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SAR EVALUATION REPORT

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

Date of Testing:
02/24/20 - 03/12/20
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M2002240025-01-R1.ZNF

FCC ID: **ZNFQ730AM**

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

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model: LM-Q730AM
Additional Model(s): LMQ730AM, Q730AM

Equipment Class	Band & Mode	Tx Frequency	SAR			
			1g Head (W/kg)	1g Body-Worn (W/kg)	1g Hotspot (W/kg)	10g Phablet (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.30	0.47	0.54	N/A
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	< 0.1	0.41	0.70	N/A
PCE	UMTS 850	826.40 - 846.60 MHz	0.24	0.41	0.41	N/A
PCE	UMTS 1750	1712.4 - 1752.6 MHz	0.13	0.65	0.84	2.90
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.14	0.68	0.75	2.65
PCE	LTE Band 12	699.7 - 715.3 MHz	0.19	0.32	0.59	N/A
PCE	LTE Band 14	790.5 - 795.5 MHz	0.15	0.32	0.37	N/A
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.22	0.38	0.38	N/A
PCE	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.14	0.66	0.77	2.66
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	0.11	0.72	0.76	2.81
PCE	LTE Band 30	2307.5 - 2312.5 MHz	0.14	0.50	0.43	2.04
DTS	2.4 GHz WLAN	2412 - 2462 MHz	1.29	0.23	0.33	N/A
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	0.26	N/A
NII	U-NII-2A	5260 - 5320 MHz	0.40	0.18	N/A	0.73
NII	U-NII-2C	5500 - 5720 MHz	0.29	0.12	N/A	0.48
NII	U-NII-3	5745 - 5825 MHz	1.00	0.32	0.46	N/A
DSS/DTS	Bluetooth	2402 - 2480 MHz	0.18	N/A	N/A	N/A
Simultaneous SAR per KDB 690783 D01v01r03:			1.59	1.21	1.46	3.76

Note: This revised test report (S/N: 1M2002240025-01-R1.ZNF) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.7 of this report; for North American frequency bands only.

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

Randy Ortanez
President

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

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 14	Voice/Data	790.5 - 795.5 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 30	Voice/Data	2307.5 - 2312.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2462 MHz
U-NII-1	Voice/Data	5180 - 5240 MHz
U-NII-2A	Voice/Data	5260 - 5320 MHz
U-NII-2C	Voice/Data	5500 - 5720 MHz
U-NII-3	Voice/Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz

1.2 Power Reduction for SAR

This device utilizes a power reduction mechanism for some wireless modes and bands for SAR compliance under portable hotspot conditions and under some conditions when the device is being used in close proximity to the user's hand. All hotspot SAR evaluations for this device were performed at the maximum allowed output power when hotspot is enabled. FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device when being used in phablet use conditions. Detailed descriptions of the power reduction mechanism are included in the operational description.

1.3 Nominal and Maximum Output Power Specifications

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

1.3.1 2G/3G/4G and WLAN Output Power

UMTS Band 5 (850 MHz)				
Power Level	Mode / Band	Modulated Average Output Power (in dBm)		
		3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6
Max	Max allowed power	25.2	25.2	25.2
	Nominal	24.7	24.7	24.7
UMTS Band 4 (1750 MHz)				
Power Level	Mode / Band	Modulated Average Output Power (in dBm)		
		3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6
Max	Max allowed power	24.7	24.7	24.7
	Nominal	24.2	24.2	24.2
Hotspot and/or Proximity Sensor Active	Max allowed power	23.2	23.2	23.2
	Nominal	22.7	22.7	22.7
UMTS Band 2 (1900 MHz)				
Power Level	Mode / Band	Modulated Average Output Power (in dBm)		
		3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6
Max	Max allowed power	24.7	24.7	24.7
	Nominal	24.2	24.2	24.2
Hotspot and/or Proximity Sensor Active	Max allowed power	23.2	23.2	23.2
	Nominal	22.7	22.7	22.7

GSM/GPRS/EDGE 850						
Power Level	Mode / Band	Voice (in dBm)	Data - Burst Average GMSK (in dBm)		Data - Burst Average 8-PSK (in dBm)	
		1 TX Slot	1 TX Slots	2 TX Slots	1 TX Slots	2 TX Slots
Max	Max allowed power	33.7	33.7	32.7	26.2	25.7
	Nominal	33.2	33.2	32.2	25.7	25.2
GSM/GPRS/EDGE 1900						
Power Level	Mode / Band	Voice (in dBm)	Data - Burst Average GMSK (in dBm)		Data - Burst Average 8-PSK (in dBm)	
		1 TX Slot	1 TX Slots	2 TX Slots	1 TX Slots	2 TX Slots
Max	Max allowed power	30.7	30.7	29.7	25.7	25.2
	Nominal	30.2	30.2	29.2	25.2	24.7

Mode / Band		Modulated Average Output Power (in dBm)	
		Max	Hotspot and/or Proximity Sensor Active
LTE Band 12	Max allowed power	25.2	25.2
	Nominal	24.7	24.7
LTE Band 14	Max allowed power	25.2	25.2
	Nominal	24.7	24.7
LTE Band 5 (Cell)	Max allowed power	25.2	25.2
	Nominal	24.7	24.7
LTE Band 66 (AWS)	Max allowed power	24.7	23.2
	Nominal	24.2	22.7
LTE Band 4 (AWS)	Max allowed power	24.7	23.2
	Nominal	24.2	22.7
LTE Band 2 (PCS)	Max allowed power	24.7	23.2
	Nominal	24.2	22.7
LTE Band 30	Max allowed power	24.2	22.2
	Nominal	23.7	21.7

Mode / Band		Modulated Average (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	**17.5**
	Nominal	**16.5**
IEEE 802.11g (2.4 GHz)	Maximum	**16.5**
	Nominal	**15.5**
IEEE 802.11n (2.4 GHz)	Maximum	**15.5**
	Nominal	**14.5**
Bluetooth	Maximum	**9.0**
	Nominal	**8.0**
Bluetooth LE	Maximum	**5.5**
	Nominal	**4.5**

Mode / Band		Modulated Average - Single Tx Chain (dBm)																							
		20 MHz Bandwidth									40 MHz Bandwidth								80 MHz Bandwidth						
	Channel	36-60	64	100	104-112	116-144	149-153	157	161	165	38-62	102	110	118-126	134	142	151	159	42	58	106	122	138	155
IEEE 802.11a (5 GHz)	Maximum	15.5	15.5	16.5	16.5	15.5	15.5	15.5	15.5	15.5															
	Nominal	14.5	14.5	15.5	15.5	14.5	14.5	14.5	14.5	14.5															
IEEE 802.11n (5 GHz)	Maximum	15.5	15.5	16.5	16.5	15.5	15.5	15.5	15.5	15.5	15.5	16.5	16.5	15.5	15.5	15.5	15.5	15.5							
	Nominal	14.5	14.5	15.5	15.5	14.5	14.5	14.5	14.5	14.5	14.5	15.5	15.5	14.5	14.5	14.5	14.5	14.5							
IEEE 802.11ac (5 GHz)	Maximum	15.5	15.5	16.5	16.5	15.5	15.5	15.5	15.5	15.5	15.5	16.5	16.5	15.5	15.5	15.5	15.5	15.5	13.0	13.0	14.0	13.0	13.0	13.0
	Nominal	14.5	14.5	15.5	15.5	14.5	14.5	14.5	14.5	14.5	14.5	15.5	15.5	14.5	14.5	14.5	14.5	14.5	12.0	12.0	13.0	12.0	12.0	12.0

1.4 DUT Antenna Locations

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

Table 1-1
Device Edges/Sides for SAR Testing

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

Note: Particular DUT edges were not required to be evaluated for wireless router SAR or phablet SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v02r01 Section III and FCC KDB Publication 648474 D04v01r03. The distances between the transmit antennas and the edges of the device are included in the filing. When wireless router mode is enabled, U-NII-2A, U-NII-2C operations are disabled.

1.5 Simultaneous Transmission Capabilities

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

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

Table 1-2
Simultaneous Transmission Scenarios

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

1. 2.4 GHz WLAN, 2.4 GHz Bluetooth share the same antenna path and cannot transmit simultaneously.
2. All licensed modes share the same antenna path and cannot transmit simultaneously.
3. When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.
4. Per the manufacturer, WIFI Direct is expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Therefore, there are no simultaneous transmission scenarios involving WIFI direct beyond that listed in the above table.
5. 5 GHz Wireless Router is only supported for U-NII-1 and U-NII-3 by S/W, therefore U-NII-2A, and U-NII-2C were not evaluated for wireless router conditions.
6. This device supports VOLTE.
7. This device supports VOWIFI.
8. This device supports Bluetooth Tethering.

1.6 Miscellaneous SAR Test Considerations

(A) WIFI/BT

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

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

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

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

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, body-worn and hotspot Bluetooth SAR was not required; [(8/10)* √2.480] = 1.3< 3.0. Per KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.

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

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

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, phablet Bluetooth SAR was not required; [(8/ 5)* √2.480] = 2.5< 7.5. Per KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.

This device supports IEEE 802.11ac with the following features:

a) Up to 80 MHz Bandwidth only
b) No aggregate channel configurations
c) 1 Tx antenna output
d) 256 QAM is supported
e) TDWR and Band gap channels are supported

Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Because wireless router operations are not supported for U-NII-2A & U-NII-2C WLAN, phablet SAR tests were performed. Phablet SAR was not evaluated for 2.4 GHz, U-NII-1 and U-NII-3 WLAN operations since wireless router 1g SAR was < 1.2 W/kg.

(B) Licensed Transmitter(s)

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

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

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

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

Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Therefore, phablet SAR tests are required when

wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information).

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

1.7 Guidance Applied

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

1.8 Device Serial Numbers

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

2 LTE INFORMATION

LTE Information					
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 14 (790.5 - 795.5 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 66 (AWS) (1710.7 - 1779.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)				
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)				
	LTE Band 30 (2307.5 - 2312.5 MHz)				
Channel Bandwidths	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 14: 5 MHz, 10 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 30: 5 MHz, 10 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 12: 1.4 MHz	699.7 (23017)		707.5 (23095)	715.3 (23173)	
LTE Band 12: 3 MHz	700.5 (23025)		707.5 (23095)	714.5 (23165)	
LTE Band 12: 5 MHz	701.5 (23035)		707.5 (23095)	713.5 (23155)	
LTE Band 12: 10 MHz	704 (23060)		707.5 (23095)	711 (23130)	
LTE Band 14: 5 MHz	790.5 (23305)		793 (23330)	795.5 (23355)	
LTE Band 14: 10 MHz	N/A		793 (23330)	N/A	
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)		836.5 (20525)	848.3 (20643)	
LTE Band 5 (Cell): 3 MHz	825.5 (20415)		836.5 (20525)	847.5 (20635)	
LTE Band 5 (Cell): 5 MHz	826.5 (20425)		836.5 (20525)	846.5 (20625)	
LTE Band 5 (Cell): 10 MHz	829 (20450)		836.5 (20525)	844 (20600)	
LTE Band 66 (AWS): 1.4 MHz	1710.7 (131979)		1745 (132322)	1779.3 (132665)	
LTE Band 66 (AWS): 3 MHz	1711.5 (131987)		1745 (132322)	1778.5 (132657)	
LTE Band 66 (AWS): 5 MHz	1712.5 (131997)		1745 (132322)	1777.5 (132647)	
LTE Band 66 (AWS): 10 MHz	1715 (132022)		1745 (132322)	1775 (132622)	
LTE Band 66 (AWS): 15 MHz	1717.5 (132047)		1745 (132322)	1772.5 (132597)	
LTE Band 66 (AWS): 20 MHz	1720 (132072)		1745 (132322)	1770 (132572)	
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)		1732.5 (20175)	1754.3 (20393)	
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)		1732.5 (20175)	1753.5 (20385)	
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)		1732.5 (20175)	1752.5 (20375)	
LTE Band 4 (AWS): 10 MHz	1715 (20000)		1732.5 (20175)	1750 (20350)	
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)		1732.5 (20175)	1747.5 (20325)	
LTE Band 4 (AWS): 20 MHz	1720 (20050)		1732.5 (20175)	1745 (20300)	
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)		1880 (18900)	1909.3 (19193)	
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)		1880 (18900)	1908.5 (19185)	
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)		1880 (18900)	1907.5 (19175)	
LTE Band 2 (PCS): 10 MHz	1855 (18650)		1880 (18900)	1905 (19150)	
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)		1880 (18900)	1902.5 (19125)	
LTE Band 2 (PCS): 20 MHz	1860 (18700)		1880 (18900)	1900 (19100)	
LTE Band 30: 5 MHz	2307.5 (27685)		2310 (27710)	2312.5 (27735)	
LTE Band 30: 10 MHz	N/A		2310 (27710)	N/A	
UE Category	6				
Modulations Supported in UL	QPSK, 16QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	YES				
A-MPR (Additional MPR) disabled for SAR Testing?	YES				
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations				
LTE Additional Information	This device does not support full CA features on 3GPP Release 11. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 11 Features are not supported: Relay, HetNet, Enhanced MIMO, eICIC, WIFI Offloading, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

3 INTRODUCTION

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

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

3.1 SAR Definition

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

Equation 3-1
SAR Mathematical Equation

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

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

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

where:

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

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

4 DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

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

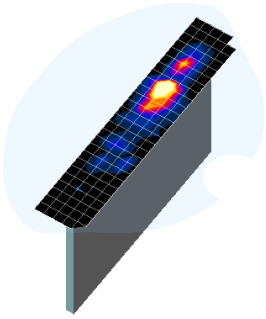

Figure 4-1
Sample SAR Area Scan

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

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

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

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

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

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

*Also compliant to IEEE 1528-2013 Table 6

5 DEFINITION OF REFERENCE POINTS

5.1 EAR REFERENCE POINT

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

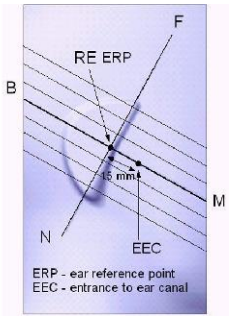

Figure 5-1
Close-Up Side view of ERP

5.2 HANDSET REFERENCE POINTS

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

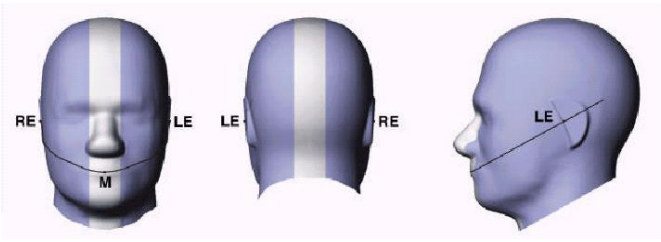

Figure 5-2
Front, back and side view of SAM Twin Phantom

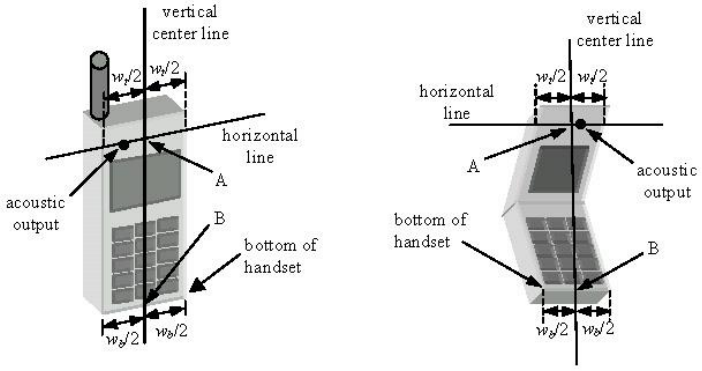

Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

6 TEST CONFIGURATION POSITIONS

6.1 Device Holder

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

6.2 Positioning for Cheek

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

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

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

6.3 Positioning for Ear / 15º Tilt

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

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

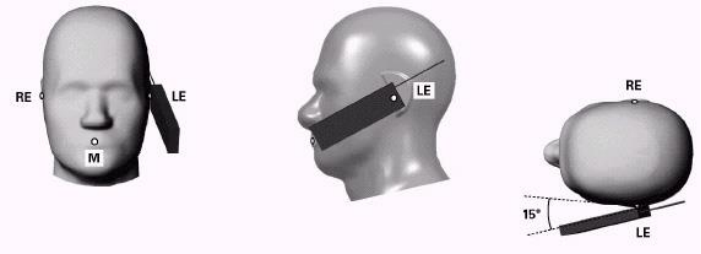

Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

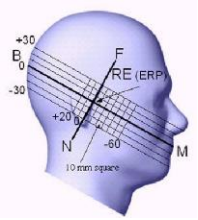

Figure 6-3
Side view w/ relevant markings

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

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

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

6.5 Body-Worn Accessory Configurations

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

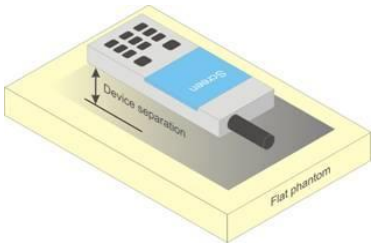

Figure 6-4
Sample Body-Worn Diagram

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not

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

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

6.6 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1g body and 10g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D01v06 should be applied to determine SAR test requirements.

Per KDB Publication 447498 D01v06, Cell phones (handsets) are not normally designed to be used on extremities or operated in extremity only exposure conditions. The maximum output power levels of handsets generally do not require extremity SAR testing to show compliance. Therefore, extremity SAR was not evaluated for this device.

6.7 Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06v02r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

6.8 Phablet Configurations

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

6.9 Proximity Sensor Considerations

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

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

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

7 RF EXPOSURE LIMITS

7.1 Uncontrolled Environment

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

7.2 Controlled Environment

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

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

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

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

8 FCC MEASUREMENT PROCEDURES

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

8.1 Measured and Reported SAR

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

8.2 3G SAR Test Reduction Procedure

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

8.3 Procedures Used to Establish RF Signal for SAR

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

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

8.4 SAR Measurement Conditions for UMTS

8.4.1 Output Power Verification

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

8.4.2 Head SAR Measurements

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

8.4.3 Body SAR Measurements

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

8.4.4 SAR Measurements with Rel 5 HSDPA

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

8.4.5 SAR Measurements with Rel 6 HSUPA

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

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

8.5 SAR Measurement Conditions for LTE

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

8.5.1 Spectrum Plots for RB Configurations

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

8.5.2 MPR

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

8.5.3 A-MPR

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

8.5.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r04:

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

8.5.5 Downlink Only Carrier Aggregation

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

8.6 SAR Testing with 802.11 Transmitters

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

8.6.1 General Device Setup

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

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

8.6.2 U-NII-1 and U-NII-2A

For devices that operate in both U-NII-1 and U-NII-2A bands, when the same maximum output power is specified for both bands, SAR measurement using OFDM SAR test procedures is not required for U-NII-1 unless the highest reported SAR for U-NII-2A is > 1.2 W/kg. When different maximum output powers are specified for the bands, SAR measurement for the U-NII band with the lower maximum output power is not required unless the highest reported SAR for the U-NII band with the higher maximum output power, adjusted by the ratio of lower to higher specified maximum output power for the two bands, is > 1.2 W/kg. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.3 U-NII-2C and U-NII-3

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

8.6.4 Initial Test Position Procedure

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

8.6.5 2.4 GHz SAR Test Requirements

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

1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

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

8.6.6 OFDM Transmission Mode and SAR Test Channel Selection

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

8.6.7 Initial Test Configuration Procedure

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

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements (See Section 8.6.6). When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.8 Subsequent Test Configuration Procedures

For OFDM configurations in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure. When the highest reported SAR (for the initial test configuration), adjusted by the ratio of the specified maximum output power of the subsequent test configuration to initial test configuration, is ≤ 1.2 W/kg, no additional SAR tests for the subsequent test configurations are required. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

9 RF CONDUCTED POWERS

9.1 GSM Conducted Powers

Table 9-1
Maximum Conducted Power

Maximum Burst-Averaged Output Power						
		Voice	*GPRS/EDGE Data (GMSK)*		*EDGE Data (8-PSK)*	
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 850	128	33.64	33.70	**32.70**	26.12	25.65
	190	33.65	33.67	**32.65**	26.18	25.64
	251	33.64	33.58	**32.68**	26.10	25.61
GSM 1900	512	30.49	30.52	**29.59**	25.69	25.15
	661	30.48	30.50	**29.47**	25.67	25.08
	810	30.62	30.65	**29.62**	25.70	25.13

Calculated Maximum Frame-Averaged Output Power						
		Voice	*GPRS/EDGE Data (GMSK)*		*EDGE Data (8-PSK)*	
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 850	128	24.44	24.50	**26.51**	16.92	19.46
	190	24.45	24.47	**26.46**	16.98	19.45
	251	24.44	24.38	**26.49**	16.90	19.42
GSM 1900	512	21.29	21.32	**23.40**	16.49	18.96
	661	21.28	21.30	**23.28**	16.47	18.89
	810	21.42	21.45	**23.43**	16.50	18.94

GSM 850	**Frame Avg.Targets:**	24.00	24.00	**26.01**	16.50	19.01
GSM 1900		21.00	21.00	**23.01**	16.00	18.51

Note:

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. GPRS/EDGE (GMSK) output powers were measured with coding scheme setting of 1 (CS1) on the base station simulator. CS1 was configured to measure GPRS output power measurements and SAR to ensure GMSK modulation in the signal. Our Investigation has shown that CS1 - CS4 settings do not have any impact on the output levels or modulation in the GPRS modes.
3. EDGE (8-PSK) output powers were measured with MCS7 on the base station simulator. MCS7 coding scheme was used to measure the output powers for EDGE since investigation has shown that choosing MCS7 coding scheme will ensure 8-PSK modulation. It has been shown that MCS levels that produce 8-PSK modulation do not have an impact on output power.

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

Figure 9-1
Power Measurement Setup

9.2 UMTS Conducted Powers

Table 9-2
Maximum Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			MPR [dB]
			4132	4183	4233	
99	WCDMA	12.2 kbps RMC	25.02	24.90	24.89	-
99		12.2 kbps AMR	24.98	24.89	24.87	-
6	HSDPA	Subtest 1	24.93	24.90	24.85	0
6		Subtest 2	25.01	24.87	24.83	0
6		Subtest 3	24.45	24.40	24.38	0.5
6		Subtest 4	24.44	24.36	24.38	0.5
6	HSUPA	Subtest 1	22.94	22.86	22.88	2
6		Subtest 2	22.95	22.89	22.88	2
6		Subtest 3	23.96	23.88	23.89	1
6		Subtest 4	22.43	22.39	22.42	2.5
6		Subtest 5	23.93	23.80	23.87	1

3GPP Release Version	Mode	3GPP 34.121 Subtest	AWS Band [dBm]			PCS Band [dBm]			MPR [dB]
			1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	24.70	24.68	24.69	24.69	24.65	24.64	-
99		12.2 kbps AMR	24.68	24.59	24.35	24.57	24.55	24.65	-
6	HSDPA	Subtest 1	24.69	24.69	24.67	24.68	24.43	24.52	0
6		Subtest 2	24.65	24.63	24.63	24.65	24.37	24.46	0
6		Subtest 3	24.17	24.13	24.18	24.16	23.89	24.00	0.5
6		Subtest 4	24.12	23.96	24.15	24.17	23.87	23.96	0.5
6	HSUPA	Subtest 1	22.58	22.49	22.63	22.64	22.41	22.52	1.5
6		Subtest 2	22.56	22.49	22.61	22.58	22.41	22.51	2
6		Subtest 3	23.59	23.46	23.62	23.67	23.34	23.45	1
6		Subtest 4	22.16	22.03	22.20	22.01	21.94	22.00	2.5
6		Subtest 5	23.53	23.55	23.58	23.64	23.32	23.34	1

Table 9-3
Reduced Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	AWS Band [dBm]			PCS Band [dBm]			MPR [dB]
			1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	23.17	23.14	23.15	22.91	22.87	23.00	-
99		12.2 kbps AMR	23.12	23.15	23.10	22.89	22.94	22.96	-
6	HSDPA	Subtest 1	23.17	23.03	23.10	23.13	22.89	22.97	0
6		Subtest 2	23.08	22.95	23.14	23.13	22.82	22.99	0
6		Subtest 3	22.54	22.42	22.63	22.70	22.38	22.50	0.5
6		Subtest 4	22.52	22.45	22.60	22.67	22.37	22.49	0.5
6	HSUPA	Subtest 1	21.63	21.50	21.67	21.69	21.38	21.51	1.5
6		Subtest 2	21.09	20.99	21.16	21.19	20.87	20.96	2
6		Subtest 3	22.13	22.02	21.18	22.12	21.86	21.98	1
6		Subtest 4	20.59	20.49	20.66	20.67	20.36	20.44	2.5
6		Subtest 5	22.07	22.01	22.12	22.18	21.87	21.97	1

This device does not support DC-HSDPA.

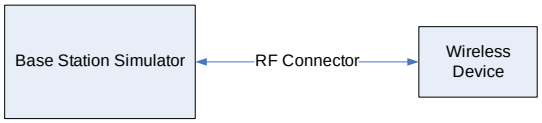

Figure 9-2
Power Measurement Setup

9.3 LTE Conducted Powers

9.3.1 LTE Band 12

Table 9-4
LTE Band 12 Conducted Powers - 10 MHz Bandwidth

LTE Band 12 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23095 (707.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.84	0	0
	1	25	**25.04**		0
	1	49	24.90		0
	25	0	23.82	0-1	1
	25	12	23.83		1
	25	25	**23.86**		1
	50	0	23.83		1
16QAM	1	0	24.16	0-1	1
	1	25	24.10		1
	1	49	24.09		1
	25	0	22.86	0-2	2
	25	12	22.87		2
	25	25	22.86		2
	50	0	22.80		2

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

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

LTE Band 12 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23035 (701.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23155 (713.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.98	24.88	24.88	0	0
	1	12	25.19	25.09	25.10		0
	1	24	25.02	24.96	24.94		0
	12	0	23.94	24.05	24.06	0-1	1
	12	6	24.03	24.06	24.10		1
	12	13	24.02	24.05	24.01		1
	25	0	23.97	24.01	24.04		1
16QAM	1	0	24.19	23.98	23.95	0-1	1
	1	12	24.20	24.06	24.10		1
	1	24	24.18	24.03	23.97		1
	12	0	22.99	23.03	23.10	0-2	2
	12	6	23.07	23.04	23.11		2
	12	13	23.06	23.02	23.05		2
	25	0	23.05	22.97	23.04		2

Table 9-6
LTE Band 12 Conducted Powers - 3 MHz Bandwidth

LTE Band 12 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23025 (700.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23165 (714.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.89	24.97	24.96	0	0
	1	7	25.02	25.06	25.11		0
	1	14	24.88	24.95	24.99		0
	8	0	23.95	24.02	24.01	0-1	1
	8	4	24.04	24.04	24.05		1
	8	7	23.97	24.01	24.00		1
	15	0	23.94	23.96	24.00		1
16QAM	1	0	23.66	23.89	24.17	0-1	1
	1	7	23.79	23.94	24.20		1
	1	14	23.61	23.83	24.11		1
	8	0	22.87	23.00	23.15	0-2	2
	8	4	22.94	23.03	23.14		2
	8	7	22.89	22.96	23.07		2
	15	0	22.88	22.95	23.03		2

Table 9-7
LTE Band 12 Conducted Powers -1.4 MHz Bandwidth

LTE Band 12 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23017 (699.7 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23173 (715.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.93	25.01	24.92	0	0
	1	2	24.95	25.11	25.01		0
	1	5	25.01	25.05	24.93		0
	3	0	24.91	25.00	25.05		0
	3	2	24.99	25.03	25.06		0
	3	3	24.99	24.99	25.04		0
	6	0	24.09	24.07	24.06	0-1	1
16QAM	1	0	23.61	23.72	24.14	0-1	1
	1	2	23.66	23.77	24.18		1
	1	5	23.64	23.76	24.06		1
	3	0	23.91	24.01	24.20		1
	3	2	23.99	24.04	24.19		1
	3	3	23.97	24.02	24.20		1
	6	0	23.13	23.18	22.93	0-2	2

9.3.2 LTE Band 14

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

LTE Band 14 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23330 (793.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.82	0	0
	1	25	**24.99**		0
	1	49	24.74		0
	25	0	**24.02**	0-1	1
	25	12	24.00		1
	25	25	24.00		1
	50	0	24.01		1
16QAM	1	0	24.15	0-1	1
	1	25	24.10		1
	1	49	24.08		1
	25	0	23.04	0-2	2
	25	12	23.06		2
	25	25	23.12		2
	50	0	23.10		2

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

LTE Band 14 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23330 (793.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.99	0	0
	1	12	25.20		0
	1	24	24.96		0
	12	0	24.06	0-1	1
	12	6	24.10		1
	12	13	24.06		1
	25	0	24.09		1
16QAM	1	0	24.11	0-1	1
	1	12	24.20		1
	1	24	24.01		1
	12	0	23.12	0-2	2
	12	6	23.17		2
	12	13	23.16		2
	25	0	23.08		2

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

9.3.3 LTE Band 5 (Cell)

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

LTE Band 5 (Cell) 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20525 (836.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	25.01	0	0
	1	25	**25.18**		0
	1	49	25.01		0
	25	0	**24.20**	0-1	1
	25	12	24.04		1
	25	25	24.04		1
	50	0	24.05		1
16QAM	1	0	23.97	0-1	1
	1	25	24.05		1
	1	49	23.90		1
	25	0	23.14	0-2	2
	25	12	23.15		2
	25	25	23.08		2
	50	0	23.10		2

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

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

LTE Band 5 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20425 (826.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20625 (846.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	25.06	25.09	25.13	0	0
	1	12	25.20	25.20	25.19		0
	1	24	25.02	25.10	25.02		0
	12	0	24.04	24.14	24.01	0-1	1
	12	6	24.03	24.19	24.20		1
	12	13	24.17	24.09	24.10		1
	25	0	24.18	24.14	24.13		1
16QAM	1	0	23.83	23.75	24.11	0-1	1
	1	12	24.10	24.20	24.20		1
	1	24	24.00	23.73	24.01		1
	12	0	23.12	23.02	23.07	0-2	2
	12	6	23.16	23.08	23.06		2
	12	13	23.06	23.20	22.96		2
	25	0	23.10	23.11	23.08		2

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

LTE Band 5 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20415 (825.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20635 (847.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	25.16	25.13	25.11	0	0
	1	7	25.20	25.19	25.14		0
	1	14	25.12	25.19	25.17		0
	8	0	24.05	24.14	24.18	0-1	1
	8	4	24.07	24.15	24.07		1
	8	7	24.18	24.10	24.15		1
	15	0	24.05	24.14	24.13		1
16QAM	1	0	23.90	23.88	24.00	0-1	1
	1	7	24.20	23.93	24.19		1
	1	14	23.87	23.90	24.03		1
	8	0	23.13	23.17	23.01	0-2	2
	8	4	23.18	23.11	23.18		2
	8	7	23.08	23.16	23.01		2
	15	0	23.11	23.17	23.01		2

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

LTE Band 5 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20407 (824.7 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20643 (848.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	25.02	24.82	25.05	0	0
	1	2	25.19	25.13	25.11		0
	1	5	25.04	24.92	25.02		0
	3	0	25.06	25.00	24.93		0
	3	2	25.14	25.00	25.02		0
	3	3	25.06	24.85	24.97		0
	6	0	23.96	23.92	23.99	0-1	1
16QAM	1	0	24.14	23.92	23.75	0-1	1
	1	2	24.20	24.04	23.92		1
	1	5	24.19	23.88	23.87		1
	3	0	24.05	24.08	23.94		1
	3	2	24.13	24.11	24.17		1
	3	3	24.03	24.12	24.00		1
	6	0	23.13	23.01	23.14	0-2	2

9.3.4 LTE Band 66 (AWS)

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

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132072 (1720.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132572 (1770.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.24	24.34	24.43	0	0
	1	50	24.47	24.69	**24.70**		0
	1	99	24.21	24.40	24.37		0
	50	0	23.39	23.44	**23.59**	0-1	1
	50	25	23.48	23.53	23.57		1
	50	50	23.38	23.49	23.42		1
	100	0	23.45	23.46	23.46		1
16QAM	1	0	23.69	23.64	23.59	0-1	1
	1	50	23.70	23.50	23.54		1
	1	99	23.64	23.54	23.51		1
	50	0	22.45	22.48	22.59	0-2	2
	50	25	22.48	22.55	22.61		2
	50	50	22.40	22.54	22.49		2
	100	0	22.44	22.54	22.41		2

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

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.23	24.40	24.34	0	0
	1	36	24.39	24.59	24.48		0
	1	74	24.19	24.49	24.31		0
	36	0	23.49	23.55	23.63	0-1	1
	36	18	23.51	23.62	23.64		1
	36	37	23.47	23.61	23.60		1
	75	0	23.44	23.61	23.63		1
16QAM	1	0	23.35	23.55	23.55	0-1	1
	1	36	23.47	23.69	23.69		1
	1	74	23.30	23.61	23.69		1
	36	0	22.35	22.52	22.58	0-2	2
	36	18	22.40	22.62	22.64		2
	36	37	22.32	22.63	22.60		2
	75	0	22.46	22.54	22.62		2

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

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.30	24.31	24.41	0	0
	1	25	24.48	24.51	24.57		0
	1	49	24.26	24.36	24.44		0
	25	0	23.31	23.54	23.61	0-1	1
	25	12	23.39	23.53	23.61		1
	25	25	23.37	23.53	23.55		1
	50	0	23.36	23.56	23.61		1
16QAM	1	0	23.39	23.55	23.64	0-1	1
	1	25	23.56	23.51	23.68		1
	1	49	23.33	23.61	23.59		1
	25	0	22.36	22.55	22.70	0-2	2
	25	12	22.41	22.59	22.68		2
	25	25	22.36	22.56	22.66		2
	50	0	22.38	22.58	22.53		2

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

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.33	24.32	24.35	0	0
	1	12	24.58	24.60	24.58		0
	1	24	24.31	24.36	24.36		0
	12	0	23.38	23.48	23.55	0-1	1
	12	6	23.41	23.53	23.59		1
	12	13	23.39	23.52	23.53		1
	25	0	23.35	23.48	23.59		1
16QAM	1	0	23.67	23.68	23.65	0-1	1
	1	12	23.66	23.60	23.50		1
	1	24	23.59	23.52	23.61		1
	12	0	22.38	22.50	22.60	0-2	2
	12	6	22.49	22.53	22.67		2
	12	13	22.41	22.50	22.62		2
	25	0	22.38	22.53	22.67		2

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

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131987 (1711.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132657 (1778.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.37	24.35	24.42	0	0
	1	7	24.48	24.49	24.60		0
	1	14	24.34	24.34	24.42		0
	8	0	23.39	23.49	23.50	0-1	1
	8	4	23.46	23.48	23.56		1
	8	7	23.38	23.44	23.51		1
	15	0	23.44	23.45	23.52		1
16QAM	1	0	23.44	23.60	23.63	0-1	1
	1	7	23.57	23.51	23.70		1
	1	14	23.36	23.58	23.59		1
	8	0	22.28	22.50	22.51	0-2	2
	8	4	22.29	22.55	22.49		2
	8	7	22.23	22.48	22.47		2
	15	0	22.37	22.43	22.61		2

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

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131979 (1710.7 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132665 (1779.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.29	24.29	24.55	0	0
	1	2	24.41	24.43	24.67		0
	1	5	24.33	24.31	24.57		0
	3	0	24.43	24.52	24.62		0
	3	2	24.46	24.58	24.67		0
	3	3	24.43	24.53	24.66		0
	6	0	23.39	23.52	23.51	0-1	1
16QAM	1	0	23.37	23.53	23.35	0-1	1
	1	2	23.49	23.64	23.49		1
	1	5	23.39	23.56	23.39		1
	3	0	23.55	23.43	23.61		1
	3	2	23.57	23.47	23.59		1
	3	3	23.56	23.47	23.63		1
	6	0	22.41	22.45	22.63	0-2	2

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

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132072 (1720.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132572 (1770.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.89	22.75	22.77	0	0
	1	50	23.09	23.10	**23.13**		0
	1	99	22.83	22.85	22.83		0
	50	0	22.94	23.05	22.98	0-1	0
	50	25	22.97	23.01	**23.07**		0
	50	50	22.90	23.03	23.01		0
	100	0	22.95	23.00	23.00		0
16QAM	1	0	23.20	23.20	23.19	0-1	0
	1	50	23.14	23.17	23.14		0
	1	99	23.19	23.12	23.10		0
	50	0	22.45	22.53	22.53	0-2	0.5
	50	25	22.51	22.62	22.50		0.5
	50	50	22.43	22.60	22.55		0.5
	100	0	22.40	22.52	22.54		0.5

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

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.82	23.02	22.99	0	0
	1	36	22.97	23.20	23.04		0
	1	74	22.76	23.08	22.89		0
	36	0	23.05	23.07	23.02	0-1	0
	36	18	23.11	23.17	23.20		0
	36	37	23.01	23.18	23.17		0
	75	0	23.02	23.17	23.02		0
16QAM	1	0	22.94	23.11	23.17	0-1	0
	1	36	23.05	23.12	23.20		0
	1	74	22.93	23.20	23.15		0
	36	0	22.44	22.63	22.68	0-2	0.5
	36	18	22.48	22.52	22.57		0.5
	36	37	22.42	22.51	22.51		0.5
	75	0	22.53	22.63	22.59		0.5

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

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.90	22.87	22.99	0	0
	1	25	23.05	23.08	23.18		0
	1	49	22.89	22.99	22.97		0
	25	0	22.92	23.10	23.02	0-1	0
	25	12	23.01	23.16	23.16		0
	25	25	22.95	23.11	23.14		0
	50	0	22.95	23.11	23.02		0
16QAM	1	0	23.00	23.16	23.12	0-1	0
	1	25	23.12	23.13	23.20		0
	1	49	22.95	23.20	23.19		0
	25	0	22.43	22.61	22.59	0-2	0.5
	25	12	22.48	22.63	22.55		0.5
	25	25	22.45	22.63	22.59		0.5
	50	0	22.44	22.66	22.63		0.5

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

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.92	22.89	22.91	0	0
	1	12	23.19	23.19	23.15		0
	1	24	22.91	22.93	22.87		0
	12	0	22.91	23.05	23.13	0-1	0
	12	6	23.00	23.12	23.15		0
	12	13	22.99	23.05	23.14		0
	25	0	22.98	23.07	23.19		0
16QAM	1	0	23.05	23.15	23.15	0-1	0
	1	12	23.20	23.14	23.20		0
	1	24	23.06	23.14	23.12		0
	12	0	22.47	22.57	22.46	0-2	0.5
	12	6	22.53	22.62	22.46		0.5
	12	13	22.49	22.57	22.42		0.5
	25	0	22.47	22.64	22.55		0.5

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

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131987 (1711.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132657 (1778.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.91	22.92	23.05	0	0
	1	7	23.06	23.13	23.16		0
	1	14	22.89	22.94	23.02		0
	8	0	22.95	23.04	23.13	0-1	0
	8	4	23.02	23.08	23.16		0
	8	7	22.93	23.06	23.09		0
	15	0	22.99	23.07	23.11		0
16QAM	1	0	23.05	23.03	23.16	0-1	0
	1	7	23.14	23.12	23.11		0
	1	14	22.96	23.17	23.05		0
	8	0	22.35	22.63	22.59	0-2	0.5
	8	4	22.40	22.66	22.59		0.5
	8	7	22.30	22.59	22.57		0.5
	15	0	22.45	22.50	22.52		0.5

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

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131979 (1710.7 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132665 (1779.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.03	22.93	22.99	0	0
	1	2	23.09	23.04	23.07		0
	1	5	23.02	22.96	22.95		0
	3	0	23.03	23.16	23.04		0
	3	2	23.05	23.17	23.07		0
	3	3	23.04	23.19	23.03		0
	6	0	23.01	23.05	23.15	0-1	0
16QAM	1	0	22.85	23.03	23.07	0-1	0
	1	2	22.90	23.16	23.02		0
	1	5	22.83	23.07	23.06		0
	3	0	22.99	23.07	23.17		0
	3	2	23.02	23.10	23.01		0
	3	3	22.97	23.10	23.15		0
	6	0	22.57	22.58	22.64	0-2	0.5

9.3.5 LTE Band 2 (PCS)

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

LTE Band 2 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18700 (1860.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19100 (1900.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.51	24.27	24.20	0	0
	1	50	**24.65**	24.57	24.56		0
	1	99	24.36	24.35	24.24		0
	50	0	23.46	23.31	**23.60**	0-1	1
	50	25	23.48	23.38	23.53		1
	50	50	23.33	23.39	23.45		1
	100	0	23.38	23.36	23.54		1
16QAM	1	0	23.64	23.50	23.67	0-1	1
	1	50	23.60	23.67	23.60		1
	1	99	23.54	23.64	23.58		1
	50	0	22.46	22.28	22.57	0-2	2
	50	25	22.41	22.36	22.49		2
	50	50	22.40	22.33	22.45		2
	100	0	22.42	22.33	22.40		2

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

LTE Band 2 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18675 (1857.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19125 (1902.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.44	24.35	24.36	0	0
	1	36	24.56	24.50	24.52		0
	1	74	24.35	24.38	24.39		0
	36	0	23.65	23.44	23.51	0-1	1
	36	18	23.68	23.54	23.70		1
	36	37	23.60	23.50	23.68		1
	75	0	23.65	23.48	23.69		1
16QAM	1	0	23.48	23.32	23.66	0-1	1
	1	36	23.61	23.57	23.65		1
	1	74	23.37	23.42	23.53		1
	36	0	22.50	22.46	22.64	0-2	2
	36	18	22.55	22.50	22.67		2
	36	37	22.49	22.51	22.62		2
	75	0	22.56	22.39	22.64		2

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

LTE Band 2 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18650 (1855.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19150 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.59	24.29	24.45	0	0
	1	25	24.69	24.48	24.60		0
	1	49	24.53	24.31	24.43		0
	25	0	23.63	23.40	23.55	0-1	1
	25	12	23.56	23.43	23.56		1
	25	25	23.52	23.41	23.56		1
	50	0	23.56	23.41	23.60		1
16QAM	1	0	23.63	23.44	23.52	0-1	1
	1	25	23.52	23.65	23.70		1
	1	49	23.54	23.46	23.57		1
	25	0	22.61	22.40	22.57	0-2	2
	25	12	22.57	22.41	22.57		2
	25	25	22.50	22.42	22.57		2
	50	0	22.53	22.41	22.60		2

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

LTE Band 2 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18625 (1852.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19175 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.57	24.31	24.26	0	0
	1	12	24.59	24.58	24.53		0
	1	24	24.52	24.31	24.26		0
	12	0	23.59	23.36	23.43	0-1	1
	12	6	23.65	23.45	23.53		1
	12	13	23.55	23.40	23.47		1
	25	0	23.57	23.40	23.48		1
16QAM	1	0	23.66	23.53	23.68	0-1	1
	1	12	23.70	23.58	23.69		1
	1	24	23.56	23.55	23.54		1
	12	0	22.57	22.33	22.45	0-2	2
	12	6	22.59	22.40	22.54		2
	12	13	22.51	22.36	22.50		2
	25	0	22.52	22.41	22.47		2

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

LTE Band 2 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18615 (1851.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19185 (1908.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.62	24.30	24.44	0	0
	1	7	24.53	24.45	24.55		0
	1	14	24.56	24.28	24.40		0
	8	0	23.63	23.38	23.51	0-1	1
	8	4	23.63	23.45	23.57		1
	8	7	23.62	23.38	23.54		1
	15	0	23.57	23.36	23.48		1
16QAM	1	0	23.66	23.49	23.53	0-1	1
	1	7	23.58	23.63	23.68		1
	1	14	23.57	23.42	23.51		1
	8	0	22.50	22.40	22.40	0-2	2
	8	4	22.50	22.42	22.44		2
	8	7	22.46	22.42	22.44		2
	15	0	22.53	22.29	22.49		2

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

LTE Band 2 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18607 (1850.7 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19193 (1909.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.66	24.31	24.35	0	0
	1	2	24.67	24.42	24.47		0
	1	5	24.66	24.31	24.35		0
	3	0	24.66	24.38	24.51		0
	3	2	24.68	24.44	24.63		0
	3	3	24.67	24.40	24.60		0
	6	0	23.70	23.41	23.59	0-1	1
16QAM	1	0	23.39	23.37	23.58	0-1	1
	1	2	23.53	23.44	23.65		1
	1	5	23.41	23.38	23.57		1
	3	0	23.54	23.48	23.41		1
	3	2	23.56	23.51	23.49		1
	3	3	23.55	23.53	23.45		1
	6	0	22.69	22.40	22.52	0-2	2

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

LTE Band 2 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18700 (1860.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19100 (1900.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.16	22.82	23.07	0	0
	1	50	23.18	23.12	**23.20**		0
	1	99	23.00	22.88	23.13		0
	50	0	23.17	23.01	**23.19**	0-1	0
	50	25	23.18	23.06	23.17		0
	50	50	23.06	23.06	23.17		0
	100	0	23.17	23.06	23.12		0
16QAM	1	0	23.18	22.78	23.20	0-1	0
	1	50	23.10	22.88	23.14		0
	1	99	23.14	23.18	23.12		0
	50	0	22.69	22.52	22.70	0-2	0.5
	50	25	22.66	22.50	22.64		0.5
	50	50	22.56	22.58	22.60		0.5
	100	0	22.65	22.51	22.54		0.5

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

LTE Band 2 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18675 (1857.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19125 (1902.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.95	22.88	22.87	0	0
	1	36	23.06	23.08	23.05		0
	1	74	22.85	22.91	22.87		0
	36	0	23.20	22.97	23.18	0-1	0
	36	18	23.20	23.05	23.20		0
	36	37	23.15	23.04	23.13		0
	75	0	23.17	23.02	23.20		0
16QAM	1	0	23.00	22.93	23.15	0-1	0
	1	36	23.15	23.12	23.18		0
	1	74	22.94	22.95	23.20		0
	36	0	22.56	22.49	22.61	0-2	0.5
	36	18	22.55	22.53	22.64		0.5
	36	37	22.52	22.53	22.57		0.5
	75	0	22.61	22.42	22.64		0.5

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

LTE Band 2 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18650 (1855.0 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19150 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.03	22.76	22.91	0	0
	1	25	23.19	23.00	23.15		0
	1	49	22.98	22.82	22.98		0
	25	0	23.15	22.93	23.13	0-1	0
	25	12	23.08	22.94	23.08		0
	25	25	23.02	22.94	23.10		0
	50	0	23.13	22.94	23.14		0
16QAM	1	0	23.14	23.00	23.14	0-1	0
	1	25	23.20	23.17	23.20		0
	1	49	23.05	22.98	23.19		0
	25	0	22.58	22.40	22.59	0-2	0.5
	25	12	22.55	22.45	22.61		0.5
	25	25	22.50	22.42	22.60		0.5
	50	0	22.52	22.44	22.61		0.5

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

LTE Band 2 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18625 (1852.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19175 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.11	22.78	22.78	0	0
	1	12	23.20	23.05	23.06		0
	1	24	23.02	22.80	22.79		0
	12	0	23.12	22.88	22.97	0-1	0
	12	6	23.19	22.97	23.05		0
	12	13	23.08	22.90	23.02		0
	25	0	23.09	22.85	22.99		0
16QAM	1	0	23.18	23.12	23.12	0-1	0
	1	12	23.20	23.14	23.20		0
	1	24	23.11	23.11	23.18		0
	12	0	22.56	22.30	22.45	0-2	0.5
	12	6	22.64	22.44	22.57		0.5
	12	13	22.54	22.38	22.52		0.5
	25	0	22.54	22.42	22.51		0.5

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

LTE Band 2 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18615 (1851.5 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19185 (1908.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.10	22.83	22.93	0	0
	1	7	23.20	22.96	23.11		0
	1	14	23.04	22.79	22.89		0
	8	0	23.17	22.91	23.03	0-1	0
	8	4	23.18	22.94	23.08		0
	8	7	23.12	22.92	23.03		0
	15	0	23.12	22.88	23.02		0
16QAM	1	0	23.18	23.03	23.09	0-1	0
	1	7	23.19	23.17	23.20		0
	1	14	23.11	22.97	23.12		0
	8	0	22.48	22.42	22.41	0-2	0.5
	8	4	22.51	22.47	22.46		0.5
	8	7	22.46	22.42	22.46		0.5
	15	0	22.54	22.31	22.53		0.5

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

LTE Band 2 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 18607 (1850.7 MHz)	Mid Channel 18900 (1880.0 MHz)	High Channel 19193 (1909.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.04	22.74	23.04	0	0
	1	2	23.15	22.85	23.14		0
	1	5	23.04	22.76	23.09		0
	3	0	23.17	22.90	23.05		0
	3	2	23.20	22.97	23.04		0
	3	3	23.20	22.92	23.05		0
	6	0	23.20	22.96	23.06	0-1	0
16QAM	1	0	23.10	22.94	22.85	0-1	0
	1	2	23.14	23.02	22.95		0
	1	5	23.13	22.97	22.87		0
	3	0	23.17	22.79	23.01		0
	3	2	23.17	22.85	23.07		0
	3	3	23.16	22.83	22.97		0
	6	0	22.69	22.36	22.61	0-2	0.5

9.3.6 LTE Band 30

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

LTE Band 30 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	23.66	0	0
	1	25	**23.74**		0
	1	49	23.65		0
	25	0	**22.77**	0-1	1
	25	12	22.73		1
	25	25	22.70		1
	50	0	22.76		1
16QAM	1	0	22.69	0-1	1
	1	25	22.73		1
	1	49	22.62		1
	25	0	21.85	0-2	2
	25	12	21.84		2
	25	25	21.80		2
	50	0	21.74		2

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

LTE Band 30 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	23.64	0	0
	1	12	23.88		0
	1	24	23.65		0
	12	0	22.92	0-1	1
	12	6	22.91		1
	12	13	22.86		1
	25	0	22.83		1
16QAM	1	0	22.78	0-1	1
	1	12	23.03		1
	1	24	22.84		1
	12	0	22.00	0-2	2
	12	6	22.00		2
	12	13	21.88		2
	25	0	21.92		2

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

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

LTE Band 30 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	21.66	0	0
	1	25	**21.85**		0
	1	49	21.63		0
	25	0	**21.80**	0-1	0
	25	12	21.76		0
	25	25	21.71		0
	50	0	21.78		0
16QAM	1	0	22.10	0-1	0
	1	25	22.19		0
	1	49	22.10		0
	25	0	21.88	0-2	0
	25	12	21.89		0
	25	25	21.80		0
	50	0	21.74		0

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

LTE Band 30 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	21.83 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	21.55	0	0
	1	12	21.83		0
	1	24	21.57		0
	12	0	21.79	0-1	0
	12	6	21.86		0
	12	13	21.81		0
	25	0	21.87		0
16QAM	1	0	21.77	0-1	0
	1	12	21.83		0
	1	24	21.84		0
	12	0	21.93	0-2	0
	12	6	21.99		0
	12	13	21.95		0
	25	0	21.95		0

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

9.4 WLAN Conducted Powers

Table 9-42
2.4 GHz WLAN Maximum Average RF Power

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
		Average	Average	Average
2412	1	16.61	15.79	14.65
2437	6	16.96	16.18	15.11
2462	11	16.88	15.93	14.83

Table 9-43
5 GHz WLAN Maximum Average RF Power

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
		Average	Average
5190	38	14.83	14.84
5230	46	14.98	14.94
5270	54	15.01	15.08
5310	62	15.11	15.13
5510	102	16.12	16.14
5550	110	16.03	16.04
5590	118	14.86	14.81
5630	126	14.56	14.54
5710	142	15.28	15.31
5755	151	14.56	14.52
5795	159	14.67	14.57

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

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

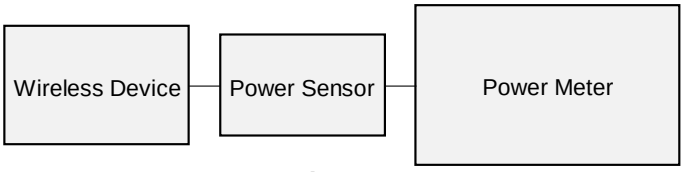

Figure 9-3
Power Measurement Setup

9.5 Bluetooth Conducted Powers

Table 9-44
Bluetooth Average RF Power

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
			[dBm]	[mW]
2402	1.0	0	5.58	3.616
2441	1.0	39	7.18	5.225
2480	1.0	78	7.59	5.740
2402	2.0	0	5.61	3.640
2441	2.0	39	7.03	5.046
2480	2.0	78	7.24	5.293
2402	3.0	0	5.63	3.652
2441	3.0	39	7.04	5.063
2480	3.0	78	7.27	5.337

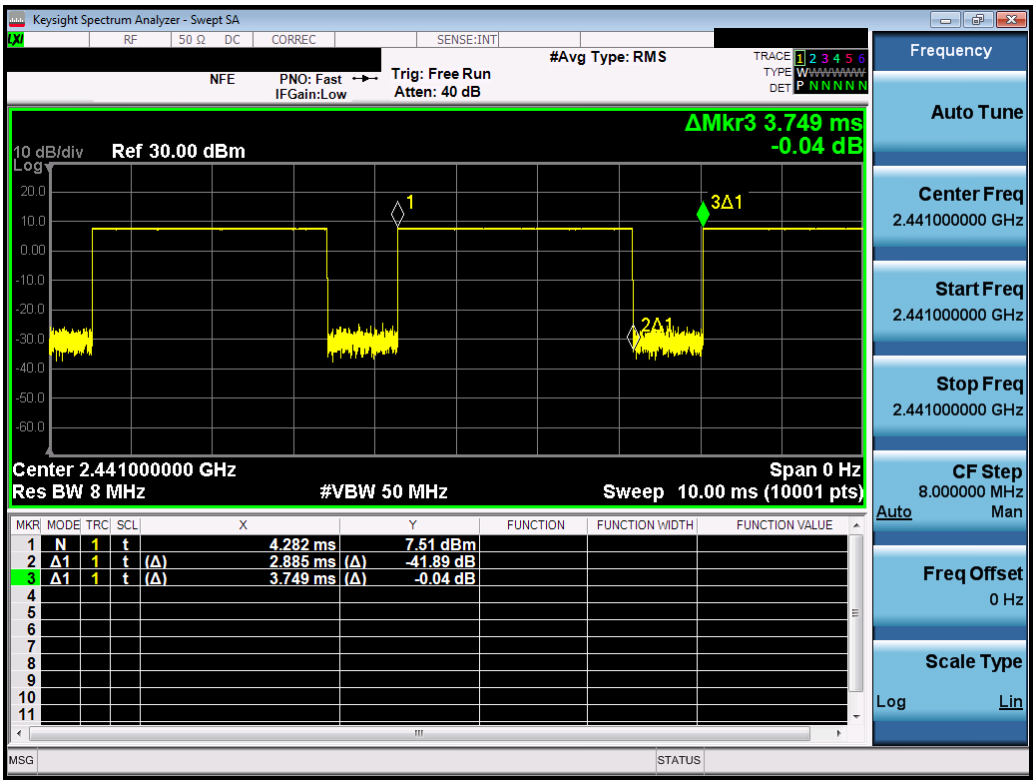

Figure 9-4
Bluetooth Transmission Plot

Equation 9-1
Bluetooth Duty Cycle Calculation

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.885ms}{3.749ms} * 100\% = 77.0\%$$

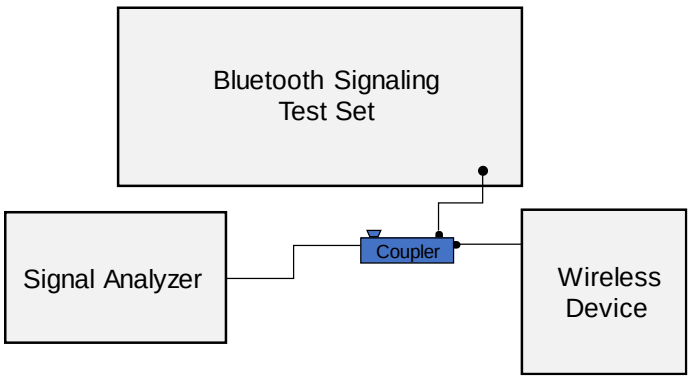

Figure 9-5
Power Measurement Setup

10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Head Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
02/26/2020	700 Head	20.4	680	0.844	40.664	0.888	42.305	-4.95%	-3.88%
			695	0.849	40.619	0.889	42.227	-4.50%	-3.81%
			700	0.851	40.604	0.889	42.201	-4.27%	-3.78%
			710	0.854	40.574	0.890	42.149	-4.04%	-3.74%
			725	0.859	40.527	0.891	42.071	-3.59%	-3.67%
			740	0.864	40.476	0.893	41.994	-3.25%	-3.61%
			750	0.868	40.444	0.894	41.942	-2.91%	-3.57%
			755	0.870	40.430	0.894	41.916	-2.68%	-3.55%
			770	0.876	40.390	0.895	41.838	-2.12%	-3.46%
			785	0.881	40.355	0.896	41.760	-1.67%	-3.36%
			800	0.886	40.322	0.897	41.682	-1.23%	-3.26%
02/28/2020	835 Head	20.5	820	0.912	40.714	0.899	41.578	1.45%	-2.08%
			835	0.918	40.658	0.900	41.500	2.00%	-2.03%
			850	0.924	40.609	0.916	41.500	0.87%	-2.15%
02/26/2020	1750 Head	20.4	1710	1.317	38.478	1.348	40.142	-2.30%	-4.15%
			1720	1.323	38.463	1.354	40.126	-2.29%	-4.14%
			1745	1.339	38.425	1.368	40.087	-2.12%	-4.15%
			1750	1.342	38.416	1.371	40.079	-2.12%	-4.15%
			1770	1.354	38.379	1.383	40.047	-2.10%	-4.17%
			1790	1.366	38.340	1.394	40.016	-2.01%	-4.19%
03/02/2020	1900 Head	22.1	1850	1.386	39.375	1.400	40.000	-1.00%	-1.56%
			1860	1.397	39.332	1.400	40.000	-0.21%	-1.67%
			1880	1.418	39.244	1.400	40.000	1.29%	-1.89%
			1900	1.439	39.154	1.400	40.000	2.79%	-2.11%
			1905	1.444	39.132	1.400	40.000	3.14%	-2.17%
			1910	1.449	39.109	1.400	40.000	3.50%	-2.23%
02/27/2020	2450 Head	21.2	2300	1.746	38.717	1.670	39.500	4.55%	-1.98%
			2310	1.754	38.701	1.679	39.480	4.47%	-1.97%
			2320	1.762	38.687	1.687	39.460	4.45%	-1.96%
			2400	1.820	38.548	1.756	39.289	3.64%	-1.89%
			2450	1.858	38.473	1.800	39.200	3.22%	-1.85%
			2500	1.897	38.384	1.855	39.136	2.26%	-1.92%
03/05/20	2450 Head	21.7	2400	1.809	38.492	1.756	39.289	3.02%	-2.03%
			2450	1.846	38.414	1.800	39.200	2.56%	-2.01%
			2500	1.885	38.332	1.855	39.136	1.62%	-2.05%
02/24/2020	5200-5800 Head	20.3	5180	4.522	35.057	4.635	36.009	-2.44%	-2.64%
			5190	4.529	35.044	4.645	35.998	-2.50%	-2.65%
			5200	4.538	35.023	4.655	35.986	-2.51%	-2.68%
			5210	4.550	35.005	4.666	35.975	-2.49%	-2.70%
			5220	4.557	34.987	4.676	35.963	-2.54%	-2.71%
			5240	4.576	34.943	4.696	35.940	-2.56%	-2.77%
			5250	4.592	34.919	4.706	35.929	-2.42%	-2.81%
			5260	4.607	34.906	4.717	35.917	-2.33%	-2.81%
			5270	4.618	34.890	4.727	35.906	-2.31%	-2.83%
			5280	4.630	34.866	4.737	35.894	-2.26%	-2.86%
			5290	4.643	34.852	4.748	35.883	-2.21%	-2.87%
			5300	4.656	34.843	4.758	35.871	-2.14%	-2.87%
			5310	4.665	34.830	4.768	35.860	-2.16%	-2.87%
			5320	4.672	34.805	4.778	35.849	-2.22%	-2.91%
			5500	4.875	34.476	4.963	35.643	-1.77%	-3.27%
			5510	4.886	34.462	4.973	35.632	-1.75%	-3.28%
			5520	4.896	34.453	4.983	35.620	-1.75%	-3.28%
			5530	4.906	34.451	4.994	35.609	-1.76%	-3.25%
			5540	4.915	34.431	5.004	35.597	-1.78%	-3.28%
			5550	4.925	34.410	5.014	35.586	-1.78%	-3.30%
			5560	4.934	34.383	5.024	35.574	-1.79%	-3.35%
			5580	4.962	34.339	5.045	35.551	-1.65%	-3.41%
			5600	4.989	34.292	5.065	35.529	-1.50%	-3.48%
			5610	5.003	34.279	5.076	35.518	-1.44%	-3.49%
			5620	5.017	34.262	5.086	35.506	-1.36%	-3.50%
			5640	5.040	34.241	5.106	35.483	-1.29%	-3.50%
			5660	5.057	34.213	5.127	35.460	-1.37%	-3.52%
			5670	5.068	34.185	5.137	35.449	-1.34%	-3.57%
			5680	5.078	34.157	5.147	35.437	-1.34%	-3.61%
			5690	5.088	34.138	5.158	35.426	-1.36%	-3.64%
			5700	5.100	34.122	5.168	35.414	-1.32%	-3.65%
			5710	5.115	34.104	5.178	35.403	-1.22%	-3.67%
			5720	5.129	34.085	5.188	35.391	-1.14%	-3.69%
			5745	5.162	34.044	5.214	35.363	-1.00%	-3.73%
			5750	5.168	34.041	5.219	35.357	-0.98%	-3.72%
			5755	5.172	34.038	5.224	35.351	-1.00%	-3.71%
			5765	5.181	34.034	5.234	35.340	-1.01%	-3.70%
			5775	5.192	34.027	5.245	35.329	-1.01%	-3.69%
			5785	5.202	34.006	5.255	35.317	-1.01%	-3.71%
			5795	5.210	33.976	5.265	35.305	-1.04%	-3.76%
			5800	5.216	33.964	5.270	35.300	-1.02%	-3.78%
			5805	5.220	33.951	5.275	35.294	-1.04%	-3.81%
			5825	5.247	33.910	5.296	35.271	-0.93%	-3.86%

Table 10-2
Measured Body Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
			680	0.952	53.314	0.958	55.804	-0.63%	-4.46%
			695	0.957	53.273	0.959	55.745	-0.21%	-4.43%
			700	0.959	53.257	0.959	55.726	0.00%	-4.43%
			710	0.962	53.231	0.960	55.687	0.21%	-4.41%
			725	0.968	53.189	0.961	55.629	0.73%	-4.39%
02/26/2020	700 Body	21.4	740	0.974	53.151	0.963	55.570	1.14%	-4.35%
			750	0.977	53.132	0.964	55.531	1.35%	-4.32%
			755	0.979	53.122	0.964	55.512	1.56%	-4.31%
			770	0.984	53.077	0.965	55.453	1.97%	-4.28%
			785	0.989	53.030	0.966	55.395	2.38%	-4.27%
			800	0.995	52.988	0.967	55.336	2.90%	-4.24%
			820	0.947	54.501	0.969	55.258	-2.27%	-1.37%
03/02/2020	835 Body	21.3	835	0.963	54.344	0.970	55.200	-0.72%	-1.55%
			850	0.977	54.195	0.988	55.154	-1.11%	-1.74%
			1710	1.428	55.742	1.463	53.537	-2.39%	4.12%
			1720	1.440	55.709	1.469	53.511	-1.97%	4.11%
02/26/2020	1750 Body	20.9	1745	1.468	55.639	1.485	53.445	-1.14%	4.11%
			1750	1.474	55.625	1.488	53.432	-0.94%	4.10%
			1770	1.496	55.565	1.501	53.379	-0.33%	4.10%
			1790	1.517	55.491	1.514	53.326	0.20%	4.06%
			1850	1.525	53.261	1.520	53.300	0.33%	-0.07%
			1860	1.537	53.233	1.520	53.300	1.12%	-0.13%
02/27/2020	1900 Body	23.0	1880	1.561	53.174	1.520	53.300	2.70%	-0.24%
			1900	1.583	53.107	1.520	53.300	4.14%	-0.36%
			1905	1.589	53.091	1.520	53.300	4.54%	-0.39%
			1910	1.595	53.075	1.520	53.300	4.93%	-0.42%
			1850	1.504	52.427	1.520	53.300	-1.05%	-1.64%
			1860	1.515	52.397	1.520	53.300	-0.33%	-1.69%
03/02/2020	1900 Body	22.6	1880	1.537	52.343	1.520	53.300	1.12%	-1.80%
			1900	1.559	52.281	1.520	53.300	2.57%	-1.91%
			1905	1.564	52.262	1.520	53.300	2.89%	-1.95%
			1910	1.570	52.243	1.520	53.300	3.29%	-1.98%
			1850	1.507	51.624	1.520	53.300	-0.86%	-3.14%
			1860	1.519	51.592	1.520	53.300	-0.07%	-3.20%
03/12/2020	1900 Body	24.0	1880	1.541	51.533	1.520	53.300	1.38%	-3.32%
			1900	1.563	51.470	1.520	53.300	2.83%	-3.43%
			1905	1.568	51.452	1.520	53.300	3.16%	-3.47%
			1910	1.574	51.435	1.520	53.300	3.55%	-3.50%
			2300	1.842	52.675	1.809	52.900	1.82%	-0.43%
02/25/2020	2450 Body	22.7	2310	1.854	52.648	1.816	52.887	2.09%	-0.45%
			2320	1.866	52.618	1.826	52.873	2.19%	-0.48%
			2400	1.959	52.384	1.902	52.767	3.00%	-0.73%
			2400	1.979	52.157	1.902	52.767	4.05%	-1.16%
03/02/2020	2450 Body	22.5	2450	2.039	51.998	1.950	52.700	4.56%	-1.33%
			2500	2.098	51.848	2.021	52.636	3.81%	-1.50%
			5180	5.416	47.364	5.276	49.041	2.65%	-3.42%
			5190	5.425	47.348	5.288	49.028	2.59%	-3.43%
			5200	5.438	47.319	5.299	49.014	2.62%	-3.46%
			5210	5.452	47.303	5.311	49.001	2.65%	-3.47%
			5220	5.460	47.288	5.323	48.987	2.57%	-3.47%
			5240	5.483	47.244	5.346	48.960	2.56%	-3.50%
			5250	5.501	47.219	5.358	48.947	2.67%	-3.53%
			5260	5.517	47.213	5.369	48.933	2.76%	-3.52%
			5270	5.530	47.205	5.381	48.919	2.77%	-3.50%
			5280	5.545	47.186	5.393	48.906	2.82%	-3.52%
			5290	5.559	47.166	5.404	48.892	2.87%	-3.53%
			5300	5.571	47.153	5.416	48.879	2.86%	-3.53%
			5310	5.583	47.136	5.428	48.865	2.86%	-3.54%
			5320	5.595	47.114	5.439	48.851	2.87%	-3.56%
			5500	5.834	46.811	5.650	48.607	3.26%	-3.69%
			5510	5.848	46.797	5.661	48.594	3.30%	-3.70%
			5520	5.860	46.790	5.673	48.580	3.30%	-3.68%
			5530	5.874	46.787	5.685	48.566	3.32%	-3.66%
			5540	5.886	46.762	5.696	48.553	3.34%	-3.69%
			5550	5.897	46.741	5.708	48.539	3.31%	-3.70%
			5560	5.909	46.714	5.720	48.526	3.30%	-3.73%
02/24/2020	5200-5800 Body	21.5	5580	5.945	46.677	5.743	48.499	3.52%	-3.76%
			5600	5.976	46.635	5.766	48.471	3.64%	-3.79%
			5610	5.990	46.627	5.778	48.458	3.67%	-3.78%
			5620	6.005	46.611	5.790	48.444	3.71%	-3.78%
			5640	6.032	46.588	5.813	48.417	3.77%	-3.78%
			5660	6.056	46.560	5.837	48.390	3.75%	-3.78%
			5670	6.070	46.527	5.848	48.376	3.80%	-3.82%
			5680	6.081	46.496	5.860	48.363	3.77%	-3.86%
			5690	6.092	46.483	5.872	48.349	3.75%	-3.86%
			5700	6.106	46.467	5.883	48.336	3.79%	-3.87%
			5710	6.125	46.451	5.895	48.322	3.90%	-3.87%
			5720	6.144	46.428	5.907	48.309	4.01%	-3.89%
			5745	6.179	46.404	5.936	48.275	4.09%	-3.88%
			5750	6.183	46.403	5.942	48.268	4.06%	-3.86%
			5755	6.189	46.403	5.947	48.261	4.07%	-3.85%
			5765	6.203	46.399	5.959	48.248	4.09%	-3.83%
			5775	6.215	46.385	5.971	48.234	4.09%	-3.83%
			5785	6.230	46.364	5.982	48.220	4.15%	-3.85%
			5795	6.241	46.332	5.994	48.207	4.12%	-3.89%
			5800	6.249	46.321	6.000	48.200	4.15%	-3.90%
			5805	6.256	46.309	6.006	48.193	4.16%	-3.91%
			5825	6.287	46.269	6.029	48.166	4.28%	-3.94%

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

10.2 Test System Verification

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

Table 10-3
System Verification Results – 1g

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	$Deviation_{1g}$ (%)
L	750	HEAD	02/26/2020	21.2	20.4	0.200	1054	7410	1.680	8.290	8.400	1.33%
L	835	HEAD	02/28/2020	21.8	20.0	0.200	4d133	7410	1.990	9.430	9.950	5.51%
L	1750	HEAD	02/26/2020	21.2	20.4	0.100	1150	7410	3.770	36.500	37.700	3.29%
G	1900	HEAD	03/02/2020	22.3	22.1	0.100	5d149	7409	4.050	39.300	40.500	3.05%
M	2300	HEAD	02/27/2020	20.8	22.2	0.100	1073	7570	5.060	49.200	50.600	2.85%
M	2450	HEAD	02/27/2020	20.8	22.2	0.100	719	7570	5.380	53.100	53.800	1.32%
E	2450	HEAD	03/05/2020	21.7	22.4	0.100	719	3589	5.420	53.100	54.200	2.07%
H	5250	HEAD	02/24/2020	23.0	20.3	0.050	1057	7406	3.710	79.200	74.200	-6.31%
H	5600	HEAD	02/24/2020	23.0	20.3	0.050	1057	7406	3.900	84.100	78.000	-7.25%
H	5750	HEAD	02/24/2020	23.0	20.3	0.050	1057	7406	3.810	80.500	76.200	-5.34%
E	750	BODY	02/26/2020	22.7	21.4	0.200	1054	3589	1.810	8.550	9.050	5.85%
D	835	BODY	03/02/2020	21.9	21.3	0.200	4d047	7488	1.850	9.470	9.250	-2.32%
I	1750	BODY	02/26/2020	21.2	20.9	0.100	1148	7357	3.850	37.700	38.500	2.12%
J	1900	BODY	02/27/2020	21.9	21.2	0.100	5d080	7571	4.230	39.200	42.300	7.91%
P	1900	BODY	03/02/2020	23.7	22.6	0.100	5d149	7551	4.000	39.400	40.000	1.52%
K	2300	BODY	02/25/2020	23.1	22.7	0.100	1073	7547	4.840	47.700	48.400	1.47%
K	2450	BODY	03/02/2020	23.0	22.5	0.100	797	7547	5.070	51.100	50.700	-0.78%
G	5250	BODY	02/24/2020	23.7	22.2	0.050	1057	7409	3.790	75.900	75.800	-0.13%
G	5600	BODY	02/24/2020	23.7	22.2	0.050	1057	7409	4.010	79.900	80.200	0.38%
G	5750	BODY	02/24/2020	23.7	22.2	0.050	1057	7409	3.760	76.700	75.200	-1.96%

Table 10-4
System Verification Results – 10g

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR_{10g} (W/kg)	1 W Target SAR_{10g} (W/kg)	1 W Normalized SAR_{10g} (W/kg)	Deviation$_{10g}$ (%)
I	1750	BODY	02/26/2020	21.2	20.9	0.100	1148	7357	2.040	19.800	20.400	3.03%
P	1900	BODY	03/02/2020	23.7	22.6	0.100	5d149	7551	2.040	20.700	20.400	-1.45%
J	1900	BODY	03/12/2020	22.0	23.5	0.100	5d148	7571	2.140	20.500	21.400	4.39%
K	2300	BODY	02/25/2020	23.1	22.7	0.100	1073	7547	2.330	23.200	23.300	0.43%
G	5250	BODY	02/24/2020	23.7	22.2	0.050	1057	7409	1.060	21.100	21.200	0.47%
G	5600	BODY	02/24/2020	23.7	22.2	0.050	1057	7409	1.110	22.300	22.200	-0.45%
G	5750	BODY	02/24/2020	23.7	22.2	0.050	1057	7409	1.030	21.200	20.600	-2.83%

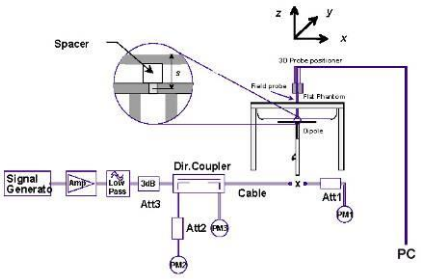

Figure 10-1
System Verification Setup Diagram

Figure 10-2
System Verification Setup Photo

11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
GSM 850 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	# of Time Slots	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.7	33.65	0.10	Right	Cheek	04689	1	1:8.3	0.203	1.012	0.205	
836.60	190	GSM 850	GSM	33.7	33.65	0.20	Right	Tilt	04689	1	1:8.3	0.087	1.012	0.088	
836.60	190	GSM 850	GSM	33.7	33.65	0.09	Left	Cheek	04689	1	1:8.3	0.193	1.012	0.195	
836.60	190	GSM 850	GSM	33.7	33.65	0.10	Left	Tilt	04689	1	1:8.3	0.098	1.012	0.099	
836.60	190	GSM 850	GPRS	32.7	32.65	0.10	Right	Cheek	04689	2	1:4.15	0.299	1.012	**0.303**	
836.60	190	GSM 850	GPRS	32.7	32.65	0.03	Right	Tilt	04689	2	1:4.15	0.138	1.012	0.140	
836.60	190	GSM 850	GPRS	32.7	32.65	0.12	Left	Cheek	04689	2	1:4.15	0.300	1.012	**0.304**	A1
836.60	190	GSM 850	GPRS	32.7	32.65	0.00	Left	Tilt	04689	2	1:4.15	0.160	1.012	0.162	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Head** **1.6 W/kg (mW/g)** averaged over 1 gram								

Table 11-2
GSM 1900 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	# of Time Slots	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GSM	30.7	30.48	-0.20	Right	Cheek	04689	1	1:8.3	0.048	1.052	0.050	
1880.00	661	GSM 1900	GSM	30.7	30.48	0.16	Right	Tilt	04689	1	1:8.3	0.021	1.052	0.022	
1880.00	661	GSM 1900	GSM	30.7	30.48	0.16	Left	Cheek	04689	1	1:8.3	0.032	1.052	0.034	
1880.00	661	GSM 1900	GSM	30.7	30.48	-0.21	Left	Tilt	04689	1	1:8.3	0.021	1.052	0.022	
1880.00	661	GSM 1900	GPRS	29.7	29.47	0.01	Right	Cheek	04689	2	1:4.15	0.065	1.054	0.069	A2
1880.00	661	GSM 1900	GPRS	29.7	29.47	0.04	Right	Tilt	04689	2	1:4.15	0.024	1.054	0.025	
1880.00	661	GSM 1900	GPRS	29.7	29.47	0.13	Left	Cheek	04689	2	1:4.15	0.063	1.054	0.066	
1880.00	661	GSM 1900	GPRS	29.7	29.47	0.17	Left	Tilt	04689	2	1:4.15	0.036	1.054	0.038	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Head** **1.6 W/kg (mW/g)** averaged over 1 gram								

Table 11-3
UMTS 850 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	25.2	24.90	-0.18	Right	Cheek	04689	1:1	0.220	1.072	0.236	A3
836.60	4183	UMTS 850	RMC	25.2	24.90	0.10	Right	Tilt	04689	1:1	0.108	1.072	0.116	
836.60	4183	UMTS 850	RMC	25.2	24.90	0.04	Left	Cheek	04689	1:1	0.218	1.072	0.234	
836.60	4183	UMTS 850	RMC	25.2	24.90	0.14	Left	Tilt	04689	1:1	0.116	1.072	0.124	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-4
UMTS 1750 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	0.02	Right	Cheek	04689	1:1	0.128	1.005	0.129	A4
1732.40	1412	UMTS 1750	RMC	24.7	24.68	-0.07	Right	Tilt	04689	1:1	0.097	1.005	0.097	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	-0.08	Left	Cheek	04689	1:1	0.111	1.005	0.112	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	0.03	Left	Tilt	04689	1:1	0.087	1.005	0.087	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-5
UMTS 1900 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	9400	UMTS 1900	RMC	24.7	24.65	-0.15	Right	Cheek	04689	1:1	0.135	1.012	0.137	A5
1880.00	9400	UMTS 1900	RMC	24.7	24.65	0.15	Right	Tilt	04689	1:1	0.054	1.012	0.055	
1880.00	9400	UMTS 1900	RMC	24.7	24.65	0.07	Left	Cheek	04689	1:1	0.072	1.012	0.073	
1880.00	9400	UMTS 1900	RMC	24.7	24.65	0.14	Left	Tilt	04689	1:1	0.053	1.012	0.054	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-6
LTE Band 12 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.2	25.04	-0.10	0	Right	Cheek	QPSK	1	25	04689	1:1	0.152	1.038	0.158	
707.50	23095	Mid	LTE Band 12	10	24.2	23.86	0.11	1	Right	Cheek	QPSK	25	25	04689	1:1	0.117	1.081	0.126	
707.50	23095	Mid	LTE Band 12	10	25.2	25.04	-0.15	0	Right	Tilt	QPSK	1	25	04689	1:1	0.076	1.038	0.079	
707.50	23095	Mid	LTE Band 12	10	24.2	23.86	0.16	1	Right	Tilt	QPSK	25	25	04689	1:1	0.055	1.081	0.059	
707.50	23095	Mid	LTE Band 12	10	25.2	25.04	0.12	0	Left	Cheek	QPSK	1	25	04689	1:1	0.186	1.038	0.193	A6
707.50	23095	Mid	LTE Band 12	10	24.2	23.86	-0.01	1	Left	Cheek	QPSK	25	25	04689	1:1	0.154	1.081	0.166	
707.50	23095	Mid	LTE Band 12	10	25.2	25.04	0.06	0	Left	Tilt	QPSK	1	25	04689	1:1	0.109	1.038	0.113	
707.50	23095	Mid	LTE Band 12	10	24.2	23.86	0.16	1	Left	Tilt	QPSK	25	25	04689	1:1	0.079	1.081	0.085	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-7
LTE Band 14 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
793.00	23330	Mid	LTE Band 14	10	25.2	24.99	-0.01	0	Right	Cheek	QPSK	1	25	04689	1:1	0.143	1.050	0.150	A7
793.00	23330	Mid	LTE Band 14	10	24.2	24.02	0.16	1	Right	Cheek	QPSK	25	0	04689	1:1	0.113	1.042	0.118	
793.00	23330	Mid	LTE Band 14	10	25.2	24.99	0.14	0	Right	Tilt	QPSK	1	25	04689	1:1	0.064	1.050	0.067	
793.00	23330	Mid	LTE Band 14	10	24.2	24.02	0.01	1	Right	Tilt	QPSK	25	0	04689	1:1	0.055	1.042	0.057	
793.00	23330	Mid	LTE Band 14	10	25.2	24.99	0.08	0	Left	Cheek	QPSK	1	25	04689	1:1	0.123	1.050	0.129	
793.00	23330	Mid	LTE Band 14	10	24.2	24.02	0.01	1	Left	Cheek	QPSK	25	0	04689	1:1	0.103	1.042	0.107	
793.00	23330	Mid	LTE Band 14	10	25.2	24.99	0.04	0	Left	Tilt	QPSK	1	25	04689	1:1	0.067	1.050	0.070	
793.00	23330	Mid	LTE Band 14	10	24.2	24.02	0.08	1	Left	Tilt	QPSK	25	0	04689	1:1	0.055	1.042	0.057	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram										

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

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.18	0.06	0	Right	Cheek	QPSK	1	25	04689	1:1	0.214	1.005	0.215	A8
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	0.10	1	Right	Cheek	QPSK	25	0	04689	1:1	0.167	1.000	0.167	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.18	0.15	0	Right	Tilt	QPSK	1	25	04689	1:1	0.104	1.005	0.105	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	0.13	1	Right	Tilt	QPSK	25	0	04689	1:1	0.088	1.000	0.088	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.18	-0.02	0	Left	Cheek	QPSK	1	25	04689	1:1	0.203	1.005	0.204	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	0.08	1	Left	Cheek	QPSK	25	0	04689	1:1	0.162	1.000	0.162	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.18	-0.14	0	Left	Tilt	QPSK	1	25	04689	1:1	0.105	1.005	0.106	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	-0.04	1	Left	Tilt	QPSK	25	0	04689	1:1	0.084	1.000	0.084	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram										

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

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.70	-0.14	0	Right	Cheek	QPSK	1	50	04689	1:1	0.138	1.000	0.138	A9
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.59	0.17	1	Right	Cheek	QPSK	50	0	04689	1:1	0.105	1.026	0.108	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.70	0.15	0	Right	Tilt	QPSK	1	50	04689	1:1	0.082	1.000	0.082	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.59	0.15	1	Right	Tilt	QPSK	50	0	04689	1:1	0.064	1.026	0.066	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.70	-0.12	0	Left	Cheek	QPSK	1	50	04689	1:1	0.109	1.000	0.109	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.59	0.14	1	Left	Cheek	QPSK	50	0	04689	1:1	0.094	1.026	0.096	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.70	0.17	0	Left	Tilt	QPSK	1	50	04689	1:1	0.070	1.000	0.070	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.59	0.21	1	Left	Tilt	QPSK	50	0	04689	1:1	0.054	1.026	0.055	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																Head 1.6 W/kg (mW/g) averaged over 1 gram			

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

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.7	24.65	0.08	0	Right	Cheek	QPSK	1	50	04689	1:1	0.113	1.012	0.114	A10
1900.00	19100	High	LTE Band 2 (PCS)	20	23.7	23.60	0.11	1	Right	Cheek	QPSK	50	0	04689	1:1	0.091	1.023	0.093	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.7	24.65	0.16	0	Right	Tilt	QPSK	1	50	04689	1:1	0.043	1.012	0.044	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.7	23.60	0.06	1	Right	Tilt	QPSK	50	0	04689	1:1	0.040	1.023	0.041	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.7	24.65	0.05	0	Left	Cheek	QPSK	1	50	04689	1:1	0.089	1.012	0.090	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.7	23.60	0.11	1	Left	Cheek	QPSK	50	0	04689	1:1	0.068	1.023	0.070	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.7	24.65	0.08	0	Left	Tilt	QPSK	1	50	04689	1:1	0.048	1.012	0.049	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.7	23.60	0.12	1	Left	Tilt	QPSK	50	0	04689	1:1	0.046	1.023	0.047	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																Head 1.6 W/kg (mW/g) averaged over 1 gram			

Table 11-11
LTE Band 30 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2310.00	27710	Mid	LTE Band 30	10	24.2	23.74	0.09	0	Right	Cheek	QPSK	1	25	04705	1:1	0.124	1.112	0.138	A11
2310.00	27710	Mid	LTE Band 30	10	23.2	22.77	0.01	1	Right	Cheek	QPSK	25	0	04705	1:1	0.093	1.104	0.103	
2310.00	27710	Mid	LTE Band 30	10	24.2	23.74	0.03	0	Right	Tilt	QPSK	1	25	04705	1:1	0.063	1.112	0.070	
2310.00	27710	Mid	LTE Band 30	10	23.2	22.77	0.15	1	Right	Tilt	QPSK	25	0	04705	1:1	0.054	1.104	0.060	
2310.00	27710	Mid	LTE Band 30	10	24.2	23.74	-0.06	0	Left	Cheek	QPSK	1	25	04705	1:1	0.104	1.112	0.116	
2310.00	27710	Mid	LTE Band 30	10	23.2	22.77	0.16	1	Left	Cheek	QPSK	25	0	04705	1:1	0.073	1.104	0.081	
2310.00	27710	Mid	LTE Band 30	10	24.2	23.74	0.13	0	Left	Tilt	QPSK	1	25	04705	1:1	0.096	1.112	0.107	
2310.00	27710	Mid	LTE Band 30	10	23.2	22.77	0.13	1	Left	Tilt	QPSK	25	0	04705	1:1	0.071	1.104	0.078	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																Head 1.6 W/kg (mW/g) averaged over 1 gram			

Table 11-12
DTS Head SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	17.5	16.96	0.14	Right	Cheek	04804	1	99.0	0.367	-	1.132	1.010	-	
2437	6	802.11b	DSSS	22	17.5	16.96	0.08	Right	Tilt	04804	1	99.0	0.290	-	1.132	1.010	-	
2412	1	802.11b	DSSS	22	17.5	16.61	-0.01	Left	Cheek	04804	1	99.0	1.411	1.040	1.227	1.010	**1.289**	
2437	6	802.11b	DSSS	22	17.5	16.96	0.18	Left	Cheek	04804	1	99.0	1.539	1.120	1.132	1.010	1.281	A12
2462	11	802.11b	DSSS	22	17.5	16.88	0.14	Left	Cheek	04804	1	99.0	1.217	0.912	1.153	1.010	1.062	
2437	6	802.11b	DSSS	22	17.5	16.96	0.12	Left	Tilt	04804	1	99.0	0.668	0.456	1.132	1.010	0.521	
2437	6	802.11b	DSSS	22	17.5	16.96	0.03	Left	Cheek	04804	1	99.0	1.063	1.090	1.132	1.010	1.246	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**									**Head** **1.6 W/kg (mW/g)** averaged over 1 gram									

Note: Blue entries represent variability measurements.

Table 11-13
NII Head SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
5310	62	802.11n	OFDM	40	15.5	15.11	0.16	Right	Cheek	04804	13.5	87.1	0.132	-	1.094	1.148	-	
5310	62	802.11n	OFDM	40	15.5	15.11	0.16	Right	Tilt	04804	13.5	87.1	0.131	-	1.094	1.148	-	
5310	62	802.11n	OFDM	40	15.5	15.11	0.12	Left	Cheek	04804	13.5	87.1	0.731	0.322	1.094	1.148	0.404	
5310	62	802.11n	OFDM	40	15.5	15.11	0.16	Left	Tilt	04804	13.5	87.1	0.302	0.121	1.094	1.148	0.152	
5510	102	802.11n	OFDM	40	16.5	16.12	0.19	Right	Cheek	04804	13.5	87.1	0.100	-	1.091	1.148	-	
5510	102	802.11n	OFDM	40	16.5	16.12	-0.15	Right	Tilt	04804	13.5	87.1	0.115	-	1.091	1.148	-	
5510	102	802.11n	OFDM	40	16.5	16.12	0.16	Left	Cheek	04804	13.5	87.1	0.589	0.232	1.091	1.148	0.291	
5510	102	802.11n	OFDM	40	16.5	16.12	0.00	Left	Tilt	04804	13.5	87.1	0.349	-	1.091	1.148	-	
5795	159	802.11n	OFDM	40	15.5	14.67	0.13	Right	Cheek	04804	13.5	87.1	0.230	-	1.211	1.148	-	
5795	159	802.11n	OFDM	40	15.5	14.67	0.10	Right	Tilt	04804	13.5	87.1	0.240	-	1.211	1.148	-	
5755	151	802.11n	OFDM	40	15.5	14.56	0.15	Left	Cheek	04804	13.5	87.1	1.495	0.665	1.242	1.148	0.948	
5795	159	802.11n	OFDM	40	15.5	14.67	0.10	Left	Cheek	04804	13.5	87.1	1.578	0.717	1.211	1.148	**0.997**	A13
5795	159	802.11n	OFDM	40	15.5	14.67	0.15	Left	Tilt	04804	13.5	87.1	0.463	0.246	1.211	1.148	0.342	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**									**Head** **1.6 W/kg (mW/g)** averaged over 1 gram									

Table 11-14
DSS Head SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2480.00	78	Bluetooth	FHSS	9.0	7.59	0.12	Right	Cheek	04804	1	77.0	0.033	1.384	1.299	0.059	
2480.00	78	Bluetooth	FHSS	9.0	7.59	0.15	Right	Tilt	04804	1	77.0	0.028	1.384	1.299	0.050	
2480.00	78	Bluetooth	FHSS	9.0	7.59	-0.10	Left	Cheek	04804	1	77.0	0.100	1.384	1.299	**0.180**	A14
2480.00	78	Bluetooth	FHSS	9.0	7.59	0.18	Left	Tilt	04804	1	77.0	0.051	1.384	1.299	0.092	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**												**Head** **1.6 W/kg (mW/g)** averaged over 1 gram				

11.2 Standalone Body-Worn SAR Data

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

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.7	33.65	0.02	10 mm	04705	1	1:8.3	back	0.302	1.012	0.306	
836.60	190	GSM 850	GPRS	32.7	32.65	0.02	10 mm	04705	2	1:4.15	back	0.460	1.012	0.466	A15
1880.00	661	GSM 1900	GSM	30.7	30.48	0.13	10 mm	04713	1	1:8.3	back	0.256	1.052	0.269	
1880.00	661	GSM 1900	GPRS	29.7	29.47	-0.08	10 mm	04713	2	1:4.15	back	0.384	1.054	0.405	A17
836.60	4183	UMTS 850	RMC	25.2	24.90	-0.05	10 mm	04705	N/A	1:1	back	0.386	1.072	0.414	A19
1712.40	1312	UMTS 1750	RMC	24.7	24.70	-0.01	10 mm	04697	N/A	1:1	back	0.628	1.000	0.628	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	-0.05	10 mm	04697	N/A	1:1	back	0.647	1.005	0.650	A20
1752.60	1513	UMTS 1750	RMC	24.7	24.69	-0.02	10 mm	04697	N/A	1:1	back	0.641	1.002	0.642	
1852.40	9262	UMTS 1900	RMC	24.7	24.69	-0.11	10 mm	04697	N/A	1:1	back	0.680	1.002	0.681	A22
1880.00	9400	UMTS 1900	RMC	24.7	24.65	-0.19	10 mm	04697	N/A	1:1	back	0.662	1.012	0.670	
1907.60	9538	UMTS 1900	RMC	24.7	24.64	-0.13	10 mm	04697	N/A	1:1	back	0.602	1.014	0.610	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**												**Body** **1.6 W/kg (mW/g)** averaged over 1 gram			

Table 11-16
LTE Body-Worn SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.2	25.04	-0.01	0	04705	QPSK	1	25	10 mm	back	1:1	0.310	1.038	0.322	A24
707.50	23095	Mid	LTE Band 12	10	24.2	23.86	-0.05	1	04705	QPSK	25	25	10 mm	back	1:1	0.241	1.081	0.261	
793.00	23330	Mid	LTE Band 14	10	25.2	24.99	-0.02	0	04705	QPSK	1	25	10 mm	back	1:1	0.308	1.050	0.323	A26
793.00	23330	Mid	LTE Band 14	10	24.2	24.02	0.03	1	04705	QPSK	25	0	10 mm	back	1:1	0.247	1.042	0.257	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.18	0.03	0	04705	QPSK	1	25	10 mm	back	1:1	0.382	1.005	0.384	A28
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	-0.06	1	04705	QPSK	25	0	10 mm	back	1:1	0.294	1.000	0.294	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.7	24.47	0.00	0	04697	QPSK	1	50	10 mm	back	1:1	0.628	1.054	0.662	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.7	24.69	0.02	0	04697	QPSK	1	50	10 mm	back	1:1	0.636	1.002	0.637	A29
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.70	-0.02	0	04697	QPSK	1	50	10 mm	back	1:1	0.618	1.000	0.618	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.59	-0.05	1	04697	QPSK	50	0	10 mm	back	1:1	0.501	1.026	0.514	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.7	24.65	0.01	0	04697	QPSK	1	50	10 mm	back	1:1	0.709	1.012	**0.718**	A31
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.7	24.57	0.03	0	04697	QPSK	1	50	10 mm	back	1:1	0.637	1.030	0.656	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.7	24.56	0.01	0	04697	QPSK	1	50	10 mm	back	1:1	0.627	1.033	0.648	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.7	23.60	-0.05	1	04697	QPSK	50	0	10 mm	back	1:1	0.496	1.023	0.507	
2310.00	27710	Mid	LTE Band 30	10	24.2	23.74	-0.17	0	04713	QPSK	1	25	10 mm	back	1:1	0.447	1.112	0.497	A33
2310.00	27710	Mid	LTE Band 30	10	23.2	22.77	-0.02	1	04713	QPSK	25	0	10 mm	back	1:1	0.333	1.104	0.368	

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

Table 11-17
DTS Body-Worn SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	17.5	16.96	-0.13	10 mm	04804	1	back	99.0	0.294	0.202	1.132	1.010	**0.231**	A35

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

Table 11-18
NII Body-Worn SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
5310	62	802.11n	OFDM	40	15.5	15.11	0.19	10 mm	04812	13.5	back	87.1	0.312	0.146	1.094	1.148	0.183	
5510	102	802.11n	OFDM	40	16.5	16.12	0.13	10 mm	04812	13.5	back	87.1	0.229	0.098	1.091	1.148	0.123	
5795	159	802.11n	OFDM	40	15.5	14.67	-0.11	10 mm	04812	13.5	back	87.1	0.490	0.233	1.211	1.148	**0.324**	A37

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

11.3 Standalone Hotspot SAR Data

Table 11-19
GPRS/UMTS Hotspot SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GPRS	32.7	32.65	0.02	10 mm	04705	2	1:4.15	back	0.460	1.012	0.466	
836.60	190	GSM 850	GPRS	32.7	32.65	-0.02	10 mm	04705	2	1:4.15	front	0.461	1.012	0.467	
836.60	190	GSM 850	GPRS	32.7	32.65	0.19	10 mm	04705	2	1:4.15	bottom	0.535	1.012	0.541	A16
836.60	190	GSM 850	GPRS	32.7	32.65	-0.08	10 mm	04705	2	1:4.15	left	0.366	1.012	0.370	
1880.00	661	GSM 1900	GPRS	29.7	29.47	-0.08	10 mm	04713	2	1:4.15	back	0.384	1.054	0.405	
1880.00	661	GSM 1900	GPRS	29.7	29.47	-0.08	10 mm	04713	2	1:4.15	front	0.307	1.054	0.324	
1850.20	512	GSM 1900	GPRS	29.7	29.59	-0.19	10 mm	04713	2	1:4.15	bottom	0.680	1.026	0.698	A18
1880.00	661	GSM 1900	GPRS	29.7	29.47	0.05	10 mm	04713	2	1:4.15	bottom	0.632	1.054	0.666	
1909.80	810	GSM 1900	GPRS	29.7	29.62	-0.13	10 mm	04713	2	1:4.15	bottom	0.582	1.019	0.593	
1880.00	661	GSM 1900	GPRS	29.7	29.47	0.01	10 mm	04713	2	1:4.15	right	0.098	1.054	0.103	
836.60	4183	UMTS 850	RMC	25.2	24.90	-0.05	10 mm	04705	N/A	1:1	back	0.386	1.072	0.414	A19
836.60	4183	UMTS 850	RMC	25.2	24.90	-0.12	10 mm	04705	N/A	1:1	front	0.334	1.072	0.358	
836.60	4183	UMTS 850	RMC	25.2	24.90	0.05	10 mm	04705	N/A	1:1	bottom	0.386	1.072	0.414	
836.60	4183	UMTS 850	RMC	25.2	24.90	0.00	10 mm	04705	N/A	1:1	left	0.248	1.072	0.266	
1732.40	1412	UMTS 1750	RMC	23.2	23.14	0.01	10 mm	04697	N/A	1:1	back	0.492	1.014	0.499	
1732.40	1412	UMTS 1750	RMC	23.2	23.14	-0.01	10 mm	04697	N/A	1:1	front	0.421	1.014	0.427	
1712.40	1312	UMTS 1750	RMC	23.2	23.17	0.01	10 mm	04697	N/A	1:1	bottom	0.769	1.007	0.774	
1732.40	1412	UMTS 1750	RMC	23.2	23.14	-0.01	10 mm	04697	N/A	1:1	bottom	0.816	1.014	0.827	
1752.60	1513	UMTS 1750	RMC	23.2	23.15	-0.09	10 mm	04697	N/A	1:1	bottom	0.828	1.012	**0.838**	A21
1732.40	1412	UMTS 1750	RMC	23.2	23.14	-0.01	10 mm	04697	N/A	1:1	right	0.148	1.014	0.150	
1752.60	1513	UMTS 1750	RMC	23.2	23.15	-0.09	10 mm	04697	N/A	1:1	bottom	0.823	1.012	0.833	
1880.00	9400	UMTS 1900	RMC	23.2	22.87	-0.02	10 mm	04697	N/A	1:1	back	0.527	1.079	0.569	
1880.00	9400	UMTS 1900	RMC	23.2	22.87	0.02	10 mm	04697	N/A	1:1	front	0.539	1.079	0.582	
1852.40	9262	UMTS 1900	RMC	23.2	22.91	0.02	10 mm	04697	N/A	1:1	bottom	0.704	1.069	0.753	A23
1880.00	9400	UMTS 1900	RMC	23.2	22.87	0.00	10 mm	04697	N/A	1:1	bottom	0.677	1.079	0.730	
1907.60	9538	UMTS 1900	RMC	23.2	23.00	-0.02	10 mm	04697	N/A	1:1	bottom	0.640	1.047	0.670	
1880.00	9400	UMTS 1900	RMC	23.2	22.87	-0.09	10 mm	04697	N/A	1:1	right	0.117	1.079	0.126	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**											**Body** **1.6 W/kg (mW/g)** averaged over 1 gram				

Note: Blue entry represents variability measurement.

Table 11-20
LTE Band 12 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.2	25.04	-0.01	0	04705	QPSK	1	25	10 mm	back	1:1	0.310	1.038	0.322	
707.50	23095	Mid	LTE Band 12	10	24.2	23.86	-0.05	1	04705	QPSK	25	25	10 mm	back	1:1	0.241	1.081	0.261	
707.50	23095	Mid	LTE Band 12	10	25.2	25.04	0.01	0	04705	QPSK	1	25	10 mm	front	1:1	0.312	1.038	0.324	
707.50	23095	Mid	LTE Band 12	10	24.2	23.86	0.00	1	04705	QPSK	25	25	10 mm	front	1:1	0.236	1.081	0.255	
707.50	23095	Mid	LTE Band 12	10	25.2	25.04	0.01	0	04705	QPSK	1	25	10 mm	bottom	1:1	0.395	1.038	0.410	
707.50	23095	Mid	LTE Band 12	10	24.2	23.86	-0.02	1	04705	QPSK	25	25	10 mm	bottom	1:1	0.296	1.081	0.320	
707.50	23095	Mid	LTE Band 12	10	25.2	25.04	-0.01	0	04705	QPSK	1	25	10 mm	left	1:1	0.566	1.038	0.588	A25
707.50	23095	Mid	LTE Band 12	10	24.2	23.86	0.02	1	04705	QPSK	25	25	10 mm	left	1:1	0.414	1.081	0.448	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 11-21
LTE Band 14 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
793.00	23330	Mid	LTE Band 14	10	25.2	24.99	-0.02	0	04705	QPSK	1	25	10 mm	back	1:1	0.308	1.050	0.323	
793.00	23330	Mid	LTE Band 14	10	24.2	24.02	0.03	1	04705	QPSK	25	0	10 mm	back	1:1	0.247	1.042	0.257	
793.00	23330	Mid	LTE Band 14	10	25.2	24.99	-0.03	0	04705	QPSK	1	25	10 mm	front	1:1	0.302	1.050	0.317	
793.00	23330	Mid	LTE Band 14	10	24.2	24.02	-0.05	1	04705	QPSK	25	0	10 mm	front	1:1	0.243	1.042	0.253	
793.00	23330	Mid	LTE Band 14	10	25.2	24.99	-0.01	0	04705	QPSK	1	25	10 mm	bottom	1:1	0.349	1.050	0.366	A27
793.00	23330	Mid	LTE Band 14	10	24.2	24.02	-0.06	1	04705	QPSK	25	0	10 mm	bottom	1:1	0.274	1.042	0.286	
793.00	23330	Mid	LTE Band 14	10	25.2	24.99	0.06	0	04705	QPSK	1	25	10 mm	left	1:1	0.252	1.050	0.265	
793.00	23330	Mid	LTE Band 14	10	24.2	24.02	-0.07	1	04705	QPSK	25	0	10 mm	left	1:1	0.204	1.042	0.213	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 11-22
LTE Band 5 (Cell) Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.18	0.03	0	04705	QPSK	1	25	10 mm	back	1:1	0.382	1.005	0.384	A28
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	-0.06	1	04705	QPSK	25	0	10 mm	back	1:1	0.294	1.000	0.294	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.18	0.04	0	04705	QPSK	1	25	10 mm	front	1:1	0.344	1.005	0.346	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	-0.01	1	04705	QPSK	25	0	10 mm	front	1:1	0.271	1.000	0.271	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.18	-0.09	0	04705	QPSK	1	25	10 mm	bottom	1:1	0.381	1.005	0.383	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	-0.02	1	04705	QPSK	25	0	10 mm	bottom	1:1	0.303	1.000	0.303	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.2	25.18	0.02	0	04705	QPSK	1	25	10 mm	left	1:1	0.228	1.005	0.229	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.2	24.20	0.01	1	04705	QPSK	25	0	10 mm	left	1:1	0.181	1.000	0.181	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 11-23
LTE Band 66 (AWS) Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.13	0.04	0	04697	QPSK	1	50	10 mm	back	1:1	0.430	1.016	0.437	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.07	-0.01	0	04697	QPSK	50	25	10 mm	back	1:1	0.434	1.030	0.447	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.13	0.05	0	04697	QPSK	1	50	10 mm	front	1:1	0.341	1.016	0.346	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.07	0.05	0	04697	QPSK	50	25	10 mm	front	1:1	0.334	1.030	0.344	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.2	23.09	-0.01	0	04697	QPSK	1	50	10 mm	bottom	1:1	0.725	1.026	0.744	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.2	23.10	0.01	0	04697	QPSK	1	50	10 mm	bottom	1:1	0.748	1.023	0.765	A30
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.13	0.00	0	04697	QPSK	1	50	10 mm	bottom	1:1	0.736	1.016	0.748	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.07	0.00	0	04697	QPSK	50	25	10 mm	bottom	1:1	0.716	1.030	0.737	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.13	0.11	0	04697	QPSK	1	50	10 mm	right	1:1	0.117	1.016	0.119	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.07	0.03	0	04697	QPSK	50	25	10 mm	right	1:1	0.117	1.030	0.121	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram					

Table 11-24
LTE Band 2 (PCS) Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.20	-0.02	0	04697	QPSK	1	50	10 mm	back	1:1	0.561	1.000	0.561	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.19	-0.06	0	04697	QPSK	50	0	10 mm	back	1:1	0.545	1.002	0.546	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.20	-0.02	0	04697	QPSK	1	50	10 mm	front	1:1	0.489	1.000	0.489	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.19	-0.03	0	04697	QPSK	50	0	10 mm	front	1:1	0.502	1.002	0.503	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.20	-0.17	0	04697	QPSK	1	50	10 mm	bottom	1:1	0.740	1.000	0.740	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.2	23.18	0.05	0	04697	QPSK	50	25	10 mm	bottom	1:1	0.731	1.005	0.735	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.2	23.06	0.05	0	04697	QPSK	50	25	10 mm	bottom	1:1	0.730	1.033	0.754	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.19	0.02	0	04697	QPSK	50	0	10 mm	bottom	1:1	0.755	1.002	0.757	A32
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.20	0.07	0	04697	QPSK	1	50	10 mm	right	1:1	0.127	1.000	0.127	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.19	0.02	0	04697	QPSK	50	0	10 mm	right	1:1	0.124	1.002	0.124	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram					

Table 11-25
LTE Band 30 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2310.00	27710	Mid	LTE Band 30	10	22.2	21.85	-0.03	0	04713	QPSK	1	25	10 mm	back	1:1	0.280	1.084	0.304	
2310.00	27710	Mid	LTE Band 30	10	22.2	21.80	-0.07	0	04713	QPSK	25	0	10 mm	back	1:1	0.263	1.096	0.288	
2310.00	27710	Mid	LTE Band 30	10	22.2	21.85	0.07	0	04713	QPSK	1	25	10 mm	front	1:1	0.214	1.084	0.232	
2310.00	27710	Mid	LTE Band 30	10	22.2	21.80	0.09	0	04713	QPSK	25	0	10 mm	front	1:1	0.199	1.096	0.218	
2310.00	27710	Mid	LTE Band 30	10	22.2	21.85	-0.04	0	04713	QPSK	1	25	10 mm	bottom	1:1	0.393	1.084	0.426	A34
2310.00	27710	Mid	LTE Band 30	10	22.2	21.80	-0.14	0	04713	QPSK	25	0	10 mm	bottom	1:1	0.392	1.096	0.430	
2310.00	27710	Mid	LTE Band 30	10	22.2	21.85	0.04	0	04713	QPSK	1	25	10 mm	right	1:1	0.107	1.084	0.116	
2310.00	27710	Mid	LTE Band 30	10	22.2	21.80	0.02	0	04713	QPSK	25	0	10 mm	right	1:1	0.103	1.096	0.113	

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

Table 11-26
WLAN Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	17.5	16.96	-0.13	10 mm	04804	1	back	99.0	0.294	-	1.132	1.010	-	
2437	6	802.11b	DSSS	22	17.5	16.96	0.13	10 mm	04804	1	front	99.0	0.243	-	1.132	1.010	-	
2437	6	802.11b	DSSS	22	17.5	16.96	0.19	10 mm	04804	1	top	99.0	0.129	-	1.132	1.010	-	
2437	6	802.11b	DSSS	22	17.5	16.96	0.14	10 mm	04804	1	right	99.0	0.431	0.289	1.132	1.010	**0.330**	A36
5230	46	802.11n	OFDM	40	15.5	14.98	-0.11	10 mm	04812	13.5	back	87.1	0.375	-	1.127	1.148	-	
5230	46	802.11n	OFDM	40	15.5	14.98	0.15	10 mm	04812	13.5	front	87.1	0.087	-	1.127	1.148	-	
5230	46	802.11n	OFDM	40	15.5	14.98	0.10	10 mm	04812	13.5	top	87.1	0.119	-	1.127	1.148	-	
5230	46	802.11n	OFDM	40	15.5	14.98	-0.12	10 mm	04812	13.5	right	87.1	0.474	0.202	1.127	1.148	0.261	
5795	159	802.11n	OFDM	40	15.5	14.67	-0.11	10 mm	04812	13.5	back	87.1	0.490	0.233	1.211	1.148	0.324	
5795	159	802.11n	OFDM	40	15.5	14.67	0.14	10 mm	04812	13.5	front	87.1	0.268	-	1.211	1.148	-	
5795	159	802.11n	OFDM	40	15.5	14.67	0.17	10 mm	04812	13.5	top	87.1	0.177	-	1.211	1.148	-	
5795	159	802.11n	OFDM	40	15.5	14.67	0.17	10 mm	04812	13.5	right	87.1	0.797	0.328	1.211	1.148	**0.456**	A38

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

11.4 Standalone Phablet SAR Data

Table 11-27
UMTS Phablet SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1712.40	1312	UMTS 1750	RMC	24.7	24.70	0.02	1 mm	04697	1:1	back	2.520	1.000	2.520	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	0.10	1 mm	04697	1:1	back	2.580	1.005	2.593	
1752.60	1513	UMTS 1750	RMC	24.7	24.69	-0.05	1 mm	04697	1:1	back	2.530	1.002	2.535	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	0.02	2 mm	04697	1:1	front	1.390	1.005	1.397	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	0.02	5 mm	04697	1:1	bottom	1.520	1.005	1.528	
1732.40	1412	UMTS 1750	RMC	24.7	24.68	0.04	0 mm	04697	1:1	right	0.592	1.005	0.595	
1712.40	1312	UMTS 1750	RMC	23.2	23.17	0.09	0 mm	04697	1:1	back	2.470	1.007	2.487	
1732.40	1412	UMTS 1750	RMC	23.2	23.14	0.06	0 mm	04697	1:1	back	2.440	1.014	2.474	
1752.60	1513	UMTS 1750	RMC	23.2	23.15	0.03	0 mm	04697	1:1	back	2.480	1.012	2.510	
1732.40	1412	UMTS 1750	RMC	23.2	23.14	-0.02	0 mm	04697	1:1	front	1.660	1.014	1.683	
1712.40	1312	UMTS 1750	RMC	23.2	23.17	-0.07	0 mm	04697	1:1	bottom	2.880	1.007	**2.900**	A39
1732.40	1412	UMTS 1750	RMC	23.2	23.14	-0.11	0 mm	04697	1:1	bottom	2.750	1.014	2.789	
1752.60	1513	UMTS 1750	RMC	23.2	23.15	-0.02	0 mm	04697	1:1	bottom	2.840	1.012	2.874	
1712.40	1312	UMTS 1750	RMC	23.2	23.17	-0.07	0 mm	04697	1:1	bottom	2.860	1.007	2.880	
1880.00	9400	UMTS 1900	RMC	24.7	24.65	-0.19	1 mm	04697	1:1	back	1.840	1.012	1.862	
1880.00	9400	UMTS 1900	RMC	24.7	24.65	-0.15	2 mm	04697	1:1	front	1.440	1.012	1.457	
1880.00	9400	UMTS 1900	RMC	24.7	24.65	-0.18	5 mm	04697	1:1	bottom	1.040	1.012	1.052	
1880.00	9400	UMTS 1900	RMC	24.7	24.65	0.02	0 mm	04697	1:1	right	0.448	1.012	0.453	
1852.40	9262	UMTS 1900	RMC	23.2	22.91	-0.05	0 mm	04697	1:1	back	2.290	1.069	2.448	
1880.00	9400	UMTS 1900	RMC	23.2	22.87	-0.05	0 mm	04697	1:1	back	2.200	1.079	2.374	
1907.60	9538	UMTS 1900	RMC	23.2	23.00	-0.07	0 mm	04697	1:1	back	2.170	1.047	2.272	
1852.40	9262	UMTS 1900	RMC	23.2	22.91	0.00	0 mm	04697	1:1	front	1.970	1.069	2.106	
1880.00	9400	UMTS 1900	RMC	23.2	22.87	0.00	0 mm	04697	1:1	front	1.950	1.079	2.104	
1907.60	9538	UMTS 1900	RMC	23.2	23.00	0.00	0 mm	04697	1:1	front	1.960	1.047	2.052	
1852.40	9262	UMTS 1900	RMC	23.2	22.91	-0.02	0 mm	04697	1:1	bottom	2.480	1.069	2.651	A40
1880.00	9400	UMTS 1900	RMC	23.2	22.87	-0.06	0 mm	04697	1:1	bottom	2.420	1.079	2.611	
1907.60	9538	UMTS 1900	RMC	23.2	23.00	0.05	0 mm	04697	1:1	bottom	2.380	1.047	2.492	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**											**Phablet** **4.0 W/kg (mW/g)** averaged over 10 grams			

Note: Blue entry represents variability measurement.

Table 11-28
LTE Band 66 (AWS) Phablet SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.7	24.47	-0.02	0	04697	QPSK	1	50	1 mm	back	1:1	2.100	1.054	2.213	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.7	24.69	0.01	0	04697	QPSK	1	50	1 mm	back	1:1	2.120	1.002	2.124	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.70	0.02	0	04697	QPSK	1	50	1 mm	back	1:1	2.090	1.000	2.090	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.59	0.03	1	04697	QPSK	50	0	1 mm	back	1:1	1.710	1.026	1.754	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.46	-0.01	1	04697	QPSK	100	0	1 mm	back	1:1	1.700	1.057	1.797	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.70	-0.10	0	04697	QPSK	1	50	2 mm	front	1:1	1.270	1.000	1.270	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.59	0.03	1	04697	QPSK	50	0	2 mm	front	1:1	0.989	1.026	1.015	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.70	0.03	0	04697	QPSK	1	50	5 mm	bottom	1:1	1.390	1.000	1.390	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.59	-0.01	1	04697	QPSK	50	0	5 mm	bottom	1:1	1.080	1.026	1.108	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.70	0.01	0	04697	QPSK	1	50	0 mm	right	1:1	0.527	1.000	0.527	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.59	-0.14	1	04697	QPSK	50	0	0 mm	right	1:1	0.386	1.026	0.396	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.2	23.09	-0.01	0	04697	QPSK	1	50	0 mm	back	1:1	2.120	1.026	2.175	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.2	23.10	0.02	0	04697	QPSK	1	50	0 mm	back	1:1	2.190	1.023	2.240	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.13	0.03	0	04697	QPSK	1	50	0 mm	back	1:1	2.150	1.016	2.184	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.2	22.97	0.02	0	04697	QPSK	50	25	0 mm	back	1:1	2.090	1.054	2.203	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.2	23.05	0.02	0	04697	QPSK	50	0	0 mm	back	1:1	2.180	1.035	2.256	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.07	0.04	0	04697	QPSK	50	25	0 mm	back	1:1	2.150	1.030	2.215	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.00	0.03	0	04697	QPSK	100	0	0 mm	back	1:1	2.160	1.047	2.262	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.13	-0.09	0	04697	QPSK	1	50	0 mm	front	1:1	1.520	1.016	1.544	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.07	-0.05	0	04697	QPSK	50	25	0 mm	front	1:1	1.520	1.030	1.566	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.2	23.09	-0.05	0	04697	QPSK	1	50	0 mm	bottom	1:1	2.550	1.026	2.616	A41
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.2	23.10	-0.06	0	04697	QPSK	1	50	0 mm	bottom	1:1	2.520	1.023	2.578	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.13	-0.02	0	04697	QPSK	1	50	0 mm	bottom	1:1	2.440	1.016	2.479	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.2	22.97	-0.03	0	04697	QPSK	50	25	0 mm	bottom	1:1	2.520	1.054	2.656	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.2	23.05	-0.04	0	04697	QPSK	50	0	0 mm	bottom	1:1	2.530	1.035	2.619	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.07	-0.02	0	04697	QPSK	50	25	0 mm	bottom	1:1	2.450	1.030	2.524	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.2	23.00	-0.04	0	04697	QPSK	100	0	0 mm	bottom	1:1	2.440	1.047	2.555	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Phablet 4.0 W/kg (mW/g) averaged over 10 grams						

Table 11-29
LTE Band 2 (PCS) Phablet SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.7	24.65	-0.08	0	04697	QPSK	1	50	1 mm	back	1:1	2.320	1.012	2.348	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.7	24.57	-0.06	0	04697	QPSK	1	50	1 mm	back	1:1	2.180	1.030	2.245	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.7	24.56	-0.04	0	04697	QPSK	1	50	1 mm	back	1:1	2.200	1.033	2.273	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.7	23.60	0.04	1	04697	QPSK	50	0	1 mm	back	1:1	1.820	1.023	1.862	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.7	23.54	-0.11	1	04697	QPSK	100	0	1 mm	back	1:1	1.790	1.038	1.858	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.7	24.65	-0.13	0	04697	QPSK	1	50	2 mm	front	1:1	1.290	1.012	1.305	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.7	23.60	0.08	1	04697	QPSK	50	0	2 mm	front	1:1	1.040	1.023	1.064	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.7	24.65	-0.15	0	04697	QPSK	1	50	5 mm	bottom	1:1	1.300	1.012	1.316	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.7	23.60	-0.18	1	04697	QPSK	50	0	5 mm	bottom	1:1	1.030	1.023	1.054	
1860.00	18700	Low	LTE Band 2 (PCS)	20	24.7	24.65	0.06	0	04697	QPSK	1	50	0 mm	right	1:1	0.533	1.012	0.539	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.7	23.60	0.06	1	04697	QPSK	50	0	0 mm	right	1:1	0.391	1.023	0.400	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.2	23.18	-0.15	0	04697	QPSK	1	50	0 mm	back	1:1	2.070	1.005	2.080	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.2	23.12	-0.12	0	04697	QPSK	1	50	0 mm	back	1:1	2.010	1.019	2.048	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.20	-0.13	0	04697	QPSK	1	50	0 mm	back	1:1	2.040	1.000	2.040	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.2	23.18	-0.15	0	04697	QPSK	50	25	0 mm	back	1:1	1.990	1.005	2.000	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.2	23.06	-0.08	0	04697	QPSK	50	25	0 mm	back	1:1	1.980	1.033	2.045	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.19	-0.11	0	04697	QPSK	50	0	0 mm	back	1:1	2.090	1.002	2.094	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.2	23.17	-0.18	0	04697	QPSK	100	0	0 mm	back	1:1	2.040	1.007	2.054	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.20	-0.14	0	04697	QPSK	1	50	0 mm	front	1:1	1.790	1.000	1.790	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.19	-0.03	0	04697	QPSK	50	0	0 mm	front	1:1	1.820	1.002	1.824	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.2	23.18	-0.09	0	04697	QPSK	1	50	0 mm	bottom	1:1	2.660	1.005	2.673	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.2	23.12	-0.11	0	04697	QPSK	1	50	0 mm	bottom	1:1	2.620	1.019	2.670	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.20	-0.13	0	04697	QPSK	1	50	0 mm	bottom	1:1	2.620	1.000	2.620	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.2	23.18	-0.11	0	04697	QPSK	50	25	0 mm	bottom	1:1	2.800	1.005	2.814	A42
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.2	23.06	-0.07	0	04697	QPSK	50	25	0 mm	bottom	1:1	2.660	1.033	2.748	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.2	23.19	-0.07	0	04697	QPSK	50	0	0 mm	bottom	1:1	2.750	1.002	2.756	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.2	23.17	-0.13	0	04697	QPSK	100	0	0 mm	bottom	1:1	2.720	1.007	2.739	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.2	23.18	-0.11	0	04697	QPSK	50	25	0 mm	bottom	1:1	2.760	1.005	2.774	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Phablet 4.0 W/kg (mW/g) averaged over 10 grams						

Note: Blue entry represents variability measurement.

Table 11-30
LTE Band 30 Phablet SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2310.00	27710	Mid	LTE Band 30	10	24.2	23.74	-0.08	0	04713	QPSK	1	25	1 mm	back	1:1	1.790	1.112	1.990	
2310.00	27710	Mid	LTE Band 30	10	23.2	22.77	-0.11	1	04713	QPSK	25	0	1 mm	back	1:1	1.390	1.104	1.535	
2310.00	27710	Mid	LTE Band 30	10	24.2	23.74	0.11	0	04713	QPSK	1	25	2 mm	front	1:1	0.920	1.112	1.023	
2310.00	27710	Mid	LTE Band 30	10	23.2	22.77	0.08	1	04713	QPSK	25	0	2 mm	front	1:1	0.696	1.104	0.768	
2310.00	27710	Mid	LTE Band 30	10	24.2	23.74	-0.17	0	04713	QPSK	1	25	5 mm	bottom	1:1	0.701	1.112	0.780	
2310.00	27710	Mid	LTE Band 30	10	23.2	22.77	-0.07	1	04713	QPSK	25	0	5 mm	bottom	1:1	0.545	1.104	0.602	
2310.00	27710	Mid	LTE Band 30	10	24.2	23.74	0.01	0	04713	QPSK	1	25	0 mm	right	1:1	0.360	1.112	0.400	
2310.00	27710	Mid	LTE Band 30	10	23.2	22.77	0.06	1	04713	QPSK	25	0	0 mm	right	1:1	0.270	1.104	0.298	
2310.00	27710	Mid	LTE Band 30	10	22.2	21.85	-0.12	0	04713	QPSK	1	25	0 mm	back	1:1	1.700	1.084	1.843	
2310.00	27710	Mid	LTE Band 30	10	22.2	21.80	-0.06	0	04713	QPSK	25	0	0 mm	back	1:1	1.650	1.096	1.808	
2310.00	27710	Mid	LTE Band 30	10	22.2	21.85	-0.09	0	04713	QPSK	1	25	0 mm	front	1:1	1.340	1.084	1.453	
2310.00	27710	Mid	LTE Band 30	10	22.2	21.80	-0.09	0	04713	QPSK	25	0	0 mm	front	1:1	1.340	1.096	1.469	
2310.00	27710	Mid	LTE Band 30	10	22.2	21.85	-0.02	0	04713	QPSK	1	25	0 mm	bottom	1:1	1.870	1.084	2.027	A43
2310.00	27710	Mid	LTE Band 30	10	22.2	21.80	-0.02	0	04713	QPSK	25	0	0 mm	bottom	1:1	1.830	1.096	2.006	
2310.00	27710	Mid	LTE Band 30	10	22.2	21.78	-0.04	0	04713	QPSK	50	0	0 mm	bottom	1:1	1.850	1.102	2.039	

ANSI / IEEE C95.1 1992 - SAFETY LIMIT	Phablet
Spatial Peak	4.0 W/kg (mW/g)
Uncontrolled Exposure/General Population	averaged over 10 grams

Table 11-31
WLAN Phablet SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
5310	62	802.11n	OFDM	40	15.5	15.11	0.13	0 mm	04812	13.5	back	87.1	11.514	0.581	1.094	1.148	**0.730**	A44
5310	62	802.11n	OFDM	40	15.5	15.11	-0.17	0 mm	04812	13.5	front	87.1	2.357	-	1.094	1.148	-	
5310	62	802.11n	OFDM	40	15.5	15.11	0.14	0 mm	04812	13.5	top	87.1	0.858	-	1.094	1.148	-	
5310	62	802.11n	OFDM	40	15.5	15.11	0.12	0 mm	04812	13.5	right	87.1	10.688	-	1.094	1.148	-	
5510	102	802.11n	OFDM	40	16.5	16.12	0.16	0 mm	04812	13.5	back	87.1	7.385	0.380	1.091	1.148	0.476	
5510	102	802.11n	OFDM	40	16.5	16.12	-0.14	0 mm	04812	13.5	front	87.1	2.216	-	1.091	1.148	-	
5510	102	802.11n	OFDM	40	16.5	16.12	0.00	0 mm	04812	13.5	top	87.1	0.993	-	1.091	1.148	-	
5510	102	802.11n	OFDM	40	16.5	16.12	0.14	0 mm	04812	13.5	right	87.1	6.708	-	1.091	1.148	-	

ANSI / IEEE C95.1 1992 - SAFETY LIMIT	Phablet
Spatial Peak	4.0 W/kg (mW/g)
Uncontrolled Exposure/General Population	averaged over 10 grams

11.5 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.

6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01r03, body-worn SAR was evaluated without a headset connected to the device. Since the standalone reported body-worn SAR was ≤ 1.2 W/kg, no additional body-worn SAR evaluations using a headset cable were required.
8. Per FCC KDB 865664 D01v01r04, variability SAR tests were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 13 for variability analysis.
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v02r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
10. Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is > 160 mm and < 200 mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information).
11. Unless otherwise noted, when 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds below.
12. The orange highlights throughout the report represents the highest scaled SAR per Equipment Class.

GSM Test Notes:

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

UMTS Notes:

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

LTE Notes:

1. LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r04. The general test procedures used for testing can be found in Section 8.5.4.

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

WLAN Notes:

1. For held-to-ear, hotspot, and phablet operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg for 1g evaluations, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 8.6.5 for more information.
3. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg for 1g evaluations. See Section 8.6.6 for more information.
4. When the maximum reported 1g averaged SAR is ≤0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured.
5. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated EMC test reports.

Bluetooth Notes

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

12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 Introduction

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

12.2 Simultaneous Transmission Procedures

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

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

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

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

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

Table 12-1
Estimated SAR

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated SAR (Body)	Separation Distance (Phablet)	Estimated SAR (Phablet)
	[MHz]	[dBm]	[mm]	[W/kg]	[mm]	[W/kg]
Bluetooth	2480	9.00	10	0.168	5	0.134

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

12.3 Head SAR Simultaneous Transmission Analysis

Table 12-2
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM/GPRS 850	0.304	1.289	**1.593**
	GSM/GPRS 1900	0.069	1.289	1.358
	UMTS 850	0.236	1.289	1.525
	UMTS 1750	0.129	1.289	1.418
	UMTS 1900	0.137	1.289	1.426
	LTE Band 12	0.193	1.289	1.482
	LTE Band 14	0.150	1.289	1.439
	LTE Band 5 (Cell)	0.215	1.289	1.504
	LTE Band 66 (AWS)	0.138	1.289	1.427
	LTE Band 2 (PCS)	0.114	1.289	1.403
	LTE Band 30	0.138	1.289	1.427

Table 12-3
Simultaneous Transmission Scenario with 5 GHz WLAN and Bluetooth (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	GSM/GPRS 850	0.304	0.997	0.180	1.301	0.484	**1.481**
	GSM/GPRS 1900	0.069	0.997	0.180	1.066	0.249	1.246
	UMTS 850	0.236	0.997	0.180	1.233	0.416	1.413
	UMTS 1750	0.129	0.997	0.180	1.126	0.309	1.306
	UMTS 1900	0.137	0.997	0.180	1.134	0.317	1.314
	LTE Band 12	0.193	0.997	0.180	1.190	0.373	1.370
	LTE Band 14	0.150	0.997	0.180	1.147	0.330	1.327
	LTE Band 5 (Cell)	0.215	0.997	0.180	1.212	0.395	1.392
	LTE Band 66 (AWS)	0.138	0.997	0.180	1.135	0.318	1.315
	LTE Band 2 (PCS)	0.114	0.997	0.180	1.111	0.294	1.291
	LTE Band 30	0.138	0.997	0.180	1.135	0.318	1.315

12.4 Body-Worn Simultaneous Transmission Analysis

Table 12-4
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body-Worn at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM/GPRS 850	0.466	0.231	0.697
	GSM/GPRS 1900	0.405	0.231	0.636
	UMTS 850	0.414	0.231	0.645
	UMTS 1750	0.650	0.231	0.881
	UMTS 1900	0.681	0.231	0.912
	LTE Band 12	0.322	0.231	0.553
	LTE Band 14	0.323	0.231	0.554
	LTE Band 5 (Cell)	0.384	0.231	0.615
	LTE Band 66 (AWS)	0.662	0.231	0.893
	LTE Band 2 (PCS)	0.718	0.231	**0.949**
	LTE Band 30	0.497	0.231	0.728

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body-Worn	GSM/GPRS 850	0.466	0.324	0.168	0.790	0.634	0.958
	GSM/GPRS 1900	0.405	0.324	0.168	0.729	0.573	0.897
	UMTS 850	0.414	0.324	0.168	0.738	0.582	0.906
	UMTS 1750	0.650	0.324	0.168	0.974	0.818	1.142
	UMTS 1900	0.681	0.324	0.168	1.005	0.849	1.173
	LTE Band 12	0.322	0.324	0.168	0.646	0.490	0.814
	LTE Band 14	0.323	0.324	0.168	0.647	0.491	0.815
	LTE Band 5 (Cell)	0.384	0.324	0.168	0.708	0.552	0.876
	LTE Band 66 (AWS)	0.662	0.324	0.168	0.986	0.830	1.154
	LTE Band 2 (PCS)	0.718	0.324	0.168	1.042	0.886	**1.210**
	LTE Band 30	0.497	0.324	0.168	0.821	0.665	0.989

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

12.5 Hotspot SAR Simultaneous Transmission Analysis

Table 12-6
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.541	0.330	0.871
	GPRS 1900	0.698	0.330	1.028
	UMTS 850	0.414	0.330	0.744
	UMTS 1750	0.838	0.330	**1.168**
	UMTS 1900	0.753	0.330	1.083
	LTE Band 12	0.588	0.330	0.918
	LTE Band 14	0.366	0.330	0.696
	LTE Band 5 (Cell)	0.384	0.330	0.714
	LTE Band 66 (AWS)	0.765	0.330	1.095
	LTE Band 2 (PCS)	0.757	0.330	1.087
	LTE Band 30	0.430	0.330	0.760

Table 12-7
Simultaneous Transmission Scenario with 5 GHz WLAN and Bluetooth (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	0.541	0.456	0.168	0.997	0.709	1.165
	GPRS 1900	0.698	0.456	0.168	1.154	0.866	1.322
	UMTS 850	0.414	0.456	0.168	0.870	0.582	1.038
	UMTS 1750	0.838	0.456	0.168	1.294	1.006	**1.462**
	UMTS 1900	0.753	0.456	0.168	1.209	0.921	1.377
	LTE Band 12	0.588	0.456	0.168	1.044	0.756	1.212
	LTE Band 14	0.366	0.456	0.168	0.822	0.534	0.990
	LTE Band 5 (Cell)	0.384	0.456	0.168	0.840	0.552	1.008
	LTE Band 66 (AWS)	0.765	0.456	0.168	1.221	0.933	1.389
	LTE Band 2 (PCS)	0.757	0.456	0.168	1.213	0.925	1.381
	LTE Band 30	0.430	0.456	0.168	0.886	0.598	1.054

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

12.6 Phablet Simultaneous Transmission Analysis

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

Table 12-8
Simultaneous Transmission Scenario with 5 GHz WLAN and Bluetooth (Phablet)

Exposure Condition	Mode	3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Phablet SAR	UMTS 1750	2.900	0.730	0.134	3.630	3.034	**3.764**
	UMTS 1900	2.651	0.730	0.134	3.381	2.785	3.515
	LTE Band 66 (AWS)	2.656	0.730	0.134	3.386	2.790	3.520
	LTE Band 2 (PCS)	2.814	0.730	0.134	3.544	2.948	3.678
	LTE Band 30	2.039	0.730	0.134	2.769	2.173	2.903

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

12.7 Simultaneous Transmission Conclusion

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

13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

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

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

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

Table 13-1
Head SAR Measurement Variability Results

HEAD VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	Side	Test Position	Data Rate (Mbps)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.						(W/kg)	(W/kg)		(W/kg)		(W/kg)	
2450	2437.00	6	802.11b, 22 MHz Bandwidth	DSSS	Left	Cheek	1	1.120	1.090	1.03	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					Head 1.6 W/kg (mW/g) averaged over 1 gram									

Table 13-2
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS													
Band	FREQUENCY		Mode	Service	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1750	1752.60	1513	UMTS 1750	RMC	bottom	10 mm	0.828	0.823	1.01	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					Body 1.6 W/kg (mW/g) averaged over 1 gram								

Table 13-3
Phablet SAR Measurement Variability Results

PHABLET VARIABILITY RESULTS													
Band	FREQUENCY		Mode	Service	Side	Spacing	Measured SAR (10g)	1st Repeated SAR (10g)	Ratio	2nd Repeated SAR (10g)	Ratio	3rd Repeated SAR (10g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1750	1712.40	1312	UMTS 1750	RMC	bottom	0 mm	2.880	2.860	1.01	N/A	N/A	N/A	N/A
1900	1860.00	18700	LTE Band 2 (PCS), 20 MHz Bandwidth	QPSK, 50 RB, 25 RB Offset	bottom	0 mm	2.800	2.760	1.01	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Phablet 4.0 W/kg (mW/g) averaged over 10 grams						

13.2 Measurement Uncertainty

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

14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	CBT	N/A	CBT	3051A00187
Agilent	E4438C	ESG Vector Signal Generator	3/8/2019	Biennial	3/8/2021	MY42082385
Agilent	E4438C	ESG Vector Signal Generator	3/11/2019	Biennial	3/11/2021	MY45090700
Agilent	N9020A	MXA Signal Analyzer	4/20/2019	Annual	4/20/2020	US46470561
Agilent	N5182A	MXG Vector Signal Generator	7/10/2019	Annual	7/10/2020	MY47420800
Agilent	N9030A	PXA Signal Analyzer (44GHz)	6/12/2019	Annual	6/12/2020	MY52350166
Agilent	8753ES	S-Parameter Network Analyzer	8/26/2019	Annual	8/26/2020	MY40000670
Agilent	8753ES	S-Parameter Vector Network Analyzer	9/19/2019	Annual	9/19/2020	MY40003841
Agilent	E5515C	Wireless Communications Test Set	9/25/2019	Annual	9/25/2020	GB43304278
Agilent	E5515C	Wireless Communications Test Set	2/7/2018	Triennial	2/7/2021	GB43304447
Agilent	E5515C	Wireless Communications Test Set	6/26/2019	Annual	6/26/2020	MY50267125
Agilent	N4010A	Wireless Connectivity Test Set	CBT	N/A	CBT	GB44450273
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	353317
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	353468
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	353469
Anritsu	MA2411B	Pulse Power Sensor	6/11/2019	Annual	6/11/2020	1207364
Anritsu	MA2411B	Pulse Power Sensor	8/8/2019	Annual	8/8/2020	1339008
Anritsu	MT8820C	Radio Communication Analyzer	3/29/2019	Annual	3/29/2020	6201300731
Anritsu	MT8821C	Radio Communication Analyzer	8/16/2019	Annual	8/16/2020	6201144418
Anritsu	MT8862A	Wireless Connectivity Test Set	8/8/2019	Annual	8/8/2020	6261782395
Anritsu	MA24106A	USB Power Sensor	5/22/2019	Annual	5/22/2020	1231535
Anritsu	MA24106A	USB Power Sensor	5/6/2019	Annual	5/6/2020	1231538
Anritsu	ML2496A	Power Meter	10/29/2019	Annual	10/29/2020	1840005
Control Company	4352	Long Stem Thermometer	6/26/2019	Biennial	6/26/2021	192282739
Control Company	4352	Long Stem Thermometer	6/26/2019	Biennial	6/26/2021	192282744
Control Company	4040	Therm./ Clock/ Humidity Monitor	10/9/2018	Biennial	10/9/2020	181647802
Control Company	4040	Therm./ Clock/ Humidity Monitor	10/9/2018	Biennial	10/9/2020	181647811
Control Company	4352	Ultra Long Stem Thermometer	11/29/2018	Biennial	11/29/2020	181766777
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	N6705B	DC Power Analyzer	4/27/2019	Biennial	4/27/2021	MY53004059
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	4/19/2019	Annual	4/19/2020	11401010036
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mitutoyo	CD-6"CSX	Digital Caliper	4/18/2018	Biennial	4/18/2020	13264165
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	NC-100	Torque Wrench	5/23/2018	Biennial	5/23/2020	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	6/3/2019	Annual	6/3/2020	109892
Rohde & Schwarz	CMW500	Radio Communication Tester	8/26/2019	Annual	8/26/2020	100976
Rohde & Schwarz	CMW500	Radio Communication Tester	10/15/2019	Annual	10/15/2020	109366
Rohde & Schwarz	CMW500	Radio Communication Tester	6/26/2019	Annual	6/26/2020	112347
Rohde & Schwarz	CMW500	Radio Communication Tester	8/27/2019	Annual	8/27/2020	116743
Rohde & Schwarz	CMW500	Radio Communication Tester	4/19/2019	Annual	4/19/2020	128633
Rohde & Schwarz	ZNLE6	Vector Network Analyzer	10/11/2019	Annual	10/11/2020	101307
Seekonk	NC-100	Torque Wrench	4/18/2018	Biennial	4/18/2020	N/A
SPEAG	EX3DV4	SAR Probe	7/16/2019	Annual	7/16/2020	7410
SPEAG	EX3DV4	SAR Probe	12/11/2019	Annual	12/11/2020	7570
SPEAG	EX3DV4	SAR Probe	5/16/2019	Annual	5/16/2020	7406
SPEAG	EX3DV4	SAR Probe	1/21/2020	Annual	1/21/2021	3589
SPEAG	EX3DV4	SAR Probe	4/24/2019	Annual	4/24/2020	7357
SPEAG	EX3DV4	SAR Probe	1/21/2020	Annual	1/21/2021	7488
SPEAG	EX3DV4	SAR Probe	12/11/2019	Annual	12/11/2020	7571
SPEAG	EX3DV4	SAR Probe	7/15/2019	Annual	7/15/2020	7547
SPEAG	EX3DV4	SAR Probe	6/19/2019	Annual	6/19/2020	7409
SPEAG	EX3DV4	SAR Probe	9/19/2019	Annual	9/19/2020	7551
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2019	Annual	7/11/2020	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/13/2020	Annual	1/13/2021	1558
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/17/2019	Annual	9/17/2020	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/8/2019	Annual	5/8/2020	728
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/18/2019	Annual	4/18/2020	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/13/2020	Annual	1/13/2021	1530
SPEAG	DAE4	Dasy Data Acquisition Electronics	12/5/2019	Annual	12/5/2020	1533
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2019	Annual	7/11/2020	1323
SPEAG	DAE4	Dasy Data Acquisition Electronics	12/18/2019	Annual	12/18/2020	859
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/20/2019	Annual	6/20/2020	1334
SPEAG	D835V2	835 MHz SAR Dipole	3/13/2019	Annual	3/13/2020	4d047
SPEAG	D835V2	835 MHz SAR Dipole	10/19/2018	Biennial	10/19/2020	4d133
SPEAG	D1750V2	1750 MHz SAR Dipole	10/22/2018	Biennial	10/22/2020	1150
SPEAG	D1750V2	1750 MHz SAR Dipole	5/15/2019	Annual	5/15/2020	1148
SPEAG	D1900V2	1900 MHz SAR Dipole	2/21/2019	Biennial	2/21/2021	5d148
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Biennial	10/23/2020	5d080
SPEAG	D2300V2	2300 MHz SAR Dipole	8/13/2018	Biennial	8/13/2020	1073
SPEAG	D2450V2	2450 MHz SAR Dipole	8/14/2019	Annual	8/14/2020	719
SPEAG	D2450V2	2450 MHz SAR Dipole	9/11/2017	Triennial	9/11/2020	797
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Biennial	10/23/2020	5d149
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/16/2018	Triennial	1/16/2021	1057
SPEAG	D750V3	750 MHz Dipole	3/18/2019	Annual	3/18/2020	1054
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/7/2019	Annual	5/7/2020	1070

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

15 MEASUREMENT UNCERTAINTIES

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

16 CONCLUSION

16.1 Measurement Conclusion

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

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

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