

# TEST REPORT



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1. Report No : DRRFCC1911-0101

2. Customer

- Name : Point Mobile Co., LTD.
- Address : B-9F, Kabul Great Valley 32 Digital-ro 9-gil, Geumcheon-gu Seoul South Korea 153-709

3. Use of Report : FCC Original Grant

4. Product Name / Model Name : Mobile Computer / PM90G1

FCC ID : V2X-PM90G1

5. Test Method Used : IEEE 1528-2013, FCC SAR KDB Publications (Details in test report)

Test Specification : CFR §2.1093

6. Date of Test : 2019.08.22 ~ 2019.10.10

7. Testing Environment : Refer to appended test report.

8. Test Result : Refer to attached test report.

Affirmation	Tested by Name : BumJun Park		Reviewed by Name : HakMin Kim	 (Signature)
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2019 . 11 . 01 .

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If this report is required to confirmation of authenticity, please contact to [report@dtnc.net](mailto:report@dtnc.net)

## **Test Report Version**

<b>Test Report No.</b>	<b>Date</b>	<b>Description</b>
DRRFCC1911-0101	Nov. 01, 2019	Initial issue

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## 1. DESCRIPTION OF DEVICE

### 1.1 General Information

EUT type	Mobile Computer			
FCC ID	V2X-PM90G1			
Equipment model name	PM90G1			
Equipment add model name	N/A			
Equipment serial no.	Identical prototype			
Mode(s) of Operation	GSM 850, GSM 1900, WCDMA 850, WCDMA 1700, WCDMA 1900, LTE Band 12, 17, 13, 14, 26, 5, 4, 25, 2, 7, 41, 2.4 G W-LAN (802.11b/g/n-HT20/n-HT40/ac-VHT20/ac-VHT40), 5 G W-LAN (802.11a/n-HT20/n-HT40/ac-VHT20/ac-VHT40/ac-VHT80), Bluetooth			
	Band	Mode	Operating Modes	Bandwidth
TX Frequency Range	GSM 850	GSM/GPRS/EDGE	Voice/Data	-
	GSM 1900	GSM/GPRS/EDGE	Voice/Data	-
	WCDMA 850	WCDMA	Voice/Data	-
	WCDMA 1700	WCDMA	Voice/Data	-
	WCDMA 1900	WCDMA	Voice/Data	-
	LTE Band 12	LTE	Voice/Data	1.4/3/5/10MHz
	LTE Band 17	LTE	Voice/Data	5/10MHz
	LTE Band 13	LTE	Voice/Data	5/10MHz
	LTE Band 14	LTE	Voice/Data	5/10MHz
	LTE Band 26	LTE	Voice/Data	1.4/3/5/10/15MHz
	LTE Band 5	LTE	Voice/Data	1.4/3/5/10MHz
	LTE Band 4	LTE	Voice/Data	1.4/3/5/10/15/20MHz
	LTE Band 25	LTE	Voice/Data	1.4/3/5/10/15/20MHz
	LTE Band 2	LTE	Voice/Data	1.4/3/5/10/15/20MHz
	LTE Band 7	LTE	Voice/Data	5/10/15/20MHz
	LTE Band 41	LTE	Voice/Data	5/10/15/20MHz
	2.4 GHz W-LAN	802.11b/g/n/ac	Voice/Data	HT20/VHT20
		802.11a/n/ac	Voice/Data	2412 - 2462 MHz
RX Frequency Range	5.2 GHz W-LAN	802.11n/ac	Voice/Data	HT20/VHT20
		802.11ac	Voice/Data	5180 - 5240 MHz
		802.11ac	Voice/Data	5190 - 5230 MHz
	5.3 GHz W-LAN	802.11a/n/ac	Voice/Data	VHT80
		802.11n/ac	Voice/Data	5210 MHz
		802.11ac	Voice/Data	5260 - 5320 MHz
	5.6 GHz W-LAN	802.11a/n/ac	Voice/Data	5270 - 5310 MHz
		802.11n/ac	Voice/Data	5530 - 5690 MHz
		802.11ac	Voice/Data	5550 - 5720 MHz
	5.8 GHz W-LAN	802.11a/n/ac	Voice/Data	5745 - 5825 MHz
		802.11n/ac	Voice/Data	5755 - 5795 MHz
		802.11ac	Voice/Data	5775 MHz
	Bluetooth	-	Data	-
RX Frequency Range	GSM 850	GSM/GPRS/EDGE	Voice/Data	-
	GSM 1900	GSM/GPRS/EDGE	Voice/Data	-
	WCDMA 850	WCDMA	Voice/Data	-
	WCDMA 1700	WCDMA	Voice/Data	-
	WCDMA 1900	WCDMA	Voice/Data	-
	LTE Band 12	LTE	Voice/Data	1.4/3/5/10MHz
	LTE Band 17	LTE	Voice/Data	5/10MHz
	LTE Band 13	LTE	Voice/Data	5/10MHz
	LTE Band 14	LTE	Voice/Data	5/10MHz
	LTE Band 26	LTE	Voice/Data	1.4/3/5/10/15MHz
	LTE Band 5	LTE	Voice/Data	1.4/3/5/10MHz
	LTE Band 4	LTE	Voice/Data	1.4/3/5/10/15/20MHz
	LTE Band 25	LTE	Voice/Data	1.4/3/5/10/15/20MHz
	LTE Band 2	LTE	Voice/Data	1.4/3/5/10/15/20MHz
	LTE Band 7	LTE	Voice/Data	5/10/15/20MHz
	LTE Band 41	LTE	Voice/Data	5/10/15/20MHz
	2.4 GHz W-LAN	802.11b/g/n/ac	Voice/Data	HT20/VHT20
		802.11a/n/ac	Voice/Data	2412 - 2462 MHz
	5.2 GHz W-LAN	802.11n/ac	Voice/Data	HT20/VHT20
		802.11ac	Voice/Data	5180 - 5240 MHz
		802.11ac	Voice/Data	5190 - 5230 MHz
	5.3 GHz W-LAN	802.11a/n/ac	Voice/Data	VHT80
		802.11n/ac	Voice/Data	5210 MHz
		802.11ac	Voice/Data	5260 - 5320 MHz
	5.6 GHz W-LAN	802.11a/n/ac	Voice/Data	5270 - 5310 MHz
		802.11n/ac	Voice/Data	5530 - 5690 MHz
		802.11ac	Voice/Data	5550 - 5720 MHz
	5.8 GHz W-LAN	802.11a/n/ac	Voice/Data	5745 - 5825 MHz
		802.11n/ac	Voice/Data	5755 - 5795 MHz
		802.11ac	Voice/Data	5775 MHz
	Bluetooth	-	Data	-

## SAR Summary Table

Equipment Class	Band	Reported SAR			
		1g SAR (W/kg)			10g SAR (W/kg)
		Head	Body-Worn	Hotspot	
PCE	GSM 850	0.29	0.19	-	-
PCE	GRPS 850	0.39	0.31	0.45	-
PCE	GSM 1900	0.26	0.23	-	-
PCE	GRPS 1900	0.34	0.29	0.60	-
PCE	WCDMA 850	0.36	0.30	0.53	-
PCE	WCDMA 1700	0.64	<b>0.56</b>	<b>0.98</b>	-
PCE	WCDMA 1900	0.47	0.54	0.94	-
PCE	LTE Band 12	0.19	0.27	0.38	-
PCE	LTE Band 17	-	-	-	-
PCE	LTE Band 13	0.27	0.36	0.44	-
PCE	LTE Band 14	0.29	0.33	0.36	-
PCE	LTE Band 26	0.34	0.29	0.43	-
PCE	LTE Band 5	-	-	-	-
PCE	LTE Band 4	0.36	0.32	0.65	-
PCE	LTE Band 25	0.32	0.46	0.90	-
PCE	LTE Band 2	-	-	-	-
PCE	LTE Band 7	0.12	0.32	0.56	-
PCE	LTE Band 41	0.10	0.19	0.44	-
DTS	2.4 GHz W-LAN	0.27	< 0.1	0.12	-
U-NII-1	5.2 GHz W-LAN	-	-	0.71	-
U-NII-2A	5.3 GHz W-LAN	<b>1.11</b>	0.26	-	<b>1.35</b>
U-NII-2C	5.6 GHz W-LAN	0.76	0.25	-	1.14
U-NII-3	5.8 GHz W-LAN	0.69	0.15	0.55	-
DSS	Bluetooth	< 0.1	< 0.1	< 0.1	-
Simultaneous SAR per KDB 690783 D01v01r03		<b>1.56</b>	<b>0.81</b>	<b>1.14</b>	-
FCC Equipment Class	Licensed Portable Transmitter Held to Ear (PCE) Part 15 Spread Spectrum Transmitter(DSS) Digital Transmission System(DTS) Unlicensed National Information Infrastructure (UNII)				
Date(s) of Tests	2019.08.22 ~ 2019.10.10				
Antenna Type	Internal Antenna				
Functions	<ul style="list-style-type: none"> <li>● GSM/GPRS/EDGE (GPRS/EDGE Class: 33) supported. * DTM not supported.</li> <li>● No simultaneous transmission between BT &amp; 2.4GHz WLAN</li> <li>● Simultaneous transmission between [GSM, WCDMA voice &amp; WLAN], [GPRS, WCDMA &amp; WLAN], [LTE &amp; WLAN].</li> <li>● VoIP is supported.</li> <li>● WLAN 2.4GHz is supported Hotspot.</li> <li>● WLAN 5 GHz is supported Hotspot in UNII B1, B3.</li> </ul>				

## 1.2 Power Reduction for SAR

This device utilizes a power reduction mechanism for some wireless modes and bands for SAR compliance under portable hotspot conditions. All hotspot SAR evaluations for this device were performed at the maximum allowed output power when hotspot is enabled. Detailed descriptions of the power reduction mechanism are included in the operational description.

## 1.3 Nominal and Maximum Output Power Specifications

The Nominal and Maximum Output Power Specifications are in section 9 of this test report.

## 1.4 DUT Antenna Locations

The overall dimensions of this device are > 9 x 5 cm. A diagram showing the location of the device of the device antenna can be found in V2X-PM90G1\_Antenna Location. Since the diagonal dimension of this device is > 160 mm and < 200 mm. it is considered a "phablet".

Mode	Device Sides for SAR Testing					
	Top	Bottom	Front	Rear	Right	Left
GSM/GPRS/EDGE 850	X	O	O	O	O	O
GSM/GPRS/EDGE 1900	X	O	O	O	O	O
WCDMA 850	X	O	O	O	O	O
WCDMA 1700	X	O	O	O	O	O
WCDMA 1900	X	O	O	O	O	O
LTE Band 12	X	O	O	O	O	O
LTE Band 17	X	O	O	O	O	O
LTE Band 13	X	O	O	O	O	O
LTE Band 14	X	O	O	O	O	O
LTE Band 26	X	O	O	O	O	O
LTE Band 5	X	O	O	O	O	O
LTE Band 4	X	O	O	O	O	O
LTE Band 25	X	O	O	O	O	O
LTE Band 2	X	O	O	O	O	O
LTE Band 7	X	O	O	O	O	O
LTE Band 41	X	O	O	O	O	O
2.4G W-LAN	O	X	O	O	X	O
5G W-LAN	O Note 2	X	O	O	X	O Note 2
Bluetooth	O	X	O	O	X	O

Note 1: Particular DUT edges were not required to be evaluated for Hotspot SAR or Phablet SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 648474 D04v01r03. The antenna document shows the distances between the transmit antennas and the edges of the device.

Note 2: WLAN Hotspot UNII-1, 3 supported.

Note 3: O - Test / X - Not test.

Note 4: This DUT has NFC operations. The NFC antenna is integrated into the back side.

The SAR tests were performed with NFC antenna already incorporated.

A diagram showing the location of the device antenna can be found in V2X-PM90G1\_Antenna Location.

## 1.5 Simultaneous Transmission Capabilities

The Simultaneous Transmission Capabilities are in section 12 of this test report.

## 1.6 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 2.4GHz, U-NII-1, 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.

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

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

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, body-worn **Bluetooth SAR was not required**;  $[(3/15)*\sqrt{2.480}] = 0.3 (< 3.0)$  and hotspot **Bluetooth SAR was not required**;  $[(3/10)*\sqrt{2.480}] = 0.5 (< 3.0)$ . Per KDB Publication 447498 D01 v06, the maximum power of the channel was rounded to the nearest mW before calculation.

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

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

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, phablet **Bluetooth SAR was not required**;  $[(3/5)*\sqrt{2.480}] = 1.0 (< 7.5)$ . Per KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.

Per FCC KDB Publication 648474 D04v01r03, this device is considered a “phablet” since the diagonal dimension is greater than 160 mm and less than 200 mm. Phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Because wireless router operations are not supported for U-NII-2A & U-NII-2C phablet SAR tests were performed. Phablet SAR was not evaluated for 2.4 GHz WLAN operations since wireless router 1g SAR was < 1.2 W/kg.

## (B) Licensed Transmitter(s)

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

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

Per FCC KDB Publication 648474 D04 v01r03, this device is considered a "phablet" since the diagonal dimension is greater than 160 mm and less than 200 mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg.

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

## 1.7 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 941225 D01v03r01 (3G SAR Procedures)
- FCC KDB Publication 941225 D05v02r05 (SAR for LTE Devices)
- FCC KDB Publication 941225 D05Av01r02 (LTE Rel.10 KDB Inquiry Sheet)
- FCC KDB Publication 941225 D06v02r01(Hotspot Mode)
- FCC KDB Publication 248227 D01v02r02 (802.11 Wi-Fi SAR)
- FCC KDB Publication 447498 D01v06 (General RF Exposure Guidance)
- FCC KDB Publication 648474 D04v01r03 (Handset SAR)
- FCC KDB Publication 690783 D01v01r03 (SAR Listings on Grants)
- FCC KDB Publication 865664 D01v01r04 (SAR Measurement 100 MHz to 6 GHz)
- FCC KDB Publication 865664 D02v01r02 (RF Exposure Reporting)
- October 2013 TCB Workshop Notes (GPRS testing criteria)
- April 2015 TCB Workshop Notes (Simultaneous transmission summation clarified)
- October 2016 TCB Workshop Notes (Bluetooth Duty Factor)
- April 2019 TCB Workshop Notes (Tissue Simulating Liquids)

## 1.8 Device Serial Numbers

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

## 2. LTE INFORMATION

LTE Information					
FCC ID	V2X-PM90G1				
Form Factor	Mobile Computer				
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 14 (790.5 ~ 795.5 MHz) LTE Band 26 (Cell) (814.7 ~ 848.3 MHz) LTE Band 5 (Cell) (824.7 ~ 848.3 MHz) LTE Band 4 (AWS) (1710.7 ~ 1754.3 MHz) LTE Band 25 (PCS) (1850.7 ~ 1914.3 MHz) LTE Band 2 (PCS) (1850.7 ~ 1909.3 MHz) LTE Band 7 (2502.5 ~ 2567.5 MHz) LTE Band 41 (2498.5 ~ 2687.5 MHz)				
Channel Bandwidths	LTE Band 12 : 1.4 MHz, 3 MHz, 5 MHz, 10 MHz LTE Band 17 : 5 MHz, 10 MHz LTE Band 13 : 5 MHz, 10 MHz LTE Band 14 : 5 MHz, 10 MHz LTE Band 26 : 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz LTE Band 5 : 1.4 MHz, 3 MHz, 5 MHz, 10 MHz LTE Band 4 : 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz LTE Band 25 : 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz LTE Band 2 : 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz LTE Band 7 : 5 MHz, 10 MHz, 15 MHz, 20 MHz LTE Band 41 : 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Number and Frequencies(MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 12: 1.4 MHz	699.7 (23017)	N/A	707.5 (23095)	N/A	715.3 (23173)
LTE Band 12: 3 MHz	700.5 (23025)	N/A	707.5 (23095)	N/A	714.5 (23165)
LTE Band 12: 5 MHz	701.5 (23035)	N/A	707.5 (23095)	N/A	713.5 (23155)
LTE Band 12: 10 MHz	704.0 (23060)	N/A	707.5 (23095) <sup>Note1</sup>	N/A	711.0 (23130)
LTE Band 17: 5 MHz	706.5(23755)	N/A	710.0(23790)	N/A	713.5(23825)
LTE Band 17: 10 MHz	709.0(23780)	N/A	710.0(23790)	N/A	711.0(23800)
LTE Band 13: 5 MHz	779.5(23205)	N/A	782.0(23230) <sup>Note2</sup>	N/A	784.5(23255)
LTE Band 13: 10 MHz	N/A	N/A	782.0(23230)	N/A	N/A
LTE Band 14: 5 MHz	790.5(23305)	N/A	793.0(23330) <sup>Note3</sup>	N/A	795.0(23355)
LTE Band 14: 10 MHz	N/A	N/A	793.0(23330)	N/A	N/A
LTE Band 26 (Cell): 1.4 MHz	814.7 (26697)	N/A	831.5 (26865)	N/A	848.3 (27033)
LTE Band 26 (Cell): 3 MHz	815.5 (26705)	N/A	831.5 (26865)	N/A	847.5 (27025)
LTE Band 26 (Cell): 5 MHz	816.5 (26715)	N/A	831.5 (26865)	N/A	846.5 (27015)
LTE Band 26 (Cell): 10 MHz	819.0 (26740)	N/A	831.5 (26865)	N/A	844.0 (26990)
LTE Band 26 (Cell): 15 MHz	821.5 (26765)	N/A	831.5 (26865) <sup>Note4</sup>	N/A	841.5 (26965)
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)	N/A	836.5 (20525)	N/A	848.3 (20643)
LTE Band 5 (Cell): 3 MHz	825.5 (20415)	N/A	836.5 (20525)	N/A	847.5 (20635)
LTE Band 5 (Cell): 5 MHz	826.5 (20425)	N/A	836.5 (20525)	N/A	846.5 (20625)
LTE Band 5 (Cell): 10 MHz	829.0 (20450)	N/A	836.5 (20525) <sup>Note5</sup>	N/A	844.0 (20600)
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)	N/A	1732.5 (20175)	N/A	1754.3 (20393)
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)	N/A	1732.5 (20175)	N/A	1753.5 (20385)
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)	N/A	1732.5 (20175)	N/A	1752.5 (20375)
LTE Band 4 (AWS): 10 MHz	1715.0 (20000)	N/A	1732.5 (20175)	N/A	1750.0 (20350)
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)	N/A	1732.5 (20175)	N/A	1747.5 (20325)
LTE Band 4 (AWS): 20 MHz	1720.0 (20050)	N/A	1732.5 (20175) <sup>Note6</sup>	N/A	1745.0 (20300)
LTE Band 25 (PCS): 1.4 MHz	1850.7 (26047)	N/A	1882.5 (26365)	N/A	1914.3 (26683)
LTE Band 25 (PCS): 3 MHz	1851.5 (26055)	N/A	1882.5 (26365)	N/A	1913.5 (26675)
LTE Band 25 (PCS): 5 MHz	1852.5 (26065)	N/A	1882.5 (26365)	N/A	1912.5 (26665)
LTE Band 25 (PCS): 10 MHz	1855.0 (26090)	N/A	1882.5 (26365)	N/A	1910.0 (26640)
LTE Band 25 (PCS): 15 MHz	1857.5 (26115)	N/A	1882.5 (26365)	N/A	1907.5 (26615)
LTE Band 25 (PCS): 20 MHz	1860.0 (26140)	N/A	1882.5 (26365)	N/A	1905.0 (26590)
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)	N/A	1880.0 (18900)	N/A	1909.3 (19193)
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)	N/A	1880.0 (18900)	N/A	1908.5 (19185)
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)	N/A	1880.0 (18900)	N/A	1907.5 (19175)
LTE Band 2 (PCS): 10 MHz	1855.0 (18650)	N/A	1880.0 (18900)	N/A	1905.0 (19150)
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)	N/A	1880.0 (18900)	N/A	1902.5 (19125)
LTE Band 2 (PCS): 20 MHz	1860.0 (18700)	N/A	1880.0 (18900)	N/A	1900.0 (19100)
LTE Band 7: 5 MHz	2502.5 (20775)	N/A	2535.0 (21100)	N/A	2567.5 (21425)
LTE Band 7: 10 MHz	2505.0 (20800)	N/A	2535.0 (21100)	N/A	2565.0 (21400)
LTE Band 7: 15 MHz	2507.5 (20825)	N/A	2535.0 (21100)	N/A	2562.5 (21375)
LTE Band 7: 20 MHz	2510.0 (20850)	N/A	2535.0 (21100)	N/A	2560.0 (21350)
LTE Band 41: 5 MHz	2498.5 (39675)	2545.8 (40148)	2593.0 (40620)	2640.3 (41093)	2687.5 (41565)
LTE Band 41: 10 MHz	2501.0 (39700)	2547.0 (40160)	2593.0 (40620)	2639.0 (41080)	2685.0 (41540)
LTE Band 41: 15 MHz	2503.5 (39725)	2548.3 (40173)	2593.0 (40620)	2637.8 (41068)	2682.5 (41515)
LTE Band 41: 20 MHz	2506.0 (39750)	2549.5 (40185)	2593.0 (40620)	2636.5 (41055)	2680.0 (41490)
UE Category	6				
Modulations Supported in UL	QPSK, 16QAM, 64QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	Yes				
A-MPR (Additional MPR) disabled for SAR Testing?	Yes				
LTE Carrier Aggregation Possible Combinations	LTE Carrier Aggregation is not supported.				
LTE Additional Information	This device does not support CA features on 3GPP Release 10. All uplink communications are identical to the Release 8 Specifications. The following LTE Release 10 Features are not supported: Relay, HetNet, Enhanced MIMO, eICIC, WiFi Offloading, MDH, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

Note(s)  
 1. LTE B12 can not contain three non-overlapping channels of 10 MHz bandwidth.

Per KDB 941225 D05v02r05, 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.

2. LTE B13 can not contain three non-overlapping channels of 5 MHz bandwidth.

Per KDB 941225 D05v02r05, 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.

3. LTE B14 can not contain three non-overlapping channels of 5 MHz bandwidth.

Per KDB 941225 D05v02r05, 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.

4. LTE B26(Cell) can not contain three non-overlapping channels of 15 MHz bandwidth.

Per KDB 941225 D05v02r05, 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.

5. LTE B5(Cell) can not contain three non-overlapping channels of 10 MHz bandwidth.

Per KDB 941225 D05v02r05, 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.

6. LTE B4 (AWS) can not contain three non-overlapping channels of 20 MHz bandwidth.

Per KDB 941225 D05v02r05, 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.

### 3. INTRODUCTION

The FCC and Industry 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.

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. 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. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring 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 National Council on Radiation Protection and Measurements (NCRP) in Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields," NCRP Report No. 86 NCRP, 1986, Bethesda, MD 20814. 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.

#### SAR Definition

Specific Absorption Rate (SAR) 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 ( $\rho$ ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Fig. 3.1)

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

Fig. 3.1 SAR Mathematical Equation

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

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

where:

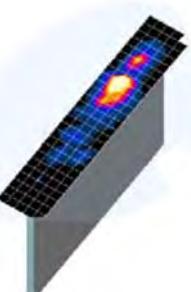
- $\sigma$  = conductivity of the tissue-simulating material (S/m)
- $\rho$  = mass density of the tissue-simulating material (kg/m<sup>3</sup>)
- E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations 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.

## 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:

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 IEEE1528-2013.
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 ( $10 \times 10 \times 10$ ) 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.

**Figure 4.1**  
**Sample SAR Area Scan**

		$\leq 3 \text{ GHz}$	$> 3 \text{ GHz}$
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		$5 \text{ mm} \pm 1 \text{ mm}$	$\frac{1}{2} \cdot \delta \cdot \ln(2) \text{ mm} \pm 0.5 \text{ mm}$
Maximum probe angle from probe axis to phantom surface normal at the measurement location		$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
		$\leq 2 \text{ GHz}: \leq 15 \text{ mm}$ $2 - 3 \text{ GHz}: \leq 12 \text{ mm}$	$3 - 4 \text{ GHz}: \leq 12 \text{ mm}$ $4 - 6 \text{ GHz}: \leq 10 \text{ mm}$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$		When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$		$\leq 2 \text{ GHz}: \leq 8 \text{ mm}$ $2 - 3 \text{ GHz}: \leq 5 \text{ mm}^*$	$3 - 4 \text{ GHz}: \leq 5 \text{ mm}^*$ $4 - 6 \text{ GHz}: \leq 4 \text{ mm}^*$
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$		$3 - 4 \text{ GHz}: \leq 4 \text{ mm}$ $4 - 5 \text{ GHz}: \leq 3 \text{ mm}$ $5 - 6 \text{ GHz}: \leq 2 \text{ mm}$
	graded grid	$\Delta z_{\text{Zoom}}(1): \text{between } 1^{\text{st}} \text{ two points closest to phantom surface}$	$\leq 4 \text{ mm}$
		$\Delta z_{\text{Zoom}}(n>1): \text{between subsequent points}$	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1) \text{ mm}$
Minimum zoom scan volume	x, y, z	$\geq 30 \text{ mm}$	$3 - 4 \text{ GHz}: \geq 28 \text{ mm}$ $4 - 5 \text{ GHz}: \geq 25 \text{ mm}$ $5 - 6 \text{ GHz}: \geq 22 \text{ mm}$

Note:  $\delta$  is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.

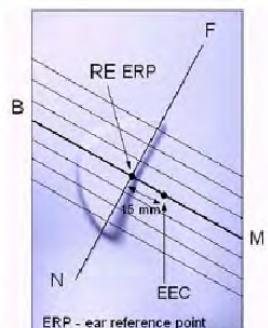
\* When zoom scan is required and the *reported SAR* from the *area scan based 1-g SAR estimation* procedures of KDB Publication 447498 is  $\leq 1.4 \text{ W/kg}$ ,  $\leq 8 \text{ mm}$ ,  $\leq 7 \text{ mm}$  and  $\leq 5 \text{ mm}$  zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Table 4.1 Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04\*

## 5. DEFINITION OF REFERENCE POINTS

### 5.1 Ear Reference Point

Figure 5.1 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 ERPs are 15 mm 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) is perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (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.



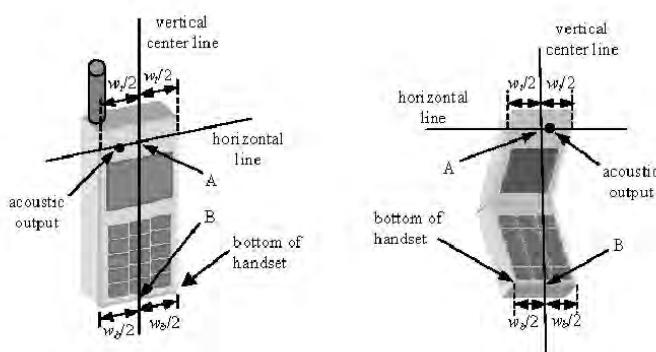
**Figure 5.1**  
Close-up side view  
of ERP

### 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 "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point" (See Fig. 5.3). The "test device reference point" 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 it's 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 SAM Twin Phantom



**Figure 5.3** Handset Vertical Center & Horizontal Line Reference Points

## 6. TEST CONFIGURATION POSITIONS FOR HANDSETS

### 6.1 Device Holder

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

### 6.2 Positioning for Cheek/Touch

1. The test device was positioned with the handset 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.



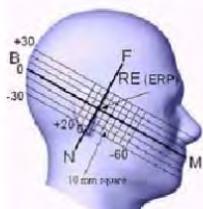
**Figure 6.1 Front, Side and Top View of Cheek/Touch Position**

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the ear.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the plane normal to MB-NF including the line MB (reference plane).
4. The phone was then rotated around the vertical centerline until the phone (horizontal line) was symmetrical with 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 phone contact with the ear, the handset was rotated about the line NF 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 / 15 ° Tilt

With the test device aligned in the “Cheek/Touch 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 15 degree.
2. The phone was then rotated around the horizontal line by 15 degree.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the phone touches 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. 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 6.3).



**Figure 6.2 Side view w/relevant markings**



**Figure 6.3 Front, Side and Top View of Ear/15° Position**

## 6.4 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  $> 1.2 \text{ W/kg}$ , 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.

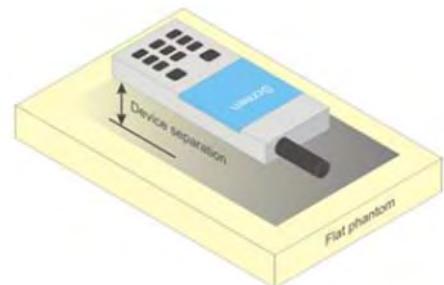


Figure 6.4 Sample Body-Worn Diagram

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.

## 6.5 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.

## 6.6 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 ( $L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$ ) are based on a composite test separation distance of 10 mm from the front the front, rear 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. When the same wireless transmission configuration is used for testing body-worn accessory and hotspot mode SAR, respectively, in voice and data mode, SAR results for the most conservative test separation distance configuration may be used to support both SAR conditions.

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 transmitter 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 KDB Publication 447498 D01v06 procedures. The "Portable Hotspot" feature on the handset was not activated during SAR assessment, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

## 6.7 Phablet Configurations

For smart phones with a display diagonal  $> 150 \text{ mm}$  or an overall diagonal dimension  $> 160 \text{ mm}$  that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the phablets procedures outlined in KDB Publication 648474 D04v01r03 should be applied to evaluate SAR compliance. A device marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. In addition to the normally required head and body-worn accessory SAR test procedures required for handsets, the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna  $\leq 25\text{mm}$  from that surface or edge, in direct contact with the phantom, for 10g SAR. The UMPC mini-tablet 1g SAR at 5 mm is not required. When hotspot mode applies, 10g SAR is required only for the surfaces and edges with hotspot mode 1g SAR  $> 1.2 \text{ W/kg}$ .

## 7. RF EXPOSURE LIMITS

### 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.

### 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 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 8.1.SAR Human Exposure Specified in ANSI/IEEE C95.1-1992**

<b>HUMAN EXPOSURE LIMITS</b>		
	General Public Exposure (W/kg) or (mW/g)	Occupational Exposure (W/kg) or (mW/g)
SPATIAL PEAK SAR * (Brain)	1.60	8.00
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.40
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.00	20.0

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.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

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).

## 8. FCC MEASUREMENT PROCEDURES

Power measurements were 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 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01v03r01.

The device was 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 were 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 was 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 deviated by more than 5%, the SAR test and drift measurements were repeated.

### 8.3 SAR Measurement Conditions for WCDMA (UMTS)

#### 8.3.1 Output Power Verification

Maximum output power is measured on the High, Middle and Low channels for each applicable transmission band according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1s”.

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 (release 5), 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.

#### 8.3.2 Head SAR Measurements for Handsets

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all “1s”. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than 0.25 dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signaling radio bearer) using the exposure configuration that resulted in the highest SAR for that RF channel in the 12.2 kbps RMC mode.

### 8.3.3 Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all “1s”.

### 8.3.4 Release 5 HSDPA Data Devices

The following procedures are applicable to HSDPA data devices operating under 3GPP Release 5. SAR is required for devices in body-worn accessory and other body exposure conditions, including handsets and data modems operating in various electronic devices. HSDPA operates in conjunction with WCDMA and requires an active DPCCH. The default test configuration is to measure SAR in WCDMA with HSDPA remain inactive, to establish a radio link between the test device and a communication test set using a 12.2 kbps RMC configured in Test Loop Mode 1. SAR for HSDPA is selectively measured using the highest reported SAR configuration in WCDMA, with an FRC in H-set 1 and a 12.2 kbps RMC. SAR is selectively confirmed for other physical channel configurations (DPCCH & DPDCHn) according to exposure conditions, device operating capabilities and maximum output power specified for production units, including tune-up tolerance by applying the 3G SAR test reduction procedures. Maximum output power is verified according to the applicable versions of 3GPP TS 34.121. SAR must be measured based on these maximum output conditions and requirements in KDB Publication 447498, with respect to the UE Categories, and explained in the SAR report. When Maximum Power Reduction (MPR) applies, the implementations must be clearly identified in the SAR report to support test results according to Cubic Metric (CM) and, as appropriate, Enhanced MPR (E-MPR) requirements.

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{hs}^{(1)}$	CM (dB) <sup>(2)</sup>
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 <sup>(3)</sup>	15/15 <sup>(3)</sup>	64	12/15 <sup>(3)</sup>	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1:  $\Delta_{ACK}, \Delta_{NACK}$  and  $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$   
Note 2: CM = 1 for  $\beta_c/\beta_d = 12/15, \beta_{hs}/\beta_c = 24/15$ .  
Note 3: For subtest 2 the  $\beta_c/\beta_d$  ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 11/15$  and  $\beta_d = 15/15$ .

Figure 9.1 Table 1

### 8.3.5 Release 6 HSUPA Data Devices

The following procedures are applicable to HSPA (HSUPA/HSDPA) data devices operating under 3GPP Release 6. SAR is required for devices in body-worn accessory and other body exposure conditions, including handsets and data modems operating in various electronic devices. HSUPA operates in conjunction with WCDMA and HSDPA. SAR is initially measured in WCDMA test configurations with HSPA remain inactive. The default test configuration is to establish a radio link between the test device and a communication test set to configure a 12.2 kbps RMC in Test Loop Mode 1. SAR for HSPA is selectively measured with HS-DPCCH, E-DPCCH and E-DPDCH, all enabled, along with a 12.2 kbps RMC using the highest reported SAR configuration in WCDMA with 12.2 kbps RMC only.

An FRC is configured according to HS-DPCCH Sub-test 1 using H-set 1 and QPSK. HSPA is configured according to E-DCH Sub-test 5 requirements. SAR for other HSPA sub-test configurations is confirmed selectively according to exposure conditions, E-DCH UE Category and maximum output power of production units, including tune-up tolerance by applying the 3G SAR test reduction procedure. Maximum output power is verified according to procedures in applicable versions of 3GPP TS 34.121. SAR must be measured based on these maximum output conditions and requirements in KDB Publication 447498, with respect to the UE Categories for HS-DPCCH and HSPA, and explained in the SAR report. When Maximum Power Reduction (MPR) applies, the implementations must be clearly identified in the SAR report to support test results according to Cubic Metric (CM) and, as appropriate, Enhanced MPR (E-MPR) requirements.

Sub-test	$\beta_c$	$\beta_d$	$\beta_a$ (SF)	$\beta_c/\beta_d$	$\beta_{hs}^{(1)}$	$\beta_{ec}$	$\beta_{ed}$	$\beta_{ed}$ (SF)	$\beta_{ed}$ (codes)	CM <sup>(2)</sup>	MPR (dB)	AG <sup>(4)</sup> Index	E-TFCI
1	11/15 <sup>(3)</sup>	15/15 <sup>(3)</sup>	64	11/15 <sup>(3)</sup>	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed}: 47/15$ $\beta_{ad}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15		56/75	4	1	3.0	2.0	17
5	15/15 <sup>(4)</sup>	15/15 <sup>(4)</sup>	64	15/15 <sup>(4)</sup>	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$ .  
 Note 2: CM = 1 for  $\beta_c/\beta_d = 12/15$ ,  $\beta_{hs}/\beta_c = 24/15$ . For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.  
 Note 3: For subtest 1 the  $\beta_c/\beta_d$  ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 10/15$  and  $\beta_d = 15/15$ .  
 Note 4: For subtest 5 the  $\beta_c/\beta_d$  ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 14/15$  and  $\beta_d = 15/15$ .  
 Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.  
 Note 6:  $\beta_{ed}$  cannot be set directly; it is set by Absolute Grant Value.

Figure 9.2 Table 2

### 8.3.6 SAR Measurement Conditions for DC-HSDPA

In the following DB 941225 D01v03r01 procedures, the mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is  $\leq 1/4$  dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is  $\leq 1.2$  W/kg, SAR measurement is not required for the secondary mode. This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as “otherwise” in the applicable procedures; SAR measurement is required for the secondary mode.

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

## 8.4 SAR Measurement Conditions for LTE

LTE modes were tested according to FCC KDB 941225 D05v02r05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR. The call simulator was used for LTE output power measurement 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).

### 8.4.1 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.

### 8.4.2 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.

### 8.4.3 A-MPR

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

### 8.4.4 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  $\leq 0.8 \text{ W/kg}$ , testing of the remaining RB offset configurations and required test channel 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  $> 1.45 \text{ W/kg}$ , 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  $< 0.8 \text{ W/kg}$ . Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is  $> 1.45 \text{ W/kg}$ , the remaining required test channels must also be tested.
- 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 0.5 dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is  $< 1.45 \text{ W/kg}$ .

### 8.4.5 64QAM uplink

(1) Per KDB 941225 D05 V02r05, we'll measure conducted powers per Section 5.1 for all uplink modulations (QPSK, 16QAM, 64QAM) and include in the test report.

(2) From these power measurements, we will apply the procedures in Section 5.2.4 ("Higher Order Modulations") to determine SAR test reduction for 16QAM and 64QAM test cases.

#### 8.4.6 LTE TDD Consideration setup for SAR measurement

According to KDB 941225 D05 SAR for LTE Devices v02r05 for Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with the highest transmission duty factor (63.33 %) using Uplink-downlink configuration 0 and Special subframe configuration 6.

LTE TDD Band 41 supports 3GPP TS 36.211 section 4.2 for Type 2 Frame and Table 4.2-2 for uplink-downlink configuration and Table 4.2-1 for Special subframe configurations.

**Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).**

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	6592 · $T_s$	2192 · $T_s$	2560 · $T_s$	7680 · $T_s$	2192 · $T_s$	2560 · $T_s$
1	19760 · $T_s$			20480 · $T_s$		
2	21952 · $T_s$			23040 · $T_s$		
3	24144 · $T_s$			25600 · $T_s$		
4	26336 · $T_s$			7680 · $T_s$		
5	6592 · $T_s$	4384 · $T_s$	5120 · $T_s$	20480 · $T_s$	4384 · $T_s$	5120 · $T_s$
6	19760 · $T_s$			23040 · $T_s$		
7	21952 · $T_s$			-		
8	24144 · $T_s$			-		

**Table 4.2-2: Uplink-downlink configurations.**

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Calculated Duty Cycle = Extended cyclic prefix in uplink \* ( $T_s$ ) \* # of S + # of U

$T_s = 1/(15000 * 2048)$  seconds

Example for calculated Duty Cycle for Uplink-Downlink Configuration 0:

Calculated Duty Cycle =  $5120 * [1/(15000 * 2048)] * 2 + 6 \text{ ms} = 63.33 \%$

## 8.5 SAR Testing with 802.11 Transmitters

The normal network operating configurations are not suitable for measuring the SAR of 802.11 b/g/n transmitters. 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 248227D01v02r02 for more details.

### 8.5.1 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. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

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.

### 8.5.2 U-NII and U-NII-2A

For devices that operate in only one of the U-NII-1 and U-NII-2A bands, the normally required SAR procedures for OFDM configurations are applied. For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following, with respect to the highest reported SAR and maximum output power specified for production units. The procedures are applied independently to each exposure configuration; for example, head, body, hotspot mode etc.

- 1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is  $\leq 1.2 \text{ W/kg}$ , SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.
- 2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is  $\leq 1.2 \text{ W/kg}$ , SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

### 8.5.3 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 Rader (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. When band gap channels are disabled, each band is tested independently according to the normally required OFDM SAR measurements and probe calibration frequency points requirements.

#### 8.5.4 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 position 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  $\leq 0.4$  W/kg, no additional testing for the remaining test positions is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR position until the reported SAR result is  $\leq 0.8$  W/kg or all test position are measured.

#### 8.5.5 2.4 GHz SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either a 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  $\leq 0.8$  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 exposure configuration 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.

#### 8.5.6 OFDM Transmission Mode and SAR Test Channel Selection

For the 2.4 GHz and 5 GHz bands, 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 and 802.11n 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 or 802.11g then 802.11n is used for SAR measurement. When the maximum output power were 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.

#### 8.5.7 Initial Test Configuration Procedure

For OFDM, in both 2.4 and 5 GHz bands, 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 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, and lowest data rate. 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  $\leq 0.8$  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  $\leq 1.2$  W/kg or all channels are measured.

### 8.5.8 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 applicable. When the highest reported SAR for the initial test configuration, adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power is  $\leq 1.2 \text{ W/kg}$ , no additional SAR testing for the subsequent test configurations is required.

## 9. RF CONDUCTED POWERS

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

### 9.1 GSM Nominal and Maximum Output Power Spec and Conducted Powers

Band & Mode		Voice[dBm]	Burst Average GMSK [dBm]				Burst Average GMSK [dBm]			
		1 TX Slot	1 TX Slot	2 TX Slot	3 TX Slot	4 TX Slot	1 TX Slot	2 TX Slot	3 TX Slot	4 TX Slot
GSM/GPRS/EDGE 850	Maximum	33.0	33.0	31.0	28.5	27.0	26.5	26.5	26.5	26.5
	Nominal	32.5	32.5	30.5	28.0	26.5	26.0	26.0	26.0	26.0
GSM/GPRSEdge 1900	Maximum	30.0	30.0	28.2	26.0	24.0	25.5	25.5	25.5	25.5
	Nominal	29.5	29.5	27.7	25.5	23.5	25.0	25.0	25.0	25.0

Table 9.1.1 GSM Nominal and Maximum Output Power Spec

Band	Channel	Maximum Burst-Averaged Output Power(dBm)								
		Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
			GSM CS 1 Slot	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot	EDGE 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot
GSM850	128	32.65	32.70	30.53	28.24	26.37	26.22	26.08	25.94	25.71
	190	32.61	32.58	30.46	28.38	26.51	26.20	26.01	25.81	25.70
	251	32.49	32.49	30.50	28.39	26.54	26.34	26.22	26.07	25.77
PCS 1900	512	29.77	29.75	27.95	25.88	23.80	24.87	24.61	24.46	24.34
	661	29.72	29.74	27.78	25.63	23.40	24.85	24.66	24.42	24.09
	810	29.51	29.50	27.30	25.12	22.89	24.79	24.57	24.30	24.07
Calculated Maximum Frame-Averaged Output Power(dBm)										
Band	Channel	Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
			GSM CS 1 Slot	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot	EDGE 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot
		128	23.62	23.67	24.51	23.98	23.36	17.19	20.06	21.68
GSM850	190	23.58	23.55	24.44	24.12	23.50	17.17	19.99	21.55	22.69
	251	23.46	23.46	24.48	24.13	23.53	17.31	20.20	21.81	22.76
	512	20.74	20.72	21.93	21.62	20.79	15.84	18.59	20.20	21.33
PCS 1900	661	20.69	20.71	21.76	21.37	20.39	15.82	18.64	20.16	21.08
	810	20.48	20.47	21.28	20.86	19.88	15.76	18.55	20.04	21.06
GSM850	Frame Avg. Targets:	23.47	23.47	24.48	23.74	23.49	16.97	19.98	21.74	22.99
PCS 1900		20.47	20.47	21.68	21.24	20.49	15.97	18.98	20.74	21.99

Table 9.1.2 GSM Conducted Power

Note:

- 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.
- GPRS (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.
- 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.

GPRS Multislot class: 33 (max 4 TX Uplink slots)  
EDGE Multislot class: 33 (max 4 TX Uplink slots)  
DTM Multislot Class: N/A



Figure 9.1 Power Measurement Setup

## 9.2 WCDMA Nominal and Maximum Output Power Spec and Conducted Powers

3GPP Release Version	Mode		Cellular Band (dBm)		AWS Band (dBm)		PCS Band (dBm)		3GPP MPR (dB)
99	WCDMA	Voice	Maximum	24.0	24.0	24.0	24.0	24.0	-
			Nominal	23.5	23.5	23.5	23.5	23.5	
5	HSDPA	Subtest 1	Maximum	24.0	24.0	24.0	24.0	24.0	0
			Nominal	23.5	23.5	23.5	23.5	23.5	
5		Subtest 2	Maximum	24.0	24.0	24.0	24.0	24.0	0
5		Subtest 3	Maximum	23.5	23.5	23.5	23.5	23.5	0.5
5		Subtest 4	Maximum	23.5	23.5	23.5	23.5	23.5	0.5
23.0			Nominal	23.0	23.0	23.0	23.0	23.0	
6	HSUPA	Subtest 1	Maximum	24.0	24.0	24.0	24.0	24.0	0
			Nominal	23.5	23.5	23.5	23.5	23.5	
6		Subtest 2	Maximum	22.0	22.0	22.0	22.0	22.0	2
			Nominal	21.5	21.5	21.5	21.5	21.5	
6		Subtest 3	Maximum	23.0	23.0	23.0	23.0	23.0	1
			Nominal	22.5	22.5	22.5	22.5	22.5	
6	DC-HSDPA	Subtest 4	Maximum	22.0	22.0	22.0	22.0	22.0	2
			Nominal	21.5	21.5	21.5	21.5	21.5	
6		Subtest 5	Maximum	24.0	24.0	24.0	24.0	24.0	0
			Nominal	23.5	23.5	23.5	23.5	23.5	
23.0				23.0	23.0	23.0	23.0	23.0	0.5

Table 9.2.1 WCDMA Nominal and Maximum Output Power Spec

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	23.82	23.85	23.76	23.35	23.37	23.38	23.88	23.89	23.84	-
99		12.2 kbps AMR	23.72	23.74	23.68	23.30	23.31	23.34	23.71	23.74	23.75	-
5	HSDPA	Subtest 1	22.33	22.35	22.25	22.30	22.34	22.35	22.38	22.41	22.30	0
5		Subtest 2	22.33	22.34	22.27	22.29	22.32	22.36	22.39	22.42	22.28	0
5		Subtest 3	21.83	21.86	21.74	21.80	21.84	21.87	21.90	21.95	21.81	0.5
5		Subtest 4	21.84	21.86	21.76	21.80	21.80	21.88	21.93	21.92	21.80	0.5
6	HSUPA	Subtest 1	22.31	22.37	22.26	22.28	22.31	22.37	22.39	22.41	22.28	0
6		Subtest 2	20.34	20.34	20.26	20.32	20.32	20.41	21.42	20.42	20.31	2
6		Subtest 3	21.32	21.37	21.24	21.30	21.32	21.36	21.40	21.43	21.29	1
6		Subtest 4	20.33	20.35	20.26	20.31	20.33	20.41	20.39	20.43	20.30	2
6		Subtest 5	22.32	22.35	22.23	22.30	22.29	22.36	22.39	22.42	22.28	0
8	DC-HSDPA	Subtest 1	22.28	22.31	22.18	22.29	22.30	22.23	22.37	22.35	22.25	0
8		Subtest 2	22.29	22.30	22.17	22.27	22.32	22.28	22.34	22.31	22.28	0
8		Subtest 3	21.86	21.83	21.79	21.81	21.85	21.79	21.86	21.83	21.81	0.5
8		Subtest 4	21.84	21.85	21.78	21.83	21.87	21.80	21.83	21.86	21.80	0.5

Table 9.2.2 WCDMA Conducted Power

WCDMA SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03r01. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

The manufacturer declares that the HSDPA, HSUPA and DC-HSDPA transmitter's power will not exceed the R99 maximum transmit power in devices based on Qualcomm's HSPA chipset solutions.

### DC-HSDPA considerations

- 3GPP Specification 34.121-1 Release 8 Ver 8.10.0 was used for DC-HSDPA guidance.
- H-Set 12 (QPSK) was confirmed to be used during DC-HSDPA measurements.
- The DUT supports UE category 24 for HSDPA.



Figure 9.2 Power Measurement Setup

### 9.3 LTE Nominal and Maximum Output Power Spec and Conducted Powers

Band & Mode			Modulated Average[dBm]
LTE Band 12		Maximum	23.0
		Nominal	22.5

Table 9.3.1.1 Nominal and Maximum Output Power Spec

#### 1) LTE Band 12

LTE Band 12 Conducted Power- 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Mid Channel		MPR Allowed Per 3GPP(dB)	MPR (dB)	
			23095 (707.5 MHz)	Conducted Power (dBm)			
			23095 (707.5 MHz)	Conducted Power (dBm)			
QPSK	1	0	22.49		$\leq 1$	0	
	1	25	22.61				
	1	49	22.59				
	25	0	21.64			1	
	25	12	21.68				
	25	25	21.69				
	50	0	21.63				
16QAM	1	0	21.48		$\leq 1$	1	
	1	25	21.52				
	1	49	21.57				
	25	0	20.58			2	
	25	12	20.56		$\leq 2$		
	25	25	20.50				
	50	0	20.61				
64QAM	1	0	20.38		$\leq 2$	2	
	1	25	20.48				
	1	49	20.42				
	25	0	19.56		$\leq 3$	3	
	25	12	19.58				
	25	25	19.53				
	50	0	19.63				

Table 9.3.1.2 LTE Conducted Power

Note : LTE B12 can not contain three non-overlapping channels of 10 MHz bandwidth.

Per KDB 941225 D05v02r05, 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.

LTE Band 12 Conducted Power- 5 MHz Bandwidth								
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)	
			23035 (701.5 MHz)	23095 (707.5 MHz)	23155 (713.5 MHz)			
			Conducted Power (dBm)					
QPSK	1	0	22.50	22.57	22.48	$\leq 1$	0	
	1	12	22.61	22.64	22.64			
	1	24	22.59	22.58	22.58			
	12	0	21.56	21.65	21.52		1	
	12	6	21.58	21.66	21.64			
	12	13	21.68	21.66	21.62			
	25	0	21.69	21.66	21.52			
16QAM	1	0	21.62	21.69	21.65	$\leq 1$	1	
	1	12	21.76	21.81	21.82			
	1	24	21.72	21.76	21.65			
	12	0	20.56	20.63	20.51		2	
	12	6	20.60	20.68	20.66	$\leq 2$		
	12	13	20.68	20.63	20.62			
	25	0	20.69	20.68	20.55			
64QAM	1	0	20.60	20.64	20.55	$\leq 2$	2	
	1	12	20.74	20.72	20.77			
	1	24	20.71	20.68	20.62			
	12	0	19.60	19.68	19.55	$\leq 3$	3	
	12	6	19.62	19.70	19.70			
	12	13	19.72	19.68	19.65			
	15	0	19.69	19.67	19.55			

Table 9.3.1.3 LTE Conducted Power

LTE Band 12 Conducted Power- 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			23025 (700.5 MHz)	23095 (707.5 MHz)	23165 (714.5 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	22.51	22.59	22.54	$\leq 1$	0
	1	7	22.52	22.60	22.58		1
	1	14	22.52	22.62	22.54		1
	8	0	21.61	21.61	21.56		1
	8	4	21.62	21.66	21.60		1
	8	7	21.53	21.61	21.58		1
	15	0	21.63	21.66	21.60		1
16QAM	1	0	21.67	21.68	21.74	$\leq 1$	1
	1	7	21.63	21.77	21.66		1
	1	14	21.66	21.71	21.66		1
	8	0	20.57	20.63	20.62		2
	8	4	20.64	20.66	20.67	$\leq 2$	2
	8	7	20.59	20.67	20.60		2
	15	0	20.64	20.68	20.66		2
64QAM	1	0	20.66	20.68	20.66	$\leq 2$	2
	1	7	20.63	20.72	20.65		2
	1	14	20.66	20.72	20.64		2
	8	0	19.57	19.65	19.64	$\leq 3$	3
	8	4	19.61	19.68	19.61		3
	8	7	19.60	19.68	19.62		3
	15	0	19.61	19.67	19.63		3

Table 9.3.1.4 LTE Conducted Power

LTE Band 12 Conducted Power- 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			23017 (699.7 MHz)	23095 (707.5 MHz)	23173 (715.3 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	22.48	22.49	22.51	$\leq 1$	0
	1	2	22.52	22.58	22.55		0
	1	5	22.50	22.48	22.47		0
	3	0	22.48	22.53	22.49		0
	3	2	22.53	22.58	22.58		0
	3	3	22.50	22.53	22.49		1
	6	0	21.49	21.57	21.54		1
16QAM	1	0	21.63	21.63	21.63	$\leq 1$	1
	1	2	21.65	21.74	21.67		1
	1	5	21.67	21.65	21.63		1
	3	0	21.48	21.54	21.45		1
	3	2	21.56	21.58	21.53		1
	3	3	21.53	21.52	21.47		1
	6	0	20.60	20.66	20.60		2
64QAM	1	0	20.61	20.63	20.61	$\leq 2$	2
	1	2	20.70	20.69	20.60		2
	1	5	20.63	20.57	20.54		2
	3	0	20.62	20.64	20.60		2
	3	2	20.64	20.69	20.63		2
	3	3	20.60	20.64	20.61		2
	6	0	19.56	19.64	19.55		3

Table 9.3.1.5 LTE Conducted Power

Band & Mode			Modulated Average[dBm]
LTE Band 13		Maximum	23.3
		Nominal	22.8

Table 9.3.2.1 Nominal and Maximum Output Power Spec

## 2) LTE Band 13

LTE Band 13 Conducted Power- 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			23230 (782.0 MHz)		
			Conducted Power (dBm)		
QPSK	1	0	22.98	$\leq 1$	0
	1	25	23.11		
	1	49	22.98		
	25	0	21.79		1
	25	12	21.82		
	25	25	21.75		
	50	0	21.79		
16QAM	1	0	22.01	$\leq 1$	1
	1	25	22.12		
	1	49	22.03		
	25	0	20.92		
	25	12	20.90	$\leq 2$	2
	25	25	20.87		
	50	0	20.89		
64QAM	1	0	20.98	$\leq 2$	2
	1	25	21.09		
	1	49	20.99		
	25	0	19.92	$\leq 3$	3
	25	12	19.96		
	25	25	19.88		
	50	0	19.89		

Table 9.3.2.2 LTE Conducted Power

LTE Band 13 Conducted Power- 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			23230 (782.0 MHz)		
			Conducted Power (dBm)		
QPSK	1	0	22.89	$\leq 1$	0
	1	12	23.01		
	1	24	22.98		
	12	0	21.68		
	12	6	21.78		1
	12	13	21.69		
	25	0	21.65		
16QAM	1	0	21.84	$\leq 1$	1
	1	12	21.98		
	1	24	21.89		
	12	0	20.67		
	12	6	20.68	$\leq 2$	2
	12	13	20.65		
	25	0	20.61		
64QAM	1	0	20.74	$\leq 2$	2
	1	12	20.94		
	1	24	20.86		
	12	0	19.87	$\leq 3$	3
	12	6	19.68		
	12	13	19.87		
	15	0	19.63		

Table 9.3.2.3 LTE Conducted Power

Note : LTE B13 can not contain three non-overlapping channels of 5 MHz bandwidth.

Per KDB 941225 D05v02r05, 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.

Band & Mode		Modulated Average[dBm]	
LTE Band 14		Maximum	23.3
		Nominal	22.8

Table 9.3.3.1 Nominal and Maximum Output Power Spec

### 3) LTE Band 14

LTE Band 14 Conducted Power- 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			23330 (793.0 MHz)		
			Conducted Power (dBm)		
QPSK	1	0	23.07	$\leq 1$	0
	1	25	23.21		
	1	49	23.08		
	25	0	21.85		1
	25	12	21.88		
	25	25	21.84		
	50	0	21.89		
16QAM	1	0	22.06	$\leq 1$	1
	1	25	22.20		
	1	49	22.11		
	25	0	21.03		
	25	12	21.03	$\leq 2$	2
	25	25	20.97		
	50	0	21.01		
64QAM	1	0	21.06	$\leq 2$	2
	1	25	21.14		
	1	49	21.11		
	25	0	20.03	$\leq 3$	3
	25	12	20.04		
	25	25	20.02		
	50	0	20.00		

Table 9.3.3.2 LTE Conducted Power

LTE Band 14 Conducted Power- 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			23330 (793.0 MHz)		
			Conducted Power (dBm)		
QPSK	1	0	23.01	$\leq 1$	0
	1	12	23.07		
	1	24	23.05		
	12	0	21.79		
	12	6	21.79		1
	12	13	21.88		
	25	0	21.91		
16QAM	1	0	21.97	$\leq 1$	1
	1	12	22.01		
	1	24	22.03		
	12	0	20.78		
	12	6	20.68	$\leq 2$	2
	12	13	20.87		
	25	0	20.90		
64QAM	1	0	20.95	$\leq 2$	2
	1	12	21.03		
	1	24	21.01		
	12	0	19.89	$\leq 3$	3
	12	6	19.78		
	12	13	19.88		
	15	0	19.92		

Table 9.3.3.3 LTE Conducted Power

Note : LTE B14 can not contain three non-overlapping channels of 5 MHz bandwidth.

Per KDB 941225 D05v02r05, 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.

Band & Mode			Modulated Average[dBm]
LTE Band 26		Maximum	23.5
		Nominal	23.0

Table 9.3.4.1 Nominal and Maximum Output Power Spec

#### 4) LTE Band 26 (Cell)

LTE Band 26 (Cell) Conducted Power- 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			26865 (831.5 MHz)		
			Conducted Power (dBm)		
QPSK	1	0	23.49	$\leq 1$	0
	1	36	23.41		1
	1	74	23.30		1
	36	0	22.22		1
	36	18	22.20		1
	36	37	22.09		1
	75	0	22.12		1
16QAM	1	0	22.49	$\leq 1$	1
	1	36	22.50		1
	1	74	22.36		1
	36	0	21.32		2
	36	18	21.28	$\leq 2$	2
	36	37	21.20		2
	75	0	21.28		2
64QAM	1	0	21.48	$\leq 2$	2
	1	36	21.41		2
	1	74	21.34		2
	36	0	20.34	$\leq 3$	3
	36	18	20.33		3
	36	37	20.23		3
	75	0	20.28		3

Table 9.3.4.2 LTE Conducted Power

Note : LTE B26 can not contain three non-overlapping channels of 10 MHz bandwidth.

Per KDB 941225 D05v02r05, 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.

LTE Band 26 (Cell) Conducted Power- 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			26740 (819.0 MHz)	26865 (831.5 MHz)	26990 (844.0 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	23.48	23.35	23.45	$\leq 1$	0
	1	25	23.44	23.42	23.36		1
	1	49	23.36	23.28	23.27		1
	25	0	22.24	22.27	22.18		1
	25	12	22.25	22.23	22.17		1
	25	25	22.15	22.18	22.13		1
	50	0	22.21	22.19	22.17		1
16QAM	1	0	22.44	22.38	22.43	$\leq 1$	1
	1	25	22.46	22.36	22.33		1
	1	49	22.44	22.21	22.19		1
	25	0	21.31	21.25	21.27		2
	25	12	21.29	21.13	21.23	$\leq 2$	2
	25	25	21.23	21.15	21.16		2
	50	0	21.27	21.08	21.25		2
64QAM	1	0	21.42	21.29	21.43	$\leq 2$	2
	1	25	21.42	21.35	21.29		2
	1	49	21.36	21.18	21.15		2
	25	0	20.32	20.18	20.25	$\leq 3$	3
	25	12	20.34	20.05	20.25		3
	25	25	20.26	20.18	20.19		3
	50	0	20.30	20.01	20.26		3

Table 9.3.4.3 LTE Conducted Power

Modulation	RB Size	RB Offset	LTE Band 26 (Cell) Conducted Power- 5 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Mid Channel	High Channel		
			26715 (816.5 MHz)	26865 (831.5 MHz)	27015 (846.5 MHz)		
Conducted Power (dBm)							
QPSK	1	0	23.46	23.42	23.34	$\leq 1$	0
	1	12	23.47	23.38	23.40		
	1	24	23.39	23.41	23.29		
	12	0	22.24	22.21	22.13		1
	12	6	22.24	22.18	22.10		
	12	13	22.22	22.19	22.06		
	25	0	22.24	22.16	22.15		
16QAM	1	0	22.43	22.38	22.30	$\leq 1$	1
	1	12	22.49	22.31	22.29		
	1	24	22.42	22.35	22.17		
	12	0	21.32	21.18	21.18		2
	12	6	21.32	21.16	21.17		
	12	13	21.28	21.15	21.14		
	25	0	21.29	21.08	21.16		
64QAM	1	0	21.42	21.26	21.29	$\leq 2$	2
	1	12	21.48	21.28	21.29		
	1	24	21.37	21.26	21.18		
	12	0	20.34	20.18	20.26		3
	12	6	20.37	20.13	20.25		
	12	13	20.37	20.08	20.18		
	25	0	20.31	20.07	20.16		

**Table 9.3.4.4 LTE Conducted Power**

Modulation	RB Size	RB Offset	LTE Band 26 (Cell) Conducted Power- 3 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Mid Channel	High Channel		
			26705 (815.5 MHz)	26865 (831.5 MHz)	27025 (847.5 MHz)		
Conducted Power (dBm)							
QPSK	1	0	23.47	23.45	23.44	$\leq 1$	0
	1	7	23.46	23.43	23.30		
	1	14	23.44	23.41	23.27		
	8	0	22.20	22.18	22.05		0-1
	8	4	22.24	22.19	22.09		
	8	7	22.20	22.16	22.08		
	15	0	22.26	22.13	22.11		
16QAM	1	0	22.44	22.41	22.25	$\leq 1$	0-1
	1	7	22.46	22.32	22.25		
	1	14	22.43	22.38	22.21		
	8	0	21.32	21.08	21.16		0-2
	8	4	21.35	21.16	21.19		
	8	7	21.31	21.14	21.14		
	15	0	21.31	21.09	21.22		
64QAM	1	0	21.44	21.35	21.26	$\leq 2$	0-2
	1	7	21.44	21.28	21.23		
	1	14	21.43	21.32	21.22		
	8	0	20.36	20.06	20.20		0-3
	8	4	20.38	20.18	20.22		
	8	7	20.34	20.13	20.19		
	15	0	20.33	20.07	20.20		

**Table 9.3.4.5 LTE Conducted Power**

Modulation	RB Size	RB Offset	LTE Band 26 (Cell) Conducted Power- 1.4 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Mid Channel	High Channel		
			26697 (814.7 MHz)	26865 (831.5 MHz)	27033 (848.3 MHz)		
Conducted Power (dBm)							
QPSK	1	0	23.37	23.28	23.27	$\leq 1$	0
	1	2	23.46	23.38	23.31		
	1	5	23.36	23.37	23.20		
	3	0	23.13	23.12	22.99		0
	3	2	23.16	23.15	23.04		
	3	3	23.12	23.08	23.00		0-1
	6	0	22.19	22.16	22.02		
16QAM	1	0	22.38	22.18	22.13	$\leq 1$	0-1
	1	2	22.44	22.26	22.21		
	1	5	22.37	22.31	22.13		
	3	0	22.21	22.08	22.00		0-2
	3	2	22.24	22.06	22.02		
	3	3	22.18	22.01	22.01		
	6	0	21.32	21.09	21.14		
64QAM	1	0	21.37	21.15	21.18	$\leq 2$	0-2
	1	2	21.45	21.21	21.21		
	1	5	21.37	21.28	21.16		
	3	0	21.25	21.03	21.18		0-3
	3	2	21.28	21.01	21.21		
	3	3	21.26	21.03	21.17		
	6	0	20.26	20.07	20.12		

**Table 9.3.4.6 LTE Conducted Power**

Band & Mode			Modulated Average[dBm]	
LTE Band 4			Maximum	23.3
		Nominal		22.8

**Table 9.3.5.1 Nominal and Maximum Output Power Spec**

### 5) LTE Band 4 (AWS)

Modulation	RB Size	RB Offset	LTE Band 4 (AWS) Conducted Power- 20 MHz Bandwidth		
			Mid Channel		MPR Allowed Per 3GPP(dB)
			20175 (1732.5 MHz)	Conducted Power (dBm)	
QPSK	1	0	23.18		$\leq 1$
	1	50	23.19		
	1	99	23.17		
	50	0	21.95		
	50	25	21.96		
	50	50	21.86		
	100	0	21.87		
16QAM	1	0	22.28		$\leq 1$
	1	50	22.27		
	1	99	22.16		
	50	0	21.06		
	50	25	21.05		
	50	50	20.98		
	100	0	20.99		
64QAM	1	0	21.28		$\leq 2$
	1	50	21.27		
	1	99	21.12		
	50	0	20.05		
	50	25	20.06		
	50	50	19.98		
	100	0	19.99		

**Table 9.3.5.2 LTE Conducted Power**

Note: LTE B4 (AWS) can not contain three non-overlapping channels of 20 MHz bandwidth.  
Per KDB 941225 D05v02r05, 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.

Modulation	RB Size	RB Offset	LTE Band 4 (AWS) Conducted Power- 15 MHz Bandwidth		
			Low Channel	Mid Channel	MPR Allowed Per 3GPP(dB)
			20025 (1717.5 MHz)	20175 (1732.5 MHz)	
QPSK	1	0	23.02	23.05	$\leq 1$
	1	36	23.08	23.06	
	1	74	23.09	23.04	
	36	0	21.85	21.95	
	36	18	21.99	21.93	
	36	37	21.95	21.89	
	75	0	21.95	21.89	
16QAM	1	0	22.14	22.19	$\leq 1$
	1	36	22.11	22.18	
	1	74	22.12	22.16	
	36	0	20.98	21.07	
	36	18	21.12	21.07	
	36	37	21.07	20.99	
	75	0	21.06	21.00	
64QAM	1	0	21.12	21.18	$\leq 2$
	1	36	21.17	21.13	
	1	74	21.16	21.01	
	36	0	20.00	20.08	
	36	18	20.12	20.08	
	36	37	20.09	20.02	
	75	0	20.06	20.00	

**Table 9.3.5.3 LTE Conducted Power**

Modulation	RB Size	RB Offset	LTE Band 4 (AWS) Conducted Power- 10 MHz Bandwidth		
			Low Channel	Mid Channel	MPR Allowed Per 3GPP(dB)
			20000 (1715.0 MHz)	20175 (1732.5 MHz)	
QPSK	1	0	22.98	22.98	$\leq 1$
	1	25	22.95	23.05	
	1	49	22.96	23.02	
	25	0	21.77	21.91	
	25	12	21.76	21.92	
	25	25	21.74	21.89	
	50	0	21.78	21.93	
16QAM	1	0	22.13	22.17	$\leq 1$
	1	25	22.13	22.18	
	1	49	22.09	22.19	
	25	0	20.88	21.04	
	25	12	20.90	21.04	
	25	25	20.84	20.97	
	50	0	20.85	20.99	
64QAM	1	0	21.09	21.14	$\leq 2$
	1	25	21.07	21.19	
	1	49	20.99	21.13	
	25	0	19.90	20.04	
	25	12	19.90	20.05	
	25	25	19.84	19.97	
	50	0	19.85	19.99	

**Table 9.3.5.4 LTE Conducted Power**

Modulation	RB Size	RB Offset	LTE Band 4 (AWS) Conducted Power- 5 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Mid Channel	High Channel		
			19975 (1712.5 MHz)	20175 (1732.5 MHz)	20375 (1752.5 MHz)		
Conducted Power (dBm)							
QPSK	1	0	22.98	23.01	23.06	$\leq 1$	0
	1	12	22.99	23.03	23.07		
	1	24	22.89	23.01	23.04		
	12	0	21.78	21.93	21.95		
	12	6	21.78	21.93	21.96		
	12	13	21.78	21.88	21.91		
16QAM	25	0	21.78	21.88	21.92	$\leq 1$	1
	1	0	22.11	22.19	22.21		
	1	12	22.18	22.16	22.19		
	1	24	22.09	22.15	22.18		
	12	0	20.89	21.06	21.04		
	12	6	20.89	21.06	21.07		
64QAM	12	13	20.86	20.99	21.02	$\leq 2$	2
	25	0	20.86	21.01	21.04		
	1	0	21.07	21.11	21.22		
	1	12	21.14	21.19	21.26		
	1	24	21.00	21.09	21.15		
	12	0	19.94	20.09	20.08		
64QAM	12	6	19.97	20.10	20.12	$\leq 3$	3
	12	13	19.92	20.04	20.08		
	25	0	19.88	20.01	20.03		

**Table 9.3.5.5 LTE Conducted Power**

Modulation	RB Size	RB Offset	LTE Band 4 (AWS) Conducted Power- 3 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Mid Channel	High Channel		
			19965 (1711.5 MHz)	20175 (1732.5 MHz)	20385 (1753.5 MHz)		
Conducted Power (dBm)							
QPSK	1	0	22.98	23.06	23.06	$\leq 1$	0
	1	7	22.97	23.08	23.05		
	1	14	22.96	23.05	23.08		
	8	0	21.76	21.88	21.90		
	8	4	21.79	21.92	21.98		
	8	7	21.74	21.90	21.96		
16QAM	15	0	21.78	21.92	21.92	$\leq 1$	1
	1	0	22.08	22.23	22.19		
	1	7	22.15	22.27	22.18		
	1	14	22.07	22.22	22.28		
	8	0	20.92	21.07	21.10		
	8	4	20.95	21.08	21.10		
64QAM	8	7	20.88	21.05	21.09	$\leq 2$	2
	15	0	20.91	21.06	21.06		
	1	0	21.09	21.21	21.22		
	1	7	21.08	21.24	21.19		
	1	14	21.03	21.16	21.25		
	8	0	19.94	20.05	20.09		
64QAM	8	4	19.98	20.10	20.14	$\leq 3$	3
	8	7	19.92	20.08	20.09		
	15	0	19.88	20.02	20.05		

**Table 9.3.5.6 LTE Conducted Power**

Modulation	RB Size	RB Offset	LTE Band 4 (AWS) Conducted Power- 1.4 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Mid Channel	High Channel		
			19957 (1710.7 MHz)	20175 (1732.5 MHz)	20393 (1754.3 MHz)		
Conducted Power (dBm)							
QPSK	1	0	22.89	22.96	23.01	$\leq 1$	0
	1	2	22.91	22.97	23.05		
	1	5	22.87	22.98	22.98		
	3	0	22.72	22.82	22.86		
	3	2	22.75	22.87	22.90		
	3	3	22.73	22.83	22.84		
16QAM	6	0	21.72	21.85	21.87	$\leq 1$	1
	1	0	22.06	22.12	22.19		
	1	2	22.10	22.14	22.18		
	1	5	22.05	22.16	22.12		
	3	0	21.82	21.99	21.99		
	3	2	21.84	22.03	22.04		
64QAM	3	3	21.84	21.93	21.98	$\leq 2$	2
	6	0	20.88	21.01	21.05		
	1	0	20.99	21.11	21.16		
	1	2	21.07	21.08	21.16		
	1	5	20.98	21.13	21.17		
	3	0	20.86	21.01	21.03		
64QAM	3	2	20.89	21.05	21.03	$\leq 3$	3
	3	3	20.87	21.02	21.01		
	6	0	19.84	19.94	19.98		

**Table 9.3.5.7 LTE Conducted Power**

Band & Mode			Modulated Average[dBm]	
LTE Band 25 (PCS)			Maximum	23.5
			Nominal	23.0

**Table 9.3.6.1 Nominal and Maximum Output Power Spec**

## 6) LTE Band 25 (PCS)

LTE Band 25 (PCS) Conducted Power- 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			26140 (1860.0 MHz)	26365 (1882.5 MHz)	26590 (1905.0 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	23.37	23.31	23.08	≤ 1	0
	1	50	23.41	23.34	23.10		1
	1	99	23.31	23.32	23.05		1
	50	0	22.22	22.00	21.96		1
	50	25	22.25	22.15	21.94	≤ 2	2
	50	50	22.18	22.10	21.93		2
	100	0	22.18	22.17	21.92		2
16QAM	1	0	22.49	22.48	22.24	≤ 1	1
	1	50	22.48	22.50	22.22		1
	1	99	22.46	22.50	22.12		1
	50	0	21.34	21.15	21.08		2
	50	25	21.37	21.31	21.08	≤ 2	2
	50	50	21.29	21.28	21.02		2
	100	0	21.28	21.26	21.01		2
64QAM	1	0	21.49	21.44	21.20	≤ 2	2
	1	50	21.48	21.48	21.16		2
	1	99	21.42	21.49	21.12		2
	50	0	20.34	20.13	20.05		3
	50	25	20.36	20.16	20.04	≤ 3	3
	50	50	20.33	20.11	19.99		3
	100	0	20.29	20.30	20.03		3

**Table 9.3.6.2 LTE Conducted Power**

LTE Band 25 (PCS) Conducted Power- 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			26115 (1857.5 MHz)	26365 (1882.5 MHz)	26615 (1907.5 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	23.30	23.31	23.09	≤ 1	0
	1	36	23.36	23.36	23.11		1
	1	74	23.30	23.29	23.01		1
	36	0	22.22	22.22	21.94		1
	36	18	22.22	22.22	21.92	≤ 2	2
	36	37	22.15	22.21	21.90		2
	75	0	22.17	22.19	21.93		2
16QAM	1	0	22.50	22.43	22.24	≤ 1	1
	1	36	22.49	22.46	22.24		1
	1	74	22.47	22.49	22.09		1
	36	0	21.33	21.31	21.00		2
	36	18	21.36	21.33	21.04	≤ 2	2
	36	37	21.33	21.33	20.99		2
	75	0	21.32	21.31	20.99		2
64QAM	1	0	21.43	21.45	21.22	≤ 2	2
	1	36	21.48	21.48	21.25		2
	1	74	21.44	21.43	21.06		2
	36	0	20.34	20.34	20.08	≤ 3	3
	36	18	20.40	20.40	20.07		3
	36	37	20.32	20.31	20.03		3
	75	0	20.30	20.33	20.03		3

**Table 9.3.6.3 LTE Conducted Power**

LTE Band 25 (PCS) Conducted Power- 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			26090 (1855.0 MHz)	26365 (1882.5 MHz)	26640 (1910.0 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	23.35	23.39	23.08	≤ 1	0
	1	25	23.26	23.33	23.09		1
	1	49	23.30	23.35	23.04		1
	25	0	22.15	22.21	21.94		1
	25	12	22.14	22.24	21.95	≤ 2	2
	25	25	22.13	22.18	21.92		2
	50	0	22.12	22.20	21.90		2
16QAM	1	0	22.45	22.49	22.23	≤ 1	1
	1	25	22.42	22.46	22.25		1
	1	49	22.50	22.49	22.09		1
	25	0	21.26	21.32	21.00		2
	25	12	21.26	21.33	21.06	≤ 2	2
	25	25	21.22	21.28	21.00		2
	50	0	21.26	21.30	21.05		2
64QAM	1	0	21.41	21.48	21.20	≤ 2	2
	1	25	21.39	21.42	21.20		2
	1	49	21.37	21.49	21.09		2
	25	0	20.27	20.33	20.03	≤ 3.	3
	25	12	20.29	20.35	20.08		3
	25	25	20.24	20.34	20.02		3
	50	0	20.28	20.33	20.04		3

**Table 9.3.6.4 LTE Conducted Power**

LTE Band 25 (PCS) Conducted Power- 5 MHz Bandwidth												
Modulation	RB Size	RB Offset	Low Channel		Mid Channel		High Channel		MPR Allowed Per 3GPP(dB)	MPR (dB)		
			26065 (1852.5 MHz)		26365 (1882.5 MHz)		26665 (1912.5 MHz)					
			Conducted Power (dBm)									
QPSK	1	0	23.24		23.32		23.09		$\leq 1$	0		
	1	12	23.31		23.40		23.14					
	1	24	23.19		23.29		23.01					
	12	0	22.12		22.19		21.91			1		
	12	6	22.17		22.20		21.94					
	12	13	22.10		22.19		21.90					
16QAM	25	0	22.12		22.18		21.93		$\leq 2$	1		
	1	0	22.33		22.47		22.23					
	1	12	22.42		22.48		22.28			2		
	1	24	22.39		22.46		22.12					
	12	0	21.24		21.32		21.04			2		
	12	6	21.25		21.35		21.01					
	12	13	21.25		21.28		20.97					
64QAM	25	0	21.21		21.30		20.99		$\leq 2$	2		
	1	0	21.33		21.40		21.18					
	1	12	21.42		21.48		21.24					
	1	24	21.34		21.36		21.06					
	12	0	20.30		20.35		20.10		$\leq 3$	3		
	12	6	20.31		20.32		20.08					
	12	13	20.29		20.38		20.03					
	25	0	20.25		20.31		20.04					

**Table 9.3.6.5 LTE Conducted Power**

LTE Band 25 (PCS) Conducted Power- 3 MHz Bandwidth												
Modulation	RB Size	RB Offset	Low Channel		Mid Channel		High Channel		MPR Allowed Per 3GPP(dB)	MPR (dB)		
			26055 (1851.5 MHz)		26365 (1882.5 MHz)		26675 (1913.5 MHz)					
			Conducted Power (dBm)									
QPSK	1	0	23.20		23.28		23.03		$\leq 1$	0		
	1	7	23.22		23.32		23.08					
	1	14	23.18		23.26		23.07					
	8	0	22.07		22.17		21.87			1		
	8	4	22.13		22.18		21.90					
	8	7	22.05		22.14		21.88					
16QAM	15	0	22.13		22.16		21.93		$\leq 2$	1		
	1	0	22.36		22.43		22.15					
	1	7	22.33		22.44		22.19			2		
	1	14	22.33		22.38		22.12					
	8	0	21.27		21.33		21.00			2		
	8	4	21.26		21.37		21.04					
	8	7	21.24		21.34		20.99					
64QAM	15	0	21.24		21.32		21.02		$\leq 3$	3		
	1	0	21.29		21.39		21.18					
	1	7	21.35		21.42		21.15			2		
	1	14	21.28		21.40		21.10					
	8	0	20.25		20.33		20.04			3		
	8	4	20.30		20.32		20.07					
	8	7	20.19		20.27		20.05					
	15	0	20.27		20.26		20.03					

**Table 9.3.6.6 LTE Conducted Power**

LTE Band 25 (PCS) Conducted Power- 1.4 MHz Bandwidth												
Modulation	RB Size	RB Offset	Low Channel		Mid Channel		High Channel		MPR Allowed Per 3GPP(dB)	MPR (dB)		
			26047 (1850.7 MHz)		26365 (1882.5 MHz)		26683 (1914.3 MHz)					
			Conducted Power (dBm)									
QPSK	1	0	23.13		23.16		23.04		$\leq 1$	0		
	1	2	23.18		23.25		23.06					
	1	5	23.10		23.15		23.03					
	3	0	22.97		23.02		22.81			0		
	3	2	23.02		23.07		22.88					
	3	3	22.96		23.02		22.84					
16QAM	6	0	22.03		22.08		21.83		$\leq 2$	1		
	1	0	22.26		22.36		22.07					
	1	2	22.35		22.43		22.15			1		
	1	5	22.29		22.25		22.06					
	3	0	22.13		22.17		21.89			2		
	3	2	22.17		22.18		21.94					
	3	3	22.11		22.15		21.91					
64QAM	6	0	21.15		21.24		21.02		$\leq 3$	2		
	1	0	21.28		21.27		21.08					
	1	2	21.35		21.40		21.15			2		
	1	5	21.26		21.34		21.07					
	3	0	21.16		21.20		20.98			2		
	3	2	21.20		21.24		20.95					
	3	3	21.08		21.21		20.97					
	6	0	20.21		20.22		19.98					

**Table 9.3.6.7 LTE Conducted Power**

Band & Mode			Modulated Average[dBm]	
LTE Band 7			Maximum	Nominal
			22.0	21.5

Table 9.3.7.1 Nominal and Maximum Output Power Spec

## 7) LTE Band 7

Modulation	RB Size	RB Offset	LTE Band 7 Conducted Power- 20 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel 20850 (2510.0 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21350 (2560.0 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	21.49	21.49	21.55	≤ 1	0
	1	50	21.47	21.48	21.67		
	1	99	21.63	21.64	21.68		
	50	0	20.57	20.59	20.63		
	50	25	20.60	20.58	20.68	≤ 2	1
	50	50	20.70	20.61	20.77		
	100	0	20.68	20.58	20.69		
16QAM	1	0	20.60	20.60	20.69	≤ 1	1
	1	50	20.59	20.58	20.78		
	1	99	20.73	20.70	20.79		
	50	0	19.65	19.64	19.73		
	50	25	19.68	19.65	19.75	≤ 2	2
	50	50	19.78	19.68	19.84		
	100	0	19.75	19.63	19.73		
64QAM	1	0	19.59	19.64	19.63	≤ 2	2
	1	50	19.60	19.60	19.80		
	1	99	19.75	19.68	19.79		
	50	0	18.70	18.66	18.74		
	50	25	18.70	18.68	18.75	≤ 3	3
	50	50	18.78	18.68	18.88		
	100	0	18.79	18.67	18.74		

Table 9.3.7.2 LTE Conducted Power

Modulation	RB Size	RB Offset	LTE Band 7 Conducted Power- 15 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel 20825 (2507.5 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21375 (2562.5 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	21.47	21.49	21.55	≤ 1	0
	1	36	21.46	21.48	21.65		
	1	74	21.51	21.52	21.66		
	36	0	20.57	20.56	20.60		
	36	18	20.59	20.56	20.74	≤ 2	1
	36	37	20.56	20.54	20.71		
	75	0	20.60	20.56	20.59		
16QAM	1	0	20.59	20.59	20.64	≤ 1	1
	1	36	20.57	20.60	20.79		
	1	74	20.66	20.63	20.74		
	36	0	19.63	19.64	19.70		
	36	18	19.66	19.67	19.83	≤ 2	2
	36	37	19.64	19.62	19.81		
	75	0	19.62	19.64	19.66		
64QAM	1	0	19.56	19.59	19.64	≤ 2	2
	1	36	19.61	19.63	19.70		
	1	74	19.58	19.62	19.73		
	36	0	18.69	18.69	18.71		
	36	18	18.71	18.71	18.84	≤ 3	3
	36	37	18.69	18.68	18.83		
	75	0	18.67	18.67	18.71		

Table 9.3.7.3 LTE Conducted Power

Modulation	RB Size	RB Offset	LTE Band 7 Conducted Power- 10 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel 20800 (2505.0 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21400 (2565.0 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	21.50	21.50	21.57	$\leq 1$	0
	1	25	21.48	21.49	21.59		1
	1	49	21.52	21.48	21.60		1
	25	0	20.56	20.56	20.69		1
	25	12	20.58	20.55	20.69		1
	25	25	20.57	20.56	20.69		1
	50	0	20.56	20.56	20.68		1
16QAM	1	0	20.57	20.58	20.68	$\leq 1$	1
	1	25	20.59	20.57	20.69		1
	1	49	20.61	20.61	20.69		1
	25	0	19.61	19.61	19.78		2
	25	12	19.64	19.66	19.78	$\leq 2$	2
	25	25	19.61	19.62	19.75		2
	50	0	19.68	19.63	19.78		2
64QAM	1	0	19.50	19.53	19.68	$\leq 2$	2
	1	25	19.53	19.53	19.65		2
	1	49	19.59	19.56	19.71		2
	25	0	18.65	18.66	18.79	$\leq 3$	3
	25	12	18.68	18.69	18.81		3
	25	25	18.63	18.64	18.81		3
	50	0	18.66	18.65	18.80		3

Table 9.3.7.4 LTE Conducted Power

Modulation	RB Size	RB Offset	LTE Band 7 Conducted Power- 5 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel 20775 (2502.5 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21425 (2567.5 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	21.43	21.43	21.55	$\leq 1$	0
	1	12	21.52	21.53	21.64		1
	1	24	21.45	21.45	21.56		1
	12	0	20.51	20.50	20.63		1
	12	6	20.58	20.54	20.66		1
	12	13	20.53	20.52	20.63		1
	25	0	20.53	20.54	20.65		1
16QAM	1	0	20.50	20.55	20.60	$\leq 1$	1
	1	12	20.56	20.62	20.72		1
	1	24	20.55	20.51	20.67		1
	12	0	19.59	19.60	19.69		2
	12	6	19.63	19.66	19.74	$\leq 2$	2
	12	13	19.61	19.63	19.69		2
	25	0	19.61	19.61	19.69		2
64QAM	1	0	19.50	19.52	19.61	$\leq 2$	2
	1	12	19.61	19.61	19.67		2
	1	24	19.51	19.50	19.63		2
	12	0	18.68	18.67	18.76		3
	12	6	18.69	18.54	18.82	$\leq 3$	3
	12	13	18.65	18.71	18.79		3
	25	0	18.61	18.65	18.73		3

Table 9.3.7.5 LTE Conducted Power

Band & Mode			Modulated Average[dBm]	
LTE Band 7	RB Size	RB Offset	Maximum	19.0
			Nominal	18.5

**Table 9.3.8.1 Nominal and Maximum Output Power Spec (Hotspot Mode Active)**

## 8) LTE Band 7

Modulation	RB Size	RB Offset	LTE Band 7 Conducted Power- 20 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Mid Channel	High Channel		
			20850 (2510.0 MHz)	21100 (2535.0 MHz)	21350 (2560.0 MHz)		
Conducted Power (dBm)							
QPSK	1	0	18.55	18.33	18.59	≤ 1	0
	1	50	18.41	18.30	18.62		
	1	99	18.67	18.48	18.80		
	50	0	17.50	17.36	17.54		
	50	25	17.61	17.39	17.66	≤ 2	1
	50	50	17.73	17.49	17.78		
	100	0	17.73	17.39	17.74		
16QAM	1	0	17.49	17.50	17.59	≤ 1	1
	1	50	17.40	17.47	17.62		
	1	99	17.66	17.63	17.61		
	50	0	16.38	16.48	16.40		
	50	25	16.45	16.51	16.47	≤ 2	2
	50	50	16.60	16.53	16.71		
	100	0	16.56	16.40	16.62		
64QAM	1	0	16.36	16.44	16.55	≤ 2	2
	1	50	16.38	16.33	16.61		
	1	99	16.75	16.52	16.65		
	50	0	15.60	15.36	15.43		
	50	25	15.64	15.45	15.49	≤ 3	3
	50	50	15.83	15.45	15.72		
	100	0	15.81	15.37	15.55		

**Table 9.3.8.2 LTE Conducted Power (Hotspot Mode Active)**

Modulation	RB Size	RB Offset	LTE Band 7 Conducted Power- 15 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Mid Channel	High Channel		
			20825 (2507.5 MHz)	21100 (2535.0 MHz)	21375 (2562.5 MHz)		
Conducted Power (dBm)							
QPSK	1	0	18.37	18.45	18.30	≤ 1	0
	1	36	18.38	18.42	18.33		
	1	74	18.51	18.45	18.42		
	36	0	17.45	17.34	17.30		
	36	18	17.48	17.46	17.34	≤ 2	1
	36	37	17.42	17.45	17.43		
	75	0	17.41	17.37	17.37		
16QAM	1	0	17.55	17.44	17.46	≤ 1	1
	1	36	17.51	17.51	17.48		
	1	74	17.54	17.53	17.49		
	36	0	16.35	16.35	16.41		
	36	18	16.30	16.47	16.47	≤ 2	2
	36	37	16.46	16.40	16.50		
	75	0	16.34	16.36	16.40		
64QAM	1	0	16.50	16.45	16.42	≤ 2	2
	1	36	16.51	16.47	16.48		
	1	74	16.69	16.57	16.52		
	36	0	15.31	15.49	15.44		
	36	18	15.39	15.56	15.51	≤ 3	3
	36	37	15.43	15.61	15.53		
	75	0	15.41	15.45	15.42		

**Table 9.3.8.3 LTE Conducted Power (Hotspot Mode Active)**

Modulation	RB Size	RB Offset	LTE Band 7 Conducted Power- 10 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Mid Channel	High Channel		
			20800 (2505.0 MHz)	21100 (2535.0 MHz)	21400 (2565.0 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	18.41	18.33	18.30	$\leq 1$	0
	1	25	18.35	18.37	18.31		1
	1	49	18.45	18.40	18.36		1
	25	0	17.40	17.36	17.37		1
	25	12	17.43	17.39	17.39		1
	25	25	17.45	17.42	17.40		1
	50	0	17.44	17.40	17.30		1
16QAM	1	0	17.31	17.37	17.47	$\leq 1$	1
	1	25	17.33	17.41	17.48		1
	1	49	17.41	17.59	17.51		1
	25	0	16.52	16.36	16.33		2
	25	12	16.54	16.47	16.35	$\leq 2$	2
	25	25	16.55	16.55	16.36		2
	50	0	16.53	16.42	16.32		2
64QAM	1	0	16.47	16.44	16.47	$\leq 2$	2
	1	25	16.47	16.45	16.49		2
	1	49	16.49	16.49	16.51		2
	25	0	15.36	15.31	15.30		3
	25	12	15.30	15.33	15.31	$\leq 3$	3
	25	25	15.43	15.36	15.39		3
	50	0	15.40	15.32	15.37		3

**Table 9.3.8.4 LTE Conducted Power (Hotspot Mode Active)**

Modulation	RB Size	RB Offset	LTE Band 7 Conducted Power- 5 MHz Bandwidth			MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Mid Channel	High Channel		
			20775 (2502.5 MHz)	21100 (2535.0 MHz)	21425 (2567.5 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	18.31	18.33	18.35	$\leq 1$	0
	1	12	18.33	18.36	18.38		1
	1	24	18.38	18.37	18.43		1
	12	0	17.32	17.33	17.38		1
	12	6	17.36	17.35	17.44		1
	12	13	17.37	17.39	17.46		1
	25	0	17.32	17.30	17.37		1
16QAM	1	0	17.34	17.45	17.41	$\leq 1$	1
	1	12	17.35	17.51	17.51		1
	1	24	17.38	17.54	17.59		1
	12	0	16.35	16.40	16.44		2
	12	6	16.36	16.42	16.52	$\leq 2$	2
	12	13	16.37	16.44	16.55		2
	25	0	16.31	16.31	16.45		2
64QAM	1	0	16.34	16.43	16.51	$\leq 2$	2
	1	12	16.35	16.46	16.54		2
	1	24	16.39	16.49	16.56		2
	12	0	15.33	15.34	15.51	$\leq 3$	3
	12	6	15.35	15.37	15.55		3
	12	13	15.39	15.39	15.58		3
	25	0	15.32	15.30	15.51		3

**Table 9.3.8.5 LTE Conducted Power (Hotspot Mode Active)**

Band & Mode			Modulated Average[dBm]		
LTE Band 41			Maximum	22.5	
		Nominal		22.0	

**Table 9.3.9.1 Nominal and Maximum Output Power Spec**

### 9) LTE Band 41

Modulation	RB Size	RB Offset	LTE Band 41 Conducted Power- 20 MHz Bandwidth					MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel		
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
Conducted Power (dBm)									
QPSK	1	0	22.02	22.13	22.16	22.03	22.01	≤ 1	0
	1	50	21.85	22.12	22.00	21.95	21.92		
	1	99	21.80	21.98	21.97	21.97	21.93		
	50	0	21.00	21.10	21.11	21.06	21.03		
	50	25	20.96	21.09	21.06	21.05	21.02	1	1
	50	50	20.91	21.07	21.01	21.03	21.01		
	100	0	20.92	21.05	21.09	21.07	21.02		
16QAM	1	0	21.15	21.08	21.21	21.01	21.16	≤ 1	1
	1	50	20.95	21.09	21.14	21.03	21.10		
	1	99	20.99	21.01	21.15	21.05	21.07		
	50	0	20.15	20.06	20.28	20.01	20.15		
	50	25	20.08	20.05	20.25	20.03	20.16	≤ 2	2
	50	50	20.03	20.04	20.16	20.05	20.14		
	100	0	20.05	20.01	20.21	20.07	20.15		
64QAM	1	0	20.15	20.04	20.18	20.03	20.03	≤ 2	2
	1	50	20.01	20.06	20.01	20.05	20.06		
	1	99	19.98	20.07	19.97	20.07	20.04		
	50	0	19.15	19.05	19.27	19.03	19.14	≤ 3	3
	50	25	19.07	19.07	19.19	19.05	19.19		
	50	50	19.04	19.03	19.17	19.01	19.16		
	100	0	19.09	19.02	19.23	19.06	19.14		

**Table 9.3.9.2 LTE Conducted Power**

Modulation	RB Size	RB Offset	LTE Band 41 Conducted Power- 15 MHz Bandwidth					MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel		
			39725 (2503.5 MHz)	40173 (2548.3 MHz)	40620 (2593.0 MHz)	41068 (2637.8 MHz)	41515 (2682.5 MHz)		
Conducted Power (dBm)									
QPSK	1	0	22.00	22.05	22.13	21.98	21.99	≤ 1	0
	1	36	21.85	22.03	22.00	21.97	21.94		
	1	74	21.84	22.01	22.01	21.95	21.94		
	36	0	20.97	21.08	21.11	21.03	21.04		
	36	18	20.94	21.09	21.08	20.98	21.02	1	1
	36	37	20.87	21.05	21.03	20.97	20.99		
	75	0	20.95	21.06	21.05	20.99	21.00		
16QAM	1	0	21.13	21.03	21.29	20.99	21.12	≤ 1	1
	1	36	20.98	21.04	21.18	20.92	21.10		
	1	74	20.95	21.02	21.14	20.93	21.11		
	36	0	20.06	20.06	20.18	20.01	20.11	≤ 2	2
	36	18	20.05	20.07	20.19	20.03	20.12		
	36	37	19.95	20.04	20.15	20.04	20.09		
	75	0	20.05	20.05	20.22	20.06	20.13		
64QAM	1	0	20.19	20.01	20.14	19.98	20.00	≤ 2	2
	1	36	20.03	20.03	20.02	19.97	20.06		
	1	74	19.94	20.08	20.20	19.99	20.04		
	36	0	19.12	19.05	19.25	19.03	19.16	≤ 3	3
	36	18	19.06	19.06	19.19	19.01	19.17		
	36	37	19.03	19.04	19.16	19.02	19.12		
	75	0	19.06	19.07	19.21	19.05	19.11		

**Table 9.3.9.3 LTE Conducted Power**

Modulation	RB Size	RB Offset	LTE Band 41 Conducted Power- 10 MHz Bandwidth					MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel		
			39700 (2501.0 MHz)	40160 (2547.0 MHz)	40620 (2593.0 MHz)	41080 (2639.0 MHz)	41540 (2685.0 MHz)		
			Conducted Power (dBm)						
QPSK	1	0	21.96	22.05	22.01	22.04	21.98	≤ 1	0
	1	25	21.87	22.03	22.03	22.01	21.95		
	1	49	21.83	22.01	21.96	21.98	21.94		
	25	0	20.99	21.07	21.03	20.95	21.01		
	25	12	20.97	20.98	21.07	20.97	21.04	≤ 2	1
	25	25	20.88	20.97	21.03	20.98	20.97		
	50	0	20.95	20.99	21.04	20.91	21.00		
16QAM	1	0	21.10	21.03	21.18	21.02	21.15	≤ 1	1
	1	25	21.01	21.05	21.15	21.03	21.10		
	1	49	20.87	21.07	21.12	21.08	21.05		
	25	0	20.14	20.05	20.20	19.98	20.17	≤ 2	2
	25	12	20.12	20.06	20.23	19.95	20.13		
	25	25	20.04	20.07	20.18	19.96	20.15		
	50	0	20.08	20.01	20.20	19.97	20.14		
64QAM	1	0	19.98	20.07	20.10	20.01	20.02	≤ 2	2
	1	25	19.99	20.08	20.03	20.05	20.05		
	1	49	20.02	20.09	20.08	20.09	20.08		
	25	0	19.16	19.03	19.16	18.96	19.02	≤ 3	3
	25	12	19.14	19.07	19.26	19.02	19.00		
	25	25	19.06	19.05	19.21	19.03	19.09		
	50	0	19.08	19.06	19.20	19.01	19.11		

**Table 9.3.9.4 LTE Conducted Power**

Modulation	RB Size	RB Offset	LTE Band 41 Conducted Power- 5 MHz Bandwidth					MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel		
			39675 (2498.5 MHz)	40148 (2545.8 MHz)	40620 (2593.0 MHz)	41093 (2640.3 MHz)	41565 (2687.5 MHz)		
			Conducted Power (dBm)						
QPSK	1	0	21.90	21.99	22.00	22.03	21.94	≤ 1	0
	1	12	21.96	21.97	22.07	22.05	22.04		
	1	24	21.84	22.01	21.96	22.01	21.92		
	12	0	20.96	21.05	21.03	21.03	20.95		
	12	6	20.98	21.03	21.05	21.05	21.01	≤ 2	1
	12	13	20.93	21.01	21.04	21.06	20.96		
	25	0	20.95	21.02	21.04	20.99	20.94		
16QAM	1	0	21.04	20.89	21.12	21.01	21.11	≤ 1	1
	1	12	21.10	20.87	21.17	21.06	21.15		
	1	24	21.03	21.03	21.06	21.03	21.08		
	12	0	20.11	20.03	20.20	20.05	20.10	≤ 2	2
	12	6	20.11	20.01	20.21	20.06	20.16		
	12	13	20.08	20.05	20.16	20.07	20.11		
	25	0	20.12	20.09	20.22	20.09	20.11		
64QAM	1	0	20.03	19.97	20.16	20.08	20.08	≤ 2	2
	1	12	20.00	19.99	20.19	20.09	20.21		
	1	24	20.01	19.95	20.15	20.07	20.07		
	12	0	19.15	19.01	19.15	19.07	19.05	≤ 3	3
	12	6	19.16	19.06	19.14	19.06	19.18		
	12	13	19.12	19.08	19.22	18.97	19.14		
	25	0	19.13	19.05	19.17	19.05	19.06		

**Table 9.3.9.5 LTE Conducted Power**

Band & Mode			Modulated Average[dBm]		
LTE Band 41			Maximum	20.5	
		Nominal		20.0	

Table 9.3.10.1 Nominal and Maximum Output Power Spec (Hotspot Mode Active)

## 10) LTE Band 41

LTE Band 41 Conducted Power- 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
Conducted Power (dBm)									
QPSK	1	0	20.05	20.11	20.20	20.15	20.09	≤ 1	0
	1	50	20.03	20.06	20.12	20.11	20.05		
	1	99	20.01	20.04	20.15	20.13	20.06		
	50	0	19.03	19.08	19.22	19.19	19.10	≤ 1	1
	50	25	19.01	19.04	19.11	19.18	19.05		
	50	50	19.02	19.01	19.09	19.14	19.04	≤ 1	1
	100	0	19.00	19.00	19.20	19.10	19.01		
16QAM	1	0	19.01	19.22	19.23	19.32	19.00	≤ 1	1
	1	50	18.84	18.90	19.22	19.30	19.22		
	1	99	18.82	18.89	19.26	19.29	19.22		
	50	0	17.89	18.00	18.13	18.31	18.18	≤ 2	2
	50	25	17.87	17.91	18.11	18.35	18.11		
	50	50	17.85	17.92	18.10	18.31	18.08		
	100	0	17.87	18.01	18.11	18.26	17.90	≤ 2	2
64QAM	1	0	18.02	18.22	18.33	18.05	18.15		
	1	50	18.01	17.99	18.22	18.02	18.13	≤ 2	2
	1	99	18.00	17.91	18.21	18.03	17.97		
	50	0	16.99	17.03	17.09	17.26	17.11	≤ 3	3
	50	25	16.88	16.95	17.08	17.32	17.09		
	50	50	16.86	16.95	17.05	17.28	17.05		
	100	0	16.87	16.93	17.05	17.22	17.01		

Table 9.3.10.2 LTE Conducted Power (Hotspot Mode Active)

LTE Band 41 Conducted Power- 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			39725 (2503.5 MHz)	40173 (2548.3 MHz)	40620 (2593.0 MHz)	41068 (2637.8 MHz)	41515 (2682.5 MHz)		
Conducted Power (dBm)									
QPSK	1	0	20.10	19.90	20.05	20.08	20.10	≤ 1	0
	1	36	19.98	19.86	19.88	20.07	20.16		
	1	74	19.99	19.89	19.98	20.09	20.10		
	36	0	18.95	18.86	19.00	19.12	19.26	≤ 1	1
	36	18	18.92	18.81	18.95	19.05	19.23		
	36	37	18.95	18.85	18.98	19.08	19.25		
	75	0	18.94	18.84	18.98	19.10	19.16	≤ 1	1
16QAM	1	0	19.07	18.97	19.15	19.26	19.28		
	1	36	18.85	18.95	19.00	19.18	19.19	≤ 2	1
	1	74	18.81	18.96	18.99	19.21	19.20		
	36	0	17.86	17.95	18.02	18.16	18.28		
	36	18	17.84	17.92	17.98	18.19	18.19	≤ 2	2
	36	37	17.80	17.94	18.01	18.22	18.23		
	75	0	17.84	17.93	18.01	18.17	18.23		
64QAM	1	0	17.97	17.87	17.88	18.01	18.18	≤ 2	2
	1	36	17.82	17.83	17.83	17.96	17.99		
	1	74	17.81	17.80	17.82	17.98	18.06		
	36	0	16.96	16.96	17.04	17.18	17.29	≤ 3	3
	36	18	16.83	16.91	16.99	17.19	17.10		
	36	37	16.80	16.95	17.03	17.23	17.24		
	75	0	16.85	16.96	17.04	17.17	17.28		

Table 9.3.10.3 LTE Conducted Power (Hotspot Mode Active)

Modulation	RB Size	RB Offset	LTE Band 41 Conducted Power- 10 MHz Bandwidth					MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel		
			39700 (2501.0 MHz)	40160 (2547.0 MHz)	40620 (2593.0 MHz)	41080 (2639.0 MHz)	41540 (2685.0 MHz)		
			Conducted Power (dBm)						
QPSK	1	0	19.90	19.90	19.94	20.00	20.06	≤ 1	0
	1	25	19.89	19.81	19.82	19.98	20.11		1
	1	49	19.80	19.80	19.91	19.99	20.09		1
	25	0	18.91	18.88	18.93	19.05	19.19	≤ 2	2
	25	12	18.88	18.87	18.94	19.08	19.14		2
	25	25	18.86	18.80	18.92	19.06	19.15		2
	50	0	18.82	18.86	18.92	19.01	19.16		2
16QAM	1	0	18.90	18.98	19.05	19.15	19.25	≤ 1	1
	1	25	18.87	18.97	19.00	19.10	19.30		1
	1	49	18.81	18.90	18.99	19.10	19.21		1
	25	0	17.85	17.98	17.95	18.15	18.34	≤ 2	2
	25	12	17.83	17.96	18.05	18.18	18.21		2
	25	25	17.81	17.90	18.04	18.16	18.19		2
	50	0	17.82	17.92	18.01	18.11	18.24		2
64QAM	1	0	17.89	17.86	17.89	17.95	18.16	≤ 2	2
	1	25	17.82	17.81	17.87	17.94	18.11		2
	1	49	17.80	17.80	17.88	17.84	18.09		2
	25	0	16.94	16.98	17.08	17.17	17.34	≤ 3	3
	25	12	16.92	16.92	17.12	17.20	17.30		3
	25	25	16.91	16.88	17.11	17.18	17.28		3
	50	0	16.88	16.98	17.11	17.19	17.31		3

Table 9.3.10.4 LTE Conducted Power (Hotspot Mode Active)

Modulation	RB Size	RB Offset	LTE Band 41 Conducted Power- 5 MHz Bandwidth					MPR Allowed Per 3GPP(dB)	MPR (dB)
			Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel		
			39675 (2498.5 MHz)	40148 (2545.8 MHz)	40620 (2593.0 MHz)	41093 (2640.3 MHz)	41565 (2687.5 MHz)		
			Conducted Power (dBm)						
QPSK	1	0	19.87	19.88	19.94	20.02	20.13	≤ 1	0
	1	12	19.92	19.85	19.95	20.03	20.08		1
	1	24	19.97	19.86	19.87	20.05	20.02		1
	12	0	18.88	19.01	19.00	19.10	19.15	≤ 2	2
	12	6	18.94	18.98	18.99	19.08	19.11		2
	12	13	18.85	18.94	18.95	19.14	19.14		2
	25	0	18.86	18.92	18.94	19.03	19.14		2
16QAM	1	0	18.92	19.04	19.13	19.12	19.21	≤ 1	1
	1	12	19.00	19.05	19.08	19.15	19.20		1
	1	24	19.01	18.96	19.06	19.17	19.15		1
	12	0	17.98	18.03	18.04	18.15	18.19	≤ 2	2
	12	6	18.08	18.00	18.02	18.18	18.25		2
	12	13	17.96	18.06	18.00	18.20	18.18		2
	25	0	17.92	18.01	18.03	18.18	18.19		2
64QAM	1	0	17.84	17.85	17.80	17.90	18.04	≤ 2	2
	1	12	17.82	17.83	17.82	17.91	17.94		2
	1	24	17.81	17.81	17.86	17.94	17.98		2
	12	0	16.90	16.99	17.07	17.16	17.21	≤ 3	3
	12	6	17.03	17.11	17.06	17.18	17.27		3
	12	13	16.86	16.97	17.03	17.28	17.21		3
	25	0	16.90	17.09	17.04	17.18	17.25		3

Table 9.3.10.5 LTE Conducted Power (Hotspot Mode Active)

## 9.4 WLAN Nominal and Maximum Output Power Spec and Conducted Powers

Band (GHz)	Mode	Ch	Modulated Average[dBm]		Nominal
			Maximum	Average	
2.4	802.11b	1	16.8	15.8	15.8
		6	16.8	15.8	15.8
		11	16.8	15.8	15.8
	802.11g	1	16.5	15.5	15.5
		6	16.5	15.5	15.5
		11	16.5	15.5	15.5
	802.11n (HT-20)	1	16.0	15.0	15.0
		6	16.0	15.0	15.0
		11	16.0	15.0	15.0
	802.11ac (VHT-20)	1	16.0	15.0	15.0
		6	16.0	15.0	15.0
		11	16.0	15.0	15.0
	802.11n (HT-40)	3	14.0	13.0	13.0
		6	16.0	15.0	15.0
		9	14.0	13.0	13.0
	802.11ac (VHT-40)	3	14.0	13.0	13.0
		6	16.0	15.0	15.0
		9	14.0	13.0	13.0

Table 9.4.1 Nominal and Maximum Output Power Spec

Mode	Freq. (MHz)	Channel	IEEE 802.11 (2.4 GHz) Conducted Power[dBm]	
			Maximum	Average
802.11b	2412	1	16.45	
	2437	6	16.61	
	2462	11	16.48	
802.11g	2412	1	15.55	
	2437	6	15.53	
	2462	11	15.57	
802.11n (HT-20)	2412	1	15.05	
	2437	6	15.26	
	2462	11	15.32	
802.11ac (VHT-20)	2412	1	14.78	
	2437	6	14.80	
	2462	11	15.01	
802.11n (HT-40)	2422	3	12.79	
	2437	6	15.31	
	2452	9	12.72	
802.11ac (VHT-40)	2422	3	12.70	
	2437	6	15.30	
	2452	9	12.73	

Table 9.4.2 IEEE 802.11 Average RF Power

Band (GHz)	Mode	Ch	Modulated Average[dBm]		Nominal
			Maximum	Average	
5 (UNII)	802.11a	36-165	18.5		17.5
	802.11n/ac (20MHz)	36-165	18.0		17.0
		38	16.0		15.0
		46, 54	18.0		17.0
		62	16.0		15.0
		102-142	18.0		17.0
		151	17.0		16.0
		159	18.0		17.0
		42	16.0		15.0
	802.11ac (80MHz)	58, 106	15.0		14.0
		122, 138	18.0		17.0
		155	16.0		15.0

Table 9.4.3 Nominal and Maximum Output Power Spec

Mode	Freq. (MHz)	Channel	IEEE 802.11a (5 GHz) Conducted Power[dBm]	
			Maximum	Average
802.11a	5180	36	17.49	
	5200	40	17.51	
	5220	44	17.44	
	5240	48	17.42	
	5260	52	17.51	
	5280	56	17.49	
	5300	60	17.52	
	5320	64	17.44	
	5500	100	17.51	
	5580	116	17.59	
	5660	132	17.28	
	5720	144	17.22	
	5745	149	17.23	
	5785	157	17.30	
	5825	165	17.52	

Table 9.4.4 IEEE 802.11a Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11n HT20 (5 GHz) Conducted Power[dBm]	
			Maximum	Average
802.11n (HT-20)	5180	36	17.28	
	5200	40	17.35	
	5220	44	17.25	
	5240	48	17.62	
	5260	52	16.91	
	5280	56	17.01	
	5300	60	16.95	
	5320	64	17.21	
	5500	100	17.19	
	5580	116	17.15	
	5660	132	17.27	
	5720	144	17.30	
	5745	149	17.21	
	5785	157	17.29	
	5825	165	17.15	

Table 9.4.5 IEEE 802.11n HT20 Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11ac VHT20 (5 GHz) Conducted Power[dBm]
802.11ac (VHT-20)	5180	36	17.26
	5200	40	17.28
	5220	44	17.31
	5240	48	17.21
	5260	52	17.10
	5280	56	17.02
	5300	60	17.03
	5320	64	17.20
	5500	100	17.16
	5580	116	17.21
	5660	132	16.80
	5720	144	17.11
	5745	149	17.29
	5785	157	17.25
	5825	165	17.21

Table 9.4.6 IEEE 802.11ac VHT20 Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11n HT40 (5 GHz) Conducted Power[dBm]
802.11n (HT-40)	5190	38	15.36
	5230	46	17.36
	5270	54	17.36
	5310	62	15.01
	5510	102	16.71
	5550	110	17.48
	5670	134	17.51
	5710	142	17.29
	5755	151	16.95
	5795	159	16.13

Table 9.4.7 IEEE 802.11n HT40 Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11ac VHT40 (5 GHz) Conducted Power[dBm]
802.11ac (VHT-40)	5190	38	15.27
	5230	46	17.32
	5270	54	17.26
	5310	62	15.08
	5510	102	16.27
	5550	110	17.46
	5670	134	17.48
	5710	142	17.30
	5755	151	15.47
	5795	159	16.28

Table 9.4.8 IEEE 802.11ac VHT40 Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11ac VHT80 (5 GHz) Conducted Power[dBm]
802.11ac (VHT-80)	5210	42	15.34
	5290	58	13.58
	5530	106	14.66
	5610	122	17.23
	5690	138	17.87
	5775	155	14.86

Table 9.4.9 IEEE 802.11ac VHT80 Average RF Power

Justification for reduced test configurations for WIFI channels 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.
- Output Power and SAR is not required for 802.11 g/n HT20/ac VHT20 channels when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjust SAR is  $\leq 1.2 \text{ W/kg}$ .
- The underlined data rate and channel above were tested for SAR.

The average output powers of this device were tested by below configuration.

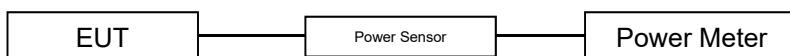


Figure 9.4 Power Measurement Setup

## 9.5 Bluetooth Conducted Powers

Frame Modulated Average[dBm]		2402 MHz	2441 MHz	2480 MHz
Bluetooth 1 Mbps	Maximum	3.5	4.0	5.0
	Nominal	3.0	3.5	4.5
Bluetooth 2 Mbps	Maximum	0.0	0.5	1.5
	Nominal	-0.5	0.0	1.0
Bluetooth 3 Mbps	Maximum	0.0	0.5	1.5
	Nominal	-0.5	0.0	1.0

Table 9.5.1 Nominal and Maximum Output Power Spec (Frame)

Burst Modulated Average[dBm]		
Bluetooth (LE / 1Mbps)	Maximum	1.5
	Nominal	1.0
Bluetooth (LE / 2Mbps)	Maximum	1.5
	Nominal	1.0

Table 9.5.2 Nominal and Maximum Output Power Spec (Burst)

Channel	Frequency (MHz)	Frame AVG Output Power (1Mbps) (dBm)	Frame AVG Output Power (2Mbps) (dBm)	Frame AVG Output Power (3Mbps) (dBm)
		(dBm)	(dBm)	(dBm)
Low	2402	2.12	-1.20	-1.21
Mid	2441	2.93	-0.55	-0.56
High	2480	4.29	0.98	0.97

Table 9.5.3 Bluetooth Frame Average RF Power

Channel	Frequency (MHz)	Burst AVG Output Power(LE / 1Mbps) (dBm)	Burst AVG Output Power(LE / 2Mbps) (dBm)
		(dBm)	(dBm)
Low	2402	0.54	0.51
Mid	2440	-0.34	-0.41
High	2480	0.65	0.63

Table 9.5.4 Bluetooth LE Burst RF Power

- Bluetooth Conducted Powers procedures

1. Bluetooth (BDR, EDR)

- 1) Enter DUT mode in EUT and operate it.  
When it operating, The EUT is transmitting at maximum power level and duty cycle fixed.
- 2) Instruments and EUT were connected like Figure 9.5.1(A).
- 3) The maximum output powers of BDR(1 Mbps), EDR(2, 3 Mbps) and each frequency were set by a Bluetooth Tester.
- 4) Power levels were measured by a Power Meter.

2. Bluetooth (LE)

- 1) Enter LE mode in EUT and operate it.  
When it operating, The EUT is transmitting at maximum power level and duty cycle fixed.
- 2) Instruments and EUT were connected like Figure 9.5.1(B).
- 3) The average conducted output powers of LE and each frequency can measurement according to setting program in EUT.
- 4) Power levels were measured by a Power Meter.

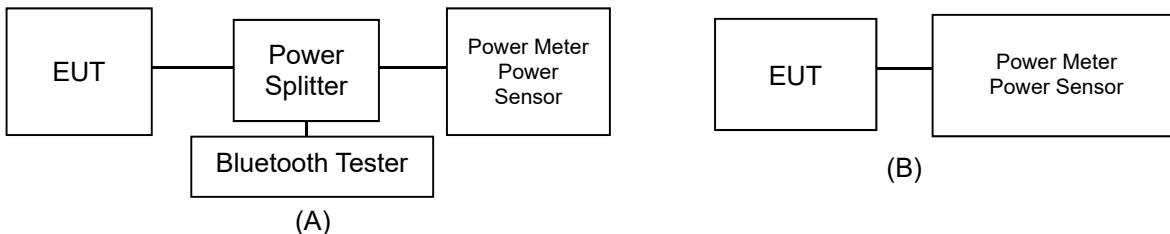


Figure 9.5.1 Average Power Measurement Setup

- Bluetooth Transmission Plot

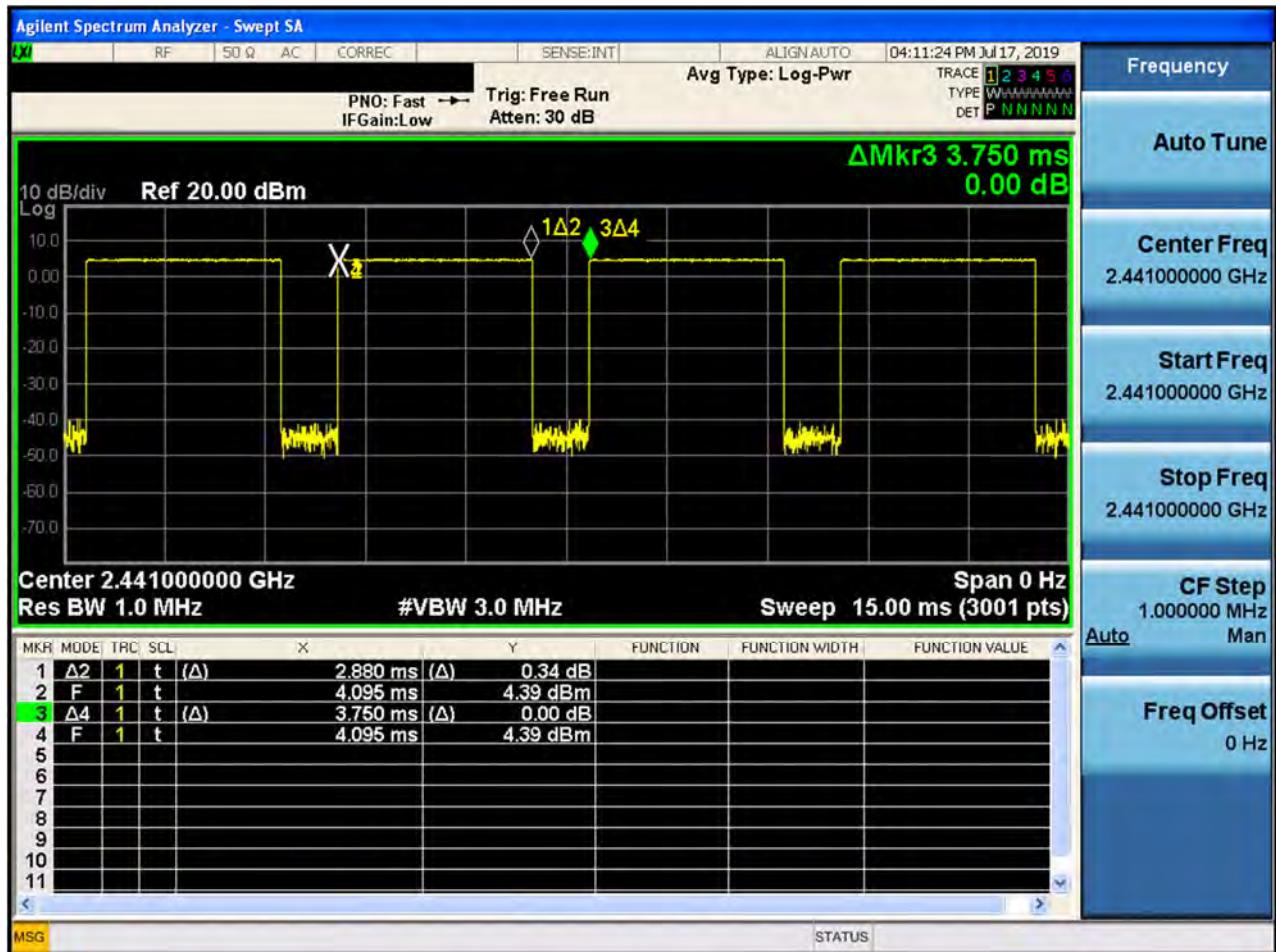


Figure 9.5.2 Bluetooth Transmission Plot

- Bluetooth Duty Cycle Calculation

$$\text{Duty Cycle} = \text{Pulse}/\text{Period} * 100\% = (2.880/3.750) * 100 = 76.8\%$$

## 10. SYSTEM VERIFICATION

### 10.1 Tissue Verification

MEASURED TISSUE PARAMETERS										
Date(s)	Tissue Type	Ambient Temp.[°C]	Liquid Temp.[°C]	Measured Frequency [MHz]	Target Dielectric Constant, $\epsilon_r$	Target Conductivity, $\sigma$ (S/m)	Measured Dielectric Constant, $\epsilon_r$	Measured Conductivity, $\sigma$ (S/m)	Er Deviation [%]	$\sigma$ Deviation [%]
Sep. 04. 2019	750 Head	21.2	21.4	707.5	42.129	0.887	41.371	0.892	-1.80	0.56
				750.0	41.900	0.890	40.806	0.924	-2.61	3.82
Sep. 06. 2019	750 Head	21.0	20.4	750.0	41.900	0.890	41.608	0.911	-0.70	2.36
				782.0	41.749	0.894	41.213	0.942	-1.28	5.37
Sep. 09. 2019	750 Head	21.3	21.4	750.0	41.900	0.890	42.687	0.895	1.88	0.56
				793.0	41.700	0.895	42.118	0.934	1.00	4.36
Sep. 02. 2019	835 Head	21.3	21.0	824.2	41.552	0.899	42.953	0.907	3.37	0.89
				835.0	41.500	0.900	42.827	0.917	3.20	1.89
				836.6	41.500	0.901	42.802	0.918	3.14	1.89
				848.8	41.500	0.914	42.666	0.930	2.81	1.75
Sep. 03. 2019	835 Head	21.1	21.3	826.4	41.542	0.899	41.631	0.884	0.21	-1.67
				835.0	41.500	0.900	41.525	0.892	0.06	-0.89
				836.6	41.500	0.901	41.508	0.894	0.02	-0.78
				846.6	41.500	0.912	41.366	0.903	-0.32	-0.99
Sep. 05. 2019	835 Head	21.4	21.3	814.7	41.600	0.898	40.978	0.862	-1.50	-4.01
				831.5	41.500	0.900	40.774	0.876	-1.75	-2.67
				835.0	41.500	0.900	40.738	0.879	-1.84	-2.33
				848.3	41.500	0.914	40.584	0.891	-2.21	-2.52
Oct. 02. 2019	1800 Head	21.7	21.5	1712.4	40.126	1.350	39.973	1.327	-0.38	-1.70
				1720.0	40.114	1.354	39.951	1.337	-0.41	-1.26
				1732.4	40.097	1.361	39.912	1.352	-0.46	-0.66
				1732.5	40.097	1.361	39.912	1.352	-0.46	-0.66
				1745.0	40.079	1.369	39.880	1.365	-0.50	-0.29
				1752.6	40.069	1.373	39.862	1.370	-0.52	-0.22
				1800.0	40.000	1.400	39.696	1.407	-0.76	0.50
Oct. 01. 2019	1900 Head	21.3	21.2	1850.2	40.000	1.400	39.430	1.363	-1.43	-2.64
				1852.4	40.000	1.400	39.432	1.366	-1.42	-2.43
				1880.0	40.000	1.400	39.352	1.396	-1.62	-0.29
				1900.0	40.000	1.400	39.265	1.416	-1.84	1.14
				1907.6	40.000	1.400	39.230	1.423	-1.93	1.64
				1909.8	40.000	1.400	39.220	1.426	-1.95	1.86
Oct. 04. 2019	1900 Head	21.8	21.6	1860.0	40.000	1.400	40.201	1.366	0.50	-2.43
				1882.5	40.000	1.400	40.071	1.386	0.18	-1.00
				1900.0	40.000	1.400	39.956	1.401	-0.11	0.07
				1905.0	40.000	1.400	39.923	1.405	-0.19	0.36
Aug. 22. 2019	2450 Head	21.5	21.7	2402.0	39.282	1.757	38.790	1.703	-1.25	-3.07
				2412.0	39.265	1.766	38.748	1.713	-1.32	-3.00
				2437.0	39.222	1.788	38.673	1.743	-1.40	-2.52
				2441.0	39.215	1.792	38.663	1.747	-1.41	-2.51
				2450.0	39.200	1.800	38.643	1.758	-1.42	-2.33
				2462.0	39.184	1.813	38.617	1.770	-1.45	-2.37
				2467.0	39.177	1.818	38.602	1.775	-1.47	-2.37
				2472.0	39.171	1.823	38.586	1.780	-1.49	-2.36
Aug. 23. 2019	2450 Head	20.9	21.0	2480.0	39.160	1.832	38.553	1.788	-1.55	-2.40
				2402.0	39.282	1.757	38.510	1.799	-1.97	2.39
				2412.0	39.265	1.766	38.475	1.810	-2.01	2.49
				2437.0	39.222	1.788	38.386	1.839	-2.13	2.85
				2441.0	39.215	1.792	38.372	1.844	-2.15	2.90
				2450.0	39.200	1.800	38.344	1.854	-2.18	3.00
				2462.0	39.184	1.813	38.307	1.867	-2.24	2.98
				2467.0	39.177	1.818	38.290	1.872	-2.26	2.97
Oct. 07. 2019	2600 Head	21.8	21.6	2472.0	39.171	1.823	38.270	1.877	-2.30	2.96
				2480.0	39.160	1.832	38.238	1.886	-2.35	2.95
				2506.0	39.125	1.860	38.703	1.841	-1.08	-1.02
				2510.0	39.120	1.864	38.687	1.846	-1.11	-0.97
				2535.0	39.087	1.891	38.606	1.875	-1.23	-0.85
				2549.5	39.068	1.906	38.565	1.892	-1.29	-0.73
				2560.0	39.053	1.917	38.541	1.904	-1.31	-0.68
				2593.0	39.009	1.953	38.444	1.938	-1.45	-0.77
Oct. 10. 2019	2600 Head	21.8	21.7	2600.0	39.000	1.960	38.419	1.946	-1.49	-0.71
				2636.5	38.955	2.000	38.283	1.987	-1.73	-0.65
				2680.0	38.900	2.048	38.165	2.038	-1.89	-0.49
				2506.0	39.125	1.860	38.914	1.842	-0.54	-0.97
				2510.0	39.120	1.864	38.895	1.846	-0.58	-0.97
				2535.0	39.087	1.891	38.805	1.877	-0.72	-0.74
				2549.5	39.068	1.906	38.772	1.895	-0.76	-0.58
				2560.0	39.053	1.917	38.752	1.906	-0.77	-0.57
TRF-RF-601(03)161101				2593.0	39.009	1.953	38.648	1.938	-0.93	-0.77
				2600.0	39.000	1.960	38.614	1.946	-0.99	-0.71
				2636.5	38.955	2.000	38.456	1.989	-1.28	-0.55
				2680.0	38.900	2.048	38.355	2.040	-1.40	-0.39

MEASURED TISSUE PARAMETERS										
Date(s)	Tissue Type	Ambient Temp.[°C]	Liquid Temp.[°C]	Measured Frequency [MHz]	Target Dielectric Constant, $\epsilon_r$	Target Conductivity, $\sigma$ (S/m)	Measured Dielectric Constant, $\epsilon_r$	Measured Conductivity, $\sigma$ (S/m)	Er Deviation [%]	$\sigma$ Deviation [%]
Sep. 04. 2019	5200 Head	20.9	21.4	5180.0	36.020	4.639	34.783	4.724	-3.43	1.83
				5190.0	36.010	4.650	34.755	4.735	-3.49	1.83
				5200.0	36.000	4.660	34.731	4.748	-3.53	1.89
				5210.0	35.990	4.670	34.715	4.762	-3.54	1.97
				5220.0	35.980	4.680	34.701	4.772	-3.55	1.97
				5230.0	35.970	4.690	34.683	4.783	-3.58	1.98
				5240.0	35.960	4.700	34.662	4.795	-3.61	2.02
Sep. 05. 2019	5300 Head	21.3	21.6	5260.0	35.940	4.720	36.909	4.718	2.70	-0.04
				5270.0	35.930	4.730	36.900	4.729	2.70	-0.02
				5280.0	35.920	4.740	36.890	4.738	2.70	-0.04
				5290.0	35.910	4.750	36.868	4.747	2.67	-0.06
				5300.0	35.900	4.760	36.842	4.760	2.62	0.00
				5310.0	35.890	4.770	36.827	4.773	2.61	0.06
				5320.0	35.880	4.780	36.816	4.783	2.61	0.06
Sep. 06. 2019	5600 Head	20.9	21.5	5500.0	35.650	4.965	35.244	4.928	-1.14	-0.75
				5510.0	35.635	4.976	35.230	4.938	-1.14	-0.76
				5530.0	35.605	4.997	35.185	4.964	-1.18	-0.66
				5550.0	35.575	5.018	35.161	4.988	-1.16	-0.60
				5580.0	35.530	5.049	35.092	5.022	-1.23	-0.53
				5600.0	35.500	5.070	35.059	5.049	-1.24	-0.41
				5660.0	35.440	5.130	34.965	5.113	-1.34	-0.33
				5670.0	35.430	5.140	34.947	5.121	-1.36	-0.37
				5690.0	35.410	5.160	34.899	5.145	-1.44	-0.29
				5710.0	35.390	5.180	34.869	5.170	-1.47	-0.19
				5720.0	35.380	5.190	34.862	5.179	-1.46	-0.21
Sep. 09. 2019	5800 Head	21.8	21.6	5745.0	35.355	5.215	36.528	5.137	3.32	-1.50
				5755.0	35.345	5.225	36.510	5.151	3.30	-1.42
				5775.0	35.325	5.245	36.484	5.173	3.28	-1.37
				5785.0	35.315	5.255	36.465	5.184	3.26	-1.35
				5795.0	35.305	5.265	36.448	5.197	3.24	-1.29
				5800.0	35.300	5.270	36.440	5.204	3.23	-1.25
				5825.0	35.275	5.296	36.418	5.239	3.24	-1.08

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 865664 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.

#### Measurement Procedure for Tissue verification:

- 1) The network analyzer and probe system was configured and calibrated.
- 2) The probe was immersed in the sample which was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
- 3) The complex admittance with respect to the probe aperture was measured
- 4) The complex relative permittivity  $\epsilon_r$ , for example from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\epsilon_r\epsilon_0}{[\ln(b/a)]^2} \int_a^b \int_a^b \int_0^\pi \cos\phi' \frac{\exp[-j\omega r(\mu_0\epsilon_r\epsilon_0)^{1/2}]}{r} d\phi' d\rho' dr$$

where  $Y$  is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively,  $r^2 = \rho^2 + \rho'^2 - 2\rho\rho'\cos\phi'$ ,  $\omega$  is the angular frequency, and  $j = \sqrt{-1}$ .

## 10.2 Test System Verification

Prior to assessment, the system is verified to the  $\pm 10\%$  of the specifications at using the SAR Dipole kit(s). (Graphic Plots Attached)

**Table 10.2.1 System Verification Results (1g)**

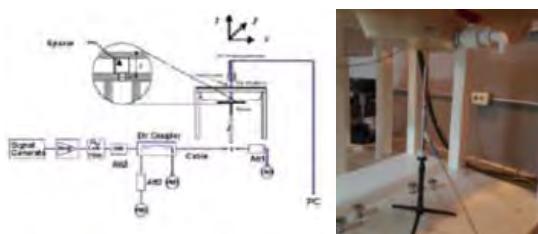
SYSTEM DIPOLE VERIFICATION TARGET & MEASURED												
SAR System #	Freq. [MHz]	SAR Dipole kits	Date(s)	Tissue Type	Ambient Temp. [°C]	Liquid Temp. [°C]	Probe S/N	Input Power (mW)	1 W Target SAR <sub>1g</sub> (W/kg)	Measured SAR <sub>1g</sub> (W/kg)	1 W Normalized SAR <sub>1g</sub> (W/kg)	Deviation [%]
C	750	D750V3, SN:1049	Sep. 04. 2019	Head	21.2	21.4	3866	250	8.38	2.24	8.96	6.92
C	750	D750V3, SN:1049	Sep. 06. 2019	Head	21.0	20.4	3866	250	8.38	2.21	8.84	5.49
C	750	D750V3, SN:1049	Sep. 09. 2019	Head	21.3	21.4	3866	250	8.38	2.17	8.68	3.58
C	835	D835V2, SN:464	Sep. 02. 2019	Head	21.3	21.0	3866	250	9.59	2.45	9.80	2.19
C	835	D835V2, SN:464	Sep. 03. 2019	Head	21.1	21.3	3866	250	9.59	2.38	9.52	-0.73
C	835	D835V2, SN:464	Sep. 05. 2019	Head	21.4	21.3	3866	250	9.59	2.35	9.40	-1.98
E	1800	D1800V2, SN:2d047	Oct. 02. 2019	Head	21.7	21.5	7337	100	38.1	3.81	38.10	0.00
E	1900	D1900V2, SN:5d029	Oct. 01. 2019	Head	21.3	21.2	7337	100	40.4	4.09	40.90	1.24
E	1900	D1900V2, SN:5d029	Oct. 04. 2019	Head	21.8	21.6	7337	100	40.4	3.94	39.40	-2.48
D	2450	D2450V2, SN:920	Aug. 22. 2019	Head	21.5	21.7	3916	100	51.9	4.93	49.30	-5.01
D	2450	D2450V2, SN:920	Aug. 23. 2019	Head	20.9	21.0	3916	100	51.9	5.20	52.00	0.19
E	2600	D2600V2, SN:1016	Oct. 07. 2019	Head	21.8	21.6	7337	100	56.6	5.71	57.10	0.88
E	2600	D2600V2, SN:1016	Oct. 10. 2019	Head	21.8	21.7	7337	100	56.6	5.62	56.20	-0.71
D	5200	D5GHzV2, SN:1103	Sep. 04. 2019	Head	20.9	21.4	3916	100	79.4	7.81	78.10	-1.64
D	5300	D5GHzV2, SN:1103	Sep. 05. 2019	Head	21.3	21.6	3916	100	82.4	7.93	79.30	-3.76
D	5500	D5GHzV2, SN:1103	Sep. 06. 2019	Head	20.9	21.5	3916	100	84.0	8.12	81.20	-3.33
D	5600	D5GHzV2, SN:1103	Sep. 06. 2019	Head	20.9	21.5	3916	100	84.0	8.14	81.40	-3.10
D	5800	D5GHzV2, SN:1103	Sep. 09. 2019	Head	21.8	21.6	3916	100	81.4	8.27	82.70	1.60

**Table 10.2.2 System Verification Results (10g)**

SYSTEM DIPOLE VERIFICATION TARGET & MEASURED												
SAR System #	Freq. [MHz]	SAR Dipole kits	Date(s)	Tissue Type	Ambient Temp. [°C]	Liquid Temp. [°C]	Probe S/N	Input Power (mW)	1 W Target SAR <sub>10g</sub> (W/kg)	Measured SAR <sub>10g</sub> (W/kg)	1 W Normalized SAR <sub>10g</sub> (W/kg)	Deviation [%]
D	5300	D5GHzV2, SN:1103	Sep. 05. 2019	Head	21.3	21.6	3916	100	23.5	2.28	22.80	-2.98
D	5500	D5GHzV2, SN:1103	Sep. 06. 2019	Head	20.9	21.5	3916	100	23.9	2.29	22.90	-4.18
D	5600	D5GHzV2, SN:1103	Sep. 06. 2019	Head	20.9	21.5	3916	100	24.0	2.30	23.00	-4.17
D	5800	D5GHzV2, SN:1103	Sep. 09. 2019	Head	21.8	21.6	3916	100	23.2	2.33	23.30	0.43

Note(s):

1. System Verification was measured with input 250 mW, 100 mW and normalized to 1W.
2. Full system validation status and results can be found in Appendix D.
3. Effective February 19, 2019, FCC has permitted the use of single head-tissue simulating liquid specified in IEC 62209-1 for all SAR tests.



**Figure 10.1 Dipole Verification Test Setup Diagram & Photo**

## **11. SAR TEST RESULTS**

## 11.1 Head SAR Results

**Table 11.1.1 GSM/GPRS 850 Head SAR**

Measurement Results														
Frequency		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch													
836.6	190	GSM850	GSM	33.00	32.61	0.120	Left Touch	FCC #1	1	1:8.3	0.234	1.094	0.256	
836.6	190	GSM850	GSM	33.00	32.61	-0.010	Right Touch	FCC #1	1	1:8.3	0.263	1.094	0.288	A1
836.6	190	GSM850	GSM	33.00	32.61	0.140	Left Tilt	FCC #1	1	1:8.3	0.125	1.094	0.137	
836.6	190	GSM850	GSM	33.00	32.61	-0.060	Right Tilt	FCC #1	1	1:8.3	0.123	1.094	0.135	
836.6	190	GSM850	GPRS	31.00	30.46	0.150	Left Touch	FCC #1	2	1:4.15	0.338	1.132	0.383	
836.6	190	GSM850	GPRS	31.00	30.46	0.110	Right Touch	FCC #1	2	1:4.15	0.343	1.132	0.388	A2
836.6	190	GSM850	GPRS	31.00	30.46	-0.180	Left Tilt	FCC #1	2	1:4.15	0.187	1.132	0.212	
836.6	190	GSM850	GPRS	31.00	30.46	0.080	Right Tilt	FCC #1	2	1:4.15	0.162	1.132	0.183	
836.6	190	GSM850	GPRS	31.00	30.46	-0.060	Right Touch	FCC #1	2	1:4.15	0.328	1.132	0.371	
ANSI / IEEE C95.1-1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Head 1.6 W/kg (mW/g) averaged over 1 gram						

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**Note(s):**

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.1.2 PCS/GPRS 1900 Head SAR**

MEASUREMENT RESULTS														
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch													
1880.0	661	PCS1900	PCS	30.00	29.72	-0.100	Left Touch	FCC #1	1	1.8.3	0.246	1.067	0.262	A3
1880.0	661	PCS1900	PCS	30.00	29.72	-0.140	Right Touch	FCC #1	1	1.8.3	0.122	1.067	0.130	
1880.0	661	PCS1900	PCS	30.00	29.72	-0.080	Left Tilt	FCC #1	1	1.8.3	0.068	1.067	0.073	
1880.0	661	PCS1900	PCS	30.00	29.72	-0.190	Right Tilt	FCC #1	1	1.8.3	0.056	1.067	0.060	
1880.0	661	PCS1900	GPRS	28.20	27.78	-0.060	Left Touch	FCC #1	2	1.4.15	0.306	1.102	0.337	A4
1880.0	661	PCS1900	GPRS	28.20	27.78	-0.170	Right Touch	FCC #1	2	1.4.15	0.124	1.102	0.137	
1880.0	661	PCS1900	GPRS	28.20	27.78	-0.040	Left Tilt	FCC #1	2	1.4.15	0.074	1.102	0.082	
1880.0	661	PCS1900	GPRS	28.20	27.78	-0.100	Right Tilt	FCC #1	2	1.4.15	0.056	1.102	0.062	
1880.0	661	PCS1900	GPRS	28.20	27.78	-0.060	Left Touch	FCC #1	2	1.4.15	0.262	1.102	0.289	

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**Note(s):**

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.1.3 WCDMA 850 Head SAR**

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch												
836.6	4183	WCDMA 850	RMC	24.00	23.85	0.040	Left Touch	FCC #1	1:1	0.300	1.035	0.311	
836.6	4183	WCDMA 850	RMC	24.00	23.85	-0.130	Right Touch	FCC #1	1:1	0.344	1.035	0.356	A5
836.6	4183	WCDMA 850	RMC	24.00	23.85	-0.080	Left Tilt	FCC #1	1:1	0.183	1.035	0.189	
836.6	4183	WCDMA 850	RMC	24.00	23.85	0.110	Right Tilt	FCC #1	1:1	0.169	1.035	0.175	
836.6	4183	WCDMA 850	RMC	24.00	23.85	0.010	Right Touch	FCC #1	1:1	0.333	1.035	0.345	
ANSI / IEEE C95.1-1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Head 1.6 W/kg (mW/g) averaged over 1 gram					

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.1.4 WCDMA 1700 Head SAR**

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch												
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	0.130	Left Touch	FCC #1	1:1	0.557	1.156	0.644	A6
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	0.150	Right Touch	FCC #1	1:1	0.210	1.156	0.243	
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	-0.030	Left Tilt	FCC #1	1:1	0.127	1.156	0.147	
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	0.060	Right Tilt	FCC #1	1:1	0.104	1.156	0.120	
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	-0.110	Left Touch	FCC #1	1:1	0.437	1.156	0.505	

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.1.5 WCDMA 1900 Head SAR**

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch												
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	-0.180	Left Touch	FCC #1	1:1	0.461	1.026	0.473	A7
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	0.130	Right Touch	FCC #1	1:1	0.268	1.026	0.275	
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	-0.070	Left Tilt	FCC #1	1:1	0.105	1.026	0.108	
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	0.040	Right Tilt	FCC #1	1:1	0.088	1.026	0.090	
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	0.000	Left Touch	FCC #1	1:1	0.391	1.026	0.401	

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.1.6 LTE Band 12 Head SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
707.5	23095	LTE B12	10	23.00	22.61	0.110	0	Left Touch	FCC #1	QPSK	1	25	1:1	0.159	1.094	0.174	
707.5	23095	LTE B12	10	22.00	21.69	0.020	1	Left Touch	FCC #1	QPSK	25	25	1:1	0.126	1.074	0.135	
707.5	23095	LTE B12	10	23.00	22.61	0.040	0	Right Touch	FCC #1	QPSK	1	25	1:1	0.177	1.094	0.194	A8
707.5	23095	LTE B12	10	22.00	21.69	-0.100	1	Right Touch	FCC #1	QPSK	25	25	1:1	0.140	1.074	0.150	
707.5	23095	LTE B12	10	23.00	22.61	0.040	0	Left Tilt	FCC #1	QPSK	1	25	1:1	0.097	1.094	0.106	
707.5	23095	LTE B12	10	22.00	21.69	0.180	1	Left Tilt	FCC #1	QPSK	25	25	1:1	0.080	1.074	0.086	
707.5	23095	LTE B12	10	23.00	22.61	-0.080	0	Right Tilt	FCC #1	QPSK	1	25	1:1	0.125	1.094	0.137	
707.5	23095	LTE B12	10	22.00	21.69	0.090	1	Right Tilt	FCC #1	QPSK	25	25	1:1	0.074	1.074	0.079	
707.5	23095	LTE B12	10	23.00	22.61	0.110	0	Right Touch	FCC #1	QPSK	1	25	1:1	0.166	1.094	0.182	

ANSI / IEEE C91.1-1992 - SAFETY LIMIT  
Spatial Peak  
Uncontrolled Exposure/General Population Exposure

Head  
1.6 W/kg (mW/g)  
averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.1.7 LTE Band 13 Head SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
782.0	23230	LTE B13	10	23.30	23.11	0.040	0	Left Touch	FCC #1	QPSK	1	25	1:1	0.226	1.045	0.236	
782.0	23230	LTE B13	10	22.30	21.82	0.110	1	Left Touch	FCC #1	QPSK	25	12	1:1	0.156	1.117	0.174	
782.0	23230	LTE B13	10	23.30	23.11	-0.070	0	Right Touch	FCC #1	QPSK	1	25	1:1	0.258	1.045	0.270	A9
782.0	23230	LTE B13	10	22.30	21.82	0.110	1	Right Touch	FCC #1	QPSK	25	12	1:1	0.205	1.117	0.229	
782.0	23230	LTE B13	10	23.30	23.11	-0.010	0	Left Tilt	FCC #1	QPSK	1	25	1:1	0.176	1.045	0.184	
782.0	23230	LTE B13	10	22.30	21.82	-0.170	1	Left Tilt	FCC #1	QPSK	25	12	1:1	0.125	1.117	0.140	
782.0	23230	LTE B13	10	23.30	23.11	0.040	0	Right Tilt	FCC #1	QPSK	1	25	1:1	0.140	1.045	0.146	
782.0	23230	LTE B13	10	22.30	21.82	0.010	1	Right Tilt	FCC #1	QPSK	25	12	1:1	0.102	1.117	0.114	
782.0	23230	LTE B13	10	23.30	23.11	-0.120	0	Right Touch	FCC #1	QPSK	1	25	1:1	0.231	1.045	0.241	

ANSI / IEEE C95.1-1992 - SAFETY LIMIT  
Spatial Peak  
Uncontrolled Exposure/General Population Exposure

Head  
1.6 W/kg (mW/g)  
averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.1.8 LTE Band 14 Head SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
793.0	23330	LTE B14	10	23.30	23.21	-0.090	0	Left Touch	FCC #1	QPSK	1	25	1:1	0.235	1.021	0.240	
793.0	23330	LTE B14	10	22.30	21.88	-0.110	1	Left Touch	FCC #1	QPSK	25	12	1:1	0.176	1.102	0.193	
793.0	23330	LTE B14	10	23.30	23.21	0.120	0	Right Touch	FCC #1	QPSK	1	25	1:1	0.281	1.021	0.287	A10
793.0	23330	LTE B14	10	22.30	21.88	0.170	1	Right Touch	FCC #1	QPSK	25	12	1:1	0.191	1.102	0.210	
793.0	23330	LTE B14	10	23.30	23.21	-0.060	0	Left Tilt	FCC #1	QPSK	1	25	1:1	0.167	1.021	0.171	
793.0	23330	LTE B14	10	22.30	21.88	-0.130	1	Left Tilt	FCC #1	QPSK	25	12	1:1	0.124	1.102	0.137	
793.0	23330	LTE B14	10	23.30	23.21	0.080	0	Right Tilt	FCC #1	QPSK	1	25	1:1	0.149	1.021	0.152	
793.0	23330	LTE B14	10	22.30	21.88	0.040	1	Right Tilt	FCC #1	QPSK	25	12	1:1	0.112	1.102	0.123	
793.0	23330	LTE B14	10	23.30	23.21	0.010	0	Right Touch	FCC #1	QPSK	1	25	1:1	0.273	1.021	0.279	

ANSI / IEEE C95.1-1992 - SAFETY LIMIT  
Spatial Peak  
Uncontrolled Exposure/General Population Exposure

Head  
1.6 W/kg (mW/g)  
averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.1.10 LTE Band 4 (AWS) Head SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
1732.5	20175	LTE B4	20	23.30	23.19	0.130	0	Left Touch	FCC #1	QPSK	1	50	1:1	0.354	1.026	0.363	A12
1732.5	20175	LTE B4	20	22.30	21.96	0.070	1	Left Touch	FCC #1	QPSK	50	25	1:1	0.272	1.081	0.294	
1732.5	20175	LTE B4	20	23.30	23.19	-0.110	0	Right Touch	FCC #1	QPSK	1	50	1:1	0.193	1.026	0.198	
1732.5	20175	LTE B4	20	22.30	21.96	0.130	1	Right Touch	FCC #1	QPSK	50	25	1:1	0.171	1.081	0.185	
1732.5	20175	LTE B4	20	23.30	23.19	0.110	0	Left Tilt	FCC #1	QPSK	1	50	1:1	0.121	1.026	0.124	
1732.5	20175	LTE B4	20	22.30	21.96	0.150	1	Left Tilt	FCC #1	QPSK	50	25	1:1	0.094	1.081	0.102	
1732.5	20175	LTE B4	20	23.30	23.19	0.150	0	Right Tilt	FCC #1	QPSK	1	50	1:1	0.104	1.026	0.107	
1732.5	20175	LTE B4	20	22.30	21.96	0.120	1	Right Tilt	FCC #1	QPSK	50	25	1:1	0.086	1.081	0.093	
1732.5	20175	LTE B4	20	23.30	23.19	0.110	0	Left Touch	FCC #1	QPSK	1	50	1:1	0.320	1.026	0.328	

ANSI / IEEE C95.1-1992 - SAFETY LIMIT  
Spatial Peak  
Uncontrolled Exposure/General Population Exposure

Head  
1.6 W/kg (mW/g)  
averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.1.11 LTE Band 25 (PCS) Head SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
1860.0	26140	LTE B25	20	23.50	23.41	-0.150	0	Left Touch	FCC #1	QPSK	1	50	1:1	0.316	1.021	0.323	A13
1860.0	26140	LTE B25	20	22.50	22.25	-0.090	1	Left Touch	FCC #1	QPSK	50	25	1:1	0.274	1.059	0.290	
1860.0	26140	LTE B25	20	23.50	23.41	0.070	0	Right Touch	FCC #1	QPSK	1	50	1:1	0.153	1.021	0.156	
1860.0	26140	LTE B25	20	22.50	22.25	0.010	1	Right Touch	FCC #1	QPSK	50	25	1:1	0.127	1.059	0.134	
1860.0	26140	LTE B25	20	23.50	23.41	0.140	0	Left Tilt	FCC #1	QPSK	1	50	1:1	0.065	1.021	0.066	
1860.0	26140	LTE B25	20	22.50	22.25	0.100	1	Left Tilt	FCC #1	QPSK	50	25	1:1	0.032	1.059	0.034	
1860.0	26140	LTE B25	20	23.50	23.41	-0.010	0	Right Tilt	FCC #1	QPSK	1	50	1:1	0.052	1.021	0.053	
1860.0	26140	LTE B25	20	22.50	22.25	0.150	1	Right Tilt	FCC #1	QPSK	50	25	1:1	0.025	1.059	0.026	
1860.0	26140	LTE B25	20	23.50	23.41	-0.070	0	Left Touch	FCC #1	QPSK	1	50	1:1	0.205	1.021	0.209	

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Spatial Peak

Uncontrolled Exposure/General Population Exposure

Head

1.6 W/kg (mW/g)

averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.1.12 LTE Band 7 Head SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
2560.0	21350	LTE B7	20	22.00	21.68	-0.040	0	Left Touch	FCC #1	QPSK	1	99	1:1	0.108	1.076	0.116	A14
2560.0	21350	LTE B7	20	21.00	20.77	0.190	1	Left Touch	FCC #1	QPSK	50	50	1:1	0.070	1.054	0.074	
2560.0	21350	LTE B7	20	22.00	21.68	0.140	0	Right Touch	FCC #1	QPSK	1	99	1:1	0.036	1.076	0.039	
2560.0	21350	LTE B7	20	21.00	20.77	0.170	1	Right Touch	FCC #1	QPSK	50	50	1:1	0.048	1.054	0.051	
2560.0	21350	LTE B7	20	22.00	21.68	0.160	0	Left Tilt	FCC #1	QPSK	1	99	1:1	0.022	1.076	0.024	
2560.0	21350	LTE B7	20	21.00	20.77	0.000	1	Left Tilt	FCC #1	QPSK	50	50	1:1	0.018	1.054	0.019	
2560.0	21350	LTE B7	20	22.00	21.68	-0.100	0	Right Tilt	FCC #1	QPSK	1	99	1:1	0.044	1.076	0.047	
2560.0	21350	LTE B7	20	21.00	20.77	0.160	1	Right Tilt	FCC #1	QPSK	50	50	1:1	0.040	1.054	0.042	
2560.0	21350	LTE B7	20	22.00	21.68	-0.080	0	Left Touch	FCC #1	QPSK	1	99	1:1	0.096	1.076	0.103	

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Spatial Peak

Uncontrolled Exposure/General Population Exposure

Head

1.6 W/kg (mW/g)

averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.1.13 LTE Band 41 Head SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
2593.0	40620	LTE B41	20	22.50	22.16	0.000	0	Left Touch	FCC #1	QPSK	1	0	1:1	0.093	1.081	0.101	A15
2593.0	40620	LTE B41	20	21.50	21.11	0.000	1	Left Touch	FCC #1	QPSK	50	0	1:1	0.044	1.094	0.048	
2593.0	40620	LTE B41	20	22.50	22.16	0.040	0	Right Touch	FCC #1	QPSK	1	0	1:1	0.043	1.081	0.046	
2593.0	40620	LTE B41	20	21.50	21.11	0.100	1	Right Touch	FCC #1	QPSK	50	0	1:1	0.020	1.094	0.022	
2593.0	40620	LTE B41	20	22.50	22.16	0.100	0	Left Tilt	FCC #1	QPSK	1	0	1:1	0.030	1.081	0.032	
2593.0	40620	LTE B41	20	21.50	21.11	0.060	1	Left Tilt	FCC #1	QPSK	50	0	1:1	0.020	1.094	0.022	
2593.0	40620	LTE B41	20	22.50	22.16	-0.020	0	Right Tilt	FCC #1	QPSK	1	0	1:1	0.035	1.081	0.038	
2593.0	40620	LTE B41	20	21.50	21.11	-0.120	1	Right Tilt	FCC #1	QPSK	50	0	1:1	0.025	1.094	0.027	
2593.0	40620	LTE B41	20	22.50	22.16	0.000	0	Left Touch	FCC #1	QPSK	1	0	1:1	0.092	1.081	0.099	

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Spatial Peak

Uncontrolled Exposure/General Population Exposure

Head

1.6 W/kg (mW/g)

averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

2. Yellow entries represent variability measurements.

Adjusted SAR results for OFDM SAR

FREQUENCY		Mode/ Antenna	Service	Maximum Allowed Power [dBm]	1g Scaled SAR (W/kg)	FREQUENCY [MHz]	Mode	Service	Maximum Allowed Power [dBm]	Ratio of OFDM to DSSS	1g Adjusted SAR (W/kg)	Determine OFDM SAR
MHz	Ch											
2437.0	6	802.11b	DSSS	16.8	0.267	2437	802.11g	OFDM	16.5	0.933	0.249	X
2437.0	6	802.11b	DSSS	16.8	0.267	2437	802.11n	OFDM	16.0	0.832	0.222	X
2437.0	6	802.11b	DSSS	16.8	0.267	2437	802.11ac	OFDM	16.0	0.832	0.222	X

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Spatial Peak

Uncontrolled Exposure/General Population Exposure

Head

1.6 W/kg (mW/g)

averaged over 1 gram

Note: SAR is not required for the following 2.4 GHz OFDM conditions. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

**Table 11.1.15 UNII Head SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode (Antenna)	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5300.0	60	802.11a	18.50	17.52	0.110	Left Touch	FCC #2	0.485	6	95.7	0.520	1.253	1.045	0.681	
5260.0	52	802.11a	18.50	17.51	0.170	Right Touch	FCC #2	0.731	6	95.7	0.778	1.256	1.045	1.021	
5300.0	60	802.11a	18.50	17.52	0.020	Right Touch	FCC #2	0.832	6	95.7	0.850	1.253	1.045	1.113	A17
5300.0	60	802.11a	18.50	17.52	-0.010	Left Tilt	FCC #2	0.510	6	95.7	0.540	1.253	1.045	0.707	
5300.0	60	802.11a	18.50	17.52	0.040	Right Tilt	FCC #2	0.653	6	95.7	0.682	1.253	1.045	0.893	
5300.0	60	802.11a	18.50	17.52	0.080	Right Touch	FCC #2	0.826	6	95.7	0.845	1.253	1.045	1.106	
5300.0	60	802.11a	18.50	17.52	0.010	Right Touch	FCC #2	0.826	6	95.7	0.848	1.253	1.045	1.110	
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Head 1.6 W/kg (mW/g) averaged over 1 gram							

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.
2. Yellow entries represent variability measurements.

## Adjusted SAR results for UNII-1 and UNII-2A SAR

FREQUENCY		Mode/ Antenna	Service	Maximum Allowed Power [dBm]	1g Scaled SAR (W/kg)	FREQUENCY [MHz]	Mode	Service	Maximum Allowed Power [dBm]	Adjusted Factor	1g Adjusted SAR (W/kg)	SAR for the band with lower maximum output power
MHz	Ch											
5300.0	60	802.11a	OFDM	18.5	1.113	5200	802.11a	OFDM	18.5	1.000	1.113	X
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Head 1.6 W/kg (mW/g) averaged over 1 gram				

Note(s):

1. U-NII-1 and U-NII-2A Bands: When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is  $\leq 1.2$  W/kg, SAR is not required for the band with lower maximum output power in that test configuration.

**Table 11.1.16 UNII Head SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode (Antenna)	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5580.0	116	802.11a	18.50	17.59	-0.010	Left Touch	FCC #2	0.397	6	95.7	0.424	1.233	1.045	0.546	
5580.0	116	802.11a	18.50	17.59	-0.000	Right Touch	FCC #2	0.575	6	95.7	0.593	1.233	1.045	0.764	A18
5580.0	116	802.11a	18.50	17.59	0.120	Left Tilt	FCC #2	0.470	6	95.7	0.474	1.233	1.045	0.611	
5580.0	116	802.11a	18.50	17.59	-0.040	Right Tilt	FCC #2	0.450	6	95.7	0.440	1.233	1.045	0.567	
5580.0	116	802.11a	18.50	17.59	0.180	Right Touch	FCC #2	0.531	6	95.7	0.583	1.233	1.045	0.751	
5825.0	165	802.11a	18.50	17.52	0.080	Left Touch	FCC #2	0.256	6	95.9	0.284	1.253	1.043	0.371	
5825.0	165	802.11a	18.50	17.52	0.090	Right Touch	FCC #2	0.496	6	95.9	0.531	1.253	1.043	0.694	A19
5825.0	165	802.11a	18.50	17.52	0.180	Left Tilt	FCC #2	0.388	6	95.9	0.364	1.253	1.043	0.476	
5825.0	165	802.11a	18.50	17.52	0.040	Right Tilt	FCC #2	0.405	6	95.9	0.411	1.253	1.043	0.537	
5825.0	165	802.11a	18.50	17.52	0.080	Right Touch	FCC #2	0.454	6	95.9	0.485	1.253	1.043	0.634	
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Head 1.6 W/kg (mW/g) averaged over 1 gram							

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.1.17 Bluetooth Head SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Rate [Mbps]	Duty Cycle (%)	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch													
2441.0	39	Bluetooth	4.00	2.93	-0.010	Left Touch	FCC #2	1	76.8	0.011	1.279	1.302	0.018	
2441.0	39	Bluetooth	4.00	2.93	0.040	Right Touch	FCC #2	1	76.8	0.036	1.279	1.302	0.060	A20
2441.0	39	Bluetooth	4.00	2.93	0.030	Left Tilt	FCC #2	1	76.8	0.009	1.279	1.302	0.015	
2441.0	39	Bluetooth	4.00	2.93	0.090	Right Tilt	FCC #2	1	76.8	0.023	1.279	1.302	0.038	
2441.0	39	Bluetooth	4.00	2.93	0.070	Right Touch	FCC #2	1	76.8	0.033	1.279	1.302	0.055	
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Head 1.6 W/kg (mW/g) averaged over 1 gram						

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

## 11.2 Standalone Body-Worn SAR Worn SAR Results

Table 11.2.1 GSM/PCS/GPRS/WCDMA Body-Worn SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #	
MHz	Ch														
836.6	190	GSM850	GSM	33.00	32.61	-0.110	15 mm [Front]	FCC #1	1	1:8.3	0.165	1.094	0.181		
836.6	190	GSM850	GSM	33.00	32.61	0.080	15 mm [Rear]	FCC #1	1	1:8.3	0.177	1.094	0.194		
836.6	190	GSM850	GPRS	31.00	30.46	0.060	15 mm [Front]	FCC #1	2	1:4.15	0.223	1.132	0.252		
836.6	190	GSM850	GPRS	31.00	30.46	-0.140	15 mm [Rear]	FCC #1	2	1:4.15	0.275	1.132	0.311	A21	
836.6	190	GSM850	GPRS	31.00	30.46	0.020	15 mm [Rear]	FCC #1	2	1:4.15	0.217	1.132	0.246		
1880.0	661	PCS1900	PCS	30.00	29.72	0.030	15 mm [Front]	FCC #1	1	1:8.3	0.118	1.067	0.126		
1880.0	661	PCS1900	PCS	30.00	29.72	0.040	15 mm [Rear]	FCC #1	1	1:8.3	0.212	1.067	0.226		
1880.0	661	PCS1900	GPRS	28.20	27.78	0.050	15 mm [Front]	FCC #1	2	1:4.15	0.144	1.102	0.159		
1880.0	661	PCS1900	GPRS	28.20	27.78	-0.010	15 mm [Rear]	FCC #1	2	1:4.15	0.261	1.102	0.288	A22	
1880.0	661	PCS1900	GPRS	28.20	27.78	-0.080	15 mm [Rear]	FCC #1	2	1:4.15	0.213	1.102	0.235		
836.6	4183	WCDMA 850	RMC	24.00	23.85	0.140	15 mm [Front]	FCC #1	N/A	1:1	0.251	1.035	0.260		
836.6	4183	WCDMA 850	RMC	24.00	23.85	0.040	15 mm [Rear]	FCC #1	N/A	1:1	0.285	1.035	0.295	A23	
836.6	4183	WCDMA 850	RMC	24.00	23.85	0.000	15 mm [Rear]	FCC #1	N/A	1:1	0.251	1.035	0.260		
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	0.000	15 mm [Front]	FCC #1	N/A	1:1	0.305	1.156	0.353		
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	-0.000	15 mm [Rear]	FCC #1	N/A	1:1	0.487	1.156	0.563	A24	
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	0.100	15 mm [Rear]	FCC #1	N/A	1:1	0.330	1.156	0.381		
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	0.090	15 mm [Front]	FCC #1	N/A	1:1	0.208	1.026	0.213		
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	0.020	15 mm [Rear]	FCC #1	N/A	1:1	0.522	1.026	0.536	A25	
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	0.010	15 mm [Rear]	FCC #1	N/A	1:1	0.259	1.026	0.266		

ANSI / IEEE C95.1-1992- SAFETY LIMIT  
Spatial Peak  
Uncontrolled Exposure/General Population Exposure

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

Table 11.2.2 LTE B12, B13, B14, B26, B4 Body-Worn SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
707.5	23095	LTE B12	10	23.00	22.61	0.110	0	15 mm [Front]	FCC #1	QPSK	1	25	1:1	0.131	1.094	0.143	
707.5	23095	LTE B12	10	22.00	21.69	0.070	1	15 mm [Front]	FCC #1	QPSK	25	25	1:1	0.112	1.074	0.120	
707.5	23095	LTE B12	10	23.00	22.61	-0.170	0	15 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.244	1.094	0.267	
707.5	23095	LTE B12	10	22.00	21.69	0.140	1	15 mm [Rear]	FCC #1	QPSK	25	25	1:1	0.192	1.074	0.206	
707.5	23095	LTE B12	10	23.00	22.61	0.050	0	15 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.205	1.094	0.224	
782.0	23230	LTE B13	10	23.30	23.11	0.000	0	15 mm [Front]	FCC #1	QPSK	1	25	1:1	0.210	1.045	0.219	
782.0	23230	LTE B13	10	22.30	21.82	-0.180	1	15 mm [Front]	FCC #1	QPSK	25	12	1:1	0.166	1.117	0.185	
782.0	23230	LTE B13	10	23.30	23.11	-0.120	0	15 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.343	1.045	0.358	
782.0	23230	LTE B13	10	22.30	21.82	-0.040	1	15 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.283	1.117	0.316	
782.0	23230	LTE B13	10	23.30	23.11	-0.070	0	15 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.326	1.045	0.341	
793.0	23330	LTE B14	10	23.30	23.21	-0.100	0	15 mm [Front]	FCC #1	QPSK	1	25	1:1	0.230	1.021	0.235	
793.0	23330	LTE B14	10	22.30	21.88	-0.040	1	15 mm [Front]	FCC #1	QPSK	25	12	1:1	0.177	1.102	0.195	
793.0	23330	LTE B14	10	23.30	23.21	-0.170	0	15 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.324	1.021	0.331	
793.0	23330	LTE B14	10	22.30	21.88	-0.090	1	15 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.253	1.102	0.279	
793.0	23330	LTE B14	10	23.30	23.21	0.070	0	15 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.286	1.021	0.292	
831.5	26865	LTE B26	15	23.50	23.49	-0.170	0	15 mm [Front]	FCC #1	QPSK	1	0	1:1	0.255	1.002	0.256	
831.5	26865	LTE B26	15	22.50	22.22	0.040	1	15 mm [Front]	FCC #1	QPSK	25	0	1:1	0.197	1.067	0.210	
831.5	26865	LTE B26	15	23.50	23.49	0.110	0	15 mm [Rear]	FCC #1	QPSK	1	0	1:1	0.290	1.002	0.291	
831.5	26865	LTE B26	15	22.50	22.22	-0.050	1	15 mm [Rear]	FCC #1	QPSK	25	0	1:1	0.223	1.067	0.238	
831.5	26865	LTE B26	15	23.50	23.49	-0.090	0	15 mm [Rear]	FCC #1	QPSK	1	0	1:1	0.264	1.002	0.265	
1732.5	20175	LTE B4	20	23.30	23.19	0.050	0	15 mm [Front]	FCC #1	QPSK	1	50	1:1	0.202	1.026	0.207	
1732.5	20175	LTE B4	20	22.30	21.96	0.040	1	15 mm [Front]	FCC #1	QPSK	50	25	1:1	0.157	1.081	0.170	
1732.5	20175	LTE B4	20	23.30	23.19	0.010	0	15 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.313	1.026	0.321	
1732.5	20175	LTE B4	20	22.30	21.96	-0.100	1	15 mm [Rear]	FCC #1	QPSK	50	25	1:1	0.250	1.081	0.270	
1732.5	20175	LTE B4	20	23.30	23.19	0.070	0	15 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.222	1.026	0.228	

ANSI / IEEE C95.1-1992- SAFETY LIMIT  
Spatial Peak  
Uncontrolled Exposure/General Population Exposure

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

Table 11.2.3 LTE B25, B7, B41 Body-Worn SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
1860.0	26140	LTE B25	20	23.50	23.41	-0.050	0	15 mm [Front]	FCC #1	QPSK	1	50	1:1	0.170	1.021	0.174	
1860.0	26140	LTE B25	20	22.50	22.25	0.000	1	15 mm [Front]	FCC #1	QPSK	50	25	1:1	0.142	1.059	0.150	
1860.0	26140	LTE B25	20	23.50	23.41	0.000	0	15 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.449	1.021	0.458	
1860.0	26140	LTE B25	20	22.50	22.25	0.030	1	15 mm [Rear]	F								

**Table 11.2.4 DTS Body-Worn SAR**

MEASUREMENT RESULTS															
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	SAR (W/kg)	Plots #
MHz	Ch														
2437.0	6	802.11b	16.80	16.61	0.070	15 mm [Front]	FCC #2	0.034	1	99.2	0.032	1.045	1.008	0.034	A34
2437.0	6	802.11b	16.80	16.61	0.020	15 mm [Rear]	FCC #2	0.020	1	99.2	0.017	1.045	1.008	0.018	
2437.0	6	802.11b	16.80	16.61	0.110	15 mm [Front]	FCC #2	0.031	1	99.2	0.028	1.045	1.008	0.029	

ANSI / IEEE C95.1-1992- SAFETY LIMIT  
Spatial Peak  
Uncontrolled Exposure/General Population Exposure

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

Adjusted SAR results for OFDM SAR

Adjusted SAR results for OFDM SAR														
FREQUENCY		Mode/ Antenna	Service	Maximum Allowed Power [dBm]	1g Scaled SAR (W/kg)	FREQUENCY [MHz]	Mode	Service	Maximum Allowed Power [dBm]	Ratio of OFDM to DSSS	1g Adjusted SAR (W/kg)	Scaling Factor	Determine OFDM SAR	Plots #
MHz	Ch													
2437.0	6	802.11b	DSSS	16.8	0.034	2437	802.11g	OFDM	16.5	0.933	0.032	X		
2437.0	6	802.11b	DSSS	16.8	0.034	2437	802.11n	OFDM	16.0	0.832	0.028	X		
2437.0	6	802.11b	DSSS	16.8	0.034	2437	802.11ac	OFDM	16.0	0.832	0.028	X		

ANSI / IEEE C95.1-1992- SAFETY LIMIT  
Spatial Peak  
Uncontrolled Exposure/General Population Exposure

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

Note: SAR is not required for the following 2.4 GHz OFDM conditions. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg.

**Table 11.2.5 UNII Body-Worn SAR**

MEASUREMENT RESULTS															
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5300.0	60	802.11a	18.50	17.52	-0.080	15 mm [Front]	FCC #2	0.199	6	95.7	0.201	1.253	1.045	0.263	A35
5300.0	60	802.11a	18.50	17.52	-0.040	15 mm [Rear]	FCC #2	0.099	6	95.7	0.095	1.253	1.045	0.124	
5300.0	60	802.11a	18.50	17.52	0.040	15 mm [Front]	FCC #2	0.191	6	95.7	0.189	1.253	1.045	0.247	

ANSI / IEEE C95.1-2005- SAFETY LIMIT  
Spatial Peak  
Uncontrolled Exposure/General Population Exposure

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

Adjusted SAR results for UNII-1 and UNII-2A SAR

Adjusted SAR results for UNII-1 and UNII-2A SAR														
FREQUENCY		Mode/ Antenna	Service	Maximum Allowed Power [dBm]	1g Scaled SAR (W/kg)	FREQUENCY [MHz]	Mode	Service	Maximum Allowed Power [dBm]	Adjusted Factor	1g Adjusted SAR (W/kg)	Scaling Factor	SAR for the band with lower maximum output power	Plots #
MHz	Ch													
5300.0	60	802.11a	OFDM	18.5	0.263	5200	802.11a	OFDM	18.5	1.000	0.263	X		

ANSI / IEEE C95.1-1992- SAFETY LIMIT  
Spatial Peak  
Uncontrolled Exposure/General Population Exposure

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

Note(s):

1. U-NII-1 and U-NII-2 Bands: When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is  $\leq 1.2$  W/kg, SAR is not required for the band with lower maximum output power in that test configuration.

**Table 11.2.6 UNII Body-Worn SAR**

MEASUREMENT RESULTS															
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5580.0	116	802.11a	18.50	17.59	0.050	15 mm [Front]	FCC #2	0.143	6	95.7	0.144	1.233	1.045	0.186	
5580.0	116	802.11a	18.50	17.59	-0.040	15 mm [Rear]	FCC #2	0.186	6	95.7	0.192	1.233	1.045	0.247	A36
5580.0	116	802.11a	18.50	17.59	0.070	15 mm [Rear]	FCC #2	0.188	6	95.7	0.190	1.233	1.045	0.245	
5825.0	165	802.11a	18.50	17.52	-0.140	15 mm [Front]	FCC #2	0.088	6	95.9	0.092	1.253	1.043	0.120	
5825.0	165	802.11a	18.50	17.52	-0.110	15 mm [Rear]	FCC #2	0.117	6	95.9	0.113	1.253	1.043	0.148	A37
5825.0	165	802.11a	18.50	17.52	-0.080	15 mm [Rear]	FCC #2	0.111	6	95.9	0.105	1.253	1.043	0.137	

ANSI / IEEE C95.1-1992- SAFETY LIMIT  
Spatial Peak  
Uncontrolled Exposure/General Population Exposure

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.2.7 Bluetooth Body-Worn SAR**

MEASUREMENT RESULTS														
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Rate [Mbps]	Duty Cycle (%)	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch													
2441.0	39	Bluetooth	4.00	2.93	0.140	15 mm [Front]	FCC #2	1	76.8	0.002	1.279	1.302	0.003	A38
2441.0	39	Bluetooth	4.00	2.93	0.000	15 mm [Rear]	FCC #2	1	76.8	0.001	1.279	1.302	0.002	
2441.0	39	Bluetooth	4.00	2.93	0.000	15 mm [Front]	FCC #2	1	76.8	0.002	1.279	1.302	0.003	

ANSI / IEEE C95.1-1992- SAFETY LIMIT  
Spatial Peak  
Uncontrolled Exposure/General Population Exposure

Body  
1.6 W/kg (mW/g)  
averaged over 1 gram

## 11.3 Standalone Hotspot SAR Results

**Table 11.3.1 GPRS/WCDMA Hotspot SAR**

Frequency		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch													
836.6	190	GSM850	GPRS	31.00	30.46	-0.040	10 mm [Bottom]	FCC #1	2	1:4.15	0.122	1.132	0.138	
836.6	190	GSM850	GPRS	31.00	30.46	0.010	10 mm [Front]	FCC #1	2	1:4.15	0.165	1.132	0.187	
836.6	190	GSM850	GPRS	31.00	30.46	0.150	10 mm [Rear]	FCC #1	2	1:4.15	0.396	1.132	0.448	A39
836.6	190	GSM850	GPRS	31.00	30.46	-0.090	10 mm [Right]	FCC #1	2	1:4.15	0.177	1.132	0.200	
836.6	190	GSM850	GPRS	31.00	30.46	0.040	10 mm [Left]	FCC #1	2	1:4.15	0.112	1.132	0.127	
836.6	190	GSM850	GPRS	31.00	30.46	0.110	10 mm [Rear]	FCC #1	2	1:4.15	0.296	1.132	0.335	
1880.0	661	PCS1900	GPRS	28.20	27.78	0.010	10 mm [Bottom]	FCC #1	2	1:4.15	0.279	1.102	0.307	
1880.0	661	PCS1900	GPRS	28.20	27.78	0.050	10 mm [Front]	FCC #1	2	1:4.15	0.159	1.102	0.175	
1880.0	661	PCS1900	GPRS	28.20	27.78	-0.050	10 mm [Rear]	FCC #1	2	1:4.15	0.545	1.102	0.601	A40
1880.0	661	PCS1900	GPRS	28.20	27.78	0.030	10 mm [Right]	FCC #1	2	1:4.15	0.061	1.102	0.067	
1880.0	661	PCS1900	GPRS	28.20	27.78	0.040	10 mm [Left]	FCC #1	2	1:4.15	0.181	1.102	0.199	
1880.0	661	PCS1900	GPRS	28.20	27.78	0.020	10 mm [Rear]	FCC #1	2	1:4.15	0.377	1.102	0.415	
836.6	4183	WCDMA 850	RMC	24.00	23.85	0.170	10 mm [Bottom]	FCC #1	N/A	1:1	0.161	1.035	0.167	
836.6	4183	WCDMA 850	RMC	24.00	23.85	-0.040	10 mm [Front]	FCC #1	N/A	1:1	0.234	1.035	0.242	
836.6	4183	WCDMA 850	RMC	24.00	23.85	-0.070	10 mm [Rear]	FCC #1	N/A	1:1	0.513	1.035	0.531	A41
836.6	4183	WCDMA 850	RMC	24.00	23.85	0.010	10 mm [Right]	FCC #1	N/A	1:1	0.281	1.035	0.291	
836.6	4183	WCDMA 850	RMC	24.00	23.85	-0.040	10 mm [Left]	FCC #1	N/A	1:1	0.188	1.035	0.195	
836.6	4183	WCDMA 850	RMC	24.00	23.85	0.120	10 mm [Rear]	FCC #1	N/A	1:1	0.332	1.035	0.344	
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	-0.060	10 mm [Bottom]	FCC #1	N/A	1:1	0.368	1.156	0.425	
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	0.070	10 mm [Front]	FCC #1	N/A	1:1	0.415	1.156	0.480	
1712.4	1312	WCDMA 1700	RMC	24.00	23.35	0.030	10 mm [Rear]	FCC #1	N/A	1:1	0.595	1.161	0.691	
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	0.030	10 mm [Rear]	FCC #1	N/A	1:1	0.845	1.156	0.977	A42
1752.6	1513	WCDMA 1700	RMC	24.00	23.38	-0.010	10 mm [Rear]	FCC #1	N/A	1:1	0.772	1.153	0.890	
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	-0.010	10 mm [Right]	FCC #1	N/A	1:1	0.137	1.156	0.158	
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	0.000	10 mm [Left]	FCC #1	N/A	1:1	0.360	1.156	0.416	
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	0.110	10 mm [Rear]	FCC #1	N/A	1:1	0.533	1.156	0.616	
1732.4	1412	WCDMA 1700	RMC	24.00	23.37	0.100	10 mm [Rear]	FCC #1	N/A	1:1	0.835	1.156	0.965	
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	0.020	10 mm [Bottom]	FCC #1	N/A	1:1	0.522	1.026	0.536	
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	0.010	10 mm [Front]	FCC #1	N/A	1:1	0.291	1.026	0.299	
1852.4	9262	WCDMA 1900	RMC	24.00	23.88	-0.020	10 mm [Rear]	FCC #1	N/A	1:1	0.849	1.028	0.873	
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	0.010	10 mm [Rear]	FCC #1	N/A	1:1	0.916	1.026	0.940	A43
1907.6	9538	WCDMA 1900	RMC	24.00	23.84	0.030	10 mm [Rear]	FCC #1	N/A	1:1	0.771	1.038	0.800	
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	0.080	10 mm [Right]	FCC #1	N/A	1:1	0.121	1.026	0.124	
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	0.100	10 mm [Left]	FCC #1	N/A	1:1	0.282	1.026	0.289	
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	0.000	10 mm [Rear]	FCC #1	N/A	1:1	0.744	1.026	0.763	
1880.0	9400	WCDMA 1900	RMC	24.00	23.89	0.070	10 mm [Rear]	FCC #1	N/A	1:1	0.912	1.026	0.936	

**ANSI / IEEE C95.1-1992 - SAFETY LIMIT**  
**Spatial Peak**  
**Uncontrolled Exposure/General Population Exposure**

**Body**  
**1.6 W/kg (mW/g)**  
averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

2. Yellow entries represent variability measurements.

**Table 11.3.2 LTE B12, B13, B14, B26 Hotspot SAR**

Frequency		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
707.5	23095	LTE B12	10	23.00	22.61	-0.090	0	10 mm [Bottom]	FCC #1	QPSK	1	25	1:1	0.061	1.094	0.067	
707.5	23095	LTE B12	10	22.00	21.69	-0.040	1	10 mm [Bottom]	FCC #1	QPSK	25	25	1:1	0.052	1.074	0.056	
707.5	23095	LTE B12	10	23.00	22.61	-0.120	0	10 mm [Front]	FCC #1	QPSK	1	25	1:1	0.140	1.094	0.153	
707.5	23095	LTE B12	10	22.00	21.69	0.030	1	10 mm [Front]	FCC #1	QPSK	25	25	1:1	0.120	1.074	0.129	
707.5	23095	LTE B12	10	23.00	22.61	-0.020	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.344	1.094	0.376	A44
707.5	23095	LTE B12	10	22.00	21.69	-0.190	1	10 mm [Rear]	FCC #1	QPSK	25	25	1:1	0.280	1.074	0.301	
707.5	23095	LTE B12	10	23.00	22.61	0.140	0	10 mm [Right]	FCC #1	QPSK	1	25	1:1	0.176	1.094	0.193	
707.5	23095	LTE B12	10	22.00	21.69	0.080	1	10 mm [Right]	FCC #1	QPSK	25	25	1:1	0.144	1.074	0.155	
707.5	23095	LTE B12	10	23.00	22.61	0.050	0	10 mm [Left]	FCC #1	QPSK	1	25	1:1	0.139	1.094	0.152	
707.5	23095	LTE B12	10	22.00	21.69	-0.160	1	10 mm [Left]	FCC #1	QPSK	25	25	1:1	0.117	1.074	0.126	
707.5	23095	LTE B12	10	23.00	22.61	0.100	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.270	1.094	0.295	
782.0	23230	LTE B13	10	23.30	23.11	0.110	0	10 mm [Bottom]	FCC #1	QPSK	1	25	1:1	0.132	1.045	0.138	
782.0	23230	LTE B13	10	22.30	21.82	0.060	1	10 mm [Bottom]	FCC #1	QPSK	25	12	1:1	0.100	1.117	0.112	
782.0	23230	LTE B13	10	23.30	23.11	0.010	0	10 mm [Front]	FCC #1	QPSK	1	25	1:1	0.233	1.045	0.243	
782.0	23230	LTE B13	10	22.30	21.82	0.150	1	10 mm [Front]	FCC #1	QPSK	25	12	1:1	0.189	1.117	0.211	
782.0	23230	LTE B13	10	23.30	23.11	-0.110	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.416	1.045	0.435	A45
782.0	23230	LTE B13	10	22.30	21.82	-0.070	1	10 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.280	1.117	0.313	
782.0	23230	LTE B13	10	23.30	23.11	-0.010	1	10 mm [Right]	FCC #1	QPSK	1	25	1:1	0.308	1.045	0.322	
782.0	23230	LTE B13	10	22.30	21.82	-0.100	1	10 mm [Right]	FCC #1	QPSK	25	12	1:1	0.238	1.117	0.266	
782.0	23230	LTE B13	10	23.30	23.11	-0.110	0	10 mm [Left]	FCC #1	QPSK	1	25	1:1	0.195	1.045	0.204	
782.0	23230	LTE B13	10	22.30	21.82	-0.030	1	10 mm [Left]	FCC #1	QPSK	25	12	1:1	0.166	1.117	0.185	
782.0	23230	LTE B13	10	23.30	23.11	-0.170	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.360	1.045	0.376	
793.0	23330	LTE B14	10	23.30	23.21	0.000	0	10 mm [Bottom]	FCC #1	QPSK	1	25	1:1	0.123	1.021	0.126	
793.0	23330	LTE B14	10	22.30	21.88	0.070	1	10 mm [Bottom									

**Table 11.3.3 LTE B4 (AWS) Hotspot SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
1732.5	20175	LTE B4	20	23.30	23.19	0.020	0	10 mm [Bottom]	FCC #1	QPSK	1	50	1:1	0.370	1.026	0.380	
1732.5	20175	LTE B4	20	22.30	21.96	0.000	1	10 mm [Bottom]	FCC #1	QPSK	50	25	1:1	0.299	1.081	0.323	
1732.5	20175	LTE B4	20	23.30	23.19	0.070	0	10 mm [Front]	FCC #1	QPSK	1	50	1:1	0.300	1.026	0.308	
1732.5	20175	LTE B4	20	22.30	21.96	0.060	1	10 mm [Front]	FCC #1	QPSK	50	25	1:1	0.232	1.081	0.251	
1732.5	20175	LTE B4	20	23.30	23.19	-0.010	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.634	1.026	0.650	A48
1732.5	20175	LTE B4	20	22.30	21.96	0.030	1	10 mm [Rear]	FCC #1	QPSK	50	25	1:1	0.593	1.081	0.641	
1732.5	20175	LTE B4	20	23.30	23.19	0.050	0	10 mm [Right]	FCC #1	QPSK	1	50	1:1	0.135	1.026	0.139	
1732.5	20175	LTE B4	20	22.30	21.96	0.070	1	10 mm [Right]	FCC #1	QPSK	50	25	1:1	0.117	1.081	0.126	
1732.5	20175	LTE B4	20	23.30	23.19	0.000	0	10 mm [Left]	FCC #1	QPSK	1	50	1:1	0.336	1.026	0.345	
1732.5	20175	LTE B4	20	22.30	21.96	0.010	1	10 mm [Left]	FCC #1	QPSK	50	25	1:1	0.276	1.081	0.298	
1732.5	20175	LTE B4	20	23.30	23.19	-0.010	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.447	1.026	0.459	

ANSI / IEEE C95.1-1992- SAFETY LIMIT

Spatial Peak

Uncontrolled Exposure/General Population Exposure

Body

1.6 W/kg (mW/g)

averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.3.4 LTE B25 (PCS) Hotspot SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
1860.0	26140	LTE B25	20	23.50	23.41	0.020	0	10 mm [Bottom]	FCC #1	QPSK	1	50	1:1	0.520	1.021	0.531	
1860.0	26140	LTE B25	20	22.50	22.25	-0.020	1	10 mm [Bottom]	FCC #1	QPSK	50	25	1:1	0.413	1.059	0.437	
1860.0	26140	LTE B25	20	23.50	23.41	0.030	0	10 mm [Front]	FCC #1	QPSK	1	50	1:1	0.265	1.021	0.271	
1860.0	26140	LTE B25	20	22.50	22.25	0.070	1	10 mm [Front]	FCC #1	QPSK	50	25	1:1	0.216	1.059	0.229	
1860.0	26140	LTE B25	20	23.50	23.41	0.010	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.837	1.021	0.855	
1860.0	26140	LTE B25	20	22.50	22.25	0.020	1	10 mm [Rear]	FCC #1	QPSK	50	25	1:1	0.680	1.059	0.720	
1860.0	26140	LTE B25	20	23.50	22.18	0.030	1	10 mm [Rear]	FCC #1	QPSK	100	0	1:1	0.676	1.076	0.727	
1882.5	26365	LTE B25	20	23.50	23.34	0.050	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.864	1.038	0.897	A49
1905.0	26590	LTE B25	20	23.50	23.10	0.100	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.814	1.096	0.892	
1860.0	26140	LTE B25	20	23.50	23.41	0.010	0	10 mm [Right]	FCC #1	QPSK	1	50	1:1	0.139	1.021	0.142	
1860.0	26140	LTE B25	20	22.50	22.25	0.050	1	10 mm [Right]	FCC #1	QPSK	50	25	1:1	0.100	1.059	0.106	
1860.0	26140	LTE B25	20	23.50	23.41	-0.020	0	10 mm [Left]	FCC #1	QPSK	1	50	1:1	0.292	1.021	0.298	
1860.0	26140	LTE B25	20	22.50	22.25	0.030	1	10 mm [Left]	FCC #1	QPSK	50	25	1:1	0.211	1.059	0.223	
1882.5	26365	LTE B25	20	23.50	23.34	0.040	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.539	1.038	0.559	
1882.5	26365	LTE B25	20	23.50	23.34	0.000	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.853	1.038	0.885	

ANSI / IEEE C95.1-1992- SAFETY LIMIT

Spatial Peak

Uncontrolled Exposure/General Population Exposure

Body

1.6 W/kg (mW/g)

averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

2. Yellow entries represent variability measurements.

**Table 11.3.5 LTE B7 Hotspot SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
2560.0	21350	LTE B7	20	19.00	18.80	-0.140	0	10 mm [Bottom]	FCC #1	QPSK	1	99	1:1	0.379	1.047	0.397	
2560.0	21350	LTE B7	20	18.00	17.78	0.010	1	10 mm [Bottom]	FCC #1	QPSK	50	50	1:1	0.321	1.052	0.338	
2560.0	21350	LTE B7	20	19.00	18.80	-0.140	0	10 mm [Front]	FCC #1	QPSK	1	99	1:1	0.198	1.047	0.207	
2560.0	21350	LTE B7	20	18.00	17.78	-0.010	1	10 mm [Front]	FCC #1	QPSK	50	50	1:1	0.147	1.052	0.155	
2560.0	21350	LTE B7	20	19.00	18.80	-0.040	0	10 mm [Rear]	FCC #1	QPSK	1	99	1:1	0.534	1.047	0.559	A50
2560.0	21350	LTE B7	20	18.00	17.78	0.080	1	10 mm [Right]	FCC #1	QPSK	50	50	1:1	0.362	1.052	0.381	
2560.0	21350	LTE B7	20	19.00	18.80	0.030	0	10 mm [Right]	FCC #1	QPSK	1	99	1:1	0.228	1.047	0.229	
2560.0	21350	LTE B7	20	18.00	17.78	0.000	1	10 mm [Right]	FCC #1	QPSK	50	50	1:1	0.022	1.052	0.023	
2560.0	21350	LTE B7	20	19.00	18.80	0.050	0	10 mm [Left]	FCC #1	QPSK	1	99	1:1	0.144	1.047	0.151	
2560.0	21350	LTE B7	20	18.00	17.78	-0.040	1	10 mm [Left]	FCC #1	QPSK	50	50	1:1	0.128	1.052	0.135	
2560.0	21350	LTE B7	20	19.00	18.80	0.020	0	10 mm [Rear]	FCC #1	QPSK	1	99	1:1	0.230	1.047	0.241	

ANSI / IEEE C95.1-1992- SAFETY LIMIT

Spatial Peak

Uncontrolled Exposure/General Population Exposure

Body

1.6 W/kg (mW/g)

averaged over 1 gram

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

2. Yellow entries represent variability measurements.

**Table 11.3.6 LTE B41 Hotspot SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
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**Table 11.3.7 DTS Hotspot SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	SAR (W/kg)	Plots #
MHz	Ch														
2437.0	6	802.11b	16.80	16.61	0.010	10 mm [Top]	FCC #2	0.066	1	99.2	0.065	1.045	1.008	0.068	
2437.0	6	802.11b	16.80	16.61	0.040	10 mm [Front]	FCC #2	0.062	1	99.2	0.056	1.045	1.008	0.059	
2437.0	6	802.11b	16.80	16.61	-0.010	10 mm [Rear]	FCC #2	0.031	1	99.2	0.027	1.045	1.008	0.028	
2437.0	6	802.11b	16.80	16.61	-0.080	10 mm [Left]	FCC #2	0.119	1	99.2	0.110	1.045	1.008	0.116	A52
2437.0	6	802.11b	16.80	16.61	0.120	10 mm [Left]	FCC #2	0.107	1	99.2	0.098	1.045	1.008	0.103	
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

## Adjusted SAR results for OFDM SAR

FREQUENCY		Mode/ Antenna	Service	Maximum Allowed Power [dBm]	1g Scaled SAR (W/kg)	FREQUENCY [MHz]	Mode	Service	Maximum Allowed Power [dBm]	Ratio of OFDM to DSSS	1g Adjusted SAR (W/kg)	Determine OFDM SAR			
MHz	Ch														
2437.0	6	802.11b	DSSS	16.8	0.116	2437	802.11g	OFDM	16.5	0.933	0.108	X			
2437.0	6	802.11b	DSSS	16.8	0.116	2437	802.11n	OFDM	16.0	0.832	0.097	X			
2437.0	6	802.11b	DSSS	16.8	0.116	2437	802.11ac	OFDM	16.0	0.832	0.097	X			
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Note: SAR is not required for the following 2.4 GHz OFDM conditions. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg.

**Table 11.3.8 UNII Hotspot SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5200.0	40	802.11a	18.50	17.51	-0.070	10 mm [Top]	FCC #2	0.113	6	95.7	0.112	1.256	1.045	0.147	
5200.0	40	802.11a	18.50	17.51	0.140	10 mm [Front]	FCC #2	0.288	6	95.7	0.288	1.256	1.045	0.378	
5200.0	40	802.11a	18.50	17.51	-0.010	10 mm [Rear]	FCC #2	0.107	6	95.7	0.102	1.256	1.045	0.134	
5200.0	40	802.11a	18.50	17.51	0.020	10 mm [Left]	FCC #2	0.538	6	95.7	0.540	1.256	1.045	0.709	A53
5200.0	40	802.11a	18.50	17.51	0.030	10 mm [Left]	FCC #2	0.379	6	95.7	0.376	1.256	1.045	0.493	
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.3.9 UNII Hotspot SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5825.0	165	802.11a	18.50	17.52	-0.130	10 mm [Top]	FCC #2	0.090	6	95.9	0.092	1.253	1.043	0.120	
5825.0	165	802.11a	18.50	17.52	0.080	10 mm [Front]	FCC #2	0.108	6	95.9	0.109	1.253	1.043	0.142	
5825.0	165	802.11a	18.50	17.52	0.080	10 mm [Rear]	FCC #2	0.131	6	95.9	0.124	1.253	1.043	0.162	
5825.0	165	802.11a	18.50	17.52	0.090	10 mm [Left]	FCC #2	0.403	6	95.9	0.417	1.253	1.043	0.545	A54
5825.0	165	802.11a	18.50	17.52	0.080	10 mm [Left]	FCC #2	0.352	6	95.9	0.368	1.253	1.043	0.481	
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

2. UNII-3 Band CH 165(5825 MHz) is not support Hotspot mode as described on operational description, so other required CHs are tested.

**Table 11.3.10 Bluetooth Hotspot SAR**

## MEASUREMENT RESULTS

FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Rate [Mbps]	Duty Cycle (%)	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #	
MHz	Ch														
2441.0	39	Bluetooth	4.00	2.93	0.010	10 mm [Top]	FCC #2	1	76.8	0.009	1.279	1.302	0.015		
2441.0	39	Bluetooth	4.00	2.93	-0.080	10 mm [Front]	FCC #2	1	76.8	0.008	1.279	1.302	0.013		
2441.0	39	Bluetooth	4.00	2.93	0.000	10 mm [Rear]	FCC #2	1	76.8	0.002	1.279	1.302	0.004		
2441.0	39	Bluetooth	4.00	2.93	0.020	10 mm [Left]	FCC #2	1	76.8	0.016	1.279	1.302	0.027	A55	
2441.0	39	Bluetooth	4.00	2.93	0.070	10 mm [Left]	FCC #2	1	76.8	0.016	1.279	1.302	0.027		
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

2. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

## 11.4 Standalone Phablet SAR Results

Per FCC KDB Publication 648474 D04 Handset SAR, Phablet SAR tests were not required when Hotspot 1g SAR (scaled to maximum output power including tolerance) < 1.2 W/kg.

**Table 11.4.1 UNII Phablet SAR**

MEASUREMENT RESULTS															
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	10g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5300.0	60	802.11a	18.50	17.52	0.020	0 mm [Top]	FCC #2	0.200	6	95.7	0.209	1.253	1.045	0.274	
5300.0	60	802.11a	18.50	17.52	0.040	0 mm [Front]	FCC #2	0.487	6	95.7	0.503	1.253	1.045	0.659	
5300.0	60	802.11a	18.50	17.52	0.070	0 mm [Rear]	FCC #2	0.107	6	95.7	0.110	1.253	1.045	0.144	
5300.0	60	802.11a	18.50	17.52	0.080	0 mm [Left]	FCC #2	0.940	6	95.7	1.030	1.253	1.045	1.349	
5300.0	60	802.11a	18.50	17.52	-0.080	0 mm [Left]	FCC #2	0.925	6	95.7	1.020	1.253	1.045	1.335	
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure														Phablet 4.0 W/kg (mW/kg) averaged over 10 gram	

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

**Table 11.4.2 UNII Phablet SAR**

MEASUREMENT RESULTS															
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	10g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5580.0	116	802.11a	18.50	17.59	0.070	0 mm [Top]	FCC #2	0.180	6	95.7	0.172	1.233	1.019	0.216	
5580.0	116	802.11a	18.50	17.59	0.090	0 mm [Front]	FCC #2	0.297	6	95.7	0.330	1.233	1.019	0.415	
5580.0	116	802.11a	18.50	17.59	0.070	0 mm [Rear]	FCC #2	0.158	6	95.7	0.165	1.233	1.019	0.207	
5580.0	116	802.11a	18.50	17.59	-0.000	0 mm [Left]	FCC #2	0.777	6	95.7	0.906	1.233	1.019	1.138	
5580.0	116	802.11a	18.50	17.59	0.070	0 mm [Left]	FCC #2	0.712	6	95.7	0.897	1.233	1.019	1.127	
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure														Phablet 4.0 W/kg (mW/kg) averaged over 10 gram	

Note(s):

1. Blue entries represent the extended battery measurement on the worst case for standard battery measurement.

## 11.5 SAR Test Notes

### General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01r03, body-worn SAR was evaluated without a headset connected to the device. Since the standalone reported body-worn SAR was > 1.2 W/kg, additional body-worn SAR evaluations using a headset cable were performed.
8. 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.
9. SAR measurements were performed using the DASY5 automated system. The procedure for spatial peak SAR evaluation has been implemented according to the IEEE 1528 standard. During a maximum search, global and local maxima searches are automatically performed in 2-D after each area scan measurement. The algorithm will find the global maximum and all local maxima within 2 dB of the global maxima for all SAR distributions. All local maxima within 2 dB of the global maximum were searched and passed for the Zoom Scan measurement.

### GSM Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
2. This device supports GSM VOIP in the head and body-worn configurations; therefore GPRS was additionally evaluated for head and body-worn compliance.
3. Justification for reduced test configurations per KDB Publication 941225 D01v03r01 and October2013 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.
4. 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  $\leq 0.8$  W/kg then testing at the other channels is not required for such test configuration(s). Since the maximum output power variation across the required test channels is not  $> \frac{1}{2}$  dB, the middle channel was used for testing.

**WCDMA (UMTS) Notes:**

1. WCDMA (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 since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.
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  $\leq 0.8$  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  $> \frac{1}{2}$  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 8.4.4.
2. According to FCC KDB 941225 D05v02r05, when the reported SAR is  $\leq 0.8$  W/kg, testing of the 100% RB allocation and required test channels is not required.  
Otherwise, SAR is required for the remaining required test channels using the 1 RB, 50% RB and 100% RB allocation with highest output power for that channel.  
Only one channel, and as reported SAR values for 1 RB allocation and 50% RB allocation were less than 1.45 W/kg only the highest power RB offset for each allocation was required.
3. 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.
4. A-MPR was disabled for all SAR tests by setting NS=1 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).
5. 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.
6. Per FCC KDB Publication 447498 D01v06, when the reported (scaled) for LTE Band 41 SAR measured at the highest output power channel in a given a test configuration was  $> 0.6$  W/kg for 1g evaluations, testing at the other channels was required for such test configurations.
7. TDD LTE was tested per the guidance provided in FCC KDB Publication 941225 D05v02r05. Testing was performed using UL-DL configuration 0 with 6 UL sub frames and 2S sub frames using extended cyclic prefix only and special sub frame configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Sec. 4, the duty factor using extended cyclic prefix is 0.633 (cf=1.58).
8. SAR test reduction is applied using the following criteria:

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is  $> 0.8$  W/kg, testing for other channels is performed at the highest output power level for 1 RB, and 50% RB configuration for that channel. Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High channel when the highest reported SAR for 1 RB and 50% RB are  $> 0.8$  W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation  $< 1.45$  W/kg. Testing for 16QAM modulation is not required because the reported SAR for QPSK is  $< 1.45$  W/kg and its output power is not more than 0.5 dB higher than that a QPSK. Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is  $< 1.45$  W/kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

#### WLAN Notes:

1. 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  $\leq 0.4$  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  $\leq 0.8$  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 when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output and the adjust SAR is  $\leq 1.2$  W/kg.
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.
4. When the maximum reported 1g averaged SAR  $\leq 0.8$  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  $\leq 1.20$  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 to determine compliance.

#### Bluetooth Notes:

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

## **12. FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS**

### **12.1 Introduction**

The following procedures adopted from FCC KDB Publication 447498 D01v06 are applicable to handsets with built-in unlicensed transmitters such as 802.11b/g/n 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 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 sum 1-g SAR for all the simultaneous transmitting antennas in a specific physical test configuration is  $\leq 1.6 \text{ W/kg}$ . The different test position 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 Simultaneous Transmission Capabilities**

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

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

**Table 12.3.1 Simultaneous Transmission Scenarios**

No.	Capable TX Configuration	GSM 850/1900 (Voice)	GPRS/EDGE 850/1900 (Data)	WCDMA B5/B4/B2 (Voice)	WCDMA B5/B4/B2 (Data)	LTE B12/B17/B13/B14/B26/B5/B4/B25/B2/B7/B41	WIFI 2.4GHz 802.11b/g/n/ac	WIFI 5GHz 802.11a/n/ac	Bluetooth 2.4GHz
1	GSM 850/1900 (Voice)		No	No	No	No	Yes	Yes	Yes
2	GPRS/EDGE 850/1900 (Data)	No		No	No	No	Yes	Yes	Yes
3	WCDMA B5/B4/B2 (Voice)	No	No		No	No	Yes	Yes	Yes
4	WCDMA B5/B4/B2 (Data)	No	No	No		No	Yes	Yes	Yes
5	LTE B12/B17/B13/B14/B26/B5/B4/B25/B2/B7/B41	No	No	No	No		Yes	Yes	Yes
6	WIFI 2.4GHz 802.11b/g/n/ac	Yes	Yes	Yes	Yes	Yes		No	No
7	WIFI 5GHz 802.11a/n/ac	Yes	Yes	Yes	Yes	Yes	No		Yes
8	Bluetooth 2.4GHz	Yes	Yes	Yes	Yes	Yes	No	Yes	

**Table 12.3.2 Simultaneous SAR Cases**

No.	Capable Transmit Configuration	Power conditions						Note	
		Head		Body-Worn		Hotspot			
		Licensed	Wi-Fi	Licensed	Wi-Fi	Licensed	Wi-Fi		
1	GSM Voice + Wi-Fi 2.4 GHz	Yes		Yes		N/A		Yes	
		Normal	Normal	Normal	Normal	Normal	Normal	Normal	
		Yes		Yes		N/A		Yes	
2	GSM Voice + Wi-Fi 5 GHz	Normal	Normal	Normal	Normal	Normal	Normal	Normal	
		Yes		Yes		N/A		Yes	
3	GSM Voice + Bluetooth 2.4 GHz	Normal	Yes	Normal	N/A	Normal	N/A	Normal	
		Yes		Yes		N/A		Yes	
		Normal	N/A	Normal	N/A	Normal	N/A	Normal	
7	GSM Voice + Bluetooth 2.4 GHz + Wi-Fi 5GHz	Yes		Yes		N/A		Yes	
		Normal	Normal	Normal	Normal	Normal	Normal	Normal	
		Yes		Yes		Yes		Yes	
8	WCDMA + Wi-Fi 2.4 GHz	Normal	Normal	Normal	Normal	Normal	Normal	Normal	
		Yes		Yes		Yes		Yes	
9	WCDMA + Wi-Fi 5 GHz	Yes		Yes		Yes*		Yes	
		Normal	Normal	Normal	Normal	Normal	Normal	Normal	
10	WCDMA + Bluetooth 2.4 GHz	Yes		Yes		Yes		Yes	
		Normal	N/A	Normal	N/A	Normal	N/A	N/A	
14	WCDMA + Bluetooth 2.4 GHz + Wi-Fi 5GHz	Yes		Yes		Yes*		Yes	
		Normal	Normal	Normal	Normal	Normal	Normal	Normal	
		Yes		Yes		Yes		Yes	
15	LTE + Wi-Fi 2.4 GHz	Yes		Yes		Yes		Yes	
		Normal	Normal	Normal	Normal	Reduced*	Normal	Normal	
16	LTE + Wi-Fi 5 GHz	Yes		Yes		Yes*		Yes	
		Normal	Normal	Normal	Normal	Reduced*	Normal	Normal	
17	LTE + Bluetooth 2.4 GHz	Yes		Yes		Yes		Yes	
		Normal	N/A	Normal	N/A	Reduced*	N/A	N/A	
21	LTE + Bluetooth 2.4 GHz + Wi-Fi 5GHz	Yes		Yes		Yes*		Yes	
		Normal	Normal	Normal	Normal	Reduced*	Normal	Normal	
		Yes		Yes		Yes		Yes	
22	GPRS/EDGE + Wi-Fi 2.4 GHz	Normal	Yes	Normal	Normal	Normal	Normal	Normal	
		Normal	Normal	Normal	Normal	Normal	Normal	Normal	
23	GPRS/EDGE + Wi-Fi 5 GHz	Yes		Yes		Yes*		Yes	
		Normal	Normal	Normal	Normal	Normal	Normal	Normal	
24	GPRS/EDGE + Bluetooth 2.4 GHz	Yes		Yes		Yes		Yes	
		Normal	N/A	Normal	N/A	Normal	N/A	N/A	
28	GPRS/EDGE + Bluetooth 2.4 GHz + Wi-Fi 5GHz	Yes		Yes		Yes*		Yes	
		Normal	Normal	Normal	Normal	Normal	Normal	Normal	

## Notes:

1. WiFi 2.4GHz is supported Hotspot and WiFi-Direct(GO/GC).
2. WiFi 5GHz is supported Hotspot in UNII B1,B3 and WiFi-Direct(GO/GC) in UNII B1,B3.
3. LTE, WCDMA, GPRS/EDGE is supported Hotspot.
4. VoIP is supported in LTE, WCDMA, GSM
5. Bluetooth and WiFi can not transmit simultaneously at 2.4G band.
6. GSM, WCDMA and LTE can not transmit simultaneously since they share the same chip.
7. 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.
8. 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 direct are included in the above table.

\* Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.

^ Reduced  
- Power reduction is applied in Hotspot Mode Only.  
- LTE Band 7, LTE Band 41

## 12.4 Head SAR Simultaneous Transmission Analysis

**Table 12.4.1 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth + 5.3 GHz W-LAN (Held to Ear)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		Bluetooth SAR (W/kg)		5.3G W-LAN SAR (W/kg)		ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3			
Head SAR	GSM 850	Left Touch	0.256	0.018	0.681	0.274	0.937	0.955			
		Right Touch	0.288	0.060	1.113	0.348	1.401	1.461			
	GPRS 850	Left Tilt	0.137	0.015	0.707	0.152	0.844	0.859			
		Right Tilt	0.135	0.038	0.693	0.173	1.028	1.066			
	GSM 1900	Left Touch	0.383	0.018	0.681	0.401	1.064	1.082			
		Right Touch	0.388	0.060	1.113	0.448	1.501	1.561			
		Left Tilt	0.212	0.015	0.707	0.227	0.919	0.934			
		Right Tilt	0.183	0.038	0.693	0.221	1.076	1.114			
	GPRS 1900	Left Touch	0.262	0.018	0.681	0.280	0.943	0.961			
		Right Touch	0.130	0.060	1.113	0.190	1.243	1.303			
		Left Tilt	0.073	0.015	0.707	0.088	0.780	0.795			
		Right Tilt	0.060	0.038	0.693	0.098	0.953	0.991			
	WCDMA 850	Left Touch	0.337	0.018	0.681	0.355	1.018	1.036			
		Right Touch	0.137	0.060	1.113	0.197	1.250	1.310			
		Left Tilt	0.082	0.015	0.707	0.097	0.789	0.804			
		Right Tilt	0.062	0.038	0.693	0.100	0.955	0.993			
	WCDMA 1700	Left Touch	0.311	0.018	0.681	0.329	0.992	1.010			
		Right Touch	0.356	0.060	1.113	0.416	1.469	1.529			
		Left Tilt	0.189	0.015	0.707	0.204	0.896	0.911			
		Right Tilt	0.175	0.038	0.693	0.213	1.068	1.106			
	WCDMA 1900	Left Touch	0.644	0.018	0.681	0.662	1.325	1.343			
		Right Touch	0.243	0.060	1.113	0.303	1.356	1.416			
		Left Tilt	0.147	0.015	0.707	0.162	0.854	0.869			
		Right Tilt	0.120	0.038	0.693	0.158	1.013	1.051			
	LTE Band 12	Left Touch	0.473	0.018	0.681	0.491	1.154	1.172			
		Right Touch	0.275	0.060	1.113	0.335	1.388	1.448			
		Left Tilt	0.108	0.015	0.707	0.123	0.815	0.830			
		Right Tilt	0.090	0.038	0.693	0.128	0.983	1.021			
	LTE Band 13	Left Touch	0.174	0.018	0.681	0.182	0.855	0.873			
		Right Touch	0.194	0.060	1.113	0.254	1.307	1.367			
		Left Tilt	0.106	0.015	0.707	0.121	0.813	0.828			
		Right Tilt	0.137	0.038	0.693	0.175	1.030	1.068			
	LTE Band 14	Left Touch	0.236	0.018	0.681	0.254	0.917	0.935			
		Right Touch	0.270	0.060	1.113	0.330	1.383	1.443			
		Left Tilt	0.184	0.015	0.707	0.199	0.891	0.906			
		Right Tilt	0.146	0.038	0.693	0.184	1.039	1.077			
	LTE Band 26	Left Touch	0.249	0.018	0.681	0.252	0.924	0.939			
		Right Touch	0.297	0.060	1.113	0.347	1.400	1.460			
		Left Tilt	0.171	0.015	0.707	0.186	0.878	0.893			
		Right Tilt	0.152	0.038	0.693	0.190	1.045	1.083			
	LTE Band 4	Left Touch	0.241	0.018	0.681	0.259	0.922	0.940			
		Right Touch	0.338	0.060	1.113	0.398	1.451	1.511			
		Left Tilt	0.193	0.015	0.707	0.208	0.900	0.915			
		Right Tilt	0.195	0.038	0.693	0.233	1.088	1.126			
	LTE Band 25	Left Touch	0.363	0.018	0.681	0.381	1.044	1.062			
		Right Touch	0.198	0.060	1.113	0.258	1.311	1.371			
		Left Tilt	0.124	0.015	0.707	0.139	0.831	0.846			
		Right Tilt	0.107	0.038	0.693	0.145	1.000	1.038			
	LTE Band 7	Left Touch	0.323	0.018	0.681	0.341	1.004	1.022			
		Right Touch	0.156	0.060	1.113	0.216	1.269	1.329			
		Left Tilt	0.066	0.015	0.707	0.081	0.773	0.788			
		Right Tilt	0.053	0.038	0.693	0.091	0.946	0.984			
	LTE Band 41	Left Touch	0.116	0.018	0.681	0.134	0.797	0.815			
		Right Touch	0.051	0.060	1.113	0.111	1.164	1.224			
		Left Tilt	0.024	0.015	0.707	0.039	0.731	0.746			
		Right Tilt	0.047	0.038	0.693	0.085	0.940	0.978			

**Table 12.4.2 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth + 5.6 GHz W-LAN (Held to Ear)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		Bluetooth SAR (W/kg)		5.6G W-LAN SAR (W/kg)		ESAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3			
Head SAR	GSM 850	Left Touch	0.256	0.018	0.546	0.274	0.802	0.820			
		Right Touch	0.288	0.060	0.764	0.348	1.052	1.112			
		Left Tilt	0.137	0.015	0.611	0.152	0.748	0.763			
		Right Tilt	0.135	0.038	0.567	0.173	0.702	0.740			
	GPRS 850	Left Touch	0.383	0.018	0.546	0.401	0.929	0.947			
		Right Touch	0.388	0.060	0.764	0.448	1.152	1.212			
		Left Tilt	0.212	0.015	0.611	0.227	0.823	0.838			
		Right Tilt	0.183	0.038	0.567	0.221	0.750	0.788			
	GSM 1900	Left Touch	0.262	0.018	0.546	0.280	0.808	0.826			
		Right Touch	0.130	0.060	0.764	0.190	0.894	0.954			
		Left Tilt	0.073	0.015	0.611	0.088	0.684	0.699			
		Right Tilt	0.060	0.038	0.567	0.098	0.627	0.665			
	GPRS 1900	Left Touch	0.337	0.018	0.546	0.355	0.883	0.901			
		Right Touch	0.137	0.060	0.764	0.197	0.901	0.961			
		Left Tilt	0.082	0.015	0.611	0.097	0.693	0.708			
		Right Tilt	0.062	0.038	0.567	0.100	0.629	0.667			
	WCDMA 850	Left Touch	0.311	0.018	0.546	0.329	0.857	0.875			
		Right Touch	0.356	0.060	0.764	0.416	1.120	1.180			
		Left Tilt	0.189	0.015	0.611	0.204	0.800	0.815			
		Right Tilt	0.175	0.038	0.567	0.213	0.742	0.780			
	WCDMA 1700	Left Touch	0.644	0.018	0.546	0.662	1.190	1.208			
		Right Touch	0.243	0.060	0.764	0.303	1.007	1.067			
		Left Tilt	0.147	0.015	0.611	0.162	0.758	0.773			
		Right Tilt	0.120	0.038	0.567	0.158	0.687	0.725			
	WCDMA 1900	Left Touch	0.473	0.018	0.546	0.491	1.019	1.037			
		Right Touch	0.275	0.060	0.764	0.335	1.039	1.099			
		Left Tilt	0.108	0.015	0.611	0.123	0.719	0.734			
		Right Tilt	0.090	0.038	0.567	0.128	0.657	0.695			
	LTE Band 12	Left Touch	0.174	0.018	0.546	0.192	0.720	0.738			
		Right Touch	0.194	0.060	0.764	0.254	0.958	1.018			
		Left Tilt	0.106	0.015	0.611	0.121	0.717	0.732			
		Right Tilt	0.137	0.038	0.567	0.175	0.704	0.742			
	LTE Band 13	Left Touch	0.236	0.018	0.546	0.254	0.782	0.800			
		Right Touch	0.270	0.060	0.764	0.330	1.034	1.094			
		Left Tilt	0.184	0.015	0.611	0.199	0.795	0.810			
		Right Tilt	0.146	0.038	0.567	0.184	0.713	0.751			
	LTE Band 14	Left Touch	0.240	0.018	0.546	0.258	0.786	0.804			
		Right Touch	0.287	0.060	0.764	0.347	1.051	1.111			
		Left Tilt	0.171	0.015	0.611	0.186	0.762	0.787			
		Right Tilt	0.152	0.038	0.567	0.190	0.719	0.757			
	LTE Band 26	Left Touch	0.241	0.018	0.546	0.259	0.787	0.805			
		Right Touch	0.338	0.060	0.764	0.398	1.102	1.162			
		Left Tilt	0.193	0.015	0.611	0.208	0.804	0.819			
		Right Tilt	0.195	0.038	0.567	0.233	0.762	0.800			
	LTE Band 4	Left Touch	0.363	0.018	0.546	0.381	0.909	0.927			
		Right Touch	0.198	0.060	0.764	0.258	0.962	1.022			
		Left Tilt	0.124	0.015	0.611	0.139	0.735	0.750			
		Right Tilt	0.107	0.038	0.567	0.145	0.674	0.712			
	LTE Band 25	Left Touch	0.323	0.018	0.546	0.341	0.869	0.887			
		Right Touch	0.156	0.060	0.764	0.216	0.920	0.980			
		Left Tilt	0.066	0.015	0.611	0.081	0.677	0.692			
		Right Tilt	0.053	0.038	0.567	0.091	0.620	0.658			
	LTE Band 7	Left Touch	0.116	0.018	0.546	0.134	0.662	0.680			
		Right Touch	0.051	0.060	0.764	0.111	0.815	0.875			
		Left Tilt	0.024	0.015	0.611	0.039	0.635	0.650			
		Right Tilt	0.047	0.038	0.567	0.085	0.614	0.652			
	LTE Band 41	Left Touch	0.101	0.018	0.546	0.119	0.647	0.665			
		Right Touch	0.046	0.060	0.764	0.106	0.810	0.870			
		Left Tilt	0.032	0.015	0.611	0.047	0.643	0.658			
		Right Tilt	0.038	0.038	0.567	0.076	0.605	0.643			

**Table 12.4.3 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth + 5.8 GHz W-LAN (Held to Ear)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		Bluetooth SAR (W/kg)	5.8G W-LAN SAR (W/kg)		ΣSAR (W/kg)		
			1	2		3	1+2	1+3	1+2+3	
Head SAR	GSM 850	Left Touch	0.256	0.018	0.371	0.274	0.627	0.645		
		Right Touch	0.288	0.060	0.694	0.348	0.982	<b>1.042</b>		
		Left Tilt	0.137	0.015	0.476	0.152	0.613	0.628		
		Right Tilt	0.135	0.038	0.537	0.173	0.672	0.710		
	GPRS 850	Left Touch	0.383	0.018	0.371	0.401	0.754	0.772		
		Right Touch	0.388	0.060	0.694	0.448	1.082	<b>1.142</b>		
		Left Tilt	0.212	0.015	0.476	0.227	0.688	0.703		
		Right Tilt	0.183	0.038	0.537	0.221	0.720	0.758		
	GSM 1900	Left Touch	0.262	0.018	0.371	0.280	0.633	0.651		
		Right Touch	0.130	0.060	0.694	0.190	0.824	<b>0.884</b>		
		Left Tilt	0.073	0.015	0.476	0.088	0.549	0.564		
		Right Tilt	0.060	0.038	0.537	0.098	0.597	0.635		
	GPRS 1900	Left Touch	0.337	0.018	0.371	0.355	0.708	0.726		
		Right Touch	0.137	0.060	0.694	0.197	0.831	<b>0.891</b>		
		Left Tilt	0.082	0.015	0.476	0.097	0.558	0.573		
		Right Tilt	0.062	0.038	0.537	0.100	0.599	0.637		
	WCDMA 850	Left Touch	0.311	0.018	0.371	0.329	0.682	0.700		
		Right Touch	0.356	0.060	0.694	0.416	1.050	<b>1.110</b>		
		Left Tilt	0.189	0.015	0.476	0.204	0.665	0.680		
		Right Tilt	0.175	0.038	0.537	0.213	0.712	0.750		
	WCDMA 1700	Left Touch	0.644	0.018	0.371	0.662	1.015	<b>1.033</b>		
		Right Touch	0.243	0.060	0.694	0.303	0.937	0.997		
		Left Tilt	0.147	0.015	0.476	0.162	0.623	0.638		
		Right Tilt	0.120	0.038	0.537	0.158	0.657	0.695		
	WCDMA 1900	Left Touch	0.473	0.018	0.371	0.491	0.844	0.862		
		Right Touch	0.275	0.060	0.694	0.335	0.969	<b>1.029</b>		
		Left Tilt	0.108	0.015	0.476	0.123	0.584	0.599		
		Right Tilt	0.090	0.038	0.537	0.128	0.627	0.665		
	LTE Band 12	Left Touch	0.174	0.018	0.371	0.192	0.545	0.563		
		Right Touch	0.194	0.060	0.694	0.254	0.888	<b>0.948</b>		
		Left Tilt	0.106	0.015	0.476	0.121	0.582	0.597		
		Right Tilt	0.137	0.038	0.537	0.175	0.674	0.712		
	LTE Band 13	Left Touch	0.236	0.018	0.371	0.254	0.607	0.625		
		Right Touch	0.270	0.060	0.694	0.330	0.964	<b>1.024</b>		
		Left Tilt	0.184	0.015	0.476	0.199	0.660	0.675		
		Right Tilt	0.146	0.038	0.537	0.184	0.683	0.721		
	LTE Band 14	Left Touch	0.240	0.018	0.371	0.258	0.611	0.629		
		Right Touch	0.287	0.060	0.694	0.347	0.981	<b>1.041</b>		
		Left Tilt	0.171	0.015	0.476	0.186	0.647	0.662		
		Right Tilt	0.152	0.038	0.537	0.190	0.689	0.727		
	LTE Band 26	Left Touch	0.241	0.018	0.371	0.259	0.612	0.630		
		Right Touch	0.338	0.060	0.694	0.398	1.032	<b>1.092</b>		
		Left Tilt	0.193	0.015	0.476	0.208	0.669	0.684		
		Right Tilt	0.195	0.038	0.537	0.233	0.732	0.770		
	LTE Band 4	Left Touch	0.363	0.018	0.371	0.381	0.734	0.752		
		Right Touch	0.198	0.060	0.694	0.258	0.892	<b>0.952</b>		
		Left Tilt	0.124	0.015	0.476	0.139	0.600	0.615		
		Right Tilt	0.107	0.038	0.537	0.145	0.644	0.682		
	LTE Band 25	Left Touch	0.323	0.018	0.371	0.341	0.694	0.712		
		Right Touch	0.158	0.060	0.694	0.216	0.850	<b>0.910</b>		
		Left Tilt	0.098	0.015	0.476	0.081	0.542	0.557		
		Right Tilt	0.053	0.038	0.537	0.091	0.590	0.628		
	LTE Band 7	Left Touch	0.116	0.018	0.371	0.134	0.487	0.505		
		Right Touch	0.051	0.060	0.374	0.111	0.475	<b>0.505</b>		
		Left Tilt	0.024	0.015	0.476	0.039	0.500	0.515		
		Right Tilt	0.047	0.038	0.537	0.085	0.584	0.622		
	LTE Band 41	Left Touch	0.101	0.018	0.371	0.119	0.472	0.490		
		Right Touch	0.046	0.060	0.694	0.106	0.740	<b>0.800</b>		
		Left Tilt	0.032	0.015	0.476	0.047	0.508	0.523		
		Right Tilt	0.038	0.038	0.537	0.076	0.575	0.613		

**Table 12.4.4 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN (Held to Ear)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		2.4G W-LAN SAR (W/kg)	ΣSAR (W/kg)		
			1	2		1+2	1+3	1+2+3
Head SAR	GSM 850	Left Touch	0.256	0.118	0.374			
		Right Touch	0.288	0.267	<b>0.555</b>			
		Left Tilt	0.137	0.109	0.246			
		Right Tilt	0.135	0.176	0.311			
	GPRS 850	Left Touch	0.383	0.118	0.501			
		Right Touch	0.388	0.267	<b>0.655</b>			
		Left Tilt	0.212	0.109	0.321			
		Right Tilt	0.183	0.176	0.359			
	GSM 1900	Left Touch	0.262	0.118	0.380			
		Right Touch	0.130	0.267	<b>0.397</b>			
		Left Tilt	0.073	0.109	0.182			
		Right Tilt	0.060	0.176	0.236			
	GPRS 1900	Left Touch	0.337	0.118	<b>0.455</b>			
		Right Touch	0.137	0.267	0.404			
		Left Tilt	0.082	0.109	0.191			
		Right Tilt	0.062	0.176	0.238			
	WCDMA 850	Left Touch	0.311	0.118	0.429			
		Right Touch	0.356	0.267	<b>0.623</b>			
		Left Tilt	0.189	0.109	0.298			
		Right Tilt	0.175	0.176	0.351			
	WCDMA 1700	Left Touch	0.644	0.118	<b>0.762</b>			
		Right Touch	0.243	0.267	0.510			
		Left Tilt	0.147	0.109	0.256			
		Right Tilt	0.120	0.176	0.296			
	WCDMA 1900	Left Touch	0.473	0.118	<b>0.591</b>			
		Right Touch	0.275	0.267	0.542			
		Left Tilt	0.108	0.109	0.217			
		Right Tilt	0.090	0.176	0.266			
	LTE Band 12	Left Touch	0.174	0.118	0.292			
		Right Touch	0.194	0.23	<b>0.451</b>			
		Left Tilt	0.106	0.109	0.215			
		Right Tilt	0.137	0.176	0.313			
	LTE Band 13	Left Touch	0.236	0.118	0.354			
		Right Touch	0.270	0.267	<b>0.537</b>			
		Left Tilt	0.184	0.109	0.293			
		Right Tilt	0.146	0.176	0.322			
	LTE Band 14	Left Touch	0.240	0.118	0.358			
		Right Touch	0.287	0.267	<b>0.554</b>			
		Left Tilt	0.171	0.109	0.280			
		Right Tilt	0.152	0.176	0.328			
	LTE Band 26	Left Touch	0.241	0.118	0.359			
		Right Touch	0.338	0.267	<b>0.605</b>			
		Left Tilt	0.193	0.109	0.302			
		Right Tilt	0.195	0.176	0.371			
	LTE Band 4	Left Touch	0.363	0.118	<b>0.481</b>			
		Right Touch	0.198	0.267	0.465			
		Left Tilt	0.124	0.109	0.233			
		Right Tilt	0.107	0.176	0.283			
	LTE Band 25	Left Touch	0.323	0.118	<b>0.441</b>			
		Right Touch	0.156	0.267	0.423			
		Left Tilt	0.066	0.109	0.175			
		Right Tilt	0.053	0.176	0.229			
	LTE Band 7	Left Touch	0.116	0.118	0.234			
		Right Touch	0.					

**Table 12.4.5 Simultaneous Transmission Scenario : 2G/3G/4G + 5.3 GHz W-LAN (Held to Ear)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		$\Sigma$ SAR (W/kg)
			1	2	
Head SAR	GSM 850	Left Touch	0.256	0.681	0.937
		Right Touch	0.288	1.113	<b>1.401</b>
		Left Tilt	0.137	0.707	0.844
		Right Tilt	0.135	0.893	1.028
	GPRS 850	Left Touch	0.383	0.681	1.064
		Right Touch	0.388	1.113	<b>1.501</b>
		Left Tilt	0.212	0.707	0.919
		Right Tilt	0.183	0.893	1.076
	GSM 1900	Left Touch	0.262	0.681	0.943
		Right Touch	0.130	1.113	<b>1.243</b>
		Left Tilt	0.073	0.707	0.780
		Right Tilt	0.060	0.893	0.953
	GPRS 1900	Left Touch	0.337	0.681	1.018
		Right Touch	0.137	1.113	<b>1.250</b>
		Left Tilt	0.082	0.707	0.789
		Right Tilt	0.062	0.893	0.955
	WCDMA 850	Left Touch	0.311	0.681	0.992
		Right Touch	0.356	1.113	<b>1.469</b>
		Left Tilt	0.189	0.707	0.896
		Right Tilt	0.175	0.893	1.068
	WCDMA 1700	Left Touch	0.644	0.681	1.325
		Right Touch	0.243	1.113	<b>1.356</b>
		Left Tilt	0.147	0.707	0.854
		Right Tilt	0.120	0.893	1.013
	WCDMA 1900	Left Touch	0.473	0.681	1.154
		Right Touch	0.275	1.113	<b>1.388</b>
		Left Tilt	0.108	0.707	0.815
		Right Tilt	0.090	0.893	0.983
	LTE Band 12	Left Touch	0.174	0.681	0.855
		Right Touch	0.194	1.113	<b>1.307</b>
		Left Tilt	0.106	0.707	0.813
		Right Tilt	0.137	0.893	1.030
	LTE Band 13	Left Touch	0.236	0.681	0.917
		Right Touch	0.270	1.113	<b>1.383</b>
		Left Tilt	0.184	0.707	0.891
		Right Tilt	0.146	0.893	1.039
	LTE Band 14	Left Touch	0.240	0.681	0.921
		Right Touch	0.287	1.113	<b>1.400</b>
		Left Tilt	0.171	0.707	0.878
		Right Tilt	0.152	0.893	1.045
	LTE Band 26	Left Touch	0.241	0.681	0.922
		Right Touch	0.338	1.113	<b>1.451</b>
		Left Tilt	0.193	0.707	0.900
		Right Tilt	0.195	0.893	1.088
	LTE Band 4	Left Touch	0.363	0.681	1.044
		Right Touch	0.198	1.113	<b>1.311</b>
		Left Tilt	0.124	0.707	0.831
		Right Tilt	0.107	0.893	1.000
	LTE Band 25	Left Touch	0.323	0.681	1.004
		Right Touch	0.175	1.113	<b>1.269</b>
		Left Tilt	0.068	0.707	0.773
		Right Tilt	0.053	0.893	0.946
	LTE Band 7	Left Touch	0.116	0.681	0.797
		Right Touch	0.051	1.113	<b>1.164</b>
		Left Tilt	0.024	0.707	0.731
		Right Tilt	0.047	0.893	0.940
	LTE Band 41	Left Touch	0.101	0.681	0.782
		Right Touch	0.046	1.113	<b>1.159</b>
		Left Tilt	0.032	0.707	0.739
		Right Tilt	0.036	0.893	0.931

**Table 12.4.6 Simultaneous Transmission Scenario : 2G/3G/4G + 5.6 GHz W-LAN (Held to Ear)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		$\Sigma$ SAR (W/kg)
			1	2	
Head SAR	GSM 850	Left Touch	0.256	0.546	0.802
		Right Touch	0.288	0.764	<b>1.052</b>
		Left Tilt	0.137	0.611	0.748
		Right Tilt	0.135	0.567	0.702
	GPRS 850	Left Touch	0.383	0.546	0.929
		Right Touch	0.388	0.764	<b>1.152</b>
		Left Tilt	0.212	0.611	0.823
		Right Tilt	0.183	0.567	0.750
	GSM 1900	Left Touch	0.262	0.546	0.808
		Right Touch	0.130	0.764	<b>0.894</b>
		Left Tilt	0.073	0.611	0.684
		Right Tilt	0.060	0.567	0.627
	GPRS 1900	Left Touch	0.337	0.546	0.883
		Right Touch	0.137	0.764	<b>0.901</b>
		Left Tilt	0.082	0.611	0.693
		Right Tilt	0.062	0.567	0.629
	WCDMA 850	Left Touch	0.311	0.546	0.857
		Right Touch	0.356	0.764	<b>1.120</b>
		Left Tilt	0.189	0.611	0.800
		Right Tilt	0.175	0.567	0.742
	WCDMA 1700	Left Touch	0.644	0.546	1.190
		Right Touch	0.243	0.764	1.007
		Left Tilt	0.147	0.611	0.758
		Right Tilt	0.120	0.567	0.687
	WCDMA 1900	Left Touch	0.473	0.546	1.019
		Right Touch	0.276	0.764	<b>1.039</b>
		Left Tilt	0.108	0.611	0.719
		Right Tilt	0.090	0.567	0.657
	LTE Band 12	Left Touch	0.174	0.546	0.720
		Right Touch	0.194	0.764	<b>0.955</b>
		Left Tilt	0.106	0.611	0.717
		Right Tilt	0.137	0.567	0.704
	LTE Band 13	Left Touch	0.236	0.546	0.782
		Right Touch	0.270	0.764	<b>1.034</b>
		Left Tilt	0.184	0.611	0.795
		Right Tilt	0.146	0.567	0.713
	LTE Band 14	Left Touch	0.240	0.546	0.786
		Right Touch	0.287	0.764	<b>1.051</b>
		Left Tilt	0.171	0.611	0.762
		Right Tilt	0.152	0.567	0.719
	LTE Band 26	Left Touch	0.241	0.546	0.787
		Right Touch	0.338	0.764	<b>1.102</b>
		Left Tilt	0.193	0.611	0.804
		Right Tilt	0.195	0.567	0.762
	LTE Band 4	Left Touch	0.363	0.546	0.909
		Right Touch	0.198	0.764	<b>0.962</b>
		Left Tilt	0.124	0.611	0.735
		Right Tilt	0.107	0.567	0.674
	LTE Band 25	Left Touch	0.323	0.546	0.869
		Right Touch	0.156	0.764	<b>0.920</b>
		Left Tilt	0.066	0.611	0.677
		Right Tilt	0.053	0.567	0.620
	LTE Band 7	Left Touch	0.116	0.546	0.662
		Right Touch	0.051	0.764	<b>0.815</b>
		Left Tilt	0.024	0.611	0.635
		Right Tilt	0.047	0.567	0.614
	LTE Band 41	Left Touch	0.101	0.546	0.647
		Right Touch	0.046	0.764	<b>0.810</b>
		Left Tilt	0.032	0.611	0.643
		Right Tilt	0.038	0.567	0.605

**Table 12.4.7 Simultaneous Transmission Scenario : 2G/3G/4G + 5.8 GHz W-LAN (Held to Ear)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		$\Sigma$ SAR (W/kg)
			1	2	
Head SAR	GSM 850	Left Touch	0.256	0.371	0.627
		Right Touch	0.288	0.694	<b>0.982</b>
		Left Tilt	0.137	0.476	0.613
		Right Tilt	0.135	0.537	0.672
	GPRS 850	Left Touch	0.383	0.371	0.754
		Right Touch	0.388	0.694	<b>1.082</b>
		Left Tilt	0.212	0.476	0.688
		Right Tilt	0.183	0.537	0.720
	GSM 1900	Left Touch	0.262	0.371	0.633
		Right Touch	0.130	0.694	<b>0.824</b>
		Left Tilt	0.073	0.476	0.549
		Right Tilt	0.060	0.537	0.597
	GPRS 1900	Left Touch	0.337	0.371	0.708
		Right Touch	0.137	0.694	<b>0.831</b>
		Left Tilt	0.082	0.476	0.558
		Right Tilt	0.062	0.537	0.599
	WCDMA 850	Left Touch	0.311	0.371	0.682
		Right Touch	0.356	0.694	<b>1.050</b>
		Left Tilt	0.189	0.476	0.665
		Right Tilt	0.175	0.537	0.712
	WCDMA 1700	Left Touch	0.644	0.371	<b>1.015</b>
		Right Touch	0.243	0.694	0.937
		Left Tilt	0.147	0.476	0.623
		Right Tilt	0.120	0.537	0.657
	WCDMA 1900	Left Touch	0.473	0.371	0.844
		Right Touch	0.275	0.694	<b>0.969</b>
		Left Tilt	0.108	0.476	0.584
		Right Tilt	0.090	0.537	0.627
	LTE Band 12	Left Touch	0.174	0.371	0.545
		Right Touch	0.194	0.694	<b>0.888</b>
		Left Tilt	0.106	0.476	0.582
		Right Tilt	0.137	0.537	0.674
	LTE Band 13	Left Touch	0.236	0.371	0.607
		Right Touch	0.270	0.694	<b>0.964</b>
		Left Tilt	0.184	0.476	0.660
		Right Tilt	0.146	0.537	0.683
	LTE Band 14	Left Touch	0.240	0.371	0.611
		Right Touch	0.287	0.694	<b>0.981</b>
		Left Tilt	0.171	0.476	0.647
		Right Tilt	0.152	0.537	0.689
	LTE Band 26	Left Touch	0.241	0.371	0.612
		Right Touch	0.338	0.694	<b>1.032</b>
		Left Tilt	0.193	0.476	0.669
		Right Tilt	0.195	0.537	0.732
	LTE Band 4	Left Touch	0.363	0.371	0.734
		Right Touch	0.198	0.694	<b>0.892</b>
		Left Tilt	0.124	0.476	0.600
		Right Tilt	0.107	0.537	0.644
	LTE Band 25	Left Touch	0.323	0.371	0.694
		Right Touch	0.175	0.694	<b>0.850</b>
		Left Tilt	0.068	0.476	0.542
		Right Tilt	0.053	0.537	0.590
	LTE Band 7	Left Touch	0.116	0.371	0.487
		Right Touch	0.051	0.694	<b>0.745</b>
		Left Tilt	0.024	0.476	0.300
		Right Tilt	0.047	0.537	0.584
	LTE Band 41	Left Touch	0.101	0.371	0.472
		Right Touch	0.046	0.694	<b>0.740</b>
		Left Tilt	0.032	0.476	0.308
		Right Tilt	0.036	0.537	0.575

**Table 12.4.8 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth (Held to Ear)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		$\Sigma$ SAR (W/kg)
			1	2	
Head SAR	GSM 850	Left Touch	0.256	0.018	0.274
		Right Touch	0.288	0.060	<b>0.348</b>
		Left Tilt	0.137	0.015	0.152
		Right Tilt	0.135	0.038	0.173
	GPRS 850	Left Touch	0.383	0.018	0.401
		Right Touch	0.388	0.060	<b>0.448</b>
		Left Tilt	0.212	0.015	0.227
		Right Tilt	0.183	0.038	0.221
	GSM 1900	Left Touch	0.262	0.018	<b>0.280</b>
		Right Touch	0.130	0.060	0.190
		Left Tilt	0.073	0.015	0.088
		Right Tilt	0.060	0.038	0.098
	GPRS 1900	Left Touch	0.337	0.018	<b>0.355</b>
		Right Touch	0.137	0.060	0.197
		Left Tilt	0.082	0.015	0.097
		Right Tilt	0.062	0.038	0.100
	WCDMA 850	Left Touch	0.311	0.018	0.329
		Right Touch	0.356	0.060	<b>0.416</b>
		Left Tilt	0.189	0.015	0.204
		Right Tilt	0.175	0.038	0.213
	WCDMA 1700	Left Touch	0.644	0.018	<b>0.662</b>
		Right Touch	0.243	0.060	0.303
		Left Tilt	0.147	0.015	0.162
		Right Tilt	0.120	0.038	0.158
	WCDMA 1900	Left Touch	0.473	0.018	<b>0.491</b>
		Right Touch	0.276	0.060	0.335
		Left Tilt	0.108	0.015	0.123
		Right Tilt	0.090	0.038	0.128
	LTE Band 12	Left Touch	0.174	0.018	0.192
		Right Touch	0.194	0.060	<b>0.254</b>
		Left Tilt	0.106	0.015	0.121
		Right Tilt	0.137	0.038	0.175
	LTE Band 13	Left Touch	0.236	0.018	0.254
		Right Touch	0.270	0.060	<b>0.330</b>
		Left Tilt	0.184	0.015	0.199
		Right Tilt	0.146	0.038	0.184
	LTE Band 14	Left Touch	0.240	0.018	0.258
		Right Touch	0.287	0.060	<b>0.347</b>
		Left Tilt	0.171	0.015	0.186
		Right Tilt	0.152	0.038	0.190
	LTE Band 26	Left Touch	0.241	0.018	0.259
		Right Touch	0.338	0.060	<b>0.398</b>
		Left Tilt	0.193	0.015	0.208
		Right Tilt	0.195	0.038	0.233
	LTE Band 4	Left Touch	0.363	0.018	<b>0.381</b>
		Right Touch	0.198	0.060	0.258
		Left Tilt	0.124	0.015	0.139
		Right Tilt	0.107	0.038	0.145
	LTE Band 25	Left Touch	0.323	0.018	<b>0.341</b>
		Right Touch	0.156	0.060	0.216
		Left Tilt	0.066	0.015	0.081
		Right Tilt	0.053	0.038	0.091
	LTE Band 7	Left Touch	0.116	0.018	<b>0.134</b>
		Right Touch	0.051	0.060	0.111
		Left Tilt	0.024	0.015	0.039
		Right Tilt	0.047	0.038	0.085
	LTE Band 41	Left Touch	0.101	0.018	<b>0.119</b>
		Right Touch	0.046	0.060	0.106
		Left Tilt	0.032	0.015	0.047
		Right Tilt	0.038	0.038	0.076

**Table 12.4.9 Simultaneous Transmission Scenario : Bluetooth + 5 GHz W-LAN (Held to Ear)**

Exposure Condition	Mode	Configuration	Bluetooth SAR (W/kg)	5G W-LAN SAR (W/kg)	$\Sigma$ SAR (W/kg)
			1	2	1+2
Head SAR	5.2G W-LAN	Left Touch	0.018	0.681	0.699
		Right Touch	0.060	1.113	1.173
		Left Tilt	0.015	0.707	0.722
		Right Tilt	0.038	0.893	0.931
	5.6G W-LAN	Left Touch	0.018	0.546	0.564
		Right Touch	0.060	0.764	0.824
		Left Tilt	0.015	0.611	0.626
		Right Tilt	0.038	0.567	0.605
	5.8G W-LAN	Left Touch	0.018	0.371	0.389
		Right Touch	0.060	0.694	0.754
		Left Tilt	0.015	0.476	0.491
		Right Tilt	0.038	0.537	0.575

## 12.5 Body-Worn Simultaneous Transmission Analysis

**Table 12.5.1 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth + 5.3 GHz W-LAN (Body-Worn at 10 mm)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		Bluetooth SAR (W/kg)	5.3G W-LAN SAR (W/kg)	$\Sigma$ SAR (W/kg)		
			1	2			1+2	1+3	1+2+3
Body-Worn SAR	GSM 850	Front	0.181	0.003	0.263	0.184	0.444	<b>0.447</b>	
		Rear	0.194	0.002	0.124	0.196	0.318	0.320	
	GPRS 850	Front	0.252	0.003	0.263	0.255	0.515	<b>0.518</b>	
		Rear	0.311	0.002	0.124	0.313	0.435	0.437	
	GSM 1900	Front	0.126	0.003	0.263	0.129	0.389	<b>0.392</b>	
		Rear	0.226	0.002	0.124	0.228	0.350	0.352	
	GPRS 1900	Front	0.159	0.003	0.263	0.162	0.422	<b>0.425</b>	
		Rear	0.288	0.002	0.124	0.290	0.412	0.414	
	WCDMA 850	Front	0.260	0.003	0.263	0.263	0.523	<b>0.526</b>	
		Rear	0.295	0.002	0.124	0.297	0.419	0.421	
	WCDMA 1700	Front	0.353	0.003	0.263	0.356	0.616	0.619	
		Rear	0.563	0.002	0.124	0.365	0.687	<b>0.689</b>	
	WCDMA 1900	Front	0.213	0.003	0.263	0.216	0.476	0.479	
		Rear	0.536	0.002	0.124	0.538	0.660	<b>0.662</b>	
	LTE Band 12	Front	0.143	0.003	0.263	0.146	0.406	<b>0.409</b>	
		Rear	0.267	0.002	0.124	0.269	0.391	0.393	
	LTE Band 13	Front	0.219	0.003	0.263	0.222	0.482	<b>0.485</b>	
		Rear	0.358	0.002	0.124	0.360	0.482	0.484	
	LTE Band 14	Front	0.235	0.003	0.263	0.238	0.498	<b>0.501</b>	
		Rear	0.331	0.002	0.124	0.333	0.455	0.457	
	LTE Band 26	Front	0.256	0.003	0.263	0.259	0.519	<b>0.522</b>	
		Rear	0.291	0.002	0.124	0.293	0.415	0.417	
	LTE Band 4	Front	0.207	0.003	0.263	0.210	0.470	<b>0.473</b>	
		Rear	0.321	0.002	0.124	0.323	0.445	0.447	
	LTE Band 25	Front	0.174	0.003	0.263	0.177	0.437	0.440	
		Rear	0.458	0.002	0.124	0.460	0.582	<b>0.584</b>	
	LTE Band 7	Front	0.125	0.003	0.263	0.128	0.388	0.391	
		Rear	0.315	0.002	0.124	0.317	0.439	<b>0.441</b>	
	LTE Band 41	Front	0.071	0.003	0.263	0.074	0.257	0.337	
		Rear	0.188	0.002	0.124	0.190	0.312	0.314	

**Table 12.5.2 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth + 5.6 GHz W-LAN (Body-Worn at 10 mm)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		Bluetooth SAR (W/kg)	5.6G W-LAN SAR (W/kg)	$\Sigma$ SAR (W/kg)		
			1	2			1+2	1+3	1+2+3
Body-Worn SAR	GSM 850	Front	0.181	0.003	0.186	0.184	0.367	0.370	
		Rear	0.194	0.002	0.247	0.196	0.441	<b>0.443</b>	
	GPRS 850	Front	0.252	0.003	0.186	0.255	0.438	0.441	
		Rear	0.311	0.002	0.247	0.313	0.558	<b>0.560</b>	
	GSM 1900	Front	0.126	0.003	0.186	0.129	0.312	0.315	
		Rear	0.226	0.002	0.247	0.228	0.473	<b>0.475</b>	
	GPRS 1900	Front	0.159	0.003	0.186	0.162	0.345	0.348	
		Rear	0.288	0.002	0.247	0.290	0.535	<b>0.537</b>	
	WCDMA 850	Front	0.260	0.003	0.186	0.263	0.446	0.449	
		Rear	0.295	0.002	0.247	0.297	0.542	<b>0.544</b>	
	WCDMA 1700	Front	0.353	0.003	0.186	0.356	0.539	0.542	
		Rear	<b>0.563</b>	<b>0.002</b>	<b>0.247</b>	<b>0.565</b>	<b>0.810</b>	<b>0.812</b>	
	WCDMA 1900	Front	0.213	0.003	0.186	0.216	0.399	0.402	
		Rear	0.536	0.002	0.247	0.538	0.783	<b>0.785</b>	
	LTE Band 12	Front	0.143	0.003	0.186	0.146	0.329	0.332	
		Rear	0.267	0.002	0.247	0.269	0.514	<b>0.516</b>	
	LTE Band 13	Front	0.219	0.003	0.186	0.222	0.405	0.408	
		Rear	0.358	0.002	0.247	0.360	0.605	<b>0.607</b>	
	LTE Band 14	Front	0.235	0.003	0.186	0.238	0.421	0.424	
		Rear	0.331	0.002	0.247	0.333	0.578	<b>0.580</b>	
	LTE Band 26	Front	0.256	0.003	0.186	0.259	0.442	0.445	
		Rear	0.291	0.002	0.247	0.293	0.538	<b>0.540</b>	
	LTE Band 4	Front	0.207	0.003	0.186	0.210	0.393	0.396	
		Rear	0.321	0.002	0.247	0.323	0.568	<b>0.570</b>	
	LTE Band 25	Front	0.174	0.003	0.186	0.177	0.360	0.363	
		Rear	0.458	0.002	0.247	0.460	0.705	<b>0.707</b>	
	LTE Band 7	Front	0.125	0.003	0.186	0.128	0.311	0.314	
		Rear	0.315	0.002	0.247	0.317	0.562	<b>0.564</b>	
	LTE Band 41	Front	0.071	0.003	0.186	0.074	0.257	0.260	
		Rear	0.188	0.002	0.247	0.190	0.435	<b>0.437</b>	

**Table 12.5.3 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth + 5.8 GHz W-LAN (Body-Worn at 10 mm)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		Bluetooth SAR (W/kg)	5.8G W-LAN SAR (W/kg)	$\Sigma$ SAR (W/kg)		
			1	2			1+2	1+3	1+2+3
Body-Worn SAR	GSM 850	Front	0.181	0.003	0.120	0.184	0.301	0.304	
		Rear	0.194	0.002	0.148	0.196	0.342	<b>0.344</b>	
	GPRS 850	Front	0.252	0.003	0.120	0.255	0.372	0.375	
		Rear	0.311	0.002	0.148	0.313	0.459	<b>0.461</b>	
	GSM 1900	Front	0.126	0.003	0.120	0.129	0.246	0.249	
		Rear	0.226	0.002	0.148	0.228	0.374	<b>0.376</b>	
	GPRS 1900	Front	0.159	0.003	0.120	0.162	0.279	0.282	
		Rear	0.288	0.002	0.148	0.290	0.436	<b>0.438</b>	
	WCDMA 850	Front	0.260	0.003	0.120	0.263	0.380	0.383	
		Rear	0.295	0.002	0.148	0.297	0.443	<b>0.445</b>	
	WCDMA 1700	Front	0.353	0.003	0.120	0.356	0.473	0.476	
		Rear	<b>0.563</b>	<b>0.002</b>	<b>0.148</b>	<b>0.565</b>	<b>0.711</b>	<b>0.713</b>	
	WCDMA 1900	Front	0.213	0.003	0.120	0.216	0.333	0.336	
		Rear	0.536	0.002	0.148	0.538	0.684	<b>0.686</b>	
	LTE Band 12	Front	0.143	0.003	0.120	0.146	0.263	0.266	
		Rear	0.267	0.002	0.148	0.269	0.415	<b>0.417</b>	
	LTE Band 13	Front	0.219	0.003	0.120	0.222	0.339	0.342	
		Rear	0.358	0.002	0.148	0.360	0.506	<b>0.508</b>	
	LTE Band 14	Front	0.235	0.003	0.120	0.238	0.355	0.358	
		Rear	0.331	0.002	0.148	0.333	0.479	<b>0.481</b>	
	LTE Band 26	Front	0.256	0.003	0.120	0.259	0.376	0.379	
		Rear	0.291	0.002	0.148	0.293	0.439	<b>0.441</b>	
	LTE Band 4	Front	0.207	0.003	0.120	0.210	0.327	0.330	
		Rear	0.321	0.002	0.148	0.323	0.469	<b>0.471</b>	
	LTE Band 25	Front	0.174	0.003	0.120	0.177	0.294	0.297	
		Rear	0.458	0.002	0.148	0.460	0.606	<b>0.608</b>	
	LTE Band 7	Front	0.125	0.003	0.120	0.128	0.245	0.248	
		Rear	0.315	0.002	0.148	0.317	0.463	<b>0.465</b>	
	LTE Band 41	Front	0.071	0.003	0.120	0.074	0.191	0.194	
		Rear	0.188	0.002	0.148	0.190	0.336	<b>0.338</b>	

**Table 12.5.4 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN (Body-Worn at 10 mm)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		$\Sigma$ SAR (W/kg)
			1	2	
Body-Worn SAR	GSM 850	Front	0.181	0.034	<b>0.215</b>
		Rear	0.194	0.018	<b>0.212</b>
	GPRS 850	Front	0.252	0.034	<b>0.286</b>
		Rear	0.311	0.018	<b>0.329</b>
	GSM 1900	Front	0.126	0.034	<b>0.160</b>
		Rear	0.226	0.018	<b>0.244</b>
	GPRS 1900	Front	0.159	0.034	<b>0.193</b>
		Rear	0.286	0.016	<b>0.306</b>
	WCDMA 850	Front	0.260	0.034	<b>0.294</b>
		Rear	0.295	0.018	<b>0.313</b>
	WCDMA 1700	Front	0.353	0.034	<b>0.387</b>
		Rear	0.563	0.018	<b>0.581</b>
	WCDMA 1900	Front	0.213	0.034	<b>0.247</b>
		Rear	0.536	0.018	<b>0.554</b>
	LTE Band 12	Front	0.143	0.034	<b>0.177</b>
		Rear	0.267	0.018	<b>0.285</b>
	LTE Band 13	Front	0.219	0.034	<b>0.253</b>
		Rear	0.358	0.018	<b>0.376</b>
	LTE Band 14	Front	0.235	0.034	<b>0.269</b>
		Rear	0.331	0.018	<b>0.349</b>
	LTE Band 26	Front	0.256	0.034	<b>0.290</b>
		Rear	0.291	0.018	<b>0.309</b>
	LTE Band 4	Front	0.207	0.034	<b>0.241</b>
		Rear	0.321	0.018	<b>0.339</b>
	LTE Band 25	Front	0.174	0.034	<b>0.208</b>
		Rear	0.458	0.018	<b>0.476</b>
	LTE Band 7	Front	0.125	0.034	<b>0.159</b>
		Rear	0.315	0.018	<b>0.333</b>
	LTE Band 41	Front	0.071	0.034	<b>0.105</b>
		Rear	0.188	0.018	<b>0.206</b>

**Table 12.5.5 Simultaneous Transmission Scenario : 2G/3G/4G + 5.3 GHz W-LAN (Body-Worn at 10 mm)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		$\Sigma$ SAR (W/kg)
			1	2	
Body-Worn SAR	GSM 850	Front	0.181	0.263	<b>0.444</b>
		Rear	0.194	0.124	<b>0.318</b>
	GPRS 850	Front	0.252	0.263	<b>0.515</b>
		Rear	0.311	0.124	<b>0.435</b>
	GSM 1900	Front	0.126	0.263	<b>0.389</b>
		Rear	0.226	0.124	<b>0.350</b>
	GPRS 1900	Front	0.159	0.263	<b>0.422</b>
		Rear	0.288	0.124	<b>0.412</b>
	WCDMA 850	Front	0.260	0.263	<b>0.523</b>
		Rear	0.295	0.124	<b>0.419</b>
	WCDMA 1700	Front	0.353	0.263	<b>0.616</b>
		Rear	0.563	0.124	<b>0.687</b>
	WCDMA 1900	Front	0.213	0.263	<b>0.476</b>
		Rear	0.536	0.124	<b>0.660</b>
	LTE Band 12	Front	0.143	0.263	<b>0.406</b>
		Rear	0.267	0.124	<b>0.391</b>
	LTE Band 13	Front	0.219	0.263	<b>0.482</b>
		Rear	0.355	0.124	<b>0.482</b>
	LTE Band 14	Front	0.235	0.263	<b>0.498</b>
		Rear	0.331	0.124	<b>0.455</b>
	LTE Band 26	Front	0.256	0.263	<b>0.519</b>
		Rear	0.291	0.124	<b>0.415</b>
	LTE Band 4	Front	0.207	0.263	<b>0.470</b>
		Rear	0.321	0.124	<b>0.445</b>
	LTE Band 25	Front	0.174	0.263	<b>0.437</b>
		Rear	0.458	0.124	<b>0.582</b>
	LTE Band 7	Front	0.125	0.263	<b>0.388</b>
		Rear	0.315	0.124	<b>0.439</b>
	LTE Band 41	Front	0.071	0.263	<b>0.334</b>
		Rear	0.188	0.124	<b>0.312</b>

**Table 12.5.6 Simultaneous Transmission Scenario : 2G/3G/4G + 5.6 GHz W-LAN (Body-Worn at 10 mm)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		$\Sigma$ SAR (W/kg)
			1	2	
Body-Worn SAR	GSM 850	Front	0.181	0.186	<b>0.367</b>
		Rear	0.194	0.247	<b>0.441</b>
	GPRS 850	Front	0.252	0.186	<b>0.438</b>
		Rear	0.311	0.247	<b>0.558</b>
	GSM 1900	Front	0.126	0.186	<b>0.312</b>
		Rear	0.226	0.247	<b>0.473</b>
	GPRS 1900	Front	0.159	0.186	<b>0.345</b>
		Rear	0.288	0.247	<b>0.535</b>
	WCDMA 850	Front	0.260	0.186	<b>0.446</b>
		Rear	0.295	0.247	<b>0.542</b>
	WCDMA 1700	Front	0.353	0.186	<b>0.539</b>
		Rear	0.563	0.247	<b>0.610</b>
	WCDMA 1900	Front	0.213	0.186	<b>0.399</b>
		Rear	0.536	0.247	<b>0.783</b>
	LTE Band 12	Front	0.143	0.186	<b>0.329</b>
		Rear	0.267	0.247	<b>0.514</b>
	LTE Band 13	Front	0.219	0.186	<b>0.405</b>
		Rear	0.358	0.247	<b>0.605</b>
	LTE Band 14	Front	0.235	0.186	<b>0.421</b>
		Rear	0.331	0.247	<b>0.578</b>
	LTE Band 26	Front	0.256	0.186	<b>0.442</b>
		Rear	0.291	0.247	<b>0.538</b>
	LTE Band 4	Front	0.207	0.186	<b>0.393</b>
		Rear	0.321	0.247	<b>0.568</b>
	LTE Band 25	Front	0.174	0.186	<b>0.360</b>
		Rear	0.458	0.247	<b>0.705</b>
	LTE Band 7	Front	0.125	0.186	<b>0.311</b>
		Rear	0.315	0.247	<b>0.562</b>
	LTE Band 41	Front	0.071	0.186	<b>0.257</b>
		Rear	0.188	0.247	<b>0.435</b>

**Table 12.5.7 Simultaneous Transmission Scenario : 2G/3G/4G + 5.8 GHz W-LAN (Body-Worn at 10 mm)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		$\Sigma$ SAR (W/kg)
			1	2	
Body-Worn SAR	GSM 850	Front	0.181	0.120	0.301
		Rear	0.194	0.148	<b>0.342</b>
	GPRS 850	Front	0.252	0.120	0.372
		Rear	0.311	0.148	<b>0.459</b>
	GSM 1900	Front	0.126	0.120	0.246
		Rear	0.226	0.148	<b>0.374</b>
	GPRS 1900	Front	0.159	0.120	0.279
		Rear	0.286	0.148	<b>0.436</b>
	WCDMA 850	Front	0.260	0.120	0.380
		Rear	0.295	0.148	<b>0.443</b>
	WCDMA 1700	Front	0.353	0.120	0.473
		Rear	0.563	0.148	<b>0.711</b>
	WCDMA 1900	Front	0.213	0.120	0.333
		Rear	0.536	0.148	<b>0.684</b>
	LTE Band 12	Front	0.143	0.120	0.263
		Rear	0.267	0.148	<b>0.415</b>
	LTE Band 13	Front	0.219	0.120	0.339
		Rear	0.358	0.148	<b>0.506</b>
	LTE Band 14	Front	0.235	0.120	0.355
		Rear	0.331	0.148	<b>0.479</b>
	LTE Band 26	Front	0.256	0.120	0.376
		Rear	0.291	0.148	<b>0.439</b>
	LTE Band 4	Front	0.207	0.120	0.327
		Rear	0.321	0.148	<b>0.469</b>
	LTE Band 25	Front	0.174	0.120	0.294
		Rear	0.458	0.148	<b>0.606</b>
	LTE Band 7	Front	0.125	0.120	0.245
		Rear	0.315	0.148	<b>0.463</b>
	LTE Band 41	Front	0.071	0.120	0.191
		Rear	0.188	0.148	<b>0.336</b>

**Table 12.5.8 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth (Body-Worn at 10 mm)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		$\Sigma$ SAR (W/kg)
			1	2	
Body-Worn SAR	GSM 850	Front	0.181	0.003	0.184
		Rear	0.194	0.002	<b>0.196</b>
	GPRS 850	Front	0.252	0.003	0.255
		Rear	0.311	0.002	<b>0.313</b>
	GSM 1900	Front	0.126	0.003	0.129
		Rear	0.226	0.002	<b>0.228</b>
	GPRS 1900	Front	0.159	0.003	0.162
		Rear	0.288	0.002	<b>0.290</b>
	WCDMA 850	Front	0.260	0.003	0.263
		Rear	0.295	0.002	<b>0.297</b>
	WCDMA 1700	Front	0.353	0.003	0.356
		Rear	0.563	0.002	<b>0.565</b>
	WCDMA 1900	Front	0.213	0.003	0.216
		Rear	0.536	0.002	<b>0.538</b>
	LTE Band 12	Front	0.143	0.003	0.146
		Rear	0.267	0.002	<b>0.269</b>
	LTE Band 13	Front	0.219	0.003	0.222
		Rear	0.358	0.002	<b>0.360</b>
	LTE Band 14	Front	0.235	0.003	0.238
		Rear	0.331	0.002	<b>0.333</b>
	LTE Band 26	Front	0.256	0.003	0.259
		Rear	0.291	0.002	<b>0.293</b>
	LTE Band 4	Front	0.207	0.003	0.210
		Rear	0.321	0.002	<b>0.323</b>
	LTE Band 25	Front	0.174	0.003	0.177
		Rear	0.458	0.002	<b>0.460</b>
	LTE Band 7	Front	0.125	0.003	0.128
		Rear	0.315	0.002	<b>0.317</b>
	LTE Band 41	Front	0.071	0.003	0.074
		Rear	0.188	0.002	<b>0.190</b>

**Table 12.5.9 Simultaneous Transmission Scenario : Bluetooth + 5 GHz W-LAN (Body-Worn at 10 mm)**

Exposure Condition	Mode	Configuration	Bluetooth SAR (W/kg)		$\Sigma$ SAR (W/kg)
			1	2	
Body-Worn SAR	5.3G W-LAN	Front	0.003	0.263	<b>0.266</b>
		Rear	0.002	0.124	0.126
	5.6G W-LAN	Front	0.003	0.186	<b>0.189</b>
		Rear	0.002	0.247	<b>0.249</b>
	5.8G W-LAN	Front	0.003	0.120	0.123
		Rear	0.002	0.148	<b>0.150</b>

## 12.6 Hotspot SAR Simultaneous Transmission Analysis

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

**Table 12.6.1 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth + 5.2 GHz W-LAN (Hotspot at 10 mm)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		Bluetooth SAR (W/kg)		5.2G W-LAN SAR (W/kg)		ΣSAR (W/kg)		
			1	2			3	1+2	1+3	1+2+3	
Hotspot SAR	GPRS 850	Top	-	0.015		0.147	0.015	0.147	0.147	0.162	
		Bottom	0.138	-			0.138	0.138	0.138	0.138	
		Front	0.187	0.013		0.378	0.200	0.365	0.365	0.376	
		Rear	0.448	0.004		0.134	0.452	0.452	0.452	0.458	
		Right	0.200				0.200	0.200	0.200	0.200	
	GPRS 1900	Left	0.127	0.027		0.709	0.154	0.36	0.36	0.653	
		Top	-	0.015		0.147	0.015	0.147	0.147	0.162	
		Bottom	0.307	-			0.307	0.307	0.307	0.307	
		Front	0.175	0.013		0.378	0.188	0.553	0.553	0.566	
		Rear	0.601	0.004		0.134	0.605	0.735	0.735	0.739	
	WCDMA 850	Right	0.067				0.067	0.067	0.067	0.067	
		Left	0.199	0.027		0.709	0.226	0.908	0.908	0.935	
		Top	-	0.015		0.147	0.015	0.147	0.147	0.162	
		Bottom	0.167			0.378	0.255	0.620	0.620	0.633	
		Front	0.242	0.013		0.134	0.535	0.665	0.665	0.669	
	WCDMA 1700	Rear	0.531	0.004			0.291	0.291	0.291	0.291	
		Right	0.291	-			0.222	0.904	0.931	0.931	
		Left	0.195	0.027		0.709	0.222	0.904	0.904	0.931	
		Top	-	0.015		0.147	0.015	0.147	0.147	0.162	
		Bottom	0.425	-		0.378	0.493	0.858	0.858	0.871	
	WCDMA 1900	Front	0.480	0.013		0.134	0.981	1.111	1.111	1.115	
		Rear	0.971	0.004			0.158	0.158	0.158	0.158	
		Right	0.158	-			0.443	1.125	1.125	1.125	
		Left	0.416	0.027		0.709	0.316	0.996	0.996	1.025	
		Top	-	0.015		0.147	0.015	0.147	0.147	0.162	
	LTE Band 12	Bottom	0.536	-		0.378	0.312	0.677	0.677	0.690	
		Front	0.299	0.013		0.134	0.944	1.074	1.074	1.078	
		Rear	0.940	0.004			0.124	0.124	0.124	0.124	
		Right	0.124	-			0.231	0.913	0.913	0.913	
		Left	0.289	0.027		0.709	0.231	0.913	0.913	0.940	
	LTE Band 13	Top	-	0.015		0.147	0.015	0.147	0.147	0.162	
		Bottom	0.138	-		0.378	0.256	0.621	0.621	0.634	
		Front	0.243	0.013		0.134	0.439	0.569	0.569	0.573	
		Rear	0.435	0.004			0.322	0.322	0.322	0.322	
		Right	0.322	-			0.231	0.913	0.913	0.913	
	LTE Band 14	Left	0.204	0.027		0.709	0.231	0.913	0.913	0.940	
		Top	-	0.015		0.147	0.015	0.147	0.147	0.162	
		Bottom	0.126	-		0.378	0.231	0.596	0.596	0.609	
		Front	0.218	0.013		0.134	0.361	0.491	0.491	0.495	
		Rear	0.357	0.004			0.283	0.283	0.283	0.283	
	LTE Band 26	Right	0.283	-			0.251	0.933	0.933	0.936	
		Left	0.224	0.027		0.709	0.219	0.930	0.930	0.926	
		Top	-	0.015		0.147	0.015	0.147	0.147	0.162	
		Bottom	0.170	-		0.378	0.271	0.636	0.636	0.649	
		Front	0.258	0.013		0.134	0.432	0.562	0.562	0.566	
	LTE Band 4	Rear	0.428	0.004			0.415	0.415	0.415	0.415	
		Right	0.415	-			0.325	1.007	1.007	1.007	
		Left	0.192	0.027		0.709	0.219	0.930	0.930	0.926	
		Top	-	0.015		0.147	0.015	0.147	0.147	0.162	
		Bottom	0.380	-		0.378	0.321	0.686	0.686	0.699	
	LTE Band 25	Front	0.308	0.013		0.134	0.654	0.784	0.784	0.788	
		Rear	0.650	0.004			0.139	0.139	0.139	0.139	
		Right	0.139	-			0.372	1.054	1.054	1.054	
		Left	0.345	0.027		0.709	0.325	1.007	1.007	1.034	
		Top	-	0.015		0.147	0.015	0.147	0.147	0.162	
	LTE Band 7	Bottom	0.531	-		0.378	0.284	0.649	0.649	0.662	
		Front	0.271	0.013		0.134	0.901	1.031	1.031	1.035	
		Rear	0.897	0.004			0.142	0.142	0.142	0.142	
		Right	0.142	-			0.029	0.029	0.029	0.029	
		Left	0.298	0.027		0.709	0.325	1.007	1.007	1.034	
	LTE Band 41	Top	-	0.015		0.147	0.015	0.147	0.147	0.162	
		Bottom	0.397	-		0.378	0.220	0.585	0.585	0.598	
		Front	0.207	0.013		0.134	0.563	0.693	0.693	0.697	
		Rear	0.559	0.004			0.029	0.029	0.029	0.029	
		Right	0.029	-			0.028	0.028	0.028	0.028	
		Left	0.151	0.027		0.709	0.178	0.860	0.860	0.867	

Table 12.6.2 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth + 5.8 GHz W-LAN (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		Bluetooth SAR (W/kg)	5.8G W-LAN SAR (W/kg)		ΣSAR (W/kg)		
			1	2		3	1+2	1+3	1+2+3	
Hotspot SAR	GPRS 850	Top	-	0.015	-	0.120	0.015	0.120	0.135	
		Bottom	0.138	-	-	-	0.138	0.138	0.138	
		Front	0.187	0.013	-	0.142	0.200	0.329	0.342	
		Rear	0.448	0.004	-	0.162	0.452	0.610	0.614	
		Right	0.200	-	-	-	0.200	0.200	0.200	
	GPRS 1900	Left	0.127	0.027	-	0.545	0.154	0.672	0.699	
		Top	-	0.015	-	0.120	0.015	0.120	0.135	
		Bottom	0.307	-	-	-	0.307	0.307	0.307	
		Front	0.175	0.013	-	0.142	0.188	0.317	0.330	
		Rear	0.601	0.004	-	0.162	0.605	0.763	0.767	
Hotspot SAR	WCDMA 850	Right	0.067	-	-	-	0.067	0.067	0.067	
		Left	0.199	0.027	-	0.545	0.226	0.744	0.771	
		Top	-	0.015	-	0.120	0.015	0.120	0.135	
		Bottom	0.167	-	-	-	0.167	0.167	0.167	
		Front	0.242	0.013	-	0.142	0.255	0.384	0.397	
	WCDMA 1700	Rear	0.531	0.004	-	0.162	0.535	0.693	0.697	
		Right	0.291	-	-	-	0.291	0.291	0.291	
		Left	0.195	0.027	-	0.545	0.222	0.740	0.767	
		Top	-	0.015	-	0.120	0.015	0.120	0.135	
		Bottom	0.426	-	-	-	0.426	0.426	0.426	
Hotspot SAR	WCDMA 1900	Front	0.480	0.013	-	0.142	0.493	0.622	0.636	
		Rear	0.977	0.004	-	0.162	0.981	1.139	1.143	
		Right	0.158	-	-	-	0.158	0.158	0.158	
		Left	0.416	0.027	-	0.545	0.443	0.961	0.988	
		Top	-	0.015	-	0.120	0.015	0.120	0.135	
	LTE Band 12	Bottom	0.536	-	-	-	0.536	0.536	0.536	
		Front	0.299	0.013	-	0.142	0.312	0.441	0.454	
		Rear	0.940	0.004	-	0.162	0.944	1.102	1.106	
		Right	0.124	-	-	-	0.124	0.124	0.124	
		Left	0.289	0.027	-	0.545	0.316	0.834	0.861	
Hotspot SAR	LTE Band 13	Top	-	0.015	-	0.120	0.015	0.120	0.135	
		Bottom	0.067	-	-	-	0.067	0.067	0.067	
		Front	0.153	0.013	-	0.142	0.166	0.295	0.308	
		Rear	0.376	0.004	-	0.162	0.389	0.538	0.542	
		Right	0.193	-	-	-	0.193	0.193	0.193	
	LTE Band 14	Left	0.152	0.027	-	0.545	0.179	0.697	0.724	
		Top	-	0.015	-	0.120	0.015	0.120	0.135	
		Bottom	0.138	-	-	-	0.138	0.138	0.138	
		Front	0.243	0.013	-	0.142	0.256	0.385	0.398	
		Rear	0.435	0.004	-	0.162	0.439	0.597	0.601	
Hotspot SAR	LTE Band 26	Right	0.322	-	-	-	0.322	0.322	0.322	
		Left	0.204	0.027	-	0.545	0.231	0.749	0.776	
		Top	-	0.015	-	0.120	0.015	0.120	0.135	
		Bottom	0.126	-	-	-	0.126	0.126	0.126	
		Front	0.218	0.013	-	0.142	0.231	0.360	0.373	
	LTE Band 4	Rear	0.357	0.004	-	0.162	0.361	0.519	0.523	
		Right	0.283	-	-	-	0.283	0.283	0.283	
		Left	0.224	0.027	-	0.545	0.251	0.769	0.796	
		Top	-	0.015	-	0.120	0.015	0.120	0.135	
		Bottom	0.170	-	-	-	0.170	0.170	0.170	
Hotspot SAR	LTE Band 25	Front	0.258	0.013	-	0.142	0.271	0.400	0.413	
		Rear	0.428	0.004	-	0.162	0.432	0.590	0.594	
		Right	0.415	-	-	-	0.415	0.415	0.415	
		Left	0.192	0.027	-	0.545	0.219	0.737	0.764	
		Top	-	0.015	-	0.120	0.015	0.120	0.135	
	LTE Band 7	Bottom	0.380	-	-	-	0.380	0.380	0.380	
		Front	0.308	0.013	-	0.142	0.321	0.450	0.463	
		Rear	0.650	0.004	-	0.162	0.654	0.812	0.816	
		Right	0.139	-	-	-	0.139	0.139	0.139	
		Left	0.345	0.027	-	0.545	0.372	0.890	0.917	
Hotspot SAR	LTE Band 41	Top	-	0.015	-	0.120	0.015	0.120	0.135	
		Bottom	0.531	-	-	-	0.531	0.531	0.531	
		Front	0.271	0.013	-	0.142	0.284	0.413	0.426	
		Rear	0.897	0.004	-	0.162	0.901	1.059	1.063	
		Right	0.142	-	-	-	0.142	0.142	0.142	
	LTE Band 41	Left	0.298	0.027	-	0.545	0.325	0.843	0.870	
		Top	-	0.015	-	0.120	0.015	0.120	0.135	
		Bottom	0.307	-	-	-	0.307	0.307	0.307	
		Front	0.207	0.013	-	0.142	0.220	0.349	0.362	
		Rear	0.559	0.004	-	0.162	0.563	0.721	0.725	

**Table 12.6.3 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN (Hotspot at 10 mm)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN SAR (W/kg)	$\Sigma$ SAR (W/kg)
			1	2	1+2
Hotspot SAR	GPRS 850	Top		0.068	0.068
		Bottom	0.138		0.138
		Front	0.187	0.059	0.246
		Rear	0.448	0.028	<b>0.476</b>
		Right	0.200		0.200
	GPRS 1900	Left	0.127	0.116	0.243
		Top		0.068	0.068
		Bottom	0.307		0.307
		Front	0.175	0.059	0.234
		Rear	0.601	0.028	<b>0.629</b>
	WCDMA 850	Right	0.067	-	0.067
		Left	0.199	0.116	0.315
		Top		0.068	0.068
		Bottom	0.167		0.167
		Front	0.242	0.059	0.301
	WCDMA 1700	Rear	0.531	0.028	<b>0.559</b>
		Right	0.291		0.291
		Left	0.195	0.116	0.311
		Top		0.068	0.068
		Bottom	0.426		0.426
	WCDMA 1900	Front	0.489	0.059	0.539
		Rear	0.377	0.028	<b>1.005</b>
		Right	0.158	-	0.158
		Left	0.416	0.116	0.532
		Top		0.068	0.068
	LTE Band 12	Bottom	0.536		0.536
		Front	0.299	0.059	0.358
		Rear	0.940	0.028	<b>0.968</b>
		Right	0.124		0.124
		Left	0.289	0.116	0.405
	LTE Band 13	Top		0.068	0.068
		Bottom	0.067		0.067
		Front	0.153	0.059	0.212
		Rear	0.376	0.028	<b>0.404</b>
		Right	0.193		0.193
	LTE Band 14	Left	0.152	0.116	0.268
		Top		0.068	0.068
		Bottom	0.138		0.138
		Front	0.243	0.059	0.302
		Rear	0.435	0.028	<b>0.463</b>
	LTE Band 26	Right	0.322		0.322
		Left	0.204	0.116	0.320
		Top		0.068	0.068
		Bottom	0.126		0.126
		Front	0.218	0.059	0.277
	LTE Band 4	Rear	0.357	0.028	<b>0.385</b>
		Right	0.283		0.283
		Left	0.224	0.116	0.340
		Top		0.068	0.068
		Bottom	0.170		0.170
	LTE Band 25	Front	0.258	0.059	0.317
		Rear	0.428	0.028	<b>0.456</b>
		Right	0.415		0.415
		Left	0.192	0.116	0.308
		Top		0.068	0.068
	LTE Band 7	Bottom	0.380		0.380
		Front	0.308	0.059	0.367
		Rear	0.850	0.028	<b>0.878</b>
		Right	0.139		0.139
		Left	0.345	0.116	0.461
	LTE Band 41	Top		0.068	0.068
		Bottom	0.531		0.531
		Front	0.271	0.059	0.330
		Rear	0.897	0.028	<b>0.925</b>
		Right	0.142		0.142
		Left	0.298	0.116	0.414
		Top		0.068	0.068
		Bottom	0.397		0.397
		Front	0.207	0.059	0.266
		Rear	0.559	0.028	<b>0.587</b>
		Right	0.029		0.029
		Left	0.151	0.116	0.267
		Top		0.068	0.068
		Bottom	0.211		0.211
		Front	0.129	0.059	0.188
		Rear	0.435	0.028	<b>0.463</b>
		Right	0.028	-	0.028
		Left	0.083	0.116	0.199

**Table 12.6.4 Simultaneous Transmission Scenario : 2G/3G/4G + 5.2 GHz W-LAN (Hotspot at 10 mm)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.2 G W-LAN SAR (W/kg)	$\Sigma$ SAR (W/kg)
			1	2	1+2
Hotspot SAR	GPRS 850	Top		0.147	0.147
		Bottom	0.138		0.138
		Front	0.187	0.378	0.565
		Rear	0.448	0.134	0.582
		Right	0.200	-	0.200
	GPRS 1900	Left	0.127	0.709	<b>0.836</b>
		Top		0.147	0.147
		Bottom	0.307		0.307
		Front	0.175	0.378	0.553
		Rear	0.601	0.134	0.735
	WCDMA 850	Right	0.067	-	0.067
		Left	0.199	0.709	<b>0.908</b>
		Top		0.147	0.147
		Bottom	0.167		0.167
		Front	0.242	0.378	0.620
	WCDMA 1700	Rear	0.531	0.134	0.665
		Right	0.291	-	0.291
		Left	0.195	0.709	<b>0.904</b>
		Top		0.147	0.147
		Bottom	0.426		0.426
	WCDMA 1900	Front	0.489	0.378	0.858
		Rear	0.377	0.134	1.111
		Right	0.158	-	0.158
		Left	0.416	0.709	<b>1.125</b>
		Top		0.147	0.147
	LTE Band 12	Bottom	0.536		0.536
		Front	0.299	0.378	0.677
		Rear	0.940	0.134	<b>1.074</b>
		Right	0.124	-	0.124
		Left	0.289	0.709	0.998
	LTE Band 13	Top		0.147	0.147
		Bottom	0.067		0.067
		Front	0.153	0.378	0.531
		Rear	0.376	0.134	0.510
		Right	0.193	-	0.193
	LTE Band 14	Left	0.152	0.709	<b>0.861</b>
		Top		0.147	0.147
		Bottom	0.138		0.138
		Front	0.243	0.378	0.621
		Rear	0.435	0.134	0.569
	LTE Band 26	Right	0.322	-	0.322
		Left	0.204	0.709	<b>0.913</b>
		Top		0.147	0.147
		Bottom	0.126		0.126
		Front	0.218	0.378	0.596
	LTE Band 4	Rear	0.357	0.134	0.491
		Right	0.283	-	0.283
		Left	0.224	0.709	<b>0.933</b>
		Top		0.147	0.147
		Bottom	0.170		0.170
	LTE Band 25	Front	0.258	0.378	0.636
		Rear	0.428	0.134	0.562
		Right	0.415	-	0.415
		Left	0.192	0.709	<b>0.901</b>
		Top		0.147	0.147
	LTE Band 7	Bottom	0.380		0.380
		Front	0.308	0.378	0.686
		Rear	0.850	0.134	0.784
		Right	0.139	-	0.139
		Left	0.345	0.709	<b>1.054</b>
	LTE Band 41	Top		0.147	0.147
		Bottom	0.531		0.531
		Front	0.271	0.378	0.649
		Rear	0.897	0.134	<b>1.031</b>
		Right	0.142	-	0.142
		Left	0.298	0.709	1.007
		Top		0.147	0.147
		Bottom	0.397		0.397
		Front	0.207	0.378	0.585
		Rear	0.559	0.134	0.693
		Right	0.029	-	0.029
		Left	0.151	0.709	<b>0.860</b>
		Top		0.147	0.147
		Bottom	0.211		0.211
		Front	0.129	0.378	0.507
		Rear	0.435	0.134	0.569
		Right	0.028	-	0.028
		Left	0.083	0.709	<b>0.792</b>

**Table 12.6.5 Simultaneous Transmission Scenario : 2G/3G/4G + 5.8 GHz W-LAN (Hotspot at 10 mm)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.8G W-LAN SAR (W/kg)	$\Sigma$ SAR (W/kg)
			1	2	1+2
Hotspot SAR	GPRS 850	Top		0.120	0.120
		Bottom	0.138		0.138
		Front	0.187	0.142	0.329
		Rear	0.448	0.162	0.610
		Right	0.200		0.200
	GPRS 1900	Left	0.127	0.545	<b>0.672</b>
		Top		0.120	0.120
		Bottom	0.307		0.307
		Front	0.175	0.142	0.317
		Rear	0.601	0.162	<b>0.763</b>
	WCDMA 850	Right	0.067	-	0.067
		Left	0.199	0.545	0.744
		Top		0.120	0.120
		Bottom	0.167		0.167
		Front	0.242	0.142	0.384
	WCDMA 1700	Rear	0.531	0.162	0.693
		Right	0.291	-	0.291
		Left	0.195	0.545	<b>0.740</b>
		Top		0.120	0.120
		Bottom	0.426		0.426
	WCDMA 1900	Front	0.489	0.142	0.622
		Rear	0.377	0.162	<b>1.139</b>
		Right	0.158	-	0.158
		Left	0.416	0.545	0.961
		Top		0.120	0.120
	LTE Band 12	Bottom	0.536		0.536
		Front	0.299	0.142	0.441
		Rear	0.940	0.162	<b>1.102</b>
		Right	0.124	-	0.124
		Left	0.289	0.545	0.834
	LTE Band 13	Top		0.120	0.120
		Bottom	0.067		0.067
		Front	0.153	0.142	0.295
		Rear	0.376	0.162	0.538
		Right	0.193	-	0.193
	LTE Band 14	Left	0.152	0.545	<b>0.697</b>
		Top		0.120	0.120
		Bottom	0.138		0.138
		Front	0.243	0.142	0.385
		Rear	0.435	0.162	0.597
	LTE Band 26	Right	0.322	-	0.322
		Left	0.204	0.545	<b>0.749</b>
		Top		0.120	0.120
		Bottom	0.126		0.126
		Front	0.218	0.142	0.360
	LTE Band 4	Rear	0.357	0.162	0.519
		Right	0.283	-	0.283
		Left	0.224	0.545	<b>0.769</b>
		Top		0.120	0.120
		Bottom	0.170		0.170
	LTE Band 25	Front	0.258	0.142	0.400
		Rear	0.428	0.162	0.590
		Right	0.415	-	0.415
		Left	0.192	0.545	<b>0.737</b>
		Top		0.120	0.120
	LTE Band 7	Bottom	0.380		0.380
		Front	0.308	0.142	0.450
		Rear	0.850	0.162	0.812
		Right	0.139	-	0.139
		Left	0.345	0.545	<b>0.890</b>
	LTE Band 41	Top		0.120	0.120
		Bottom	0.531		0.531
		Front	0.271	0.142	0.413
		Rear	0.897	0.162	<b>1.059</b>
		Right	0.142	-	0.142
		Left	0.298	0.545	0.843
	LTE Band 41	Top		0.120	0.120
		Bottom	0.397		0.397
		Front	0.207	0.142	0.349
		Rear	0.559	0.162	<b>0.721</b>
		Right	0.029	-	0.029
		Left	0.151	0.545	0.696
		Top		0.120	0.120
		Bottom	0.211		0.211
		Front	0.129	0.142	0.271
		Rear	0.435	0.162	0.597
		Right	0.028	-	0.028
		Left	0.083	0.545	<b>0.628</b>

**Table 12.6.6 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth (Hotspot at 10 mm)**

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)		$\Sigma$ SAR (W/kg)
			1	2	
Hotspot SAR	GPRS 850	Top	-	0.015	0.015
		Bottom	0.138	-	0.138
		Front	0.187	0.013	0.200
		Rear	0.448	0.004	<b>0.452</b>
		Right	0.200	-	0.200
	GPRS 1900	Left	0.127	0.027	0.154
		Top	-	0.015	0.015
		Bottom	0.307	-	0.307
		Front	0.175	0.013	0.188
		Rear	0.601	0.004	<b>0.605</b>
	WCDMA 850	Right	0.067	-	0.067
		Left	0.199	0.027	0.226
		Top	-	0.015	0.015
		Bottom	0.167	-	0.167
		Front	0.242	0.013	0.255
	WCDMA 1700	Rear	0.531	0.004	<b>0.535</b>
		Right	0.291	-	0.291
		Left	0.195	0.027	0.222
		Top	-	0.015	0.015
		Bottom	0.426	-	0.426
	WCDMA 1900	Front	0.489	0.013	0.493
		Rear	0.377	0.004	<b>0.381</b>
		Right	0.158	-	0.158
		Left	0.416	0.027	0.443
		Top	-	0.015	0.015
	LTE Band 12	Bottom	0.536	-	0.536
		Front	0.299	0.013	0.312
		Rear	0.940	0.004	<b>0.944</b>
		Right	0.124	-	0.124
		Left	0.289	0.027	0.316
	LTE Band 13	Top	-	0.015	0.015
		Bottom	0.067	-	0.067
		Front	0.153	0.013	0.166
		Rear	0.376	0.004	<b>0.380</b>
		Right	0.193	-	0.193
	LTE Band 14	Left	0.152	0.027	0.179
		Top	-	0.015	0.015
		Bottom	0.138	-	0.138
		Front	0.243	0.013	0.256
		Rear	0.435	0.004	<b>0.439</b>
	LTE Band 26	Right	0.322	-	0.322
		Left	0.204	0.027	0.231
		Top	-	0.015	0.015
		Bottom	0.126	-	0.126
		Front	0.218	0.013	0.231
	LTE Band 4	Rear	0.357	0.004	<b>0.361</b>
		Right	0.283	-	0.283
		Left	0.224	0.027	0.251
		Top	-	0.015	0.015
		Bottom	0.170	-	0.170
	LTE Band 25	Front	0.258	0.013	0.271
		Rear	0.428	0.004	<b>0.432</b>
		Right	0.415	-	0.415
		Left	0.192	0.027	0.219
		Top	-	0.015	0.015
	LTE Band 7	Bottom	0.380	-	0.380
		Front	0.308	0.013	0.321
		Rear	0.850	0.004	<b>0.854</b>
		Right	0.139	-	0.139
		Left	0.345	0.027	0.372
	LTE Band 41	Top	-	0.015	0.015
		Bottom	0.531	-	0.531
		Front	0.271	0.013	0.284
		Rear	0.897	0.004	<b>0.901</b>
		Right	0.142	-	0.142
		Left	0.298	0.027	0.325
	LTE Band 1	Top	-	0.015	0.015
		Bottom	0.397	-	0.397
		Front	0.207	0.013	0.220
		Rear	0.559	0.004	<b>0.563</b>
		Right	0.029	-	0.029
		Left	0.151	0.027	0.178
	LTE Band 41	Top	-	0.015	0.015
		Bottom	0.211	-	0.211
		Front	0.129	0.013	0.142
		Rear	0.435	0.004	<b>0.439</b>
		Right	0.028	-	0.028
		Left	0.083	0.027	0.110

**Table 12.6.7 Simultaneous Transmission Scenario : Bluetooth + 5 GHz W-LAN (Hotspot at 10 mm)**

Exposure Condition	Mode	Configuration	Bluetooth SAR (W/kg)		$\Sigma$ SAR (W/kg)
			1	2	
Hotspot SAR	5.2G W-LAN	Top	0.015	0.147	0.162
		Bottom	-	-	
		Front	0.013	0.378	0.391
		Rear	0.004	0.134	0.138
		Right	-	-	
	5.8G W-LAN	Left	0.027	0.709	<b>0.736</b>
		Top	0.015	0.120	0.135
		Bottom	-	-	
		Front	0.013	0.142	0.155
		Rear	0.004	0.162	<b>0.166</b>

## 12.7 Phablet SAR Simultaneous Transmission Analysis

Per FCC KDB Publication 648474 D04 Handset SAR, Phablet SAR tests were not required of Hotspot 1g SAR (scaled to maximum output power, including tolerance) < 1.2 W/kg. Therefore no further analysis was required for Phablet Simultaneous Transmission Analysis.

## 12.8 Simultaneous Transmission Conclusion

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

## 13. SAR MEASUREMENT VARIABILITY

### 13.1 Measurement Variability

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

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

1. When the original highest measured SAR is  $\geq 0.80$  W/kg, the measurement was repeated once.
2. A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was  $> 1.20$  or when the original or repeated measurement was  $\geq 1.45$  W/kg ( $\sim 10\%$  from the 1-g SAR limit).
3. A third repeated measurement was performed only if the original, first or second repeated measurement was  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .
4. Repeated measurements are not required when the original highest measured SAR is  $< 0.80$  W/kg
5. The same procedures should be adapted for measurements according to extremity exposure limits by applying a factor of 2.5 for extremity exposure to the corresponding SAR thresholds.

**Table 13.1 Hotspot SAR Measurement Variability Results**

Frequency		Mode	Service	# of Time Slots	Spacing [Side]	Measured SAR (1g) (W/kg)	1st Repeated SAR(1g) (W/kg)	Ratio	2nd Repeated SAR(1g) (W/kg)	Ratio	3rd Repeated SAR(1g) (W/kg)	Ratio
MHz	Ch.											
5300.0	60	802.11a	-	-	Right Touch	0.850	0.848	1.00	-	-	-	-
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure												
Body 1.6 W/kg (mW/g) averaged over 1 gram												

**Table 13.2 Hotspot SAR Measurement Variability Results**

Frequency		Mode	Service	# of Time Slots	Spacing [Side]	Measured SAR (1g) (W/kg)	1st Repeated SAR(1g) (W/kg)	Ratio	2nd Repeated SAR(1g) (W/kg)	Ratio	3rd Repeated SAR(1g) (W/kg)	Ratio
MHz	Ch.											
1732.4	1412	WCDMA 1700	RMC	-	10 mm [Rear]	0.845	0.835	1.01	-	-	-	-
1880.0	9400	WCDMA 1900	RMC	-	10 mm [Rear]	0.916	0.912	1.00	-	-	-	-
1882.5	26365	LTE B25	-	-	10 mm [Rear]	0.864	0.853	1.01	-	-	-	-
ANSI / IEEE C95.1-1992- SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure												
Body 1.6 W/kg (mW/g) averaged over 1 gram												

### 13.2 Measurement Uncertainty

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

## 14. EQUIPMENT LIST

Table 14.1.1 Test Equipment Calibration

Type	Manufacturer	Model	Cal.Date	Next.Cal.Date	S/N
SEMITEC Engineering	SEMITEC	N/A	N/A	N/A	Shield Room
SEMITEC Engineering	SEMITEC	N/A	N/A	N/A	Shield Room
SEMITEC Engineering	SEMITEC	N/A	N/A	N/A	Shield Room
Robot	SPEAG	TX90XL	N/A	N/A	F13/5P9GA1/A/01
Robot	SPEAG	TX60L	N/A	N/A	F15/50NHA1/A/01
Robot	SPEAG	TX90XL	N/A	N/A	F13/5RR2A1/A/01
Robot Controller	SPEAG	CS8C	N/A	N/A	F13/5P9GA1/C/01
Robot Controller	SPEAG	CS8C	N/A	N/A	F15/50NHA1/C/01
Robot Controller	SPEAG	CS8C	N/A	N/A	F13/5RR2A1/C/01
Joystick	SPEAG	N/A	N/A	N/A	S-12450905
Joystick	SPEAG	P21142605A	N/A	N/A	005695
Joystick	SPEAG	N/A	N/A	N/A	S-13200990
Intel Core i7-3770 3.40 GHz Windows 7 Professional	N/A	N/A	N/A	N/A	N/A
Intel Core i7-3770 3.40 GHz Windows 7 Professional	N/A	N/A	N/A	N/A	N/A
Intel Core i7-3770 3.40 GHz Windows 7 Professional	N/A	N/A	N/A	N/A	N/A
Probe Alignment Unit LB	N/A	N/A	N/A	N/A	SE UKS 030 AA
Probe Alignment Unit LB	N/A	N/A	N/A	N/A	SE UKS 030 AA
Probe Alignment Unit LB	N/A	N/A	N/A	N/A	SE UKS 030 AA
Device Holder	SPEAG	SD000H01HA	N/A	N/A	N/A
Device Holder	SPEAG	SD000H01HA	N/A	N/A	N/A
Device Holder	SPEAG	SD000H01HA	N/A	N/A	N/A
Twin SAM Phantom	SPEAG	QD000P40CD	N/A	N/A	1782
Twin SAM Phantom	SPEAG	QD000P40CD	N/A	N/A	1895
Twin SAM Phantom	SPEAG	QD000P40CD	N/A	N/A	1785
Twin SAM Phantom	SPEAG	QD000P40CD	N/A	N/A	1786
Data Acquisition Electronics	SPEAG	DAE4V1	2019-03-20	2020-03-20	1394
Data Acquisition Electronics	SPEAG	DAE4V1	2019-05-23	2020-05-23	1392
Dosimetric E-Field Probe	SPEAG	EX3DV4	2019-05-28	2020-05-28	3866
Dosimetric E-Field Probe	SPEAG	EX3DV4	2018-11-22	2019-11-22	7337
Dosimetric E-Field Probe	SPEAG	EX3DV4	2019-04-25	2020-04-25	3916
750MHz SAR Dipole	SPEAG	D750V3	2019-01-25	2021-01-25	1049
835MHz SAR Dipole	SPEAG	D835V2	2019-07-18	2020-07-18	464
1800MHz SAR Dipole	SPEAG	D1800V2	2019-04-24	2021-04-24	2d047
1900MHz SAR Dipole	SPEAG	D1900V2	2019-07-17	2021-07-17	5d029
2450MHz SAR Dipole	SPEAG	D2450V2	2018-08-24	2020-08-24	920
2600MHz SAR Dipole	SPEAG	D2600V2	2019-02-27	2021-02-27	1016
5GHz SAR Dipole	SPEAG	D5GHzV2	2019-02-28	2021-02-28	1103
Network Analyzer	Agilent	E5071C	2019-06-24	2020-06-24	MY46106970
Signal Generator	Agilent	E4438C	2019-06-24	2020-06-24	US41461520
Amplifier	RFBAY Inc	MPA-40-40	2018-12-20	2019-12-20	21151801
Amplifier	EMPOWER	BBS3Q7ELU	2019-06-24	2020-06-24	1020
High Power RF Amplifier	EMPOWER	BBS3Q8CCJ	2019-06-24	2020-06-24	1005
Power Meter	HP	EPM-442A	2018-12-19	2019-12-19	GB37170267
Power Meter	HP	EPM-442A	2018-12-18	2019-12-18	GB37170413
Power Sensor	HP	8481A	2018-12-18	2019-12-18	US37294267
Power Sensor	HP	8481A	2018-12-19	2019-12-19	3318A96566
Power Sensor	HP	8481A	2018-12-19	2019-12-19	2702A65976
Dual Directional Coupler	Agilent	778D-012	2018-12-19	2019-12-19	50228
Directional Coupler	HP	772D	2019-06-24	2020-06-24	2889A01064
Low Pass Filter 1GHz	Wainwright Instruments	WLK6-1000-1400-9000-60SS	2019-06-24	2020-06-24	165
Low Pass Filter 1.5GHz	Micro LAB	LA-15N	2019-06-24	2020-06-24	2
Low Pass Filter 3.0GHz	Micro LAB	LA-30N	2019-06-24	2020-06-24	2
Low Pass Filter 6.0GHz	Micro LAB	LA-60N	2018-12-19	2019-12-19	03942
Attenuators(10 dB)	WEINSCHEL	23-10-34	2018-12-19	2019-12-19	BP4387
Attenuators	Cernexwave	CFADC2603U5	2019-06-27	2020-06-27	C11740
Dielectric Probe kit	SPEAG	DAK-3.5	2018-11-20	2019-11-20	1092
8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	2019-06-28	2020-06-28	GB41321164
Radio Communication Analyzer	Agilent	E5515E	2019-06-28	2020-06-28	MY52113012
Wideband Radio Communication Tester	Rohde Schwarz	CMW500	2018-12-19	2019-12-19	101414
Power Splitter	Anritsu	K241B	2018-12-18	2019-12-18	1301183
Bluetooth Tester	TESCOM	TC-3000B	2018-12-18	2019-12-18	3000B770243

## NOTE(S):

1. The E-field probe was calibrated by SPEAG, by temperature measurement procedure. Dipole Verification measurement is performed by DT&C before each test. The brain and muscle simulating material are calibrated by DT&C using the dielectric probe system and network analyzer to determine the conductivity and permittivity (dielectric constant) of the brain and muscle-equivalent material. Each equipment item was used solely within its respective calibration period.

2. CBT(Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. 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

### 750 MHz Head (SN: 3866)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
<b>Measurement System</b>								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
<b>Test Sample Related</b>								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
<b>Physical Parameters</b>								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.9	Normal	1	0.78	0.71	± 3.0 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.0	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
Temp. unc. - Conductivity	± 1.7	Rectangular	√3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
<b>Combined Standard Uncertainty</b>								
<b>Expanded Uncertainty (k=2)</b>								
						± 11.6 %	± 11.4 %	330
						± 23.2 %	± 22.8 %	

The above measurement uncertainties are according to IEEE Std 1528

**835 MHz Head (SN: 3866)**

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
<b>Measurement System</b>								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
<b>Test Sample Related</b>								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
<b>Physical Parameters</b>								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.0	Normal	1	0.78	0.71	± 3.1 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 3.8	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
Temp. unc. - Conductivity	± 2.0	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 1.8	Rectangular	√3	0.23	0.26	± 0.2 %	± 0.3 %	∞
<b>Combined Standard Uncertainty</b>								
<b>Expanded Uncertainty (k=2)</b>								

The above measurement uncertainties are according to IEEE Std 1528

1800 MHz Head (SN: 7337)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
<b>Measurement System</b>								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
<b>Test Sample Related</b>								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
<b>Physical Parameters</b>								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.0	Normal	1	0.78	0.71	± 3.1 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.1	Normal	1	0.23	0.26	± 0.9 %	± 1.1 %	10
Temp. unc. - Conductivity	± 1.8	Rectangular	√3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
<b>Combined Standard Uncertainty</b>								
± 11.6 %								
<b>Expanded Uncertainty (k=2)</b>								
± 23.2 %								
± 22.8 %								

The above measurement uncertainties are according to IEEE Std 1528

**1900 MHz Head (SN: 7337)**

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
<b>Measurement System</b>								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
<b>Test Sample Related</b>								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
<b>Physical Parameters</b>								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.0	Normal	1	0.78	0.71	± 3.1 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.2	Normal	1	0.23	0.26	± 1.0 %	± 1.1 %	10
Temp. unc. - Conductivity	± 1.9	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 1.8	Rectangular	√3	0.23	0.26	± 0.2 %	± 0.3 %	∞
<b>Combined Standard Uncertainty</b>								
<b>Expanded Uncertainty (k=2)</b>								
						± 11.6 %	± 11.4 %	330
						± 23.2 %	± 22.8 %	

The above measurement uncertainties are according to IEEE Std 1528

### 2450 MHz Head (SN: 3916)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
<b>Measurement System</b>								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	$\sqrt{3}$	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	$\sqrt{3}$	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	$\sqrt{3}$	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	$\sqrt{3}$	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	$\sqrt{3}$	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	$\sqrt{3}$	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	$\sqrt{3}$	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	$\sqrt{3}$	1	1	± 2.3 %	± 2.3 %	∞
<b>Test Sample Related</b>								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	$\sqrt{3}$	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	$\sqrt{3}$	1	1	± 0.0 %	± 0.0 %	∞
<b>Physical Parameters</b>								
Phantom Shell	± 7.6	Rectangular	$\sqrt{3}$	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	$\sqrt{3}$	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.1	Normal	1	0.78	0.71	± 3.2 %	± 2.9 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	$\sqrt{3}$	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 3.8	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
Temp. unc. - Conductivity	± 1.9	Rectangular	$\sqrt{3}$	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	$\sqrt{3}$	0.23	0.26	± 0.3 %	± 0.3 %	∞
<b>Combined Standard Uncertainty</b>							<b>± 11.6 %</b>	<b>± 11.4 %</b>
<b>Expanded Uncertainty (k=2)</b>							<b>± 23.2 %</b>	<b>± 22.8 %</b>

The above measurement uncertainties are according to IEEE Std 1528

### 2600 MHz Head (SN: 7337)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
<b>Measurement System</b>								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	$\sqrt{3}$	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	$\sqrt{3}$	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	$\sqrt{3}$	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	$\sqrt{3}$	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	$\sqrt{3}$	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	$\sqrt{3}$	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	$\sqrt{3}$	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	$\sqrt{3}$	1	1	± 2.3 %	± 2.3 %	∞
<b>Test Sample Related</b>								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	$\sqrt{3}$	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	$\sqrt{3}$	1	1	± 0.0 %	± 0.0 %	∞
<b>Physical Parameters</b>								
Phantom Shell	± 7.6	Rectangular	$\sqrt{3}$	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	$\sqrt{3}$	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.1	Normal	1	0.78	0.71	± 3.2 %	± 2.9 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	$\sqrt{3}$	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 3.8	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
Temp. unc. - Conductivity	± 1.9	Rectangular	$\sqrt{3}$	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 1.8	Rectangular	$\sqrt{3}$	0.23	0.26	± 0.2 %	± 0.3 %	∞
<b>Combined Standard Uncertainty</b>							<b>± 11.6 %</b>	<b>± 11.4 %</b>
<b>Expanded Uncertainty (k=2)</b>							<b>± 23.2 %</b>	<b>± 22.8 %</b>

The above measurement uncertainties are according to IEEE Std 1528

### 5200 MHz Head (SN: 3916)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
<b>Measurement System</b>								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
<b>Test Sample Related</b>								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
<b>Physical Parameters</b>								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.9	Normal	1	0.78	0.71	± 3.0 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 3.8	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
Temp. unc. - Conductivity	± 1.8	Rectangular	√3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
<b>Combined Standard Uncertainty</b>							± 11.9 %	± 11.7 %
<b>Expanded Uncertainty (k=2)</b>							± 23.8 %	± 23.4 %

The above measurement uncertainties are according to IEEE Std 1528

**5300 MHz Head (SN: 3916)**

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
<b>Measurement System</b>								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
<b>Test Sample Related</b>								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
<b>Physical Parameters</b>								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.8	Normal	1	0.78	0.71	± 3.0 %	± 2.7 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.1	Normal	1	0.23	0.26	± 0.9 %	± 1.1 %	10
Temp. unc. - Conductivity	± 1.8	Rectangular	√3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 1.8	Rectangular	√3	0.23	0.26	± 0.2 %	± 0.3 %	∞
<b>Combined Standard Uncertainty</b>								
<b>Expanded Uncertainty (k=2)</b>								
						± 11.9 %	± 11.7 %	330
						± 23.8 %	± 23.4 %	

The above measurement uncertainties are according to IEEE Std 1528

**5500 MHz Head (SN: 3916)**

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
<b>Measurement System</b>								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
<b>Test Sample Related</b>								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
<b>Physical Parameters</b>								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.2	Normal	1	0.78	0.71	± 3.3 %	± 3.0 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.0	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
Temp. unc. - Conductivity	± 1.7	Rectangular	√3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
<b>Combined Standard Uncertainty</b>								
<b>Expanded Uncertainty (k=2)</b>								
						± 11.9 %	± 11.8 %	330
						± 23.8 %	± 23.6 %	

The above measurement uncertainties are according to IEEE Std 1528

### 5600 MHz Head (SN: 3916)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
<b>Measurement System</b>								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
<b>Test Sample Related</b>								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
<b>Physical Parameters</b>								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.0	Normal	1	0.78	0.71	± 3.1 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.2	Normal	1	0.23	0.26	± 1.0 %	± 1.1 %	10
Temp. unc. - Conductivity	± 1.9	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
<b>Combined Standard Uncertainty</b>								
± 11.9 %								
<b>Expanded Uncertainty (k=2)</b>								
± 23.8 %								

The above measurement uncertainties are according to IEEE Std 1528

**5800 MHz Head (SN: 3916)**

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
<b>Measurement System</b>								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	$\sqrt{3}$	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	$\sqrt{3}$	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	$\sqrt{3}$	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	$\sqrt{3}$	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	$\sqrt{3}$	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	$\sqrt{3}$	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	$\sqrt{3}$	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	$\sqrt{3}$	1	1	± 2.3 %	± 2.3 %	∞
<b>Test Sample Related</b>								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	$\sqrt{3}$	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	$\sqrt{3}$	1	1	± 0.0 %	± 0.0 %	∞
<b>Physical Parameters</b>								
Phantom Shell	± 7.6	Rectangular	$\sqrt{3}$	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	$\sqrt{3}$	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.7	Normal	1	0.78	0.71	± 2.9 %	± 2.6 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	$\sqrt{3}$	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.1	Normal	1	0.23	0.26	± 0.9 %	± 1.1 %	10
Temp. unc. - Conductivity	± 1.9	Rectangular	$\sqrt{3}$	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 2.0	Rectangular	$\sqrt{3}$	0.23	0.26	± 0.3 %	± 0.3 %	∞
<b>Combined Standard Uncertainty</b>						<b>± 11.9 %</b>	<b>± 11.7 %</b>	330
<b>Expanded Uncertainty (k=2)</b>						<b>± 23.8 %</b>	<b>± 23.4 %</b>	

The above measurement uncertainties are according to IEEE Std 1528

## 16. CONCLUSION

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### Measurement Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements are taken to simulate the RF effects exposure under the worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The tested device complies with the requirements in respect to all parameters subject to the test. The test results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are every 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 impossible biological effect 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 innumerable factors may interact to determine the specific biological outcome of an exposure to electromagnetic fields, any protection guide shall consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

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## APPENDIX A. – Probe Calibration Data

**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 DT&amp;C (Dymstec)

Certificate No: EX3-3916\_Apr19

## CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3916

Calibration procedure(s) QA CAL-01.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7  
Calibration procedure for dosimetric E-field probes

Calibration date: April 25, 2019

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

All calibrations have been conducted in the closed laboratory facility, environment temperature  $(22 \pm 3)^\circ\text{C}$  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	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-19 (No. 217-02894)	Apr-20
DAE4	SN: 660	19-Dec-18 (No. DAE4-660_Dec18)	Dec-19
Reference Probe ES3DV2	SN: 3013	31-Dec-18 (No. ES3-3013_Dec18)	Dec-19
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

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

Issued: April 27, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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

Accreditation No.: SCS 0108

#### Glossary:

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

#### Calibration is Performed According to the Following Standards:

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

#### Methods Applied and Interpretation of Parameters:

- $NORMx,y,z$ : Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  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  $f \leq 800$  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  $\pm 50$  MHz to  $\pm 100$  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).

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April 25, 2019

**DASY/EASY - Parameters of Probe: EX3DV4 - SN:3916****Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup>	0.56	0.48	0.52	$\pm 10.1 \%$
DCP (mV) <sup>B</sup>	101.7	96.9	104.5	

**Calibration Results for Modulation Response**

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Max dev.	Unc <sup>E</sup> (k=2)
0	CW	X	0.0	0.0	1.0	0.00	146.1	$\pm 3.8 \%$	$\pm 4.7 \%$
		Y	0.0	0.0	1.0		139.8		
		Y	0.0	0.0	1.0		143.5		

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%.

<sup>A</sup> The uncertainties of Norm X,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

<sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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**DASY/EASY - Parameters of Probe: EX3DV4 - SN:3916****Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle (°)	90.9
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

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April 25, 2019

**DASY/EASY - Parameters of Probe: EX3DV4 - SN:3916****Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k=2)
2450	39.2	1.80	7.66	7.66	7.66	0.39	0.85	± 12.0 %
2600	39.0	1.96	7.46	7.46	7.46	0.36	0.86	± 12.0 %
5200	36.0	4.66	5.14	5.14	5.14	0.40	1.80	± 13.1 %
5300	35.9	4.76	4.94	4.94	4.94	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.89	4.89	4.89	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.75	4.75	4.75	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.82	4.82	4.82	0.40	1.80	± 13.1 %

<sup>C</sup> 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. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

<sup>G</sup> 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.

EX3DV4– SN:3916

April 25, 2019

**DASY/EASY - Parameters of Probe: EX3DV4 - SN:3916****Calibration Parameter Determined in Body Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k=2)
2450	52.7	1.95	7.62	7.62	7.62	0.34	0.85	± 12.0 %
2600	52.5	2.16	7.42	7.42	7.42	0.22	1.03	± 12.0 %
5200	49.0	5.30	4.56	4.56	4.56	0.50	1.90	± 13.1 %
5300	48.9	5.42	4.37	4.37	4.37	0.50	1.90	± 13.1 %
5500	48.6	5.65	4.14	4.14	4.14	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.00	4.00	4.00	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.23	4.23	4.23	0.50	1.90	± 13.1 %

<sup>C</sup> 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. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

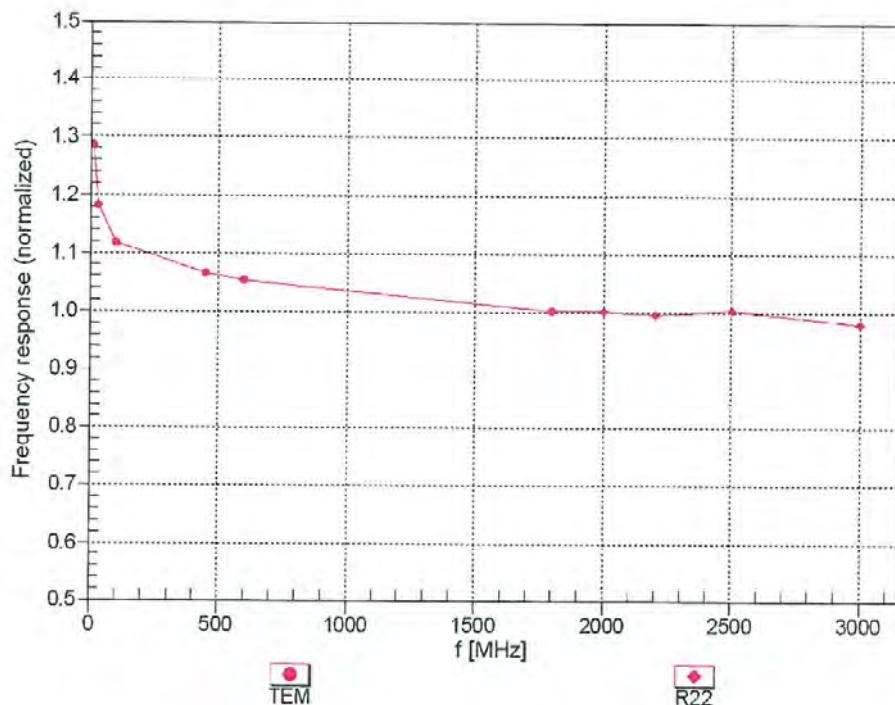
<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter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

EX3DV4- SN:3916

April 25, 2019

## Frequency Response of E-Field

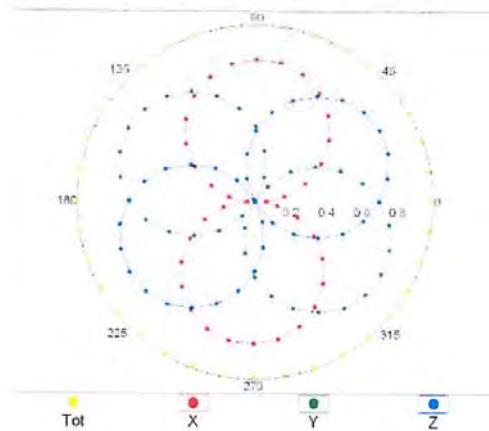
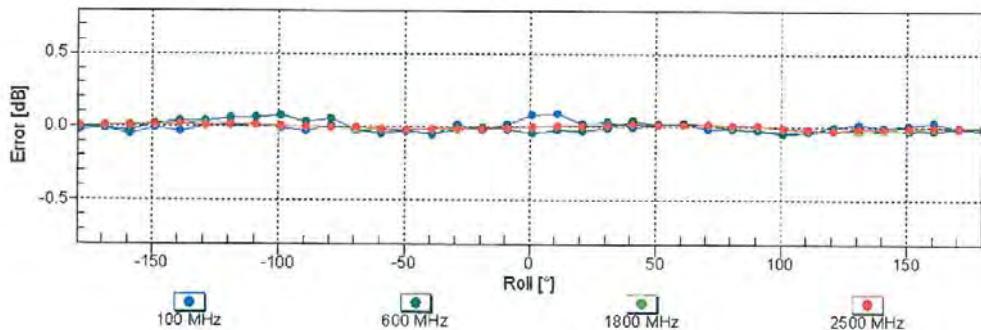
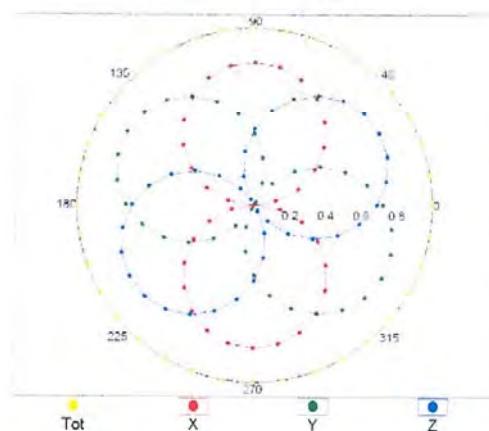
(TEM-Cell:ifi110 EXX, Waveguide: R22)

Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

EX3DV4– SN:3916

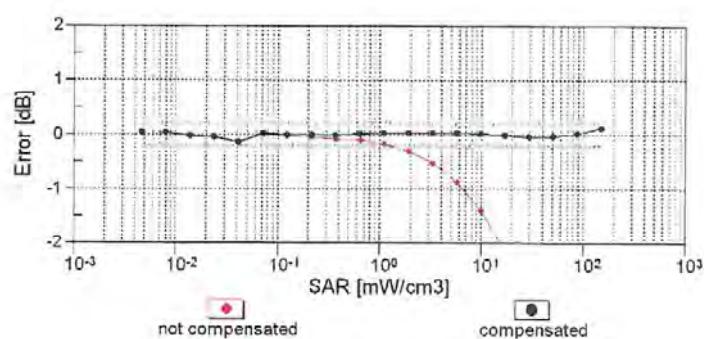
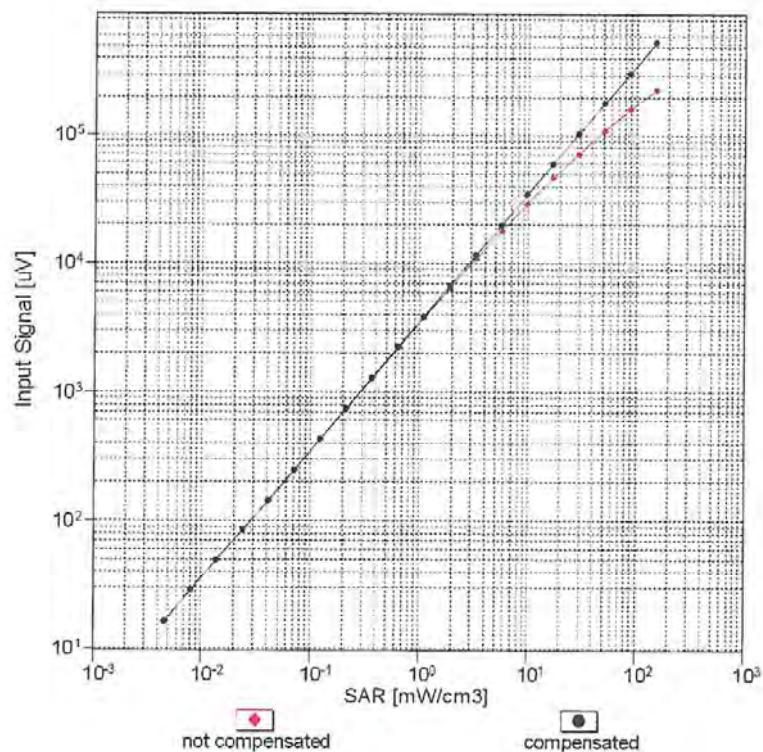
April 25, 2019

### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$

 $f=600 \text{ MHz, TEM}$  $f=1800 \text{ MHz, R22}$ Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

EX3DV4– SN:3916

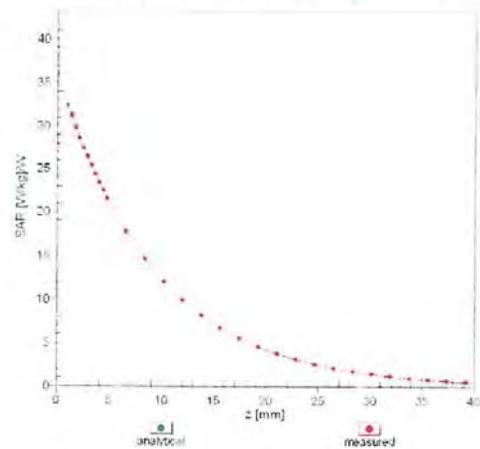
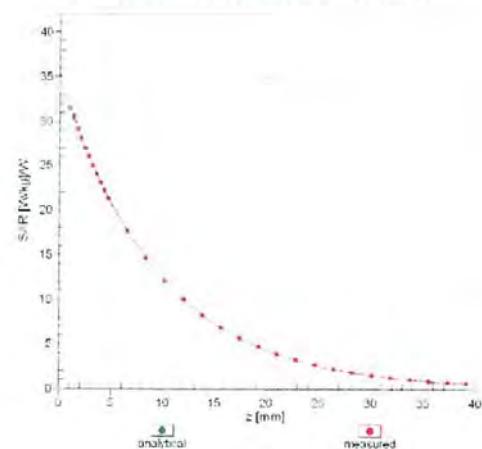
April 25, 2019

**Dynamic Range f(SAR<sub>head</sub>)**  
(TEM cell , f<sub>eval</sub>= 1900 MHz)**Uncertainty of Linearity Assessment: ± 0.6% (k=2)**

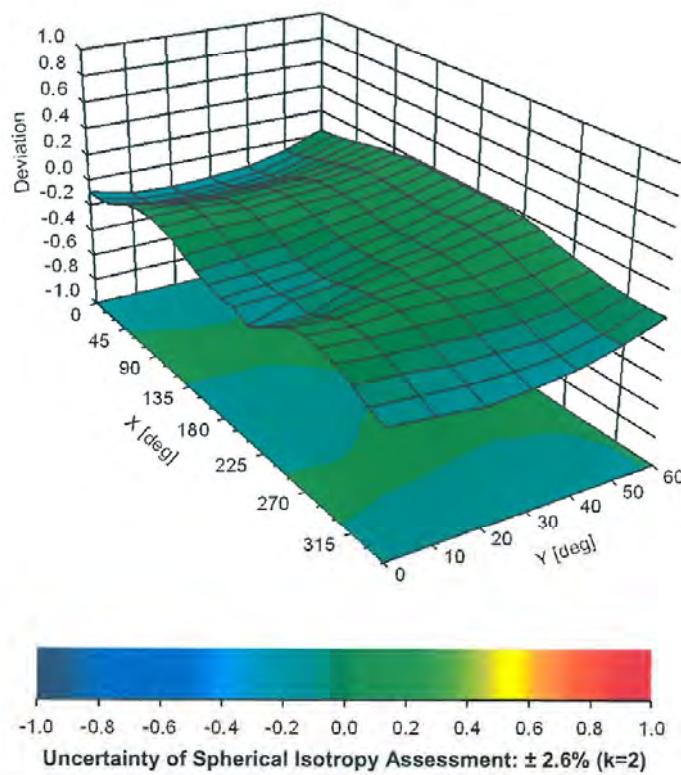
EX3DV4– SN:3916

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## Conversion Factor Assessment

 $f = 2450 \text{ MHz}, \text{WGLS R22 (H\_convF)}$  $f = 2450 \text{ MHz}, \text{WGLS R22 (M\_convF)}$ 

## Deviation from Isotropy in Liquid Error ( $\phi, \theta$ ), $f = 900 \text{ MHz}$



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



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
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The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**Client **DT&C (Dymstec)**Certificate No: **EX3-7337\_Nov18**

## CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:7337**Calibration procedure(s) **QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6**  
Calibration procedure for dosimetric E-field probesCalibration date: **November 22, 2018**

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

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

Calibration Equipment used (M&amp;TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-18 (No. 217-02682)	Apr-19
Reference Probe ES3DV2	SN: 3013	30-Dec-17 (No. ES3-3013_Dec17)	Dec-18
DAE4	SN: 660	21-Dec-17 (No. DAE4-660_Dec17)	Dec-18
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

Calibrated by:	Name Jeton Kastrati	Function Laboratory Technician	Signature
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 22, 2018

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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Accreditation No.: SCS 0108

#### Glossary:

TSL	tissue simulating liquid
NORM $x,y,z$	sensitivity in free space
ConvF	sensitivity in TSL / NORM $x,y,z$
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization $\phi$	$\phi$ rotation around probe axis
Polarization $\vartheta$	$\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ 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:

- 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
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Methods Applied and Interpretation of Parameters:

- $NORM_{x,y,z}$ : Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide).  $NORM_{x,y,z}$  are only intermediate values, i.e., the uncertainties of  $NORM_{x,y,z}$  does not affect the  $E^2$ -field uncertainty inside TSL (see below ConvF).
- $NORM(f)x,y,z = NORM_{x,y,z} * frequency\_response$  (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  $f \leq 800$  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  $NORM_{x,y,z} * ConvF$  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  $\pm 50$  MHz to  $\pm 100$  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  $NORM_x$  (no uncertainty required).

EX3DV4 – SN:7337

November 22, 2018

# Probe EX3DV4

## SN:7337

Manufactured: July 23, 2014  
Calibrated: November 22, 2018

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

EX3DV4– SN:7337

November 22, 2018

**DASY/EASY - Parameters of Probe: EX3DV4 - SN:7337****Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup>	0.53	0.59	0.56	$\pm 10.1 \%$
DCP (mV) <sup>B</sup>	98.7	97.6	100.6	

**Modulation Calibration Parameters**

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc <sup>E</sup> (k=2)
0	CW	X	0.0	0.0	1.0	0.00	148.8	$\pm 3.5 \%$
		Y	0.0	0.0	1.0		159.0	
		Z	0.0	0.0	1.0		150.6	

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%.

<sup>A</sup> The uncertainties of Norm X,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

<sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

EX3DV4– SN:7337

November 22, 2018

**DASY/EASY - Parameters of Probe: EX3DV4 - SN:7337****Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k=2)
835	41.5	0.90	10.16	10.16	10.16	0.60	0.80	± 12.0 %
900	41.5	0.97	10.04	10.04	10.04	0.38	1.02	± 12.0 %
1750	40.1	1.37	8.96	8.96	8.96	0.37	0.87	± 12.0 %
1900	40.0	1.40	8.49	8.49	8.49	0.38	0.85	± 12.0 %
2450	39.2	1.80	7.66	7.66	7.66	0.42	0.86	± 12.0 %
2600	39.0	1.96	7.43	7.43	7.43	0.36	0.96	± 12.0 %
5200	36.0	4.66	5.67	5.67	5.67	0.40	1.80	± 13.1 %
5300	35.9	4.76	5.46	5.46	5.46	0.40	1.80	± 13.1 %
5500	35.6	4.96	5.05	5.05	5.05	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.86	4.86	4.86	0.40	1.80	± 13.1 %
5800	35.3	5.27	5.06	5.06	5.06	0.40	1.80	± 13.1 %

<sup>C</sup> 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.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

<sup>G</sup> 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.

EX3DV4– SN:7337

November 22, 2018

**DASY/EASY - Parameters of Probe: EX3DV4 - SN:7337****Calibration Parameter Determined in Body Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k=2)
835	55.2	0.97	10.23	10.23	10.23	0.51	0.80	± 12.0 %
900	55.0	1.05	10.13	10.13	10.13	0.43	0.80	± 12.0 %
1750	53.4	1.49	8.42	8.42	8.42	0.41	0.83	± 12.0 %
1900	53.3	1.52	8.03	8.03	8.03	0.43	0.86	± 12.0 %
2450	52.7	1.95	7.74	7.74	7.74	0.39	0.95	± 12.0 %
2600	52.5	2.16	7.59	7.59	7.59	0.23	1.05	± 12.0 %
5200	49.0	5.30	5.15	5.15	5.15	0.50	1.90	± 13.1 %
5300	48.9	5.42	4.95	4.95	4.95	0.50	1.90	± 13.1 %
5500	48.6	5.65	4.45	4.45	4.45	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.28	4.28	4.28	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.55	4.55	4.55	0.50	1.90	± 13.1 %

<sup>C</sup> 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.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

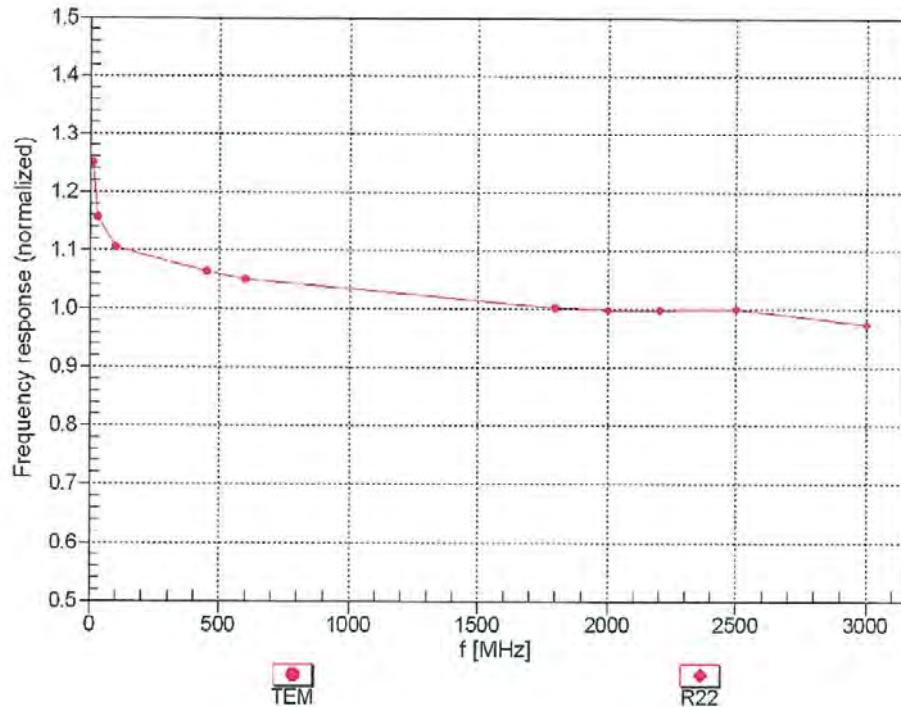
<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter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

EX3DV4~ SN:7337

November 22, 2018

## Frequency Response of E-Field

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

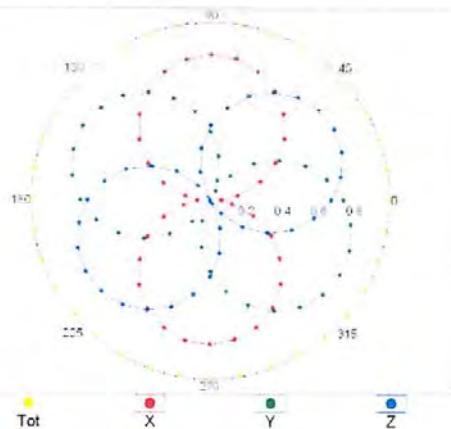
Uncertainty of Frequency Response of E-field:  $\pm 6.3\% (k=2)$

EX3DV4– SN:7337

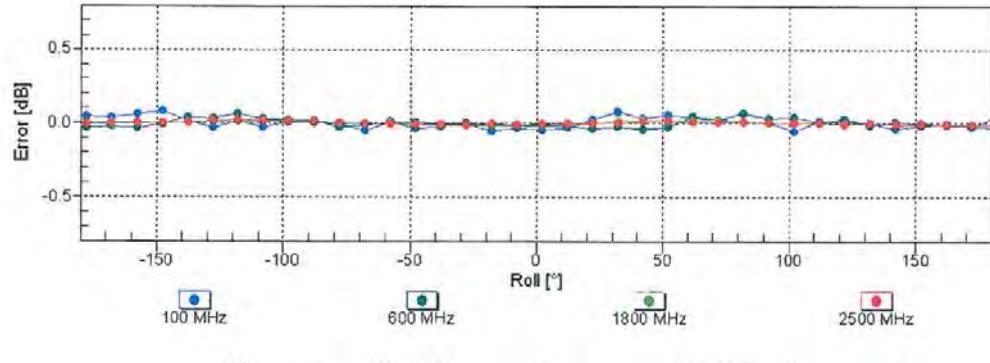
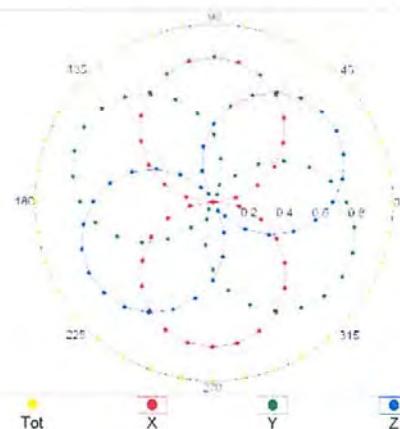
November 22, 2018

**Receiving Pattern ( $\phi$ ),  $\theta = 0^\circ$** 

f=600 MHz, TEM



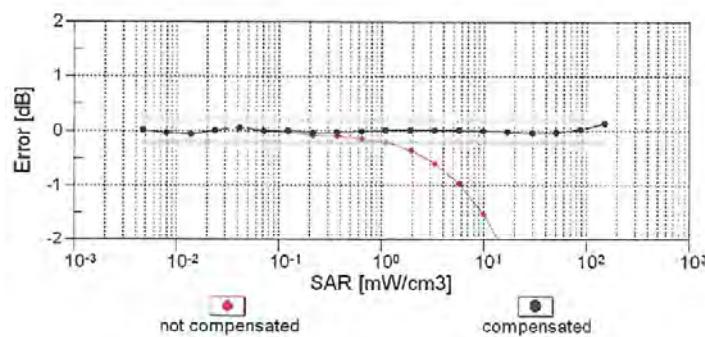
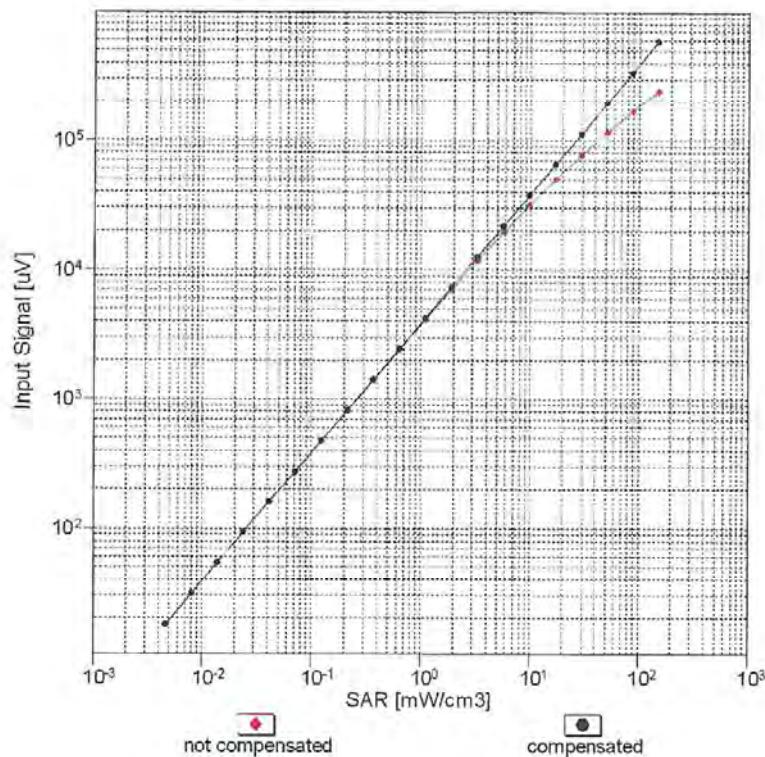
f=1800 MHz, R22

**Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )**

EX3DV4– SN:7337

November 22, 2018

**Dynamic Range f(SAR<sub>head</sub>)**  
(TEM cell , f<sub>eval</sub>= 1900 MHz)

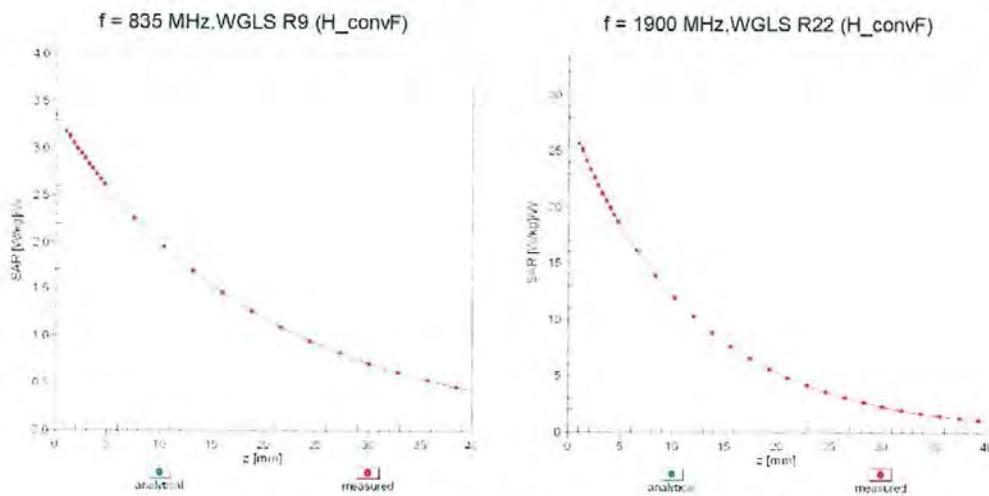


Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

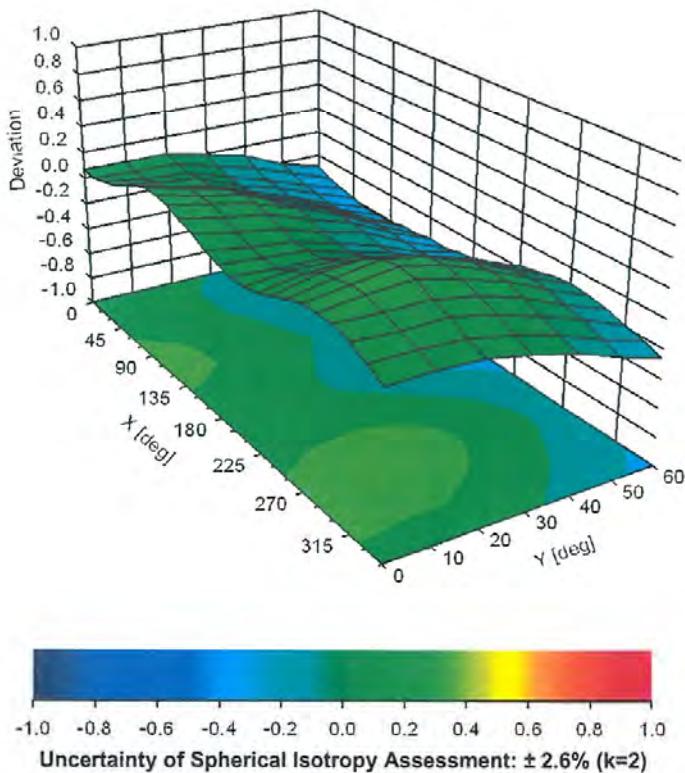
EX3DV4- SN:7337

November 22, 2018

## Conversion Factor Assessment



## Deviation from Isotropy in Liquid Error ( $\phi, \theta$ ), f = 900 MHz



EX3DV4—SN:7337

November 22, 2018

**DASY/EASY - Parameters of Probe: EX3DV4 - SN:7337****Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle (°)	62.1
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