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SAR EVALUATION REPORT

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

Date of Testing:
12/17/20 - 02/02/21
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M2012100195-01.ZNF (Rev 1)

FCC ID: **ZNFK735MM**

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

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model: LM-K735MM
Additional Model(s): LM-K735PM, LMK735MM, LMK735PM, K735MM, K735PM

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	0.27	0.57	0.57	N/A
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	0.10	0.37	0.45	N/A
PCE	UMTS 850	826.40 - 846.60 MHz	0.24	0.52	0.52	N/A
PCE	UMTS 1750	1712.4 - 1752.6 MHz	0.16	0.55	0.55	2.87
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.15	0.75	0.77	2.93
PCE	LTE Band 71	665.5 - 695.5 MHz	0.13	0.22	0.29	N/A
PCE	LTE Band 12	699.7 - 715.3 MHz	0.14	0.27	0.30	N/A
PCE	LTE Band 13	779.5 - 784.5 MHz	0.13	0.29	0.30	N/A
PCE	LTE Band 26 (Cell)	814.7 - 848.3 MHz	0.28	0.57	0.57	N/A
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.18	0.55	0.55	3.16
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.21	0.81	0.81	3.18
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 41	2498.5 - 2687.5 MHz	< 0.1	0.55	0.79	1.00
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.73	0.23	0.31	N/A
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	0.77	N/A
NII	U-NII-2A	5260 - 5320 MHz	1.19	0.38	N/A	2.36
NII	U-NII-2C	5500 - 5720 MHz	1.25	0.50	N/A	2.48
NII	U-NII-3	5745 - 5825 MHz	1.29	0.55	1.12	N/A
DSS/DTS	Bluetooth	2402 - 2480 MHz	< 0.1	< 0.1	< 0.1	N/A
Simultaneous SAR per KDB 690783 D01v01r03:			1.59	1.38	1.59	3.84

This revised Test Report supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.8 of this report; for North American frequency bands only.
I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.

Randy Ortanez
President

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TABLE OF CONTENTS

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 71	Voice/Data	665.5 - 695.5 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 26 (Cell)	Voice/Data	814.7 - 848.3 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 25 (PCS)	Voice/Data	1850.7 - 1914.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 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
NFC	Data	13.56 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.

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

1.3 Nominal and Maximum Output Power Specifications

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

1.3.1 2G/3G/4G Output Power

Power Level		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	3 TX Slots	4 TX Slots	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots
Max	Max allowed power	34.0	34.0	32.0	30.5	29.0	27.0	27.0	26.0	26.0
	Nominal	33.0	33.0	31.0	29.5	28.0	26.0	26.0	25.0	25.0
GSM/GPRS/EDGE 1900										
Power Level		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	3 TX Slots	4 TX Slots	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots
Max	Max allowed power	31.0	31.0	29.0	28.0	26.0	26.0	26.0	25.0	25.0
	Nominal	30.0	30.0	28.0	27.0	25.0	25.0	25.0	24.0	24.0

Band/Mode		Modulated Average Output Power	
		Max	
UMTS Band 5 (850 MHz)		Nominal	Max allowed power
3GPP WCDMA Rel 99		24.0	25.0
3GPP HSDPA Rel 5	Subtest 1	24.0	25.0
	Subtest 2	24.0	25.0
	Subtest 3	23.5	24.5
	Subtest 4	23.5	24.5
3GPP HSUPA Rel 6	Subtest 1	24.0	25.0
	Subtest 2	22.0	23.0
	Subtest 3	23.0	24.0
	Subtest 4	22.0	23.0
	Subtest 5	24.0	25.0

Band/Mode		Modulated Average Output Power (in dBm)			
		Max		Grip Sensor Mode Active	
UMTS Band 4 (1750 MHz)		Nominal	Max allowed power	Nominal	Max allowed power
3GPP WCDMA		24.0	25.0	22.0	23.0
3GPP HSDPA Rel 5	Subtest 1	24.0	25.0	22.0	23.0
	Subtest 2	24.0	25.0	22.0	23.0
	Subtest 3	23.5	24.5	21.5	22.5
	Subtest 4	23.5	24.5	21.5	22.5
3GPP HSUPA Rel 6	Subtest 1	24.0	25.0	22.0	23.0
	Subtest 2	22.0	23.0	20.0	21.0
	Subtest 3	23.0	24.0	21.0	22.0
	Subtest 4	22.0	23.0	20.0	21.0
	Subtest 5	24.0	25.0	22.0	23.0

Band/Mode		Modulated Average Output Power (in dBm)			
		Max		Grip Sensor Mode Active	
UMTS Band 2 (1900 MHz)		Nominal	Max allowed power	Nominal	Max allowed power
3GPP WCDMA		24.0	25.0	22.5	23.5
3GPP HSDPA Rel 5	Subtest 1	24.0	25.0	22.5	23.5
	Subtest 2	24.0	25.0	22.5	23.5
	Subtest 3	23.5	24.5	22.0	23.0
	Subtest 4	23.5	24.5	22.0	23.0
3GPP HSUPA Rel 6	Subtest 1	24.0	25.0	22.5	23.5
	Subtest 2	22.0	23.0	20.5	21.5
	Subtest 3	23.0	24.0	21.5	22.5
	Subtest 4	22.0	23.0	20.5	21.5
	Subtest 5	24.0	25.0	22.5	23.5

Mode / Band		Modulated Average Output Power (in dBm)		
		Max	Hotspot Mode Active	Grip Sensor Mode Active
LTE FDD Band 71	Max allowed power	25.0	25.0	25.0
	Nominal	24.0	24.0	24.0
LTE FDD Band 12	Max allowed power	25.0	25.0	25.0
	Nominal	24.0	24.0	24.0
LTE FDD Band 13	Max allowed power	25.0	25.0	25.0
	Nominal	24.0	24.0	24.0
LTE FDD Band 5	Max allowed power	25.0	25.0	25.0
	Nominal	24.0	24.0	24.0
LTE FDD Band 26	Max allowed power	25.0	25.0	25.0
	Nominal	24.0	24.0	24.0
LTE FDD Band 4	Max allowed power	25.0	25.0	23.0
	Nominal	24.0	24.0	22.0
LTE FDD Band 66	Max allowed power	25.0	25.0	23.0
	Nominal	24.0	24.0	22.0
LTE FDD Band 2	Max allowed power	25.0	25.0	23.5
	Nominal	24.0	24.0	22.5
LTE FDD Band 25	Max allowed power	25.0	25.0	23.5
	Nominal	24.0	24.0	22.5
LTE TDD Band 41 (PC3)	Max allowed power	24.0	21.0	24.0
	Nominal	23.0	20.0	23.0
LTE TDD Band 41 (PC2)	Max allowed power	27.0	21.0	27.0
	Nominal	26.0	20.0	26.0

1.3.2 Maximum WLAN and Bluetooth Output Power

Mode	Band	IEEE 802.11 (in dBm)							
		SISO							
		b		g		n		ac	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.
2.4 GHz WIFI	2.45 GHz	23.0	22.0	21.5 ch. 1: 21.0 ch. 11: 19.5	20.5 20.0 18.5	20.5 ch. 1: 20.0 ch. 11: 18.5	19.5 19.0 17.5	20.5 ch. 1: 20.0 ch. 11: 18.5	19.5 19.0 17.5

Mode	Band	IEEE 802.11 (in dBm)					
		SISO					
		a		n		ac	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
5 GHz WIFI (20MHz BW)	5200 MHz	19.0 ch. 36: 17.0 ch. 48: 17.0	18.0 16.0 16.0	18.0 ch. 36: 16.0 ch. 48: 16.0	17.0 15.0 15.0	18.0 ch. 36: 16.0 ch. 48: 16.0	17.0 15.0 15.0
	5300 MHz	19.0 ch. 52: 17.0 ch. 64: 17.0	18.0 16.0 16.0	18.0 ch. 52: 16.0 ch. 64: 16.0	17.0 15.0 15.0	18.0 ch. 52: 16.0 ch. 64: 16.0	17.0 15.0 15.0
	5500 MHz	19.0 ch. 100: 17.0 ch. 144: 17.0	18.0 16.0 16.0	18.0 ch. 100: 16.0 ch. 144: 16.0	17.0 15.0 15.0	18.0 ch. 100: 16.0 ch. 144: 16.0	17.0 15.0 15.0
	5800 MHz	19.0 ch. 149: 17.0	18.0 16.0	18.0 ch. 149: 16.0	17.0 15.0	18.0 ch. 149: 16.0	17.0 15.0
5 GHz WIFI (40MHz BW)	5200 MHz			16.5 ch. 38: 14.5	15.5 13.5	16.5 ch. 38: 14.5	15.5 13.5
	5300 MHz			14.5	13.5	14.5	13.5
	5500 MHz			16.5 ch. 102: 14.5	15.5 13.5	16.5 ch. 102: 14.5	15.5 13.5
	5800 MHz			16.5	15.5	16.5	15.5
5 GHz WIFI (80MHz BW)	5200 MHz					14.0	13.0
	5300 MHz					14.0	13.0
	5500 MHz					14.0	13.0
	5800 MHz					14.0	13.0

Mode / Band		Modulated Average (dBm)
Bluetooth 1 Mbps (GFSK)	Maximum	**10.5**
	Nominal	**9.5**
Bluetooth 2 Mbps (DPSK)	Maximum	**10.0**
	Nominal	**9.0**
Bluetooth 3 Mbps (8DPSK)	Maximum	**10.0**
	Nominal	**9.0**
Bluetooth LE	Maximum	**7.5**
	Nominal	**6.5**

1.3.3 Reduced WLAN Output Power

Mode	Band	IEEE 802.11 (in dBm)							
		SISO							
		b		g		n		ac	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.
2.4 GHz WIFI	2.45 GHz	19.0	18.0	19.0	18.0	19.0 ch. 11: 18.0	18.0 17.0	19.0 ch. 11: 18.0	18.0 17.0

Mode	Band	IEEE 802.11 (in dBm)					
		SISO					
		a		n		ac	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
5 GHz WIFI (20MHz BW)	5200 MHz	15.0	14.0	15.0	14.0	15.0	14.0
	5300 MHz	15.0	14.0	15.0	14.0	15.0	14.0
	5500 MHz	15.0	14.0	15.0	14.0	15.0	14.0
	5800 MHz	15.0	14.0	15.0	14.0	15.0	14.0
5 GHz WIFI (40MHz BW)	5200 MHz	[redacted]		15.0 ch. 38: 14.5	14.0 13.5	15.0 ch. 38: 14.5	14.0 13.5
	5300 MHz			14.5	13.5	14.5	13.5
	5500 MHz			15.0 ch. 102: 14.5	14.0 13.5	15.0 ch. 102: 14.5	14.0 13.5
	5800 MHz			15.0	14.0	15.0	14.0
5 GHz WIFI (80MHz BW)	5200 MHz	[redacted]				14.0	13.0
	5300 MHz					14.0	13.0
	5500 MHz					14.0	13.0
	5800 MHz					14.0	13.0

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	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	No	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	Yes
UMTS 1750	Yes	Yes	No	Yes	No	Yes
UMTS 1900	Yes	Yes	No	Yes	No	Yes
LTE Band 71	Yes	Yes	No	Yes	Yes	Yes
LTE Band 12	Yes	Yes	No	Yes	Yes	Yes
LTE Band 13	Yes	Yes	No	Yes	Yes	Yes
LTE Band 26 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 66 (AWS)	Yes	Yes	No	Yes	No	Yes
LTE Band 25 (PCS)	Yes	Yes	No	Yes	No	Yes
LTE Band 41	Yes	Yes	No	Yes	Yes	Yes
2.4 GHz WLAN	Yes	Yes	Yes	No	Yes	No
5 GHz WLAN	Yes	Yes	Yes	No	Yes	No
Bluetooth	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 Near Field Communications (NFC) Antenna

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

1.6 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 and 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 supported for UNII-1 and UNII-3 by S/W, therefore UNII-2A and UNII-2C were not evaluated for wireless router conditions.
6. This device supports VOLTE.
7. This device supports VOWIFI.
8. This device supports Bluetooth Tethering.

1.7 Miscellaneous SAR Test Considerations

(A) WIFI/BT

When 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 for applicable exposure condition(s) 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-NII1 and U-NII-3 WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v02r01.

This device supports IEEE 802.11ac with the following features:
a) Up to 80 MHz Bandwidth only
b) No aggregate channel configurations
c) 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 WLAN, U-NII-3 WLAN and 2.4 BT 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. LTE 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.

This device supports 64QAM on the uplink for LTE Operations. Conducted powers for 64QAM uplink configurations were measured per Section 5.1 of FCC KDB Publication 941225D05v02r05. SAR was not required for 64QAM since the highest maximum output power for 64QAM is ≤ ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45W/kg, per Section 5.2.4 of FCC KDB Publication 941225 D05v02r05.

This device supports both Power Class 2 (PC2) and Power Class 3 (PC3) for LTE Band 41. Per May 2017 TCB Workshop Notes, SAR tests were performed with Power Class 3 (given the specific UL/DL limitations for Power Class 2). Additionally, SAR testing for the power class 2 condition was evaluated for the highest configuration in Power Class 3 for each test configuration to confirm the results were scalable linearly (See Section 14.1).
This device supports LTE Carrier Aggregation (CA) for LTE B41 (PC3 only) with two component carriers in the uplink. SAR measurements and conducted powers were evaluated per 2017 Fall TCB Workshop Notes.

1.8 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)
- May 2017 TCB Workshop Notes (LTE Band 41 Power Class 2/3)
- April 2018 TCB Workshop Notes (LTE Carrier Aggregation)

1.9 Device Serial Numbers

Several samples with identical hardware were used to support SAR testing. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units. 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 71 (665.5 - 695.5 MHz)				
	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 13 (779.5 - 784.5 MHz)				
	LTE Band 26 (Cell) (814.7 - 848.3 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 66 (AWS) (1710.7 - 1779.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)				
	LTE Band 25 (PCS) (1850.7 - 1914.3 MHz)				
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)				
	LTE Band 41 (2498.5 - 2687.5 MHz)				
Channel Bandwidths	LTE Band 71: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 13: 5 MHz, 10 MHz				
	LTE Band 26 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 25 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 71: 5 MHz	665.5 (133147)		680.5 (133297)	695.5 (133447)	
LTE Band 71: 10 MHz	668 (133172)		680.5 (133297)	693 (133422)	
LTE Band 71: 15 MHz	670.5 (133197)		680.5 (133297)	690.5 (133397)	
LTE Band 71: 20 MHz	673 (133222)		680.5 (133297)	688 (133372)	
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 13: 5 MHz	779.5 (23205)		782 (23230)	784.5 (23255)	
LTE Band 13: 10 MHz	N/A		782 (23230)	N/A	
LTE Band 26 (Cell): 1.4 MHz	814.7 (26697)		831.5 (26865)	848.3 (27033)	
LTE Band 26 (Cell): 3 MHz	815.5 (26705)		831.5 (26865)	847.5 (27025)	
LTE Band 26 (Cell): 5 MHz	816.5 (26715)		831.5 (26865)	846.5 (27015)	
LTE Band 26 (Cell): 10 MHz	819 (26740)		831.5 (26865)	844 (26990)	
LTE Band 26 (Cell): 15 MHz	821.5 (26765)		831.5 (26865)	841.5 (26965)	
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 25 (PCS): 1.4 MHz	1850.7 (26047)		1882.5 (26365)	1914.3 (26683)	
LTE Band 25 (PCS): 3 MHz	1851.5 (26055)		1882.5 (26365)	1913.5 (26675)	
LTE Band 25 (PCS): 5 MHz	1852.5 (26065)		1882.5 (26365)	1912.5 (26665)	
LTE Band 25 (PCS): 10 MHz	1855 (26090)		1882.5 (26365)	1910 (26640)	
LTE Band 25 (PCS): 15 MHz	1857.5 (26115)		1882.5 (26365)	1907.5 (26615)	
LTE Band 25 (PCS): 20 MHz	1860 (26140)		1882.5 (26365)	1905 (26590)	
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)		1880 (18900)	1909.3 (19193)	
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)		1880 (18900)	1908.5 (19185)	
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)		1880 (18900)	1907.5 (19175)	
LTE Band 2 (PCS): 10 MHz	1855 (18650)		1880 (18900)	1905 (19150)	
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)		1880 (18900)	1902.5 (19125)	
LTE Band 2 (PCS): 20 MHz	1860 (18700)		1880 (18900)	1900 (19100)	
LTE Band 41: 5 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 10 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 15 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
UE Category	DL UE Cat 13, UL UE Cat 13				
Modulations Supported in UL	QPSK, 16QAM, 64QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	YES				
A-MPR (Additional MPR) disabled for SAR Testing?	YES				
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations				
LTE Additional Information	This device does not support full CA features on 3GPP Release 10. It supports carrier aggregation features as shown in Appendix F. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 10 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:

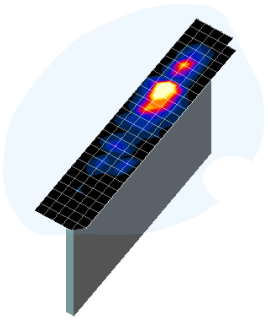

Figure 4-1
Sample SAR Area Scan

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].

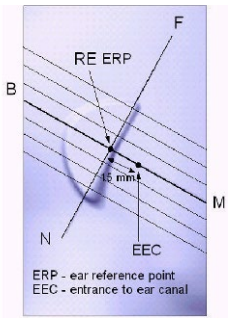

Figure 5-1
Close-Up Side view of ERP

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.

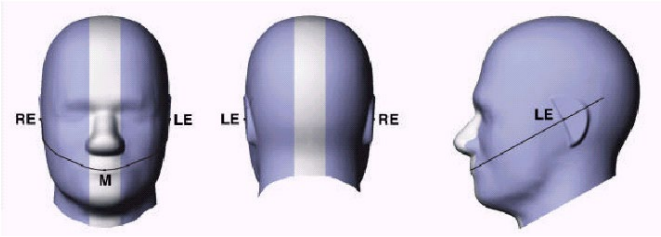

Figure 5-2
Front, back and side view of SAM Twin Phantom

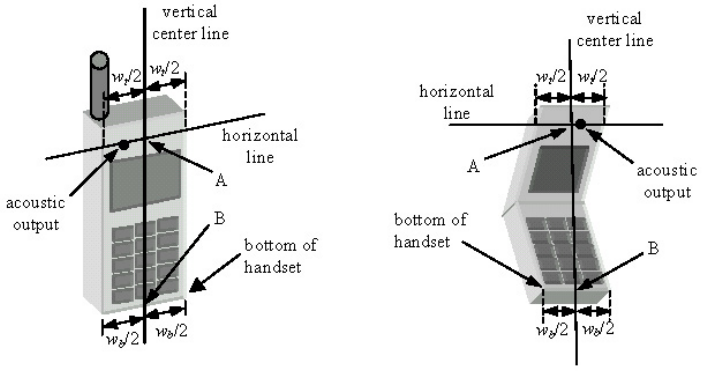

Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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.

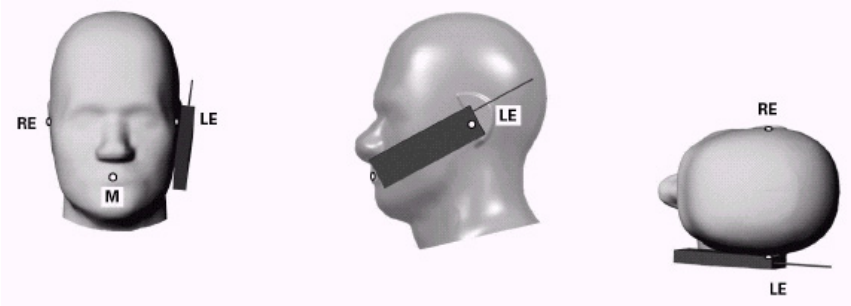

Figure 6-1 Front, Side and Top View of Cheek Position

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).

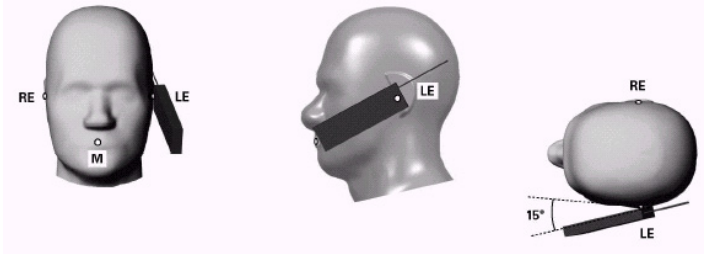

Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

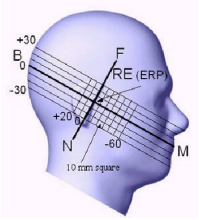

Figure 6-3
Side view w/ relevant markings

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.

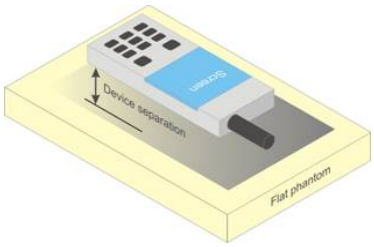

Figure 6-4
Sample Body-Worn Diagram

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 TDD

LTE TDD testing is performed using the SAR test guidance provided in FCC KDB 941225 D05v02r04. TDD is tested at the highest duty factor using UL-DL configuration 0 with special subframe configuration 6 and applying the FDD LTE procedures in KDB 941225 D05v02r04. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211 Section 4.

8.5.6 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/ax 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. Per April 2019 TCB Workshop guidance, 802.11ax was considered the highest order 802.11 mode. 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**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 850	128	33.55	33.55	31.47	**29.86**	28.11	26.11	26.05	25.11	25.09
	190	33.42	33.45	31.58	**29.61**	28.05	26.15	26.14	25.14	25.11
	251	33.34	33.33	31.25	**29.74**	27.64	26.21	26.20	25.18	25.22
GSM 1900	512	30.53	30.56	28.29	**27.04**	25.17	25.39	25.18	24.20	23.80
	661	30.52	30.53	28.30	**27.11**	25.09	25.31	25.08	24.10	23.78
	810	30.44	30.42	28.16	**26.84**	25.18	25.25	25.00	24.05	23.71

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**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 850	128	24.35	24.35	25.28	**25.43**	24.93	16.91	19.86	20.68	21.91
	190	24.22	24.25	25.39	**25.18**	24.87	16.95	19.95	20.71	21.93
	251	24.14	24.13	25.06	**25.31**	24.46	17.01	20.01	20.75	22.04
GSM 1900	512	21.33	21.36	22.10	**22.61**	21.99	16.19	18.99	19.77	20.62
	661	21.32	21.33	22.11	**22.68**	21.91	16.11	18.89	19.67	20.60
	810	21.24	21.22	21.97	**22.41**	22.00	16.05	18.81	19.62	20.53

GSM 850	**Frame Avg.Targets:**	23.80	23.80	24.81	**25.07**	24.82	16.80	19.81	20.57	21.82
GSM 1900		20.80	20.80	21.81	**22.57**	21.82	15.80	18.81	19.57	20.82

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: 12 (Max 4 Tx uplink slots)
EDGE Multislot class: 12 (Max 4 Tx uplink slots)
DTM Multislot Class: N/A

Figure 9-1
Power Measurement Setup

9.2 UMTS Conducted Powers

Table 9-2
Maximum Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	24.62	24.70	24.71	24.52	24.62	24.46	24.80	24.79	24.56	-
99		12.2 kbps AMR	24.60	24.65	24.70	24.51	24.60	24.40	24.80	24.80	24.53	-
6	HSDPA	Subtest 1	24.13	24.07	24.10	24.23	24.21	24.22	24.50	24.52	24.19	0
6		Subtest 2	24.20	24.03	24.02	24.27	24.33	24.19	24.42	24.51	24.37	0
6		Subtest 3	23.62	23.42	23.57	23.75	23.84	23.73	23.98	23.87	23.88	0.5
6		Subtest 4	23.60	23.52	23.63	23.39	23.54	23.71	24.00	24.07	23.94	0.5
6	HSUPA	Subtest 1	24.00	24.02	24.03	23.18	23.71	23.58	23.44	23.47	23.26	0
6		Subtest 2	22.20	22.09	22.15	22.22	22.32	22.18	22.41	22.44	22.21	2
6		Subtest 3	23.18	23.07	23.17	23.26	23.37	23.22	23.44	23.45	23.21	1
6		Subtest 4	22.18	22.11	22.20	22.25	22.33	22.20	22.42	22.49	22.21	2
6		Subtest 5	24.21	24.10	24.17	24.28	24.39	24.24	24.46	24.50	24.41	0

Table 9-3
Reduced Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	22.61	22.65	22.58	23.27	23.31	23.14	-
99		12.2 kbps AMR	22.53	22.61	22.43	23.28	23.35	23.14	-
6	HSDPA	Subtest 1	22.52	22.56	22.50	23.29	23.35	23.09	0
6		Subtest 2	22.56	22.50	22.49	22.83	23.28	23.06	0
6		Subtest 3	22.09	22.08	22.04	22.57	22.80	22.51	0.5
6		Subtest 4	22.02	22.10	22.08	22.70	22.74	22.28	0.5
6	HSUPA	Subtest 1	21.96	21.99	21.87	22.72	22.80	22.56	0
6		Subtest 2	20.54	20.61	20.44	21.22	21.28	20.99	2
6		Subtest 3	21.55	21.59	21.48	22.24	22.27	22.02	1
6		Subtest 4	20.34	20.57	20.46	21.21	21.24	21.02	2
6		Subtest 5	22.50	22.61	22.48	23.23	23.30	23.03	0

This device does not support DC-HSDPA.

Figure 9-2
Power Measurement Setup

9.3 LTE Conducted Powers

Note: Per FCC KDB Publication 941225 D05v02r05, LTE SAR for the lower bandwidths was not required for testing 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. Lower bandwidth conducted powers for all LTE bands can be found in appendix H.

9.3.1 LTE Band 71

Table 9-4
LTE Band 71 Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 71 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 133297 (680.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.28	0	0
	1	50	**24.37**		0
	1	99	24.29		0
	50	0	**23.30**	0-1	1
	50	25	23.27		1
	50	50	23.29		1
	100	0	23.20		1
16QAM	1	0	23.26	0-1	1
	1	50	23.18		1
	1	99	23.32		1
	50	0	22.18	0-2	2
	50	25	22.12		2
	50	50	22.06		2
	100	0	22.11		2
64QAM	1	0	22.19	0-2	2
	1	50	22.13		2
	1	99	22.18		2
	50	0	21.16	0-3	3
	50	25	21.10		3
	50	50	21.03		3
	100	0	21.10		3

Note: LTE Band 71 at 20 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.

9.3.2 LTE Band 12

Table 9-5
LTE Band 12 Maximum 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	**24.38**	0	0
	1	25	24.07		0
	1	49	24.07		0
	25	0	23.09	0-1	1
	25	12	**23.30**		1
	25	25	23.07		1
	50	0	23.08		1
16QAM	1	0	23.20	0-1	1
	1	25	23.16		1
	1	49	23.15		1
	25	0	22.14	0-2	2
	25	12	22.16		2
	25	25	22.18		2
	50	0	22.06		2
64QAM	1	0	22.49	0-2	2
	1	25	22.23		2
	1	49	22.30		2
	25	0	21.08	0-3	3
	25	12	21.13		3
	25	25	21.10		3
	50	0	21.08		3

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

9.3.3 LTE Band 13

Table 9-6
LTE Band 13 Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 13 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**24.30**	0	0
	1	25	23.89		0
	1	49	23.97		0
	25	0	**23.15**	0-1	1
	25	12	23.07		1
	25	25	22.99		1
	50	0	23.13		1
16QAM	1	0	23.42	0-1	1
	1	25	23.23		1
	1	49	23.41		1
	25	0	22.21	0-2	2
	25	12	22.14		2
	25	25	22.04		2
	50	0	22.19		2
64QAM	1	0	22.29	0-2	2
	1	25	22.15		2
	1	49	22.31		2
	25	0	21.18	0-3	3
	25	12	21.09		3
	25	25	21.04		3
	50	0	21.13		3

9.3.4 LTE Band 26 (Cell)

Table 9-7
LTE Band 26 (Cell) Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 26 (Cell) 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 26865 (831.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.29	0	0
	1	36	23.99		0
	1	74	**24.32**		0
	36	0	**23.19**	0-1	1
	36	18	23.02		1
	36	37	22.89		1
	75	0	23.03		1
16QAM	1	0	23.17	0-1	1
	1	36	22.90		1
	1	74	23.43		1
	36	0	22.19	0-2	2
	36	18	22.04		2
	36	37	21.82		2
	75	0	22.02		2
64QAM	1	0	22.32	0-2	2
	1	36	22.15		2
	1	74	22.20		2
	36	0	21.15	0-3	3
	36	18	20.97		3
	36	37	20.88		3
	75	0	21.05		3

Note: LTE Band 26 (Cell) at 15 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.

9.3.5 LTE Band 66 (AWS)

Table 9-8
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	24.13	24.12	24.28	0	0
	1	50	24.02	24.14	24.16		0
	1	99	24.33	24.30	**24.40**		0
	50	0	23.12	23.22	23.30	0-1	1
	50	25	23.24	23.25	**23.42**		1
	50	50	23.26	23.25	23.30		1
	100	0	23.23	23.20	23.33		1
16QAM	1	0	23.46	23.51	23.49	0-1	1
	1	50	23.49	23.61	23.65		1
	1	99	23.53	23.66	23.67		1
	50	0	22.18	22.18	22.24	0-2	2
	50	25	22.25	22.21	22.34		2
	50	50	22.24	22.21	22.32		2
	100	0	22.19	22.19	22.32		2
64QAM	1	0	22.41	22.46	22.45	0-2	2
	1	50	22.48	22.23	22.40		2
	1	99	22.53	22.36	22.58		2
	50	0	21.16	21.20	21.25	0-3	3
	50	25	21.27	21.22	21.30		3
	50	50	21.15	21.15	21.28		3
	100	0	21.23	21.14	21.30		3

Table 9-9
LTE Band 66 (AWS) Reduced Conducted Powers – Grip Sensor Mode Active - 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	22.24	22.20	22.32	0	0
	1	50	22.10	22.10	**22.41**		0
	1	99	22.28	22.15	22.22		0
	50	0	22.09	22.18	**22.22**	0-1	0
	50	25	22.20	22.17	22.15		0
	50	50	22.10	22.19	22.09		0
	100	0	22.15	22.11	22.19		0
16QAM	1	0	22.15	22.51	22.42	0-1	0
	1	50	22.61	22.18	22.18		0
	1	99	22.56	22.46	22.45		0
	50	0	22.08	22.14	22.21	0-2	0
	50	25	22.03	22.19	22.09		0
	50	50	22.09	22.18	22.20		0
	100	0	22.12	22.14	22.21		0
64QAM	1	0	22.46	22.41	22.41	0-2	0
	1	50	22.29	22.23	22.23		0
	1	99	22.32	22.23	22.22		0
	50	0	21.03	21.11	21.24	0-3	1
	50	25	21.14	21.22	21.18		1
	50	50	21.02	21.11	21.12		1
	100	0	21.12	21.17	21.14		1

9.3.6 LTE Band 25 (PCS)

Table 9-10
LTE Band 25 (PCS) Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26140 (1860.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26590 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	**24.17**	24.07	24.06	0	0
	1	50	23.98	23.92	23.80		0
	1	99	23.63	23.62	23.90		0
	50	0	23.01	22.97	22.88	0-1	1
	50	25	**23.06**	23.00	22.83		1
	50	50	23.01	22.93	22.79		1
	100	0	23.05	23.03	22.89		1
16QAM	1	0	23.22	23.13	23.06	0-1	1
	1	50	23.06	23.11	22.89		1
	1	99	22.99	22.99	22.89		1
	50	0	22.03	21.96	21.86	0-2	2
	50	25	21.96	22.00	21.80		2
	50	50	21.99	21.93	21.82		2
	100	0	22.02	22.00	21.80		2
64QAM	1	0	22.19	22.16	22.09	0-2	2
	1	50	22.01	22.11	21.90		2
	1	99	21.99	21.89	21.97		2
	50	0	20.98	20.95	20.81	0-3	3
	50	25	20.96	20.98	20.81		3
	50	50	20.95	20.93	20.77		3
	100	0	21.06	20.98	20.80		3

Table 9-11
LTE Band 25 (PCS) Reduced Conducted Powers – Grip Sensor Mode Active - 20 MHz Bandwidth

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26140 (1860.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26590 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	22.70	22.60	**22.76**	0	0
	1	50	22.65	22.65	22.52		0
	1	99	22.60	22.35	22.13		0
	50	0	22.54	22.55	**22.56**	0-1	0
	50	25	22.51	22.50	22.42		0
	50	50	22.51	22.50	22.42		0
	100	0	22.49	22.54	22.42		0
16QAM	1	0	22.59	22.62	22.78	0-1	0
	1	50	22.64	22.74	22.48		0
	1	99	22.64	22.35	22.33		0
	50	0	22.11	22.03	21.83	0-2	0.5
	50	25	22.03	22.01	21.81		0.5
	50	50	22.02	22.03	21.93		0.5
	100	0	22.08	22.08	21.81		0.5
64QAM	1	0	22.17	22.14	21.91	0-2	0.5
	1	50	22.41	22.21	22.21		0.5
	1	99	22.21	22.20	21.90		0.5
	50	0	21.06	21.02	20.94	0-3	1.5
	50	25	21.03	21.06	20.80		1.5
	50	50	21.05	21.02	20.85		1.5
	100	0	21.06	21.08	20.84		1.5

9.3.7 LTE Band 41

Table 9-12
LTE Band 41 PC3 Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	22.92	22.94	22.76	22.80	22.65	0	0
	1	50	23.04	23.02	**23.06**	22.92	23.00		0
	1	99	22.52	22.57	22.66	22.60	22.66		0
	50	0	21.96	21.96	21.94	21.78	21.92	0-1	1
	50	25	21.95	21.98	**22.06**	21.91	21.97		1
	50	50	21.69	21.91	21.93	21.83	21.96		1
	100	0	21.82	21.92	21.97	21.75	21.94		1
16QAM	1	0	21.71	21.66	21.57	21.60	21.89	0-1	1
	1	50	21.61	21.70	21.83	21.75	21.69		1
	1	99	21.40	21.50	21.50	21.50	21.40		1
	50	0	20.99	20.95	20.91	20.73	20.97	0-2	2
	50	25	20.98	20.98	21.06	20.91	20.95		2
	50	50	20.78	20.90	20.93	20.79	20.94		2
	100	0	20.78	20.88	20.95	20.76	20.89		2
64QAM	1	0	20.98	20.98	20.81	20.55	20.80	0-2	2
	1	50	21.16	21.06	21.20	20.92	21.13		2
	1	99	20.64	20.53	20.64	20.45	20.52		2
	50	0	20.21	20.19	20.15	19.94	20.16	0-3	3
	50	25	20.20	20.22	20.25	20.08	20.19		3
	50	50	20.17	20.12	20.10	20.00	20.20		3
	100	0	20.12	20.12	20.13	19.96	20.16		3

Table 9-13
LTE Band 41 PC2 Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	26.01	26.00	25.69	25.00	25.60	0	0
	1	50	26.15	**26.16**	25.69	25.75	25.70		0
	1	99	25.42	25.52	25.69	25.26	25.33		0
	50	0	24.88	24.96	24.82	24.63	24.87	0-1	1
	50	25	24.92	**25.01**	25.00	24.85	24.90		1
	50	50	24.70	24.89	24.89	24.70	24.83		1
	100	0	24.76	24.93	24.98	24.75	24.88		1
16QAM	1	0	24.73	24.98	24.81	24.44	24.38	0-1	1
	1	50	25.16	24.97	25.07	24.51	24.57		1
	1	99	24.64	24.50	24.66	24.46	24.48		1
	50	0	23.95	24.17	23.95	23.87	23.76	0-2	2
	50	25	24.17	24.15	24.04	23.69	23.83		2
	50	50	23.80	24.02	23.80	23.73	23.75		2
	100	0	23.92	24.09	23.89	23.71	23.79		2
64QAM	1	0	23.90	24.07	23.86	23.88	23.69	0-2	2
	1	50	23.83	24.16	24.07	23.82	23.67		2
	1	99	23.50	23.85	23.75	23.50	23.62		2
	50	0	23.06	23.21	23.03	22.75	22.88	0-3	3
	50	25	23.15	23.24	23.15	22.90	22.83		3
	50	50	22.93	23.08	22.99	22.79	22.78		3
	100	0	22.94	23.15	22.96	22.86	22.78		3

Table 9-14
LTE Band 41 PC3 Reduced Conducted Powers – Hotspot - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	20.31	20.68	20.51	20.58	20.70	0	0
	1	50	20.41	20.61	20.48	20.39	20.52		0
	1	99	20.52	20.68	**20.82**	20.43	20.40		0
	50	0	20.60	20.61	20.42	20.41	20.50	0-1	0
	50	25	20.43	20.46	20.54	20.34	20.38		0
	50	50	20.30	20.55	**20.66**	20.37	20.45		0
	100	0	20.47	20.60	20.53	20.36	20.40		0
16QAM	1	0	20.60	20.22	20.57	20.36	20.48	0-1	0
	1	50	20.65	20.25	20.53	20.27	20.38		0
	1	99	20.74	20.53	20.73	20.20	20.32		0
	50	0	20.60	20.55	20.48	20.40	20.45	0-2	0
	50	25	20.53	20.54	20.52	20.32	20.43		0
	50	50	20.50	20.58	20.54	20.37	20.40		0
	100	0	20.32	20.63	20.67	20.40	20.45		0
64QAM	1	0	20.28	20.54	20.42	20.39	20.51	0-2	0
	1	50	20.10	20.49	20.51	20.51	20.48		0
	1	99	20.27	20.50	20.30	20.50	20.49		0
	50	0	20.12	20.16	20.14	20.00	20.16	0-3	0
	50	25	20.12	20.13	20.14	20.15	20.03		0
	50	50	20.04	20.14	20.19	20.03	20.10		0
	100	0	20.07	20.24	20.23	20.22	20.08		0

Table 9-15
LTE Band 41 PC2 Reduced Conducted Powers – Hotspot - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	20.26	20.50	20.61	20.39	20.54	0	0
	1	50	20.36	20.48	20.62	20.18	20.37		0
	1	99	20.35	20.58	20.86	20.13	20.36		0
	50	0	20.58	20.40	20.48	20.30	20.43	0-1	0
	50	25	20.44	20.49	20.54	20.23	20.25		0
	50	50	20.40	20.46	20.68	20.30	20.36		0
	100	0	20.36	20.50	20.56	20.28	20.41		0

9.3.8 LTE Uplink Carrier Aggregation Conducted Powers

Table 9-16
LTE Band 41 Uplink Carrier Aggregation PC3 Maximum Conducted Powers

	PCC							SCC							Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL/DL) Channel	PCC (UL/DL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL/DL) Channel	SCC (UL/DL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41C	LTE B41	20	40620	2593.0	QPSK	1	0	LTE B41	20	40422	2573.2	QPSK	1	99	23.00	22.76

Table 9-17
LTE Band 41 Uplink Carrier Aggregation PC3 Reduced Conducted Powers

	PCC							SCC							Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL/DL) Channel	PCC (UL/DL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL/DL) Channel	SCC (UL/DL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41C	LTE B41	20	39750	2506.0	QPSK	50	50	LTE B41	20	39948	2525.8	QPSK	50	0	20.61	20.30

Notes:

1. This device supports uplink carrier aggregation for LTE CA_41C with a maximum of two component carriers. For intraband contiguous carrier aggregation scenarios, 3GPP 36.101 Table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when non-contiguous RB allocation is implemented. The conducted powers and MPR settings in this device are permanently implemented per the above 3GPP requirements.
2. Per FCC Guidance, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.

Figure 9-3
Power Measurement Setup

9.4 WLAN Conducted Powers

Table 9-18
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	802.11ac
		Average	Average	Average	Average
2412	1	22.91	20.98	19.85	19.52
2417	2	N/A	21.32	20.37	20.13
2437	6	22.83	21.49	20.42	20.06
2457	10	N/A	21.18	20.47	19.99
2462	11	22.12	19.48	17.92	17.87

Table 9-19
5 GHz WLAN Maximum Average RF Power

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
		Average	Average	Average
5180	36	16.62	15.26	15.21
5200	40	18.83	17.60	17.62
5220	44	18.79	17.58	17.63
5240	48	16.35	15.15	15.14
5260	52	16.36	15.06	15.03
5280	56	18.68	17.30	17.33
5300	60	18.66	17.40	17.37
5320	64	16.49	15.21	15.22
5500	100	16.67	15.53	15.55
5520	104	18.92	17.67	17.63
5600	120	18.71	17.55	17.47
5620	124	18.68	17.41	17.43
5700	140	18.62	17.18	17.17
5720	144	16.26	15.04	15.02
5745	149	16.49	15.34	15.32
5765	153	18.81	17.45	17.52
5785	157	18.41	17.14	17.24
5825	165	18.84	17.61	17.51

Table 9-20
2.4 GHz WLAN Reduced Average RF Power

2.4GHz Conducted Power [dBm]					
Freq [MHz]	Channel	IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ac
		Average	Average	Average	Average
2412	1	18.35	18.14	18.04	18.04
2437	6	18.76	18.54	18.27	18.26
2457	10	N/A	N/A	18.17	18.18
2462	11	18.54	18.33	17.74	17.66

Table 9-21
5 GHz WLAN Reduced Average RF Power

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
		Average	Average	Average
5180	36	14.51	14.36	14.35
5200	40	14.62	14.39	14.39
5220	44	14.74	14.54	14.51
5240	48	14.34	14.21	14.18
5260	52	14.77	14.58	14.58
5280	56	14.73	14.52	14.50
5300	60	14.79	14.59	14.63
5320	64	14.58	14.36	14.44

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
		Average	Average
5510	102	14.17	13.99
5550	110	14.86	14.85
5590	118	14.99	14.99
5630	126	14.54	14.52
5710	142	14.02	14.12
5755	151	14.19	14.08
5795	159	14.27	14.17

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.

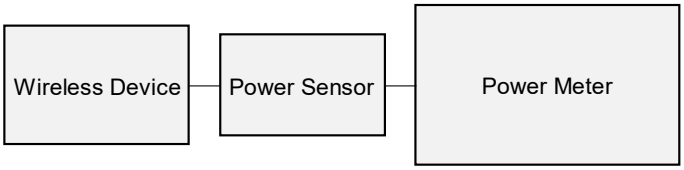

Figure 9-4
Power Measurement Setup

9.5 Bluetooth Conducted Powers

Table 9-22
Bluetooth Average RF Power

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
			[dBm]	[mW]
2402	1.0	0	10.22	10.508
2441	1.0	39	10.48	11.171
2480	1.0	78	10.26	10.607
2402	2.0	0	9.66	9.240
2441	2.0	39	9.88	9.716
2480	2.0	78	9.68	9.280
2402	3.0	0	9.71	9.353
2441	3.0	39	9.96	9.900
2480	3.0	78	9.75	9.442

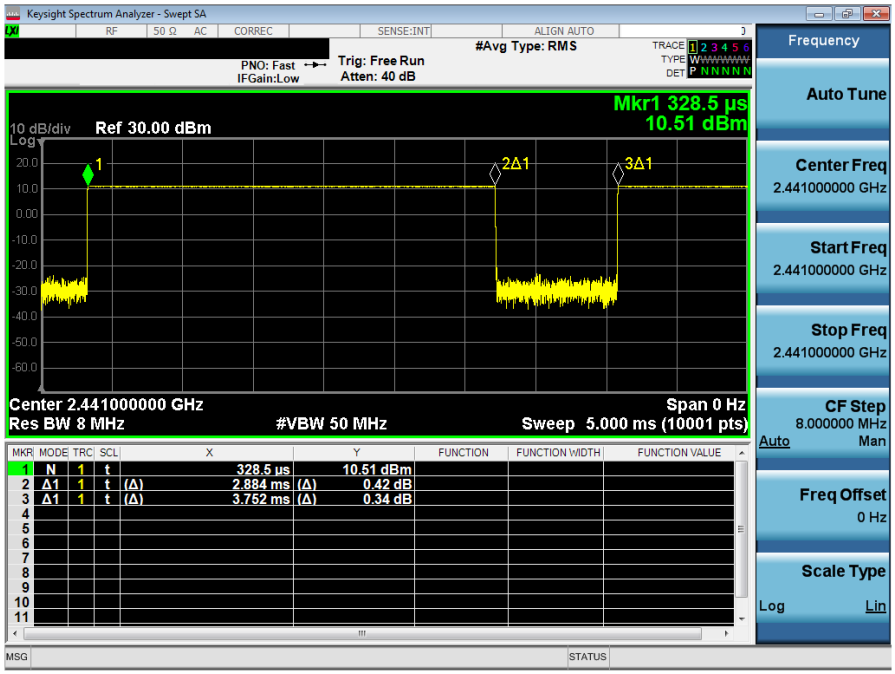

Figure 9-5
Bluetooth Transmission Plot

Equation 9-1
Bluetooth Duty Cycle Calculation

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.884\ ms}{3.752\ ms} * 100\% = 76.9\%$$

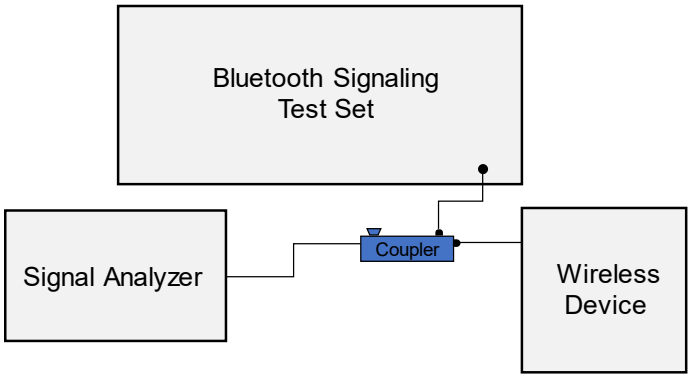

Figure 9-6
Power Measurement Setup

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
12/22/2020	750 Head	20.0	680	0.856	43.219	0.888	42.305	-3.60%	2.16%
			695	0.861	43.170	0.889	42.227	-3.15%	2.23%
			700	0.863	43.152	0.889	42.201	-2.92%	2.25%
			710	0.867	43.114	0.890	42.149	-2.58%	2.29%
			750	0.881	42.984	0.894	41.942	-1.45%	2.48%
			770	0.889	42.931	0.895	41.838	-0.67%	2.61%
			785	0.894	42.896	0.896	41.760	-0.22%	2.72%
12/22/2020	835 Head	21.6	820	0.901	43.226	0.899	41.578	0.22%	3.96%
			835	0.917	43.012	0.900	41.500	1.89%	3.64%
			850	0.933	42.798	0.916	41.500	1.86%	3.13%
12/30/2020	835 Head	22.5	820	0.940	42.018	0.899	41.578	4.56%	1.06%
			835	0.945	41.975	0.900	41.500	5.00%	1.14%
			850	0.951	41.928	0.916	41.500	3.82%	1.03%
12/17/2020	1750 Head	20.6	1720	1.379	38.716	1.354	40.126	1.85%	-3.51%
			1745	1.405	38.590	1.368	40.087	2.70%	-3.73%
			1750	1.410	38.564	1.371	40.079	2.84%	-3.78%
			1770	1.431	38.465	1.383	40.047	3.47%	-3.95%
12/20/2020	1900 Head	20.7	1860	1.369	40.365	1.400	40.000	-2.21%	0.91%
			1880	1.390	40.285	1.400	40.000	-0.71%	0.71%
			1900	1.410	40.208	1.400	40.000	0.71%	0.52%
1/5/2021	1900 Head	23.6	1880	1.387	38.856	1.400	40.000	-0.93%	-2.86%
			1900	1.408	38.778	1.400	40.000	0.57%	-3.06%
1/7/2021	2450 Head	24.6	2400	1.789	39.926	1.756	39.289	1.88%	1.62%
			2450	1.847	39.716	1.800	39.200	2.61%	1.32%
			2480	1.883	39.596	1.833	39.162	2.73%	1.11%
1/10/2021	2450 Head	24.0	2400	1.775	39.729	1.756	39.289	1.08%	1.12%
			2450	1.832	39.546	1.800	39.200	1.78%	0.88%
1/25/2021	2450 Head	23.0	2560	1.949	38.833	1.920	39.060	1.51%	-0.58%
			2600	1.995	38.658	1.964	39.009	1.58%	-0.90%
1/5/2021	5200-5800 Head	20.8	5250	4.692	34.957	4.706	35.929	-0.30%	-2.71%
			5260	4.703	34.931	4.717	35.917	-0.30%	-2.75%
			5300	4.759	34.853	4.758	35.871	0.02%	-2.84%
			5550	5.045	34.449	5.014	35.586	0.62%	-3.20%
			5580	5.060	34.391	5.045	35.551	0.30%	-3.26%
			5600	5.087	34.331	5.065	35.529	0.43%	-3.37%
			5620	5.125	34.301	5.086	35.506	0.77%	-3.39%
			5640	5.150	34.286	5.106	35.483	0.86%	-3.37%
			5710	5.223	34.125	5.178	35.403	0.87%	-3.61%
			5750	5.272	34.085	5.219	35.357	1.02%	-3.60%
			5755	5.276	34.074	5.224	35.351	1.00%	-3.61%
			5795	5.313	33.976	5.265	35.305	0.91%	-3.76%

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
12/28/2020	750 Body	20.5	680	0.920	54.381	0.958	55.804	-3.97%	-2.55%
			695	0.925	54.344	0.959	55.745	-3.55%	-2.51%
			700	0.927	54.333	0.959	55.726	-3.34%	-2.50%
			710	0.931	54.314	0.960	55.687	-3.02%	-2.47%
			750	0.947	54.217	0.964	55.531	-1.76%	-2.37%
			770	0.954	54.164	0.965	55.453	-1.14%	-2.32%
			785	0.960	54.126	0.966	55.395	-0.62%	-2.29%
12/17/2020	835 Body	20.5	820	0.951	55.545	0.969	55.258	-1.86%	0.52%
			835	0.967	55.324	0.970	55.200	-0.31%	0.22%
			850	0.981	55.150	0.988	55.154	-0.71%	-0.01%
1/7/2021	835 Body	22.3	820	0.941	54.837	0.969	55.258	-2.89%	-0.76%
			835	0.956	54.674	0.970	55.200	-1.44%	-0.95%
			850	0.971	54.505	0.988	55.154	-1.72%	-1.18%
12/18/2020	1750 Body	21.0	1720	1.511	51.194	1.469	53.511	2.86%	-4.33%
			1745	1.539	51.068	1.485	53.445	3.64%	-4.45%
			1750	1.545	51.047	1.488	53.432	3.83%	-4.46%
1/4/2021	1750 Body	23.7	1750	1.474	51.396	1.488	53.432	-0.94%	-3.81%
			1770	1.494	51.330	1.501	53.379	-0.47%	-3.84%
1/8/2021	1750 Body	21.2	1710	1.484	52.446	1.463	53.537	1.44%	-2.04%
			1720	1.495	52.401	1.469	53.511	1.77%	-2.07%
			1745	1.526	52.295	1.485	53.445	2.76%	-2.15%
			1750	1.532	52.275	1.488	53.432	2.96%	-2.17%
			1770	1.556	52.199	1.501	53.379	3.66%	-2.21%
1/11/2021	1750 Body	20.3	1720	1.505	51.166	1.469	53.511	2.45%	-4.38%
			1745	1.533	51.046	1.485	53.445	3.23%	-4.49%
			1750	1.539	51.024	1.488	53.432	3.43%	-4.51%
			1770	1.561	50.944	1.501	53.379	4.00%	-4.56%
12/28/2020	1900 Body	21.4	1850	1.478	52.917	1.520	53.300	-2.76%	-0.72%
			1860	1.489	52.895	1.520	53.300	-2.04%	-0.76%
			1880	1.510	52.834	1.520	53.300	-0.66%	-0.87%
			1900	1.532	52.765	1.520	53.300	0.79%	-1.00%
			1905	1.538	52.749	1.520	53.300	1.18%	-1.03%
			1910	1.544	52.734	1.520	53.300	1.58%	-1.06%
12/30/2020	1900 Body	22.1	1850	1.482	52.672	1.520	53.300	-2.50%	-1.18%
			1860	1.493	52.660	1.520	53.300	-1.78%	-1.20%
			1880	1.515	52.613	1.520	53.300	-0.33%	-1.29%
			1900	1.535	52.531	1.520	53.300	0.99%	-1.44%
			1905	1.540	52.509	1.520	53.300	1.32%	-1.48%
			1910	1.545	52.486	1.520	53.300	1.64%	-1.53%
			1950	1.588	52.362	1.520	53.300	4.47%	-1.76%
1/5/2021	1900 Body	24.2	1850	1.465	53.218	1.520	53.300	-3.62%	-0.15%
			1860	1.477	53.187	1.520	53.300	-2.83%	-0.21%
			1880	1.501	53.126	1.520	53.300	-1.25%	-0.33%
			1900	1.520	53.063	1.520	53.300	0.00%	-0.44%
			1905	1.526	53.048	1.520	53.300	0.39%	-0.47%
			1910	1.531	53.033	1.520	53.300	0.72%	-0.50%
12/17/2020	2450 Body	21.6	2400	1.984	51.228	1.902	52.767	4.31%	-2.92%
			2450	2.042	51.065	1.950	52.700	4.72%	-3.10%
1/3/2021	2450 Body	22.2	2450	2.041	51.375	1.950	52.700	4.67%	-2.51%
			2500	2.099	51.249	2.021	52.636	3.86%	-2.64%
			2510	2.110	51.214	2.035	52.623	3.69%	-2.68%
			2535	2.141	51.130	2.071	52.592	3.38%	-2.78%
			2550	2.161	51.087	2.092	52.573	3.30%	-2.83%
			2560	2.173	51.063	2.106	52.560	3.18%	-2.85%
			2600	2.218	50.951	2.163	52.509	2.54%	-2.97%
			2650	2.280	50.791	2.234	52.445	2.06%	-3.15%
			2680	2.316	50.712	2.277	52.407	1.71%	-3.23%
1/4/2021	2450 Body	23.4	2400	1.937	51.877	1.902	52.767	1.84%	-1.69%
			2450	2.004	51.686	1.950	52.700	2.77%	-1.92%
1/21/2021	2450 Body	22.3	2560	2.17	51.519	2.106	52.56	3.04%	-1.98%
			2600	2.228	51.353	2.163	52.509	3.01%	-2.20%
2/2/2021	2450 Body	23.9	2535	2.122	50.747	2.071	52.592	2.46%	-3.51%
			2550	2.141	50.709	2.092	52.573	2.34%	-3.55%
			2560	2.152	50.683	2.106	52.560	2.18%	-3.57%
			2600	2.199	50.565	2.163	52.509	1.66%	-3.70%
1/4/2021	5200-5800 Body	23.0	5180	5.435	47.372	5.276	49.041	3.01%	-3.40%
			5190	5.451	47.362	5.288	49.028	3.08%	-3.40%
			5200	5.465	47.362	5.299	49.014	3.13%	-3.37%
			5250	5.531	47.268	5.358	48.947	3.23%	-3.43%
			5280	5.567	47.213	5.393	48.906	3.23%	-3.46%
			5300	5.597	47.182	5.416	48.879	3.34%	-3.47%
			5320	5.622	47.146	5.439	48.851	3.36%	-3.49%
			5520	5.880	46.815	5.673	48.580	3.65%	-3.63%
			5600	5.989	46.681	5.766	48.471	3.87%	-3.69%
			5700	6.134	46.514	5.883	48.336	4.27%	-3.77%
			5750	6.203	46.430	5.942	48.268	4.39%	-3.81%
			5765	6.223	46.399	5.959	48.248	4.43%	-3.83%
			5785	6.256	46.375	5.982	48.220	4.58%	-3.83%
			5825	6.306	46.310	6.029	48.166	4.59%	-3.85%

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 D.

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)	$Deviation_{1g}$ (%)
H	750	HEAD	12/22/2020	20.0	20.0	0.200	1003	7357	1.660	8.780	8.300	-5.47%
E	835	HEAD	12/22/2020	23.3	21.6	0.200	4d047	3589	1.930	9.420	9.650	2.44%
E	835	HEAD	12/30/2020	24.7	22.5	0.200	4d047	3589	1.940	9.420	9.700	2.97%
P	1750	HEAD	12/17/2020	22.0	20.6	0.100	1008	7308	3.410	36.200	34.100	-5.80%
P	1900	HEAD	12/20/2020	23.3	21.9	0.100	5d148	7308	3.800	39.100	38.000	-2.81%
L	1900	HEAD	01/05/2021	23.7	21.8	0.100	5d148	7539	4.160	39.100	41.600	6.39%
E	2450	HEAD	01/07/2021	23.1	24.7	0.100	719	7571	5.180	51.400	51.800	0.78%
E	2450	HEAD	01/10/2021	22.2	22.3	0.100	719	7571	4.970	51.400	49.700	-3.31%
E	2600	HEAD	01/25/2021	22.5	21.3	0.100	1064	7571	5.520	58.100	55.200	-4.99%
H	5250	HEAD	01/05/2021	20.7	20.8	0.050	1057	7357	3.860	79.200	77.200	-2.53%
H	5600	HEAD	01/05/2021	20.7	20.8	0.050	1057	7357	3.980	84.100	79.600	-5.35%
H	5750	HEAD	01/05/2021	20.7	20.8	0.050	1057	7357	3.790	80.500	75.800	-5.84%
L	750	BODY	12/28/2020	20.1	20.5	0.200	1161	7539	1.740	8.430	8.700	3.20%
L	835	BODY	12/17/2020	23.3	20.5	0.200	4d133	7539	1.900	9.750	9.500	-2.56%
D	835	BODY	01/07/2021	22.8	22.1	0.200	4d133	7552	1.910	9.750	9.550	-2.05%
H	1750	BODY	12/18/2020	22.0	21.0	0.100	1150	7357	3.800	36.600	38.000	3.83%
L	1750	BODY	01/04/2021	22.5	23.7	0.100	1148	7539	3.900	36.300	39.000	7.44%
J	1900	BODY	12/28/2020	20.7	21.4	0.100	5d080	7410	3.990	39.200	39.900	1.79%
I	1900	BODY	01/05/2021	21.3	22.3	0.100	5d149	7551	4.080	39.400	40.800	3.55%
K	2450	BODY	12/17/2020	21.6	21.6	0.100	981	7409	5.190	50.900	51.900	1.96%
K	2450	BODY	01/03/2021	23.1	22.2	0.100	981	7409	5.190	50.900	51.900	1.96%
P	2450	BODY	01/04/2021	22.0	21.5	0.100	797	7308	4.950	49.400	49.500	0.20%
K	2600	BODY	01/03/2021	23.1	22.2	0.100	1004	7409	5.550	54.800	55.500	1.28%
P	2600	BODY	01/21/2021	23.9	22.7	0.100	1064	7308	5.470	55.600	54.700	-1.62%
G	5250	BODY	01/04/2021	22.8	23.0	0.050	1237	7406	3.510	75.600	70.200	-7.14%
G	5600	BODY	01/04/2021	22.8	23.0	0.050	1237	7406	3.860	78.500	77.200	-1.66%
G	5750	BODY	01/04/2021	22.8	23.0	0.050	1237	7406	3.600	75.900	72.000	-5.14%

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)	$Deviation_{10g}$ (%)
J	1750	BODY	01/08/2021	19.7	20.1	0.100	1008	7410	1.960	19.900	19.600	-1.51%
J	1750	BODY	01/11/2021	21.3	20.3	0.100	1008	7410	2.040	19.900	20.400	2.51%
J	1900	BODY	12/30/2020	20.8	21.0	0.100	5d080	7410	2.050	20.600	20.500	-0.49%
I	1900	BODY	01/05/2021	21.3	22.3	0.100	5d149	7551	2.140	20.700	21.400	3.38%
K	2600	BODY	02/02/2021	23.0	22.5	0.100	1004	7409	2.390	24.700	23.900	-3.24%
G	5250	BODY	01/04/2021	22.8	23.0	0.050	1237	7406	0.981	21.200	19.620	-7.45%
G	5600	BODY	01/04/2021	22.8	23.0	0.050	1237	7406	1.070	22.000	21.400	-2.73%
G	5750	BODY	01/04/2021	22.8	23.0	0.050	1237	7406	0.989	21.200	19.780	-6.70%

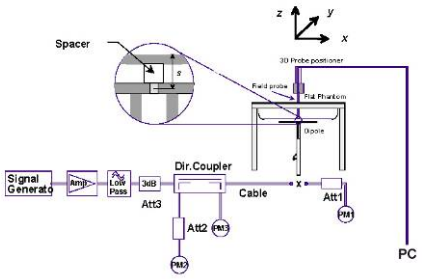

Figure 10-1
System Verification Setup Diagram

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	34.0	33.42	0.02	Right	Cheek	05249	1	1:8.3	0.209	1.143	0.239	
836.60	190	GSM 850	GSM	34.0	33.42	-0.04	Right	Tilt	05249	1	1:8.3	0.065	1.143	0.074	
836.60	190	GSM 850	GSM	34.0	33.42	0.04	Left	Cheek	05249	1	1:8.3	0.109	1.143	0.125	
836.60	190	GSM 850	GSM	34.0	33.42	0.10	Left	Tilt	05249	1	1:8.3	0.067	1.143	0.077	
836.60	190	GSM 850	GPRS	30.5	29.61	-0.01	Right	Cheek	05249	3	1:2.76	0.218	1.227	0.267	A1
836.60	190	GSM 850	GPRS	30.5	29.61	-0.18	Right	Tilt	05249	3	1:2.76	0.071	1.227	0.087	
836.60	190	GSM 850	GPRS	30.5	29.61	0.11	Left	Cheek	05249	3	1:2.76	0.116	1.227	0.142	
836.60	190	GSM 850	GPRS	30.5	29.61	0.04	Left	Tilt	05249	3	1:2.76	0.071	1.227	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 11-2
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	31.0	30.52	-0.09	Right	Cheek	05249	1	1:8.3	0.057	1.117	0.064	
1880.00	661	GSM 1900	GSM	31.0	30.52	0.02	Right	Tilt	05249	1	1:8.3	0.044	1.117	0.049	
1880.00	661	GSM 1900	GSM	31.0	30.52	0.04	Left	Cheek	05249	1	1:8.3	0.055	1.117	0.061	
1880.00	661	GSM 1900	GSM	31.0	30.52	0.02	Left	Tilt	05249	1	1:8.3	0.043	1.117	0.048	
1880.00	661	GSM 1900	GPRS	28.0	27.11	-0.07	Right	Cheek	05249	3	1:2.76	0.071	1.227	0.087	
1880.00	661	GSM 1900	GPRS	28.0	27.11	-0.02	Right	Tilt	05249	3	1:2.76	0.054	1.227	0.066	
1880.00	661	GSM 1900	GPRS	28.0	27.11	-0.02	Left	Cheek	05249	3	1:2.76	0.078	1.227	0.096	A2
1880.00	661	GSM 1900	GPRS	28.0	27.11	0.12	Left	Tilt	05249	3	1:2.76	0.057	1.227	0.070	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-3
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	25.0	24.70	0.02	Right	Cheek	05272	1:1	0.226	1.072	0.242	A3
836.60	4183	UMTS 850	RMC	25.0	24.70	0.04	Right	Tilt	05272	1:1	0.068	1.072	0.073	
836.60	4183	UMTS 850	RMC	25.0	24.70	0.14	Left	Cheek	05272	1:1	0.165	1.072	0.177	
836.60	4183	UMTS 850	RMC	25.0	24.70	0.11	Left	Tilt	05272	1:1	0.087	1.072	0.093	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

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	25.0	24.62	0.18	Right	Cheek	05264	1:1	0.115	1.091	0.125	
1732.40	1412	UMTS 1750	RMC	25.0	24.62	0.21	Right	Tilt	05264	1:1	0.126	1.091	0.137	
1732.40	1412	UMTS 1750	RMC	25.0	24.62	0.11	Left	Cheek	05264	1:1	0.147	1.091	0.160	A4
1732.40	1412	UMTS 1750	RMC	25.0	24.62	0.14	Left	Tilt	05264	1:1	0.105	1.091	0.115	
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	25.0	24.79	0.16	Right	Cheek	05231	1:1	0.107	1.050	0.112	
1880.00	9400	UMTS 1900	RMC	25.0	24.79	0.02	Right	Tilt	05231	1:1	0.104	1.050	0.109	
1880.00	9400	UMTS 1900	RMC	25.0	24.79	0.13	Left	Cheek	05231	1:1	0.144	1.050	0.151	A5
1880.00	9400	UMTS 1900	RMC	25.0	24.79	0.02	Left	Tilt	05231	1:1	0.106	1.050	0.111	
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 71 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) (W/kg)	Scaling Factor	Reported SAR (1g) (W/kg)	Plot #
MHz	Ch.																		
680.50	133297	Mid	LTE Band 71	20	25.0	24.37	0.01	0	Right	Cheek	QPSK	1	50	05231	1:1	0.114	1.156	0.132	A6
680.50	133297	Mid	LTE Band 71	20	24.0	23.30	0.01	1	Right	Cheek	QPSK	50	0	05231	1:1	0.076	1.175	0.089	
680.50	133297	Mid	LTE Band 71	20	25.0	24.37	0.10	0	Right	Tilt	QPSK	1	50	05231	1:1	0.049	1.156	0.057	
680.50	133297	Mid	LTE Band 71	20	24.0	23.30	0.04	1	Right	Tilt	QPSK	50	0	05231	1:1	0.035	1.175	0.041	
680.50	133297	Mid	LTE Band 71	20	25.0	24.37	0.14	0	Left	Cheek	QPSK	1	50	05231	1:1	0.089	1.156	0.103	
680.50	133297	Mid	LTE Band 71	20	24.0	23.30	0.05	1	Left	Cheek	QPSK	50	0	05231	1:1	0.076	1.175	0.089	
680.50	133297	Mid	LTE Band 71	20	25.0	24.37	0.19	0	Left	Tilt	QPSK	1	50	05231	1:1	0.041	1.156	0.047	
680.50	133297	Mid	LTE Band 71	20	24.0	23.30	0.06	1	Left	Tilt	QPSK	50	0	05231	1:1	0.038	1.175	0.045	
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 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) (W/kg)	Scaling Factor	Reported SAR (1g) (W/kg)	Plot #
MHz	Ch.																		
707.50	23095	Mid	LTE Band 12	10	25.0	24.38	-0.05	0	Right	Cheek	QPSK	1	0	05231	1:1	0.122	1.153	0.141	A7
707.50	23095	Mid	LTE Band 12	10	24.0	23.30	0.07	1	Right	Cheek	QPSK	25	12	05231	1:1	0.106	1.175	0.125	
707.50	23095	Mid	LTE Band 12	10	25.0	24.38	0.02	0	Right	Tilt	QPSK	1	0	05231	1:1	0.043	1.153	0.050	
707.50	23095	Mid	LTE Band 12	10	24.0	23.30	0.18	1	Right	Tilt	QPSK	25	12	05231	1:1	0.037	1.175	0.043	
707.50	23095	Mid	LTE Band 12	10	25.0	24.38	-0.03	0	Left	Cheek	QPSK	1	0	05231	1:1	0.113	1.153	0.130	
707.50	23095	Mid	LTE Band 12	10	24.0	23.30	0.05	1	Left	Cheek	QPSK	25	12	05231	1:1	0.098	1.175	0.115	
707.50	23095	Mid	LTE Band 12	10	25.0	24.38	0.07	0	Left	Tilt	QPSK	1	0	05231	1:1	0.034	1.153	0.039	
707.50	23095	Mid	LTE Band 12	10	24.0	23.30	0.04	1	Left	Tilt	QPSK	25	12	05231	1:1	0.027	1.175	0.032	
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 13 Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Reported SAR (1g) (W/kg)	Plot #
MHz	Ch.																		
782.00	23230	Mid	LTE Band 13	10	25.0	24.30	-0.10	0	Right	Cheek	QPSK	1	0	05231	1:1	0.112	1.175	0.132	A8
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.07	1	Right	Cheek	QPSK	25	0	05231	1:1	0.081	1.216	0.098	
782.00	23230	Mid	LTE Band 13	10	25.0	24.30	0.15	0	Right	Tilt	QPSK	1	0	05231	1:1	0.044	1.175	0.052	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.02	1	Right	Tilt	QPSK	25	0	05231	1:1	0.034	1.216	0.041	
782.00	23230	Mid	LTE Band 13	10	25.0	24.30	0.09	0	Left	Cheek	QPSK	1	0	05231	1:1	0.085	1.175	0.100	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.16	1	Left	Cheek	QPSK	25	0	05231	1:1	0.073	1.216	0.089	
782.00	23230	Mid	LTE Band 13	10	25.0	24.30	0.02	0	Left	Tilt	QPSK	1	0	05231	1:1	0.042	1.175	0.049	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.15	1	Left	Tilt	QPSK	25	0	05231	1:1	0.037	1.216	0.045	
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 26 (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)	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.32	-0.01	0	Right	Cheek	QPSK	1	74	05272	1:1	0.240	1.169	**0.281**	A9
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.19	0.05	1	Right	Cheek	QPSK	36	0	05272	1:1	0.173	1.205	0.208	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.32	-0.07	0	Right	Tilt	QPSK	1	74	05272	1:1	0.091	1.169	0.106	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.19	0.02	1	Right	Tilt	QPSK	36	0	05272	1:1	0.068	1.205	0.082	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.32	0.03	0	Left	Cheek	QPSK	1	74	05272	1:1	0.166	1.169	0.194	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.19	0.10	1	Left	Cheek	QPSK	36	0	05272	1:1	0.116	1.205	0.140	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.32	0.19	0	Left	Tilt	QPSK	1	74	05272	1:1	0.094	1.169	0.110	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.19	0.14	1	Left	Tilt	QPSK	36	0	05272	1:1	0.062	1.205	0.075	

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

Table 11-10
LTE Band 66 (AWS) Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.40	-0.03	0	Right	Cheek	QPSK	1	99	05264	1:1	0.111	1.148	0.127	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.42	0.18	1	Right	Cheek	QPSK	50	25	05264	1:1	0.094	1.143	0.107	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.40	0.04	0	Right	Tilt	QPSK	1	99	05264	1:1	0.114	1.148	0.131	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.42	0.08	1	Right	Tilt	QPSK	50	25	05264	1:1	0.094	1.143	0.107	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.40	0.04	0	Left	Cheek	QPSK	1	99	05264	1:1	0.156	1.148	0.179	A10
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.42	0.19	1	Left	Cheek	QPSK	50	25	05264	1:1	0.120	1.143	0.137	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.40	0.13	0	Left	Tilt	QPSK	1	99	05264	1:1	0.128	1.148	0.147	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.42	0.17	1	Left	Tilt	QPSK	50	25	05264	1:1	0.093	1.143	0.106	

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

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

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.17	0.20	0	Right	Cheek	QPSK	1	0	05249	1:1	0.136	1.211	0.165	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.06	0.02	1	Right	Cheek	QPSK	50	25	05249	1:1	0.106	1.242	0.132	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.17	-0.02	0	Right	Tilt	QPSK	1	0	05249	1:1	0.100	1.211	0.121	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.06	0.11	1	Right	Tilt	QPSK	50	25	05249	1:1	0.081	1.242	0.101	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.17	0.01	0	Left	Cheek	QPSK	1	0	05249	1:1	0.169	1.211	0.205	A11
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.06	0.15	1	Left	Cheek	QPSK	50	25	05249	1:1	0.136	1.242	0.169	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.17	-0.01	0	Left	Tilt	QPSK	1	0	05249	1:1	0.103	1.211	0.125	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.06	0.16	1	Left	Tilt	QPSK	50	25	05249	1:1	0.088	1.242	0.109	

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

Table 11-12
LTE Band 41 Head SAR

MEASUREMENT RESULTS																						
1 CC Uplink | 2 CC Uplink, Power Class	Component Carrier	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)	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	24.0	23.06	0.05	0	Right	Cheek	QPSK	1	50	05256	1:1.58	0.019	1.242	0.024	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	23.0	22.06	0.04	1	Right	Cheek	QPSK	50	25	05256	1:1.58	0.015	1.242	0.019	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	24.0	23.06	0.03	0	Right	Tilt	QPSK	1	50	05256	1:1.58	0.028	1.242	0.035	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	23.0	22.06	0.03	1	Right	Tilt	QPSK	50	25	05256	1:1.58	0.023	1.242	0.029	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	24.0	22.76	0.04	0	Left	Cheek	QPSK	1	0	05256	1:1.58	0.060	1.330	0.080	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	24.0	23.06	0.03	0	Left	Cheek	QPSK	1	50	05256	1:1.58	0.042	1.242	0.052	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	23.0	22.06	0.03	1	Left	Cheek	QPSK	50	25	05256	1:1.58	0.028	1.242	0.035	
1 CC Uplink - Power Class 2	N/A	2593.00	40620	Mid	LTE Band 41	20	27.0	25.69		0	Left	Cheek	QPSK	1	0	05264	1:2.31	0.000	1.352	0.000	
2 CC Uplink - Power Class 3	PCC	2593.00	40620	Mid	LTE Band 41	20	24.0	23.00	0.01	0	Left	Cheek	QPSK	1	0	05256	1:1.58	0.062	1.259	0.078	A12
	SCC	2573.20	40422												99						
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	24.0	23.06	0.06	0	Left	Tilt	QPSK	1	50	05256	1:1.58	0.013	1.242	0.016	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	23.0	22.06	0.10	1	Left	Tilt	QPSK	50	25	05256	1:1.58	0.009	1.242	0.011	

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

Table 11-13
DTS Head SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	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	19.0	18.76	0.01	Right	Cheek	05173	1	98.9	0.356	-	1.057	1.011	-	
2437	6	802.11b	DSSS	22	19.0	18.76	-0.17	Right	Tilt	05173	1	98.9	0.323	-	1.057	1.011	-	
2437	6	802.11b	DSSS	22	19.0	18.76	0.05	Left	Cheek	05173	1	98.9	0.850	0.596	1.057	1.011	0.637	
2412	1	802.11b	DSSS	22	19.0	18.35	-0.02	Left	Tilt	05173	1	98.9	0.650	0.497	1.161	1.011	0.583	
2437	6	802.11b	DSSS	22	19.0	18.76	0.03	Left	Tilt	05173	1	98.9	1.117	0.680	1.057	1.011	**0.727**	A13
2462	11	802.11b	DSSS	22	19.0	18.54	0.07	Left	Tilt	05173	1	98.9	0.613	0.459	1.112	1.011	0.516	

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

Table 11-14
NII Head SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
5300	60	802.11a	OFDM	20	15.0	14.79	0.02	Right	Cheek	05181	6	98.2	1.011	-	1.050	1.018	-	
5300	60	802.11a	OFDM	20	15.0	14.79	0.09	Right	Tilt	05181	6	98.2	1.227	0.586	1.050	1.018	0.626	
5260	52	802.11a	OFDM	20	15.0	14.77	0.10	Left	Cheek	05181	6	98.2	2.221	0.910	1.054	1.018	0.976	
5300	60	802.11a	OFDM	20	15.0	14.79	0.02	Left	Cheek	05181	6	98.2	2.138	0.911	1.050	1.018	0.974	
5260	52	802.11a	OFDM	20	15.0	14.77	-0.04	Left	Tilt	05181	6	98.2	3.073	1.100	1.054	1.018	1.180	
5300	60	802.11a	OFDM	20	15.0	14.79	0.10	Left	Tilt	05181	6	98.2	2.987	1.110	1.050	1.018	1.186	
5300	60	802.11a	OFDM	20	15.0	14.79	0.07	Left	Tilt	05181	6	98.2	2.569	1.060	1.050	1.018	1.133	
5590	118	802.11n	OFDM	40	15.0	14.99	0.20	Right	Cheek	05181	13.5	97.2	1.049	-	1.002	1.029	-	
5590	118	802.11n	OFDM	40	15.0	14.99	0.20	Right	Tilt	05181	13.5	97.2	1.178	0.687	1.002	1.029	0.708	
5550	110	802.11n	OFDM	40	15.0	14.86	0.20	Left	Cheek	05181	13.5	97.2	1.532	0.864	1.033	1.029	0.918	
5590	118	802.11n	OFDM	40	15.0	14.99	0.20	Left	Cheek	05181	13.5	97.2	1.374	0.996	1.002	1.029	1.027	
5550	110	802.11n	OFDM	40	15.0	14.86	0.04	Left	Tilt	05181	13.5	97.2	1.732	1.110	1.033	1.029	1.180	
5590	118	802.11n	OFDM	40	15.0	14.99	0.20	Left	Tilt	05181	13.5	97.2	2.392	1.210	1.002	1.029	1.248	A14
5590	118	802.11n	OFDM	40	15.0	14.99	0.20	Left	Tilt	05181	13.5	97.2	1.849	1.170	1.002	1.029	1.206	
5795	159	802.11n	OFDM	40	15.0	14.27	0.05	Right	Cheek	05181	13.5	97.2	1.159	0.551	1.183	1.029	0.671	
5755	151	802.11n	OFDM	40	15.0	14.19	0.10	Right	Tilt	05181	13.5	97.2	1.666	0.792	1.205	1.029	0.982	
5795	159	802.11n	OFDM	40	15.0	14.27	0.10	Right	Tilt	05181	13.5	97.2	1.461	0.707	1.183	1.029	0.861	
5755	151	802.11n	OFDM	40	15.0	14.19	-0.04	Left	Cheek	05181	13.5	97.2	1.636	0.927	1.205	1.029	1.149	
5795	159	802.11n	OFDM	40	15.0	14.27	-0.02	Left	Cheek	05181	13.5	97.2	2.114	0.844	1.183	1.029	1.027	
5755	151	802.11n	OFDM	40	15.0	14.19	0.01	Left	Tilt	05181	13.5	97.2	1.798	1.040	1.205	1.029	**1.290**	
5795	159	802.11n	OFDM	40	15.0	14.27	0.09	Left	Tilt	05181	13.5	97.2	2.410	1.060	1.183	1.029	**1.290**	
5795	159	802.11n	OFDM	40	15.0	14.27	0.04	Left	Tilt	05181	13.5	97.2	1.834	1.060	1.183	1.029	1.290	
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 entry represents variability measurements

Table 11-15
DSS Head SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441.00	39	Bluetooth	FHSS	10.5	10.48	0.02	Right	Cheek	05173	1	76.9	0.011	1.005	1.300	0.014	
2441.00	39	Bluetooth	FHSS	10.5	10.48	0.18	Right	Tilt	05173	1	76.9	0.031	1.005	1.300	0.041	
2441.00	39	Bluetooth	FHSS	10.5	10.48	0.02	Left	Cheek	05173	1	76.9	0.072	1.005	1.300	**0.094**	A15
2441.00	39	Bluetooth	FHSS	10.5	10.48	0.02	Left	Tilt	05173	1	76.9	0.063	1.005	1.300	0.082	
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 11-16
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	34.0	33.42	-0.01	10 mm	05249	1	1:8.3	back	0.448	1.143	0.512	
836.60	190	GSM 850	GPRS	30.5	29.61	-0.11	10 mm	05249	3	1:2.76	back	0.465	1.227	0.571	A16
1880.00	661	GSM 1900	GSM	31.0	30.52	-0.05	10 mm	05231	1	1:8.3	back	0.241	1.117	0.269	
1880.00	661	GSM 1900	GPRS	28.0	27.11	-0.16	10 mm	05231	3	1:2.76	back	0.302	1.227	0.371	A17
836.60	4183	UMTS 850	RMC	25.0	24.70	-0.08	10 mm	05231	N/A	1:1	back	0.483	1.072	0.518	A19
1732.40	1412	UMTS 1750	RMC	25.0	24.62	-0.01	10 mm	05249	N/A	1:1	back	0.507	1.091	0.553	A20
1852.40	9262	UMTS 1900	RMC	25.0	24.80	-0.02	10 mm	05264	N/A	1:1	back	0.718	1.047	0.752	A21
1880.00	9400	UMTS 1900	RMC	25.0	24.79	-0.19	10 mm	05264	N/A	1:1	back	0.688	1.050	0.722	
1907.60	9538	UMTS 1900	RMC	25.0	24.56	-0.19	10 mm	05264	N/A	1:1	back	0.612	1.107	0.677	
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 11-17
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)	
680.50	133297	Mid	LTE Band 71	20	25.0	24.37	0.02	0	05256	QPSK	1	50	10 mm	back	1:1	0.192	1.156	0.222	A23
680.50	133297	Mid	LTE Band 71	20	24.0	23.30	0.01	1	05256	QPSK	50	0	10 mm	back	1:1	0.152	1.175	0.179	
707.50	23095	Mid	LTE Band 12	10	25.0	24.38	-0.20	0	05256	QPSK	1	0	10 mm	back	1:1	0.235	1.153	0.271	A25
707.50	23095	Mid	LTE Band 12	10	24.0	23.30	-0.14	1	05256	QPSK	25	12	10 mm	back	1:1	0.186	1.175	0.219	
782.00	23230	Mid	LTE Band 13	10	25.0	24.30	-0.17	0	05256	QPSK	1	0	10 mm	back	1:1	0.249	1.175	0.293	A27
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	-0.14	1	05256	QPSK	25	0	10 mm	back	1:1	0.205	1.216	0.249	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.32	-0.06	0	05231	QPSK	1	74	10 mm	back	1:1	0.487	1.169	0.569	A29
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.19	-0.06	1	05231	QPSK	36	0	10 mm	back	1:1	0.370	1.205	0.446	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.40	-0.02	0	05264	QPSK	1	99	10 mm	back	1:1	0.476	1.148	0.546	A30
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.42	-0.05	1	05264	QPSK	50	25	10 mm	back	1:1	0.418	1.143	0.478	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.17	-0.02	0	05264	QPSK	1	0	10 mm	back	1:1	0.667	1.211	**0.808**	A32
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.0	24.07	-0.02	0	05264	QPSK	1	0	10 mm	back	1:1	0.585	1.239	0.725	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.0	24.06	0.01	0	05264	QPSK	1	0	10 mm	back	1:1	0.468	1.242	0.581	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.06	-0.11	1	05264	QPSK	50	25	10 mm	back	1:1	0.541	1.242	0.672	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.05	-0.02	1	05264	QPSK	100	0	10 mm	back	1:1	0.536	1.245	0.667	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**													**Body** **1.6 W/kg (mW/g)** averaged over 1 gram						

Table 11-18
LTE 41 Body-Worn SAR

MEASUREMENT RESULTS																					
1 CC Uplink | 2 CC Uplink, Power Class	Component Carrier	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)	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	24.0	22.76	0.04	0	05256	QPSK	1	0	10 mm	back	1:1.58	0.339	1.330	0.451	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	24.0	23.06	0.04	0	05256	QPSK	1	50	10 mm	back	1:1.58	0.351	1.242	0.436	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	23.0	22.06	0.03	1	05256	QPSK	50	25	10 mm	back	1:1.58	0.277	1.242	0.344	
1 CC Uplink - Power Class 2	N/A	2593.00	40620	Mid	LTE Band 41	20	27.0	25.69	0.11	0	05256	QPSK	1	50	10 mm	back	1:2.31	0.404	1.352	0.546	A33
2 CC Uplink - Power Class 3	PCC	2593.00	40620	Mid	LTE Band 41	20	24.0	23.00	0.02	0	05256	QPSK	1	0	10 mm	back	1:1.58	0.347	1.259	0.437	
	SCC	2573.20	40422											99							
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**													**Body** **1.6 W/kg (mW/g)** averaged over 1 gram								

Table 11-19
DTS Body-Worn SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	23.0	22.91	-0.21	10 mm	05173	1	back	98.9	0.322	0.219	1.021	1.011	**0.226**	A35
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**								**Body** **1.6 W/kg (mW/g)** averaged over 1 gram										

Table 11-20
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)	
5280	56	802.11a	OFDM	20	19.0	18.68	0.13	10 mm	05181	6	back	98.2	0.716	0.350	1.076	1.018	0.383	
5520	104	802.11a	OFDM	20	19.0	18.92	0.03	10 mm	05181	6	back	98.2	1.062	0.486	1.019	1.018	0.504	
5825	165	802.11a	OFDM	20	19.0	18.84	0.03	10 mm	05181	6	back	98.2	1.193	0.524	1.038	1.018	**0.554**	A37
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
DSS Body-Worn SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	10.5	10.48	0.20	10 mm	05173	1	back	76.9	0.016	1.005	1.300	**0.021**	A39
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Body** **1.6 W/kg (mW/g)** averaged over 1 gram									

11.3 Standalone Hotspot SAR Data

Table 11-22
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	30.5	29.61	-0.11	10 mm	05249	3	1:2.76	back	0.465	1.227	0.571	A16
836.60	190	GSM 850	GPRS	30.5	29.61	0.00	10 mm	05249	3	1:2.76	front	0.423	1.227	0.519	
836.60	190	GSM 850	GPRS	30.5	29.61	0.09	10 mm	05249	3	1:2.76	bottom	0.295	1.227	0.362	
836.60	190	GSM 850	GPRS	30.5	29.61	-0.01	10 mm	05249	3	1:2.76	right	0.119	1.227	0.146	
836.60	190	GSM 850	GPRS	30.5	29.61	0.04	10 mm	05249	3	1:2.76	left	0.243	1.227	0.298	
1880.00	661	GSM 1900	GPRS	28.0	27.11	-0.16	10 mm	05231	3	1:2.76	back	0.302	1.227	0.371	
1880.00	661	GSM 1900	GPRS	28.0	27.11	-0.08	10 mm	05231	3	1:2.76	front	0.106	1.227	0.130	
1880.00	661	GSM 1900	GPRS	28.0	27.11	0.03	10 mm	05231	3	1:2.76	bottom	0.367	1.227	0.450	A18
1880.00	661	GSM 1900	GPRS	28.0	27.11	-0.13	10 mm	05231	3	1:2.76	left	0.123	1.227	0.151	
836.60	4183	UMTS 850	RMC	25.0	24.70	-0.08	10 mm	05231	N/A	1:1	back	0.483	1.072	0.518	A19
836.60	4183	UMTS 850	RMC	25.0	24.70	-0.05	10 mm	05231	N/A	1:1	front	0.458	1.072	0.491	
836.60	4183	UMTS 850	RMC	25.0	24.70	-0.18	10 mm	05231	N/A	1:1	bottom	0.347	1.072	0.372	
836.60	4183	UMTS 850	RMC	25.0	24.70	0.03	10 mm	05231	N/A	1:1	right	0.240	1.072	0.257	
836.60	4183	UMTS 850	RMC	25.0	24.70	-0.02	10 mm	05231	N/A	1:1	left	0.104	1.072	0.111	
1732.40	1412	UMTS 1750	RMC	25.0	24.62	-0.01	10 mm	05249	N/A	1:1	back	0.507	1.091	0.553	A20
1732.40	1412	UMTS 1750	RMC	25.0	24.62	0.03	10 mm	05249	N/A	1:1	front	0.439	1.091	0.479	
1732.40	1412	UMTS 1750	RMC	25.0	24.62	0.06	10 mm	05249	N/A	1:1	bottom	0.489	1.091	0.533	
1732.40	1412	UMTS 1750	RMC	25.0	24.62	0.03	10 mm	05249	N/A	1:1	left	0.467	1.091	0.509	
1880.00	9400	UMTS 1900	RMC	25.0	24.79	-0.19	10 mm	05264	N/A	1:1	back	0.688	1.050	0.722	
1880.00	9400	UMTS 1900	RMC	25.0	24.79	0.07	10 mm	05264	N/A	1:1	front	0.331	1.050	0.348	
1852.40	9262	UMTS 1900	RMC	25.0	24.80	0.02	10 mm	05264	N/A	1:1	bottom	0.735	1.047	0.770	A22
1880.00	9400	UMTS 1900	RMC	25.0	24.79	0.02	10 mm	05264	N/A	1:1	bottom	0.733	1.050	0.770	
1907.60	9538	UMTS 1900	RMC	25.0	24.56	-0.01	10 mm	05264	N/A	1:1	bottom	0.668	1.107	0.739	
1880.00	9400	UMTS 1900	RMC	25.0	24.79	-0.04	10 mm	05264	N/A	1:1	left	0.268	1.050	0.281	
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 71 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)	
680.50	133297	Mid	LTE Band 71	20	25.0	24.37	0.02	0	05256	QPSK	1	50	10 mm	back	1:1	0.192	1.156	0.222	
680.50	133297	Mid	LTE Band 71	20	24.0	23.30	0.01	1	05256	QPSK	50	0	10 mm	back	1:1	0.152	1.175	0.179	
680.50	133297	Mid	LTE Band 71	20	25.0	24.37	-0.03	0	05256	QPSK	1	50	10 mm	front	1:1	0.187	1.156	0.216	
680.50	133297	Mid	LTE Band 71	20	24.0	23.30	0.09	1	05256	QPSK	50	0	10 mm	front	1:1	0.141	1.175	0.166	
680.50	133297	Mid	LTE Band 71	20	25.0	24.37	-0.02	0	05256	QPSK	1	50	10 mm	bottom	1:1	0.113	1.156	0.131	
680.50	133297	Mid	LTE Band 71	20	24.0	23.30	-0.13	1	05256	QPSK	50	0	10 mm	bottom	1:1	0.090	1.175	0.106	
680.50	133297	Mid	LTE Band 71	20	25.0	24.37	-0.13	0	05256	QPSK	1	50	10 mm	right	1:1	0.247	1.156	0.286	A24
680.50	133297	Mid	LTE Band 71	20	24.0	23.30	-0.01	1	05256	QPSK	50	0	10 mm	right	1:1	0.182	1.175	0.214	
680.50	133297	Mid	LTE Band 71	20	25.0	24.37	-0.03	0	05256	QPSK	1	50	10 mm	left	1:1	0.185	1.156	0.214	
680.50	133297	Mid	LTE Band 71	20	24.0	23.30	0.06	1	05256	QPSK	50	0	10 mm	left	1:1	0.136	1.175	0.160	
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 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	25.0	24.38	-0.20	0	05256	QPSK	1	0	10 mm	back	1:1	0.235	1.153	0.271	
707.50	23095	Mid	LTE Band 12	10	24.0	23.30	-0.14	1	05256	QPSK	25	12	10 mm	back	1:1	0.186	1.175	0.219	
707.50	23095	Mid	LTE Band 12	10	25.0	24.38	-0.01	0	05256	QPSK	1	0	10 mm	front	1:1	0.182	1.153	0.210	
707.50	23095	Mid	LTE Band 12	10	24.0	23.30	0.05	1	05256	QPSK	25	12	10 mm	front	1:1	0.148	1.175	0.174	
707.50	23095	Mid	LTE Band 12	10	25.0	24.38	-0.11	0	05256	QPSK	1	0	10 mm	bottom	1:1	0.153	1.153	0.176	
707.50	23095	Mid	LTE Band 12	10	24.0	23.30	-0.03	1	05256	QPSK	25	12	10 mm	bottom	1:1	0.122	1.175	0.143	
707.50	23095	Mid	LTE Band 12	10	25.0	24.38	-0.06	0	05256	QPSK	1	0	10 mm	right	1:1	0.258	1.153	0.297	A26
707.50	23095	Mid	LTE Band 12	10	24.0	23.30	-0.02	1	05256	QPSK	25	12	10 mm	right	1:1	0.237	1.175	0.278	
707.50	23095	Mid	LTE Band 12	10	25.0	24.38	-0.03	0	05256	QPSK	1	0	10 mm	left	1:1	0.182	1.153	0.210	
707.50	23095	Mid	LTE Band 12	10	24.0	23.30	0.02	1	05256	QPSK	25	12	10 mm	left	1:1	0.167	1.175	0.196	
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 13 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
782.00	23230	Mid	LTE Band 13	10	25.0	24.30	-0.17	0	05256	QPSK	1	0	10 mm	back	1:1	0.249	1.175	0.293	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	-0.14	1	05256	QPSK	25	0	10 mm	back	1:1	0.205	1.216	0.249	
782.00	23230	Mid	LTE Band 13	10	25.0	24.30	0.03	0	05256	QPSK	1	0	10 mm	front	1:1	0.252	1.175	0.296	A28
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.06	1	05256	QPSK	25	0	10 mm	front	1:1	0.202	1.216	0.246	
782.00	23230	Mid	LTE Band 13	10	25.0	24.30	-0.02	0	05256	QPSK	1	0	10 mm	bottom	1:1	0.191	1.175	0.224	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	-0.18	1	05256	QPSK	25	0	10 mm	bottom	1:1	0.154	1.216	0.187	
782.00	23230	Mid	LTE Band 13	10	25.0	24.30	0.01	0	05256	QPSK	1	0	10 mm	right	1:1	0.200	1.175	0.235	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	-0.02	1	05256	QPSK	25	0	10 mm	right	1:1	0.156	1.216	0.190	
782.00	23230	Mid	LTE Band 13	10	25.0	24.30	-0.01	0	05256	QPSK	1	0	10 mm	left	1:1	0.114	1.175	0.134	
782.00	23230	Mid	LTE Band 13	10	24.0	23.15	0.01	1	05256	QPSK	25	0	10 mm	left	1:1	0.088	1.216	0.107	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 11-26
LTE Band 26 (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)	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.32	-0.06	0	05231	QPSK	1	74	10 mm	back	1:1	0.487	1.169	0.569	A29
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.19	-0.06	1	05231	QPSK	36	0	10 mm	back	1:1	0.370	1.205	0.446	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.32	0.09	0	05231	QPSK	1	74	10 mm	front	1:1	0.465	1.169	0.544	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.19	0.04	1	05231	QPSK	36	0	10 mm	front	1:1	0.344	1.205	0.415	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.32	0.01	0	05231	QPSK	1	74	10 mm	bottom	1:1	0.318	1.169	0.372	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.19	0.03	1	05231	QPSK	36	0	10 mm	bottom	1:1	0.251	1.205	0.302	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.32	0.05	0	05231	QPSK	1	74	10 mm	right	1:1	0.247	1.169	0.289	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.19	0.02	1	05231	QPSK	36	0	10 mm	right	1:1	0.189	1.205	0.228	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.0	24.32	0.01	0	05231	QPSK	1	74	10 mm	left	1:1	0.110	1.169	0.129	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.0	23.19	0.06	1	05231	QPSK	36	0	10 mm	left	1:1	0.088	1.205	0.106	
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 11-27
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	25.0	24.40	-0.02	0	05264	QPSK	1	99	10 mm	back	1:1	0.476	1.148	0.546	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.42	-0.05	1	05264	QPSK	50	25	10 mm	back	1:1	0.418	1.143	0.478	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.40	0.10	0	05264	QPSK	1	99	10 mm	front	1:1	0.313	1.148	0.359	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.42	0.02	1	05264	QPSK	50	25	10 mm	front	1:1	0.301	1.143	0.344	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.40	-0.01	0	05264	QPSK	1	99	10 mm	bottom	1:1	0.483	1.148	0.554	A31
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.42	-0.07	1	05264	QPSK	50	25	10 mm	bottom	1:1	0.444	1.143	0.507	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.40	0.03	0	05264	QPSK	1	99	10 mm	left	1:1	0.376	1.148	0.432	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.42	-0.01	1	05264	QPSK	50	25	10 mm	left	1:1	0.340	1.143	0.389	
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 11-28
LTE Band 25 (PCS) Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.17	-0.02	0	05264	QPSK	1	0	10 mm	back	1:1	0.667	1.211	**0.808**	A32
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.0	24.07	-0.02	0	05264	QPSK	1	0	10 mm	back	1:1	0.585	1.239	0.725	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.0	24.06	0.01	0	05264	QPSK	1	0	10 mm	back	1:1	0.468	1.242	0.581	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.06	-0.11	1	05264	QPSK	50	25	10 mm	back	1:1	0.541	1.242	0.672	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.05	-0.02	1	05264	QPSK	100	0	10 mm	back	1:1	0.536	1.245	0.667	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.17	0.00	0	05264	QPSK	1	0	10 mm	front	1:1	0.286	1.211	0.346	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.06	0.01	1	05264	QPSK	50	25	10 mm	front	1:1	0.225	1.242	0.279	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.17	-0.11	0	05264	QPSK	1	0	10 mm	bottom	1:1	0.640	1.211	0.775	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.06	-0.03	1	05264	QPSK	50	25	10 mm	bottom	1:1	0.497	1.242	0.617	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.17	-0.05	0	05264	QPSK	1	0	10 mm	left	1:1	0.317	1.211	0.384	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.06	-0.08	1	05264	QPSK	50	25	10 mm	left	1:1	0.236	1.242	0.293	
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 11-29
LTE Band 41 Hotspot SAR

MEASUREMENT RESULTS																						
1 CC Uplink | 2 CC Uplink, Power Class	Component Carrier	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)	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	21.0	20.82	0.01	0	05256	QPSK	1	99	10 mm	back	1:1.58	0.134	1.042	0.140	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	21.0	20.66	0.15	0	05256	QPSK	50	50	10 mm	back	1:1.58	0.153	1.081	0.165	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	21.0	20.82	-0.05	0	05256	QPSK	1	99	10 mm	front	1:1.58	0.287	1.042	0.299	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	21.0	20.66	-0.04	0	05256	QPSK	50	50	10 mm	front	1:1.58	0.324	1.081	0.350	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	21.0	20.82	-0.01	0	05256	QPSK	1	99	10 mm	bottom	1:1.58	0.506	1.042	0.527	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	21.0	20.60	-0.04	0	05256	QPSK	50	0	10 mm	bottom	1:1.58	0.665	1.096	0.729	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	21.0	20.30	0.17	0	05256	QPSK	50	50	10 mm	bottom	1:1.58	0.645	1.175	0.758	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	21.0	20.61	-0.07	0	05256	QPSK	50	0	10 mm	bottom	1:1.58	0.619	1.094	0.677	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	21.0	20.66	0.00	0	05256	QPSK	50	50	10 mm	bottom	1:1.58	0.575	1.081	0.622	
1 CC Uplink - Power Class 3	N/A	2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.41	-0.11	0	05256	QPSK	50	0	10 mm	bottom	1:1.58	0.495	1.146	0.567	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	21.0	20.50	-0.16	0	05256	QPSK	50	0	10 mm	bottom	1:1.58	0.406	1.122	0.456	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	21.0	20.60	-0.17	0	05256	QPSK	100	0	10 mm	bottom	1:1.58	0.612	1.096	0.671	
1 CC Uplink - Power Class 2	N/A	2506.00	39750	Low	LTE Band 41	20	21.0	20.58	0.16	0	05256	QPSK	50	0	10 mm	bottom	1:2.31	0.495	1.102	0.545	
2 CC Uplink - Power Class 3	PCC	2506.00	39750	Low	LTE Band 41	20	21.0	20.61	0.15	0	05256	QPSK	50	50	10 mm	bottom	1:1.58	0.721	1.094	0.789	A34
	SCC	2525.80	39948											0							
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	21.0	20.82	-0.01	0	05256	QPSK	1	99	10 mm	right	1:1.58	0.002	1.042	0.002	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	21.0	20.66	0.01	0	05256	QPSK	50	50	10 mm	right	1:1.58	0.003	1.081	0.003	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	21.0	20.82	0.06	0	05256	QPSK	1	99	10 mm	left	1:1.58	0.022	1.042	0.023	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	21.0	20.66	0.10	0	05256	QPSK	50	50	10 mm	left	1:1.58	0.017	1.081	0.018	

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 11-30
WLAN Hotspot SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	23.0	22.91	-0.21	10 mm	05173	1	back	98.9	0.322	0.219	1.021	1.011	0.226	
2412	1	802.11b	DSSS	22	23.0	22.91	-0.16	10 mm	05173	1	front	98.9	0.366	-	1.021	1.011	-	
2412	1	802.11b	DSSS	22	23.0	22.91	0.04	10 mm	05173	1	top	98.9	0.452	0.295	1.021	1.011	**0.305**	A36
2412	1	802.11b	DSSS	22	23.0	22.91	-0.03	10 mm	05173	1	right	98.9	0.308	-	1.021	1.011	-	
5200	40	802.11a	OFDM	20	19.0	18.83	0.10	10 mm	05181	6	back	98.2	0.672	0.351	1.040	1.018	0.372	
5200	40	802.11a	OFDM	20	19.0	18.83	0.01	10 mm	05181	6	front	98.2	0.610	0.305	1.040	1.018	0.323	
5200	40	802.11a	OFDM	20	19.0	18.83	0.02	10 mm	05181	6	top	98.2	1.419	0.726	1.040	1.018	0.769	
5200	40	802.11a	OFDM	20	19.0	18.83	0.10	10 mm	05181	6	right	98.2	0.127	-	1.040	1.018	-	
5825	165	802.11a	OFDM	20	19.0	18.84	0.03	10 mm	05181	6	back	98.2	1.193	0.524	1.038	1.018	0.554	
5825	165	802.11a	OFDM	20	19.0	18.84	0.01	10 mm	05181	6	front	98.2	1.009	0.445	1.038	1.018	0.470	
5765	153	802.11a	OFDM	20	19.0	18.81	0.21	10 mm	05181	6	top	98.2	2.254	0.993	1.045	1.018	1.056	A38
5785	157	802.11a	OFDM	20	19.0	18.41	0.02	10 mm	05181	6	top	98.2	2.112	0.959	1.146	1.018	**1.119**	
5825	165	802.11a	OFDM	20	19.0	18.84	0.06	10 mm	05181	6	top	98.2	2.367	0.964	1.038	1.018	1.019	
5825	165	802.11a	OFDM	20	19.0	18.84	0.03	10 mm	05181	6	right	98.2	0.225	-	1.038	1.018	-	

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 11-31
DSS Hotspot SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	10.5	10.48	0.20	10 mm	05173	1	back	76.9	0.016	1.005	1.300	**0.021**	A39
2441	39	Bluetooth	FHSS	10.5	10.48	-0.08	10 mm	05173	1	front	76.9	0.012	1.005	1.300	0.016	
2441	39	Bluetooth	FHSS	10.5	10.48	0.03	10 mm	05173	1	top	76.9	0.012	1.005	1.300	0.016	
2441	39	Bluetooth	FHSS	10.5	10.48	0.03	10 mm	05173	1	right	76.9	0.008	1.005	1.300	0.010	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Body** **1.6 W/kg (mW/g)** averaged over 1 gram									

11.4 Standalone Phablet SAR Data

Table 11-32
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	25.0	24.52	0.03	2 mm	05256	1:1	back	1.940	1.117	2.167	
1732.40	1412	UMTS 1750	RMC	25.0	24.62	0.01	2 mm	05256	1:1	back	1.900	1.091	2.073	
1752.60	1513	UMTS 1750	RMC	25.0	24.46	0.08	2 mm	05256	1:1	back	2.340	1.132	2.649	
1732.40	1412	UMTS 1750	RMC	25.0	24.62	-0.02	1 mm	05256	1:1	front	1.180	1.091	1.287	
1732.40	1412	UMTS 1750	RMC	25.0	24.62	-0.12	3 mm	05256	1:1	bottom	0.928	1.091	1.012	
1732.40	1412	UMTS 1750	RMC	25.0	24.62	-0.03	0 mm	05256	1:1	left	1.820	1.091	1.986	
1712.40	1312	UMTS 1750	RMC	23.0	22.61	-0.01	0 mm	05256	1:1	back	2.180	1.094	2.385	
1732.40	1412	UMTS 1750	RMC	23.0	22.65	0.01	0 mm	05256	1:1	back	2.420	1.084	2.623	
1752.60	1513	UMTS 1750	RMC	23.0	22.58	0.01	0 mm	05256	1:1	back	2.600	1.102	2.865	A40
1732.40	1412	UMTS 1750	RMC	23.0	22.65	-0.11	0 mm	05256	1:1	front	1.270	1.084	1.377	
1732.40	1412	UMTS 1750	RMC	23.0	22.65	0.01	0 mm	05256	1:1	bottom	1.050	1.084	1.138	
1852.40	9262	UMTS 1900	RMC	25.0	24.80	0.13	2 mm	05264	1:1	back	2.130	1.047	2.230	
1880.00	9400	UMTS 1900	RMC	25.0	24.79	0.02	2 mm	05264	1:1	back	1.970	1.050	2.069	
1907.60	9538	UMTS 1900	RMC	25.0	24.56	0.03	2 mm	05264	1:1	back	1.680	1.107	1.860	
1880.00	9400	UMTS 1900	RMC	25.0	24.79	0.08	1 mm	05264	1:1	front	0.711	1.050	0.747	
1880.00	9400	UMTS 1900	RMC	25.0	24.79	0.01	3 mm	05264	1:1	bottom	1.170	1.050	1.229	
1880.00	9400	UMTS 1900	RMC	25.0	24.79	-0.07	0 mm	05264	1:1	left	1.700	1.050	1.785	
1852.40	9262	UMTS 1900	RMC	23.5	23.27	-0.02	0 mm	05249	1:1	back	2.780	1.054	2.930	A41
1880.00	9400	UMTS 1900	RMC	23.5	23.31	-0.02	0 mm	05249	1:1	back	2.470	1.045	2.581	
1907.60	9538	UMTS 1900	RMC	23.5	23.14	0.12	0 mm	05249	1:1	back	2.080	1.086	2.259	
1880.00	9400	UMTS 1900	RMC	23.5	23.31	0.02	0 mm	05249	1:1	front	0.308	1.045	0.322	
1880.00	9400	UMTS 1900	RMC	23.5	23.31	0.01	0 mm	05249	1:1	bottom	0.701	1.045	0.733	
1852.40	9262	UMTS 1900	RMC	23.5	23.27	-0.20	0 mm	05249	1:1	back	2.620	1.054	2.761	
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 represent variability measurement

Table 11-33
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)	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.40	0.01	0	05256	QPSK	1	99	2 mm	back	1:1	1.440	1.148	1.653	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.42	0.02	1	05256	QPSK	50	25	2 mm	back	1:1	1.310	1.143	1.497	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.40	-0.20	0	05256	QPSK	1	99	1 mm	front	1:1	0.634	1.148	0.728	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.42	-0.20	1	05256	QPSK	50	25	1 mm	front	1:1	0.587	1.143	0.671	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.40	-0.03	0	05256	QPSK	1	99	3 mm	bottom	1:1	0.873	1.148	1.002	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.42	-0.11	1	05256	QPSK	50	25	3 mm	bottom	1:1	0.799	1.143	0.913	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	24.40	0.02	0	05256	QPSK	1	99	0 mm	left	1:1	1.650	1.148	1.894	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.42	0.02	1	05256	QPSK	50	25	0 mm	left	1:1	1.560	1.143	1.783	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.0	22.28	-0.02	0	05256	QPSK	1	99	0 mm	back	1:1	2.400	1.180	2.832	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.20	0.00	0	05256	QPSK	1	0	0 mm	back	1:1	2.210	1.202	2.656	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.41	-0.02	0	05256	QPSK	1	50	0 mm	back	1:1	2.600	1.146	2.980	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.0	22.20	-0.02	0	05256	QPSK	50	25	0 mm	back	1:1	2.130	1.202	2.560	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	23.0	22.19	-0.05	0	05256	QPSK	50	50	0 mm	back	1:1	2.360	1.205	2.844	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.22	0.01	0	05256	QPSK	50	0	0 mm	back	1:1	2.520	1.197	3.016	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.19	-0.02	0	05256	QPSK	100	0	0 mm	back	1:1	2.620	1.205	3.157	A42
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.41	-0.09	0	05256	QPSK	1	50	0 mm	front	1:1	1.290	1.146	1.478	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.22	-0.07	0	05256	QPSK	50	0	0 mm	front	1:1	1.310	1.197	1.568	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.41	0.01	0	05256	QPSK	1	50	0 mm	bottom	1:1	1.080	1.146	1.238	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.22	-0.10	0	05256	QPSK	50	0	0 mm	bottom	1:1	1.070	1.197	1.281	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.0	22.19	0.01	0	05256	QPSK	100	0	0 mm	back	1:1	2.620	1.205	3.157	
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 represent variability measurement

Table 11-34
LTE Band 25 (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	26140	Low	LTE Band 25 (PCS)	20	25.0	24.17	0.02	0	05264	QPSK	1	0	2 mm	back	1:1	1.990	1.211	2.410	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.0	24.07	0.02	0	05264	QPSK	1	0	2 mm	back	1:1	1.820	1.239	2.255	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.0	24.06	0.11	0	05264	QPSK	1	0	2 mm	back	1:1	1.520	1.242	1.888	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.06	0.02	1	05264	QPSK	50	25	2 mm	back	1:1	1.590	1.242	1.975	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.05	0.02	1	05264	QPSK	100	0	2 mm	back	1:1	1.600	1.245	1.992	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.17	0.06	0	05264	QPSK	1	0	1 mm	front	1:1	1.050	1.211	1.272	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.06	0.04	1	05264	QPSK	50	25	1 mm	front	1:1	0.816	1.242	1.013	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.17	-0.13	0	05264	QPSK	1	0	3 mm	bottom	1:1	1.240	1.211	1.502	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.06	-0.12	1	05264	QPSK	50	25	3 mm	bottom	1:1	0.977	1.242	1.213	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.0	24.17	0.05	0	05264	QPSK	1	0	0 mm	left	1:1	1.900	1.211	2.301	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.0	24.07	-0.08	0	05264	QPSK	1	0	0 mm	left	1:1	1.610	1.239	1.995	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.0	24.06	-0.11	0	05264	QPSK	1	0	0 mm	left	1:1	1.320	1.242	1.639	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.06	-0.09	1	05264	QPSK	50	25	0 mm	left	1:1	1.460	1.242	1.813	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.0	23.05	-0.07	1	05264	QPSK	100	0	0 mm	left	1:1	1.470	1.245	1.830	
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.5	22.70	0.03	0	05264	QPSK	1	0	0 mm	back	1:1	2.620	1.202	3.149	A43
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.5	22.65	0.02	0	05264	QPSK	1	50	0 mm	back	1:1	2.360	1.216	2.870	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.5	22.76	0.02	0	05264	QPSK	1	0	0 mm	back	1:1	2.360	1.186	2.799	
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.5	22.54	0.03	0	05264	QPSK	50	0	0 mm	back	1:1	2.550	1.247	**3.180**	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.5	22.55	0.03	0	05264	QPSK	50	0	0 mm	back	1:1	2.410	1.245	3.000	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.5	22.56	0.02	0	05264	QPSK	50	0	0 mm	back	1:1	2.230	1.242	2.770	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.5	22.54	0.02	0	05264	QPSK	100	0	0 mm	back	1:1	2.140	1.247	2.669	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.5	22.76	0.19	0	05264	QPSK	1	0	0 mm	front	1:1	1.140	1.186	1.352	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.5	22.56	0.18	0	05264	QPSK	50	0	0 mm	front	1:1	1.070	1.242	1.329	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.5	22.76	0.17	0	05264	QPSK	1	0	0 mm	bottom	1:1	1.110	1.186	1.316	
1905.00	26590	High	LTE Band 25 (PCS)	20	23.5	22.56	0.15	0	05264	QPSK	50	0	0 mm	bottom	1:1	1.060	1.242	1.317	
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 11-35
LTE Band 41 Phablet SAR

MEASUREMENT RESULTS																						
1 CC Uplink | 2 CC Uplink, Power Class	Component Carrier	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)	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	24.0	22.76	-0.06	0	05256	QPSK	1	0	0 mm	bottom	1:1.58	0.605	1.330	0.805	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	24.0	23.06	-0.14	0	05256	QPSK	1	50	0 mm	bottom	1:1.58	0.583	1.242	0.724	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	23.0	22.06	-0.04	1	05256	QPSK	50	25	0 mm	bottom	1:1.58	0.491	1.242	0.610	
1 CC Uplink - Power Class 2	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	27.0	26.16	0.04	0	05256	QPSK	1	50	0 mm	bottom	1:2.31	0.828	1.213	1.004	A44
	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	26.0	25.01	0.00	1	05256	QPSK	50	25	0 mm	bottom	1:2.31	0.694	1.256	0.872	
2 CC Uplink - Power Class 3	PCC	2593.00	40620	High	LTE Band 41	20	24.0	23.00	0.01	0	05256	QPSK	1	0	0 mm	bottom	1:1.58	0.601	1.259	0.757	
	SCC	2573.20	40422	High										99							
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 11-36
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)	
5280	56	802.11a	OFDM	20	19.0	18.68	0.10	0 mm	05181	6	back	98.2	3.791	0.555	1.076	1.018	0.608	
5280	56	802.11a	OFDM	20	19.0	18.68	0.20	0 mm	05181	6	front	98.2	12.319	1.100	1.076	1.018	1.205	
5280	56	802.11a	OFDM	20	19.0	18.68	0.10	0 mm	05181	6	top	98.2	31.661	2.150	1.076	1.018	2.355	
5300	60	802.11a	OFDM	20	19.0	18.66	0.10	0 mm	05181	6	top	98.2	24.263	2.100	1.081	1.018	2.311	
5320	64	802.11a	OFDM	20	17.0	16.49	0.04	0 mm	05181	6	top	98.2	19.412	1.310	1.125	1.018	1.500	
5280	56	802.11a	OFDM	20	19.0	18.68	0.10	0 mm	05181	6	right	98.2	2.338	-	1.076	1.018	-	
5520	104	802.11a	OFDM	20	19.0	18.92	0.10	0 mm	05181	6	back	98.2	5.691	0.639	1.019	1.018	0.663	
5520	104	802.11a	OFDM	20	19.0	18.92	0.03	0 mm	05181	6	front	98.2	13.523	1.190	1.019	1.018	1.234	
5520	104	802.11a	OFDM	20	19.0	18.92	0.02	0 mm	05181	6	top	98.2	35.169	2.330	1.019	1.018	2.417	A45
5600	120	802.11a	OFDM	20	19.0	18.71	0.20	0 mm	05181	6	top	98.2	34.624	2.280	1.069	1.018	**2.481**	
5700	140	802.11a	OFDM	20	19.0	18.62	0.20	0 mm	05181	6	top	98.2	31.035	2.100	1.091	1.018	2.332	
5520	104	802.11a	OFDM	20	19.0	18.92	0.06	0 mm	05181	6	right	98.2	3.419	-	1.019	1.018	-	
5280	56	802.11a	OFDM	20	19.0	18.68	0.10	0 mm	05181	6	top	98.2	24.411	2.110	1.076	1.018	2.311	
5520	104	802.11a	OFDM	20	19.0	18.92	0.10	0 mm	05181	6	top	98.2	33.568	2.310	1.019	1.018	2.396	
5700	140	802.11a	OFDM	20	19.0	18.62	0.01	0 mm	05181	6	top	98.2	24.400	2.080	1.091	1.018	2.310	
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 measurements.

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. See Section 13 for variability analysis.
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v02r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
10. Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is > 160 mm and < 200 mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg.
11. Unless otherwise noted, when 10g SAR measurement is considered, a factor of 2.5 is applied to the 1g thresholds for the equivalent test cases.
12. This device utilizes power reduction for some wireless modes and technologies, as outlined in Section 1.3. The maximum output power allowed for each transmitter and exposure condition was evaluated for SAR compliance based on expected use conditions and simultaneous transmission scenarios.
13. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information).
14. The orange highlights throughout the report represents the highest 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 and MCC=001 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 FCC KDB Publication 447498 D01v06, when the reported LTE Band 41 SAR measured at the highest output power channel in a given a test configuration was > 0.6 W/kg for 1g evaluations, testing at the other channels was required for such test configurations.
5. TDD LTE was tested per the guidance provided in FCC KDB Publication 941225 D05v02r04. Testing was performed using UL-DL configuration 0 with 6 UL subframes and 2 S subframes using extended cyclic prefix only and special subframe configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Section 4, the duty factor for special subframe configuration 6 using extended cyclic prefix is 0.633.
6. 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.
7. This device supports Power Class 2 and Power Class 3 operations for LTE Band 41. The highest available duty cycle for Power Class 2 operations is 43.3 % using UL-DL configuration 1. Per May 2017 TCB Workshop Notes based on the device behavior, all SAR tests were performed using Power Class 3. SAR with Power Class 2 at the highest power and available duty factor was additionally performed for the Power Class 3 configuration with the highest SAR for each exposure condition. The linearity between the Power Class 2 and Power Class 3 SAR results and the respective frame averaged powers was calculated to determine that the results were linear. Per May 2017 TCB Workshop, no additional SAR measurements for Head, Body-Worn, and Hotspot were required since the linearity between power classes was < 10% and all reported SAR values were < 1.4 W/kg for 1g and < 3.5 W/kg for 10g. Please see Section 14 for linearity results.
8. This device supports LTE Carrier Aggregation (CA) for LTE B41 (PC3 only) with two component carriers in the uplink. SAR measurements and conducted powers were evaluated per 2017 Fall TCB Workshop Notes.

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 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 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 and Hotspot 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.

12.3 Head SAR Simultaneous Transmission Analysis

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM/GPRS 850	0.267	0.727	0.994
	GSM/GPRS 1900	0.096	0.727	0.823
	UMTS 850	0.242	0.727	0.969
	UMTS 1750	0.160	0.727	0.887
	UMTS 1900	0.151	0.727	0.878
	LTE Band 71	0.132	0.727	0.859
	LTE Band 12	0.141	0.727	0.868
	LTE Band 13	0.132	0.727	0.859
	LTE Band 26 (Cell)	0.281	0.727	**1.008**
	LTE Band 66 (AWS)	0.179	0.727	0.906
	LTE Band 25 (PCS)	0.205	0.727	0.932
	LTE Band 41	0.080	0.727	0.807

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM/GPRS 850	0.267	1.290	1.557
	GSM/GPRS 1900	0.096	1.290	1.386
	UMTS 850	0.242	1.290	1.532
	UMTS 1750	0.160	1.290	1.450
	UMTS 1900	0.151	1.290	1.441
	LTE Band 71	0.132	1.290	1.422
	LTE Band 12	0.141	1.290	1.431
	LTE Band 13	0.132	1.290	1.422
	LTE Band 26 (Cell)	0.281	1.290	**1.571**
	LTE Band 66 (AWS)	0.179	1.290	1.469
	LTE Band 25 (PCS)	0.205	1.290	1.495
	LTE Band 41	0.080	1.290	1.370

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM/GPRS 850	0.267	0.094	0.361
	GSM/GPRS 1900	0.096	0.094	0.190
	UMTS 850	0.242	0.094	0.336
	UMTS 1750	0.160	0.094	0.254
	UMTS 1900	0.151	0.094	0.245
	LTE Band 71	0.132	0.094	0.226
	LTE Band 12	0.141	0.094	0.235
	LTE Band 13	0.132	0.094	0.226
	LTE Band 26 (Cell)	0.281	0.094	**0.375**
	LTE Band 66 (AWS)	0.179	0.094	0.273
	LTE Band 25 (PCS)	0.205	0.094	0.299
	LTE Band 41	0.080	0.094	0.174

Table 12-4
Simultaneous Transmission Scenario with 5GHz WLAN and Bluetooth (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	GSM/GPRS 850	0.267	1.290	0.094	See Table Below
	GSM/GPRS 1900	0.096	1.290	0.094	1.480
	UMTS 850	0.242	1.290	0.094	See Table Below
	UMTS 1750	0.160	1.290	0.094	1.544
	UMTS 1900	0.151	1.290	0.094	1.535
	LTE Band 71	0.132	1.290	0.094	1.516
	LTE Band 12	0.141	1.290	0.094	1.525
	LTE Band 13	0.132	1.290	0.094	1.516
	LTE Band 26 (Cell)	0.281	1.290	0.094	See Table Below
	LTE Band 66 (AWS)	0.179	1.290	0.094	1.563
	LTE Band 25 (PCS)	0.205	1.290	0.094	**1.589**
	LTE Band 41	0.080	1.290	0.094	1.464

Simult Tx	Configuration	GSM 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.239	0.671	0.014	0.924
	Right Tilt	0.074	0.982	0.041	1.097
	Left Cheek	0.125	1.149	0.094	1.368
	Left Tilt	0.077	1.290	0.082	**1.449**

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.267	0.671	0.014	0.952
	Right Tilt	0.087	0.982	0.041	1.110
	Left Cheek	0.142	1.149	0.094	1.385
	Left Tilt	0.087	1.290	0.082	**1.459**

Simult Tx	Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.242	0.671	0.014	0.927
	Right Tilt	0.073	0.982	0.041	1.096
	Left Cheek	0.177	1.149	0.094	1.420
	Left Tilt	0.093	1.290	0.082	**1.465**

Simult Tx	Configuration	LTE Band 26 (Cell) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.281	0.671	0.014	0.966
	Right Tilt	0.106	0.982	0.041	1.129
	Left Cheek	0.194	1.149	0.094	1.437
	Left Tilt	0.110	1.290	0.082	**1.482**

12.4 Body-Worn Simultaneous Transmission Analysis

Table 12-5
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body-Worn at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM/GPRS 850	0.571	0.226	0.797
	GSM/GPRS 1900	0.371	0.226	0.597
	UMTS 850	0.518	0.226	0.744
	UMTS 1750	0.553	0.226	0.779
	UMTS 1900	0.752	0.226	0.978
	LTE Band 71	0.222	0.226	0.448
	LTE Band 12	0.271	0.226	0.497
	LTE Band 13	0.293	0.226	0.519
	LTE Band 26 (Cell)	0.569	0.226	0.795
	LTE Band 66 (AWS)	0.546	0.226	0.772
	LTE Band 25 (PCS)	0.808	0.226	**1.034**
	LTE Band 41	0.546	0.226	0.772

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM/GPRS 850	0.571	0.554	1.125
	GSM/GPRS 1900	0.371	0.554	0.925
	UMTS 850	0.518	0.554	1.072
	UMTS 1750	0.553	0.554	1.107
	UMTS 1900	0.752	0.554	1.306
	LTE Band 71	0.222	0.554	0.776
	LTE Band 12	0.271	0.554	0.825
	LTE Band 13	0.293	0.554	0.847
	LTE Band 26 (Cell)	0.569	0.554	1.123
	LTE Band 66 (AWS)	0.546	0.554	1.100
	LTE Band 25 (PCS)	0.808	0.554	**1.362**
	LTE Band 41	0.546	0.554	1.100

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM/GPRS 850	0.571	0.021	0.592
	GSM/GPRS 1900	0.371	0.021	0.392
	UMTS 850	0.518	0.021	0.539
	UMTS 1750	0.553	0.021	0.574
	UMTS 1900	0.752	0.021	0.773
	LTE Band 71	0.222	0.021	0.243
	LTE Band 12	0.271	0.021	0.292
	LTE Band 13	0.293	0.021	0.314
	LTE Band 26 (Cell)	0.569	0.021	0.590
	LTE Band 66 (AWS)	0.546	0.021	0.567
	LTE Band 25 (PCS)	0.808	0.021	**0.829**
	LTE Band 41	0.546	0.021	0.567

Table 12-8
Simultaneous Transmission Scenario with 5GHz WLAN and Bluetooth (Body-Worn at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body-Worn	GSM/GPRS 850	0.571	0.554	0.021	1.146
	GSM/GPRS 1900	0.371	0.554	0.021	0.946
	UMTS 850	0.518	0.554	0.021	1.093
	UMTS 1750	0.553	0.554	0.021	1.128
	UMTS 1900	0.752	0.554	0.021	1.327
	LTE Band 71	0.222	0.554	0.021	0.797
	LTE Band 12	0.271	0.554	0.021	0.846
	LTE Band 13	0.293	0.554	0.021	0.868
	LTE Band 26 (Cell)	0.569	0.554	0.021	1.144
	LTE Band 66 (AWS)	0.546	0.554	0.021	1.121
	LTE Band 25 (PCS)	0.808	0.554	0.021	**1.383**
	LTE Band 41	0.546	0.554	0.021	1.121

12.5 Hotspot SAR Simultaneous Transmission Analysis

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

(*) For test positions that were not required to be evaluated for WLAN SAR per FCC KDB publication 248227, the worst case WLAN SAR result for the applicable exposure conditions was used for simultaneous transmission analysis.

Table 12-9
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	0.571	0.305	0.876
	GPRS 1900	0.450	0.305	0.755
	UMTS 850	0.518	0.305	0.823
	UMTS 1750	0.553	0.305	0.858
	UMTS 1900	0.770	0.305	1.075
	LTE Band 71	0.286	0.305	0.591
	LTE Band 12	0.297	0.305	0.602
	LTE Band 13	0.296	0.305	0.601
	LTE Band 26 (Cell)	0.569	0.305	0.874
	LTE Band 66 (AWS)	0.554	0.305	0.859
	LTE Band 25 (PCS)	0.808	0.305	**1.113**
	LTE Band 41	0.789	0.305	1.094

Table 12-10
Simultaneous Transmission Scenario with 5 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.571	1.119	See Table Below
	GPRS 1900	0.450	1.119	**1.569**
	UMTS 850	0.518	1.119	See Table Below
	UMTS 1750	0.553	1.119	See Table Below
	UMTS 1900	0.770	1.119	See Table Below
	LTE Band 71	0.286	1.119	1.405
	LTE Band 12	0.297	1.119	1.416
	LTE Band 13	0.296	1.119	1.415
	LTE Band 26 (Cell)	0.569	1.119	See Table Below
	LTE Band 66 (AWS)	0.554	1.119	See Table Below
	LTE Band 25 (PCS)	0.808	1.119	See Table Below
	LTE Band 41	0.789	1.119	See Table Below

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.571	0.554	1.125
	Front	0.519	0.470	0.989
	Top	-	1.119	1.119
	Bottom	0.362	-	0.362
	Right	0.146	1.119*	**1.265**
	Left	0.298	-	0.298

Simult Tx	Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.518	0.554	1.072
	Front	0.491	0.470	0.961
	Top	-	1.119	1.119
	Bottom	0.372	-	0.372
	Right	0.257	1.119*	**1.376**
	Left	0.111	-	0.111

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.553	0.554	1.107
	Front	0.479	0.470	0.949
	Top	-	1.119	**1.119**
	Bottom	0.533	-	0.533
	Right	-	1.119*	**1.119**
	Left	0.509	-	0.509

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.722	0.554	**1.276**
	Front	0.348	0.470	0.818
	Top	-	1.119	1.119
	Bottom	0.770	-	0.770
	Right	-	1.119*	1.119
	Left	0.281	-	0.281

Simult Tx	Configuration	LTE Band 26 (Cell) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.569	0.554	1.123
	Front	0.544	0.470	1.014
	Top	-	1.119	1.119
	Bottom	0.372	-	0.372
	Right	0.289	1.119*	**1.408**
	Left	0.129	-	0.129

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.546	0.554	1.100
	Front	0.359	0.470	0.829
	Top	-	1.119	**1.119**
	Bottom	0.554	-	0.554
	Right	-	1.119*	**1.119**
	Left	0.432	-	0.432

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.808	0.554	**1.362**
	Front	0.346	0.470	0.816
	Top	-	1.119	1.119
	Bottom	0.775	-	0.775
	Right	-	1.119*	1.119
	Left	0.384	-	0.384

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.165	0.554	0.719
	Front	0.350	0.470	0.820
	Top	-	1.119	1.119
	Bottom	0.789	-	0.789
	Right	0.003	1.119*	**1.122**
	Left	0.023	-	0.023

Table 12-11
Simultaneous Transmission Scenario with Bluetooth (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.571	0.021	0.592
	GPRS 1900	0.450	0.021	0.471
	UMTS 850	0.518	0.021	0.539
	UMTS 1750	0.553	0.021	0.574
	UMTS 1900	0.770	0.021	0.791
	LTE Band 71	0.286	0.021	0.307
	LTE Band 12	0.297	0.021	0.318
	LTE Band 13	0.296	0.021	0.317
	LTE Band 26 (Cell)	0.569	0.021	0.590
	LTE Band 66 (AWS)	0.554	0.021	0.575
	LTE Band 25 (PCS)	0.808	0.021	**0.829**
	LTE Band 41	0.789	0.021	0.810

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	GPRS 850	0.571	1.119	0.021	See Table Below
	GPRS 1900	0.450	1.119	0.021	**1.590**
	UMTS 850	0.518	1.119	0.021	See Table Below
	UMTS 1750	0.553	1.119	0.021	See Table Below
	UMTS 1900	0.770	1.119	0.021	See Table Below
	LTE Band 71	0.286	1.119	0.021	1.426
	LTE Band 12	0.297	1.119	0.021	1.437
	LTE Band 13	0.296	1.119	0.021	1.436
	LTE Band 26 (Cell)	0.569	1.119	0.021	See Table Below
	LTE Band 66 (AWS)	0.554	1.119	0.021	See Table Below
	LTE Band 25 (PCS)	0.808	1.119	0.021	See Table Below
	LTE Band 41	0.789	1.119	0.021	See Table Below

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3			1	2	3	1+2+3
Hotspot SAR	Back	0.571	0.554	0.021	1.146	Hotspot SAR	Back	0.518	0.554	0.021	1.093
	Front	0.519	0.470	0.016	1.005		Front	0.491	0.470	0.016	0.977
	Top	-	1.119	0.016	1.135		Top	-	1.119	0.016	1.135
	Bottom	0.362	-	-	0.362		Bottom	0.372	-	-	0.372
	Right	0.146	1.119*	0.010	**1.275**		Right	0.257	1.119*	0.010	**1.386**
	Left	0.298	-	-	0.298		Left	0.111	-	-	0.111

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3			1	2	3	1+2+3
Hotspot SAR	Back	0.553	0.554	0.021	1.128	Hotspot SAR	Back	0.722	0.554	0.021	**1.297**
	Front	0.479	0.470	0.016	0.965		Front	0.348	0.470	0.016	0.834
	Top	-	1.119	0.016	**1.135**		Top	-	1.119	0.016	1.135
	Bottom	0.533	-	-	0.533		Bottom	0.770	-	-	0.770
	Right	-	1.119*	0.010	1.129		Right	-	1.119*	0.010	1.129
	Left	0.509	-	-	0.509		Left	0.281	-	-	0.281

Simult Tx	Configuration	LTE Band 26 (Cell) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3			1	2	3	1+2+3
Hotspot SAR	Back	0.569	0.554	0.021	1.144	Hotspot SAR	Back	0.546	0.554	0.021	1.121
	Front	0.544	0.470	0.016	1.030		Front	0.359	0.470	0.016	0.845
	Top	-	1.119	0.016	1.135		Top	-	1.119	0.016	**1.135**
	Bottom	0.372	-	-	0.372		Bottom	0.554	-	-	0.554
	Right	0.289	1.119*	0.010	**1.418**		Right	-	1.119*	0.010	1.129
	Left	0.129	-	-	0.129		Left	0.432	-	-	0.432

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3			1	2	3	1+2+3
Hotspot SAR	Back	0.808	0.554	0.021	**1.383**	Hotspot SAR	Back	0.165	0.554	0.021	0.740
	Front	0.346	0.470	0.016	0.832		Front	0.350	0.470	0.016	0.836
	Top	-	1.119	0.016	1.135		Top	-	1.119	0.016	**1.135**
	Bottom	0.775	-	-	0.775		Bottom	0.789	-	-	0.789
	Right	-	1.119*	0.010	1.129		Right	0.003	1.119*	0.010	1.132
	Left	0.384	-	-	0.384		Left	0.023	-	-	0.023

12.6 Phablet Simultaneous Transmission Analysis

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

(*) For test positions that were not required to be evaluated for WLAN SAR per FCC KDB publication 248227, the worst case WLAN SAR result for the applicable exposure conditions was used for simultaneous transmission analysis.

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

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

Table 12-13
Simultaneous Transmission Scenario with 5 GHz WLAN (Phablet)

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2			1	2	1+2
Phablet SAR	Back	2.865	0.663	**3.528**	Phablet SAR	Back	2.930	0.663	**3.593**
	Front	1.377	1.234	2.611		Front	0.747	1.234	1.981
	Top	-	2.481	2.481		Top	-	2.481	2.481
	Bottom	1.138	-	1.138		Bottom	1.229	-	1.229
	Right	-	2.481*	2.481		Right	-	2.481*	2.481
	Left	1.986	-	1.986		Left	1.785	-	1.785

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2			1	2	1+2
Phablet SAR	Back	3.157	0.663	**3.820**	Phablet SAR	Back	3.180	0.663	**3.843**
	Front	1.568	1.234	2.802		Front	1.352	1.234	2.586
	Top	-	2.481	2.481		Top	-	2.481	2.481
	Bottom	1.281	-	1.281		Bottom	1.502	-	1.502
	Right	-	2.481*	2.481		Right	-	2.481*	2.481
	Left	1.894	-	1.894		Left	2.301	-	2.301

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	-	0.663	0.663
	Front	-	1.234	1.234
	Top	-	2.481	**2.481**
	Bottom	1.004	-	1.004
	Right	-	2.481*	**2.481**

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)	
5250	5300.00	60	802.11a, 20 MHz Bandwidth	OFDM	Left	Tilt	6	1.110	1.060	1.05	N/A	N/A	N/A	N/A
5600	5590.00	118	802.11n, 40 MHz Bandwidth	OFDM	Left	Tilt	13.5	1.210	1.170	1.03	N/A	N/A	N/A	N/A
5750	5795.00	159	802.11n, 40 MHz Bandwidth	OFDM	Left	Tilt	13.5	1.060	1.060	1.00	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
Phablet SAR Measurement Variability Results

PHABLET VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	Data Rate (Mbps)	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	1770.00	132572	LTE Band 66 (AWS), 20 MHz Bandwidth	QPSK, 100 RB, 0 RB Offset	N/A	back	0 mm	2.620	2.620	1.00	N/A	N/A	N/A	N/A
1900	1852.40	9262	UMTS 1900	RMC	N/A	back	0 mm	2.780	2.620	1.06	N/A	N/A	N/A	N/A
5250	5280.00	56	802.11a, 20 MHz Bandwidth	OFDM	6	top	0 mm	2.150	2.110	1.02	N/A	N/A	N/A	N/A
5600	5520.00	104	802.11a, 20 MHz Bandwidth	OFDM	6	top	0 mm	2.330	2.310	1.01	N/A	N/A	N/A	N/A
5750	5700.00	140	802.11a, 20 MHz Bandwidth	OFDM	6	top	0 mm	2.100	2.080	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 ADDITIONAL TESTING PER FCC GUIDANCE

14.1 LTE Band 41 Power Class 2 and Power Class 3 Linearity

This device supports Power Class 2 and Power Class 3 operations for LTE Band 41. The highest available duty cycle for Power Class 2 operations is 43.3 % using UL-DL configuration 1. Per May 2017 TCB Workshop Notes based on the device behavior, all SAR tests were performed using Power Class 3. SAR with Power Class 2 at the highest power and available duty factor was additionally performed for the Power Class 3 configuration with the highest SAR for each exposure condition. The linearity between the Power Class 2 and Power Class 3 SAR results and the respective frame averaged powers was calculated to determine that the results were linear. Per May 2017 TCB Workshop, no additional SAR measurements for Head, Body-Worn, and Hotspot were required since the linearity between power classes was < 10% and all reported SAR values were < 1.4 W/kg for 1g and < 3.5 W/kg for 10g.

Table 14-1
LTE Band 41 Head Linearity Data

	LTE Band 41 PC3	LTE Band 41 PC2
Maximum Allowed Output Power (dBm)	24.00	27.00
Measured Output Power (dBm)	23.06	25.69
Measured SAR (W/kg)	0.042	0.050
Measured Power (mW)	202.30	370.68
Duty Cycle	63.3%	43.3%
Frame Averaged Output Power (mW)	128.06	160.50
% deviation from expected linearity		-5.59%

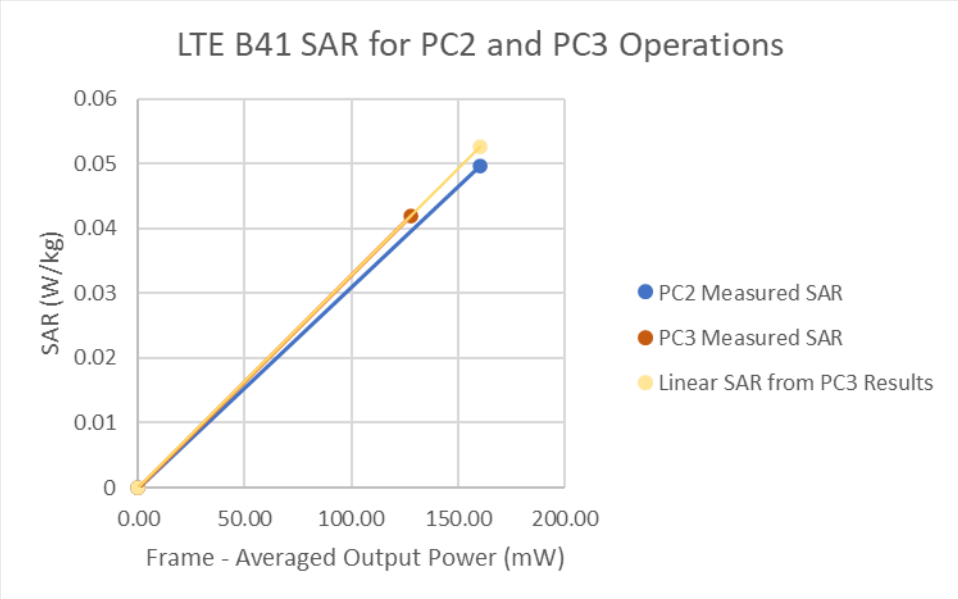

Figure 14-1
LTE Band 41 Head Linearity

Table 14-2
LTE Band 41 Body-Worn Linearity Data

	LTE Band 41 PC3	LTE Band 41 PC2
Maximum Allowed Output Power (dBm)	24.00	27.00
Measured Output Power (dBm)	23.06	25.69
Measured SAR (W/kg)	0.351	0.404
Measured Power (mW)	202.30	370.68
Duty Cycle	63.3%	43.3%
Frame Averaged Output Power (mW)	128.06	160.50
% deviation from expected linearity		-8.17%

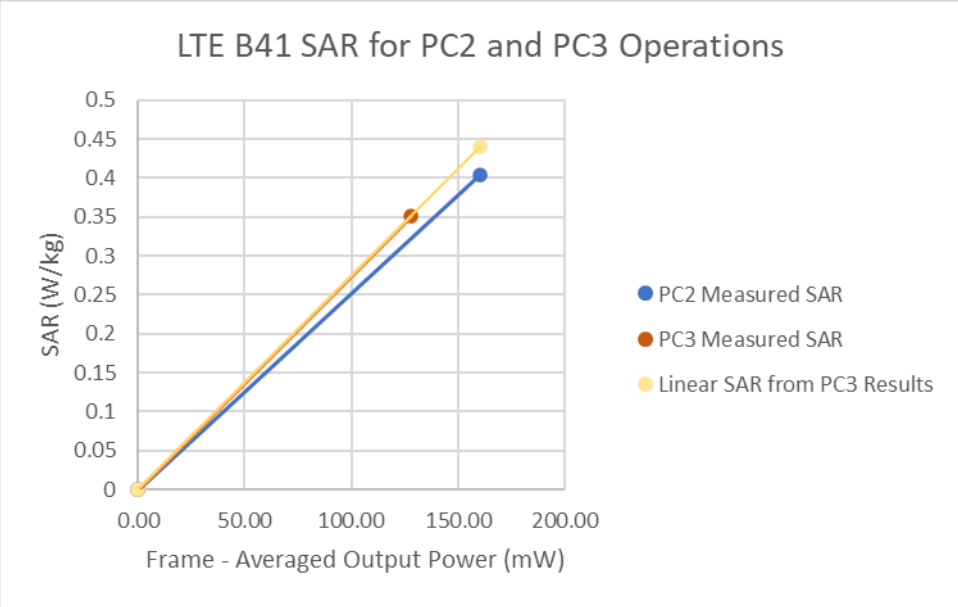

Figure 14-2
LTE Band 41 Body-Worn Linearity

Table 14-3
LTE Band 41 Hotspot Linearity Data

	LTE Band 41 PC3	LTE Band 41 PC2
Maximum Allowed Output Power (dBm)	21.00	21.00
Measured Output Power (dBm)	20.60	20.58
Measured SAR (W/kg)	0.665	0.495
Measured Power (mW)	114.82	114.29
Duty Cycle	63.3%	43.3%
Frame Averaged Output Power (mW)	72.68	49.49
% deviation from expected linearity		9.32%

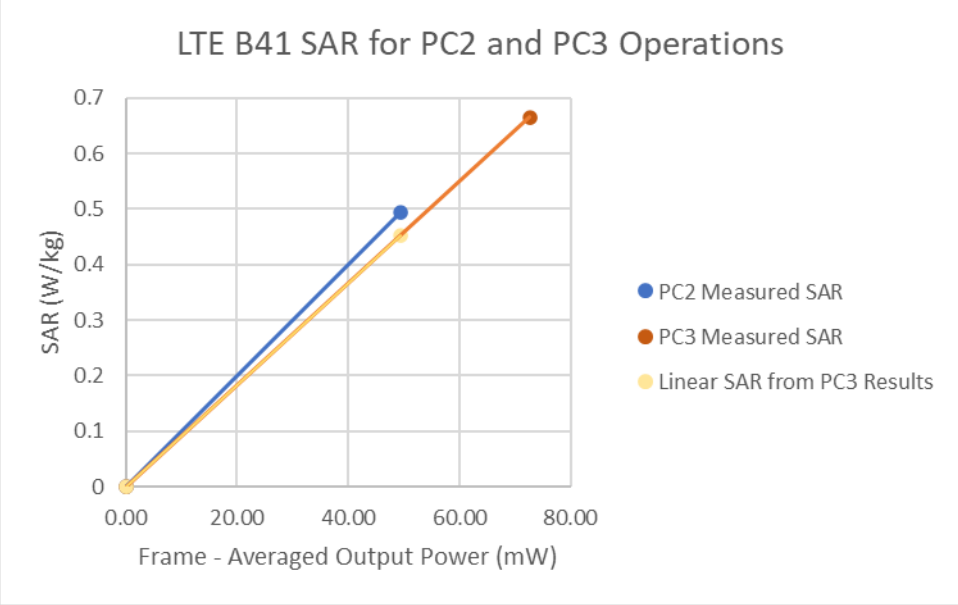

Figure 14-3
LTE Band 41 Hotspot Linearity

15 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	85033E	3.5mm Standard Calibration Kit	6/6/2020	Annual	6/6/2021	MY53402352
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	8753ES	Network Analyzer	3/5/2020	Annual	3/5/2021	MY40001472
Agilent	8753ES	S-Parameter Network Analyzer	9/16/2020	Annual	9/16/2021	MY40000670
Agilent	8753ES	S-Parameter Vector Network Analyzer	12/15/2020	Annual	12/15/2021	MY40003841
Agilent	E4438C	ESG Vector Signal Generator	12/14/2020	Biennial	12/14/2022	MY42082385
Agilent	E5515C	8960 Series 10 Wireless Communications Test Set	2/10/2020	Annual	2/10/2021	GB42230325
Agilent	E5515C	Wireless Communications Test Set	2/26/2020	Annual	2/26/2021	GB44400860
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46170464
Agilent	N5182A	MXG Vector Signal Generator	2/19/2020	Annual	2/19/2021	MY47420651
Agilent	N9030A	PXA Signal Analyzer (44GHz)	8/17/2020	Annual	8/17/2021	MY52350166
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433972
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433974
Anritsu	MA24106A	USB Power Sensor	9/15/2020	Annual	9/15/2021	1244515
Anritsu	MA2411B	Pulse Power Sensor	8/12/2020	Annual	8/12/2021	1207364
Anritsu	ML2495A	Power Meter	11/3/2020	Annual	11/3/2021	1039008
Anritsu	MT8821C	Radio Communication Analyzer	3/10/2020	Annual	3/10/2021	6200901190
Anritsu	MT8821C	Radio Communication Analyzer	6/15/2020	Annual	6/15/2021	6201381794
Control Company	4040	Therm./ Clock/ Humidity Monitor	3/6/2020	Biennial	3/6/2022	200170313
Control Company	4352	Long Stem Thermometer	6/26/2019	Biennial	6/26/2021	192282739
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
KEYSIGHT	E4438C	VECTOR SIGNAL GENERATOR	6/22/2020	Annual	6/22/2021	MY45092078
Keysight Technologies	AT/N6705B	DC Power Supply	N/A	N/A	N/A	MY53001315
Keysight Technologies	N6705B	DC Power Analyzer	4/27/2019	Biennial	4/27/2021	MY53004059
Keysight Technologies	U3401A	Digital Multimeter	5/14/2020	Biennial	5/14/2022	MY57201470
Insize	1108-150	Digital Caliper	1/17/2020	Biennial	1/17/2022	409193536
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	NC-100	Torque Wrench	8/4/2020	Biennial	8/4/2022	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMW500	Radio Communication Tester	11/4/2020	Annual	11/4/2021	100976
Rohde & Schwarz	CMW500	Radio Communication Tester	11/5/2020	Annual	11/5/2021	112347
Rohde & Schwarz	ZNLE6	Vector Network Analyzer	9/29/2020	Annual	9/29/2021	101307
SPEAG	DAK-12	Dielectric Assessment Kit (10MHz - 3GHz)	11/12/2020	Annual	11/12/2021	1121
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/12/2020	Annual	5/12/2021	1070
SPEAG	D750V3	750 MHz SAR Dipole	3/16/2020	Annual	3/16/2021	1003
SPEAG	D750V3	750 MHz SAR Dipole	10/19/2018	Triennial	10/19/2021	1161
SPEAG	D835V2	835 MHz SAR Dipole	3/13/2019	Biennial	3/13/2021	4d047
SPEAG	D835V2	835 MHz SAR Dipole	10/19/2018	Triennial	10/19/2021	4d133
SPEAG	D1765V2	1750 MHz SAR Dipole	5/23/2018	Triennial	5/23/2021	1008
SPEAG	D1750V2	1750 MHz SAR Dipole	10/22/2018	Triennial	10/22/2021	1150
SPEAG	D1750V2	1750 MHz SAR Dipole	5/12/2020	Annual	5/12/2021	1148
SPEAG	D1900V2	1900 MHz SAR Dipole	2/21/2019	Biennial	2/21/2021	5d148
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Triennial	10/23/2021	5d080
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Triennial	10/23/2021	5d149
SPEAG	D2450V2	2450 MHz SAR Dipole	8/14/2020	Annual	8/14/2021	719
SPEAG	D2450V2	2450 MHz SAR Dipole	8/16/2018	Triennial	8/16/2021	981
SPEAG	D2450V2	2450 MHz SAR Dipole	9/9/2020	Annual	9/9/2021	797
SPEAG	D2600V2	2600 MHz SAR Dipole	4/11/2018	Triennial	4/11/2021	1004
SPEAG	D2600V2	2600 MHz SAR Dipole	6/14/2019	Biennial	6/14/2021	1064
SPEAG	D5GHzV2	5 GHz SAR Dipole	8/10/2018	Triennial	8/10/2021	1237
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/16/2018	Triennial	1/16/2021	1057
SPEAG	EX3DV4	SAR Probe	4/21/2020	Annual	4/21/2021	7357
SPEAG	EX3DV4	SAR Probe	1/21/2020	Annual	1/21/2021	3589
SPEAG	EX3DV4	SAR Probe	7/31/2020	Annual	7/31/2021	7308
SPEAG	EX3DV4	SAR Probe	10/20/2020	Annual	10/20/2021	7539
SPEAG	EX3DV4	SAR Probe	12/11/2020	Annual	12/11/2021	7571
SPEAG	EX3DV4	SAR Probe	9/11/2020	Annual	9/11/2021	7552
SPEAG	EX3DV4	SAR Probe	7/20/2020	Annual	7/20/2021	7410
SPEAG	EX3DV4	SAR Probe	6/23/2020	Annual	6/23/2021	7409
SPEAG	EX3DV4	SAR Probe	6/23/2020	Annual	6/23/2021	7406
SPEAG	EX3DV4	SAR Probe	10/20/2020	Annual	10/20/2021	7551
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/14/2020	Annual	5/14/2021	1583
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/11/2020	Annual	8/11/2021	1450
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/13/2020	Annual	1/13/2021	1558
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/15/2020	Annual	4/15/2021	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/15/2020	Annual	7/15/2021	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2020	Annual	6/18/2021	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/20/2020	Annual	5/20/2021	728
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/10/2020	Annual	9/10/2021	1449
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/16/2020	Annual	10/16/2021	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	12/7/2020	Annual	12/7/2021	1533

Note: Equipment was solely used during its calibration period

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.

16 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	

17 CONCLUSION

17.1 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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