TEST REPORT

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1. Report No : DRRFCC1902-0013(1)
2. Customer
   - Name : BLUEBIRD INC.
   - Address : (Dogok-dong, SEI Tower 13,14) 39, Eonjuro30-gil, Gangnam-gu, Seoul South Korea
3. Use of Report : FCC Original Grant
4. Product Name / Model Name : Enterprise Full Touch Handheld Computer / EF501R
   FCC ID : SS4EF501X
5. Test Method Used : IEEE 1528-2013, FCC SAR KDB Publications (Details in test report)
   Test Specification : CFR §2.1093
6. Date of Test : 2018.12.06 ~ 2019.01.28
7. Testing Environment : Refer to appended test report.
8. Test Result : Refer to attached test report.

Affirmation	Tested by Name : HoSik Sim (Signature)	Reviewed by Name : HakMin Kim (Signature)

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Test Report Version

Test Report No.	Date	Description
DRRFCC1902-0013	Feb. 12, 2019	Initial issue
DRRFCC1902-0013(1)	Feb. 21, 2019	Revise of SAR Summary table.

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1. DESCRIPTION OF DEVICE

1.1 General Information

EUT type	Enterprise Full Touch Handheld Computer				
FCC ID	SS4EF501X				
Equipment model name	EF501R				
Equipment add model name	N/A				
Equipment serial no.	Identical prototype				
SW version	R1.12				
Mode(s) of Operation	WCDMA 850, WCDMA 1700, WCDMA 1900, LTE Band 71, 12, 13, 14, 5, 66, 4, 2, 2.4 G W-LAN (802.11b/g/n-HT20/n-HT40), 5 G W-LAN (802.11a/n-HT20/n-HT40/ac-VHT20/ac-VHT40/ac-VHT80), Bluetooth				
	Band	**Mode**	**Operating Modes**	**Bandwidth**	**Frequency**
TX Frequency Range	WCDMA 850	WCDMA	Voice/Data	-	826.4 ~ 846.6 MHz
	WCDMA 1700	WCDMA	Voice/Data	-	1712.4 ~ 1752.6 MHz
	WCDMA 1900	WCDMA	Voice/Data	-	1852.4 ~ 1907.6 MHz
	LTE Band 71	LTE	Voice/Data	5/10/15/20MHz	665.5 ~ 695.5 MHz
	LTE Band 12	LTE	Voice/Data	1.4/3/5/10MHz	699.7 ~ 715.3 MHz
	LTE Band 13	LTE	Voice/Data	5/10MHz	779.5 ~ 784.5 MHz
	LTE Band 14	LTE	Voice/Data	5/10MHz	790.5 ~ 795.5 MHz
	LTE Band 5	LTE	Voice/Data	1.4/3/5/10MHz	824.7 ~ 848.3 MHz
	LTE Band 66	LTE	Voice/Data	1.4/3/5/10/15/20MHz	1710.7 ~ 1779.3 MHz
	LTE Band 4	LTE	Voice/Data	1.4/3/5/10/15/20MHz	1710.7 ~ 1754.3 MHz
	LTE Band 2	LTE	Voice/Data	1.4/3/5/10/15/20MHz	1850.7 ~ 1909.3 MHz
	2.4 GHz W-LAN	802.11b/g/n	Voice/Data	HT20/ HT40	2412 ~ 2472 MHz
	5.2 GHz W-LAN	802.11a/n/ac	Voice/Data	HT20/VHT20	5180 ~ 5240 MHz
		802.11n/ac	Voice/Data	HT40/VHT40	5190 ~ 5230 MHz
		802.11ac	Voice/Data	VHT80	5210 MHz
	5.3 GHz W-LAN	802.11a/n/ac	Voice/Data	HT20/VHT20	5260 ~ 5320 MHz
		802.11n/ac	Voice/Data	HT40/VHT40	5270 ~ 5310 MHz
		802.11ac	Voice/Data	VHT80	5290 MHz
	5.6 GHz W-LAN	802.11a/n/ac	Voice/Data	HT20/VHT20	5500 ~ 5700 MHz
		802.11n/ac	Voice/Data	HT40/VHT40	5510 ~ 5670 MHz
		802.11ac	Voice/Data	VHT80	5530 MHz
	5.8 GHz W-LAN	802.11a/n/ac	Voice/Data	HT20/VHT20	5745 ~ 5825 MHz
		802.11n/ac	Voice/Data	HT40/VHT40	5755 ~ 5795 MHz
		802.11ac	Voice/Data	VHT80	5775 MHz
	Bluetooth	-	Data	-	2402 ~ 2480 MHz
RX Frequency Range	WCDMA 850	WCDMA	Voice/Data	-	871.4 ~ 891.6 MHz
	WCDMA 1700	WCDMA	Voice/Data	-	2112.4 ~ 2152.6 MHz
	WCDMA 1900	WCDMA	Voice/Data	-	1932.4 ~ 1987.6 MHz
	LTE Band 71	LTE	Voice/Data	5/10/15/20MHz	619.5 ~ 649.5 MHz
	LTE Band 12	LTE	Voice/Data	1.4/3/5/10MHz	729.7 ~ 745.3 MHz
	LTE Band 13	LTE	Voice/Data	5/10MHz	748.5 ~ 753.5 MHz
	LTE Band 14	LTE	Voice/Data	5/10MHz	760.5 ~ 765.5 MHz
	LTE Band 5	LTE	Voice/Data	1.4/3/5/10MHz	869.7 ~ 893.3 MHz
	LTE Band 66	LTE	Voice/Data	1.4/3/5/10/15/20MHz	2110.7 ~ 2179.3 MHz
	LTE Band 4	LTE	Voice/Data	1.4/3/5/10/15/20MHz	2110.7 ~ 2154.3 MHz
	LTE Band 2	LTE	Voice/Data	1.4/3/5/10/15/20MHz	1930.7 ~ 1989.3 MHz
	2.4 GHz W-LAN	802.11b/g/n	Voice/Data	HT20/ HT40	2412 ~ 2472 MHz
	5.2 GHz W-LAN	802.11a/n/ac	Voice/Data	HT20/VHT20	5180 ~ 5240 MHz
		802.11n/ac	Voice/Data	HT40/VHT40	5190 ~ 5230 MHz
		802.11ac	Voice/Data	VHT80	5210 MHz
	5.3 GHz W-LAN	802.11a/n/ac	Voice/Data	HT20/VHT200	5260 ~ 5320 MHz
		802.11n/ac	Voice/Data	HT40/VHT40	5270 ~ 5310 MHz
		802.11ac	Voice/Data	VHT80	5290 MHz
	5.6 GHz W-LAN	802.11a/n/ac	Voice/Data	HT20/VHT20	5500 ~ 5700 MHz
		802.11n/ac	Voice/Data	HT40/VHT40	5510 ~ 5670 MHz
		802.11ac	Voice/Data	VHT80	5530 MHz
	5.8 GHz W-LAN	802.11a/n/ac	Voice/Data	HT20/VHT20	5745 ~ 5825 MHz
		802.11n/ac	Voice/Data	HT40/VHT40	5755 ~ 5795 MHz
		802.11ac	Voice/Data	VHT80	5775 MHz
	Bluetooth	-	Data	-	2402 ~ 2480 MHz

SAR Summary Table

Equipment Class	Band	Reported SAR			
		1g SAR (W/kg)			10g SAR (W/kg)
		Head	Body-Worn	Hotspot	Phablet
PCE	WCDMA 850	0.26	0.23	0.23	-
PCE	WCDMA 1700	0.15	0.49	0.63	-
PCE	WCDMA 1900	0.24	0.22	0.22	-
PCE	LTE Band 71	0.12	0.18	0.18	-
PCE	LTE Band 12	0.16	0.23	0.23	-
PCE	LTE Band 13	0.28	0.44	0.44	-
PCE	LTE Band 14	0.34	0.44	0.44	-
PCE	LTE Band 5	0.25	0.34	0.34	-
PCE	LTE Band 66	0.15	0.30	0.47	-
PCE	LTE Band 4	-	-	-	-
PCE	LTE Band 2	0.23	0.20	0.25	-
DTS	2.4 GHz W-LAN	0.22	< 0.1	< 0.1	-
U-NII-1	5.2 GHz W-LAN	-	-	-	-
U-NII-2A	5.3 GHz W-LAN	0.30	0.13	-	0.21
U-NII-2C	5.6 GHz W-LAN	0.32	0.13	-	0.33
U-NII-3	5.8 GHz W-LAN	0.34	< 0.1	-	0.17
Simultaneous SAR per KDB 690783 D01v01r03		0.93	0.78	0.92	-

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	2018.12.06 ~ 2019.01.28
Antenna Type	Internal Antenna
Functions	● The equipment add model(EF501R) was full tested because of enclosure(rubber) change. (Original Model(EF501) Report No:. DRRFCC1902-0012) ● No simultaneous transmission between BT & 2.4GHz WLAN ● Simultaneous transmission between [WCDMA voice & WLAN], [WCDMA & WLAN], [LTE & WLAN]. ● VoIP is supported. ● W-LAN 2.4GHz is supported Hotspot. ● W-LAN 5 GHz is not supported Hotspot.

1.2 Power Reduction for SAR

There is no power reduction used for any band/mode implemented in this device for SAR purposes.

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 SS4EF501X_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
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 71	X	O	O	O	O	O
LTE Band 12	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 5	X	O	O	O	O	O
LTE Band 66	X	O	O	O	O	O
LTE Band 4	X	O	O	O	O	O
LTE Band 2	X	O	O	O	O	O
2.4G W-LAN	X	X	O	O	O	X
5G W-LAN	X	X	O	O	X	X
Bluetooth	X	X	O	O	O	X

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: W-LAN 5 GHz is not supported Hotspot.

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 SS4EF501X_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-1, U-NII-2A, U-NII-2C and U-NII-3 WIFI, only 2.4GHz 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:

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

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, body-worn and hotspot **Bluetooth SAR were not required; [(14/10)*√2.441] = 2.2 (< 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:

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

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, phablet **Bluetooth SAR was not required; [(14/5)*√2.441] = 4.4 (< 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-1, U-NII-2A, U-NII-2C and U-NII-3, 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)

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 lager 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)
- April 2015 TCB Workshop Notes (Simultaneous transmission summation clarified)
- October 2016 TCB Workshop Notes (Bluetooth Duty Factor)

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	**SS4EF501X**				
Form Factor	Enterprise Full Touch Handheld Computer				
Frequency Range of each LTE transmission Band	LTE Band 71 (665.5 ~ 695.5 MHz) LTE Band 12 (699.7 ~ 715.3 MHz) LTE Band 13 (779.5 ~ 784.5 MHz) LTE Band 14 (790.5 ~ 795.5 MHz) LTE Band 5 (Cell) (824.7 ~ 848.3 MHz) LTE Band 66 (AWS) (1710.7 ~ 1779.3 MHz) LTE Band 4 (AWS) (1710.7 ~ 1754.3 MHz) LTE Band 2 (PCS) (1850.7 ~ 1909.3 MHz)				
Channel Bandwidths	LTE Band 71: 5 MHz, 10 MHz, 15 MHz, 20 MHz LTE Band 12 : 1.4 MHz, 3 MHz, 5 MHz, 10 MHz LTE Band 13 : 5 MHz, 10 MHz LTE Band 14 : 5 MHz, 10 MHz LTE Band 5 : 1.4 MHz, 3 MHz, 5 MHz, 10 MHz LTE Band 66 : 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz LTE Band 4 : 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 MH				
Channel Number and Frequencies(MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 71: 5 MHz	665.5 (133147)	N/A	680.5 (133297)	N/A	695.5 (133447)
LTE Band 71: 10 MHz	668.0 (133172)	N/A	680.5 (133297)	N/A	693.0 (133422)
LTE Band 71: 15 MHz	670.5 (133197)	N/A	680.5 (133297)Npte1	N/A	690.5 (133397)
LTE Band 71: 20 MHz	673.0 (133222)	N/A	**680.5 (133297)Note1**	N/A	688.0 (133372)
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)Note2**	N/A	711.0 (23130)
LTE Band 13: 5 MHz	779.5(23205)	N/A	782.0(23230)Note3	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) Note4	N/A	795.5(23355)
LTE Band 14: 10 MHz	N/A	N/A	**793.0(23330)**	N/A	N/A
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)Note5**	N/A	844.0 (20600)
LTE Band 66 (AWS): 1.4 MHz	1710.7 (131979)	N/A	1745.0 (132322)	N/A	1779.3 (132665)
LTE Band 66 (AWS): 3 MHz	1711.5 (131987)	N/A	1745.0 (132322)	N/A	1778.5 (132657)
LTE Band 66 (AWS): 5 MHz	1712.5 (131997)	N/A	1745.0 (132322)	N/A	1777.5 (132647)
LTE Band 66 (AWS): 10 MHz	1715.0 (132022)	N/A	1745.0 (132322)	N/A	1775.0 (132622)
LTE Band 66 (AWS): 15 MHz	1717.5 (132047)	N/A	1745.0 (132322)	N/A	1772.5 (132597)
LTE Band 66 (AWS): 20 MHz	**1720.0 (132072)**	N/A	**1745.0 (132322)**	N/A	**1770.0 (132572)**
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) Note6	N/A	1745.0 (20300)
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)**
UE Category	LTE Rel.11, UE Cat 4				
Modulations Supported in UL	QPSK, 16QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	Yes				
A-MPR (Additional MPR) disabled for SAR Testing?	Yes				
LTE Carrier Aggregation Possible Combinations	LTE Carrier Aggregation is not support.				
LTE Additional Information	This device does not support full CA features on 3GPP Release 11. All uplink communications are identical to the Release 8 Specifications. The following LTE Release 11 Features are not supported: Relay, HetNet, Enhanced MIMO, eICIC, WIFI Offloading, MDH, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

Note(s)
1. LTE B71 can not contain three non-overlapping channels of 15 MHz & 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.
2. 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
3. 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
4. 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
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. INTROCUCTION

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 (ρ) 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:

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

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

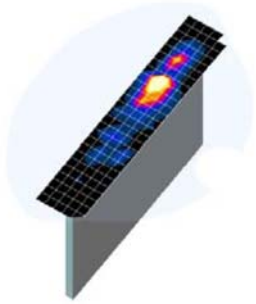

Figure 4.1
Sample SAR Area Scan

3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4.1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):

   a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4.1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).

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

   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 mm ± 1 mm	½·δ·ln(2) mm ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			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 ≤ 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: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ 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 ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 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.

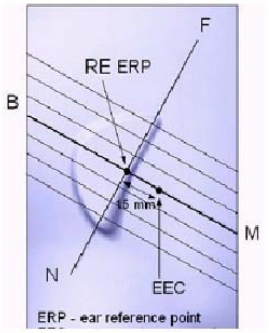

Figure 5.1 Close-up side view of ERP

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

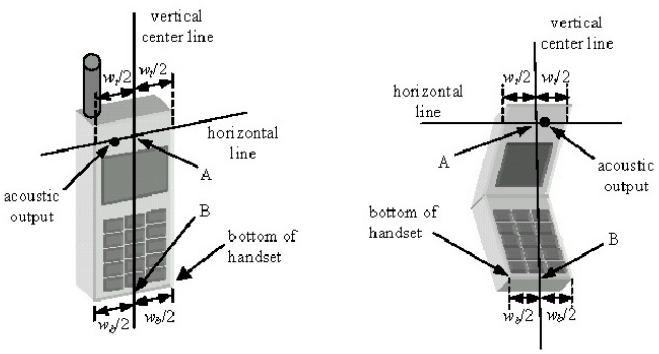

Figure 5.3 Handset Vertical Center & Horizontal Line Reference Points

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 ε = 3 and loss tangent δ = 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 hen rotated around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the 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).

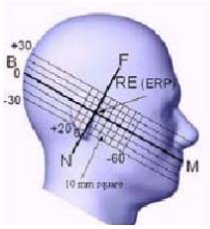

Figure 6.2 Side view w/relevant markings

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 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.

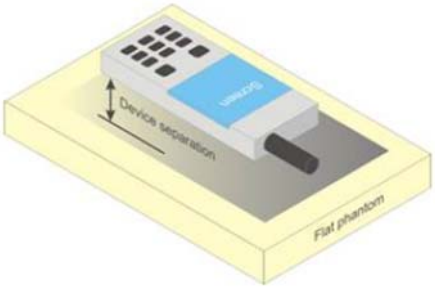

Figure 6.4 Sample Body-Worn Diagram

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 x W ≥ 9 cm x 5 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 mm or an overall diagonal dimension > 160 mm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the phablets procedures outlined in KDB Publication 648474 D04v01r03 should be applied to evaluate SAR compliance. A device marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. In addition to the normally required head and body-worn accessory SAR test procedures required for handsets, the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna ≤ 25mm from that surface or edge, in direct contact with the phantom, for 10g SAR. The UMPC mini-tablet 1g SAR at 5 mm is not required. When hotspot mode applies, 10g SAR is required only for the surfaces and edges with hotspot mode 1g SAR > 1.2 W/kg.

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 7.1.SAR Human Exposure Specified in ANSI/IEEE C95.1-1992

	HUMAN EXPOSURE LIMITS	
	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 in12.2 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	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	CM (dB)(2)
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15(3)	15/15(3)	64	12/15(3)	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: Δ_{ACK}, Δ_{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 β_c/β_d =12/15, β_{hs}/β_c=24/15.
Note 3: For subtest 2 the β_c/β_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 β_c = 11/15 and β_d = 15/15.

Figure 8.1 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	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}(1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM(2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	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	β_{ed1}: 47/15 β_{ed2}: 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	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c$ = 30/15 ⇔ β_{hs}= 30/15 *β_c.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_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 β_c/β_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 β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_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 β_c = 14/15 and β_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: β_{ed} cannot be set directly; it is set by Absolute Grant Value.

Figure 8.2 Table 2

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 ≤ 0.8 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 W/kg, SAR is required for all RB offset configurations for that channel.
b. Per Section 5.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 5.2.1.
c. Per Section 5.2.3, QPSK SAR is not required for the 100% allocation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 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 W/kg.

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 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 ≤ 1.2 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 ≤ 1.2 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 ≤ 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 ≤ 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 ≤ 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 80211n or 802.11g then 802.11n is used for SAR measurement. When the maximum output power ware 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 ≤ 0.8 W/kg, no additional measurements on other test channels are required.
Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2 W/kg or all channels are measured.

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 ≤ 1.2 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 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	23.0	21.0	22.0	-
			Nominal	22.5	20.5	21.5	
5	HSDPA	Subtest 1	Maximum	23.0	21.0	22.0	0
			Nominal	22.5	20.5	21.5	
5		Subtest 2	Maximum	23.0	21.0	22.0	0
			Nominal	22.5	20.5	21.5	
5		Subtest 3	Maximum	22.5	20.5	21.5	0.5
			Nominal	22.0	20.0	21.0	
5		Subtest 4	Maximum	22.5	20.5	21.5	0.5
			Nominal	22.0	20.0	21.0	
6	HSUPA	Subtest 1	Maximum	23.0	21.0	22.0	0
			Nominal	22.5	20.5	21.5	
6		Subtest 2	Maximum	21.0	19.0	20.0	2
			Nominal	20.5	18.5	19.5	
6		Subtest 3	Maximum	22.0	20.0	21.0	1
			Nominal	21.5	19.5	20.5	
6		Subtest 4	Maximum	21.0	19.0	20.0	2
			Nominal	20.5	18.5	19.5	
6		Subtest 5	Maximum	23.0	21.0	22.0	0
			Nominal	22.5	20.5	21.5	

Table 9.1.1 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	22.58	22.49	22.54	20.79	20.83	20.87	21.24	21.40	21.40	-
99		12.2 kbps AMR	22.54	22.47	22.52	20.76	20.81	20.82	21.22	21.36	21.35	-
5	HSDPA	Subtest 1	21.53	21.49	21.55	19.80	19.71	19.69	20.26	20.39	20.33	0
5		Subtest 2	21.51	21.47	21.51	19.76	19.99	19.89	20.23	20.41	20.38	0
5		Subtest 3	21.03	20.91	21.02	19.50	19.51	19.44	19.74	19.84	19.79	0.5
5		Subtest 4	21.00	20.99	21.01	19.49	19.52	19.43	19.73	19.84	19.84	0.5
6	HSUPA	Subtest 1	21.26	21.24	21.58	19.96	19.65	19.68	20.02	19.99	20.31	0
6		Subtest 2	20.30	20.46	20.33	18.77	18.87	18.67	19.21	19.31	19.17	2
6		Subtest 3	20.17	20.29	20.41	18.95	18.88	18.81	19.19	19.02	19.37	1
6		Subtest 4	20.93	20.82	20.60	18.77	18.77	18.75	19.42	19.58	19.43	2
6		Subtest 5	21.54	21.48	21.52	20.01	19.90	19.82	20.29	20.41	20.38	0

Table 9.1.2 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 and HSUPA transmitter's power will not exceed the R99 maximum transmit power in devices based on Qualcomm's HSPA chipset solutions.

Figure 9.1 Power Measurement Setup

9.2 LTE Nominal and Maximum Output Power Spec and Conducted Powers

Band & Mode		Modulated Average[dBm]
LTE Band 71	Maximum	23.5
	Nominal	23.0

Table 9.2.1.1 Nominal and Maximum Output Power Spec

1) LTE Band 71

LTE Band 71 Conducted Power– 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 133297 (680.5 MHz) Conducted Power (dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
QPSK	1	0	23.27	0	0
	1	**50**	**23.40**		
	1	99	23.15		
	50	0	21.98	0-1	1
	50	**25**	**22.16**		
	50	50	22.02		
	100	0	22.09	0-1	1
16QAM	1	0	22.09	0-1	1
	1	50	22.24		
	1	99	22.00		
	50	0	21.09	0-2	2
	50	25	21.18		
	50	50	21.03		
	100	0	21.20	0-2	2

Table 9.2.1.2 LTE Conducted Power

Note : LTE B71 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.

LTE Band 71 Conducted Power– 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 133297 (680.5 MHz) Conducted Power (dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
QPSK	1	0	23.15	0	0
	1	36	23.18		
	1	74	23.16		
	36	0	22.10	0-1	1
	36	18	22.13		
	36	37	22.16		
	75	0	22.15	0-1	1
16QAM	1	0	22.11	0-1	1
	1	36	22.00		
	1	74	22.03		
	36	0	21.24	0-2	2
	36	18	21.09		
	36	37	21.23		
	75	0	21.22	0-2	2

Table 9.2.1.3 LTE Conducted Power

Note : LTE B71 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.

LTE Band 71 Conducted Power– 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 133172 (668.0 MHz)	Mid Channel 133297 (680.5 MHz)	High Channel 133422 (693.0 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	23.17	23.26	23.03	0	0
	1	25	23.36	23.30	23.15		
	1	49	23.11	23.08	23.26		
	25	0	22.15	22.10	22.12	0-1	1
	25	12	22.11	22.07	22.10		
	25	25	22.07	22.06	22.20		
	50	0	22.11	22.08	22.05	0-1	1
16QAM	1	0	21.99	22.10	21.84	0-1	1
	1	25	22.20	22.22	22.17		
	1	49	21.96	22.25	22.13		
	25	0	21.34	21.27	21.18	0-2	2
	25	12	21.30	21.08	21.13		
	25	25	21.17	21.18	21.35		
	50	0	21.22	21.20	21.02	0-2	2

Table 9.2.1.4 LTE Conducted Power

LTE Band 71 Conducted Power– 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 133147 (665.5 MHz)	Mid Channel 133297 (680.5 MHz)	High Channel 133427 (695.5 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	23.25	23.19	23.26	0	0
	1	12	23.27	23.10	23.19		
	1	24	23.12	23.15	23.39		
	12	0	22.15	22.16	22.17	0	0
	12	6	22.22	22.15	22.18		
	12	13	22.19	22.17	22.22		
	25	0	22.11	22.17	22.19	0-1	1
16QAM	1	0	22.08	22.00	22.08	0-1	1
	1	12	22.09	21.97	22.00		
	1	24	22.00	21.98	22.20		
	12	0	21.03	21.09	21.06	0-1	1
	12	6	21.17	21.18	21.26		
	12	13	21.14	21.10	21.27		
	15	0	21.19	21.18	21.26	0-2	2

Table 9.2.1.5 LTE Conducted Power

Band & Mode		Modulated Average[dBm]
LTE Band 12	Maximum	23.5
	Nominal	23.0

Table 9.2.2.1 Nominal and Maximum Output Power Spec

2) LTE Band 12

LTE Band 12 Conducted Power– 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23095 (707.5 MHz) Conducted Power (dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
QPSK	1	0	23.06	0	0
	1	**25**	**23.38**		
	1	49	23.35		
	25	0	22.20	0-1	1
	25	**12**	**22.24**		
	25	25	22.22		
	50	0	22.20	0-1	1
16QAM	1	0	22.02	0-1	1
	1	25	22.36		
	1	49	22.32		
	25	0	21.09	0-2	2
	25	12	21.19		
	25	25	21.16		
	50	0	21.08	0-2	2

Table 9.2.2.2 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 23035 (701.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23155 (713.5 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	23.02	23.04	23.07	0	0
	1	12	23.21	23.16	23.07		
	1	24	23.12	22.99	23.27		
	12	0	22.15	22.05	22.15	0-1	1
	12	6	22.20	22.11	22.15		
	12	13	22.15	22.04	22.06		
	25	0	22.15	22.00	22.15	0-1	1
16QAM	1	0	21.84	21.88	21.88	0-1	1
	1	12	22.02	21.97	21.89		
	1	24	21.94	21.84	22.09		
	12	0	21.05	21.04	21.04	0-2	2
	12	6	21.08	21.01	21.10		
	12	13	21.13	21.02	20.96		
	25	0	21.12	21.17	21.28	0-2	2

Table 9.2.2.3 LTE Conducted Power

LTE Band 12 Conducted Power– 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23025 (700.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23165 (714.5 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	23.01	23.08	23.09	0	0
	1	7	23.31	23.10	23.00		
	1	14	23.28	23.00	23.21		
	8	0	22.10	22.11	22.11	0-1	1
	8	4	22.19	22.08	22.17		
	8	7	22.17	22.10	22.14		
	15	0	22.09	22.01	22.12	0-1	1
16QAM	1	0	21.85	21.89	22.00	0-1	1
	1	7	22.12	21.91	21.87		
	1	14	22.09	22.10	22.15		
	8	0	21.26	21.12	21.19	0-2	2
	8	4	21.33	21.26	21.25		
	8	7	21.32	21.28	21.32		
	15	0	21.20	20.94	21.26	0-2	2

Table 9.2.2.4 LTE Conducted Power

LTE Band 12 Conducted Power– 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23017 (699.7 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23173 (715.3 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	22.88	23.11	23.24	0	0
	1	2	23.21	23.36	23.22		
	1	5	23.20	23.23	23.27		
	3	0	22.99	23.14	23.07	0	0
	3	2	23.14	23.23	23.12		
	3	3	23.22	23.11	23.16		
	6	0	22.27	22.10	22.08	0-1	1
16QAM	1	0	21.81	21.96	22.14	0-1	1
	1	2	22.02	22.18	22.37		
	1	5	22.03	22.05	22.34		
	3	0	22.06	22.03	22.10	0-1	1
	3	2	22.20	22.13	22.29		
	3	3	22.14	22.02	22.28		
	6	0	21.09	20.96	21.15	0-2	2

Table 9.2.2.5 LTE Conducted Power

Band & Mode		Modulated Average[dBm]
LTE Band 13	Maximum	23.5
	Nominal	23.0

Table 9.2.3.1 Nominal and Maximum Output Power Spec

3) LTE Band 13

LTE Band 13 Conducted Power– 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power (dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
QPSK	1	0	23.13	0	0
	1	**25**	**23.30**		
	1	49	23.20		
	25	0	22.16	0-1	1
	25	**12**	**22.28**		
	25	25	22.25		
	50	0	22.23	0-1	1
16QAM	1	0	21.97	0-1	1
	1	25	22.24		
	1	49	22.04		
	25	0	21.11	0-2	2
	25	12	21.26		
	25	25	21.24		
	50	0	21.23	0-2	2

Table 9.2.3.2 LTE Conducted Power

Note : LTE B13 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 13 Conducted Power– 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power (dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
QPSK	1	0	23.09	0	0
	1	12	23.18		
	1	24	23.16		
	12	0	22.11	0-1	1
	12	6	22.21		
	12	13	22.23		
	25	0	22.18	0-1	1
16QAM	1	0	21.94	0-1	1
	1	12	22.21		
	1	24	22.01		
	12	0	21.08	0-2	2
	12	6	21.17		
	12	13	21.19		
	25	0	21.17	0-2	2

Table 9.2.3.3 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	23.5
	Nominal	23.0

Table 9.2.4.1 Nominal and Maximum Output Power Spec

4) LTE Band 14

LTE Band 14 Conducted Power– 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23330 (793.0 MHz) Conducted Power (dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
QPSK	1	0	23.38	0	0
	1	**25**	**23.46**		
	1	49	23.21		
	25	0	22.30	0-1	1
	25	**12**	**22.33**		
	25	25	22.11		
	50	0	22.29	0-1	1
16QAM	1	0	22.23	0-1	1
	1	25	22.32		
	1	49	22.04		
	25	0	21.24	0-2	2
	25	12	21.24		
	25	25	21.21		
	50	0	21.29	0-2	2

Table 9.2.4.2 LTE Conducted Power

Note : LTE B14 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 14 Conducted Power– 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23330 (793.0 MHz) Conducted Power (dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
QPSK	1	0	23.25	0	0
	1	12	23.30		
	1	24	23.07		
	12	0	22.14	0-1	1
	12	6	22.10		
	12	13	22.01		
	25	0	22.08	0-1	1
16QAM	1	0	22.10	0-1	1
	1	12	22.11		
	1	24	21.96		
	12	0	21.13	0-2	2
	12	6	21.03		
	12	13	21.03		
	25	0	21.02	0-2	2

Table 9.2.4.3 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 5	Maximum	23.5
	Nominal	23.0

Table 9.2.5.1 Nominal and Maximum Output Power Spec

5) LTE Band 5 (Cell)

LTE Band 5 (Cell) Conducted Power– 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20525 (836.5 MHz) Conducted Power (dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
QPSK	**1**	**0**	23.42	0	0
	1	25	23.24		
	1	49	23.30		
	25	**0**	22.16	0-1	1
	25	12	22.09		
	25	25	22.13		
	50	0	22.11	0-1	1
16QAM	1	0	22.28	0-1	1
	1	25	22.17		
	1	49	22.11		
	25	0	21.11	0-2	2
	25	12	21.26		
	25	25	21.07		
	50	0	21.15	0-2	2

Table 9.2.5.2 LTE Conducted Power

Note : 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.

LTE Band 5 (Cell) Conducted Power– 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20425 (826.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20625 (846.5 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	23.04	23.02	23.01	0	0
	1	12	23.19	23.15	23.06		
	1	24	23.14	23.07	23.09		
	12	0	21.98	22.08	22.01	0-1	1
	12	6	22.12	22.07	22.01		
	12	13	22.14	22.10	22.10		
	25	0	22.07	22.08	22.07	0-1	1
16QAM	1	0	21.94	21.89	21.93	0-1	1
	1	12	22.00	21.96	21.96		
	1	24	21.95	21.92	21.95		
	12	0	20.92	21.12	20.99	0-2	2
	12	6	21.07	21.02	21.04		
	12	13	20.99	21.13	21.11		
	25	0	21.09	21.03	21.09	0-2	2

Table 9.2.5.3 LTE Conducted Power

LTE Band 5 (Cell) Conducted Power– 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20415 (825.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20635 (847.5 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	23.15	23.40	23.11	0	0
	1	7	23.04	23.19	23.24		
	1	14	23.21	23.14	23.23		
	8	0	22.16	22.17	22.15	0-1	1
	8	4	22.10	22.19	22.17		
	8	7	22.22	22.19	22.14		
	15	0	22.06	22.13	22.08	0-1	1
16QAM	1	0	21.98	22.21	21.98	0-1	1
	1	7	21.92	22.05	22.06		
	1	14	22.05	21.95	22.06		
	8	0	21.05	21.07	21.12	0-2	2
	8	4	21.15	21.29	21.26		
	8	7	21.36	21.31	21.16		
	15	0	21.07	21.12	20.94	0-2	2

Table 9.2.5.4 LTE Conducted Power

LTE Band 5 (Cell) Conducted Power– 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20407 (824.7 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20643 (848.3 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	23.06	23.17	23.22	0	0
	1	2	23.18	23.22	23.41		
	1	5	23.04	23.06	23.17		
	3	0	23.02	23.11	23.19	0	0
	3	2	23.03	23.06	23.18		
	3	3	23.05	23.14	23.20		
	6	0	21.98	22.17	22.05	0-1	1
16QAM	1	0	21.89	22.06	22.03	0-1	1
	1	2	22.07	22.04	22.24		
	1	5	21.95	21.96	22.03		
	3	0	22.02	22.04	22.26	0-1	1
	3	2	22.16	22.12	22.38		
	3	3	22.10	22.09	22.32		
	6	0	20.93	20.99	20.96	0-2	2

Table 9.2.5.5 LTE Conducted Power

Band & Mode		Modulated Average[dBm]
LTE Band 66 (AWS)	Maximum	22.5
	Nominal	22.0

Table 9.2.6.1 Nominal and Maximum Output Power Spec

6) LTE Band 66 (AWS)

LTE Band 66 (AWS) Conducted Power– 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132072 (1720.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132572 (1770.0 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	**1**	**0**	22.12	22.42	22.38	0	0
	1	50	21.97	22.27	22.20		
	1	99	21.96	22.04	22.10		
	50	**0**	21.06	21.35	21.29	0-1	1
	50	25	21.03	21.29	21.25		
	50	50	20.99	21.03	21.22		
	100	0	21.02	21.19	21.14	0-1	1
16QAM	1	0	20.97	21.30	21.25	0-1	1
	1	50	20.80	21.16	21.06		
	1	99	20.80	20.87	20.91		
	50	0	20.06	20.41	20.36	0-2	2
	50	25	20.05	20.36	20.29		
	50	50	20.00	20.12	20.23		
	100	0	19.98	20.26	20.20	0-2	2

Table 9.2.6.2 LTE Conducted Power

LTE Band 66 (AWS) Conducted Power– 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	22.07	22.38	22.14	0	0
	1	36	21.94	22.25	22.26		
	1	74	21.92	22.11	21.85		
	36	0	20.84	21.35	21.10	0-1	1
	36	18	20.82	21.25	21.14		
	36	37	20.81	20.97	21.05		
	75	0	20.80	21.13	21.09	0-1	1
16QAM	1	0	21.12	21.20	21.00	0-1	1
	1	36	20.91	21.06	21.09		
	1	74	20.80	20.92	20.87		
	36	0	19.80	20.30	20.06	0-2	2
	36	18	19.80	20.21	20.22		
	36	37	19.81	20.05	20.14		
	75	0	19.81	20.18	20.16	0-2	2

Table 9.2.6.3 LTE Conducted Power

LTE Band 66 (AWS) Conducted Power– 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	22.00	22.38	22.21	0	0
	1	25	21.86	22.33	22.31		
	1	49	21.89	22.08	22.16		
	25	0	20.80	21.37	21.19	0-1	1
	25	12	20.83	21.17	21.17		
	25	25	20.80	21.08	21.10		
	50	0	20.85	21.18	21.19	0-1	1
16QAM	1	0	20.83	21.19	21.02	0-1	1
	1	25	20.89	21.15	21.17		
	1	49	20.83	20.89	20.99		
	25	0	19.91	20.43	20.21	0-2	2
	25	12	19.93	20.33	20.21		
	25	25	19.89	20.13	20.00		
	50	0	19.82	20.24	20.16	0-2	2

Table 9.3.6.4 LTE Conducted Power

LTE Band 66 (AWS) Conducted Power– 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	21.95	22.23	22.17	0	0
	1	12	21.84	22.21	22.13		
	1	24	21.80	22.06	22.08		
	12	0	20.89	21.23	21.18	0-1	1
	12	6	20.87	21.19	21.13		
	12	13	20.80	21.03	21.03		
	25	0	20.84	20.99	21.11	0-1	1
16QAM	1	0	20.81	21.14	21.05	0-1	1
	1	12	20.80	21.02	20.96		
	1	24	20.81	20.87	20.93		
	12	0	20.02	20.28	20.15	0-2	2
	12	6	19.98	20.15	20.20		
	12	13	19.85	20.08	20.20		
	25	0	19.98	20.11	20.26	0-2	2

Table 9.2.6.5 LTE Conducted Power

LTE Band 66 (AWS) Conducted Power– 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131987 (1711.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132657 (1778.5 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	22.04	22.36	22.27	0	0
	1	7	21.95	22.26	22.08		
	1	14	21.93	22.08	22.15		
	8	0	20.97	21.25	21.20	0-1	1
	8	4	21.03	21.31	21.16		
	8	7	21.03	21.10	21.15		
	15	0	21.00	21.18	21.14	0-1	1
16QAM	1	0	21.10	21.17	21.10	0-1	1
	1	7	21.04	21.08	20.91		
	1	14	21.08	20.98	21.04		
	8	0	20.11	20.23	20.31	0-2	2
	8	4	20.10	20.38	20.28		
	8	7	20.08	20.26	20.34		
	15	0	19.83	20.20	20.22	0-2	2

Table 9.2.6.6 LTE Conducted Power

LTE Band 66 (AWS) Conducted Power– 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131979 (1710.7 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132665 (1779.3 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	21.89	22.14	22.14	0	0
	1	2	21.97	22.37	22.25		
	1	5	21.93	22.02	22.13		
	3	0	21.93	22.13	22.18	0	0
	3	2	21.90	22.17	22.06		
	3	3	21.87	22.14	22.14		
	6	0	20.98	21.23	21.24	0-1	1
16QAM	1	0	20.97	20.95	21.01	0-1	1
	1	2	21.09	21.26	21.17		
	1	5	20.93	20.85	21.10		
	3	0	20.81	21.28	21.12	0-1	1
	3	2	20.87	21.29	21.20		
	3	3	20.85	21.26	21.11		
	6	0	19.85	20.25	20.15	0-2	2

Table 9.2.6.7 LTE Conducted Power

Band & Mode		Modulated Average[dBm]
LTE Band 2(PCS)	Maximum	23.5
	Nominal	23.0

Table 9.2.7.1 Nominal and Maximum Output Power Spec

7) LTE Band 2 (PCS)

LTE Band 2 (PCS) Conducted Power– 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18700 (1860.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19100 (1900.0 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	23.29	23.16	23.09	0	0
	1	**50**	23.29	23.46	23.18		
	1	99	23.16	23.19	23.12		
	50	0	22.21	22.16	22.17	0-1	1
	50	**25**	22.14	22.26	22.24		
	50	50	22.21	22.24	22.21		
	100	0	22.11	22.21	22.08	0-1	1
16QAM	1	0	22.33	22.20	22.15	0-1	1
	1	50	22.17	22.32	22.36		
	1	99	22.36	22.11	22.08		
	50	0	21.11	21.30	21.18	0-2	2
	50	25	21.11	21.32	21.21		
	50	50	21.12	21.30	21.14		
	100	0	21.24	21.10	21.11	0-2	2

Table 9.2.7.2 LTE Conducted Power

LTE Band 2 (PCS) Conducted Power– 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18675 (1857.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19125 (1902.5 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	23.24	23.09	23.08	0	0
	1	36	23.14	23.20	23.15		
	1	74	23.28	23.08	23.20		
	36	0	22.22	22.21	22.11	0-1	1
	36	18	22.21	22.20	22.20		
	36	37	22.21	22.22	22.15		
	75	0	22.13	22.16	22.16	0-1	1
16QAM	1	0	22.12	22.11	22.21	0-1	1
	1	36	22.15	22.08	22.16		
	1	74	22.15	22.09	22.18		
	36	0	21.28	21.11	21.18	0-2	2
	36	18	21.28	21.18	21.17		
	36	37	21.17	21.11	21.22		
	75	0	21.27	21.12	21.13	0-2	2

Table 9.2.7.3 LTE Conducted Power

LTE Band 2 (PCS) Conducted Power– 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18650 (1855.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19150 (1905.0 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	23.08	23.15	23.20	0	0
	1	25	23.11	23.11	23.18		
	1	49	23.14	23.08	23.21		
	25	0	22.12	22.30	22.29	0-1	1
	25	12	22.09	22.12	22.32		
	25	25	22.13	22.19	22.27		
	50	0	22.15	22.19	22.28	0-1	1
16QAM	1	0	22.11	22.31	22.15	0-1	1
	1	25	22.17	22.30	22.26		
	1	49	22.14	22.24	22.19		
	25	0	21.15	21.18	21.30	0-2	2
	25	12	21.15	21.19	21.29		
	25	25	21.21	21.17	21.38		
	50	0	21.20	21.17	21.29	0-2	2

Table 9.2.7.4 LTE Conducted Power

LTE Band 2 (PCS) Conducted Power– 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18625 (1852.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19175 (1907.5 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	23.15	23.07	23.10	0	0
	1	12	23.28	23.12	23.08		
	1	24	23.15	23.08	23.27		
	12	0	22.30	22.10	22.23	0-1	1
	12	6	22.32	22.19	22.34		
	12	13	22.26	22.19	22.27		
	25	0	22.29	22.20	22.22	0-1	1
16QAM	1	0	22.13	22.09	22.15	0-1	1
	1	12	22.13	22.17	22.10		
	1	24	22.18	22.13	22.08		
	12	0	21.30	21.09	21.28	0-2	2
	12	6	21.27	21.08	21.23		
	12	13	21.32	21.18	21.19		
	25	0	21.25	21.26	21.23	0-2	2

Table 9.2.7.5 LTE Conducted Power

LTE Band 2 (PCS) Conducted Power– 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18615 (1851.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19185 (1908.5 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	23.17	23.12	23.21	0	0
	1	7	23.17	23.21	23.21		
	1	14	23.14	23.12	23.28		
	8	0	22.13	22.21	22.27	0-1	1
	8	4	22.15	22.19	22.30		
	8	7	22.12	22.25	22.29		
	15	0	22.15	22.16	22.27	0-1	1
16QAM	1	0	22.10	22.10	22.20	0-1	1
	1	7	22.17	22.11	22.22		
	1	14	22.17	22.16	22.23		
	8	0	21.07	21.38	21.44	0-2	2
	8	4	21.22	21.31	21.38		
	8	7	21.21	21.34	21.45		
	15	0	21.20	21.17	21.33	0-2	2

Table 9.2.7.6 LTE Conducted Power

LTE Band 2 (PCS) Conducted Power– 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18607 (1850.7 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19193 (1909.3 MHz)	MPR Allowed Per 3GPP(dB)	MPR (dB)
			Conducted Power (dBm)				
QPSK	1	0	23.15	23.10	23.15	0	0
	1	2	23.29	23.15	23.27		
	1	5	23.20	23.07	23.13		
	3	0	23.08	23.11	23.37	0	0
	3	2	23.12	23.15	23.35		
	3	3	23.08	23.22	23.36		
	6	0	22.15	22.15	22.31	0-1	1
16QAM	1	0	22.14	22.09	22.07	0-1	1
	1	2	22.12	22.13	22.17		
	1	5	22.14	22.09	22.16		
	3	0	22.15	22.18	22.19	0-1	1
	3	2	22.13	22.35	22.20		
	3	3	22.19	22.35	22.20		
	6	0	21.12	21.14	21.12	0-2	2

Table 9.2.7.7 LTE Conducted Power

9.3 WLAN Nominal and Maximum Output Power Spec and Conducted Powers

Band (GHz)	Mode	Ch	Modulated Average[dBm]	
			Maximum	Nominal
2.4	802.11b	1~11	17.0	16.5
	802.11g	1~11	14.0	13.5
	802.11n HT20	1~11	12.0	11.5
	802.11n HT40	1~11	12.0	11.5

Table 9.3.1 Nominal and Maximum Output Power Spec

Mode	Freq.	Channel	IEEE 802.11 (2.4 GHz) Conducted Power
	(MHz)		[dBm]
802.11b	2412	1	16.89
	2437	6	16.72
	2462	**11**	16.91
802.11g	2412	1	13.63
	2437	6	13.64
	2462	11	13.82
802.11n (HT-20)	2412	1	11.95
	2437	6	11.88
	2462	11	11.91
802.11n (HT-40)	2422	3	11.90
	2437	6	11.74
	2452	9	11.85

Table 9.3.2 IEEE 802.11 Average RF Power

Band (GHz)	Mode	Ch	Modulated Average[dBm]	
			Maximum	Nominal
5 (UNII)	802.11a	36~165	12.2	11.7
	802.11n (20MHz)	36~165	12.0	11.5
	802.11ac (20MHz)	36~165	10.0	9.5
	802.11n (40MHz)	38~159	12.0	11.5
	802.11ac (40MHz)	38~159	10.0	9.5
	802.11ac (80MHz)	42~155	10.0	9.5

Table 9.3.3 Nominal and Maximum Output Power Spec

Mode	Freq. (MHz)	Channel	IEEE 802.11a (5 GHz) Conducted Power [dBm]
802.11a	5180	36	11.96
	5200	40	11.81
	5220	44	11.80
	5240	48	11.81
	5260	**52**	**11.79**
	5280	56	11.72
	5300	60	11.74
	5320	64	11.72
	5500	**100**	**11.94**
	5580	116	11.65
	5660	132	11.64
	5700	140	11.62
	5745	**149**	**11.91**
	5785	157	11.73
	5825	165	11.63

Table 9.3.4 IEEE 802.11a Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11n HT20 (5 GHz) Conducted Power [dBm]
802.11n (HT-20)	5180	36	11.91
	5200	40	11.81
	5220	44	11.81
	5240	48	11.89
	5260	52	11.79
	5280	56	11.73
	5300	60	11.72
	5320	64	11.76
	5500	100	11.93
	5580	116	11.69
	5660	132	11.67
	5700	140	11.62
	5745	149	11.88
	5785	157	11.67
	5825	165	11.66

Table 9.3.5 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	9.42
	5200	40	9.47
	5220	44	9.49
	5240	48	9.64
	5260	52	9.59
	5280	56	9.59
	5300	60	9.62
	5320	64	9.52
	5500	100	9.79
	5580	116	9.80
	5660	132	9.73
	5700	140	9.66
	5745	149	9.71
	5785	157	9.42
	5825	165	9.50

Table 9.3.6 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	11.83
	5230	46	11.79
	5270	54	11.75
	5310	62	11.73
	5510	102	11.89
	5550	110	11.87
	5670	134	11.74
	5755	151	11.93
	5795	159	11.71

Table 9.3.7 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	9.54
	5230	46	9.42
	5270	54	9.52
	5310	62	9.57
	5510	102	9.74
	5550	110	9.65
	5670	134	9.82
	5755	151	9.75
	5795	159	9.53

Table 9.3.8 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	9.61
	5290	58	9.70
	5530	106	9.57
	5775	155	9.66

Table 9.3.9 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, duo 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 ≤ 1.2 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.

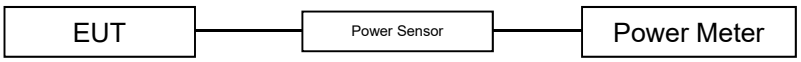

Figure 9.3 Power Measurement Setup

9.4 Bluetooth Conducted Powers

Burst Modulated Average[dBm]		Ch. Low	CH. Mid	Ch. High
Bluetooth 1 Mbps	Maximum	10.0	11.5	10.0
	Nominal	9.5	11.0	9.5
Bluetooth 2 Mbps	Maximum	8.0	9.5	8.0
	Nominal	7.5	9.0	7.5
Bluetooth 3 Mbps	Maximum	8.0	9.5	8.0
	Nominal	7.5	9.0	7.5
Bluetooth LE	Maximum	0.0	1.5	0.0
	Nominal	-0.5	1.0	-0.5

Table 9.4.1 Nominal and Maximum Output Power Spec (Frame)

Channel	Frequency (MHz)	Frame AVG Output Power (1Mbps) (dBm)	Frame AVG Output Power (2Mbps) (dBm)	Frame AVG Output Power (3Mbps) (dBm)
Low	2402	9.77	7.66	7.67
Mid	2441	11.43	9.27	9.28
High	2480	8.78	6.66	6.67

Table 9.4.2 Bluetooth Frame Average RF Power

Channel	Frequency (MHz)	Frame AVG Output Power(LE / 1Mbps) (dBm)
Low	2402	-0.42
Mid	2440	1.03
High	2480	-1.13

Table 9.4.3 Bluetooth LE Frame Average 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 9.4.1(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 9.4.1(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.

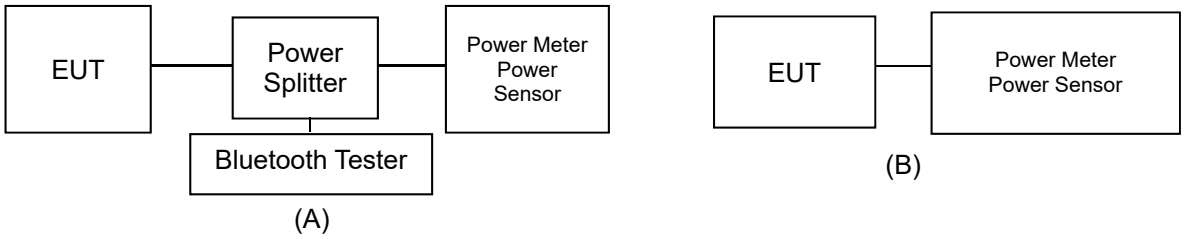

Figure 9.4.1 Average Power Measurement Setup

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, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	Er Deviation [%]	σ Deviation [%]
Jan. 10. 2019	750 Head	21.1	22.0	680.5	42.273	0.885	43.936	0.851	3.93	-3.84
				750.0	41.900	0.890	43.024	0.918	2.68	3.15
Jan. 10. 2019	750 Body	21.1	21.9	680.5	55.804	0.958	57.702	0.925	3.40	-3.44
				750.0	55.531	0.963	56.917	0.991	2.50	2.91
Jan. 07. 2019	750 Head	20.6	21.6	707.5	42.129	0.887	41.865	0.861	-0.63	-2.93
				750.0	41.900	0.890	41.258	0.898	-1.53	0.90
Jan. 07. 2019	750 Body	20.6	21.5	707.5	55.699	0.960	55.529	0.926	-0.31	-3.54
				750.0	55.531	0.963	55.136	0.968	-0.71	0.52
Jan. 08. 2019	750 Head	20.3	21.5	750.0	41.900	0.890	42.609	0.896	1.69	0.67
				782.0	41.749	0.894	42.225	0.924	1.14	3.36
Jan. 08. 2019	750 Body	20.3	21.3	750.0	55.531	0.963	55.271	0.971	-0.47	0.83
				782.0	55.406	0.966	54.956	1.003	-0.81	3.83
Jan. 09. 2019	750 Head	20.7	21.8	750.0	41.900	0.890	42.282	0.883	0.91	-0.79
				793.0	41.698	0.895	41.777	0.921	0.19	2.91
Jan. 09. 2019	750 Body	20.7	21.7	750.0	55.531	0.963	55.098	0.955	-0.78	-0.83
				793.0	55.364	0.967	54.667	0.998	-1.26	3.21
Dec. 07. 2018	835 Head	21.1	22.0	826.4	41.542	0.899	41.401	0.868	-0.34	-3.45
				835.0	41.500	0.900	41.309	0.875	-0.46	-2.78
				836.6	41.500	0.901	41.291	0.877	-0.50	-2.66
				846.6	41.500	0.912	41.177	0.885	-0.78	-2.96
Dec. 07. 2018	835 Body	21.1	22.1	826.4	55.235	0.969	54.163	0.986	-1.94	1.75
				835.0	55.200	0.970	54.085	0.993	-2.02	2.37
				836.6	55.197	0.971	54.074	0.994	-2.03	2.37
				846.6	55.166	0.984	53.979	1.003	-2.15	1.93
Dec. 11. 2018	835 Head	20.7	21.5	829.0	41.528	0.899	41.526	0.872	0.00	-3.00
				835.0	41.500	0.900	41.458	0.877	-0.10	-2.56
				836.5	41.500	0.901	41.437	0.878	-0.15	-2.55
				844.0	41.500	0.910	41.350	0.883	-0.36	-2.97
Dec. 11. 2018	835 Body	20.7	21.2	829.0	55.223	0.970	53.941	0.972	-2.32	0.21
				835.0	55.200	0.970	53.883	0.977	-2.39	0.72
				836.5	55.197	0.971	53.869	0.978	-2.41	0.72
				844.0	55.172	0.981	53.810	0.985	-2.47	0.41
Jan. 14. 2019	1800 Head	21.3	22.0	1712.4	40.126	1.350	41.051	1.299	2.31	-3.78
				1732.4	40.097	1.361	40.975	1.319	2.19	-3.09
				1752.6	40.069	1.373	40.881	1.338	2.03	-2.55
				1800.0	40.000	1.400	40.644	1.382	1.61	-1.29
Jan. 14. 2019	1800 Body	21.3	22.1	1712.4	53.596	1.464	52.771	1.422	-1.54	-2.87
				1732.4	53.556	1.477	52.737	1.441	-1.53	-2.44
				1752.6	53.516	1.489	52.687	1.459	-1.55	-2.01
				1800.0	53.300	1.520	52.550	1.501	-1.41	-1.25
Jan. 28. 2019	1800 Head	21.0	21.8	1720.0	40.114	1.354	41.247	1.307	2.82	-3.47
				1745.0	40.079	1.369	41.142	1.331	2.65	-2.78
				1770.0	40.043	1.383	41.023	1.354	2.45	-2.10
				1800.0	40.000	1.400	40.866	1.382	2.17	-1.29
Jan. 28. 2019	1800 Body	21.0	21.6	1720.0	53.580	1.469	52.762	1.419	-1.53	-3.40
				1745.0	53.530	1.485	52.713	1.443	-1.53	-2.83
				1770.0	53.480	1.501	52.651	1.466	-1.55	-2.33
				1800.0	53.300	1.520	52.566	1.493	-1.38	-1.78

MEASURED TISSUE PARAMETERS										
Date(s)	Tissue Type	Ambient Temp.[°C]	Liquid Temp.[°C]	Measured Frequency [MHz]	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	Er Deviation [%]	σ Deviation [%]
Dec. 06. 2018	1900 Head	20.1	21.2	1852.4	40.000	1.400	39.637	1.365	-0.91	-2.50
				1880.0	40.000	1.400	39.554	1.396	-1.11	-0.29
				1900.0	40.000	1.400	39.470	1.416	-1.33	1.14
				1907.6	40.000	1.400	39.436	1.423	-1.41	1.64
Dec. 06. 2018	1900 Body	20.1	21.0	1852.4	53.300	1.520	51.859	1.503	-2.70	-1.12
				1880.0	53.300	1.520	51.659	1.538	-3.08	1.18
				1900.0	53.300	1.520	51.417	1.563	-3.53	2.83
				1907.6	53.300	1.520	51.311	1.575	-3.73	3.62
Dec. 10. 2018	1900 Head	20.3	21.1	1860.0	40.000	1.400	39.670	1.375	-0.82	-1.79
				1880.0	40.000	1.400	39.598	1.396	-1.01	-0.29
				1900.0	40.000	1.400	39.513	1.416	-1.22	1.14
Dec. 10. 2018	1900 Body	20.3	20.9	1860.0	53.300	1.520	51.828	1.514	-2.76	-0.39
				1880.0	53.300	1.520	51.676	1.538	-3.05	1.18
				1900.0	53.300	1.520	51.433	1.564	-3.50	2.89
Jan. 15. 2019	2450 Head	21.1	21.9	2402.0	39.282	1.757	40.646	1.732	3.47	-1.42
				2412.0	39.265	1.766	40.618	1.745	3.45	-1.19
				2437.0	39.222	1.788	40.558	1.778	3.41	-0.56
				2441.0	39.215	1.792	40.546	1.783	3.39	-0.50
				2450.0	39.200	1.800	40.522	1.795	3.37	-0.28
				2462.0	39.184	1.813	40.497	1.810	3.35	-0.17
				2472.0	39.171	1.823	40.465	1.821	3.30	-0.11
				2480.0	39.160	1.832	40.436	1.830	3.26	-0.11
Jan. 15. 2019	2450 Body	21.1	22.1	2402.0	52.764	1.904	54.639	1.891	3.55	-0.68
				2412.0	52.751	1.914	54.611	1.904	3.53	-0.52
				2437.0	52.717	1.938	54.549	1.937	3.48	-0.05
				2441.0	52.712	1.941	54.537	1.942	3.46	0.05
				2450.0	52.700	1.950	54.513	1.954	3.44	0.21
				2462.0	52.685	1.967	54.486	1.969	3.42	0.10
				2472.0	52.672	1.981	54.458	1.982	3.39	0.05
				2480.0	52.662	1.993	54.437	1.992	3.37	-0.05
Jan. 16. 2019	5300 Head	21.5	22.2	5260.0	35.940	4.720	36.332	4.600	1.09	-2.54
				5270.0	35.930	4.730	36.318	4.615	1.08	-2.43
				5280.0	35.920	4.740	36.304	4.628	1.07	-2.36
				5290.0	35.910	4.750	36.283	4.635	1.04	-2.42
				5300.0	35.900	4.760	36.257	4.642	0.99	-2.48
				5310.0	35.890	4.770	36.235	4.654	0.96	-2.43
				5320.0	35.880	4.780	36.205	4.667	0.91	-2.36
Jan. 16. 2019	5300 Body	21.5	22.0	5260.0	48.933	5.369	48.377	5.324	-1.14	-0.84
				5270.0	48.919	5.381	48.355	5.340	-1.15	-0.76
				5280.0	48.906	5.393	48.344	5.355	-1.15	-0.70
				5290.0	48.892	5.404	48.334	5.366	-1.14	-0.70
				5300.0	48.879	5.416	48.308	5.377	-1.17	-0.72
				5310.0	48.865	5.428	48.279	5.391	-1.20	-0.68
				5320.0	48.851	5.439	48.256	5.408	-1.22	-0.57

MEASURED TISSUE PARAMETERS										
Date(s)	Tissue Type	Ambient Temp.[°C]	Liquid Temp.[°C]	Measured Frequency [MHz]	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	Er Deviation [%]	σ Deviation [%]
Jan. 17. 2019	5600 Head	21.0	22.0	5500.0	35.650	4.965	36.322	4.924	1.88	-0.83
				5510.0	35.635	4.976	36.313	4.931	1.90	-0.90
				5530.0	35.605	4.997	36.254	4.953	1.82	-0.88
				5550.0	35.575	5.018	36.219	4.981	1.81	-0.74
				5580.0	35.530	5.049	36.164	5.019	1.78	-0.59
				5600.0	35.500	5.070	36.131	5.048	1.78	-0.43
				5660.0	35.440	5.130	36.022	5.116	1.64	-0.27
				5670.0	35.430	5.140	36.005	5.127	1.62	-0.25
				5690.0	35.410	5.160	35.965	5.154	1.57	-0.12
				5700.0	35.400	5.170	35.949	5.169	1.55	-0.02
Jan. 17. 2019	5600 Body	21.0	21.8	5500.0	48.607	5.650	47.733	5.566	-1.80	-1.49
				5510.0	48.594	5.661	47.713	5.577	-1.81	-1.48
				5530.0	48.566	5.685	47.648	5.607	-1.89	-1.37
				5550.0	48.539	5.708	47.613	5.643	-1.91	-1.14
				5580.0	48.499	5.743	47.543	5.680	-1.97	-1.10
				5600.0	48.471	5.766	47.505	5.708	-1.99	-1.01
				5660.0	48.390	5.836	47.396	5.795	-2.05	-0.70
				5670.0	48.376	5.848	47.380	5.810	-2.06	-0.65
				5690.0	48.349	5.872	47.319	5.835	-2.13	-0.63
				5700.0	48.336	5.883	47.300	5.848	-2.14	-0.59
Jan. 18. 2019	5800 Head	21.3	22.1	5745.0	35.355	5.215	35.408	5.153	0.15	-1.19
				5755.0	35.345	5.225	35.384	5.166	0.11	-1.13
				5775.0	35.325	5.245	35.352	5.188	0.08	-1.09
				5785.0	35.315	5.255	35.330	5.199	0.04	-1.07
				5795.0	35.305	5.265	35.305	5.212	0.00	-1.01
				5800.0	35.300	5.270	35.294	5.219	-0.02	-0.97
				5825.0	35.275	5.296	35.265	5.258	-0.03	-0.72
Jan. 18. 2019	5800 Body	21.3	22.0	5745.0	48.275	5.936	46.755	6.156	-3.15	3.71
				5755.0	48.261	5.947	46.740	6.174	-3.15	3.82
				5775.0	48.234	5.971	46.677	6.199	-3.23	3.82
				5785.0	48.220	5.982	46.668	6.213	-3.22	3.86
				5795.0	48.207	5.994	46.658	6.230	-3.21	3.94
				5800.0	48.200	6.000	46.643	6.237	-3.23	3.95
				5825.0	48.166	6.029	46.575	6.274	-3.30	4.06

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 , for example from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\varepsilon_r\varepsilon_0}{[\ln(b/a)]^2}\int_a^b\int_a^b\int_0^\pi \cos\phi' \frac{\exp\left[-j\omega r(\mu_0\varepsilon_r'\varepsilon_0)^{1/2}\right]}{r} d\phi' d\rho' d\rho$$

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, $r^2 = \rho^2 + \rho'^2 - 2\rho\rho'\cos\phi'$, ω is the angular frequency, and $j = \sqrt{-1}$.

10.2 Test System Verification

Prior to assessment, the system is verified to the ± 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_{1g} (W/kg)	Measured SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	Deviation [%]
D	750	D750V3, SN:1049	Jan. 10. 2019	Head	21.1	22.0	3933	250	8.32	2.11	8.44	1.44
D	750	D750V3, SN:1049	Jan. 10. 2019	Body	21.1	21.9	3933	250	8.70	2.24	8.96	2.99
D	750	D750V3, SN:1049	Jan. 07. 2019	Head	20.6	21.6	3933	250	8.32	1.96	7.84	-5.77
D	750	D750V3, SN:1049	Jan. 07. 2019	Body	20.6	21.5	3933	250	8.70	2.19	8.76	0.69
D	750	D750V3, SN:1049	Jan. 08. 2019	Head	20.3	21.5	3933	250	8.32	2.04	8.16	-1.92
D	750	D750V3, SN:1049	Jan. 08. 2019	Body	20.3	21.3	3933	250	8.70	2.25	9.00	3.45
D	750	D750V3, SN:1049	Jan. 09. 2019	Head	20.7	21.8	3933	250	8.32	1.98	7.92	-4.81
D	750	D750V3, SN:1049	Jan. 09. 2019	Body	20.7	21.7	3933	250	8.70	2.16	8.64	-0.69
D	835	D835V2, SN:4d159	Dec. 07. 2018	Head	21.1	22.0	7337	250	9.36	2.42	9.68	3.42
D	835	D835V2, SN:4d159	Dec. 07. 2018	Body	21.1	22.1	7337	250	9.56	2.38	9.52	-0.42
D	835	D835V2, SN:4d159	Dec. 11. 2018	Head	20.7	21.5	7337	250	9.36	2.36	9.44	0.85
D	835	D835V2, SN:4d159	Dec. 11. 2018	Body	20.7	21.2	3933	250	9.56	2.34	9.36	-2.09
D	1800	D1800V2, SN:2d202	Jan. 14. 2019	Head	21.3	22.0	7337	100	38.7	3.79	37.90	-2.07
D	1800	D1800V2, SN:2d202	Jan. 14. 2019	Body	21.3	22.1	3933	100	38.8	4.07	40.70	4.90
D	1800	D1800V2, SN:2d202	Jan. 28. 2019	Head	21.0	21.8	7337	100	38.7	3.80	38.00	-1.81
D	1800	D1800V2, SN:2d202	Jan. 28. 2019	Body	21.0	21.6	3933	100	38.8	3.81	38.10	-1.80
D	1900	D1900V2, SN:5d176	Dec. 06. 2018	Head	20.1	21.2	7337	100	40.7	3.99	39.90	-1.97
D	1900	D1900V2, SN:5d176	Dec. 06. 2018	Body	20.1	21.0	7337	100	39.7	4.10	41.00	3.27
D	1900	D1900V2, SN:5d176	Dec. 10. 2018	Head	20.3	21.1	7337	100	40.7	3.89	38.90	-4.42
D	1900	D1900V2, SN:5d176	Dec. 10. 2018	Body	20.3	20.9	3933	100	39.7	3.76	37.60	-5.29
D	2450	D2450V2, SN: 920	Jan. 15. 2019	Head	21.1	21.9	3933	100	51.9	5.43	54.30	4.62
D	2450	D2450V2, SN: 920	Jan. 15. 2019	Body	21.1	22.1	3933	100	52.1	5.04	50.40	-3.26
D	5300	D5GHzV2, SN:1212	Jan. 16. 2019	Head	21.5	22.2	3933	100	81.1	7.71	77.10	-4.93
D	5300	D5GHzV2, SN:1212	Jan. 16. 2019	Body	21.5	22.0	3933	100	75.2	7.26	72.60	-3.46
D	5500	D5GHzV2, SN:1212	Jan. 17. 2019	Head	21.0	22.0	3933	100	85.4	8.44	84.40	-1.17
D	5500	D5GHzV2, SN:1212	Jan. 17. 2019	Body	21.0	21.8	3933	100	79.9	7.96	79.60	-0.38
D	5800	D5GHzV2, SN:1212	Jan. 18. 2019	Head	21.3	22.1	3933	100	79.5	8.41	84.10	5.79
D	5800	D5GHzV2, SN:1212	Jan. 18. 2019	Body	21.3	22.0	3933	100	75.7	7.75	77.50	2.38

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_{10g} (W/kg)	Measured SAR_{10g} (W/kg)	1 W Normalized SAR_{10g} (W/kg)	Deviation [%]
D	5300	D5GHzV2, SN:1212	Jan. 16. 2019	Body	21.5	22.0	3933	100	20.9	2.02	20.20	-3.35
D	5500	D5GHzV2, SN:1212	Jan. 17. 2019	Body	21.0	21.8	3933	100	22.0	2.28	22.80	3.64
D	5800	D5GHzV2, SN:1212	Jan. 18. 2019	Body	21.3	22.0	3933	100	20.8	2.14	21.40	2.88

Note1 : System Verification was measured with input 250 mW, 100 mW and normalized to 1W.
Note2 : Full system validation status and results can be found in Attachment 3.

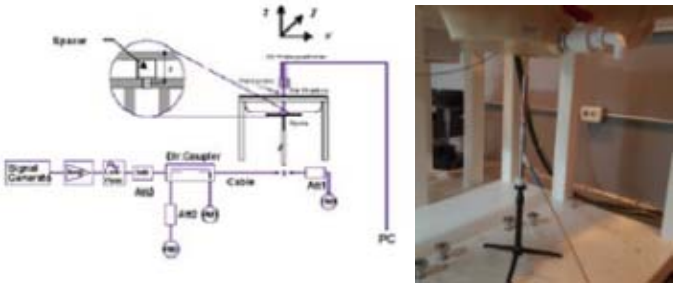

Figure 10.1 Dipole Verification Test Setup Diagram & Photo

11. SAR TEST RESULTS

11.1 Head SAR Results

Table 11.1.1 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	23.00	22.49	0.080	Left Touch	FCC #1	1:1	0.183	1.125	0.206	
836.6	4183	WCDMA 850	RMC	23.00	22.49	-0.000	Right Touch	FCC #1	1:1	0.230	1.125	**0.259**	A1
836.6	4183	WCDMA 850	RMC	23.00	22.49	0.050	Left Tilt	FCC #1	1:1	0.099	1.125	0.111	
836.6	4183	WCDMA 850	RMC	23.00	22.49	0.010	Right Tilt	FCC #1	1:1	0.093	1.125	0.105	
836.6	4183	WCDMA 850	RMC	23.00	22.49	0.090	Right Touch	FCC #1	1:1	0.210	1.125	0.236	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.1.2 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	21.00	20.83	0.150	Left Touch	FCC #1	1:1	0.147	1.040	**0.153**	A2
1732.4	1412	WCDMA 1700	RMC	21.00	20.83	-0.180	Right Touch	FCC #1	1:1	0.074	1.040	0.077	
1732.4	1412	WCDMA 1700	RMC	21.00	20.83	0.110	Left Tilt	FCC #1	1:1	0.021	1.040	0.022	
1732.4	1412	WCDMA 1700	RMC	21.00	20.83	0.190	Right Tilt	FCC #1	1:1	0.050	1.040	0.052	
1732.4	1412	WCDMA 1700	RMC	21.00	20.83	0.160	Left Touch	FCC #1	1:1	0.138	1.040	0.144	
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Head 1.6 W/kg (mW/g)** averaged over 1 gram					

Note(s):
1. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.1.3 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	22.00	21.40	-0.180	Left Touch	FCC #1	1:1	0.209	1.148	**0.240**	A3
1880.0	9400	WCDMA 1900	RMC	22.00	21.40	-0.120	Right Touch	FCC #1	1:1	0.090	1.148	0.103	
1880.0	9400	WCDMA 1900	RMC	22.00	21.40	0.020	Left Tilt	FCC #1	1:1	0.039	1.148	0.045	
1880.0	9400	WCDMA 1900	RMC	22.00	21.40	0.030	Right Tilt	FCC #1	1:1	0.060	1.148	0.069	
1880.0	9400	WCDMA 1900	RMC	22.00	21.40	0.150	Left Touch	FCC #1	1:1	0.175	1.148	0.201	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.1.4 LTE Band 71 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																
680.5	23095	LTE B71	20	23.50	23.40	-0.030	0	Left Touch	FCC #1	QPSK	1	50	1:1	0.114	1.023	**0.117**	A4
680.5	23095	LTE B71	20	22.50	22.16	0.090	1	Left Touch	FCC #1	QPSK	50	25	1:1	0.101	1.081	0.109	
680.5	23095	LTE B71	20	23.50	23.40	0.040	0	Right Touch	FCC #1	QPSK	1	50	1:1	0.107	1.023	0.109	
680.5	23095	LTE B71	20	22.50	22.16	-0.000	1	Right Touch	FCC #1	QPSK	50	25	1:1	0.084	1.081	0.091	
680.5	23095	LTE B71	20	23.50	23.40	0.180	0	Left Tilt	FCC #1	QPSK	1	50	1:1	0.058	1.023	0.059	
680.5	23095	LTE B71	20	22.50	22.16	0.100	1	Left Tilt	FCC #1	QPSK	50	25	1:1	0.043	1.081	0.046	
680.5	23095	LTE B71	20	23.50	23.40	0.160	0	Right Tilt	FCC #1	QPSK	1	50	1:1	0.055	1.023	0.056	
680.5	23095	LTE B71	20	22.50	22.16	0.140	1	Right Tilt	FCC #1	QPSK	50	25	1:1	0.037	1.081	0.040	
680.5	23095	LTE B71	20	23.50	23.40	0.150	0	Left Touch	FCC #1	QPSK	1	50	1:1	0.109	1.023	0.112	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.1.5 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	23.50	23.38	-0.060	0	Left Touch	FCC #1	QPSK	1	25	1:1	0.141	1.028	0.145	
707.5	23095	LTE B12	10	22.50	22.24	-0.050	1	Left Touch	FCC #1	QPSK	25	12	1:1	0.116	1.062	0.123	
707.5	23095	LTE B12	10	23.50	23.38	0.150	0	Right Touch	FCC #1	QPSK	1	25	1:1	0.158	1.028	**0.162**	A5
707.5	23095	LTE B12	10	22.50	22.24	0.050	1	Right Touch	FCC #1	QPSK	25	12	1:1	0.124	1.062	0.132	
707.5	23095	LTE B12	10	23.50	23.38	0.030	0	Left Tilt	FCC #1	QPSK	1	25	1:1	0.075	1.028	0.077	
707.5	23095	LTE B12	10	22.50	22.24	0.040	1	Left Tilt	FCC #1	QPSK	25	12	1:1	0.066	1.062	0.070	
707.5	23095	LTE B12	10	23.50	23.38	0.020	0	Right Tilt	FCC #1	QPSK	1	25	1:1	0.080	1.028	0.082	
707.5	23095	LTE B12	10	22.50	22.24	0.140	1	Right Tilt	FCC #1	QPSK	25	12	1:1	0.063	1.062	0.067	
707.5	23095	LTE B12	10	23.50	23.38	0.120	0	Right Touch	FCC #1	QPSK	1	25	1:1	0.137	1.028	0.141	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.1.6 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	23.50	23.30	-0.050	0	Left Touch	FCC #1	QPSK	1	25	1:1	0.250	1.047	0.262	
782.0	23230	LTE B13	10	22.50	22.28	0.090	1	Left Touch	FCC #1	QPSK	25	12	1:1	0.180	1.052	0.189	
782.0	23230	LTE B13	10	23.50	23.30	0.180	0	Right Touch	FCC #1	QPSK	1	25	1:1	0.270	1.047	**0.283**	A6
782.0	23230	LTE B13	10	22.50	22.28	0.180	1	Right Touch	FCC #1	QPSK	25	12	1:1	0.225	1.052	0.237	
782.0	23230	LTE B13	10	23.50	23.30	-0.100	0	Left Tilt	FCC #1	QPSK	1	25	1:1	0.171	1.047	0.179	
782.0	23230	LTE B13	10	22.50	22.28	-0.010	1	Left Tilt	FCC #1	QPSK	25	12	1:1	0.128	1.052	0.135	
782.0	23230	LTE B13	10	23.50	23.30	0.080	0	Right Tilt	FCC #1	QPSK	1	25	1:1	0.160	1.047	0.168	
782.0	23230	LTE B13	10	22.50	22.28	0.020	1	Right Tilt	FCC #1	QPSK	25	12	1:1	0.123	1.052	0.129	
782.0	23230	LTE B13	10	23.50	23.30	0.110	0	Right Touch	FCC #1	QPSK	1	25	1:1	0.256	1.047	0.268	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.1.7 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	23.50	23.46	0.020	0	Left Touch	FCC #1	QPSK	1	25	1:1	0.259	1.009	0.261	
793.0	23330	LTE B14	10	22.50	22.33	0.090	1	Left Touch	FCC #1	QPSK	25	12	1:1	0.207	1.040	0.215	
793.0	23330	LTE B14	10	23.50	23.46	-0.070	0	Right Touch	FCC #1	QPSK	1	25	1:1	0.333	1.009	**0.336**	A7
793.0	23330	LTE B14	10	22.50	22.33	-0.050	1	Right Touch	FCC #1	QPSK	25	12	1:1	0.260	1.040	0.270	
793.0	23330	LTE B14	10	23.50	23.46	0.000	0	Left Tilt	FCC #1	QPSK	1	25	1:1	0.181	1.009	0.183	
793.0	23330	LTE B14	10	22.50	22.33	0.080	1	Left Tilt	FCC #1	QPSK	25	12	1:1	0.127	1.040	0.132	
793.0	23330	LTE B14	10	23.50	23.46	0.010	0	Right Tilt	FCC #1	QPSK	1	25	1:1	0.164	1.009	0.165	
793.0	23330	LTE B14	10	22.50	22.33	0.110	1	Right Tilt	FCC #1	QPSK	25	12	1:1	0.129	1.040	0.134	
793.0	23330	LTE B14	10	23.50	23.46	-0.100	0	Right Touch	FCC #1	QPSK	1	25	1:1	0.330	1.009	0.333	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.1.8 LTE Band 5 (Cell) 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																
836.5	20525	LTE B5	10	23.50	23.42	0.150	0	Left Touch	FCC #1	QPSK	1	0	1:1	0.202	1.019	0.206	
836.5	20525	LTE B5	10	22.50	22.16	0.050	1	Left Touch	FCC #1	QPSK	25	0	1:1	0.174	1.081	0.188	
836.5	20525	LTE B5	10	23.50	23.42	-0.000	0	Right Touch	FCC #1	QPSK	1	0	1:1	0.243	1.019	**0.248**	A8
836.5	20525	LTE B5	10	22.50	22.16	0.080	1	Right Touch	FCC #1	QPSK	25	0	1:1	0.190	1.081	0.205	
836.5	20525	LTE B5	10	23.50	23.42	-0.180	0	Left Tilt	FCC #1	QPSK	1	0	1:1	0.110	1.019	0.112	
836.5	20525	LTE B5	10	22.50	22.16	-0.100	1	Left Tilt	FCC #1	QPSK	25	0	1:1	0.085	1.081	0.092	
836.5	20525	LTE B5	10	23.50	23.42	-0.140	0	Right Tilt	FCC #1	QPSK	1	0	1:1	0.107	1.019	0.109	
836.5	20525	LTE B5	10	22.50	22.16	-0.100	1	Right Tilt	FCC #1	QPSK	25	0	1:1	0.083	1.081	0.090	
836.5	20525	LTE B5	10	23.50	23.42	0.050	0	Right Touch	FCC #1	QPSK	1	0	1:1	0.211	1.019	0.215	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.1.9 LTE Band 66 (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																
1745.0	132322	LTE B66	20	22.50	22.42	0.050	0	Left Touch	FCC #1	QPSK	1	0	1:1	0.144	1.019	**0.147**	A9
1745.0	132322	LTE B66	20	21.50	21.35	0.120	1	Left Touch	FCC #1	QPSK	50	0	1:1	0.097	1.035	0.100	
1745.0	132322	LTE B66	20	22.50	22.42	-0.190	0	Right Touch	FCC #1	QPSK	1	0	1:1	0.071	1.019	0.072	
1745.0	132322	LTE B66	20	21.50	21.35	-0.120	1	Right Touch	FCC #1	QPSK	50	0	1:1	0.051	1.035	0.053	
1745.0	132322	LTE B66	20	22.50	22.42	0.110	0	Left Tilt	FCC #1	QPSK	1	0	1:1	0.017	1.019	0.017	
1745.0	132322	LTE B66	20	21.50	21.35	0.060	1	Left Tilt	FCC #1	QPSK	50	0	1:1	0.013	1.035	0.013	
1745.0	132322	LTE B66	20	22.50	22.42	0.120	0	Right Tilt	FCC #1	QPSK	1	0	1:1	0.038	1.019	0.039	
1745.0	132322	LTE B66	20	21.50	21.35	0.180	1	Right Tilt	FCC #1	QPSK	50	0	1:1	0.027	1.035	0.028	
1745.0	132322	LTE B66	20	22.50	22.42	0.100	0	Left Touch	FCC #1	QPSK	1	0	1:1	0.140	1.019	0.143	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.1.10 LTE Band 2 (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																
1880.0	18900	LTE B2	20	23.50	23.46	-0.050	0	Left Touch	FCC #1	QPSK	1	50	1:1	0.229	1.009	**0.231**	A10
1880.0	18900	LTE B2	20	22.50	22.26	-0.060	1	Left Touch	FCC #1	QPSK	50	25	1:1	0.174	1.057	0.184	
1880.0	18900	LTE B2	20	23.50	23.46	0.110	0	Right Touch	FCC #1	QPSK	1	50	1:1	0.085	1.009	0.086	
1880.0	18900	LTE B2	20	22.50	22.26	0.150	1	Right Touch	FCC #1	QPSK	50	25	1:1	0.073	1.057	0.077	
1880.0	18900	LTE B2	20	23.50	23.46	0.050	0	Left Tilt	FCC #1	QPSK	1	50	1:1	0.030	1.009	0.030	
1880.0	18900	LTE B2	20	22.50	22.26	0.030	1	Left Tilt	FCC #1	QPSK	50	25	1:1	0.025	1.057	0.026	
1880.0	18900	LTE B2	20	23.50	23.46	-0.020	0	Right Tilt	FCC #1	QPSK	1	50	1:1	0.043	1.009	0.043	
1880.0	18900	LTE B2	20	22.50	22.26	0.120	1	Right Tilt	FCC #1	QPSK	50	25	1:1	0.034	1.057	0.036	
1880.0	18900	LTE B2	20	23.50	23.46	-0.070	0	Left Touch	FCC #1	QPSK	1	50	1:1	0.200	1.009	0.202	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.1.11 DTS 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														
2462.0	11	802.11b	17.00	16.91	-0.090	Left Touch	FCC #1	0.126	1	97.6	0.120	1.021	1.025	0.126	
2462.0	11	802.11b	17.00	16.91	-0.140	Right Touch	FCC #1	0.208	1	97.6	0.213	1.021	1.025	**0.223**	A11
2462.0	11	802.11b	17.00	16.91	0.030	Left Tilt	FCC #1	0.053	1	97.6	0.047	1.021	1.025	0.049	
2462.0	11	802.11b	17.00	16.91	0.100	Right Tilt	FCC #1	0.043	1	97.6	0.037	1.021	1.025	0.039	
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							

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											
2462.0	11	802.11b	DSSS	17.0	0.223	2437	802.11g	OFDM	14.0	0.501	**0.112**	X
2462.0	11	802.11b	DSSS	17.0	0.223	2437	802.11n (HT-20)	OFDM	12.0	0.316	**0.070**	X
2462.0	11	802.11b	DSSS	17.0	0.223	2437	802.11n (HT-40)	OFDM	12.0	0.316	**0.070**	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: 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 11.1.12 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														
5260.0	52	802.11a	12.20	11.79	0.000	Left Touch	FCC #1	0.157	6	86.6	0.157	1.099	1.155	0.199	
5260.0	52	802.11a	12.20	11.79	0.000	Right Touch	FCC #1	0.202	6	86.6	0.236	1.099	1.155	**0.299**	A12
5260.0	52	802.11a	12.20	11.79	0.000	Left Tilt	FCC #1	0.044	6	86.6	0.029	1.099	1.155	0.037	
5260.0	52	802.11a	12.20	11.79	0.000	Right Tilt	FCC #1	0.028	6	86.6	0.007	1.099	1.155	0.009	
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**							

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											
5260.0	52	802.11a	OFDM	12.2	0.299	5180	802.11a	OFDM	12.2	1.000	**0.299**	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 ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration.

Table 11.1.13 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														
5500.0	100	802.11a	12.20	11.94	0.000	Left Touch	FCC #1	0.167	6	86.6	0.168	1.062	1.155	0.206	
5500.0	100	802.11a	12.20	11.94	0.000	Right Touch	FCC #1	0.223	6	86.6	0.264	1.062	1.155	**0.324**	A13
5500.0	100	802.11a	12.20	11.94	0.000	Left Tilt	FCC #1	0.057	6	86.6	0.035	1.062	1.155	0.043	
5500.0	100	802.11a	12.20	11.94	0.000	Right Tilt	FCC #1	0.026	6	86.6	0.015	1.062	1.155	0.018	
5745.0	149	802.11a	12.20	11.91	0.000	Left Touch	FCC #1	0.178	6	86.6	0.168	1.069	1.155	0.207	
5745.0	149	802.11a	12.20	11.91	0.000	Right Touch	FCC #1	0.228	6	86.6	0.279	1.069	1.155	**0.344**	A14
5745.0	149	802.11a	12.20	11.91	0.000	Left Tilt	FCC #1	0.058	6	86.6	0.030	1.069	1.155	0.037	
5745.0	149	802.11a	12.20	11.91	0.000	Right Tilt	FCC #1	0.031	6	86.6	0.015	1.069	1.155	0.019	
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**							

11.2 Standalone Body-Worn SAR Worn SAR Results

Table 11.2.1 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	4183	WCDMA 850	RMC	23.00	22.49	0.010	10 mm [Front]	FCC #1	N/A	1:1	0.153	1.125	0.172	
836.6	4183	WCDMA 850	RMC	23.00	22.49	-0.020	10 mm [Rear]	FCC #1	N/A	1:1	0.208	1.125	**0.234**	A15
1732.4	1412	WCDMA 1700	RMC	21.00	20.83	0.010	10 mm [Front]	FCC #1	N/A	1:1	0.155	1.040	0.161	
1732.4	1412	WCDMA 1700	RMC	21.00	20.83	-0.000	10 mm [Rear]	FCC #1	N/A	1:1	0.470	1.040	**0.489**	A16
1880.0	9400	WCDMA 1900	RMC	22.00	21.40	0.010	10 mm [Front]	FCC #1	N/A	1:1	0.154	1.148	0.177	
1880.0	9400	WCDMA 1900	RMC	22.00	21.40	-0.030	10 mm [Rear]	FCC #1	N/A	1:1	0.191	1.148	**0.219**	A17
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 11.2.2 LTE B71, B12, B13, B14, B5, B66 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																	
680.5	23095	LTE B71	20	23.50	23.40	0.190	0	10 mm [Front]	FCC #1	QPSK	1	50	1:1	0.132	1.023	0.135	
680.5	23095	LTE B71	20	22.50	22.09	0.050	1	10 mm [Front]	FCC #1	QPSK	50	25	1:1	0.107	1.099	0.118	
680.5	23095	LTE B71	20	23.50	23.40	-0.120	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.178	1.023	**0.182**	A18
680.5	23095	LTE B71	20	22.50	22.09	-0.010	1	10 mm [Rear]	FCC #1	QPSK	50	25	1:1	0.164	1.099	0.180	
707.5	23095	LTE B12	10	23.50	23.38	-0.030	0	10 mm [Front]	FCC #1	QPSK	1	25	1:1	0.165	1.028	0.170	
707.5	23095	LTE B12	10	22.50	22.24	0.160	1	10 mm [Front]	FCC #1	QPSK	25	12	1:1	0.132	1.062	0.140	
707.5	23095	LTE B12	10	23.50	23.38	0.000	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.224	1.028	**0.230**	A19
707.5	23095	LTE B12	10	22.50	22.24	0.030	1	10 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.185	1.062	0.196	
782.0	23230	LTE B13	10	23.50	23.30	0.080	0	10 mm [Front]	FCC #1	QPSK	1	25	1:1	0.138	1.047	0.144	
782.0	23230	LTE B13	10	22.50	22.28	0.150	1	10 mm [Front]	FCC #1	QPSK	25	12	1:1	0.100	1.052	0.105	
782.0	23230	LTE B13	10	23.50	23.30	-0.010	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.416	1.047	**0.436**	A20
782.0	23230	LTE B13	10	22.50	22.28	-0.070	1	10 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.320	1.052	0.337	
793.0	23330	LTE B14	10	23.50	23.46	0.010	0	10 mm [Front]	FCC #1	QPSK	1	25	1:1	0.118	1.009	0.119	
793.0	23330	LTE B14	10	22.50	22.33	0.090	1	10 mm [Front]	FCC #1	QPSK	25	12	1:1	0.102	1.040	0.106	
793.0	23330	LTE B14	10	23.50	23.46	-0.000	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.433	1.009	**0.437**	A21
793.0	23330	LTE B14	10	22.50	22.33	0.010	1	10 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.329	1.040	0.342	
836.5	20525	LTE B5	10	23.50	23.42	0.010	0	10 mm [Front]	FCC #1	QPSK	1	0	1:1	0.249	1.019	0.254	
836.5	20525	LTE B5	10	22.50	22.16	-0.090	1	10 mm [Front]	FCC #1	QPSK	25	0	1:1	0.204	1.081	0.221	
836.5	20525	LTE B5	10	23.50	23.42	0.000	0	10 mm [Rear]	FCC #1	QPSK	1	0	1:1	0.335	1.019	**0.341**	A22
836.5	20525	LTE B5	10	22.50	22.16	-0.010	1	10 mm [Rear]	FCC #1	QPSK	25	0	1:1	0.276	1.081	0.298	
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									

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Table 11.2.3 LTE B66/B2 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																
1745.0	132322	LTE B66	20	22.50	22.42	0.080	0	10 mm [Front]	FCC #1	QPSK	1	0	1:1	0.130	1.019	0.132	
1745.0	132322	LTE B66	20	21.50	21.35	-0.030	1	10 mm [Front]	FCC #1	QPSK	50	0	1:1	0.100	1.035	0.104	
1745.0	132322	LTE B66	20	22.50	22.42	0.090	0	10 mm [Rear]	FCC #1	QPSK	1	0	1:1	0.295	1.019	**0.301**	A23
1745.0	132322	LTE B66	20	21.50	21.35	0.040	1	10 mm [Rear]	FCC #1	QPSK	50	0	1:1	0.229	1.035	0.237	
1880.0	18900	LTE B2	20	23.50	23.46	-0.000	0	10 mm [Front]	FCC #1	QPSK	1	50	1:1	0.174	1.009	0.176	
1880.0	18900	LTE B2	20	22.50	22.26	0.010	1	10 mm [Front]	FCC #1	QPSK	50	25	1:1	0.145	1.057	0.153	
1880.0	18900	LTE B2	20	23.50	23.46	-0.070	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.193	1.009	**0.195**	A24
1880.0	18900	LTE B2	20	22.50	22.26	-0.040	1	10 mm [Rear]	FCC #1	QPSK	50	25	1:1	0.145	1.057	0.153	
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 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														
2462.0	11	802.11b	17.00	16.91	0.160	10 mm [Front]	FCC #1	0.016	1	97.6	0.006	1.021	1.025	0.006	
2462.0	11	802.11b	17.00	16.91	0.190	10 mm [Rear]	FCC #1	0.029	1	97.6	0.027	1.021	1.025	**0.028**	A25
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**							

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											
2462.0	11	802.11b	DSSS	17.0	0.028	2437	802.11g	OFDM	14.0	0.501	**0.014**	X
2462.0	11	802.11b	DSSS	17.0	0.028	2437	802.11n (HT-20)	OFDM	12.0	0.316	**0.009**	X
2462.0	11	802.11b	DSSS	17.0	0.028	2437	802.11n (HT-40)	OFDM	12.0	0.316	**0.009**	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 ≤ 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														
5260.0	52	802.11a	12.20	11.79	0.150	10 mm [Front]	FCC #1	0.029	6	86.6	0.014	1.099	1.155	0.018	
5260.0	52	802.11a	12.20	11.79	-0.190	10 mm [Rear]	FCC #1	0.115	6	86.6	0.103	1.099	1.155	**0.131**	A26
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							

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											
5260.0	52	802.11a	OFDM	12.2	0.131	5180	802.11a	OFDM	12.2	1.000	**0.131**	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-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 ≤ 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														
5500.0	100	802.11a	12.20	11.94	-0.100	10 mm [Front]	FCC #1	0.044	6	86.6	0.024	1.062	1.155	0.029	
5500.0	100	802.11a	12.20	11.94	0.010	10 mm [Rear]	FCC #1	0.111	6	86.6	0.106	1.062	1.155	**0.130**	A27
5745.0	149	802.11a	12.20	11.91	0.000	10 mm [Front]	FCC #2	0.018	6	86.6	0.012	1.069	1.155	0.015	
5745.0	149	802.11a	12.20	11.91	0.090	10 mm [Rear]	FCC #2	0.074	6	86.6	0.058	1.069	1.155	**0.072**	A28
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 WCDMA Hotspot 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	4183	WCDMA 850	RMC	23.00	22.49	0.150	10 mm [Bottom]	FCC #1	N/A	1:1	0.039	1.125	0.044	
836.6	4183	WCDMA 850	RMC	23.00	22.49	0.010	10 mm [Front]	FCC #1	N/A	1:1	0.153	1.125	0.172	
836.6	4183	WCDMA 850	RMC	23.00	22.49	-0.020	10 mm [Rear]	FCC #1	N/A	1:1	0.208	1.125	**0.234**	A15
836.6	4183	WCDMA 850	RMC	23.00	22.49	-0.010	10 mm [Right]	FCC #1	N/A	1:1	0.128	1.125	0.144	
836.6	4183	WCDMA 850	RMC	23.00	22.49	0.020	10 mm [Left]	FCC #1	N/A	1:1	0.068	1.125	0.077	
836.6	4183	WCDMA 850	RMC	23.00	22.49	-0.010	10 mm [Rear]	FCC #1	N/A	1:1	0.185	1.125	0.208	
1732.4	1412	WCDMA 1700	RMC	21.00	20.83	0.060	10 mm [Bottom]	FCC #1	N/A	1:1	0.606	1.040	**0.630**	A29
1732.4	1412	WCDMA 1700	RMC	21.00	20.83	0.010	10 mm [Front]	FCC #1	N/A	1:1	0.155	1.040	0.161	
1732.4	1412	WCDMA 1700	RMC	21.00	20.83	-0.000	10 mm [Rear]	FCC #1	N/A	1:1	0.470	1.040	0.489	
1732.4	1412	WCDMA 1700	RMC	21.00	20.83	0.150	10 mm [Right]	FCC #1	N/A	1:1	0.049	1.040	0.051	
1732.4	1412	WCDMA 1700	RMC	21.00	20.83	0.020	10 mm [Left]	FCC #1	N/A	1:1	0.136	1.040	0.141	
1732.4	1412	WCDMA 1700	RMC	21.00	20.83	-0.060	10 mm [Bottom]	FCC #1	N/A	1:1	0.531	1.040	0.552	
1880.0	9400	WCDMA 1900	RMC	22.00	21.40	-0.020	10 mm [Bottom]	FCC #1	N/A	1:1	0.155	1.148	0.178	
1880.0	9400	WCDMA 1900	RMC	22.00	21.40	0.010	10 mm [Front]	FCC #1	N/A	1:1	0.154	1.148	0.177	
1880.0	9400	WCDMA 1900	RMC	22.00	21.40	-0.030	10 mm [Rear]	FCC #1	N/A	1:1	0.191	1.148	**0.219**	A17
1880.0	9400	WCDMA 1900	RMC	22.00	21.40	-0.040	10 mm [Right]	FCC #1	N/A	1:1	0.017	1.148	0.020	
1880.0	9400	WCDMA 1900	RMC	22.00	21.40	0.010	10 mm [Left]	FCC #1	N/A	1:1	0.080	1.148	0.092	
1880.0	9400	WCDMA 1900	RMC	22.00	21.40	0.010	10 mm [Rear]	FCC #1	N/A	1:1	0.179	1.148	0.205	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.3.2 LTE B71, B12 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																
680.5	23095	LTE B71	20	23.50	23.40	-0.150	0	10 mm [Bottom]	FCC #1	QPSK	1	50	1:1	0.017	1.023	0.017	
680.5	23095	LTE B71	20	22.50	22.09	-0.060	1	10 mm [Bottom]	FCC #1	QPSK	50	25	1:1	0.016	1.099	0.018	
680.5	23095	LTE B71	20	23.50	23.40	0.190	0	10 mm [Front]	FCC #1	QPSK	1	50	1:1	0.132	1.023	0.135	
680.5	23095	LTE B71	20	22.50	22.09	0.050	1	10 mm [Front]	FCC #1	QPSK	50	25	1:1	0.107	1.099	0.118	
680.5	23095	LTE B71	20	23.50	23.40	-0.120	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.178	1.023	**0.182**	A18
680.5	23095	LTE B71	20	22.50	22.09	-0.010	1	10 mm [Rear]	FCC #1	QPSK	50	25	1:1	0.164	1.099	0.180	
680.5	23095	LTE B71	20	23.50	23.40	0.030	0	10 mm [Right]	FCC #1	QPSK	1	50	1:1	0.125	1.023	0.128	
680.5	23095	LTE B71	20	22.50	22.09	-0.110	1	10 mm [Right]	FCC #1	QPSK	50	25	1:1	0.104	1.099	0.114	
680.5	23095	LTE B71	20	23.50	23.40	-0.010	0	10 mm [Left]	FCC #1	QPSK	1	50	1:1	0.131	1.023	0.134	
680.5	23095	LTE B71	20	22.50	22.09	0.150	1	10 mm [Left]	FCC #1	QPSK	50	25	1:1	0.098	1.099	0.108	
680.5	23095	LTE B71	20	23.50	23.40	-0.090	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.176	1.023	0.180	
707.5	23095	LTE B12	10	23.50	23.38	0.110	0	10 mm [Bottom]	FCC #1	QPSK	1	25	1:1	0.016	1.028	0.016	
707.5	23095	LTE B12	10	22.50	22.24	0.100	1	10 mm [Bottom]	FCC #1	QPSK	25	12	1:1	0.014	1.062	0.015	
707.5	23095	LTE B12	10	23.50	23.38	-0.030	0	10 mm [Front]	FCC #1	QPSK	1	25	1:1	0.165	1.028	0.170	
707.5	23095	LTE B12	10	22.50	22.24	0.160	1	10 mm [Front]	FCC #1	QPSK	25	12	1:1	0.132	1.062	0.140	
707.5	23095	LTE B12	10	23.50	23.38	0.000	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.224	1.028	**0.230**	A19
707.5	23095	LTE B12	10	22.50	22.24	0.030	1	10 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.185	1.062	0.196	
707.5	23095	LTE B12	10	23.50	23.38	0.140	0	10 mm [Right]	FCC #1	QPSK	1	25	1:1	0.135	1.028	0.139	
707.5	23095	LTE B12	10	22.50	22.24	-0.000	1	10 mm [Right]	FCC #1	QPSK	25	12	1:1	0.097	1.062	0.103	
707.5	23095	LTE B12	10	23.50	23.38	0.000	0	10 mm [Left]	FCC #1	QPSK	1	25	1:1	0.099	1.028	0.102	
707.5	23095	LTE B12	10	22.50	22.24	0.010	1	10 mm [Left]	FCC #1	QPSK	25	12	1:1	0.081	1.062	0.086	
707.5	23095	LTE B12	10	23.50	23.38	-0.030	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.208	1.028	0.214	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.3.3 LTE B13, B14 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																
782.0	23230	LTE B13	10	23.50	23.30	0.090	0	10 mm [Bottom]	FCC #1	QPSK	1	25	1:1	0.034	1.047	0.036	
782.0	23230	LTE B13	10	22.50	22.28	0.110	1	10 mm [Bottom]	FCC #1	QPSK	25	12	1:1	0.026	1.052	0.027	
782.0	23230	LTE B13	10	23.50	23.30	0.080	0	10 mm [Front]	FCC #1	QPSK	1	25	1:1	0.138	1.047	0.144	
782.0	23230	LTE B13	10	22.50	22.28	0.150	1	10 mm [Front]	FCC #1	QPSK	25	12	1:1	0.100	1.052	0.105	
782.0	23230	LTE B13	10	23.50	23.30	-0.010	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.416	1.047	**0.436**	A20
782.0	23230	LTE B13	10	22.50	22.28	-0.070	1	10 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.320	1.052	0.337	
782.0	23230	LTE B13	10	23.50	23.30	0.010	0	10 mm [Right]	FCC #1	QPSK	1	25	1:1	0.239	1.047	0.250	
782.0	23230	LTE B13	10	22.50	22.28	-0.090	1	10 mm [Right]	FCC #1	QPSK	25	12	1:1	0.179	1.052	0.188	
782.0	23230	LTE B13	10	23.50	23.30	0.090	0	10 mm [Left]	FCC #1	QPSK	1	25	1:1	0.151	1.047	0.158	
782.0	23230	LTE B13	10	22.50	22.28	-0.010	1	10 mm [Left]	FCC #1	QPSK	25	12	1:1	0.114	1.052	0.120	
782.0	23230	LTE B13	10	23.50	23.30	0.060	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.375	1.047	0.393	
793.0	23330	LTE B14	10	23.50	23.46	0.100	0	10 mm [Bottom]	FCC #1	QPSK	1	25	1:1	0.048	1.009	0.048	
793.0	23330	LTE B14	10	22.50	22.33	0.100	1	10 mm [Bottom]	FCC #1	QPSK	25	12	1:1	0.036	1.040	0.037	
793.0	23330	LTE B14	10	23.50	23.46	0.010	0	10 mm [Front]	FCC #1	QPSK	1	25	1:1	0.118	1.009	0.119	
793.0	23330	LTE B14	10	22.50	22.33	0.090	1	10 mm [Front]	FCC #1	QPSK	25	12	1:1	0.102	1.040	0.106	
793.0	23330	LTE B14	10	23.50	23.46	-0.000	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.433	1.009	**0.437**	A21
793.0	23330	LTE B14	10	22.50	22.33	0.010	1	10 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.329	1.040	0.342	
793.0	23330	LTE B14	10	23.50	23.46	0.020	0	10 mm [Right]	FCC #1	QPSK	1	25	1:1	0.262	1.009	0.264	
793.0	23330	LTE B14	10	22.50	22.33	-0.000	1	10 mm [Right]	FCC #1	QPSK	25	12	1:1	0.203	1.040	0.211	
793.0	23330	LTE B14	10	23.50	23.46	-0.120	0	10 mm [Left]	FCC #1	QPSK	1	25	1:1	0.141	1.009	0.142	
793.0	23330	LTE B14	10	22.50	22.33	0.020	1	10 mm [Left]	FCC #1	QPSK	25	12	1:1	0.107	1.040	0.111	
793.0	23330	LTE B14	10	23.50	23.46	-0.090	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.402	1.009	0.406	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.3.4 LTE B5 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																
836.5	20525	LTE B5	10	23.50	23.42	0.050	0	10 mm [Bottom]	FCC #1	QPSK	1	0	1:1	0.073	1.019	0.074	
836.5	20525	LTE B5	10	22.50	22.16	0.090	1	10 mm [Bottom]	FCC #1	QPSK	25	0	1:1	0.065	1.081	0.070	
836.5	20525	LTE B5	10	23.50	23.42	0.010	0	10 mm [Front]	FCC #1	QPSK	1	0	1:1	0.249	1.019	0.254	
836.5	20525	LTE B5	10	22.50	22.16	-0.090	1	10 mm [Front]	FCC #1	QPSK	25	0	1:1	0.204	1.081	0.221	
836.5	20525	LTE B5	10	23.50	23.42	0.000	0	10 mm [Rear]	FCC #1	QPSK	1	0	1:1	0.335	1.019	**0.341**	A22
836.5	20525	LTE B5	10	22.50	22.16	-0.010	1	10 mm [Rear]	FCC #1	QPSK	25	0	1:1	0.276	1.081	0.298	
836.5	20525	LTE B5	10	23.50	23.42	-0.040	0	10 mm [Right]	FCC #1	QPSK	1	0	1:1	0.209	1.019	0.213	
836.5	20525	LTE B5	10	22.50	22.16	-0.030	1	10 mm [Right]	FCC #1	QPSK	25	0	1:1	0.177	1.081	0.191	
836.5	20525	LTE B5	10	23.50	23.42	-0.000	0	10 mm [Left]	FCC #1	QPSK	1	0	1:1	0.098	1.019	0.100	
836.5	20525	LTE B5	10	22.50	22.16	0.020	1	10 mm [Left]	FCC #1	QPSK	25	0	1:1	0.084	1.081	0.091	
836.5	20525	LTE B5	10	23.50	23.42	-0.010	0	10 mm [Rear]	FCC #1	QPSK	1	0	1:1	0.311	1.019	0.317	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.3.5 LTE B66 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																
1745.0	132322	LTE B66	20	22.50	22.42	0.040	0	10 mm [Bottom]	FCC #1	QPSK	1	0	1:1	0.459	1.019	**0.468**	A30
1745.0	132322	LTE B66	20	21.50	21.35	-0.000	1	10 mm [Bottom]	FCC #1	QPSK	50	0	1:1	0.351	1.035	0.363	
1745.0	132322	LTE B66	20	22.50	22.42	0.080	0	10 mm [Front]	FCC #1	QPSK	1	0	1:1	0.130	1.019	0.132	
1745.0	132322	LTE B66	20	21.50	21.35	-0.030	1	10 mm [Front]	FCC #1	QPSK	50	0	1:1	0.100	1.035	0.104	
1745.0	132322	LTE B66	20	22.50	22.42	0.090	0	10 mm [Rear]	FCC #1	QPSK	1	0	1:1	0.295	1.019	0.301	
1745.0	132322	LTE B66	20	21.50	21.35	0.040	1	10 mm [Rear]	FCC #1	QPSK	50	0	1:1	0.229	1.035	0.237	
1745.0	132322	LTE B66	20	22.50	22.42	-0.030	0	10 mm [Right]	FCC #1	QPSK	1	0	1:1	0.046	1.019	0.047	
1745.0	132322	LTE B66	20	21.50	21.35	0.060	1	10 mm [Right]	FCC #1	QPSK	50	0	1:1	0.041	1.035	0.042	
1745.0	132322	LTE B66	20	22.50	22.42	-0.040	0	10 mm [Left]	FCC #1	QPSK	1	0	1:1	0.168	1.019	0.171	
1745.0	132322	LTE B66	20	21.50	21.35	0.020	1	10 mm [Left]	FCC #1	QPSK	50	0	1:1	0.137	1.035	0.142	
1745.0	132322	LTE B66	20	22.50	22.42	0.030	0	10 mm [Bottom]	FCC #1	QPSK	1	0	1:1	0.415	1.019	0.423	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

Table 11.3.6 LTE B2 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																	
1880.0	18900	LTE B2	20	23.50	23.46	-0.030	0	10 mm [Bottom]	FCC #1	QPSK	1	50	1:1	0.243	1.009	**0.245**	A31
1880.0	18900	LTE B2	20	22.50	22.26	0.020	1	10 mm [Bottom]	FCC #1	QPSK	50	25	1:1	0.195	1.057	0.206	
1880.0	18900	LTE B2	20	23.50	23.46	-0.000	0	10 mm [Front]	FCC #1	QPSK	1	50	1:1	0.174	1.009	0.176	
1880.0	18900	LTE B2	20	22.50	22.26	0.010	1	10 mm [Front]	FCC #1	QPSK	50	25	1:1	0.145	1.057	0.153	
1880.0	18900	LTE B2	20	23.50	23.46	-0.070	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.193	1.009	0.195	
1880.0	18900	LTE B2	20	22.50	22.26	-0.040	1	10 mm [Rear]	FCC #1	QPSK	50	25	1:1	0.145	1.057	0.153	
1880.0	18900	LTE B2	20	23.50	23.46	-0.080	0	10 mm [Right]	FCC #1	QPSK	1	50	1:1	0.035	1.009	0.035	
1880.0	18900	LTE B2	20	22.50	22.26	-0.040	1	10 mm [Right]	FCC #1	QPSK	50	25	1:1	0.026	1.057	0.027	
1880.0	18900	LTE B2	20	23.50	23.46	-0.120	0	10 mm [Left]	FCC #1	QPSK	1	50	1:1	0.192	1.009	0.194	
1880.0	18900	LTE B2	20	22.50	22.26	0.060	1	10 mm [Left]	FCC #1	QPSK	50	25	1:1	0.156	1.057	0.165	
1880.0	18900	LTE B2	20	23.50	23.46	0.020	0	10 mm [Bottom]	FCC #1	QPSK	1	50	1:1	0.230	1.009	0.232	
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. Green entries represent the SIM2 measurement on the worst case for SIM1 measurement.

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														
2462.0	11	802.11b	17.00	16.91	0.160	10 mm [Front]	FCC #1	0.016	1	97.6	0.006	1.021	1.025	0.006	
2462.0	11	802.11b	17.00	16.91	0.190	10 mm [Rear]	FCC #1	0.029	1	97.6	0.027	1.021	1.025	0.028	
2462.0	11	802.11b	17.00	16.91	-0.040	10 mm [Right]	FCC #1	0.052	1	97.6	0.053	1.021	1.025	**0.055**	A32
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							

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											
2462.0	11	802.11b	DSSS	17.0	0.055	2437	802.11g	OFDM	14.0	0.501	**0.028**	X
2462.0	11	802.11b	DSSS	17.0	0.055	2437	802.11n (HT-20)	OFDM	12.0	0.316	**0.017**	X
2462.0	11	802.11b	DSSS	17.0	0.055	2437	802.11n (HT-40)	OFDM	12.0	0.316	**0.017**	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 ≤ 1.2 W/kg.

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	10g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	10g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5260.0	52	802.11a	12.20	11.79	0.000	0 mm [Front]	FCC #2	0.092	6	86.6	0.021	1.099	1.155	0.027	
5260.0	52	802.11a	12.20	11.79	-0.140	0 mm [Rear]	FCC #2	0.421	6	86.6	0.138	1.099	1.155	0.175	
5260.0	52	802.11a	12.20	11.79	-0.030	0 mm [Right]	FCC #2	0.875	6	86.6	0.163	1.099	1.155	**0.207**	A33
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Phablet 4.0 W/kg (mW/g)** averaged over 10 gram							

Adjusted SAR results for UNII-1 and UNII-2A SAR												
FREQUENCY		Mode/ Antenna	Service	Maximum Allowed Power [dBm]	10g Scaled SAR (W/kg)	FREQUENCY [MHz]	Mode	Service	Maximum Allowed Power [dBm	Adjusted Factor	10g Adjusted SAR (W/kg)	SAR for the band with lower maximum output power
MHz	Ch											
5260.0	52	802.11a	OFDM	12.2	0.207	5180	802.11a	OFDM	12.2	1.000	**0.207**	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 ≤ 3.0 W/kg, SAR is not required for the band with lower maximum output power in that test configuration.

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	10g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	10g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5500.0	100	802.11a	12.20	11.94	-0.160	0 mm [Front]	FCC #2	0.092	6	86.6	0.024	1.062	1.155	0.029	
5500.0	100	802.11a	12.20	11.94	-0.040	0 mm [Rear]	FCC #2	0.421	6	86.6	0.127	1.062	1.155	0.156	
5500.0	100	802.11a (Ant.1)	12.20	11.94	-0.000	10 mm [Right]	FCC #2	0.875	6	86.6	0.268	1.062	1.155	**0.329**	A34
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Phablet 4.0 W/kg (mW/g)** averaged over 10 gram							

Table 11.4.3 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	10g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	10g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5745.0	149	802.11a (Ant.1)	12.20	11.91	-0.100	10 mm [Front]	FCC #2	0.095	6	86.6	0.023	1.069	1.155	0.028	
5745.0	149	802.11a (Ant.1)	12.20	11.91	-0.000	10 mm [Rear]	FCC #2	0.202	6	86.6	0.063	1.069	1.155	0.078	
5745.0	149	802.11a (Ant.1)	12.20	11.91	-0.130	10 mm [Right]	FCC #2	0.467	6	86.6	0.137	1.069	1.155	**0.169**	A35
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Phablet 4.0 W/kg (mW/g)** averaged over 10 gram							

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 boy-worn SAR was not > 1.2 W/kg, no 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.

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 ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r05. The general test procedures used for testing can be found in Section 8.4.4.
2. According to FCC KDB 941225 D05v02r05, when the reported SAR is ≤ 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. 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 ≤ 0.4 W/kg, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required duo 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 ≤ 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 ≤ 0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg or all test channels were measured.
5. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor to determine compliance.

Bluetooth Notes:

1. Bluetooth SAR was measured with the device connected to a call with hopping disabled with DH5 operation.
   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.

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 a physical test configuration is ≤ 1.6 W/kg. The different test positon in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1-g or 10-g SAR.

Table 12.2.1 Estimated SAR (Head)

Mode	Frequency	Maximum Allowed Power		Separation Distance (Hand)	Estimated SAR (Body)
	[MHz]	[dBm]	[mW]	[mm]	[W/kg]
Bluetooth	2441	11.5	14	5	0.589

Table 12.2.2 Estimated SAR (Body)

Mode	Frequency	Maximum Allowed Power		Separation Distance (Hand)	Estimated SAR (Body)
	[MHz]	[dBm]	[mW]	[mm]	[W/kg]
Bluetooth	2441	11.5	14	10	0.294

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	WCDMA B5/B4/B2 (Voice)	WCDMA B5/B4/B2 (Data)	LTE B71/B12/B13/B14/ B5/B66/B4/B2	WIFI 2.4GHz 802.11b/g/n	WIFI 5GHz 802.11a/n/ac	Bluetooth 2.4GHz
1	WCDMA B5/B4/B2 (Voice)		No	No	Yes	Yes	Yes
2	WCDMA B5/B4/B2 (Data)	No		No	Yes	Yes	Yes
3	LTE B71/B12/B13/B14/B5/B66/B4/B2	No	No		Yes	Yes	Yes
4	WIFI 2.4GHz 802.11b/g/n	Yes	Yes	Yes		No	No
5	WIFI 5GHz 802.11a/n/ac	Yes	Yes	Yes	No		No
6	Bluetooth 2.4GHz	Yes	Yes	Yes	No	No	

Table 12.3.2 Simultaneous SAR Cases

No.	Capable Transmit Configuration	Head SAR	Body-Worn SAR	Hotspot SAR	Phablet SAR	Note
1	WCDMA + Wi-Fi 2.4 GHz	Yes	Yes	Yes	Yes	
2	WCDMA + Wi-Fi 5 GHz	Yes	Yes	No	Yes	
3	WCDMA + Bluetooth 2.4 GHz	Yes	Yes	Yes	Yes	
4	LTE + Wi-Fi 2.4 GHz	Yes	Yes	Yes	Yes	
5	LTE + Wi-Fi 5 GHz	Yes	Yes	No	Yes	
6	LTE + Bluetooth 2.4 GHz	Yes	Yes	Yes	Yes	

Notes:

1. WiFi 2.4GHz is supported Hotspot and WiFi-Direct(GO/GC).
2. WiFi 5GHz is not supported Hotspot.
3. LTE, WCDMA is supported Hotspot.
4. VoIP is supported in LTE, WCDMA.
5. Bluetooth and WiFi can not transmit simultaneously at 2.4G band.
6. 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.

12.4 Head SAR Simultaneous Transmission Analysis

Table 12.4.1 Simultaneous Transmission Scenario : 3G/4G + 2.4 GHz W-LAN (Held to Ear)

Exposure Condition	Mode	Configuration	3G/4G SAR (W/kg)	2.4G W-LAN SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	WCDMA 850	Left Touch	0.206	0.126	0.332
		Right Touch	0.259	0.223	**0.482**
		Left Tilt	0.111	0.049	0.160
		Right Tilt	0.105	0.039	0.144
	WCDMA 1700	Left Touch	0.153	0.126	0.279
		Right Touch	0.077	0.223	**0.300**
		Left Tilt	0.022	0.049	0.071
		Right Tilt	0.052	0.039	0.091
	WCDMA 1900	Left Touch	0.240	0.126	**0.366**
		Right Touch	0.103	0.223	0.326
		Left Tilt	0.045	0.049	0.094
		Right Tilt	0.069	0.039	0.108
	LTE Band 71	Left Touch	0.117	0.126	0.243
		Right Touch	0.109	0.223	**0.332**
		Left Tilt	0.059	0.049	0.108
		Right Tilt	0.056	0.039	0.095
	LTE Band 12	Left Touch	0.145	0.126	0.271
		Right Touch	0.162	0.223	**0.385**
		Left Tilt	0.077	0.049	0.126
		Right Tilt	0.082	0.039	0.121
	LTE Band 13	Left Touch	0.262	0.126	0.388
		Right Touch	0.283	0.223	**0.506**
		Left Tilt	0.179	0.049	0.228
		Right Tilt	0.168	0.039	0.207
	LTE Band 14	Left Touch	0.261	0.126	0.387
		Right Touch	0.336	0.223	**0.559**
		Left Tilt	0.183	0.049	0.232
		Right Tilt	0.165	0.039	0.204
	LTE Band 5	Left Touch	0.206	0.126	0.332
		Right Touch	0.248	0.223	**0.471**
		Left Tilt	0.112	0.049	0.161
		Right Tilt	0.109	0.039	0.148
	LTE Band 66	Left Touch	0.147	0.126	0.273
		Right Touch	0.072	0.223	**0.295**
		Left Tilt	0.017	0.049	0.066
		Right Tilt	0.039	0.039	0.078
	LTE Band 2	Left Touch	0.231	0.126	**0.357**
		Right Touch	0.086	0.223	0.309
		Left Tilt	0.030	0.049	0.079
		Right Tilt	0.043	0.039	0.082

Table 12.4.2 Simultaneous Transmission Scenario : 3G/4G + 5.3 GHz W-LAN (Held to Ear)

Exposure Condition	Mode	Configuration	3G/4G SAR (W/kg)	5.3G W-LAN SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	WCDMA 850	Left Touch	0.206	0.199	0.405
		Right Touch	0.259	0.299	**0.558**
		Left Tilt	0.111	0.037	0.148
		Right Tilt	0.105	0.009	0.114
	WCDMA 1700	Left Touch	0.153	0.199	0.352
		Right Touch	0.077	0.299	**0.376**
		Left Tilt	0.022	0.037	0.059
		Right Tilt	0.052	0.009	0.061
	WCDMA 1900	Left Touch	0.240	0.199	**0.439**
		Right Touch	0.103	0.299	0.402
		Left Tilt	0.045	0.037	0.082
		Right Tilt	0.069	0.009	0.078
	LTE Band 71	Left Touch	0.117	0.199	0.316
		Right Touch	0.109	0.299	**0.408**
		Left Tilt	0.059	0.037	0.096
		Right Tilt	0.056	0.009	0.065
	LTE Band 12	Left Touch	0.145	0.199	0.344
		Right Touch	0.162	0.299	**0.461**
		Left Tilt	0.077	0.037	0.114
		Right Tilt	0.082	0.009	0.091
	LTE Band 13	Left Touch	0.262	0.199	0.461
		Right Touch	0.283	0.299	**0.582**
		Left Tilt	0.179	0.037	0.216
		Right Tilt	0.168	0.009	0.177
	LTE Band 14	Left Touch	0.261	0.199	0.460
		Right Touch	0.336	0.299	**0.635**
		Left Tilt	0.183	0.037	0.220
		Right Tilt	0.165	0.009	0.174
	LTE Band 5	Left Touch	0.206	0.199	0.405
		Right Touch	0.248	0.299	**0.547**
		Left Tilt	0.112	0.037	0.149
		Right Tilt	0.109	0.009	0.118
	LTE Band 66	Left Touch	0.147	0.199	0.346
		Right Touch	0.072	0.299	**0.371**
		Left Tilt	0.017	0.037	0.054
		Right Tilt	0.039	0.009	0.048
	LTE Band 2	Left Touch	0.231	0.199	**0.430**
		Right Touch	0.086	0.299	0.385
		Left Tilt	0.030	0.037	0.067
		Right Tilt	0.043	0.009	0.052

Table 12.4.3 Simultaneous Transmission Scenario : 3G/4G + 5.6 GHz W-LAN (Held to Ear)

Exposure Condition	Mode	Configuration	3G/4G SAR (W/kg)	5.6G W-LAN SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	WCDMA 850	Left Touch	0.206	0.206	0.412
		Right Touch	0.259	0.324	**0.583**
		Left Tilt	0.111	0.043	0.154
		Right Tilt	0.105	0.018	0.123
	WCDMA 1700	Left Touch	0.153	0.206	0.359
		Right Touch	0.077	0.324	**0.401**
		Left Tilt	0.022	0.043	0.065
		Right Tilt	0.052	0.018	0.070
	WCDMA 1900	Left Touch	0.240	0.206	**0.446**
		Right Touch	0.103	0.324	0.427
		Left Tilt	0.045	0.043	0.088
		Right Tilt	0.069	0.018	0.087
	LTE Band 71	Left Touch	0.117	0.206	0.323
		Right Touch	0.109	0.324	**0.433**
		Left Tilt	0.059	0.043	0.102
		Right Tilt	0.056	0.018	0.074
	LTE Band 12	Left Touch	0.145	0.206	0.351
		Right Touch	0.162	0.324	**0.486**
		Left Tilt	0.077	0.043	0.120
		Right Tilt	0.082	0.018	0.100
	LTE Band 13	Left Touch	0.262	0.206	0.468
		Right Touch	0.283	0.324	**0.607**
		Left Tilt	0.179	0.043	0.222
		Right Tilt	0.168	0.018	0.186
	LTE Band 14	Left Touch	0.261	0.206	0.467
		Right Touch	0.336	0.324	**0.660**
		Left Tilt	0.183	0.043	0.226
		Right Tilt	0.165	0.018	0.183
	LTE Band 5	Left Touch	0.206	0.206	0.412
		Right Touch	0.248	0.324	**0.572**
		Left Tilt	0.112	0.043	0.155
		Right Tilt	0.109	0.018	0.127
	LTE Band 66	Left Touch	0.147	0.206	0.353
		Right Touch	0.072	0.324	**0.396**
		Left Tilt	0.017	0.043	0.060
		Right Tilt	0.039	0.018	0.057
	LTE Band 2	Left Touch	0.231	0.206	**0.437**
		Right Touch	0.086	0.324	0.410
		Left Tilt	0.030	0.043	0.073
		Right Tilt	0.043	0.018	0.061

Table 12.4.4 Simultaneous Transmission Scenario : 3G/4G + 5.8 GHz W-LAN (Held to Ear)

Exposure Condition	Mode	Configuration	3G/4G SAR (W/kg)	5.8G W-LAN SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	WCDMA 850	Left Touch	0.206	0.207	0.413
		Right Touch	0.259	0.344	**0.603**
		Left Tilt	0.111	0.037	0.148
		Right Tilt	0.105	0.019	0.124
	WCDMA 1700	Left Touch	0.153	0.207	0.360
		Right Touch	0.077	0.344	**0.421**
		Left Tilt	0.022	0.037	0.059
		Right Tilt	0.052	0.019	0.071
	WCDMA 1900	Left Touch	0.240	0.207	**0.447**
		Right Touch	0.103	0.344	**0.447**
		Left Tilt	0.045	0.037	0.082
		Right Tilt	0.069	0.019	0.088
	LTE Band 71	Left Touch	0.117	0.207	0.324
		Right Touch	0.109	0.344	**0.453**
		Left Tilt	0.059	0.037	0.096
		Right Tilt	0.056	0.019	0.075
	LTE Band 12	Left Touch	0.145	0.207	0.352
		Right Touch	0.162	0.344	**0.506**
		Left Tilt	0.077	0.037	0.114
		Right Tilt	0.082	0.019	0.101
	LTE Band 13	Left Touch	0.262	0.207	0.469
		Right Touch	0.283	0.344	**0.627**
		Left Tilt	0.179	0.037	0.216
		Right Tilt	0.168	0.019	0.187
	LTE Band 14	Left Touch	0.261	0.207	0.468
		Right Touch	0.336	0.344	**0.680**
		Left Tilt	0.183	0.037	0.220
		Right Tilt	0.165	0.019	0.184
	LTE Band 5	Left Touch	0.206	0.207	0.413
		Right Touch	0.248	0.344	**0.592**
		Left Tilt	0.112	0.037	0.149
		Right Tilt	0.109	0.019	0.128
	LTE Band 66	Left Touch	0.147	0.207	0.354
		Right Touch	0.072	0.344	**0.416**
		Left Tilt	0.017	0.037	0.054
		Right Tilt	0.039	0.019	0.058
	LTE Band 2	Left Touch	0.231	0.207	**0.438**
		Right Touch	0.086	0.344	0.430
		Left Tilt	0.030	0.037	0.067
		Right Tilt	0.043	0.019	0.062

Table 12.4.5 Simultaneous Transmission Scenario : 3G/4G + Bluetooth (Held to Ear)

Exposure Condition	Mode	Configuration	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	WCDMA 850	Left Touch	0.206	0.589	0.795
		Right Touch	0.259	0.589	**0.848**
		Left Tilt	0.111	0.589	0.700
		Right Tilt	0.105	0.589	0.694
	WCDMA 1700	Left Touch	0.153	0.589	**0.742**
		Right Touch	0.077	0.589	0.666
		Left Tilt	0.022	0.589	0.611
		Right Tilt	0.052	0.589	0.641
	WCDMA 1900	Left Touch	0.240	0.589	**0.829**
		Right Touch	0.103	0.589	0.692
		Left Tilt	0.045	0.589	0.634
		Right Tilt	0.069	0.589	0.658
	LTE Band 71	Left Touch	0.117	0.589	**0.706**
		Right Touch	0.109	0.589	0.698
		Left Tilt	0.059	0.589	0.648
		Right Tilt	0.056	0.589	0.645
	LTE Band 12	Left Touch	0.145	0.589	0.734
		Right Touch	0.162	0.589	**0.751**
		Left Tilt	0.077	0.589	0.666
		Right Tilt	0.082	0.589	0.671
	LTE Band 13	Left Touch	0.262	0.589	0.851
		Right Touch	0.283	0.589	**0.872**
		Left Tilt	0.179	0.589	0.768
		Right Tilt	0.168	0.589	0.757
	LTE Band 14	Left Touch	0.261	0.589	0.850
		Right Touch	0.336	0.589	**0.925**
		Left Tilt	0.183	0.589	0.772
		Right Tilt	0.165	0.589	0.754
	LTE Band 5	Left Touch	0.206	0.589	0.795
		Right Touch	0.248	0.589	**0.837**
		Left Tilt	0.112	0.589	0.701
		Right Tilt	0.109	0.589	0.698
	LTE Band 66	Left Touch	0.147	0.589	**0.736**
		Right Touch	0.072	0.589	0.661
		Left Tilt	0.017	0.589	0.606
		Right Tilt	0.039	0.589	0.628
	LTE Band 2	Left Touch	0.231	0.589	**0.820**
		Right Touch	0.086	0.589	0.675
		Left Tilt	0.030	0.589	0.619
		Right Tilt	0.043	0.589	0.632

12.5 Body-Worn Simultaneous Transmission Analysis

Table 12.5.1 Simultaneous Transmission Scenario : 3G/4G + 2.4 GHz W-LAN (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	3G/4G SAR (W/kg)	2.4G W-LAN SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	WCDMA 850	Front	0.172	0.006	0.178
		Rear	0.234	0.028	**0.262**
	WCDMA 1700	Front	0.161	0.006	0.167
		Rear	0.489	0.028	**0.517**
	WCDMA 1900	Front	0.177	0.006	0.183
		Rear	0.219	0.028	**0.247**
	LTE Band 71	Front	0.135	0.006	0.141
		Rear	0.182	0.028	**0.210**
	LTE Band 12	Front	0.170	0.006	0.176
		Rear	0.230	0.028	**0.258**
	LTE Band 13	Front	0.144	0.006	0.150
		Rear	0.436	0.028	**0.464**
	LTE Band 14	Front	0.119	0.006	0.125
		Rear	0.437	0.028	**0.465**
	LTE Band 5	Front	0.254	0.006	0.260
		Rear	0.341	0.028	**0.369**
	LTE Band 66	Front	0.132	0.006	0.138
		Rear	0.301	0.028	**0.329**
	LTE Band 2	Front	0.176	0.006	0.182
		Rear	0.195	0.028	**0.223**

Table 12.5.2 Simultaneous Transmission Scenario : 3G/4G + 5.3 GHz W-LAN (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	3G/4G SAR (W/kg)	5.3G W-LAN SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	WCDMA 850	Front	0.172	0.018	0.190
		Rear	0.234	0.131	**0.365**
	WCDMA 1700	Front	0.161	0.018	0.179
		Rear	0.489	0.131	**0.620**
	WCDMA 1900	Front	0.177	0.018	0.195
		Rear	0.219	0.131	**0.350**
	LTE Band 71	Front	0.135	0.018	0.153
		Rear	0.182	0.131	**0.313**
	LTE Band 12	Front	0.170	0.018	0.188
		Rear	0.230	0.131	**0.361**
	LTE Band 13	Front	0.144	0.018	0.162
		Rear	0.436	0.131	**0.567**
	LTE Band 14	Front	0.119	0.018	0.137
		Rear	0.437	0.131	**0.568**
	LTE Band 5	Front	0.254	0.018	0.272
		Rear	0.341	0.131	**0.472**
	LTE Band 66	Front	0.132	0.018	0.150
		Rear	0.301	0.131	**0.432**
	LTE Band 2	Front	0.176	0.018	0.194
		Rear	0.195	0.131	**0.326**

Table 12.5.3 Simultaneous Transmission Scenario : 3G/4G + 5.6 GHz W-LAN (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	3G/4G SAR (W/kg)	5.6G W-LAN SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	WCDMA 850	Front	0.172	0.029	0.201
		Rear	0.234	0.130	**0.364**
	WCDMA 1700	Front	0.161	0.029	0.190
		Rear	0.489	0.130	**0.619**
	WCDMA 1900	Front	0.177	0.029	0.206
		Rear	0.219	0.130	**0.349**
	LTE Band 71	Front	0.135	0.029	0.164
		Rear	0.182	0.130	**0.312**
	LTE Band 12	Front	0.170	0.029	0.199
		Rear	0.230	0.130	**0.360**
	LTE Band 13	Front	0.144	0.029	0.173
		Rear	0.436	0.130	**0.566**
	LTE Band 14	Front	0.119	0.029	0.148
		Rear	0.437	0.130	**0.567**
	LTE Band 5	Front	0.254	0.029	0.283
		Rear	0.341	0.130	**0.471**
	LTE Band 66	Front	0.132	0.029	0.161
		Rear	0.301	0.130	**0.431**
	LTE Band 2	Front	0.176	0.029	0.205
		Rear	0.195	0.130	**0.325**

Table 12.5.4 Simultaneous Transmission Scenario : 3G/4G + 5.8 GHz W-LAN (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	3G/4G SAR (W/kg)	5.8G W-LAN SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	WCDMA 850	Front	0.172	0.015	0.187
		Rear	0.234	0.072	**0.306**
	WCDMA 1700	Front	0.161	0.015	0.176
		Rear	0.489	0.072	**0.561**
	WCDMA 1900	Front	0.177	0.015	0.192
		Rear	0.219	0.072	**0.291**
	LTE Band 71	Front	0.135	0.015	0.150
		Rear	0.182	0.072	**0.254**
	LTE Band 12	Front	0.170	0.015	0.185
		Rear	0.230	0.072	**0.302**
	LTE Band 13	Front	0.144	0.015	0.159
		Rear	0.436	0.072	**0.508**
	LTE Band 14	Front	0.119	0.015	0.134
		Rear	0.437	0.072	**0.509**
	LTE Band 5	Front	0.254	0.015	0.269
		Rear	0.341	0.072	**0.413**
	LTE Band 66	Front	0.132	0.015	0.147
		Rear	0.301	0.072	**0.373**
	LTE Band 2	Front	0.176	0.015	0.191
		Rear	0.195	0.072	**0.267**

Table 12.5.5 Simultaneous Transmission Scenario : 3G/4G + Bluetooth (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	WCDMA 850	Front	0.172	0.294	0.466
		Rear	0.234	0.294	**0.528**
	WCDMA 1700	Front	0.161	0.294	0.455
		Rear	0.489	0.294	**0.783**
	WCDMA 1900	Front	0.177	0.294	0.471
		Rear	0.219	0.294	**0.513**
	LTE Band 71	Front	0.135	0.294	0.429
		Rear	0.182	0.294	**0.476**
	LTE Band 12	Front	0.170	0.294	0.464
		Rear	0.230	0.294	**0.524**
	LTE Band 13	Front	0.144	0.294	0.438
		Rear	0.436	0.294	**0.730**
	LTE Band 14	Front	0.119	0.294	0.413
		Rear	0.437	0.294	**0.731**
	LTE Band 5	Front	0.254	0.294	0.548
		Rear	0.341	0.294	**0.635**
	LTE Band 66	Front	0.132	0.294	0.426
		Rear	0.301	0.294	**0.595**
	LTE Band 2	Front	0.176	0.294	0.470
		Rear	0.195	0.294	**0.489**

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 : 3G/4G + 2.4 GHz W-LAN (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	3G/4G SAR (W/kg)	2.4G W-LAN SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	WCDMA 850	Top	0.000	0.000	0.000
		Bottom	0.044	0.000	0.044
		Front	0.172	0.006	0.178
		Rear	0.234	0.028	**0.262**
		Right	0.144	0.055	0.199
		Left	0.077	0.000	0.077
	WCDMA 1700	Top	0.000	0.000	0.000
		Bottom	0.630	0.000	**0.630**
		Front	0.161	0.006	0.167
		Rear	0.489	0.028	0.517
		Right	0.051	0.055	0.106
		Left	0.141	0.000	0.141
	WCDMA 1900	Top	0.000	0.000	0.000
		Bottom	0.178	0.000	0.178
		Front	0.177	0.006	0.183
		Rear	0.219	0.028	**0.247**
		Right	0.020	0.055	0.075
		Left	0.092	0.000	0.092
	LTE Band 71	Top	0.000	0.000	0.000
		Bottom	0.018	0.000	0.018
		Front	0.135	0.006	0.141
		Rear	0.182	0.028	**0.210**
		Right	0.128	0.055	0.183
		Left	0.134	0.000	0.134
	LTE Band 12	Top	0.000	0.000	0.000
		Bottom	0.016	0.000	0.016
		Front	0.170	0.006	0.176
		Rear	0.230	0.028	**0.258**
		Right	0.139	0.055	0.194
		Left	0.102	0.000	0.102
	LTE Band 13	Top	0.000	0.000	0.000
		Bottom	0.036	0.000	0.036
		Front	0.144	0.006	0.150
		Rear	0.436	0.028	**0.464**
		Right	0.250	0.055	0.305
		Left	0.158	0.000	0.158
	LTE Band 14	Top	0.000	0.000	0.000
		Bottom	0.048	0.000	0.048
		Front	0.119	0.006	0.125
		Rear	0.437	0.028	**0.465**
		Right	0.264	0.055	0.319
		Left	0.142	0.000	0.142
	LTE Band 5	Top	0.000	0.000	0.000
		Bottom	0.074	0.000	0.074
		Front	0.254	0.006	0.260
		Rear	0.341	0.028	**0.369**
		Right	0.213	0.055	0.268
		Left	0.100	0.000	0.100
	LTE Band 66	Top	0.000	0.000	0.000
		Bottom	0.468	0.000	**0.468**
		Front	0.132	0.006	0.138
		Rear	0.301	0.028	0.329
		Right	0.047	0.055	0.102
		Left	0.171	0.000	0.171
	LTE Band 2	Top	0.000	0.000	0.000
		Bottom	0.245	0.000	**0.245**
		Front	0.176	0.006	0.182
		Rear	0.195	0.028	0.223
		Right	0.035	0.055	0.090
		Left	0.194	0.000	0.194

Table 12.6.2 Simultaneous Transmission Scenario : 3G/4G + Bluetooth (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	WCDMA 850	Top	0.000	0.294	0.294
		Bottom	0.044	0.294	0.338
		Front	0.172	0.294	0.466
		Rear	0.234	0.294	**0.528**
		Right	0.144	0.294	0.438
		Left	0.077	0.294	0.371
	WCDMA 1700	Top	0.000	0.294	0.294
		Bottom	0.630	0.294	**0.924**
		Front	0.161	0.294	0.455
		Rear	0.489	0.294	0.783
		Right	0.051	0.294	0.345
		Left	0.141	0.294	0.435
	WCDMA 1900	Top	0.000	0.294	0.294
		Bottom	0.178	0.294	0.472
		Front	0.177	0.294	0.471
		Rear	0.219	0.294	**0.513**
		Right	0.020	0.294	0.314
		Left	0.092	0.294	0.386
	LTE Band 71	Top	0.000	0.294	0.294
		Bottom	0.018	0.294	0.312
		Front	0.135	0.294	0.429
		Rear	0.182	0.294	**0.476**
		Right	0.128	0.294	0.422
		Left	0.134	0.294	0.428
	LTE Band 12	Top	0.000	0.294	0.294
		Bottom	0.016	0.294	0.310
		Front	0.170	0.294	0.464
		Rear	0.230	0.294	**0.524**
		Right	0.139	0.294	0.433
		Left	0.102	0.294	0.396
	LTE Band 13	Top	0.000	0.294	0.294
		Bottom	0.036	0.294	0.330
		Front	0.144	0.294	0.438
		Rear	0.436	0.294	**0.730**
		Right	0.250	0.294	0.544
		Left	0.158	0.294	0.452
	LTE Band 14	Top	0.000	0.294	0.294
		Bottom	0.048	0.294	0.342
		Front	0.119	0.294	0.413
		Rear	0.437	0.294	**0.731**
		Right	0.264	0.294	0.558
		Left	0.142	0.294	0.436
	LTE Band 5	Top	0.000	0.294	0.294
		Bottom	0.074	0.294	0.368
		Front	0.254	0.294	0.548
		Rear	0.341	0.294	0.635
		Right	0.213	0.294	0.507
		Left	0.100	0.294	0.394
	LTE Band 66	Top	0.000	0.294	0.294
		Bottom	0.468	0.294	**0.762**
		Front	0.132	0.294	0.426
		Rear	0.301	0.294	0.595
		Right	0.047	0.294	0.341
		Left	0.171	0.294	0.465
	LTE Band 2	Top	0.000	0.294	0.294
		Bottom	0.245	0.294	**0.539**
		Front	0.176	0.294	0.470
		Rear	0.195	0.294	0.489
		Right	0.035	0.294	0.329
		Left	0.194	0.294	0.488

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 to 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. 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
☒	Robot	SPEAG	TX90XL	N/A	N/A	F13/5RR2A1/A/01
☒	Robot Controller	SPEAG	CS8C	N/A	N/A	F13/5RR2A1/C/01
☒	Joystick	SPEAG	N/A	N/A	N/A	S-13200990
☒	IntelCorei7-3770 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
☒	Device Holder	SPEAG	Holder	N/A	N/A	SD000H01HA
☒	Twin SAM Phantom	SPEAG	QD000P40CD	N/A	N/A	1786
☒	Data Acquisition Electronics	SPEAG	DAE4V1	2018-08-22	2019-08-22	1396
☒	Dosimetric E-Field Probe	SPEAG	EX3DV4	2018-09-25	2019-09-25	3933
☒	Dosimetric E-Field Probe	SPEAG	EX3DV4	2018-11-22	2019-11-22	7337
☒	750MHz SAR Dipole	SPEAG	D750V3	2018-01-18	2020-01-18	1049
☒	835MHz SAR Dipole	SPEAG	D835V2	2018-08-23	2020-08-23	4d159
☒	1800MHz SAR Dipole	SPEAG	D1800V2	2018-04-26	2020-04-26	2d202
☒	1900MHz SAR Dipole	SPEAG	D1900V2	2018-08-27	2020-08-27	5d176
☒	2450MHz SAR Dipole	SPEAG	D2450V2	2018-08-24	2020-08-24	920
☒	5GHz SAR Dipole	SPEAG	D5GHzV2	2018-02-15	2020-02-15	1212
☒	Network Analyzer	Agilent	E5071C	2018-02-02	2019-02-02	MY46111534
☒	Signal Generator	Agilent	E4438C	2018-07-04	2019-07-04	US41461520
☒	Amplifier	RFBAY.Inc	MPA-40-40	2018-12-20	2019-12-20	21151801
☒	Amplifier	EMPOWER	BBS3Q7ELU	2018-07-10	2019-07-10	1020
☒	High Power RF Amplifier	EMPOWER	BBS3Q8CCJ	2018-07-06	2019-07-06	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 Meter	Anritsu	ML2495A	2018-07-04	2019-07-04	1435003
☒	Power Sensor	Anritsu	MA2490A	2018-07-04	2019-07-04	1409034
☒	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	2018-07-03	2019-07-03	2889A01064
☒	Low Pass Filter 1GHz	Wainwright Instruments	WLK6-1000-1400-9000-60SS	2018-07-05	2019-07-05	165
☒	Low Pass Filter 1.5GHz	Micro LAB	LA-15N	2018-07-05	2019-07-05	2
☒	Low Pass Filter 3.0GHz	Micro LAB	LA-30N	2018-07-05	2019-07-05	2
☒	Low Pass Filter 6.0GHz	Micro LAB	LA-60N	2018-12-19	2019-12-19	03942
☒	Attenuators(3 dB)	Agilent	8491B	2018-12-19	2019-12-19	MY39260700
☒	Attenuators(10 dB)	WEINSCHEL	23-10-34	2018-12-19	2019-12-19	BP4387
☒	Dielectric Probe kit	SPEAG	DAK-3.5	2018-07-24	2019-07-24	1046
☒	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	2018-07-04	2019-07-04	GB41321164
☒	Wideband Radio Communication Tester	Rohde Schwarz	CMW500	2018-02-05	2019-02-05	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.

14. MEASUREMENT UNCERTAINTIES

750 MHz Head (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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	± 1.8	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 %	∞
Combined Standard Uncertainty						**± 11.7 %**	**± 11.5 %**	330
Expanded Uncertainty (k=2)						**± 23.4 %**	**± 23.0 %**	

The above measurement uncertainties are according to IEEE Std 1528

750 MHz Body (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 4.1	Normal	1	0.78	0.71	± 3.2 %	± 2.9 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 3.7	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	± 1.8	Rectangular	√3	0.23	0.26	± 0.2%	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

835 MHz Head (SN: 7337)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 3.7	Normal	1	0.78	0.71	± 2.9 %	± 2.6 %	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	± 1.8	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 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

835 MHz Body (SN: 7337)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 3.7	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	± 1.8	Rectangular	√3	0.23	0.26	± 0.2 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

835 MHz Body (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 4.1	Normal	1	0.23	0.26	± 0.9 %	± 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 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

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
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

1800 MHz Body (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 4.0	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	± 1.8	Rectangular	√3	0.23	0.26	± 0.2 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 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
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

1900 MHz Body (SN: 7337)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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	± 1.9	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 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

1900 MHz Body (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 4.1	Normal	1	0.78	0.71	± 3.2 %	± 2.9 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 3.9	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	± 1.8	Rectangular	√3	0.23	0.26	± 0.2 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

2450 MHz Head (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 4.0	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	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 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

2450 MHz Body (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 3.7	Normal	1	0.78	0.71	± 2.9 %	± 2.6 %	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 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

5200 MHz Head (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 4.1	Normal	1	0.78	0.71	± 3.2 %	± 2.9 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 3.9	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 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.7 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.4 %**	

The above measurement uncertainties are according to IEEE Std 1528

5200 MHz Body (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 4.3	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 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.7 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.4 %**	

The above measurement uncertainties are according to IEEE Std 1528

5300 MHz Head (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 3.7	Normal	1	0.78	0.71	± 2.9 %	± 2.6 %	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 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.7 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.4 %**	

The above measurement uncertainties are according to IEEE Std 1528

5300 MHz Body (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 4.1	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 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.7 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.4 %**	

The above measurement uncertainties are according to IEEE Std 1528

5500 MHz Head (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 3.7	Normal	1	0.78	0.71	± 2.9 %	± 2.6 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.3	Normal	1	0.23	0.26	± 1.0 %	± 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 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.7 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.4 %**	

The above measurement uncertainties are according to IEEE Std 1528

5500 MHz Body (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
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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 %	∞
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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 %	∞
Test Sample Related								
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
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Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
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Liquid conductivity (Meas.)	± 3.8	Normal	1	0.78	0.71	± 3.0 %	± 2.7 %	10
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Liquid permittivity (Meas.)	± 4.3	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 %	∞
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5600 MHz Head (SN: 3933)

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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 %	∞
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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 %	∞
Test Sample Related								
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
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Liquid permittivity (Meas.)	± 4.2	Normal	1	0.23	0.26	± 1.0 %	± 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 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.7 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.4 %**	

The above measurement uncertainties are according to IEEE Std 1528

5600 MHz Body (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
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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 %	∞
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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 %	∞
Test Sample Related								
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 %	∞
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Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
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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	± 1.9	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 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.7 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.4 %**	

The above measurement uncertainties are according to IEEE Std 1528

5800 MHz Head (SN: 3933)

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Measurement System								
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 %	∞
Test Sample Related								
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 %	∞
Physical Parameters								
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.)	± 4.3	Normal	1	0.78	0.71	± 3.4 %	± 3.1 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
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Temp. unc. - Conductivity	± 1.8	Rectangular	√3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 2.0	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 12.0 %**	**± 11.8 %**	330
Expanded Uncertainty (k=2)						**± 24.0 %**	**± 23.6 %**	

The above measurement uncertainties are according to IEEE Std 1528

5800 MHz Body (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
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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 %	∞
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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 %	∞
Test Sample Related								
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 %	∞
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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.)	± 3.8	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
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Temp. unc. - Permittivity	± 2.0	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.8 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.6 %**	

The above measurement uncertainties are according to IEEE Std 1528

15. CONCLUSION

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

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[25] FCC SAR Considerations for Handsets with Multiple Transmitters and Antennas, KDB Publications 648474D02-D04

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

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

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

[29] 615223 D01 802 16e WI-Max SAR Guidance v01, Nov. 13, 2009

[30] Anexo à Resolução No. 533, de 10 de September de 2009.

[31] IEC 62209-2, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body(frequency range of 30 MHz to 6 GHz), Mar. 2010.

APPENDIX A. – Probe Calibration Data

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
C 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&C (Dymstec)**

Certificate No: EX3-3933_Sep18

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3933
Calibration procedure(s)	QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	September 25, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-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-17)	In house check: Oct-18

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

Issued: September 27, 2018

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

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3933

Manufactured: July 24, 2013
Calibrated: September 25, 2018

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3933

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.50	0.52	0.19	± 10.1 %
DCP (mV)[B]	104.5	98.7	93.5	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	144.0	±2.7 %
		Y	0.0	0.0	1.0		147.5	
		Z	0.0	0.0	1.0		142.5	

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%.

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

EX3DV4– SN:3933 September 25, 2018

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3933

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	10.76	10.76	10.76	0.35	1.00	± 12.0 %
835	41.5	0.90	10.26	10.26	10.26	0.46	0.83	± 12.0 %
900	41.5	0.97	9.91	9.91	9.91	0.43	0.80	± 12.0 %
1750	40.1	1.37	8.83	8.83	8.83	0.34	0.83	± 12.0 %
1900	40.0	1.40	8.54	8.54	8.54	0.25	0.80	± 12.0 %
2300	39.5	1.67	7.90	7.90	7.90	0.41	0.80	± 12.0 %
2450	39.2	1.80	7.61	7.61	7.61	0.21	1.16	± 12.0 %
2600	39.0	1.96	7.41	7.41	7.41	0.25	1.00	± 12.0 %
3500	37.9	2.91	7.30	7.30	7.30	0.27	1.20	± 13.1 %
3700	37.7	3.12	7.13	7.13	7.13	0.25	1.20	± 13.1 %
5200	36.0	4.66	5.24	5.24	5.24	0.40	1.80	± 13.1 %
5300	35.9	4.76	5.02	5.02	5.02	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.87	4.87	4.87	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.71	4.71	4.71	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.77	4.77	4.77	0.40	1.80	± 13.1 %

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

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3933

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	10.43	10.43	10.43	0.32	1.02	± 12.0 %
835	55.2	0.97	10.27	10.27	10.27	0.44	0.80	± 12.0 %
900	55.0	1.05	10.20	10.20	10.20	0.42	0.80	± 12.0 %
1750	53.4	1.49	8.62	8.62	8.62	0.31	0.88	± 12.0 %
1900	53.3	1.52	8.21	8.21	8.21	0.38	0.80	± 12.0 %
2300	52.9	1.81	7.86	7.86	7.86	0.34	0.88	± 12.0 %
2450	52.7	1.95	7.75	7.75	7.75	0.34	0.95	± 12.0 %
2600	52.5	2.16	7.63	7.63	7.63	0.31	0.95	± 12.0 %
3500	51.3	3.31	7.13	7.13	7.13	0.30	1.25	± 13.1 %
3700	51.0	3.55	7.08	7.08	7.08	0.30	1.25	± 13.1 %
5200	49.0	5.30	4.67	4.67	4.67	0.50	1.90	± 13.1 %
5300	48.9	5.42	4.51	4.51	4.51	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	4.01	4.01	4.01	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.10	4.10	4.10	0.50	1.90	± 13.1 %

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

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

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

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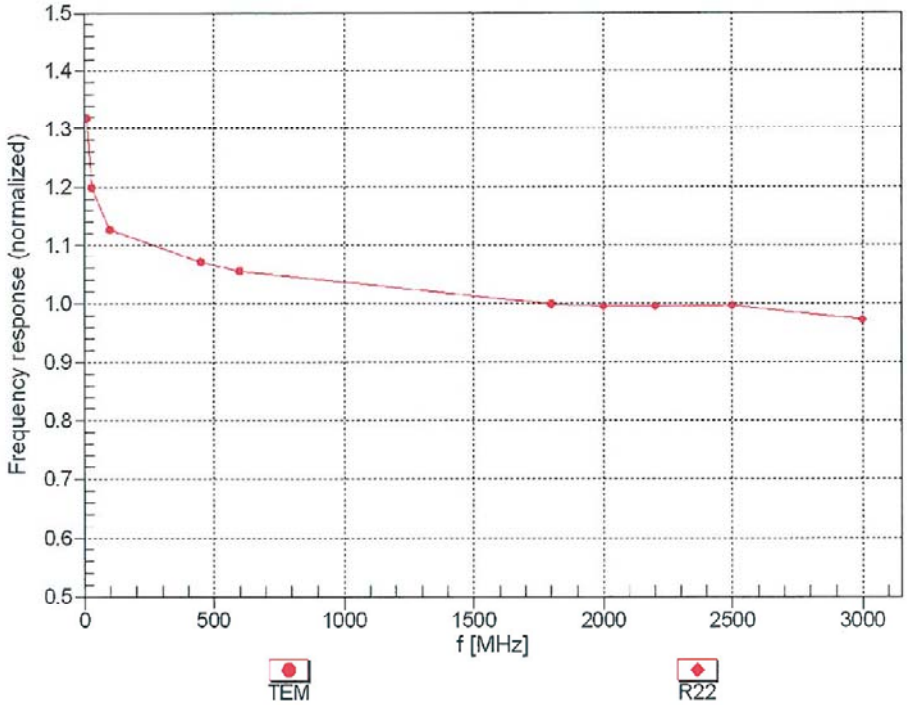
Frequency Response of E-Field

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



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

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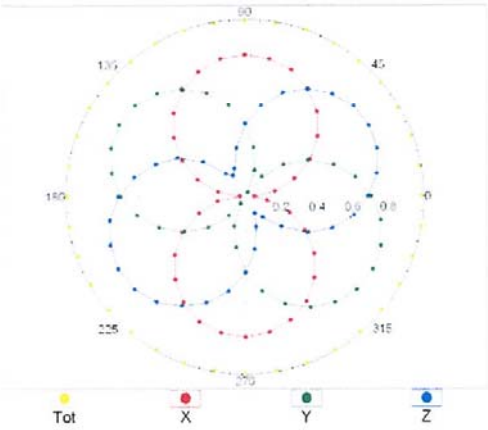
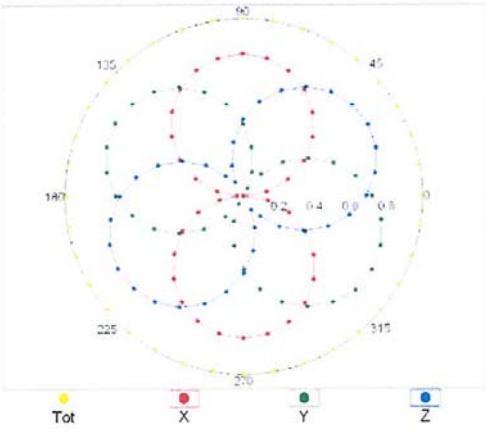
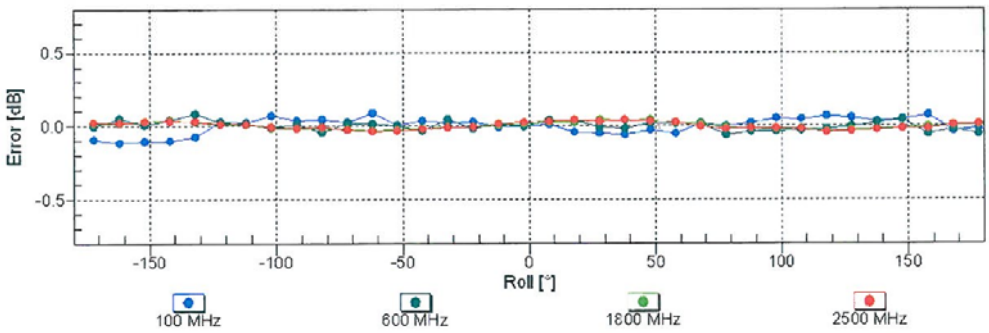
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22





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

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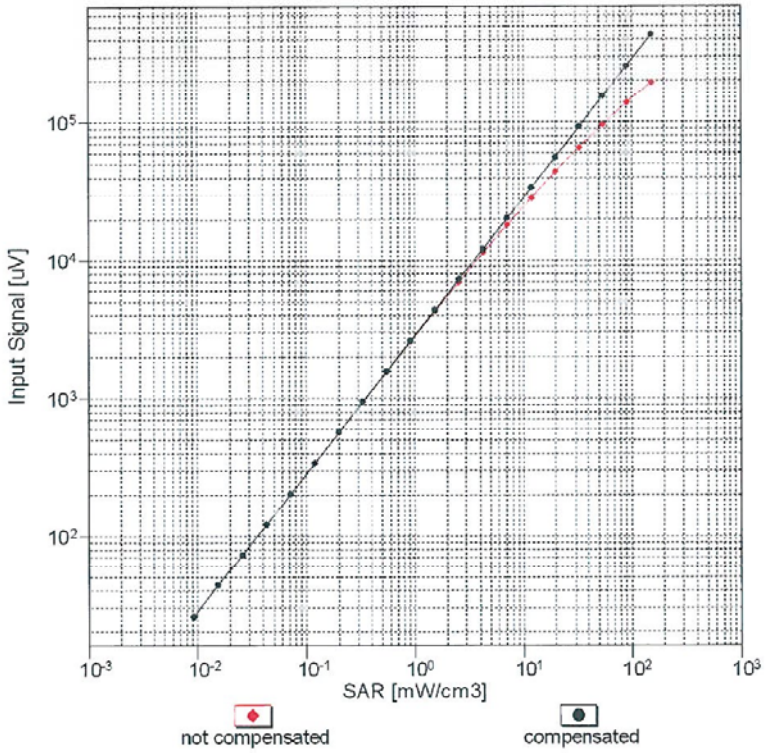
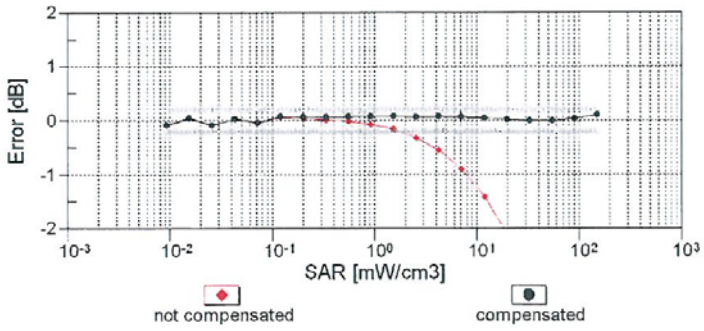
Dynamic Range f(SAR$_{head}$)
(TEM cell , f_{eval}= 1900 MHz)





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

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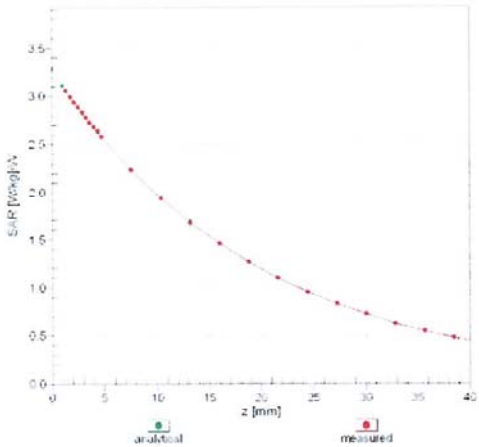
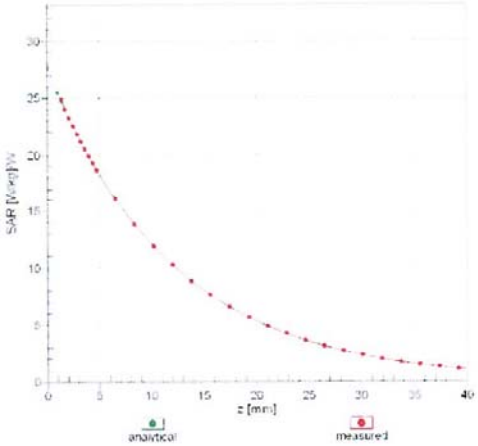
Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

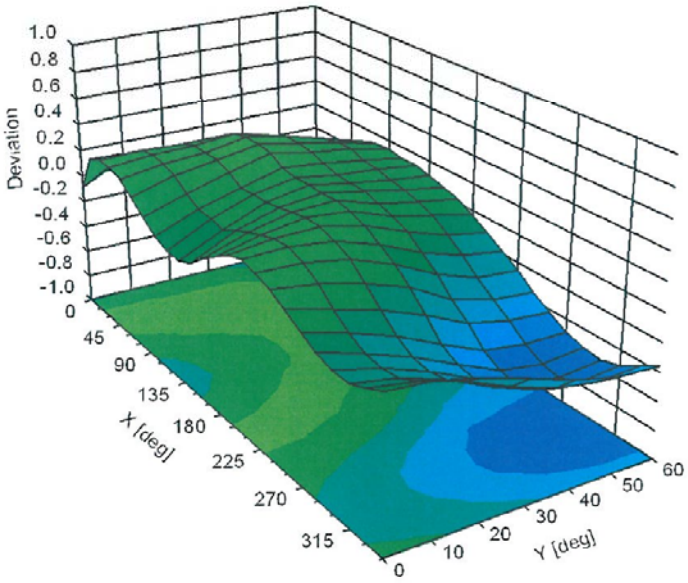


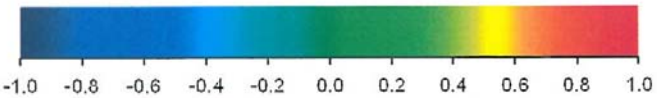
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3933

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	77.9
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