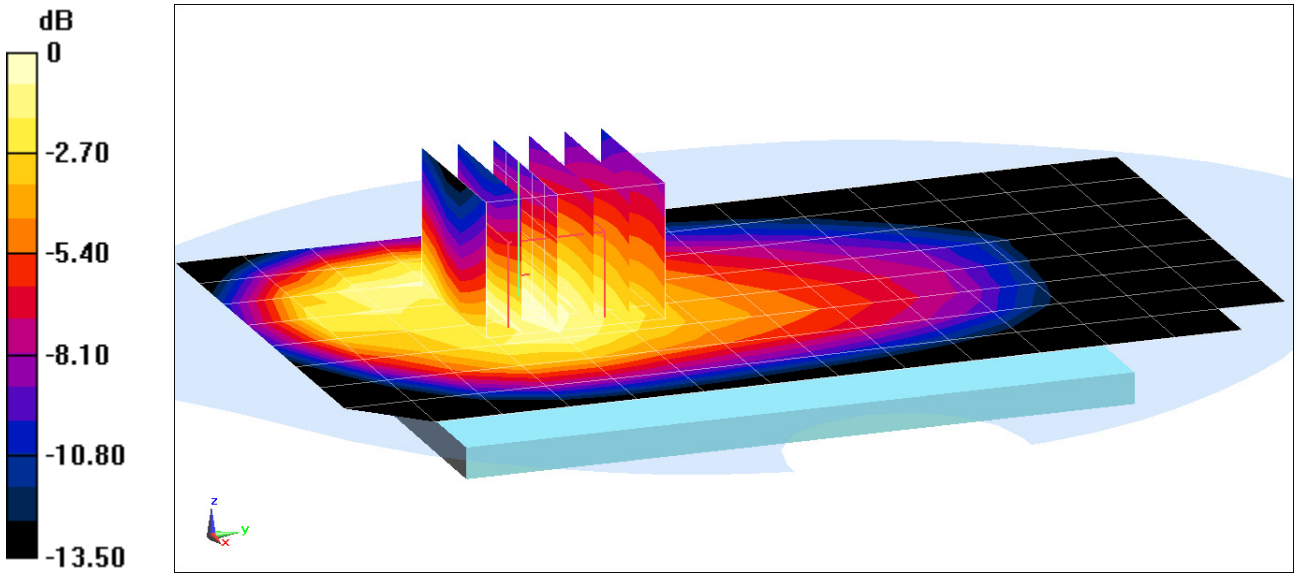
Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.52 MHz; σ = 1.001 S/m; ε_r = 55.506; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2017; Ambient Temp: 22.8°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3319; ConvF(6.04, 6.04, 6.04); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/14/2016
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.73 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.884 W/kg
SAR(1 g) = 0.612 W/kg



0 dB = 0.697 W/kg = -1.57 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06848

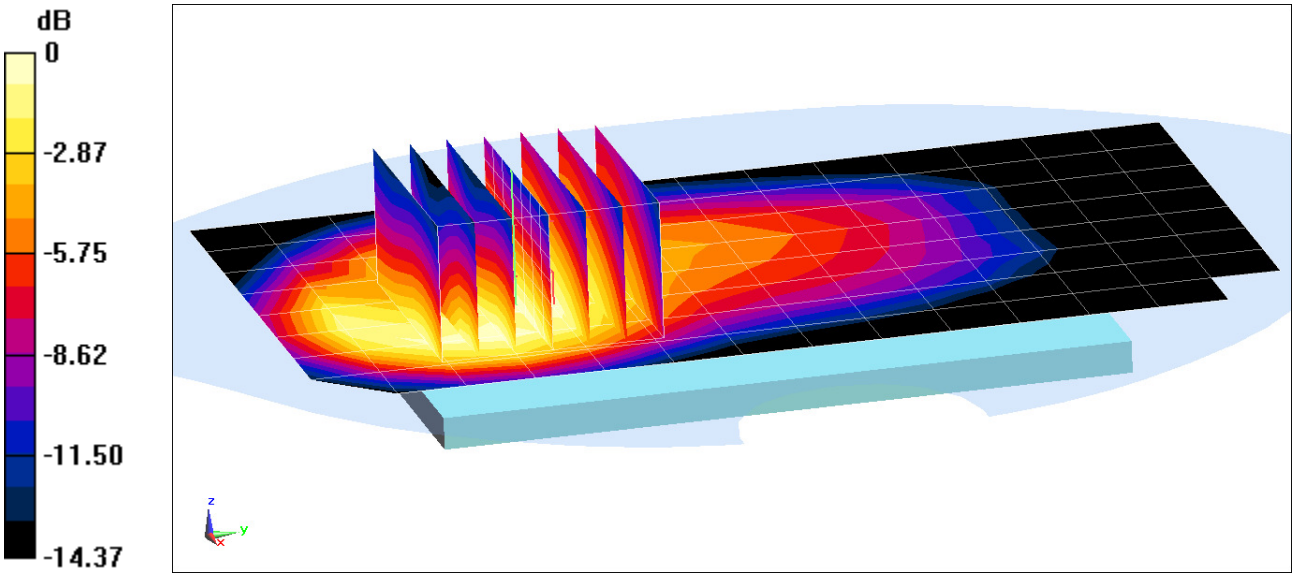
Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.52 MHz; σ = 1.001 S/m; ε_r = 55.506; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2017; Ambient Temp: 22.8°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3319; ConvF(6.04, 6.04, 6.04); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/14/2016
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Cell. EVDO Rev. 0, Body SAR, Front side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.63 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.936 W/kg
SAR(1 g) = 0.627 W/kg



0 dB = 0.718 W/kg = -1.44 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06855

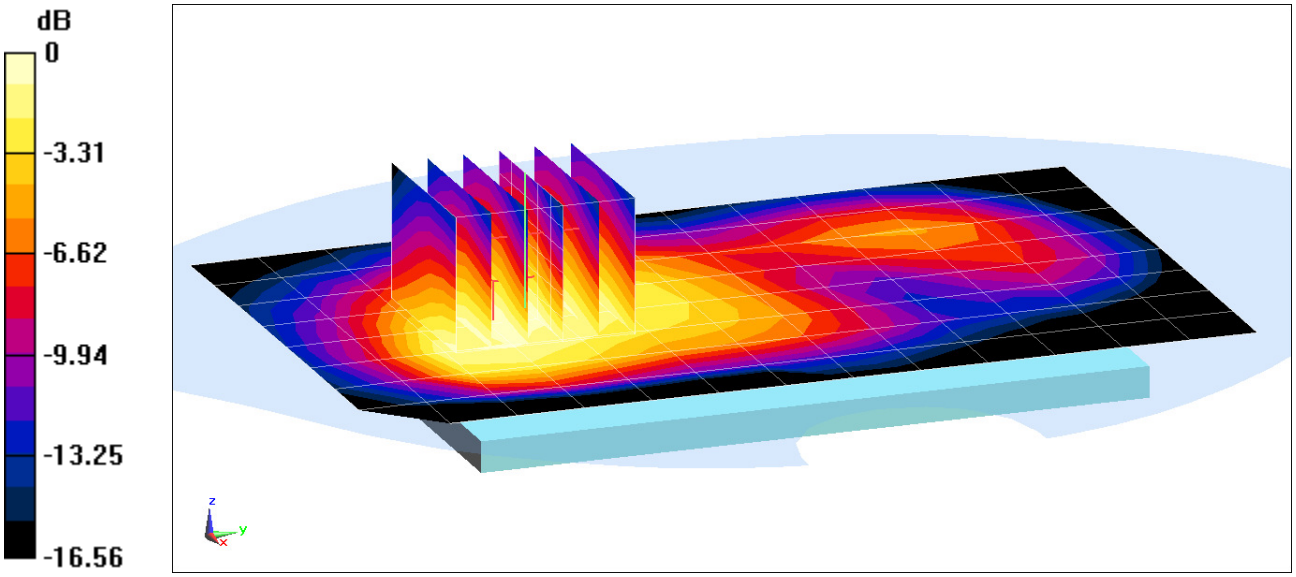
Communication System: UID 0, CDMA; Frequency: 1851.25 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1851.25 MHz; σ = 1.505 S/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2017; Ambient Temp: 24.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(7.47, 7.47, 7.47); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.56 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.56 W/kg
SAR(1 g) = 1.01 W/kg



0 dB = 1.33 W/kg = 1.24 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06855

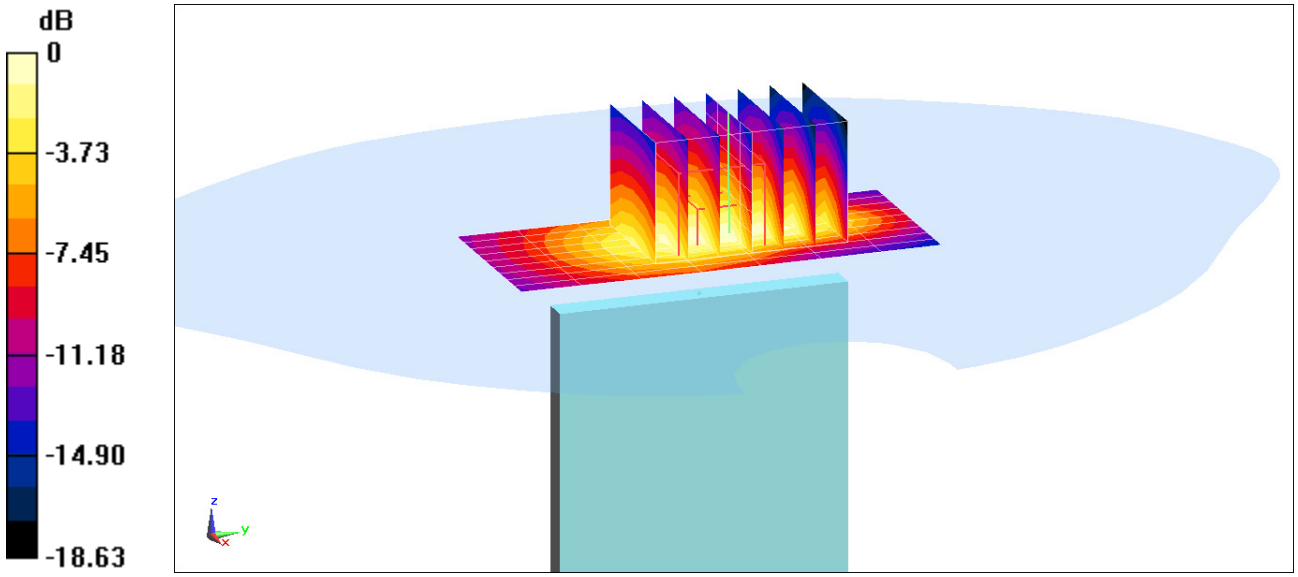
Communication System: UID 0, CDMA; Frequency: 1851.25 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
$f = 1851.25$ MHz; $\sigma = 1.505$ S/m; $\varepsilon_r = 52.3$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2017; Ambient Temp: 24.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(7.47, 7.47, 7.47); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (10x8x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.96 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 2.10 W/kg
SAR(1 g) = 1.23 W/kg



0 dB = 1.78 W/kg = 2.50 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06863

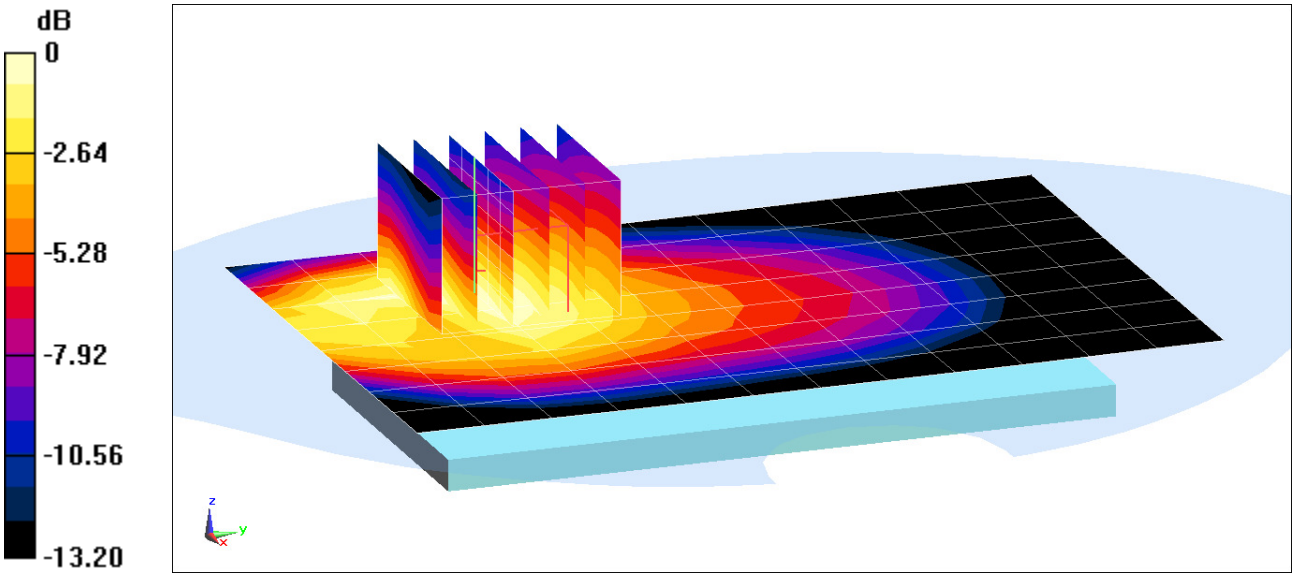
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body; Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.92 S/m; ε_r = 54.991; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2017; Ambient Temp: 22.7°C; Tissue Temp: 20.8°C

Probe: ES3DV3 - SN3209; ConvF(6.19, 6.19, 6.19); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.89 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.983 W/kg
SAR(1 g) = 0.648 W/kg



0 dB = 0.751 W/kg = -1.24 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06863

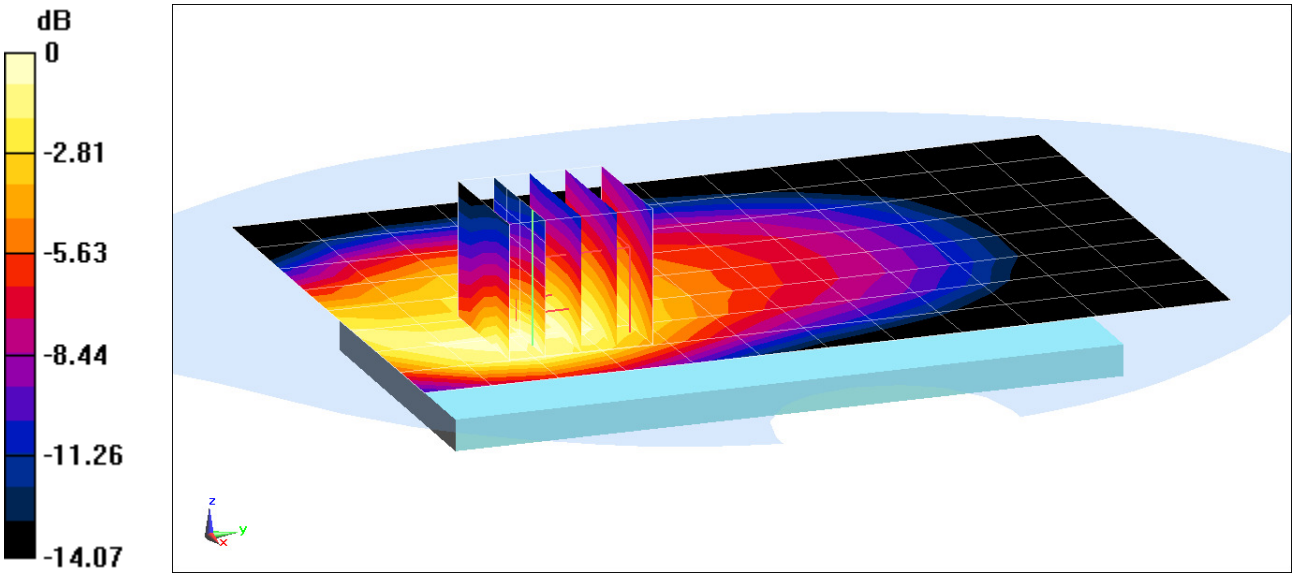
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body; Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.92 S/m; ε_r = 54.991; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2017; Ambient Temp: 22.7°C; Tissue Temp: 20.8°C

Probe: ES3DV3 - SN3209; ConvF(6.19, 6.19, 6.19); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.74 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.690 W/kg



0 dB = 0.817 W/kg = -0.88 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06863

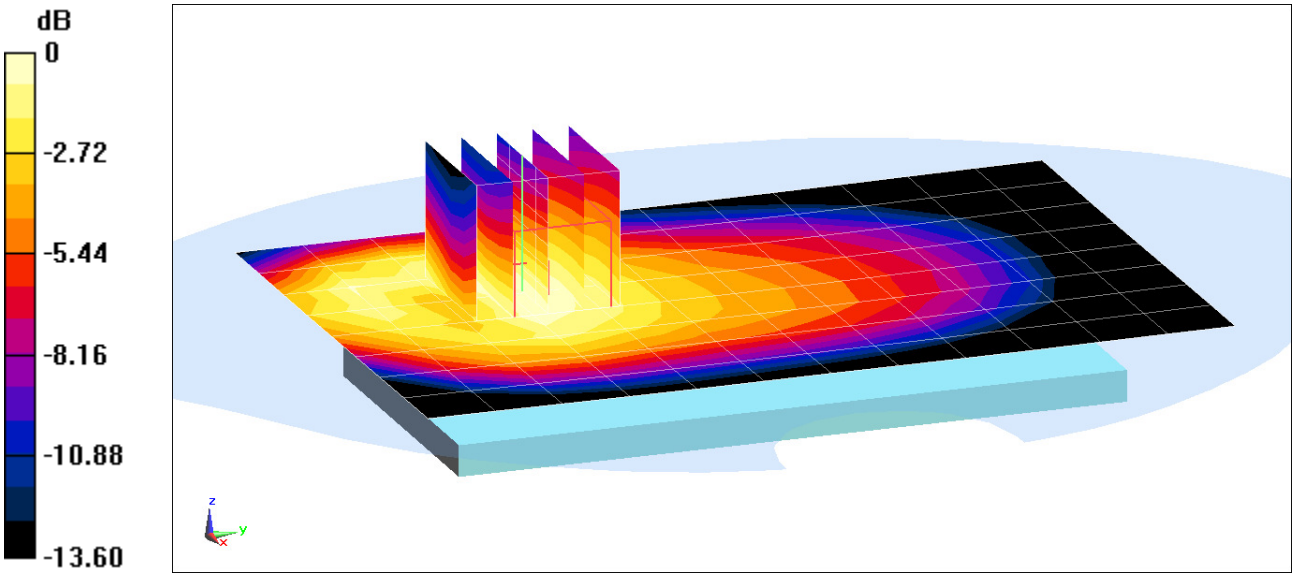
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 Body; Medium parameters used (interpolated):
f = 782 MHz; σ = 0.993 S/m; ε_r = 54.105; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2017; Ambient Temp: 22.7°C; Tissue Temp: 20.8°C

Probe: ES3DV3 - SN3209; ConvF(6.19, 6.19, 6.19); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.19 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.900 W/kg
SAR(1 g) = 0.619 W/kg



0 dB = 0.707 W/kg = -1.51 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06871

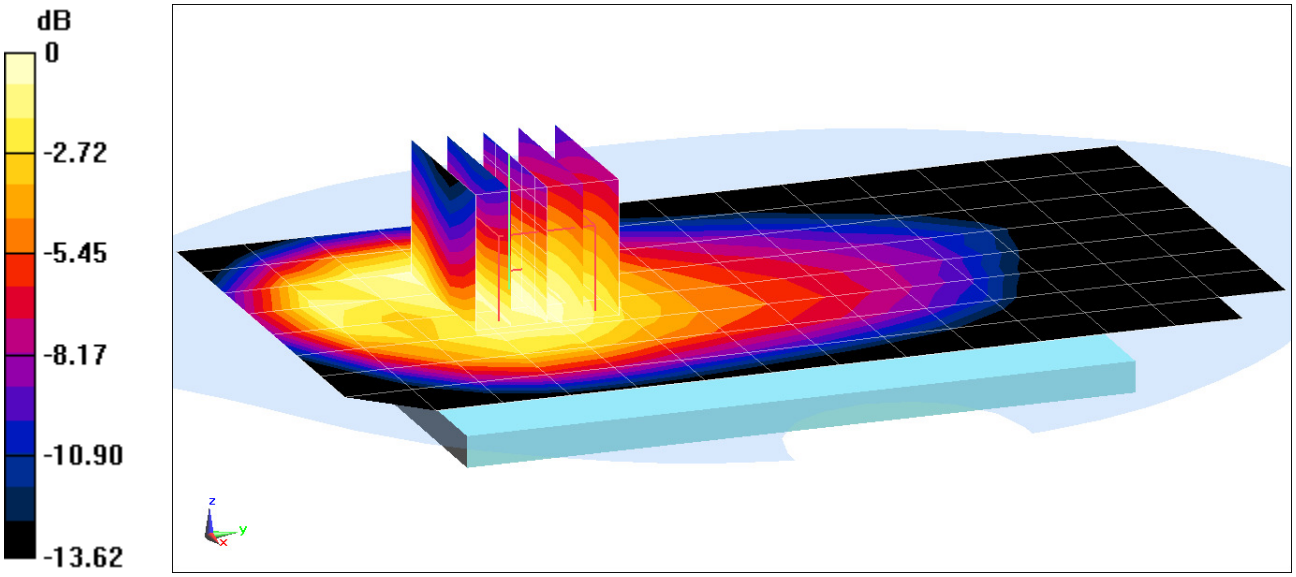
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.5 MHz; σ = 1.006 S/m; ε_r = 56.425; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-26-2017; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3319; ConvF(6.04, 6.04, 6.04); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/14/2016
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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 (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.49 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.702 W/kg



0 dB = 0.797 W/kg = -0.99 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06863

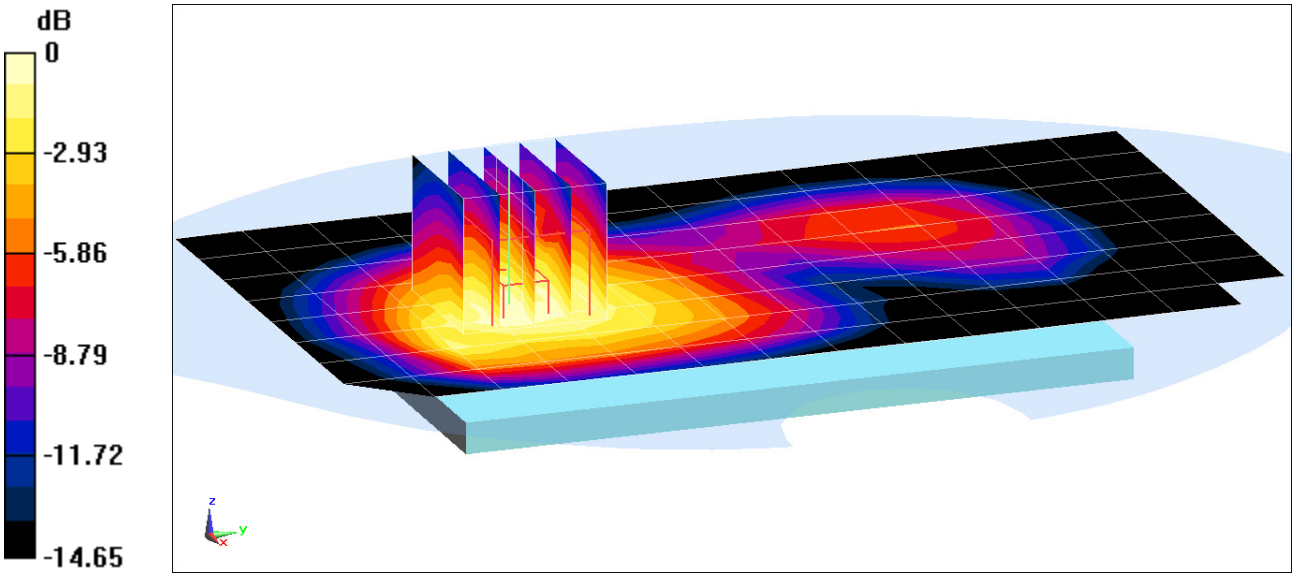
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1720 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used (interpolated):
f = 1720 MHz; σ = 1.475 S/m; ε_r = 51.693; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2017; Ambient Temp: 23.6°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3209; ConvF(4.99, 4.99, 4.99); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.19 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.68 W/kg
SAR(1 g) = 1.14 W/kg



0 dB = 1.31 W/kg = 1.17 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06863

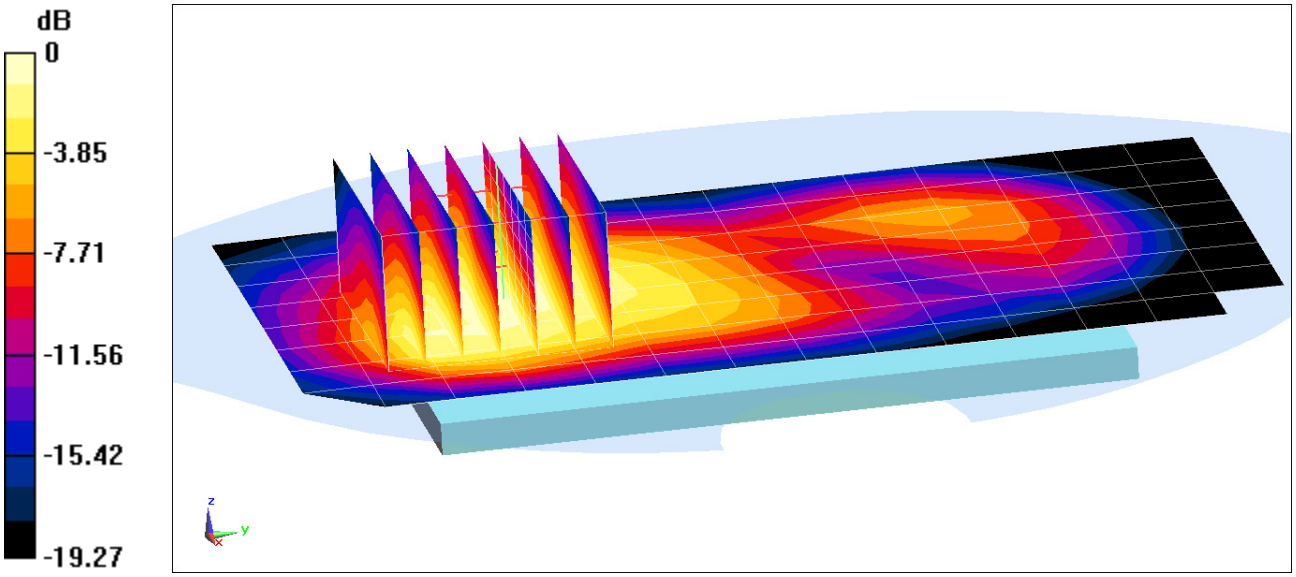
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1882.5 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1882.5 MHz; σ = 1.539 S/m; ε_r = 52.203; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2017; Ambient Temp: 24.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(7.47, 7.47, 7.47); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.26 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.35 W/kg
SAR(1 g) = 0.862 W/kg



0 dB = 1.17 W/kg = 0.68 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06863

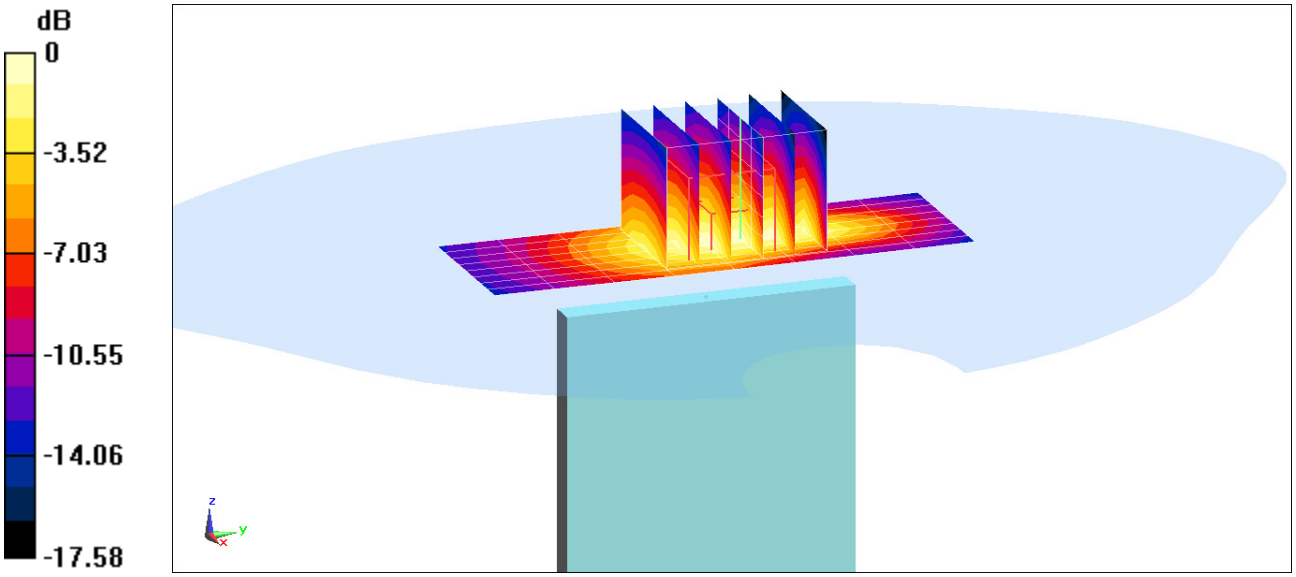
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1860 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1860 MHz; σ = 1.515 S/m; ε_r = 52.273; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-25-2017; Ambient Temp: 24.0°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(7.47, 7.47, 7.47); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (9x9x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.44 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.80 W/kg
SAR(1 g) = 1.05 W/kg



0 dB = 1.53 W/kg = 1.85 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06996

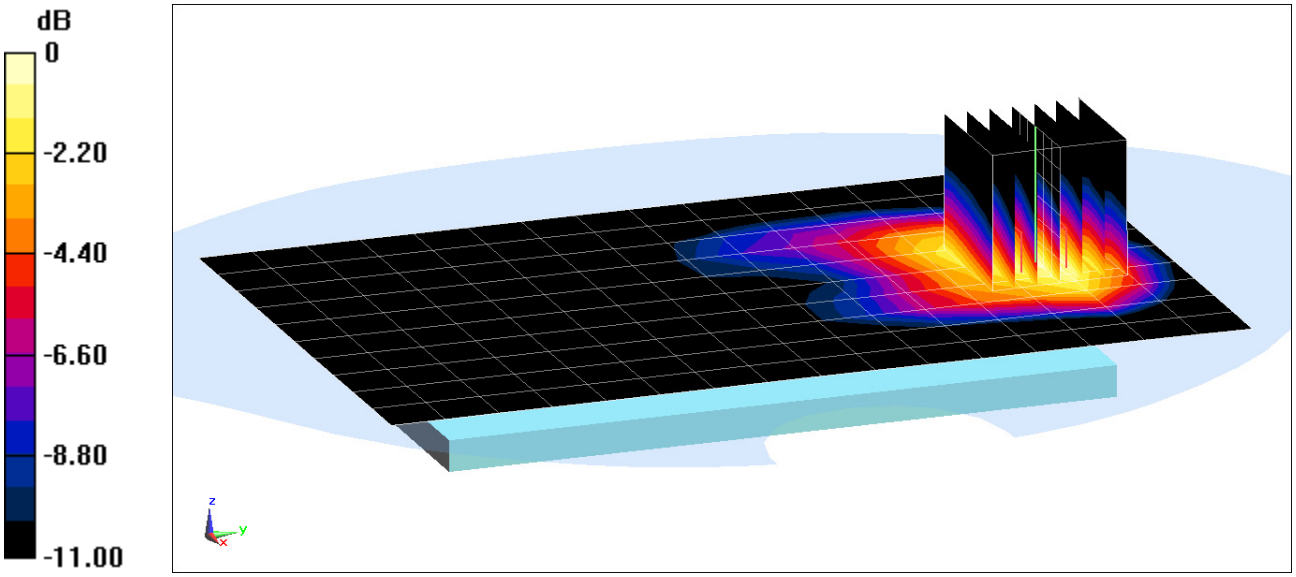
Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2437 MHz; σ = 1.956 S/m; ε_r = 51.405; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-24-2017; Ambient Temp: 24.0°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/14/2016
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Secondary Antenna, 22 MHz Bandwidth
Body SAR, Ch 6, 1 Mbps, Back Side

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.39 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.354 W/kg
SAR(1 g) = 0.188 W/kg



0 dB = 0.292 W/kg = -5.35 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 07036

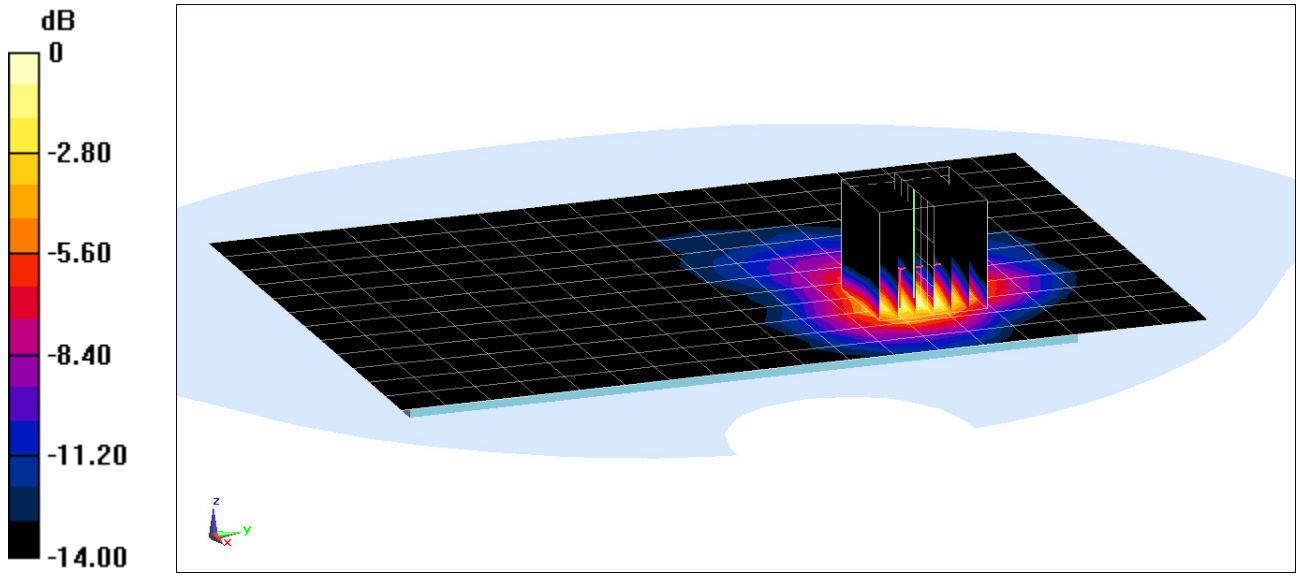
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5745 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:
f = 5745 MHz; σ = 6.172 S/m; ε_r = 47.057; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-22-2017; Ambient Temp: 21.9°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN3914; ConvF(3.86, 3.86, 3.86); Calibrated: 2/22/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (13x19x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 9.684 V/m; Power Drift = -0.21 dB
Peak SAR (extrapolated) = 1.61 W/kg
SAR(1 g) = 0.440 W/kg



0 dB = 1.03 W/kg = 0.13 dBW/kg

DUT: ZNFVS988; Type: Portable Handset; Serial: 06996

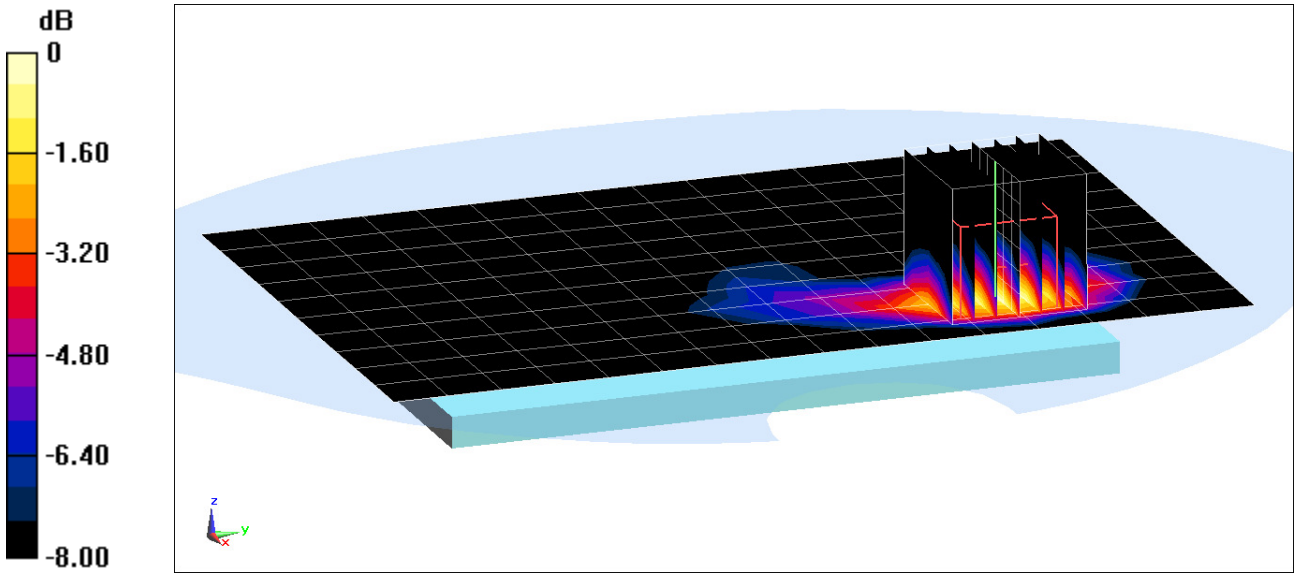
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.3
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2441 MHz; σ = 1.961 S/m; ε_r = 51.39; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-24-2017; Ambient Temp: 24.0°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/14/2016
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.703 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.0750 W/kg
SAR(1 g) = 0.040 W/kg



0 dB = 0.0616 W/kg = -12.10 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

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

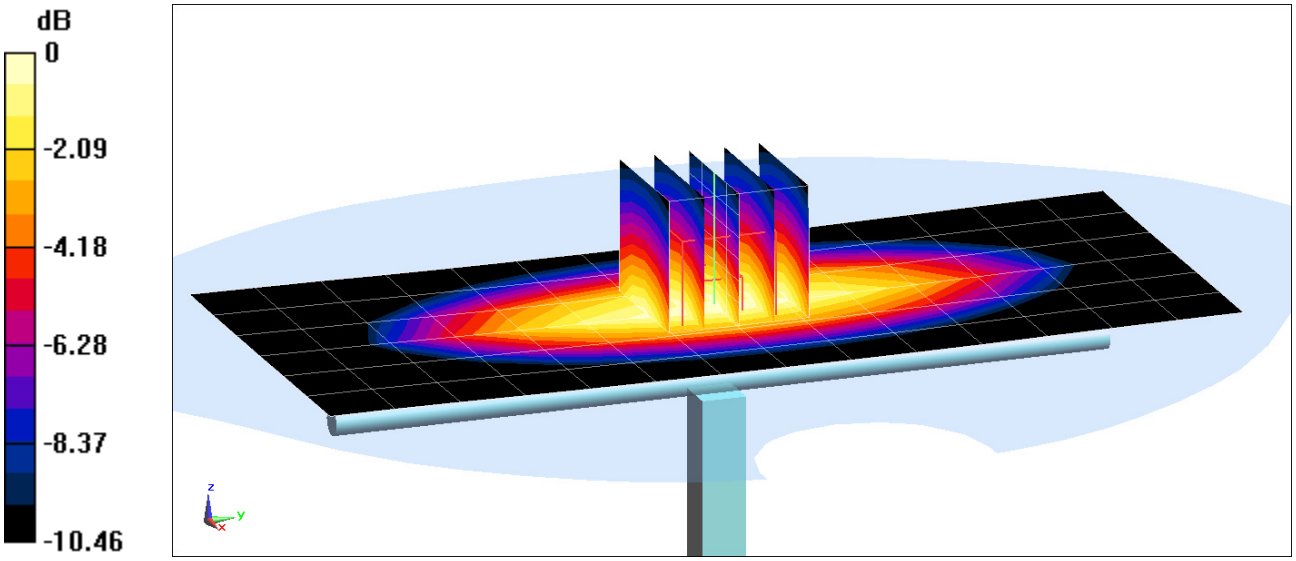
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Head; Medium parameters used (interpolated):
f = 750 MHz; σ = 0.906 S/m; ε_r = 42.188; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-25-2017; Ambient Temp: 22.3°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3209; ConvF(6.6, 6.6, 6.6); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Right; Type: SAM; Serial: 1757
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

750 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.29 W/kg
SAR(1 g) = 1.57 W/kg
Deviation(1 g) = -3.92%



0 dB = 1.84 W/kg = 2.65 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

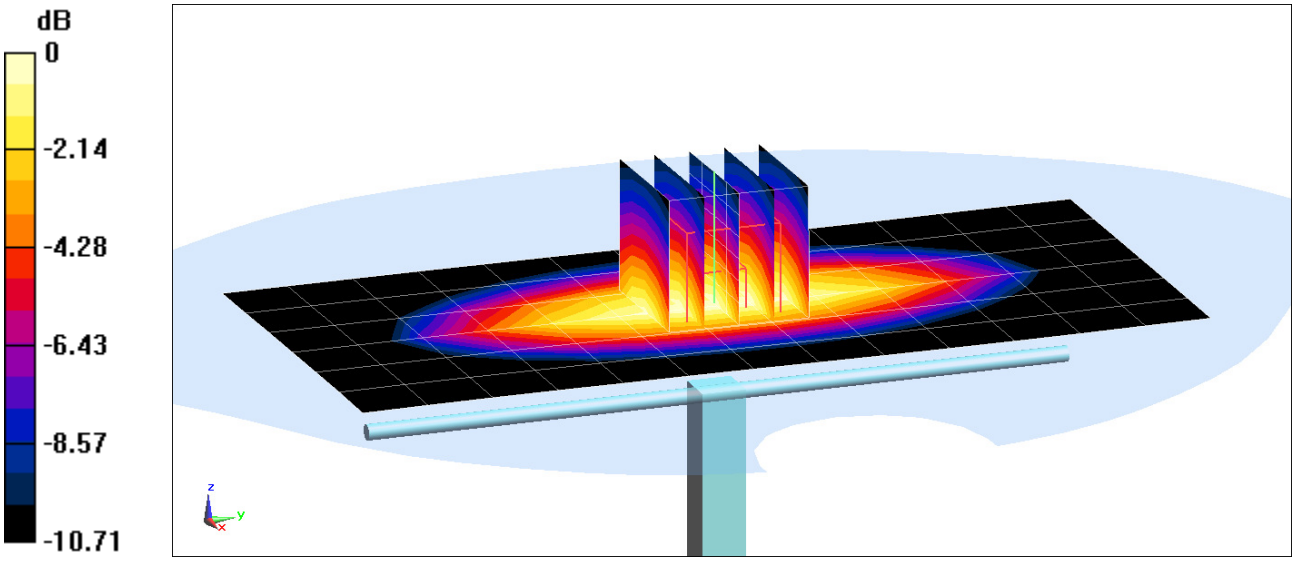
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used:
f = 835 MHz; σ = 0.912 S/m; ε_r = 43.015; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-31-2017; Ambient Temp: 23.1°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN7409; ConvF(10.04, 10.04, 10.04); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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) = 2.59 W/kg
SAR(1 g) = 1.73 W/kg
Deviation(1 g) = -5.26 %



0 dB = 2.31 W/kg = 3.64 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

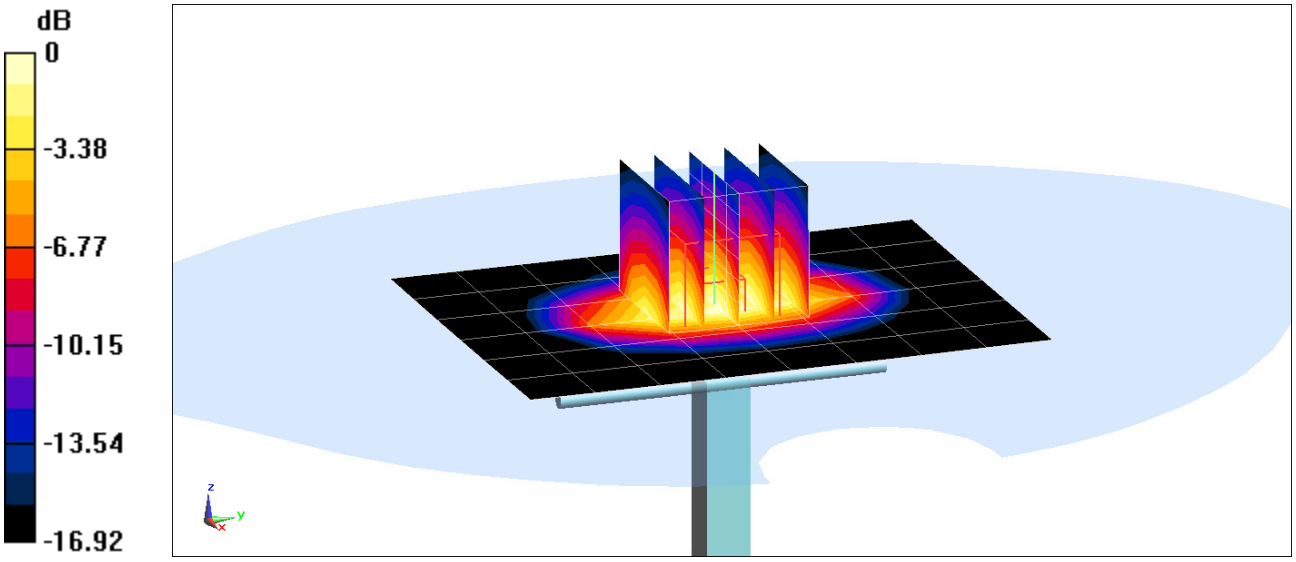
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Head; Medium parameters used:
f = 1750 MHz; σ = 1.36 S/m; ε_r = 38.821; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-27-2017; Ambient Temp: 24.0°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3209; ConvF(5.28, 5.28, 5.28); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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) = 6.02 W/kg
SAR(1 g) = 3.37 W/kg
Deviation(1 g) = -6.91%



0 dB = 4.22 W/kg = 6.25 dBW/kg

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

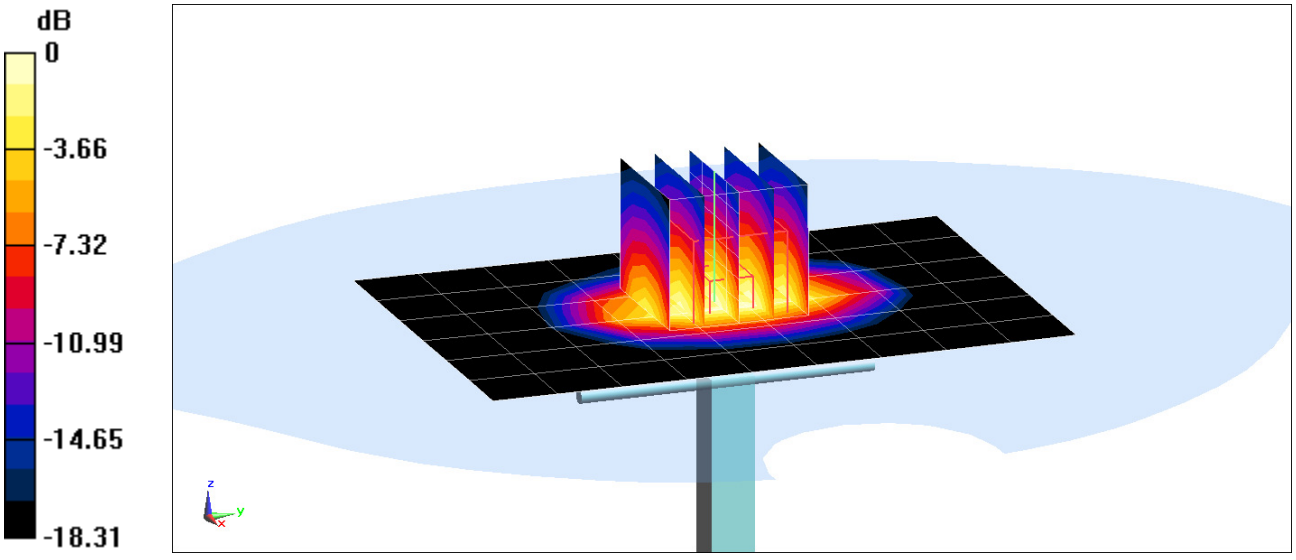
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head; Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.449 S/m; ε_r = 38.241; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-27-2017; Ambient Temp: 22.9°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3332; ConvF(5.45, 5.45, 5.45); Calibrated: 8/25/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 9/15/2016
Phantom: SAM Left; Type: SAM; Serial: 1688
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.09 W/kg
SAR(1 g) = 3.88 W/kg
Deviation(1 g) = -3.24%



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

PCTEST ENGINEERING LABORATORY, INC.

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

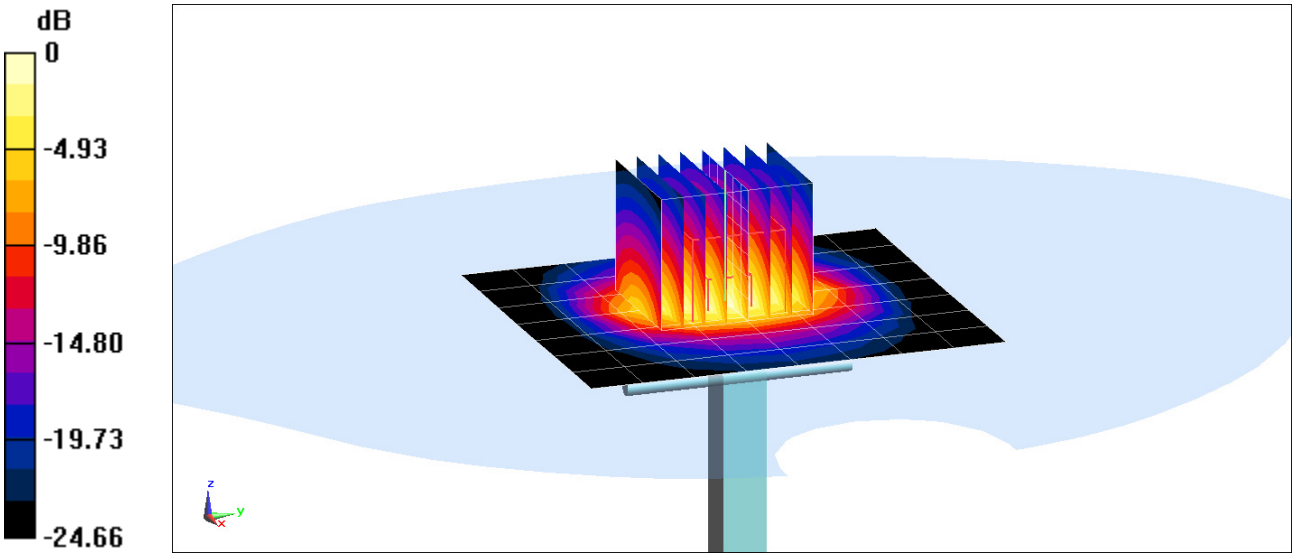
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head; Medium parameters used:
f = 2450 MHz; σ = 1.878 S/m; ε_r = 39.433; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-20-2017; Ambient Temp: 24.1°C; Tissue Temp: 23.1°C

Probe: ES3DV3 - SN3287; ConvF(4.54, 4.54, 4.54); Calibrated: 9/19/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 9/14/2016
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.6 W/kg
SAR(1 g) = 5.50 W/kg
Deviation(1 g) = 5.57%



0 dB = 7.30 W/kg = 8.63 dBW/kg

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

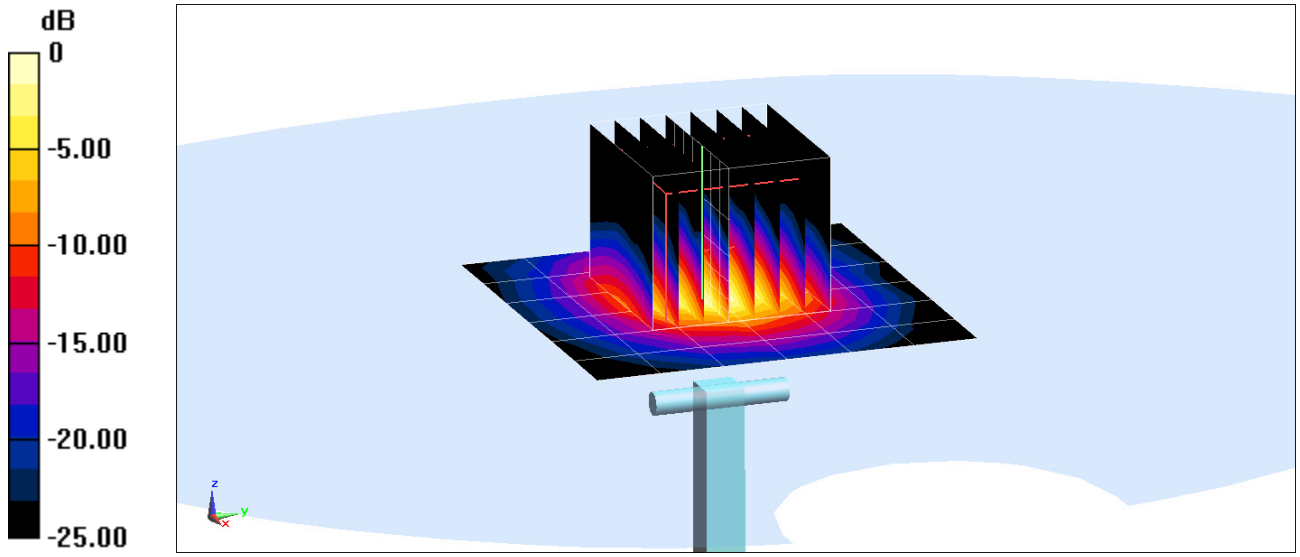
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5GHz Head; Medium parameters used (interpolated):
f = 5250 MHz; σ = 4.572 S/m; ε_r = 34.988; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2017; Ambient Temp: 20.9°C; Tissue Temp: 20.3°C

Probe: EX3DV4 - SN7357; ConvF(5.1, 5.1, 5.1); Calibrated: 4/19/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/19/2016
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 16.0 W/kg
SAR(1 g) = 3.88 W/kg
Deviation(1 g) = -1.65%



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

PCTEST ENGINEERING LABORATORY, INC.

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

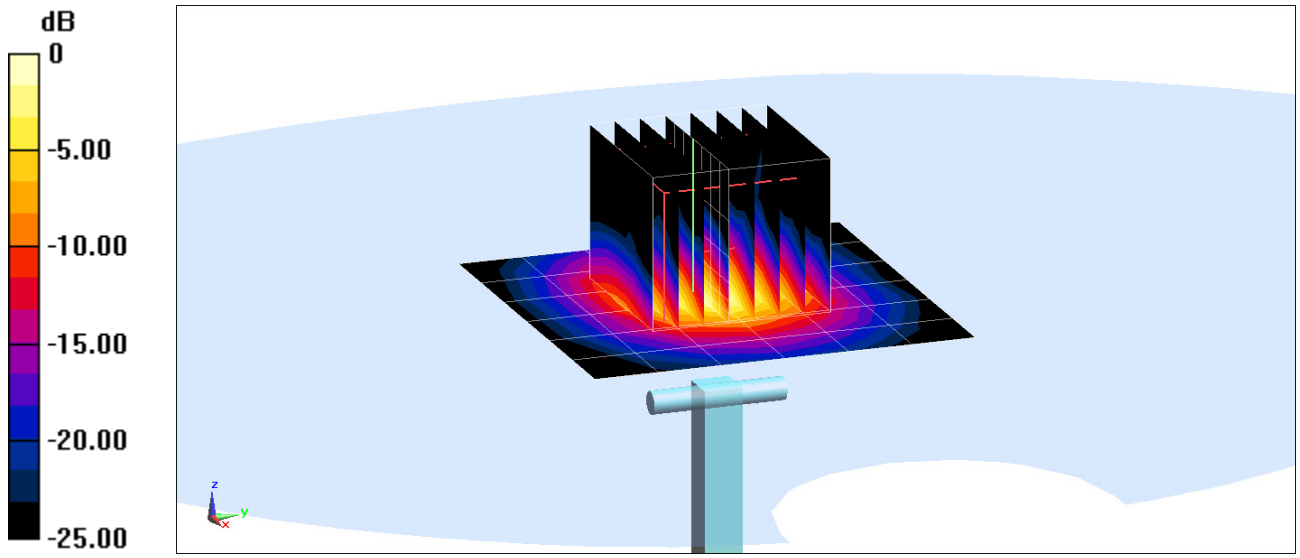
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5GHz Head; Medium parameters used:
f = 5600 MHz; σ = 4.914 S/m; ε_r = 34.502; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2017; Ambient Temp: 20.9°C; Tissue Temp: 20.3°C

Probe: EX3DV4 - SN7357; ConvF(4.41, 4.41, 4.41); Calibrated: 4/19/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/19/2016
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 4.12 W/kg
Deviation(1 g) = -1.44%



0 dB = 10.1 W/kg = 10.04 dBW/kg

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

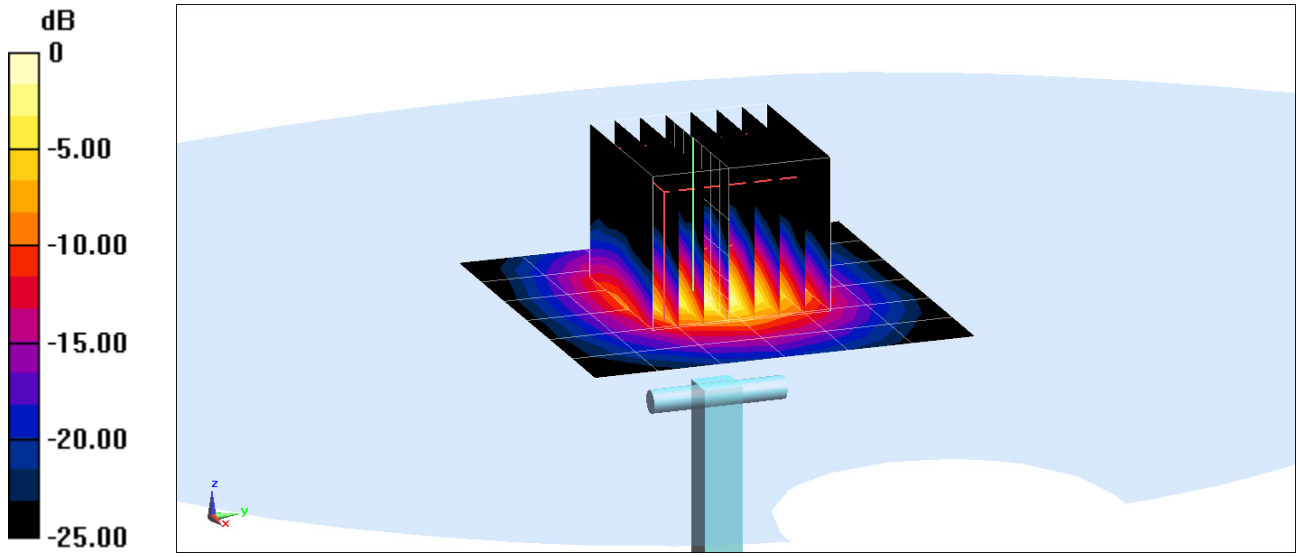
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5GHz Head; Medium parameters used (interpolated):
f = 5750 MHz; σ = 5.074 S/m; ε_r = 34.319; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2017; Ambient Temp: 20.9°C; Tissue Temp: 20.3°C

Probe: EX3DV4 - SN7357; ConvF(4.65, 4.65, 4.65); Calibrated: 4/19/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/19/2016
Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 3.91 W/kg
Deviation(1 g) = -1.14%



0 dB = 9.67 W/kg = 9.85 dBW/kg

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

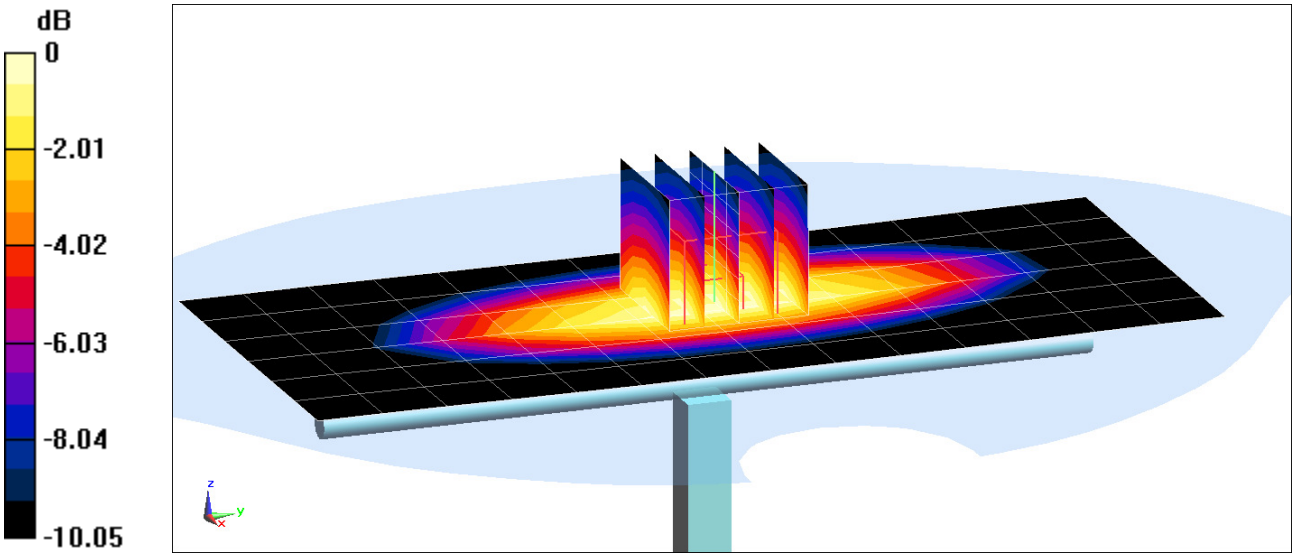
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Body; Medium parameters used (interpolated):
f = 750 MHz; σ = 0.961 S/m; ε_r = 54.452; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-30-2017; Ambient Temp: 22.7°C; Tissue Temp: 20.8°C

Probe: ES3DV3 - SN3209; ConvF(6.19, 6.19, 6.19); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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) = 2.57 W/kg
SAR(1 g) = 1.76 W/kg
Deviation(1 g) = 4.39%



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

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

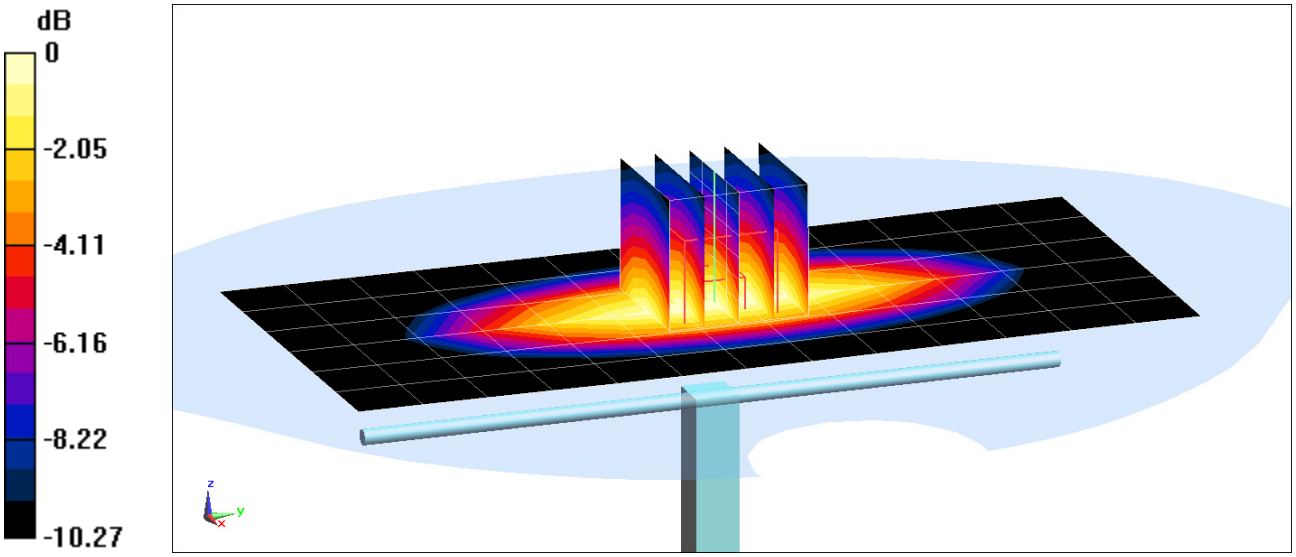
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used:
f = 835 MHz; σ = 1.004 S/m; ε_r = 56.44; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-26-2017; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3319; ConvF(6.04, 6.04, 6.04); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1368; Calibrated: 3/14/2016
Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.99 W/kg
SAR(1 g) = 2.02 W/kg
Deviation(1 g) = 5.54%



0 dB = 2.36 W/kg = 3.73 dBW/kg

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

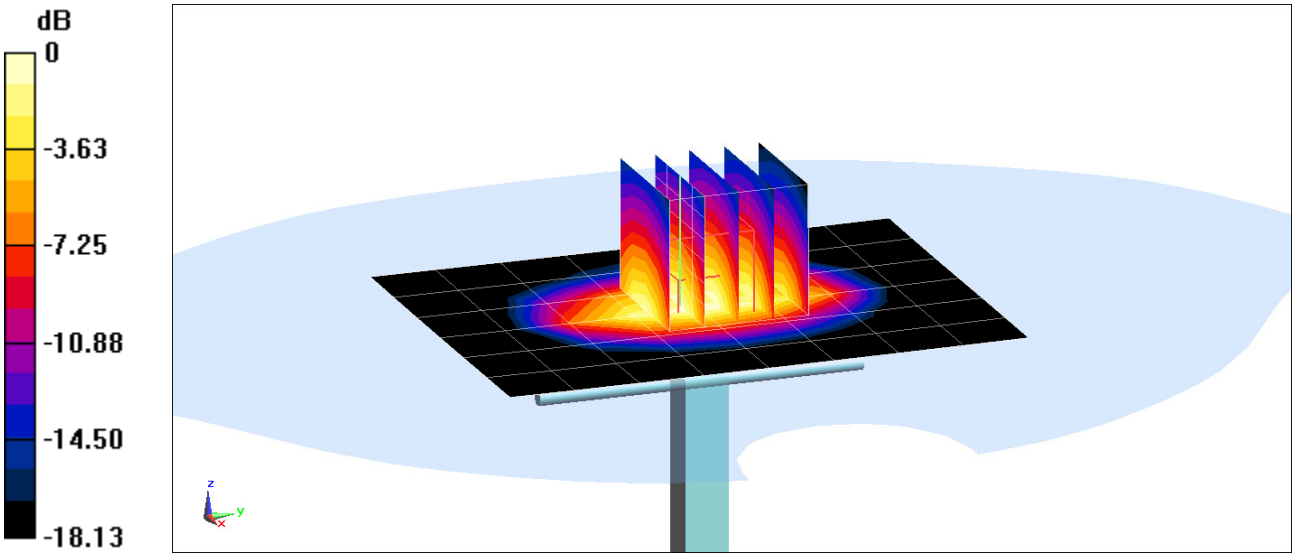
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used:
f = 1750 MHz; σ = 1.506 S/m; ε_r = 51.573; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-23-2017; Ambient Temp: 23.6°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3209; ConvF(4.99, 4.99, 4.99); Calibrated: 3/18/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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) = 6.96 W/kg
SAR(1 g) = 3.93 W/kg
Deviation(1 g) = 5.93%



0 dB = 4.81 W/kg = 6.82 dBW/kg

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

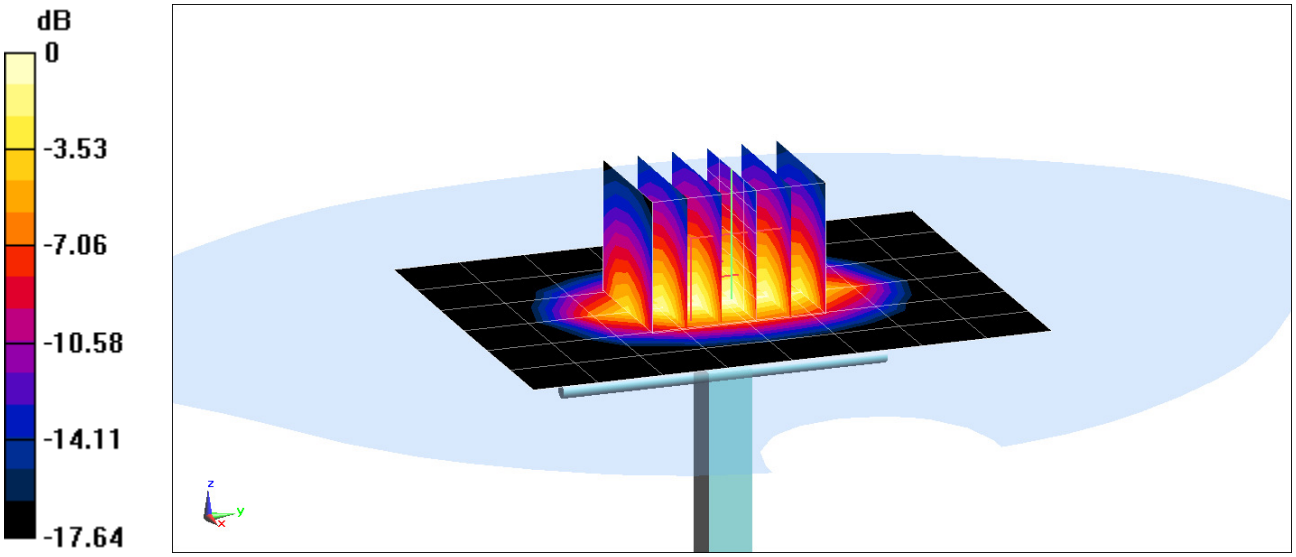
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 Body; Medium parameters used:
f = 1750 MHz; σ = 1.488 S/m; ε_r = 52.205; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-27-2017; Ambient Temp: 23.2°C; Tissue Temp: 21.6°C

Probe: ES3DV3 - SN3213; ConvF(4.94, 4.94, 4.94); Calibrated: 2/19/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016
Phantom: SAM with CRP v5.0 Left; Type: QD000P40CD; Serial: 1687
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.23 W/kg
SAR(1 g) = 3.57 W/kg
Deviation(1 g) = -3.77%



0 dB = 4.46 W/kg = 6.49 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

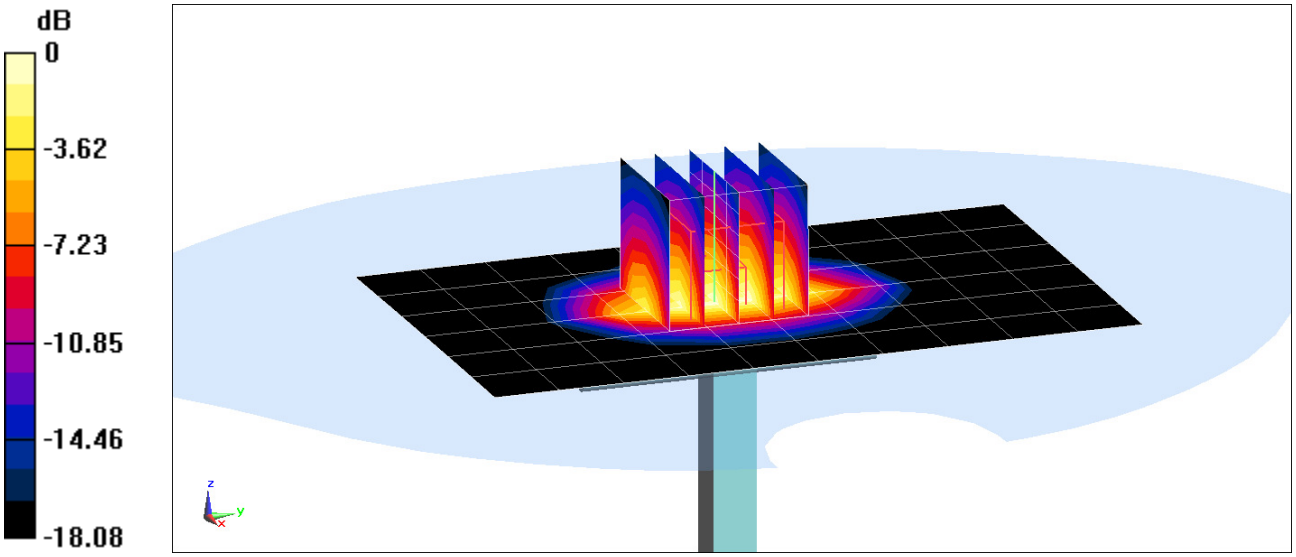
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body; Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.574 S/m; ε_r = 53.213; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-30-2017; Ambient Temp: 22.3°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN7409; ConvF(7.47, 7.47, 7.47); Calibrated: 5/17/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/11/2016
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.50 W/kg
SAR(1 g) = 4.09 W/kg
Deviation(1 g) = 4.60%



0 dB = 6.32 W/kg = 8.01 dBW/kg

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

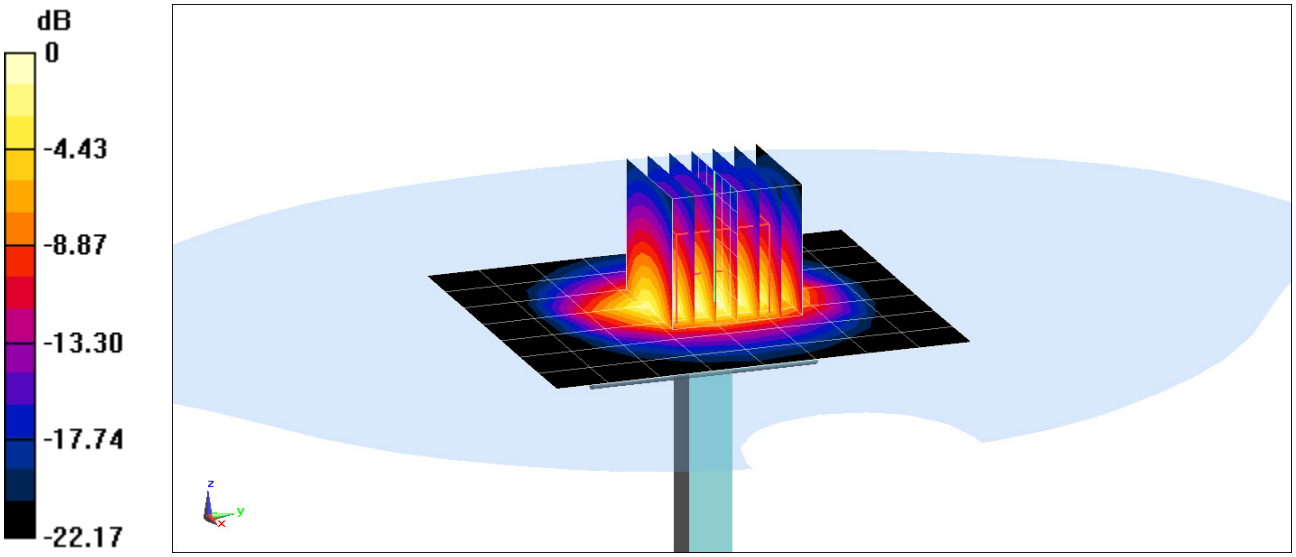
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used:
f = 2450 MHz; σ = 1.973 S/m; ε_r = 51.355; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-24-2017; Ambient Temp: 24.0°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/14/2016
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.1 W/kg
SAR(1 g) = 4.94 W/kg
Deviation(1 g) = -2.76%



0 dB = 8.19 W/kg = 9.13 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

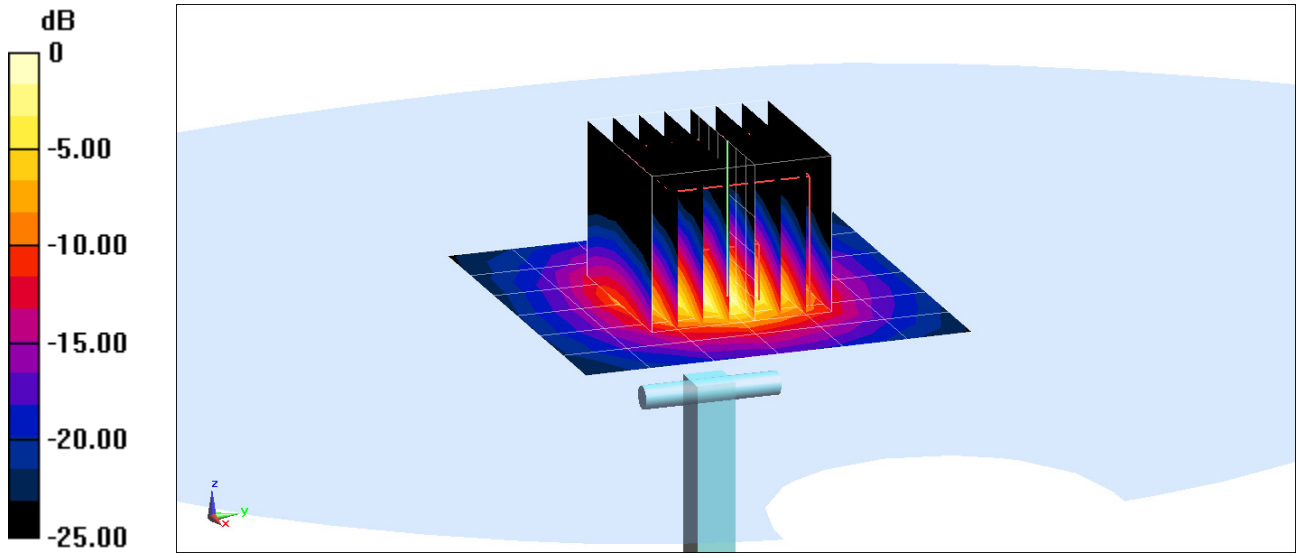
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used (interpolated):
f = 5250 MHz; σ = 5.502 S/m; ε_r = 47.905; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-22-2017; Ambient Temp: 21.9°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN3914; ConvF(4.32, 4.32, 4.32); Calibrated: 2/22/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 14.3 W/kg
SAR(1 g) = 3.49 W/kg
Deviation(1 g) =-6.68%



0 dB = 8.19 W/kg = 9.13 dBW/kg

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

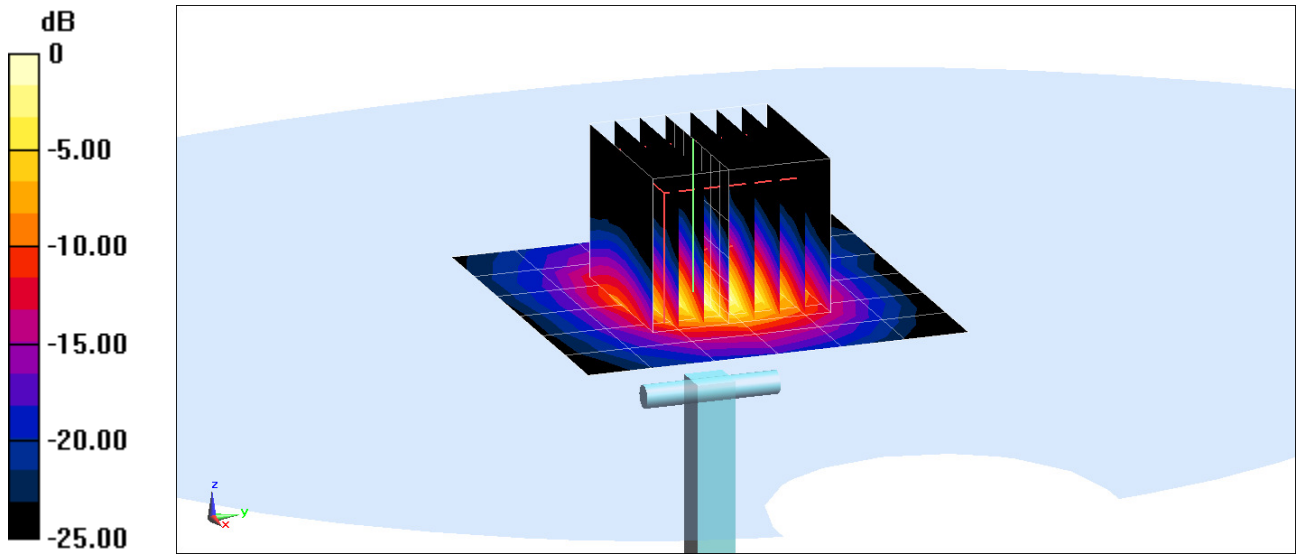
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:
f = 5600 MHz; σ = 5.972 S/m; ε_r = 47.325; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-22-2017; Ambient Temp: 21.9°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN3914; ConvF(3.63, 3.63, 3.63); Calibrated: 2/22/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 16.3 W/kg
SAR(1 g) = 3.95 W/kg
Deviation(1 g) =2.60%



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

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

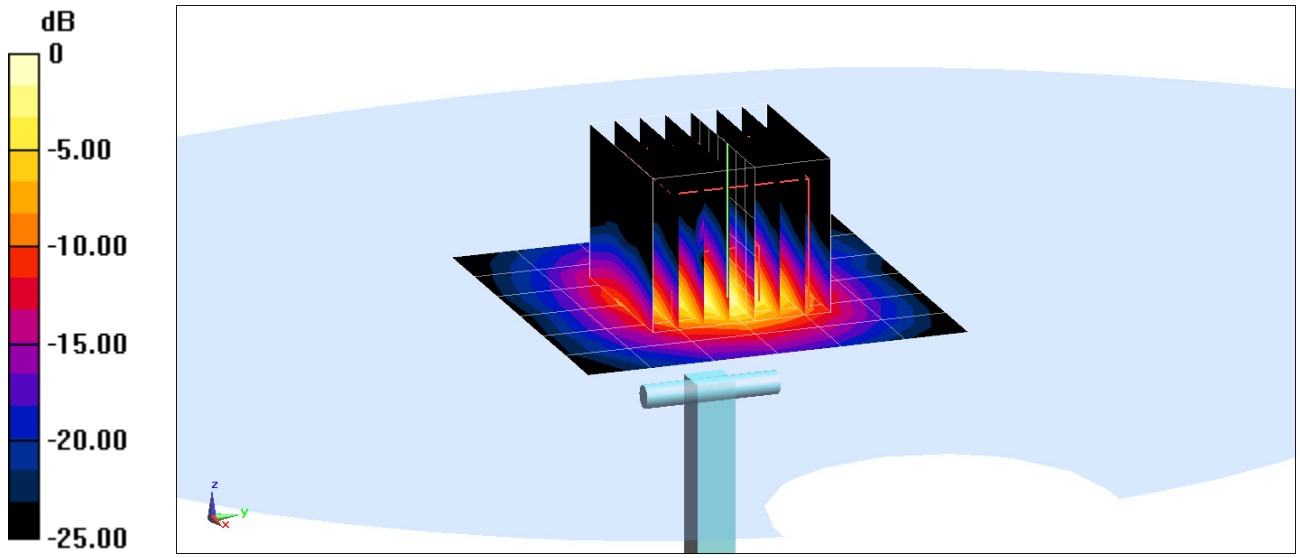
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used (interpolated):
f = 5750 MHz; σ = 6.178 S/m; ε_r = 47.043; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-22-2017; Ambient Temp: 21.9°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN3914; ConvF(3.86, 3.86, 3.86); Calibrated: 2/22/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016
Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 14.8 W/kg
SAR(1 g) = 3.43 W/kg
Deviation(1 g) = -9.02%



0 dB = 8.31 W/kg = 9.20 dBW/kg

APPENDIX C: PROBE CALIBRATION

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

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

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

Accreditation No.: SCS 0108

Client PC Test

Certificate No: ES3-3209_Mar16

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3209

Calibration procedure(s) QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: March 18, 2016

BN 3/30/2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	01-Apr-15 (No. 217-02128)	Mar-16
Power sensor E4412A	MY41498087	01-Apr-15 (No. 217-02128)	Mar-16
Reference 3 dB Attenuator	SN: S5054 (3c)	01-Apr-15 (No. 217-02129)	Mar-16
Reference 20 dB Attenuator	SN: S5277 (20x)	01-Apr-15 (No. 217-02132)	Mar-16
Reference 30 dB Attenuator	SN: S5129 (30b)	01-Apr-15 (No. 217-02133)	Mar-16
Reference Probe ES3DV2	SN: 3013	31-Dec-15 (No. ES3-3013_Dec15)	Dec-16
DAE4	SN: 660	23-Dec-15 (No. DAE4-660_Dec15)	Dec-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

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

Issued: March 22, 2016

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

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 ES3DV3

SN:3209

Manufactured: October 14, 2008
Calibrated: March 18, 2016

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3209

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.33	1.31	1.12	± 10.1 %
DCP (mV)[B]	101.7	103.5	101.2	

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	220.0	±3.8 %
		Y	0.0	0.0	1.0		213.1	
		Z	0.0	0.0	1.0		195.4	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	2.09	61.8	11.1	10.00	43.7	±0.9 %
		Y	2.54	63.7	12.3		42.4	
		Z	9.74	76.2	16.0		38.8	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	2.73	68.3	18.8	1.87	133.3	±0.7 %
		Y	3.26	72.2	21.0		127.7	
		Z	2.80	68.4	18.6		116.7	
10100-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.61	68.5	20.5	5.67	147.6	±1.4 %
		Y	6.48	68.0	20.1		139.5	
		Z	6.30	67.2	19.6		127.7	
10103-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	9.09	74.0	25.9	9.29	124.5	±2.2 %
		Y	9.05	73.2	25.1		120.6	
		Z	8.51	71.7	24.5		107.7	
10108-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.45	68.0	20.4	5.80	144.1	±1.4 %
		Y	6.35	67.6	20.0		137.6	
		Z	6.17	66.8	19.5		124.8	
10151-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	8.52	73.1	25.6	9.28	119.2	±2.5 %
		Y	8.47	72.2	24.7		116.3	
		Z	9.20	75.3	26.7		148.4	
10154-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	6.14	67.6	20.2	5.75	140.1	±1.4 %
		Y	6.03	67.1	19.8		134.4	
		Z	5.89	66.4	19.4		121.9	
10160-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	6.57	68.0	20.3	5.82	145.9	±1.4 %
		Y	6.48	67.6	20.0		139.5	
		Z	6.32	67.0	19.6		126.7	
10169-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	4.84	66.7	19.9	5.73	121.1	±1.2 %
		Y	4.86	66.6	19.8		117.0	
		Z	5.16	67.8	20.4		148.7	
10172-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	7.43	77.3	28.3	9.21	131.4	±1.9 %
		Y	7.40	75.8	27.0		129.7	
		Z	6.83	73.7	26.0		116.1	
10175-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	4.75	66.3	19.7	5.72	114.6	±0.9 %
		Y	4.82	66.4	19.7		110.3	
		Z	5.16	67.8	20.4		147.4	

10181-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	4.82	66.6	19.9	5.72	119.3	±0.9 %
		Y	4.79	66.2	19.6		110.0	
		Z	5.15	67.8	20.3		147.0	
10237-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	7.37	76.9	28.1	9.21	130.4	±1.9 %
		Y	7.02	74.1	26.0		122.0	
		Z	6.83	73.6	25.9		115.6	
10252-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	7.85	72.0	25.2	9.24	112.3	±2.5 %
		Y	7.74	70.8	24.1		104.5	
		Z	8.42	73.9	26.1		138.6	
10267-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	8.43	72.7	25.4	9.30	116.9	±2.5 %
		Y	8.28	71.5	24.3		109.4	
		Z	9.17	75.2	26.7		147.6	
10297-AAA	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.48	68.1	20.5	5.81	141.5	±1.4 %
		Y	6.32	67.4	20.0		136.8	
		Z	6.17	66.8	19.6		123.8	
10311-AAA	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	7.07	68.8	20.8	6.06	146.9	±1.7 %
		Y	6.98	68.3	20.5		142.2	
		Z	6.77	67.5	20.0		128.8	

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 6 and 7).
[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: ES3DV3 - SN:3209

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	6.60	6.60	6.60	0.47	1.59	± 12.0 %
835	41.5	0.90	6.20	6.20	6.20	0.80	1.19	± 12.0 %
1750	40.1	1.37	5.28	5.28	5.28	0.54	1.35	± 12.0 %
1900	40.0	1.40	5.14	5.14	5.14	0.71	1.21	± 12.0 %
2300	39.5	1.67	4.82	4.82	4.82	0.74	1.26	± 12.0 %
2450	39.2	1.80	4.63	4.63	4.63	0.55	1.50	± 12.0 %
2600	39.0	1.96	4.48	4.48	4.48	0.78	1.25	± 12.0 %

[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: ES3DV3 - SN:3209

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	6.19	6.19	6.19	0.53	1.42	± 12.0 %
835	55.2	0.97	6.19	6.19	6.19	0.62	1.30	± 12.0 %
1750	53.4	1.49	4.99	4.99	4.99	0.51	1.54	± 12.0 %
1900	53.3	1.52	4.77	4.77	4.77	0.56	1.52	± 12.0 %
2300	52.9	1.81	4.44	4.44	4.44	0.75	1.26	± 12.0 %
2450	52.7	1.95	4.31	4.31	4.31	0.74	1.26	± 12.0 %
2600	52.5	2.16	4.11	4.11	4.11	0.80	1.20	± 12.0 %

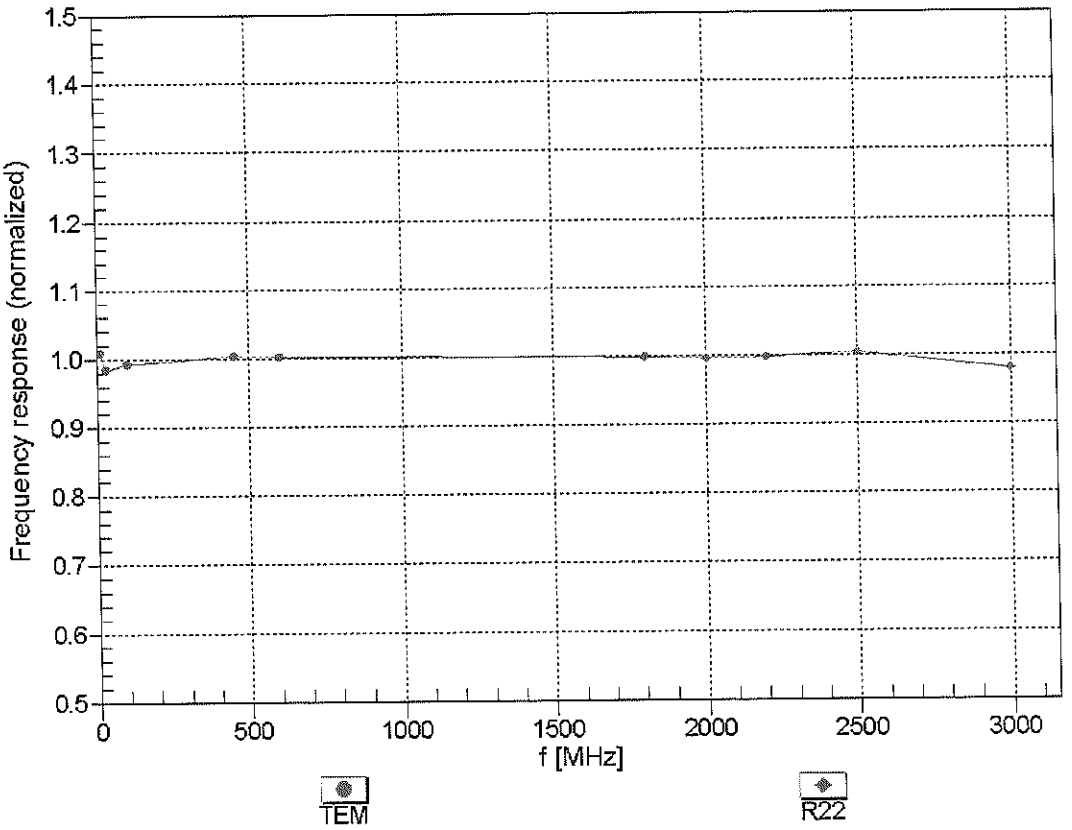
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz 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.

Frequency Response of E-Field

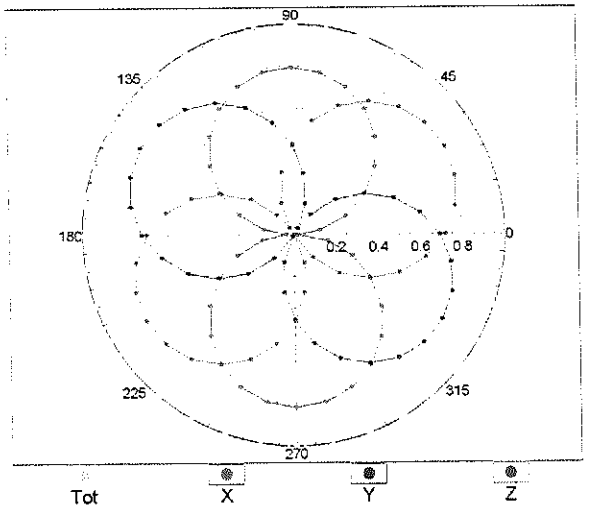
(TEM-Cell:ifi110 EXX, Waveguide: R22)



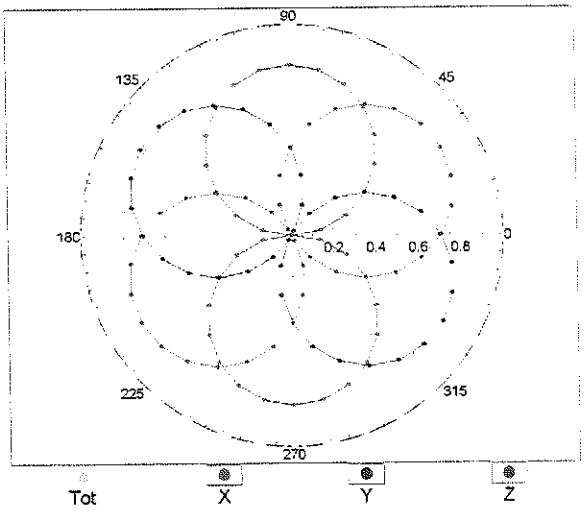
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

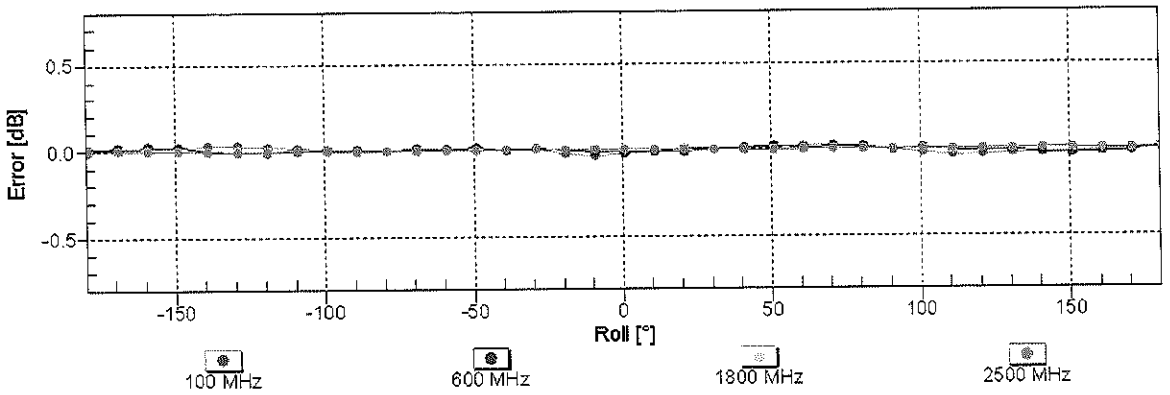
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

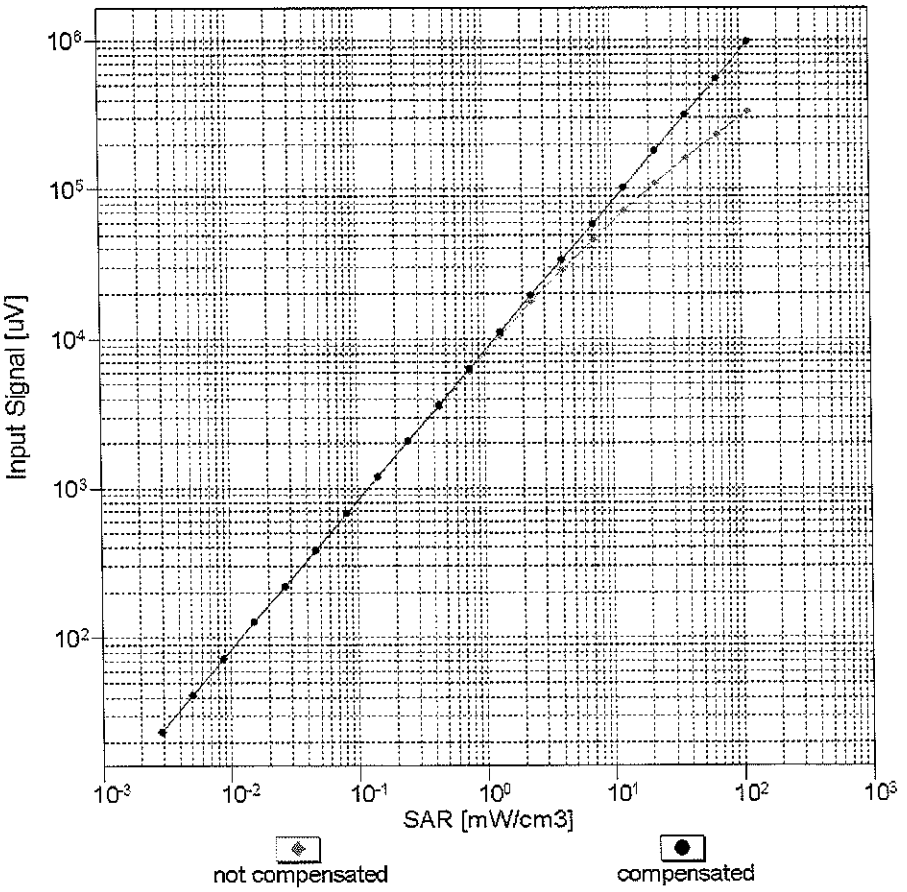


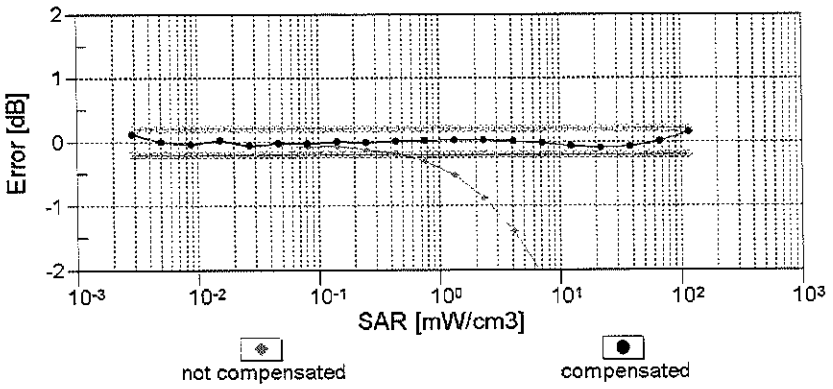


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

(TEM cell , f_{eval}= 1900 MHz)

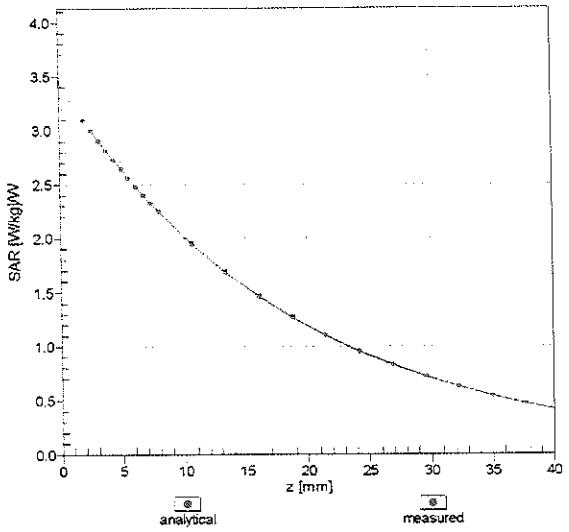




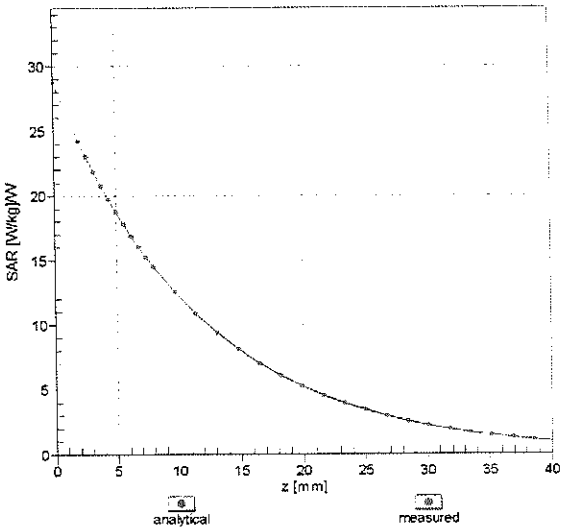
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

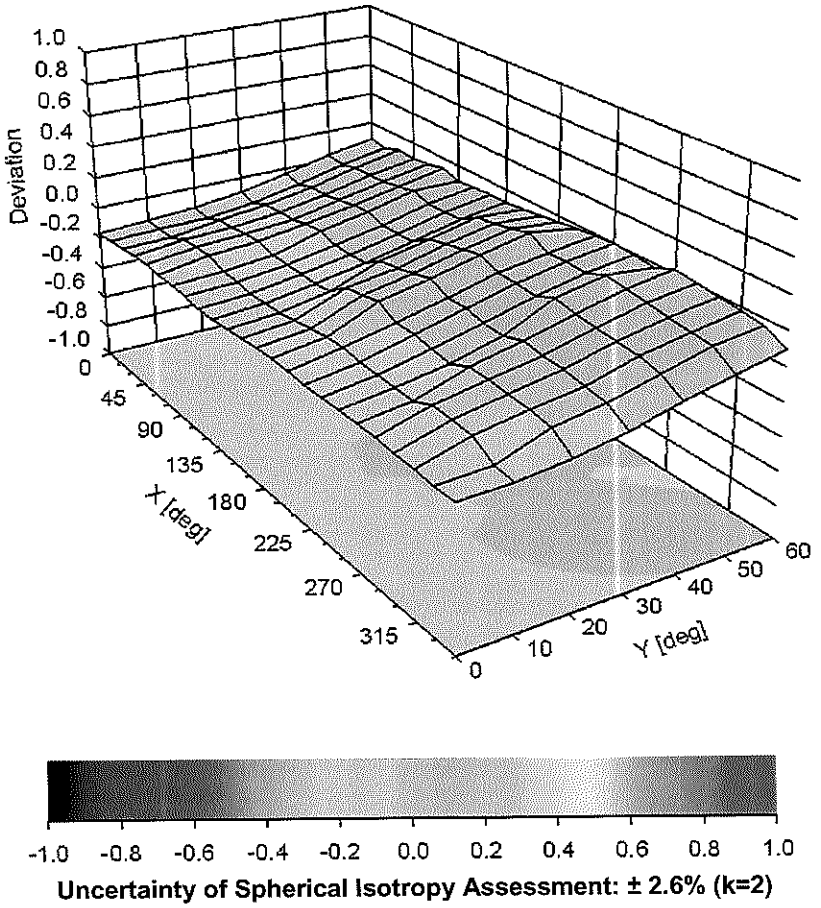


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3209

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	141
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

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

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

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

Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: EX3-7409_May16

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:7409

Calibration procedure(s) QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

BN ✓ 05/23/16

Calibration date: May 17, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: S5277 (20x)	05-Apr-16 (No. 217-02293)	Apr-17
Reference Probe ES3DV2	SN: 3013	31-Dec-15 (No. ES3-3013_Dec15)	Dec-16
DAE4	SN: 660	23-Dec-15 (No. DAE4-660_Dec15)	Dec-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (No. 217-02285/02284)	In house check: Jun-16
Power sensor E4412A	SN: MY41498087	06-Apr-16 (No. 217-02285)	In house check: Jun-16
Power sensor E4412A	SN: 000110210	06-Apr-16 (No. 217-02284)	In house check: Jun-16
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Apr-13)	In house check: Jun-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 18, 2016

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

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: May 17, 2016

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]	0.39	0.34	0.39	± 10.1 %
DCP (mV)[B]	106.3	102.2	99.4	

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	141.2	±3.3 %
		Y	0.0	0.0	1.0		127.3	
		Z	0.0	0.0	1.0		131.8	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	0.39	53.8	5.5	10.00	42.5	±1.2 %
		Y	0.55	54.7	5.9		41.8	
		Z	0.85	58.7	9.1		41.6	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	3.55	75.3	22.2	1.87	149.7	±0.7 %
		Y	3.32	72.6	21.0		139.7	
		Z	2.84	68.8	19.0		144.7	
10100-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	5.98	66.6	19.3	5.67	113.6	±0.9 %
		Y	6.17	66.7	19.4		107.1	
		Z	6.13	66.1	18.8		110.9	
10103-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.59	66.2	21.1	9.29	123.5	±1.4 %
		Y	7.27	67.9	22.1		121.1	
		Z	7.01	66.4	21.1		119.9	
10108-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	5.72	66.1	19.2	5.80	111.4	±1.2 %
		Y	6.34	67.6	20.0		149.2	
		Z	6.02	65.9	19.0		109.0	
10151-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.27	66.1	21.2	9.28	116.8	±1.4 %
		Y	6.89	67.6	22.1		114.7	
		Z	6.69	66.0	21.0		116.4	
10154-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	5.37	65.9	19.1	5.75	107.3	±1.2 %
		Y	5.98	67.2	19.9		143.3	
		Z	6.01	66.7	19.4		149.2	
10160-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	5.76	66.2	19.2	5.82	109.5	±1.2 %
		Y	6.43	67.6	20.0		148.3	
		Z	6.05	65.6	18.7		107.5	
10169-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	4.24	65.6	19.3	5.73	127.4	±0.9 %
		Y	4.54	66.4	19.8		120.4	
		Z	4.62	65.9	19.3		123.8	
10172-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	4.91	68.0	22.7	9.21	126.7	±1.4 %
		Y	5.24	68.8	23.3		124.0	
		Z	5.35	68.1	22.5		125.0	
10175-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	4.27	65.8	19.4	5.72	128.9	±0.9 %
		Y	4.52	66.2	19.7		121.2	
		Z	4.63	65.9	19.3		125.2	

10181-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	4.26	65.7	19.4	5.72	125.9	±0.9 %
		Y	4.47	66.0	19.5		120.6	
		Z	4.60	65.7	19.2		123.0	
10237-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	4.89	67.9	22.6	9.21	125.9	±1.7 %
		Y	5.26	69.0	23.4		123.8	
		Z	5.32	67.8	22.3		124.3	
10252-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	6.04	66.8	21.7	9.24	149.2	±1.4 %
		Y	6.64	68.1	22.6		148.9	
		Z	6.48	66.5	21.4		147.5	
10267-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.27	66.1	21.2	9.30	119.1	±1.4 %
		Y	6.88	67.4	22.0		115.9	
		Z	6.73	66.1	21.1		117.6	
10297-AAA	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	5.71	66.0	19.2	5.81	110.7	±0.9 %
		Y	6.41	67.8	20.2		149.8	
		Z	5.98	65.7	18.9		107.9	
10311-AAA	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	6.23	66.3	19.4	6.06	112.8	±0.9 %
		Y	6.51	66.6	19.5		107.4	
		Z	6.49	66.1	19.0		109.4	

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 6 and 7).
[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	10.73	10.73	10.73	0.62	0.83	± 12.0 %
835	41.5	0.90	10.04	10.04	10.04	0.45	0.93	± 12.0 %
1750	40.1	1.37	8.05	8.05	8.05	0.38	0.80	± 12.0 %
1900	40.0	1.40	7.69	7.69	7.69	0.41	0.80	± 12.0 %
2300	39.5	1.67	7.22	7.22	7.22	0.25	0.92	± 12.0 %
2450	39.2	1.80	6.90	6.90	6.90	0.30	0.93	± 12.0 %
2600	39.0	1.96	6.77	6.77	6.77	0.32	0.83	± 12.0 %

[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

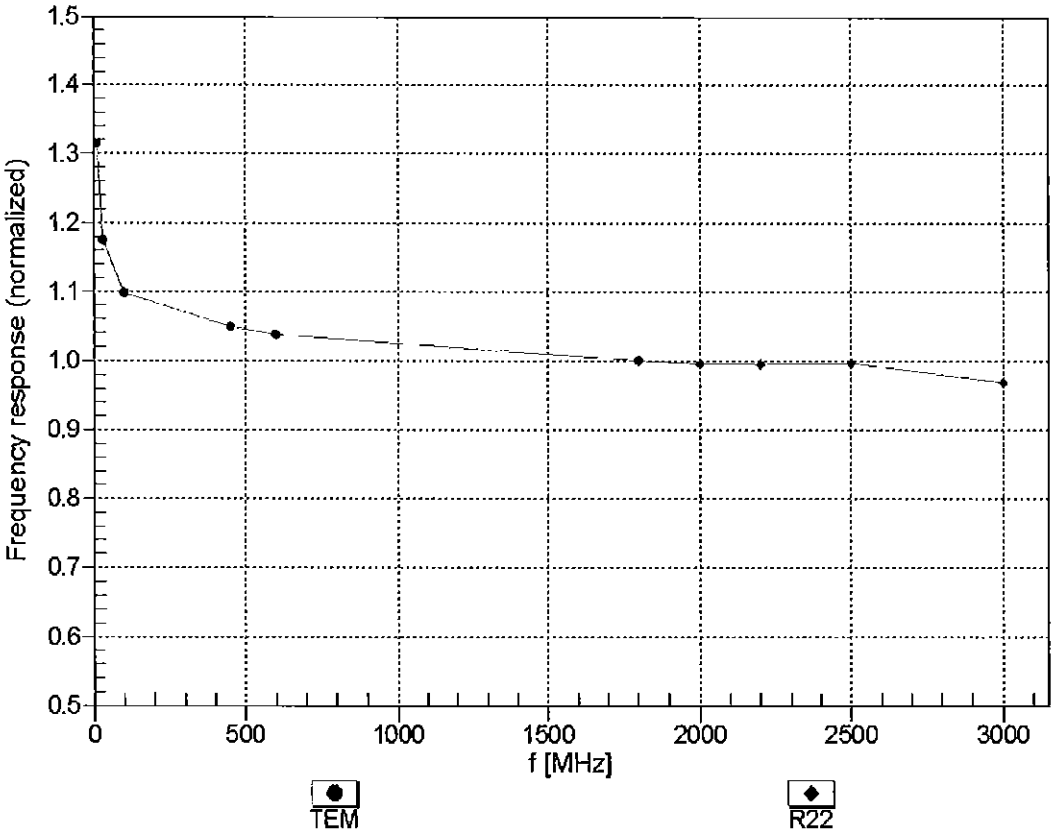
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	9.46	9.46	9.46	0.52	0.80	± 12.0 %
835	55.2	0.97	9.33	9.33	9.33	0.34	1.04	± 12.0 %
1750	53.4	1.49	7.72	7.72	7.72	0.44	0.80	± 12.0 %
1900	53.3	1.52	7.47	7.47	7.47	0.43	0.80	± 12.0 %
2300	52.9	1.81	7.22	7.22	7.22	0.36	0.85	± 12.0 %
2450	52.7	1.95	7.10	7.10	7.10	0.39	0.80	± 12.0 %
2600	52.5	2.16	6.83	6.83	6.83	0.39	0.86	± 12.0 %

[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.

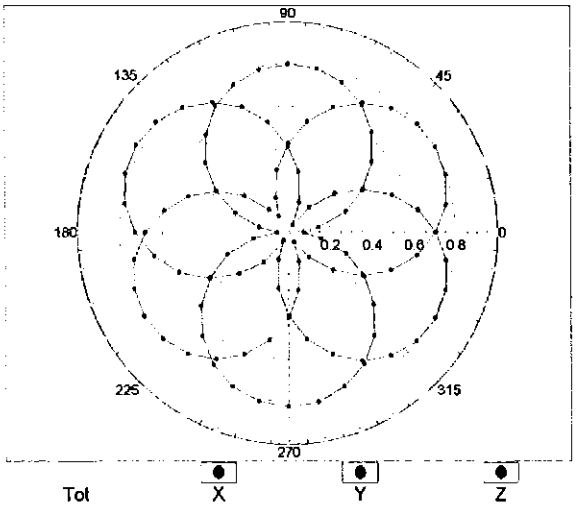
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



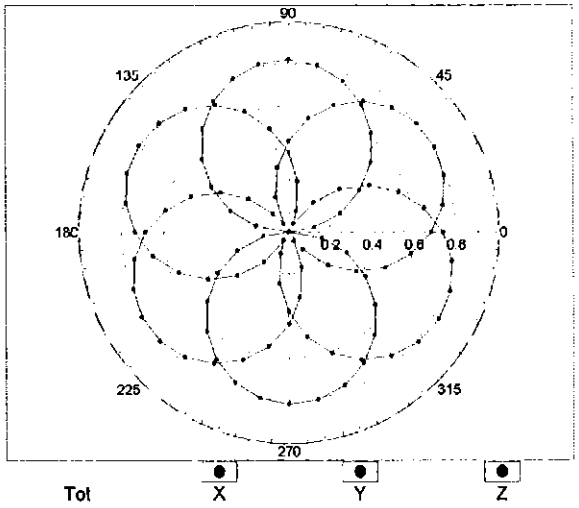
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

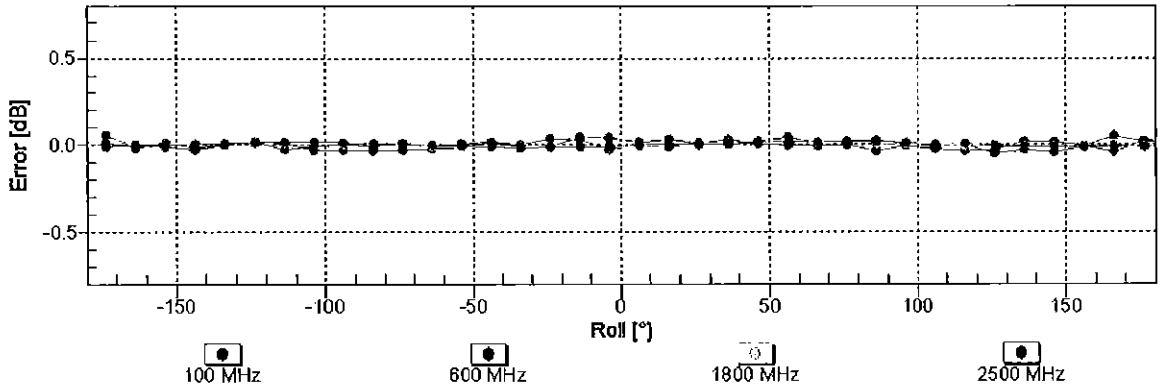
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



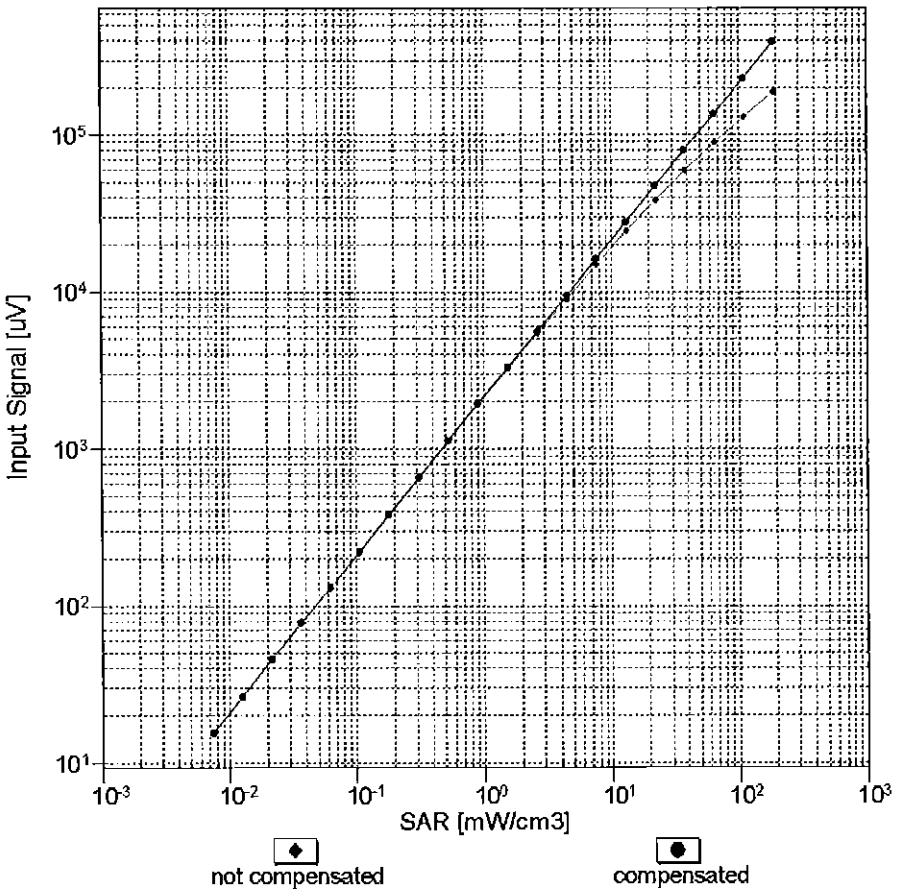
f=1800 MHz,R22

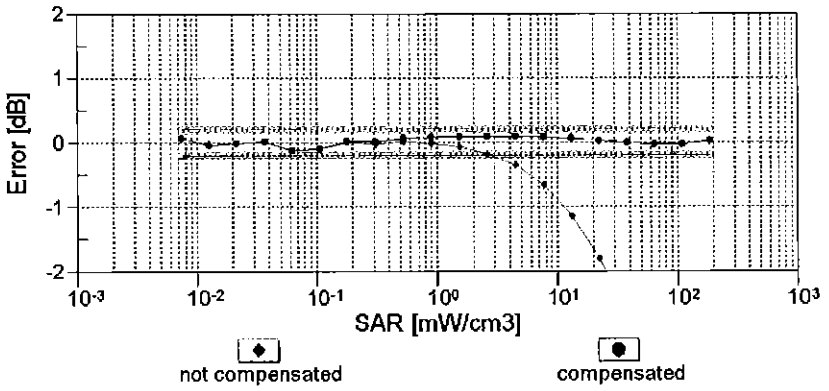




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR$_{head}$)
(TEM cell , f_{eval}= 1900 MHz)

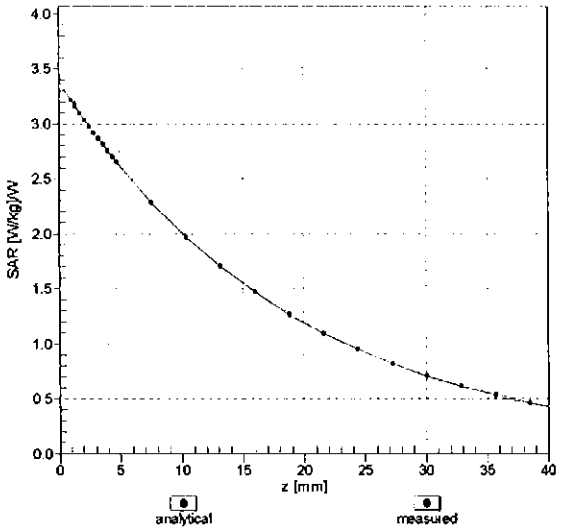




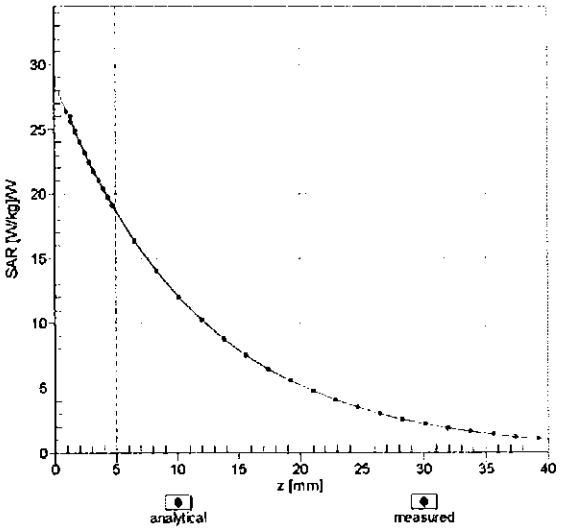
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

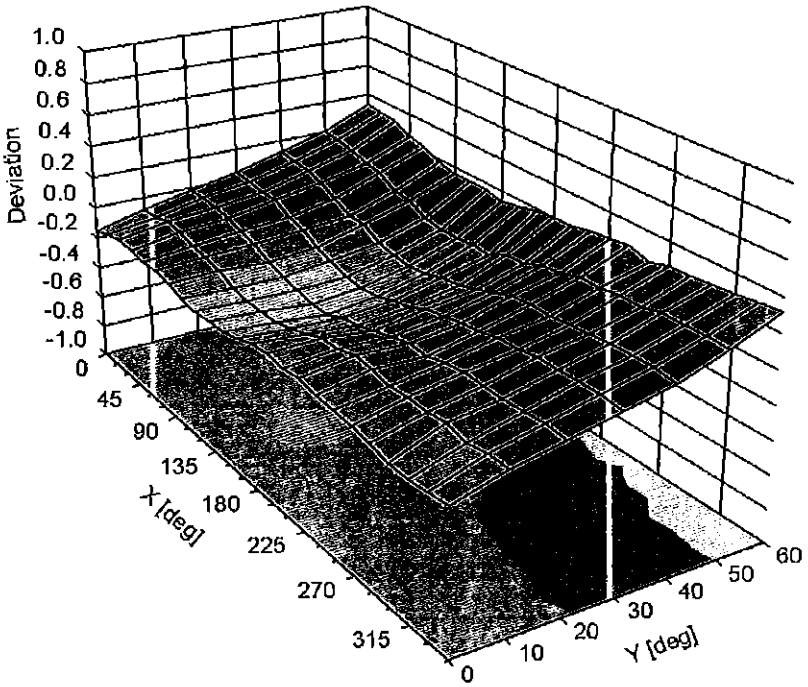


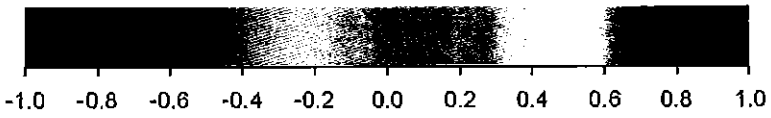
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	36.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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

S Schweizerischer Kalibrierdienst
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Swiss Calibration Service

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

Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: ES3-3332_Aug16

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3332

Calibration procedure(s) QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

BNV
09-01-2016

Calibration date: August 25, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: S5277 (20x)	05-Apr-16 (No. 217-02293)	Apr-17
Reference Probe ES3DV2	SN: 3013	31-Dec-15 (No. ES3-3013_Dec15)	Dec-16
DAE4	SN: 660	23-Dec-15 (No. DAE4-660_Dec15)	Dec-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-16)	In house check: Jun-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

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

Issued: August 25, 2016

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) Accreditation No.: **SCS 0108**
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

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 ES3DV3

SN:3332

Manufactured:	January 24, 2012
Repaired:	August 22, 2016
Calibrated:	August 25, 2016

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3332

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.00	0.93	0.88	± 10.1 %
DCP (mV)[B]	103.8	101.7	103.3	

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	186.6	±3.5 %
		Y	0.0	0.0	1.0		177.5	
		Z	0.0	0.0	1.0		195.2	

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	93.87	665.6	34.78	68.82	4.226	5.1	0.573	0.731	1.01
Y	56.07	408.1	36.28	28.84	2.507	5.1	0	0.527	1.008
Z	49.66	353.4	34.95	26.76	1.898	5.1	1.289	0.244	1.008

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: ES3DV3 - SN:3332

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	7.03	7.03	7.03	0.72	1.30	± 12.0 %
835	41.5	0.90	6.82	6.82	6.82	0.80	1.15	± 12.0 %
1750	40.1	1.37	5.72	5.72	5.72	0.53	1.44	± 12.0 %
1900	40.0	1.40	5.45	5.45	5.45	0.80	1.22	± 12.0 %
2300	39.5	1.67	5.07	5.07	5.07	0.71	1.35	± 12.0 %
2450	39.2	1.80	4.80	4.80	4.80	0.79	1.30	± 12.0 %
2600	39.0	1.96	4.59	4.59	4.59	0.80	1.30	± 12.0 %

[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: ES3DV3 - SN:3332

Calibration Parameter Determined in Body Tissue Simulating Media

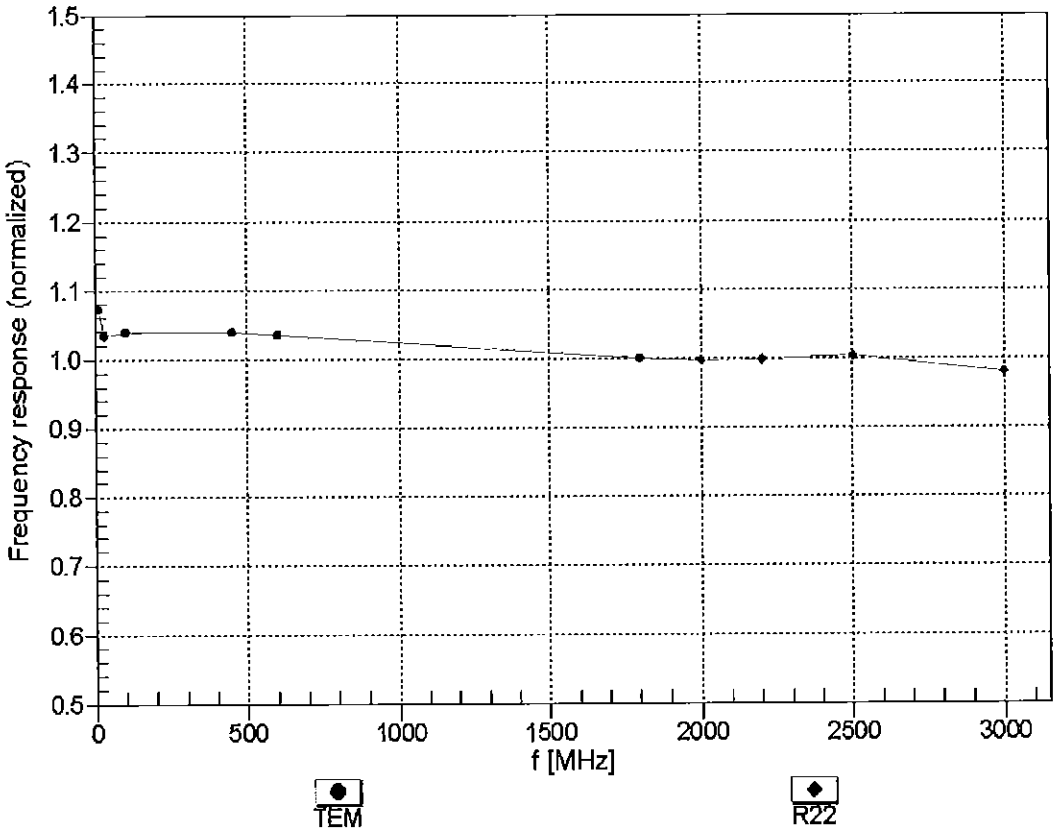
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	6.70	6.70	6.70	0.80	1.19	± 12.0 %
835	55.2	0.97	6.58	6.58	6.58	0.60	1.39	± 12.0 %
1750	53.4	1.49	5.18	5.18	5.18	0.43	1.73	± 12.0 %
1900	53.3	1.52	4.96	4.96	4.96	0.49	1.65	± 12.0 %
2300	52.9	1.81	4.73	4.73	4.73	0.67	1.39	± 12.0 %
2450	52.7	1.95	4.55	4.55	4.55	0.80	1.17	± 12.0 %
2600	52.5	2.16	4.40	4.40	4.40	0.80	1.07	± 12.0 %

[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.

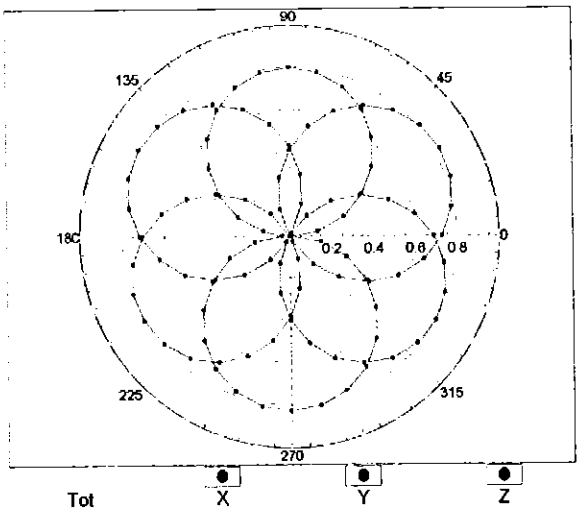
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



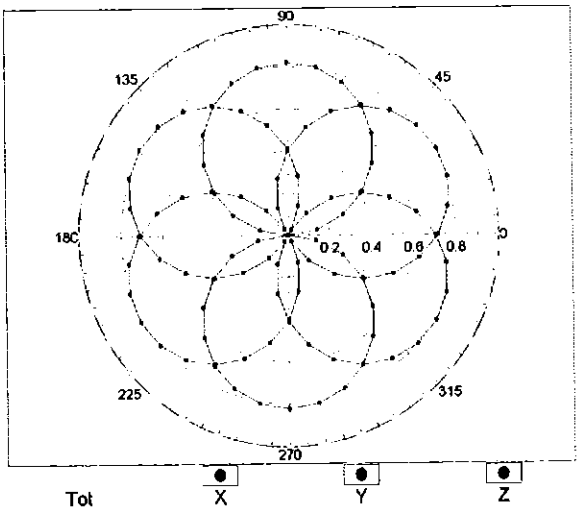
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

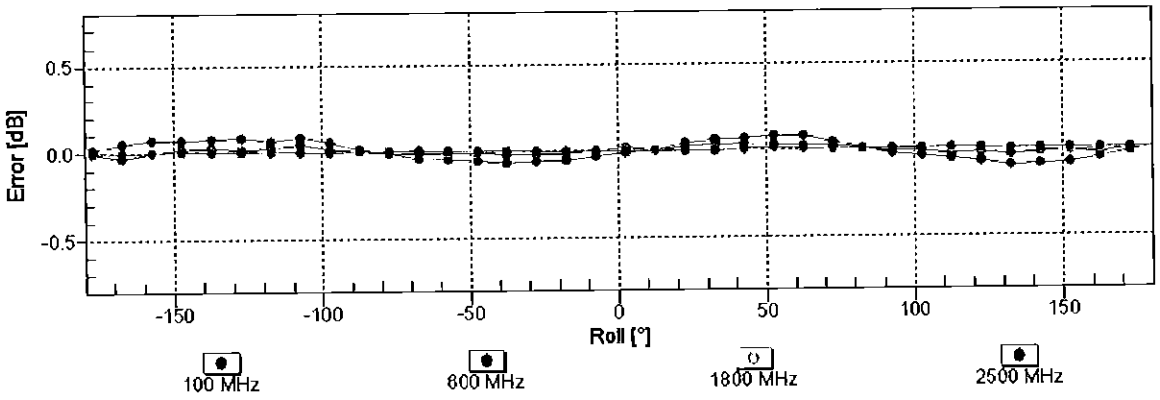
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



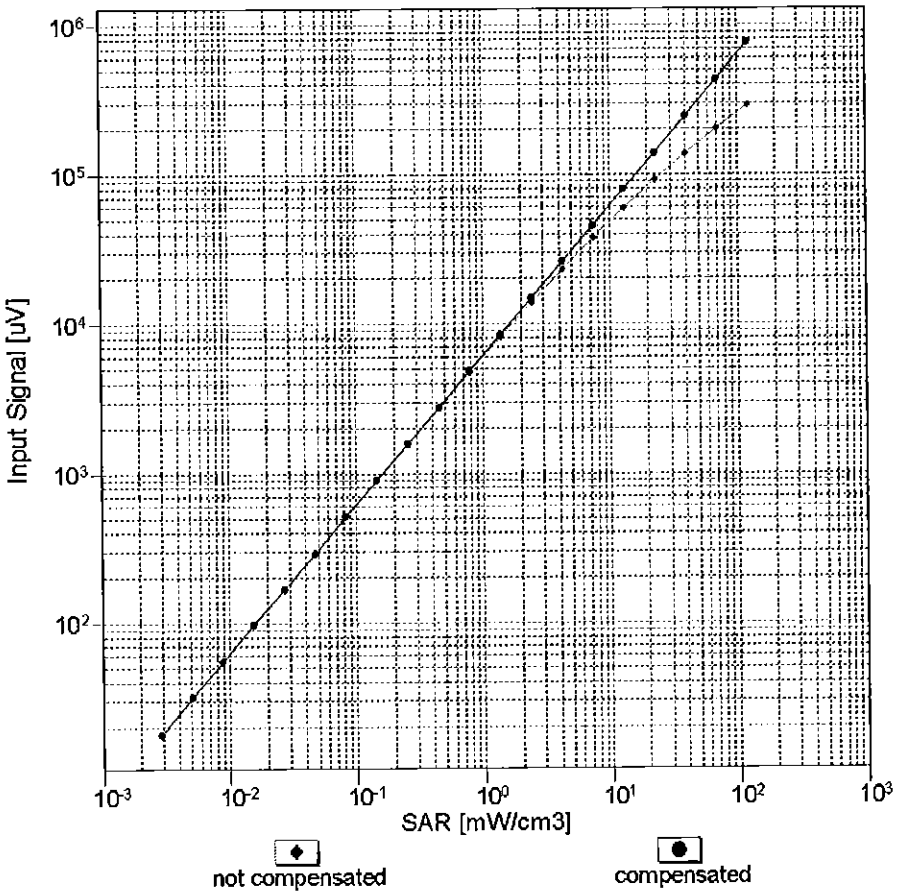
f=1800 MHz,R22

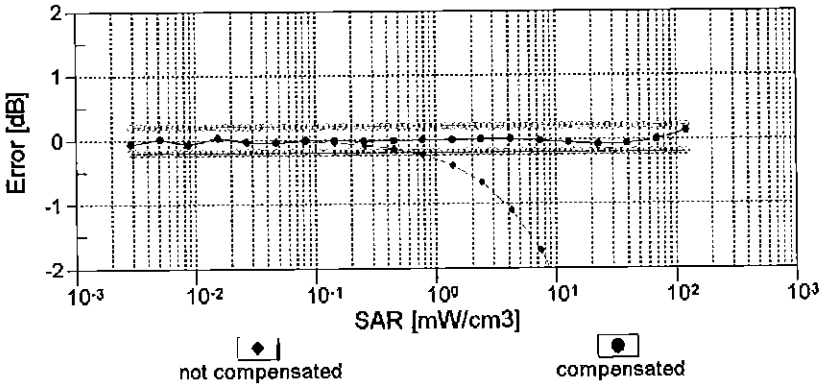




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

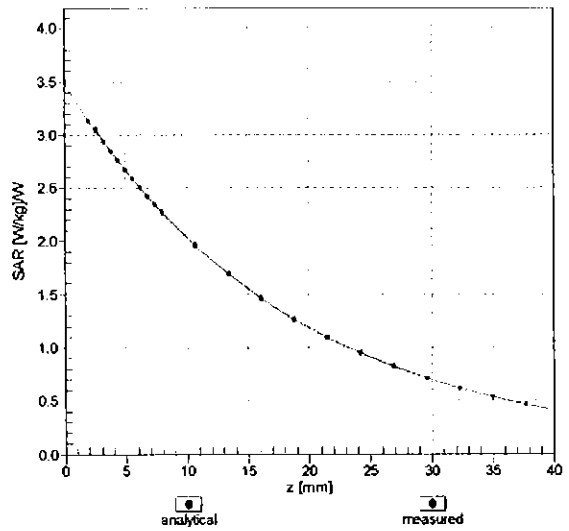




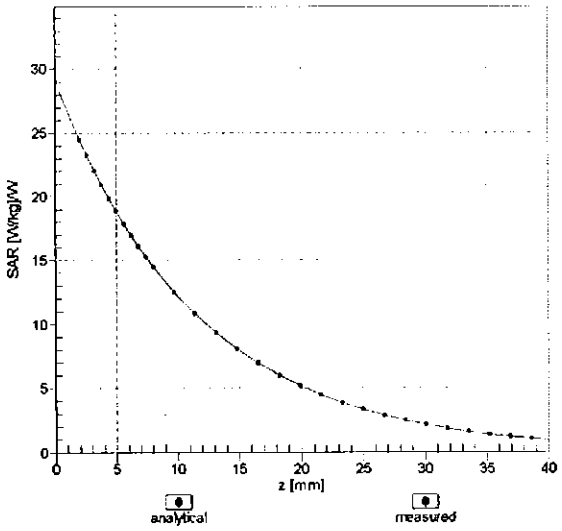
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

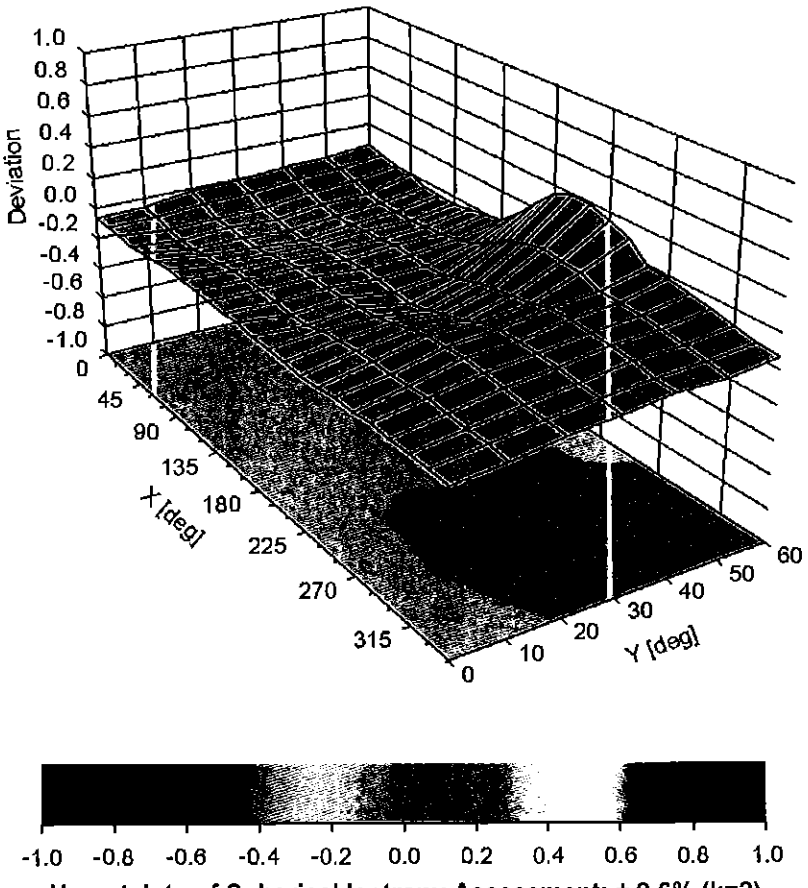


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3332

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	52.6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max Unc^E (k=2)
0	CW	X	0.00	0.00	1.00	0.00	186.6	± 3.5 %
		Y	0.00	0.00	1.00		177.5	
		Z	0.00	0.00	1.00		195.2	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	9.69	77.93	19.31	10.00	25.0	± 9.6 %
		Y	10.94	84.09	20.78		25.0	
		Z	13.55	87.28	21.27		25.0	
10011-CAB	UMTS-FDD (WCDMA)	X	1.25	69.75	16.75	0.00	150.0	± 9.6 %
		Y	1.05	66.93	15.02		150.0	
		Z	1.12	68.64	16.04		150.0	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.53	67.02	16.86	0.41	150.0	± 9.6 %
		Y	1.30	64.73	15.63		150.0	
		Z	1.31	65.39	16.10		150.0	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	5.48	67.50	17.61	1.46	150.0	± 9.6 %
		Y	5.15	67.18	17.44		150.0	
		Z	5.07	67.37	17.49		150.0	
10021-DAB	GSM-FDD (TDMA, GMSK)	X	11.77	81.97	22.25	9.39	50.0	± 9.6 %
		Y	54.42	112.91	31.42		50.0	
		Z	100.00	121.98	33.01		50.0	
10023-DAB	GPRS-FDD (TDMA, GMSK, TN 0)	X	11.70	81.77	22.24	9.57	50.0	± 9.6 %
		Y	40.68	107.94	30.12		50.0	
		Z	100.00	121.94	33.05		50.0	
10024-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	12.67	84.47	21.75	6.56	60.0	± 9.6 %
		Y	100.00	119.84	31.18		60.0	
		Z	100.00	119.08	30.46		60.0	
10025-DAB	EDGE-FDD (TDMA, 8PSK, TN 0)	X	20.72	100.17	36.55	12.57	50.0	± 9.6 %
		Y	12.94	94.85	36.01		50.0	
		Z	15.97	104.01	40.19		50.0	
10026-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	18.90	95.39	31.72	9.56	60.0	± 9.6 %
		Y	17.05	100.19	34.68		60.0	
		Z	22.47	109.08	38.03		60.0	
10027-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	17.89	90.71	22.87	4.80	80.0	± 9.6 %
		Y	100.00	118.79	29.76		80.0	
		Z	100.00	118.54	29.33		80.0	
10028-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	46.15	104.57	25.98	3.55	100.0	± 9.6 %
		Y	100.00	119.01	29.04		100.0	
		Z	100.00	119.36	28.92		100.0	
10029-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	16.04	92.38	29.64	7.80	80.0	± 9.6 %
		Y	11.64	91.80	30.64		80.0	
		Z	13.10	96.16	32.51		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	13.88	86.44	21.79	5.30	70.0	± 9.6 %
		Y	100.00	118.21	29.83		70.0	
		Z	100.00	117.61	29.23		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	115.87	27.37	1.88	100.0	± 9.6 %
		Y	100.00	119.77	27.80		100.0	
		Z	100.00	121.28	28.22		100.0	

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	100.00	119.38	27.78	1.17	100.0	± 9.6 %
		Y	100.00	123.90	28.44		100.0	
		Z	100.00	127.59	29.78		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	13.66	88.30	24.25	5.30	70.0	± 9.6 %
		Y	18.98	98.45	27.40		70.0	
		Z	35.75	109.11	30.11		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	10.34	89.43	23.47	1.88	100.0	± 9.6 %
		Y	6.78	85.99	21.86		100.0	
		Z	11.66	94.06	24.10		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	6.92	85.64	22.10	1.17	100.0	± 9.6 %
		Y	3.76	79.10	19.18		100.0	
		Z	5.48	84.83	20.93		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	14.68	89.65	24.76	5.30	70.0	± 9.6 %
		Y	23.98	102.55	28.67		70.0	
		Z	52.73	115.69	31.90		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	10.26	89.28	23.37	1.88	100.0	± 9.6 %
		Y	6.43	85.26	21.58		100.0	
		Z	10.58	92.73	23.67		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	7.33	86.69	22.50	1.17	100.0	± 9.6 %
		Y	3.87	79.73	19.50		100.0	
		Z	5.67	85.64	21.30		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	2.29	72.93	17.78	0.00	150.0	± 9.6 %
		Y	1.83	71.25	15.78		150.0	
		Z	2.11	74.13	16.77		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	12.07	82.71	21.20	7.78	50.0	± 9.6 %
		Y	100.00	118.63	30.87		50.0	
		Z	100.00	117.56	29.99		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.01	106.13	1.54	0.00	150.0	± 9.6 %
		Y	0.00	93.75	0.63		150.0	
		Z	0.01	100.11	1.38		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	11.60	79.73	23.39	13.80	25.0	± 9.6 %
		Y	15.51	90.14	26.56		25.0	
		Z	23.68	98.24	28.53		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	11.58	80.99	22.41	10.79	40.0	± 9.6 %
		Y	20.29	95.84	27.01		40.0	
		Z	37.59	106.16	29.43		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	12.26	82.69	23.28	9.03	50.0	± 9.6 %
		Y	14.90	90.82	25.94		50.0	
		Z	20.93	97.43	27.76		50.0	
10058-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	13.83	90.12	28.17	6.55	100.0	± 9.6 %
		Y	8.69	86.17	27.85		100.0	
		Z	9.10	88.55	29.00		100.0	
10059-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.93	70.36	18.25	0.61	110.0	± 9.6 %
		Y	1.46	66.73	16.63		110.0	
		Z	1.48	67.55	17.19		110.0	
10060-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	100.00	124.76	31.66	1.30	110.0	± 9.6 %
		Y	100.00	131.67	33.93		110.0	
		Z	100.00	133.96	34.79		110.0	

10061-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	16.14	97.85	26.70	2.04	110.0	± 9.6 %
		Y	8.08	92.61	26.00		110.0	
		Z	12.52	101.33	28.85		110.0	
10062-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	5.15	67.14	16.85	0.49	100.0	± 9.6 %
		Y	4.87	66.94	16.72		100.0	
		Z	4.80	67.15	16.79		100.0	
10063-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	5.22	67.37	17.03	0.72	100.0	± 9.6 %
		Y	4.91	67.10	16.86		100.0	
		Z	4.84	67.30	16.92		100.0	
10064-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	5.63	67.77	17.30	0.86	100.0	± 9.6 %
		Y	5.23	67.43	17.13		100.0	
		Z	5.14	67.59	17.17		100.0	
10065-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	5.54	67.87	17.49	1.21	100.0	± 9.6 %
		Y	5.13	67.46	17.30		100.0	
		Z	5.04	67.61	17.34		100.0	
10066-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	5.63	68.10	17.77	1.46	100.0	± 9.6 %
		Y	5.19	67.59	17.52		100.0	
		Z	5.09	67.72	17.56		100.0	
10067-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	6.00	68.32	18.28	2.04	100.0	± 9.6 %
		Y	5.51	67.78	17.99		100.0	
		Z	5.41	67.95	18.04		100.0	
10068-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	6.22	68.89	18.71	2.55	100.0	± 9.6 %
		Y	5.64	68.10	18.35		100.0	
		Z	5.52	68.18	18.37		100.0	
10069-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	6.25	68.61	18.82	2.67	100.0	± 9.6 %
		Y	5.72	68.06	18.53		100.0	
		Z	5.60	68.19	18.57		100.0	
10071-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	5.67	67.85	18.05	1.99	100.0	± 9.6 %
		Y	5.29	67.41	17.82		100.0	
		Z	5.21	67.58	17.87		100.0	
10072-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	5.81	68.59	18.42	2.30	100.0	± 9.6 %
		Y	5.35	67.95	18.14		100.0	
		Z	5.25	68.10	18.19		100.0	
10073-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	6.03	69.13	18.93	2.83	100.0	± 9.6 %
		Y	5.48	68.29	18.56		100.0	
		Z	5.38	68.44	18.61		100.0	
10074-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	6.14	69.49	19.35	3.30	100.0	± 9.6 %
		Y	5.51	68.36	18.81		100.0	
		Z	5.41	68.49	18.85		100.0	
10075-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	6.47	70.44	20.05	3.82	90.0	± 9.6 %
		Y	5.66	68.80	19.29		90.0	
		Z	5.53	68.86	19.30		90.0	
10076-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	6.47	70.32	20.20	4.15	90.0	± 9.6 %
		Y	5.67	68.61	19.41		90.0	
		Z	5.56	68.71	19.45		90.0	
10077-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	6.53	70.47	20.33	4.30	90.0	± 9.6 %
		Y	5.71	68.70	19.52		90.0	
		Z	5.60	68.81	19.56		90.0	

10081-CAB	CDMA2000 (1xRTT, RC3)	X	1.23	69.13	15.82	0.00	150.0	± 9.6 %
		Y	0.90	65.96	12.93		150.0	
		Z	0.95	67.61	13.58		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	3.84	66.59	11.26	4.77	80.0	± 9.6 %
		Y	2.12	64.11	8.98		80.0	
		Z	1.88	63.53	8.34		80.0	
10090-DAB	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	12.59	84.38	21.75	6.56	60.0	± 9.6 %
		Y	100.00	119.92	31.24		60.0	
		Z	100.00	119.15	30.51		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	1.98	68.10	16.38	0.00	150.0	± 9.6 %
		Y	1.84	67.22	15.54		150.0	
		Z	1.90	68.33	16.08		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	1.94	68.07	16.35	0.00	150.0	± 9.6 %
		Y	1.80	67.18	15.50		150.0	
		Z	1.86	68.30	16.06		150.0	
10099-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	18.80	95.23	31.67	9.56	60.0	± 9.6 %
		Y	17.02	100.10	34.65		60.0	
		Z	22.42	108.97	37.99		60.0	
10100-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	3.68	72.06	17.34	0.00	150.0	± 9.6 %
		Y	3.18	70.15	16.57		150.0	
		Z	3.24	70.94	17.02		150.0	
10101-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.63	68.60	16.42	0.00	150.0	± 9.6 %
		Y	3.33	67.57	15.94		150.0	
		Z	3.31	67.94	16.16		150.0	
10102-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.73	68.43	16.47	0.00	150.0	± 9.6 %
		Y	3.43	67.53	16.04		150.0	
		Z	3.41	67.87	16.23		150.0	
10103-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	9.88	77.18	20.43	3.98	65.0	± 9.6 %
		Y	8.55	78.27	21.41		65.0	
		Z	8.67	79.30	21.85		65.0	
10104-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	10.16	76.88	21.19	3.98	65.0	± 9.6 %
		Y	8.42	76.71	21.60		65.0	
		Z	8.41	77.44	21.93		65.0	
10105-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	9.24	75.08	20.67	3.98	65.0	± 9.6 %
		Y	8.00	75.66	21.43		65.0	
		Z	7.67	75.58	21.41		65.0	
10108-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	3.28	71.12	17.13	0.00	150.0	± 9.6 %
		Y	2.81	69.41	16.41		150.0	
		Z	2.83	70.19	16.86		150.0	
10109-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	3.32	68.34	16.39	0.00	150.0	± 9.6 %
		Y	2.99	67.37	15.85		150.0	
		Z	2.97	67.81	16.08		150.0	
10110-CAC	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	2.73	70.00	16.84	0.00	150.0	± 9.6 %
		Y	2.30	68.48	16.04		150.0	
		Z	2.32	69.37	16.53		150.0	
10111-CAC	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	2.99	68.54	16.68	0.00	150.0	± 9.6 %
		Y	2.68	67.96	16.09		150.0	
		Z	2.68	68.64	16.39		150.0	

10112-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	3.43	68.13	16.38	0.00	150.0	± 9.6 %
		Y	3.11	67.35	15.91		150.0	
		Z	3.09	67.77	16.12		150.0	
10113-CAC	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	3.16	68.50	16.72	0.00	150.0	± 9.6 %
		Y	2.84	68.08	16.22		150.0	
		Z	2.83	68.75	16.50		150.0	
10114-CAB	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	5.45	67.54	16.57	0.00	150.0	± 9.6 %
		Y	5.24	67.31	16.51		150.0	
		Z	5.20	67.52	16.60		150.0	
10115-CAB	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.96	68.11	16.85	0.00	150.0	± 9.6 %
		Y	5.61	67.66	16.70		150.0	
		Z	5.50	67.68	16.69		150.0	
10116-CAB	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.63	67.89	16.66	0.00	150.0	± 9.6 %
		Y	5.37	67.59	16.57		150.0	
		Z	5.30	67.73	16.63		150.0	
10117-CAB	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	5.45	67.55	16.60	0.00	150.0	± 9.6 %
		Y	5.23	67.25	16.49		150.0	
		Z	5.16	67.37	16.54		150.0	
10118-CAB	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.93	67.92	16.75	0.00	150.0	± 9.6 %
		Y	5.70	67.89	16.82		150.0	
		Z	5.59	67.92	16.81		150.0	
10119-CAB	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.55	67.72	16.59	0.00	150.0	± 9.6 %
		Y	5.34	67.53	16.56		150.0	
		Z	5.28	67.67	16.61		150.0	
10140-CAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.79	68.43	16.40	0.00	150.0	± 9.6 %
		Y	3.48	67.53	15.96		150.0	
		Z	3.45	67.88	16.15		150.0	
10141-CAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.90	68.37	16.49	0.00	150.0	± 9.6 %
		Y	3.60	67.61	16.12		150.0	
		Z	3.57	67.96	16.31		150.0	
10142-CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	2.49	69.76	16.76	0.00	150.0	± 9.6 %
		Y	2.07	68.39	15.76		150.0	
		Z	2.10	69.47	16.26		150.0	
10143-CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	2.89	69.03	16.74	0.00	150.0	± 9.6 %
		Y	2.54	68.58	15.87		150.0	
		Z	2.56	69.50	16.18		150.0	
10144-CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	2.76	67.50	15.63	0.00	150.0	± 9.6 %
		Y	2.36	66.66	14.46		150.0	
		Z	2.33	67.24	14.59		150.0	
10145-CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	1.96	69.33	16.13	0.00	150.0	± 9.6 %
		Y	1.38	66.00	12.81		150.0	
		Z	1.34	66.37	12.62		150.0	
10146-CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	4.17	75.23	18.46	0.00	150.0	± 9.6 %
		Y	2.35	68.49	13.59		150.0	
		Z	2.38	68.77	12.96		150.0	
10147-CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	4.89	77.80	19.69	0.00	150.0	± 9.6 %
		Y	2.82	71.02	14.91		150.0	
		Z	3.01	71.75	14.40		150.0	

10149-CAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	3.33	68.39	16.43	0.00	150.0	± 9.6 %
		Y	3.00	67.43	15.89		150.0	
		Z	2.98	67.87	16.13		150.0	
10150-CAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	3.44	68.18	16.41	0.00	150.0	± 9.6 %
		Y	3.12	67.40	15.95		150.0	
		Z	3.10	67.83	16.16		150.0	
10151-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	9.93	78.08	20.89	3.98	65.0	± 9.6 %
		Y	9.12	80.67	22.44		65.0	
		Z	9.65	82.56	23.18		65.0	
10152-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	9.86	77.05	21.14	3.98	65.0	± 9.6 %
		Y	8.03	76.89	21.43		65.0	
		Z	8.05	77.75	21.77		65.0	
10153-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	10.15	77.56	21.66	3.98	65.0	± 9.6 %
		Y	8.43	77.73	22.12		65.0	
		Z	8.48	78.64	22.48		65.0	
10154-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	2.81	70.59	17.19	0.00	150.0	± 9.6 %
		Y	2.35	68.90	16.31		150.0	
		Z	2.36	69.78	16.78		150.0	
10155-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	2.99	68.52	16.66	0.00	150.0	± 9.6 %
		Y	2.68	67.96	16.10		150.0	
		Z	2.69	68.66	16.40		150.0	
10156-CAC	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	2.39	70.13	16.93	0.00	150.0	± 9.6 %
		Y	1.92	68.51	15.63		150.0	
		Z	1.95	69.68	16.13		150.0	
10157-CAC	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	2.59	68.07	15.87	0.00	150.0	± 9.6 %
		Y	2.19	67.20	14.53		150.0	
		Z	2.18	67.93	14.70		150.0	
10158-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	3.16	68.53	16.75	0.00	150.0	± 9.6 %
		Y	2.84	68.13	16.26		150.0	
		Z	2.84	68.81	16.54		150.0	
10159-CAC	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	2.70	68.40	16.12	0.00	150.0	± 9.6 %
		Y	2.30	67.63	14.81		150.0	
		Z	2.29	68.38	14.98		150.0	
10160-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	3.14	69.43	16.71	0.00	150.0	± 9.6 %
		Y	2.84	68.62	16.29		150.0	
		Z	2.84	69.26	16.64		150.0	
10161-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	3.32	67.99	16.37	0.00	150.0	± 9.6 %
		Y	3.01	67.31	15.88		150.0	
		Z	2.99	67.77	16.10		150.0	
10162-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	3.41	67.88	16.36	0.00	150.0	± 9.6 %
		Y	3.12	67.42	15.97		150.0	
		Z	3.10	67.90	16.20		150.0	
10166-CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	4.36	70.41	19.63	3.01	150.0	± 9.6 %
		Y	3.66	69.23	19.03		150.0	
		Z	3.73	70.55	19.68		150.0	
10167-CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	5.73	73.59	20.29	3.01	150.0	± 9.6 %
		Y	4.43	71.79	19.40		150.0	
		Z	4.81	74.43	20.51		150.0	

10168-CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	6.11	74.96	21.16	3.01	150.0	± 9.6 %
		Y	4.84	73.78	20.63		150.0	
		Z	5.40	76.98	21.93		150.0	
10169-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	4.63	74.36	21.10	3.01	150.0	± 9.6 %
		Y	3.06	68.99	18.96		150.0	
		Z	3.17	70.74	19.84		150.0	
10170-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	7.14	81.00	23.31	3.01	150.0	± 9.6 %
		Y	4.06	74.30	21.07		150.0	
		Z	4.90	79.16	23.07		150.0	
10171-AAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	5.84	76.64	20.78	3.01	150.0	± 9.6 %
		Y	3.40	70.54	18.47		150.0	
		Z	3.84	73.94	19.92		150.0	
10172-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	21.59	96.42	28.73	6.02	65.0	± 9.6 %
		Y	17.89	100.99	31.31		65.0	
		Z	27.42	111.88	34.81		65.0	
10173-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	18.76	90.78	25.77	6.02	65.0	± 9.6 %
		Y	25.32	103.41	30.42		65.0	
		Z	100.00	129.46	37.16		65.0	
10174-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	16.94	88.22	24.62	6.02	65.0	± 9.6 %
		Y	19.74	97.71	28.21		65.0	
		Z	54.07	116.72	33.41		65.0	
10175-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	4.54	73.91	20.81	3.01	150.0	± 9.6 %
		Y	3.02	68.69	18.71		150.0	
		Z	3.13	70.41	19.59		150.0	
10176-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	7.15	81.03	23.32	3.01	150.0	± 9.6 %
		Y	4.06	74.32	21.08		150.0	
		Z	4.91	79.19	23.08		150.0	
10177-CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	4.60	74.15	20.96	3.01	150.0	± 9.6 %
		Y	3.05	68.85	18.81		150.0	
		Z	3.16	70.57	19.68		150.0	
10178-CAC	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	7.00	80.62	23.13	3.01	150.0	± 9.6 %
		Y	4.02	74.08	20.95		150.0	
		Z	4.84	78.90	22.94		150.0	
10179-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	6.37	78.49	21.84	3.01	150.0	± 9.6 %
		Y	3.70	72.30	19.64		150.0	
		Z	4.32	76.41	21.35		150.0	
10180-CAC	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	5.80	76.48	20.69	3.01	150.0	± 9.6 %
		Y	3.39	70.46	18.42		150.0	
		Z	3.83	73.85	19.87		150.0	
10181-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	4.59	74.12	20.94	3.01	150.0	± 9.6 %
		Y	3.04	68.83	18.80		150.0	
		Z	3.15	70.56	19.68		150.0	
10182-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	6.99	80.60	23.12	3.01	150.0	± 9.6 %
		Y	4.01	74.05	20.94		150.0	
		Z	4.83	78.87	22.93		150.0	
10183-AAA	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	5.79	76.46	20.68	3.01	150.0	± 9.6 %
		Y	3.39	70.44	18.40		150.0	
		Z	3.82	73.82	19.85		150.0	

10184-CAC	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	4.61	74.17	20.97	3.01	150.0	± 9.6 %
		Y	3.05	68.87	18.82		150.0	
		Z	3.16	70.60	19.70		150.0	
10185-CAC	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	7.03	80.67	23.15	3.01	150.0	± 9.6 %
		Y	4.03	74.12	20.97		150.0	
		Z	4.86	78.97	22.97		150.0	
10186-AAC	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	5.81	76.52	20.71	3.01	150.0	± 9.6 %
		Y	3.40	70.50	18.44		150.0	
		Z	3.84	73.91	19.89		150.0	
10187-CAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	4.61	74.16	20.98	3.01	150.0	± 9.6 %
		Y	3.06	68.91	18.88		150.0	
		Z	3.17	70.66	19.76		150.0	
10188-CAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	7.32	81.50	23.57	3.01	150.0	± 9.6 %
		Y	4.15	74.76	21.35		150.0	
		Z	5.06	79.82	23.41		150.0	
10189-AAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	5.97	77.05	21.01	3.01	150.0	± 9.6 %
		Y	3.47	70.90	18.71		150.0	
		Z	3.94	74.44	20.21		150.0	
10193-CAB	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.89	66.83	16.38	0.00	150.0	± 9.6 %
		Y	4.64	66.67	16.22		150.0	
		Z	4.58	66.90	16.29		150.0	
10194-CAB	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	5.13	67.27	16.47	0.00	150.0	± 9.6 %
		Y	4.83	67.02	16.34		150.0	
		Z	4.76	67.22	16.42		150.0	
10195-CAB	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	5.16	67.22	16.45	0.00	150.0	± 9.6 %
		Y	4.87	67.04	16.36		150.0	
		Z	4.80	67.25	16.43		150.0	
10196-CAB	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.94	66.97	16.42	0.00	150.0	± 9.6 %
		Y	4.65	66.76	16.25		150.0	
		Z	4.59	66.97	16.31		150.0	
10197-CAB	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	5.14	67.27	16.47	0.00	150.0	± 9.6 %
		Y	4.84	67.04	16.36		150.0	
		Z	4.77	67.25	16.43		150.0	
10198-CAB	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	5.17	67.23	16.45	0.00	150.0	± 9.6 %
		Y	4.87	67.06	16.37		150.0	
		Z	4.80	67.27	16.45		150.0	
10219-CAB	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.89	67.00	16.40	0.00	150.0	± 9.6 %
		Y	4.60	66.77	16.21		150.0	
		Z	4.54	66.98	16.28		150.0	
10220-CAB	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	5.15	67.29	16.48	0.00	150.0	± 9.6 %
		Y	4.84	67.02	16.35		150.0	
		Z	4.77	67.22	16.42		150.0	
10221-CAB	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	5.18	67.20	16.47	0.00	150.0	± 9.6 %
		Y	4.88	66.99	16.36		150.0	
		Z	4.81	67.20	16.43		150.0	
10222-CAB	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	5.44	67.59	16.61	0.00	150.0	± 9.6 %
		Y	5.21	67.26	16.49		150.0	
		Z	5.14	67.38	16.54		150.0	

10223-CAB	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.85	67.86	16.74	0.00	150.0	± 9.6 %
		Y	5.54	67.53	16.65		150.0	
		Z	5.45	67.60	16.67		150.0	
10224-CAB	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	5.54	67.82	16.64	0.00	150.0	± 9.6 %
		Y	5.25	67.35	16.46		150.0	
		Z	5.18	67.49	16.52		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	3.14	66.40	15.95	0.00	150.0	± 9.6 %
		Y	2.89	66.08	15.41		150.0	
		Z	2.86	66.50	15.54		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	19.13	91.19	25.97	6.02	65.0	± 9.6 %
		Y	27.02	104.73	30.89		65.0	
		Z	100.00	129.68	37.30		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	17.13	88.50	24.79	6.02	65.0	± 9.6 %
		Y	23.15	100.58	29.15		65.0	
		Z	93.34	126.19	35.81		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	21.41	96.70	28.93	6.02	65.0	± 9.6 %
		Y	21.98	105.42	32.75		65.0	
		Z	52.34	124.97	38.40		65.0	
10229-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	18.76	90.76	25.78	6.02	65.0	± 9.6 %
		Y	25.40	103.45	30.44		65.0	
		Z	100.00	129.46	37.17		65.0	
10230-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	16.83	88.14	24.61	6.02	65.0	± 9.6 %
		Y	21.92	99.53	28.77		65.0	
		Z	82.35	123.82	35.15		65.0	
10231-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	20.94	96.21	28.71	6.02	65.0	± 9.6 %
		Y	20.82	104.24	32.32		65.0	
		Z	47.61	122.90	37.78		65.0	
10232-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	18.76	90.77	25.78	6.02	65.0	± 9.6 %
		Y	25.38	103.45	30.44		65.0	
		Z	100.00	129.47	37.17		65.0	
10233-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	16.84	88.16	24.62	6.02	65.0	± 9.6 %
		Y	21.91	99.53	28.77		65.0	
		Z	82.43	123.85	35.16		65.0	
10234-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	20.43	95.64	28.46	6.02	65.0	± 9.6 %
		Y	19.79	103.07	31.87		65.0	
		Z	43.63	120.88	37.13		65.0	
10235-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	18.78	90.80	25.79	6.02	65.0	± 9.6 %
		Y	25.45	103.51	30.45		65.0	
		Z	100.00	129.48	37.17		65.0	
10236-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	16.89	88.21	24.63	6.02	65.0	± 9.6 %
		Y	22.11	99.66	28.80		65.0	
		Z	84.03	124.15	35.23		65.0	
10237-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	21.05	96.32	28.74	6.02	65.0	± 9.6 %
		Y	20.95	104.39	32.37		65.0	
		Z	48.31	123.22	37.87		65.0	
10238-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	18.76	90.78	25.78	6.02	65.0	± 9.6 %
		Y	25.37	103.45	30.44		65.0	
		Z	100.00	129.48	37.17		65.0	

10239-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	16.84	88.17	24.62	6.02	65.0	± 9.6 %
		Y	21.89	99.53	28.77		65.0	
		Z	82.47	123.88	35.17		65.0	
10240-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	21.01	96.29	28.73	6.02	65.0	± 9.6 %
		Y	20.88	104.33	32.35		65.0	
		Z	48.10	123.14	37.85		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	15.45	87.26	27.54	6.98	65.0	± 9.6 %
		Y	11.04	84.82	26.82		65.0	
		Z	12.90	89.71	28.70		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	14.94	86.42	27.15	6.98	65.0	± 9.6 %
		Y	9.99	82.59	25.84		65.0	
		Z	10.58	85.38	26.97		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	13.20	85.87	27.69	6.98	65.0	± 9.6 %
		Y	8.19	79.71	25.49		65.0	
		Z	8.16	81.11	26.18		65.0	
10244-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	11.50	80.68	21.87	3.98	65.0	± 9.6 %
		Y	8.87	79.76	20.74		65.0	
		Z	9.52	81.24	20.81		65.0	
10245-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	11.46	80.43	21.75	3.98	65.0	± 9.6 %
		Y	8.72	79.23	20.48		65.0	
		Z	9.20	80.44	20.46		65.0	
10246-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	10.21	80.78	21.55	3.98	65.0	± 9.6 %
		Y	9.21	83.14	22.01		65.0	
		Z	10.18	85.32	22.50		65.0	
10247-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	9.64	78.21	21.09	3.98	65.0	± 9.6 %
		Y	7.56	77.67	20.49		65.0	
		Z	7.61	78.43	20.54		65.0	
10248-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	9.70	77.89	20.98	3.98	65.0	± 9.6 %
		Y	7.51	77.10	20.25		65.0	
		Z	7.49	77.71	20.24		65.0	
10249-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	10.31	80.78	21.79	3.98	65.0	± 9.6 %
		Y	10.17	85.03	23.37		65.0	
		Z	11.76	88.25	24.33		65.0	
10250-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	10.06	78.79	21.99	3.98	65.0	± 9.6 %
		Y	8.41	79.53	22.52		65.0	
		Z	8.60	80.75	22.93		65.0	
10251-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	9.73	77.29	21.23	3.98	65.0	± 9.6 %
		Y	7.93	77.32	21.34		65.0	
		Z	8.00	78.29	21.64		65.0	
10252-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	10.18	79.83	21.68	3.98	65.0	± 9.6 %
		Y	9.87	83.90	23.66		65.0	
		Z	11.01	86.77	24.67		65.0	
10253-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	9.71	76.75	21.13	3.98	65.0	± 9.6 %
		Y	7.84	76.32	21.21		65.0	
		Z	7.85	77.16	21.53		65.0	
10254-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	10.03	77.26	21.61	3.98	65.0	± 9.6 %
		Y	8.23	77.13	21.85		65.0	
		Z	8.26	78.00	22.17		65.0	

10255-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	9.84	78.12	21.15	3.98	65.0	± 9.6 %
		Y	8.79	80.23	22.49		65.0	
		Z	9.26	82.06	23.20		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	11.29	80.30	21.28	3.98	65.0	± 9.6 %
		Y	7.73	77.21	18.92		65.0	
		Z	7.68	77.31	18.36		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	11.33	80.06	21.15	3.98	65.0	± 9.6 %
		Y	7.53	76.45	18.53		65.0	
		Z	7.33	76.27	17.86		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	10.31	80.91	21.35	3.98	65.0	± 9.6 %
		Y	7.76	79.92	20.19		65.0	
		Z	7.82	80.45	19.98		65.0	
10259-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	9.79	78.29	21.36	3.98	65.0	± 9.6 %
		Y	7.89	78.31	21.20		65.0	
		Z	8.01	79.28	21.39		65.0	
10260-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	9.86	78.18	21.35	3.98	65.0	± 9.6 %
		Y	7.89	78.02	21.10		65.0	
		Z	7.96	78.87	21.24		65.0	
10261-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	10.13	80.23	21.74	3.98	65.0	± 9.6 %
		Y	9.61	83.83	23.25		65.0	
		Z	10.78	86.66	24.15		65.0	
10262-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	10.06	78.78	21.97	3.98	65.0	± 9.6 %
		Y	8.40	79.48	22.49		65.0	
		Z	8.58	80.70	22.89		65.0	
10263-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	9.74	77.31	21.24	3.98	65.0	± 9.6 %
		Y	7.92	77.31	21.33		65.0	
		Z	7.99	78.27	21.64		65.0	
10264-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	10.16	79.77	21.64	3.98	65.0	± 9.6 %
		Y	9.80	83.74	23.58		65.0	
		Z	10.90	86.57	24.58		65.0	
10265-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	9.86	77.05	21.15	3.98	65.0	± 9.6 %
		Y	8.03	76.90	21.43		65.0	
		Z	8.05	77.75	21.78		65.0	
10266-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	10.15	77.56	21.65	3.98	65.0	± 9.6 %
		Y	8.43	77.72	22.11		65.0	
		Z	8.48	78.63	22.47		65.0	
10267-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	9.92	78.07	20.89	3.98	65.0	± 9.6 %
		Y	9.10	80.63	22.42		65.0	
		Z	9.63	82.52	23.16		65.0	
10268-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	10.25	76.65	21.26	3.98	65.0	± 9.6 %
		Y	8.52	76.45	21.62		65.0	
		Z	8.48	77.13	21.92		65.0	
10269-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	10.19	76.42	21.27	3.98	65.0	± 9.6 %
		Y	8.45	76.04	21.51		65.0	
		Z	8.40	76.67	21.79		65.0	
10270-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	9.86	76.75	20.51	3.98	65.0	± 9.6 %
		Y	8.62	77.91	21.51		65.0	
		Z	8.79	79.05	21.99		65.0	

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	2.77	66.49	15.71	0.00	150.0	± 9.6 %
		Y	2.64	66.30	15.24		150.0	
		Z	2.65	66.91	15.49		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	1.88	69.31	16.53	0.00	150.0	± 9.6 %
		Y	1.64	67.55	15.40		150.0	
		Z	1.70	68.78	16.07		150.0	
10277-CAA	PHS (QPSK)	X	8.68	73.85	17.59	9.03	50.0	± 9.6 %
		Y	5.42	69.49	13.89		50.0	
		Z	4.74	68.12	12.61		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	X	11.80	81.35	22.35	9.03	50.0	± 9.6 %
		Y	9.38	80.62	21.03		50.0	
		Z	9.08	80.35	20.35		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	X	12.00	81.57	22.44	9.03	50.0	± 9.6 %
		Y	9.52	80.78	21.11		50.0	
		Z	9.21	80.51	20.43		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	1.97	70.58	16.54	0.00	150.0	± 9.6 %
		Y	1.53	68.60	14.31		150.0	
		Z	1.62	70.34	14.87		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	1.20	68.77	15.64	0.00	150.0	± 9.6 %
		Y	0.88	65.75	12.81		150.0	
		Z	0.93	67.33	13.43		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	1.42	72.46	17.76	0.00	150.0	± 9.6 %
		Y	1.05	69.10	14.86		150.0	
		Z	1.29	72.85	16.37		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	1.79	76.28	19.83	0.00	150.0	± 9.6 %
		Y	1.44	73.75	17.39		150.0	
		Z	2.22	81.02	20.07		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	11.75	82.61	24.25	9.03	50.0	± 9.6 %
		Y	11.50	85.78	24.97		50.0	
		Z	13.16	88.95	25.79		50.0	
10297-AAA	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	3.30	71.22	17.19	0.00	150.0	± 9.6 %
		Y	2.82	69.50	16.47		150.0	
		Z	2.85	70.29	16.93		150.0	
10298-AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	2.18	69.85	16.58	0.00	150.0	± 9.6 %
		Y	1.67	67.77	14.48		150.0	
		Z	1.69	68.80	14.77		150.0	
10299-AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	4.23	74.55	18.49	0.00	150.0	± 9.6 %
		Y	2.86	70.57	15.39		150.0	
		Z	3.26	72.64	15.67		150.0	
10300-AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	3.53	70.72	16.20	0.00	150.0	± 9.6 %
		Y	2.22	66.27	12.62		150.0	
		Z	2.22	66.71	12.25		150.0	
10301-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	X	6.36	68.85	19.32	4.17	80.0	± 9.6 %
		Y	5.68	68.17	18.80		80.0	
		Z	5.55	68.25	18.76		80.0	
10302-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	7.00	70.03	20.38	4.96	80.0	± 9.6 %
		Y	6.06	68.21	19.20		80.0	
		Z	5.98	68.63	19.38		80.0	

10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	6.98	70.52	20.65	4.96	80.0	± 9.6 %
		Y	5.89	68.20	19.20		80.0	
		Z	5.80	68.59	19.37		80.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	6.46	69.38	19.61	4.17	80.0	± 9.6 %
		Y	5.55	67.58	18.44		80.0	
		Z	5.48	68.00	18.61		80.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	9.75	80.93	26.10	6.02	50.0	± 9.6 %
		Y	7.80	78.66	24.74		50.0	
		Z	7.67	79.09	24.85		50.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	7.97	74.84	23.57	6.02	50.0	± 9.6 %
		Y	6.61	73.09	22.49		50.0	
		Z	6.07	70.95	21.08		50.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	8.31	76.06	23.89	6.02	50.0	± 9.6 %
		Y	6.81	74.21	22.83		50.0	
		Z	6.09	71.46	21.16		50.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	8.49	76.81	24.22	6.02	50.0	± 9.6 %
		Y	6.91	74.82	23.13		50.0	
		Z	6.73	75.04	23.19		50.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	8.03	74.86	23.58	6.02	50.0	± 9.6 %
		Y	6.73	73.43	22.67		50.0	
		Z	6.15	71.24	21.25		50.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	8.06	75.25	23.64	6.02	50.0	± 9.6 %
		Y	6.67	73.52	22.60		50.0	
		Z	6.07	71.16	21.10		50.0	
10311-AAA	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	3.66	70.59	16.87	0.00	150.0	± 9.6 %
		Y	3.17	68.80	16.13		150.0	
		Z	3.21	69.53	16.54		150.0	
10313-AAA	iDEN 1:3	X	8.35	75.49	17.72	6.99	70.0	± 9.6 %
		Y	7.95	79.95	19.50		70.0	
		Z	9.26	82.77	20.34		70.0	
10314-AAA	iDEN 1:6	X	11.10	81.08	21.83	10.00	30.0	± 9.6 %
		Y	10.75	87.12	24.53		30.0	
		Z	13.73	92.29	26.13		30.0	
10315-AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	1.32	66.13	16.48	0.17	150.0	± 9.6 %
		Y	1.16	64.22	15.34		150.0	
		Z	1.18	64.92	15.85		150.0	
10316-AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	5.02	67.07	16.57	0.17	150.0	± 9.6 %
		Y	4.75	66.87	16.44		150.0	
		Z	4.68	67.09	16.52		150.0	
10317-AAB	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	5.02	67.07	16.57	0.17	150.0	± 9.6 %
		Y	4.75	66.87	16.44		150.0	
		Z	4.68	67.09	16.52		150.0	
10400-AAC	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	5.16	67.30	16.45	0.00	150.0	± 9.6 %
		Y	4.83	67.08	16.34		150.0	
		Z	4.75	67.29	16.42		150.0	
10401-AAC	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.77	67.53	16.58	0.00	150.0	± 9.6 %
		Y	5.52	67.31	16.53		150.0	
		Z	5.47	67.54	16.62		150.0	

10402-AAC	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	6.05	68.07	16.68	0.00	150.0	± 9.6 %
		Y	5.79	67.71	16.57		150.0	
		Z	5.71	67.77	16.58		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	1.97	70.58	16.54	0.00	115.0	± 9.6 %
		Y	1.53	68.60	14.31		115.0	
		Z	1.62	70.34	14.87		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	1.97	70.58	16.54	0.00	115.0	± 9.6 %
		Y	1.53	68.60	14.31		115.0	
		Z	1.62	70.34	14.87		115.0	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	28.32	105.49	28.28	0.00	100.0	± 9.6 %
		Y	14.90	98.73	25.93		100.0	
		Z	100.00	120.76	29.81		100.0	
10410-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.66	69.85	12.19	2.23	80.0	± 9.6 %
		Y	1.26	61.35	6.31		80.0	
		Z	0.95	60.00	4.82		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	1.05	63.52	15.18	0.00	150.0	± 9.6 %
		Y	1.03	62.82	14.49		150.0	
		Z	1.04	63.47	14.98		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.88	66.81	16.36	0.00	150.0	± 9.6 %
		Y	4.64	66.71	16.28		150.0	
		Z	4.59	66.94	16.36		150.0	
10417-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.88	66.81	16.36	0.00	150.0	± 9.6 %
		Y	4.64	66.71	16.28		150.0	
		Z	4.59	66.94	16.36		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	X	4.86	66.93	16.35	0.00	150.0	± 9.6 %
		Y	4.63	66.85	16.28		150.0	
		Z	4.58	67.10	16.38		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preambule)	X	4.89	66.90	16.37	0.00	150.0	± 9.6 %
		Y	4.65	66.81	16.29		150.0	
		Z	4.60	67.05	16.38		150.0	
10422-AAA	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	X	5.03	66.92	16.38	0.00	150.0	± 9.6 %
		Y	4.78	66.83	16.31		150.0	
		Z	4.72	67.05	16.39		150.0	
10423-AAA	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	X	5.30	67.39	16.55	0.00	150.0	± 9.6 %
		Y	4.96	67.18	16.44		150.0	
		Z	4.88	67.37	16.51		150.0	
10424-AAA	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	X	5.19	67.31	16.51	0.00	150.0	± 9.6 %
		Y	4.88	67.12	16.41		150.0	
		Z	4.80	67.32	16.48		150.0	
10425-AAA	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	X	5.73	67.72	16.66	0.00	150.0	± 9.6 %
		Y	5.50	67.56	16.64		150.0	
		Z	5.42	67.67	16.68		150.0	
10426-AAA	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	X	5.76	67.78	16.68	0.00	150.0	± 9.6 %
		Y	5.50	67.57	16.65		150.0	
		Z	5.43	67.71	16.70		150.0	

10427-AAA	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	X	5.81	67.91	16.74	0.00	150.0	± 9.6 %
		Y	5.51	67.53	16.62		150.0	
		Z	5.43	67.67	16.67		150.0	
10430-AAA	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	4.62	69.59	18.10	0.00	150.0	± 9.6 %
		Y	4.31	70.41	18.12		150.0	
		Z	4.28	70.94	18.23		150.0	
10431-AAA	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	4.73	67.38	16.53	0.00	150.0	± 9.6 %
		Y	4.34	67.24	16.29		150.0	
		Z	4.27	67.52	16.37		150.0	
10432-AAA	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	4.99	67.36	16.52	0.00	150.0	± 9.6 %
		Y	4.64	67.14	16.35		150.0	
		Z	4.57	67.38	16.44		150.0	
10433-AAA	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	5.22	67.42	16.56	0.00	150.0	± 9.6 %
		Y	4.89	67.15	16.43		150.0	
		Z	4.82	67.36	16.50		150.0	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	4.68	70.02	18.09	0.00	150.0	± 9.6 %
		Y	4.40	71.16	18.09		150.0	
		Z	4.38	71.81	18.21		150.0	
10435-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.61	69.70	12.13	2.23	80.0	± 9.6 %
		Y	1.27	61.33	6.29		80.0	
		Z	0.95	60.00	4.82		80.0	
10447-AAA	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	4.07	67.39	16.27	0.00	150.0	± 9.6 %
		Y	3.63	67.20	15.67		150.0	
		Z	3.57	67.58	15.72		150.0	
10448-AAA	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	X	4.50	67.14	16.38	0.00	150.0	± 9.6 %
		Y	4.17	67.00	16.14		150.0	
		Z	4.11	67.30	16.23		150.0	
10449-AAA	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	X	4.72	67.15	16.41	0.00	150.0	± 9.6 %
		Y	4.44	66.96	16.24		150.0	
		Z	4.38	67.21	16.33		150.0	
10450-AAA	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.87	67.12	16.42	0.00	150.0	± 9.6 %
		Y	4.63	66.90	16.27		150.0	
		Z	4.58	67.12	16.36		150.0	
10451-AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	X	4.03	67.67	16.16	0.00	150.0	± 9.6 %
		Y	3.54	67.41	15.35		150.0	
		Z	3.46	67.78	15.35		150.0	
10456-AAA	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	X	6.57	68.45	16.88	0.00	150.0	± 9.6 %
		Y	6.36	68.13	16.80		150.0	
		Z	6.29	68.20	16.82		150.0	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	3.96	65.55	16.17	0.00	150.0	± 9.6 %
		Y	3.86	65.34	15.98		150.0	
		Z	3.83	65.58	16.07		150.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	3.73	66.33	15.59	0.00	150.0	± 9.6 %
		Y	3.37	66.75	14.83		150.0	
		Z	3.29	67.13	14.77		150.0	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	4.80	64.25	15.81	0.00	150.0	± 9.6 %
		Y	4.44	64.93	15.63		150.0	
		Z	4.47	65.77	15.89		150.0	

10460-AAA	UMTS-FDD (WCDMA, AMR)	X	1.06	70.38	17.59	0.00	150.0	± 9.6 %
		Y	0.90	67.32	15.64		150.0	
		Z	0.98	69.52	16.94		150.0	
10461-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	116.53	30.21	3.29	80.0	± 9.6 %
		Y	100.00	124.93	32.76		80.0	
		Z	100.00	126.81	33.20		80.0	
10462-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	70.18	103.94	25.18	3.23	80.0	± 9.6 %
		Y	100.00	110.54	25.86		80.0	
		Z	100.00	108.56	24.48		80.0	
10463-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	34.47	94.04	22.31	3.23	80.0	± 9.6 %
		Y	24.86	92.54	20.87		80.0	
		Z	100.00	104.83	22.72		80.0	
10464-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	115.32	29.52	3.23	80.0	± 9.6 %
		Y	100.00	123.01	31.71		80.0	
		Z	100.00	124.63	32.03		80.0	
10465-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	51.21	99.84	24.08	3.23	80.0	± 9.6 %
		Y	70.70	106.13	24.73		80.0	
		Z	100.00	107.97	24.20		80.0	
10466-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	27.09	90.97	21.41	3.23	80.0	± 9.6 %
		Y	13.41	85.62	18.91		80.0	
		Z	31.05	92.96	19.89		80.0	
10467-AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	115.43	29.57	3.23	80.0	± 9.6 %
		Y	100.00	123.23	31.81		80.0	
		Z	100.00	124.89	32.14		80.0	
10468-AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	54.96	100.78	24.34	3.23	80.0	± 9.6 %
		Y	94.28	109.52	25.53		80.0	
		Z	100.00	108.16	24.29		80.0	
10469-AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	27.59	91.19	21.47	3.23	80.0	± 9.6 %
		Y	13.74	85.89	18.98		80.0	
		Z	32.90	93.53	20.03		80.0	
10470-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	115.44	29.58	3.23	80.0	± 9.6 %
		Y	100.00	123.25	31.82		80.0	
		Z	100.00	124.92	32.15		80.0	
10471-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	55.24	100.82	24.34	3.23	80.0	± 9.6 %
		Y	94.55	109.51	25.51		80.0	
		Z	100.00	108.10	24.25		80.0	
10472-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	27.68	91.21	21.47	3.23	80.0	± 9.6 %
		Y	13.71	85.85	18.96		80.0	
		Z	32.46	93.35	19.96		80.0	
10473-AAA	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	115.43	29.57	3.23	80.0	± 9.6 %
		Y	100.00	123.22	31.80		80.0	
		Z	100.00	124.89	32.13		80.0	
10474-AAA	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	54.80	100.73	24.32	3.23	80.0	± 9.6 %
		Y	91.93	109.20	25.45		80.0	
		Z	100.00	108.10	24.25		80.0	
10475-AAA	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	27.50	91.14	21.45	3.23	80.0	± 9.6 %
		Y	13.50	85.69	18.91		80.0	
		Z	31.52	93.08	19.90		80.0	

10477-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	52.37	100.09	24.13	3.23	80.0	± 9.6 %
		Y	75.38	106.81	24.87		80.0	
		Z	100.00	107.91	24.16		80.0	
10478-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	27.26	91.02	21.41	3.23	80.0	± 9.6 %
		Y	13.26	85.47	18.84		80.0	
		Z	30.16	92.61	19.77		80.0	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	110.48	26.81	1.99	80.0	± 9.6 %
		Y	2.73	68.06	11.81		80.0	
		Z	1.43	62.45	8.56		80.0	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	10.33	78.63	17.34	1.99	80.0	± 9.6 %
		Y	1.46	60.00	7.26		80.0	
		Z	1.33	60.00	6.36		80.0	
10481-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	8.08	75.22	15.95	1.99	80.0	± 9.6 %
		Y	1.48	60.00	7.04		80.0	
		Z	1.36	60.00	6.13		80.0	
10482-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	9.61	82.86	21.13	1.99	80.0	± 9.6 %
		Y	5.81	78.79	19.00		80.0	
		Z	7.49	82.61	19.95		80.0	
10483-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	11.05	82.78	21.52	1.99	80.0	± 9.6 %
		Y	7.68	79.55	19.16		80.0	
		Z	9.15	81.77	19.31		80.0	
10484-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	10.66	82.06	21.31	1.99	80.0	± 9.6 %
		Y	6.96	78.04	18.65		80.0	
		Z	7.77	79.52	18.59		80.0	
10485-AAA	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	10.18	83.77	21.74	1.99	80.0	± 9.6 %
		Y	6.53	81.04	20.70		80.0	
		Z	8.63	85.83	22.16		80.0	
10486-AAA	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.80	75.85	19.18	1.99	80.0	± 9.6 %
		Y	4.63	73.14	17.52		80.0	
		Z	4.93	74.63	17.85		80.0	
10487-AAA	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	6.74	75.42	19.05	1.99	80.0	± 9.6 %
		Y	4.56	72.57	17.30		80.0	
		Z	4.76	73.82	17.53		80.0	
10488-AAA	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	9.26	81.31	21.14	1.99	80.0	± 9.6 %
		Y	6.04	78.74	20.60		80.0	
		Z	6.88	81.70	21.70		80.0	
10489-AAA	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.70	74.94	19.37	1.99	80.0	± 9.6 %
		Y	4.74	72.58	18.49		80.0	
		Z	4.87	73.80	18.93		80.0	
10490-AAA	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	6.63	74.31	19.19	1.99	80.0	± 9.6 %
		Y	4.78	72.20	18.37		80.0	
		Z	4.88	73.31	18.77		80.0	
10491-AAA	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.99	77.79	20.04	1.99	80.0	± 9.6 %
		Y	5.54	75.44	19.58		80.0	
		Z	5.85	77.18	20.31		80.0	
10492-AAA	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.64	73.40	18.97	1.99	80.0	± 9.6 %
		Y	4.89	71.22	18.27		80.0	
		Z	4.91	72.02	18.60		80.0	

10493-AAA	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	6.63	73.05	18.88	1.99	80.0	± 9.6 %
		Y	4.93	70.98	18.19		80.0	
		Z	4.94	71.73	18.50		80.0	
10494-AAA	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	9.25	79.94	20.55	1.99	80.0	± 9.6 %
		Y	6.29	77.48	20.14		80.0	
		Z	6.82	79.60	20.99		80.0	
10495-AAA	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.90	74.24	19.21	1.99	80.0	± 9.6 %
		Y	5.00	71.81	18.51		80.0	
		Z	5.02	72.61	18.86		80.0	
10496-AAA	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	6.80	73.58	19.03	1.99	80.0	± 9.6 %
		Y	5.02	71.34	18.37		80.0	
		Z	5.02	72.06	18.68		80.0	
10497-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	8.70	81.61	20.39	1.99	80.0	± 9.6 %
		Y	3.68	72.36	15.74		80.0	
		Z	3.73	72.83	15.43		80.0	
10498-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.14	74.45	17.47	1.99	80.0	± 9.6 %
		Y	2.42	64.76	11.65		80.0	
		Z	2.01	63.29	10.42		80.0	
10499-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	6.10	74.03	17.25	1.99	80.0	± 9.6 %
		Y	2.34	64.14	11.24		80.0	
		Z	1.93	62.60	9.95		80.0	
10500-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	9.20	81.83	21.24	1.99	80.0	± 9.6 %
		Y	6.05	79.44	20.47		80.0	
		Z	7.38	83.28	21.74		80.0	
10501-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.68	75.21	19.15	1.99	80.0	± 9.6 %
		Y	4.68	72.89	17.89		80.0	
		Z	4.92	74.35	18.29		80.0	
10502-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	6.61	74.73	18.98	1.99	80.0	± 9.6 %
		Y	4.69	72.56	17.72		80.0	
		Z	4.90	73.90	18.06		80.0	
10503-AAA	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	9.12	81.09	21.05	1.99	80.0	± 9.6 %
		Y	5.94	78.46	20.49		80.0	
		Z	6.74	81.37	21.57		80.0	
10504-AAA	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.67	74.86	19.32	1.99	80.0	± 9.6 %
		Y	4.71	72.47	18.43		80.0	
		Z	4.83	73.67	18.86		80.0	
10505-AAA	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	6.59	74.22	19.14	1.99	80.0	± 9.6 %
		Y	4.75	72.08	18.31		80.0	
		Z	4.84	73.19	18.70		80.0	
10506-AAA	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	9.16	79.78	20.48	1.99	80.0	± 9.6 %
		Y	6.22	77.28	20.05		80.0	
		Z	6.73	79.37	20.90		80.0	
10507-AAA	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.87	74.17	19.18	1.99	80.0	± 9.6 %
		Y	4.97	71.74	18.47		80.0	
		Z	5.00	72.54	18.82		80.0	

10508-AAA	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	6.78	73.51	18.99	1.99	80.0	± 9.6 %
		Y	5.00	71.26	18.32		80.0	
		Z	4.99	71.98	18.64		80.0	
10509-AAA	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	8.19	76.69	19.48	1.99	80.0	± 9.6 %
		Y	5.96	74.56	19.11		80.0	
		Z	6.18	75.85	19.67		80.0	
10510-AAA	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	7.09	73.18	18.86	1.99	80.0	± 9.6 %
		Y	5.35	70.96	18.27		80.0	
		Z	5.32	71.51	18.53		80.0	
10511-AAA	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	7.01	72.71	18.76	1.99	80.0	± 9.6 %
		Y	5.36	70.59	18.17		80.0	
		Z	5.32	71.09	18.41		80.0	
10512-AAA	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	9.39	79.21	20.17	1.99	80.0	± 9.6 %
		Y	6.60	76.78	19.74		80.0	
		Z	7.04	78.51	20.46		80.0	
10513-AAA	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	7.22	74.05	19.13	1.99	80.0	± 9.6 %
		Y	5.31	71.48	18.45		80.0	
		Z	5.29	72.06	18.74		80.0	
10514-AAA	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	7.01	73.30	18.95	1.99	80.0	± 9.6 %
		Y	5.25	70.89	18.29		80.0	
		Z	5.21	71.40	18.54		80.0	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	1.01	63.76	15.28	0.00	150.0	± 9.6 %
		Y	0.99	62.98	14.53		150.0	
		Z	1.00	63.68	15.06		150.0	
10516-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	X	0.80	75.28	19.93	0.00	150.0	± 9.6 %
		Y	0.58	68.61	16.24		150.0	
		Z	0.70	72.93	18.74		150.0	
10517-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	X	0.91	66.46	16.32	0.00	150.0	± 9.6 %
		Y	0.83	64.68	15.01		150.0	
		Z	0.86	65.89	15.88		150.0	
10518-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	4.89	66.93	16.38	0.00	150.0	± 9.6 %
		Y	4.64	66.79	16.26		150.0	
		Z	4.58	67.02	16.34		150.0	
10519-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	X	5.17	67.29	16.52	0.00	150.0	± 9.6 %
		Y	4.84	67.06	16.39		150.0	
		Z	4.77	67.26	16.46		150.0	
10520-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	X	5.01	67.26	16.44	0.00	150.0	± 9.6 %
		Y	4.69	67.02	16.31		150.0	
		Z	4.62	67.22	16.38		150.0	
10521-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	X	4.93	67.28	16.44	0.00	150.0	± 9.6 %
		Y	4.62	67.01	16.29		150.0	
		Z	4.55	67.22	16.37		150.0	
10522-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	X	4.95	67.09	16.39	0.00	150.0	± 9.6 %
		Y	4.68	67.06	16.36		150.0	
		Z	4.61	67.31	16.46		150.0	

10523-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	X	4.83	67.13	16.32	0.00	150.0	± 9.6 %
		Y	4.55	66.92	16.20		150.0	
		Z	4.49	67.17	16.30		150.0	
10524-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	X	4.91	67.07	16.40	0.00	150.0	± 9.6 %
		Y	4.62	66.99	16.33		150.0	
		Z	4.55	67.23	16.42		150.0	
10525-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	4.83	66.16	16.01	0.00	150.0	± 9.6 %
		Y	4.59	66.02	15.91		150.0	
		Z	4.54	66.27	16.01		150.0	
10526-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	5.08	66.58	16.15	0.00	150.0	± 9.6 %
		Y	4.78	66.41	16.06		150.0	
		Z	4.71	66.64	16.15		150.0	
10527-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	X	5.00	66.62	16.14	0.00	150.0	± 9.6 %
		Y	4.69	66.37	16.00		150.0	
		Z	4.63	66.60	16.10		150.0	
10528-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	X	5.02	66.63	16.17	0.00	150.0	± 9.6 %
		Y	4.71	66.39	16.04		150.0	
		Z	4.65	66.62	16.13		150.0	
10529-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	X	5.02	66.63	16.17	0.00	150.0	± 9.6 %
		Y	4.71	66.39	16.04		150.0	
		Z	4.65	66.62	16.13		150.0	
10531-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	X	5.05	66.78	16.18	0.00	150.0	± 9.6 %
		Y	4.71	66.51	16.06		150.0	
		Z	4.64	66.73	16.14		150.0	
10532-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	X	4.92	66.80	16.21	0.00	150.0	± 9.6 %
		Y	4.57	66.36	15.99		150.0	
		Z	4.50	66.58	16.08		150.0	
10533-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	X	5.04	66.62	16.13	0.00	150.0	± 9.6 %
		Y	4.72	66.42	16.02		150.0	
		Z	4.66	66.67	16.12		150.0	
10534-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	5.50	66.89	16.23	0.00	150.0	± 9.6 %
		Y	5.25	66.56	16.12		150.0	
		Z	5.18	66.72	16.18		150.0	
10535-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	5.61	67.07	16.29	0.00	150.0	± 9.6 %
		Y	5.32	66.72	16.19		150.0	
		Z	5.26	66.91	16.27		150.0	
10536-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	X	5.45	67.03	16.27	0.00	150.0	± 9.6 %
		Y	5.18	66.67	16.15		150.0	
		Z	5.12	66.85	16.22		150.0	
10537-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	X	5.51	66.97	16.23	0.00	150.0	± 9.6 %
		Y	5.25	66.66	16.15		150.0	
		Z	5.18	66.81	16.21		150.0	
10538-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	X	5.66	67.09	16.33	0.00	150.0	± 9.6 %
		Y	5.35	66.71	16.21		150.0	
		Z	5.27	66.83	16.26		150.0	
10540-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	X	5.52	66.96	16.29	0.00	150.0	± 9.6 %
		Y	5.27	66.69	16.22		150.0	
		Z	5.21	66.87	16.29		150.0	

10541-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	X	5.54	67.03	16.32	0.00	150.0	± 9.6 %
		Y	5.24	66.55	16.14		150.0	
		Z	5.17	66.72	16.20		150.0	
10542-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	X	5.66	66.95	16.30	0.00	150.0	± 9.6 %
		Y	5.40	66.64	16.20		150.0	
		Z	5.33	66.79	16.25		150.0	
10543-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	X	5.85	67.19	16.42	0.00	150.0	± 9.6 %
		Y	5.49	66.69	16.24		150.0	
		Z	5.41	66.83	16.30		150.0	
10544-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	5.73	67.00	16.21	0.00	150.0	± 9.6 %
		Y	5.55	66.66	16.11		150.0	
		Z	5.50	66.82	16.17		150.0	
10545-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	5.97	67.35	16.30	0.00	150.0	± 9.6 %
		Y	5.77	67.14	16.30		150.0	
		Z	5.70	67.27	16.35		150.0	
10546-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	X	5.89	67.40	16.36	0.00	150.0	± 9.6 %
		Y	5.63	66.93	16.21		150.0	
		Z	5.56	67.04	16.25		150.0	
10547-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	X	5.98	67.45	16.37	0.00	150.0	± 9.6 %
		Y	5.72	67.02	16.25		150.0	
		Z	5.63	67.08	16.26		150.0	
10548-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	X	6.20	68.21	16.72	0.00	150.0	± 9.6 %
		Y	6.10	68.30	16.85		150.0	
		Z	5.92	68.12	16.75		150.0	
10550-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	X	5.90	67.28	16.30	0.00	150.0	± 9.6 %
		Y	5.65	66.91	16.21		150.0	
		Z	5.59	67.06	16.27		150.0	
10551-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	X	5.89	67.30	16.27	0.00	150.0	± 9.6 %
		Y	5.66	66.95	16.19		150.0	
		Z	5.60	67.09	16.24		150.0	
10552-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	X	5.82	67.18	16.24	0.00	150.0	± 9.6 %
		Y	5.56	66.72	16.09		150.0	
		Z	5.51	66.88	16.15		150.0	
10553-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	X	5.91	67.18	16.26	0.00	150.0	± 9.6 %
		Y	5.65	66.78	16.14		150.0	
		Z	5.59	66.92	16.19		150.0	
10554-AAA	IEEE 1602.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	X	6.12	67.39	16.31	0.00	150.0	± 9.6 %
		Y	5.96	67.06	16.22		150.0	
		Z	5.91	67.18	16.26		150.0	
10555-AAA	IEEE 1602.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	X	6.35	67.90	16.52	0.00	150.0	± 9.6 %
		Y	6.10	67.40	16.36		150.0	
		Z	6.04	67.50	16.40		150.0	
10556-AAA	IEEE 1602.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	X	6.31	67.76	16.45	0.00	150.0	± 9.6 %
		Y	6.12	67.42	16.37		150.0	
		Z	6.06	67.55	16.41		150.0	
10557-AAA	IEEE 1602.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	X	6.32	67.78	16.49	0.00	150.0	± 9.6 %
		Y	6.09	67.35	16.35		150.0	
		Z	6.02	67.44	16.38		150.0	

10558-AAA	IEEE 1602.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	X	6.37	67.94	16.58	0.00	150.0	± 9.6 %
		Y	6.15	67.54	16.46		150.0	
		Z	6.07	67.61	16.48		150.0	
10560-AAA	IEEE 1602.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	X	6.41	67.89	16.59	0.00	150.0	± 9.6 %
		Y	6.13	67.35	16.40		150.0	
		Z	6.06	67.45	16.43		150.0	
10561-AAA	IEEE 1602.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	X	6.29	67.78	16.58	0.00	150.0	± 9.6 %
		Y	6.06	67.32	16.43		150.0	
		Z	5.99	67.43	16.46		150.0	
10562-AAA	IEEE 1602.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	X	6.44	68.21	16.80	0.00	150.0	± 9.6 %
		Y	6.22	67.82	16.68		150.0	
		Z	6.12	67.82	16.66		150.0	
10563-AAA	IEEE 1602.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	X	6.59	68.18	16.73	0.00	150.0	± 9.6 %
		Y	6.63	68.58	17.01		150.0	
		Z	6.34	68.11	16.76		150.0	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	5.25	67.12	16.59	0.46	150.0	± 9.6 %
		Y	4.98	66.92	16.45		150.0	
		Z	4.92	67.13	16.52		150.0	
10565-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	X	5.57	67.65	16.90	0.46	150.0	± 9.6 %
		Y	5.23	67.39	16.77		150.0	
		Z	5.14	67.56	16.83		150.0	
10566-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	X	5.38	67.52	16.73	0.46	150.0	± 9.6 %
		Y	5.06	67.25	16.60		150.0	
		Z	4.98	67.42	16.66		150.0	
10567-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	X	5.40	67.87	17.04	0.46	150.0	± 9.6 %
		Y	5.08	67.62	16.93		150.0	
		Z	5.01	67.79	16.99		150.0	
10568-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	X	5.28	67.17	16.47	0.46	150.0	± 9.6 %
		Y	4.98	67.02	16.37		150.0	
		Z	4.90	67.24	16.46		150.0	
10569-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	X	5.33	67.87	17.05	0.46	150.0	± 9.6 %
		Y	5.03	67.67	16.98		150.0	
		Z	4.97	67.89	17.06		150.0	
10570-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	X	5.37	67.60	16.95	0.46	150.0	± 9.6 %
		Y	5.07	67.53	16.92		150.0	
		Z	5.00	67.73	16.99		150.0	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	1.66	68.44	17.44	0.46	130.0	± 9.6 %
		Y	1.33	65.54	16.01		130.0	
		Z	1.35	66.28	16.53		130.0	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	1.71	69.24	17.84	0.46	130.0	± 9.6 %
		Y	1.36	66.15	16.37		130.0	
		Z	1.37	66.96	16.93		130.0	
10573-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	X	23.25	116.08	31.04	0.46	130.0	± 9.6 %
		Y	2.80	86.95	23.21		130.0	
		Z	7.22	103.82	28.80		130.0	
10574-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	X	2.45	78.44	21.67	0.46	130.0	± 9.6 %
		Y	1.56	72.17	19.23		130.0	
		Z	1.66	74.16	20.33		130.0	

10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	5.08	67.00	16.69	0.46	130.0	± 9.6 %
		Y	4.80	66.81	16.56		130.0	
		Z	4.73	67.01	16.63		130.0	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	5.11	67.18	16.76	0.46	130.0	± 9.6 %
		Y	4.82	66.96	16.62		130.0	
		Z	4.76	67.17	16.69		130.0	
10577-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	X	5.40	67.54	16.94	0.46	130.0	± 9.6 %
		Y	5.04	67.27	16.80		130.0	
		Z	4.96	67.45	16.85		130.0	
10578-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	X	5.29	67.72	17.03	0.46	130.0	± 9.6 %
		Y	4.94	67.44	16.89		130.0	
		Z	4.86	67.61	16.95		130.0	
10579-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	X	5.09	67.24	16.49	0.46	130.0	± 9.6 %
		Y	4.71	66.78	16.24		130.0	
		Z	4.63	66.96	16.30		130.0	
10580-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	X	5.13	67.14	16.47	0.46	130.0	± 9.6 %
		Y	4.76	66.78	16.25		130.0	
		Z	4.68	67.00	16.33		130.0	
10581-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	X	5.24	67.96	17.05	0.46	130.0	± 9.6 %
		Y	4.84	67.49	16.84		130.0	
		Z	4.76	67.68	16.91		130.0	
10582-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	X	5.05	66.95	16.29	0.46	130.0	± 9.6 %
		Y	4.66	66.55	16.03		130.0	
		Z	4.58	66.73	16.10		130.0	
10583-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	5.08	67.00	16.69	0.46	130.0	± 9.6 %
		Y	4.80	66.81	16.56		130.0	
		Z	4.73	67.01	16.63		130.0	
10584-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	5.11	67.18	16.76	0.46	130.0	± 9.6 %
		Y	4.82	66.96	16.62		130.0	
		Z	4.76	67.17	16.69		130.0	
10585-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	X	5.40	67.54	16.94	0.46	130.0	± 9.6 %
		Y	5.04	67.27	16.80		130.0	
		Z	4.96	67.45	16.85		130.0	
10586-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	X	5.29	67.72	17.03	0.46	130.0	± 9.6 %
		Y	4.94	67.44	16.89		130.0	
		Z	4.86	67.61	16.95		130.0	
10587-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	X	5.09	67.24	16.49	0.46	130.0	± 9.6 %
		Y	4.71	66.78	16.24		130.0	
		Z	4.63	66.96	16.30		130.0	
10588-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	X	5.13	67.14	16.47	0.46	130.0	± 9.6 %
		Y	4.76	66.78	16.25		130.0	
		Z	4.68	67.00	16.33		130.0	
10589-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	X	5.24	67.96	17.05	0.46	130.0	± 9.6 %
		Y	4.84	67.49	16.84		130.0	
		Z	4.76	67.68	16.91		130.0	
10590-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	X	5.05	66.95	16.29	0.46	130.0	± 9.6 %
		Y	4.66	66.55	16.03		130.0	
		Z	4.58	66.73	16.10		130.0	

10591-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	5.23	67.05	16.77	0.46	130.0	± 9.6 %
		Y	4.95	66.86	16.65		130.0	
		Z	4.88	67.05	16.71		130.0	
10592-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	5.44	67.40	16.87	0.46	130.0	± 9.6 %
		Y	5.11	67.20	16.78		130.0	
		Z	5.03	67.39	16.84		130.0	
10593-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	X	5.39	67.43	16.83	0.46	130.0	± 9.6 %
		Y	5.04	67.14	16.68		130.0	
		Z	4.96	67.31	16.73		130.0	
10594-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	X	5.42	67.52	16.93	0.46	130.0	± 9.6 %
		Y	5.09	67.29	16.82		130.0	
		Z	5.01	67.47	16.88		130.0	
10595-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	X	5.44	67.58	16.88	0.46	130.0	± 9.6 %
		Y	5.06	67.25	16.72		130.0	
		Z	4.98	67.43	16.78		130.0	
10596-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	X	5.36	67.53	16.86	0.46	130.0	± 9.6 %
		Y	5.00	67.25	16.73		130.0	
		Z	4.92	67.44	16.79		130.0	
10597-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	X	5.32	67.55	16.82	0.46	130.0	± 9.6 %
		Y	4.95	67.17	16.62		130.0	
		Z	4.87	67.35	16.68		130.0	
10598-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	X	5.31	67.84	17.09	0.46	130.0	± 9.6 %
		Y	4.93	67.41	16.88		130.0	
		Z	4.85	67.56	16.93		130.0	
10599-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	5.98	68.04	17.10	0.46	130.0	± 9.6 %
		Y	5.63	67.46	16.88		130.0	
		Z	5.55	67.59	16.92		130.0	
10600-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	6.16	68.48	17.29	0.46	130.0	± 9.6 %
		Y	5.84	68.13	17.18		130.0	
		Z	5.70	68.07	17.13		130.0	
10601-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	X	6.01	68.11	17.11	0.46	130.0	± 9.6 %
		Y	5.68	67.73	17.00		130.0	
		Z	5.58	67.79	17.01		130.0	
10602-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	X	6.12	68.18	17.08	0.46	130.0	± 9.6 %
		Y	5.77	67.72	16.91		130.0	
		Z	5.68	67.84	16.95		130.0	
10603-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	X	6.27	68.61	17.40	0.46	130.0	± 9.6 %
		Y	5.85	68.00	17.18		130.0	
		Z	5.75	68.10	17.21		130.0	
10604-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	X	5.96	67.89	17.04	0.46	130.0	± 9.6 %
		Y	5.63	67.42	16.88		130.0	
		Z	5.56	67.56	16.93		130.0	
10605-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	X	6.05	68.09	17.15	0.46	130.0	± 9.6 %
		Y	5.76	67.82	17.08		130.0	
		Z	5.68	67.94	17.13		130.0	
10606-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	X	5.81	67.58	16.78	0.46	130.0	± 9.6 %
		Y	5.51	67.17	16.62		130.0	
		Z	5.42	67.25	16.64		130.0	

10607-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	5.04	66.30	16.36	0.46	130.0	± 9.6 %
		Y	4.78	66.14	16.25		130.0	
		Z	4.72	66.37	16.34		130.0	
10608-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	5.30	66.73	16.50	0.46	130.0	± 9.6 %
		Y	4.98	66.56	16.42		130.0	
		Z	4.90	66.77	16.50		130.0	
10609-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	X	5.19	66.70	16.41	0.46	130.0	± 9.6 %
		Y	4.87	66.42	16.27		130.0	
		Z	4.79	66.63	16.35		130.0	
10610-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	X	5.25	66.83	16.55	0.46	130.0	± 9.6 %
		Y	4.92	66.58	16.43		130.0	
		Z	4.84	66.79	16.50		130.0	
10611-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	X	5.20	66.77	16.47	0.46	130.0	± 9.6 %
		Y	4.84	66.40	16.28		130.0	
		Z	4.76	66.60	16.36		130.0	
10612-AAA	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	X	5.21	66.84	16.45	0.46	130.0	± 9.6 %
		Y	4.85	66.56	16.33		130.0	
		Z	4.77	66.77	16.41		130.0	
10613-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	X	5.23	66.80	16.38	0.46	130.0	± 9.6 %
		Y	4.86	66.47	16.23		130.0	
		Z	4.78	66.66	16.30		130.0	
10614-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	X	5.17	67.09	16.66	0.46	130.0	± 9.6 %
		Y	4.79	66.63	16.45		130.0	
		Z	4.72	66.82	16.52		130.0	
10615-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	X	5.19	66.51	16.22	0.46	130.0	± 9.6 %
		Y	4.84	66.23	16.06		130.0	
		Z	4.76	66.45	16.15		130.0	
10616-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	5.70	67.02	16.57	0.46	130.0	± 9.6 %
		Y	5.44	66.69	16.47		130.0	
		Z	5.36	66.82	16.52		130.0	
10617-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	5.80	67.16	16.60	0.46	130.0	± 9.6 %
		Y	5.50	66.84	16.51		130.0	
		Z	5.44	67.03	16.59		130.0	
10618-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	X	5.66	67.20	16.64	0.46	130.0	± 9.6 %
		Y	5.39	66.87	16.55		130.0	
		Z	5.32	67.02	16.60		130.0	
10619-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	X	5.69	67.00	16.48	0.46	130.0	± 9.6 %
		Y	5.42	66.71	16.40		130.0	
		Z	5.34	66.85	16.45		130.0	
10620-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	X	5.85	67.18	16.62	0.46	130.0	± 9.6 %
		Y	5.52	66.78	16.49		130.0	
		Z	5.43	66.87	16.51		130.0	
10621-AAA	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	X	5.81	67.25	16.76	0.46	130.0	± 9.6 %
		Y	5.50	66.84	16.63		130.0	
		Z	5.42	66.97	16.68		130.0	
10622-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	X	5.76	67.22	16.74	0.46	130.0	± 9.6 %
		Y	5.51	67.01	16.71		130.0	
		Z	5.44	67.16	16.77		130.0	

10623-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	X	5.73	67.10	16.58	0.46	130.0	± 9.6 %
		Y	5.38	66.53	16.35		130.0	
		Z	5.32	66.69	16.41		130.0	
10624-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	X	5.85	67.03	16.60	0.46	130.0	± 9.6 %
		Y	5.59	66.76	16.53		130.0	
		Z	5.51	66.88	16.57		130.0	
10625-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	X	6.18	67.71	16.97	0.46	130.0	± 9.6 %
		Y	6.05	68.01	17.20		130.0	
		Z	5.89	67.91	17.13		130.0	
10626-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	5.90	67.04	16.50	0.46	130.0	± 9.6 %
		Y	5.71	66.72	16.41		130.0	
		Z	5.66	66.86	16.46		130.0	
10627-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	6.16	67.44	16.62	0.46	130.0	± 9.6 %
		Y	5.99	67.38	16.70		130.0	
		Z	5.91	67.48	16.73		130.0	
10628-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	X	6.03	67.34	16.53	0.46	130.0	± 9.6 %
		Y	5.77	66.89	16.39		130.0	
		Z	5.70	66.99	16.42		130.0	
10629-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	X	6.14	67.42	16.56	0.46	130.0	± 9.6 %
		Y	5.85	66.95	16.41		130.0	
		Z	5.78	67.06	16.45		130.0	
10630-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	X	6.60	68.90	17.30	0.46	130.0	± 9.6 %
		Y	6.51	69.06	17.46		130.0	
		Z	6.28	68.74	17.29		130.0	
10631-AAA	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	X	6.69	69.20	17.61	0.46	130.0	± 9.6 %
		Y	6.27	68.46	17.35		130.0	
		Z	6.11	68.34	17.28		130.0	
10632-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	X	6.24	67.82	16.94	0.46	130.0	± 9.6 %
		Y	5.94	67.39	16.84		130.0	
		Z	5.87	67.50	16.88		130.0	
10633-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	X	6.15	67.59	16.67	0.46	130.0	± 9.6 %
		Y	5.84	67.04	16.49		130.0	
		Z	5.75	67.11	16.51		130.0	
10634-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	X	6.17	67.68	16.78	0.46	130.0	± 9.6 %
		Y	5.81	67.04	16.55		130.0	
		Z	5.73	67.14	16.58		130.0	
10635-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	X	6.04	67.02	16.21	0.46	130.0	± 9.6 %
		Y	5.71	66.42	15.98		130.0	
		Z	5.62	66.52	16.02		130.0	
10636-AAA	IEEE 1602.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	X	6.29	67.42	16.59	0.46	130.0	± 9.6 %
		Y	6.13	67.13	16.52		130.0	
		Z	6.07	67.23	16.55		130.0	
10637-AAA	IEEE 1602.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	X	6.55	68.03	16.85	0.46	130.0	± 9.6 %
		Y	6.31	67.56	16.71		130.0	
		Z	6.24	67.64	16.74		130.0	
10638-AAA	IEEE 1602.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	X	6.48	67.77	16.71	0.46	130.0	± 9.6 %
		Y	6.31	67.53	16.68		130.0	
		Z	6.23	67.61	16.70		130.0	

10639-AAA	IEEE 1602.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	X	6.52	67.90	16.82	0.46	130.0	± 9.6 %
		Y	6.29	67.48	16.70		130.0	
		Z	6.21	67.54	16.71		130.0	
10640-AAA	IEEE 1602.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	X	6.53	67.94	16.79	0.46	130.0	± 9.6 %
		Y	6.31	67.55	16.68		130.0	
		Z	6.22	67.57	16.67		130.0	
10641-AAA	IEEE 1602.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	X	6.56	67.74	16.70	0.46	130.0	± 9.6 %
		Y	6.32	67.33	16.59		130.0	
		Z	6.26	67.47	16.64		130.0	
10642-AAA	IEEE 1602.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	X	6.66	68.15	17.06	0.46	130.0	± 9.6 %
		Y	6.37	67.62	16.89		130.0	
		Z	6.29	67.69	16.90		130.0	
10643-AAA	IEEE 1602.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	X	6.45	67.77	16.79	0.46	130.0	± 9.6 %
		Y	6.21	67.32	16.65		130.0	
		Z	6.14	67.41	16.67		130.0	
10644-AAA	IEEE 1602.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	X	6.70	68.51	17.19	0.46	130.0	± 9.6 %
		Y	6.43	67.99	17.00		130.0	
		Z	6.30	67.92	16.95		130.0	
10645-AAA	IEEE 1602.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	X	6.82	68.38	17.06	0.46	130.0	± 9.6 %
		Y	6.97	69.10	17.51		130.0	
		Z	6.66	68.59	17.25		130.0	
10646-AAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	X	20.33	96.08	30.98	9.30	60.0	± 9.6 %
		Y	28.65	112.39	37.39		60.0	
		Z	69.08	135.74	44.36		60.0	
10647-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	X	21.13	97.54	31.55	9.30	60.0	± 9.6 %
		Y	28.75	113.30	37.80		60.0	
		Z	67.82	136.37	44.71		60.0	
10648-AAA	CDMA2000 (1x Advanced)	X	1.02	66.50	14.04	0.00	150.0	± 9.6 %
		Y	0.75	63.83	11.28		150.0	
		Z	0.75	64.56	11.47		150.0	

[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.