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

SAR EVALUATION REPORT

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

Date of Testing:
02/26/20 - 03/17/20
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M2002250026-01-R1.ZNF

FCC ID: **ZNFK300TM**

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

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model: LM-K300TM
Additional Model(s): LM-K300TMS, LMK300TM, LMK300TMS, K300TM, K300TMS, LM-K300MM, LMK300MM, K300MM

Equipment Class	Band & Mode	Tx Frequency	SAR		
			1g Head (W/kg)	1g Body-Worn (W/kg)	1g Hotspot (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.39	0.56	0.56
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	0.18	0.27	0.38
PCE	UMTS 850	826.40 - 846.60 MHz	0.34	0.44	0.44
PCE	UMTS 1750	1712.4 - 1752.6 MHz	0.26	0.75	0.75
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.42	0.65	0.79
PCE	CDMA/EVDO BC10 (§90S)	817.90 - 823.10 MHz	0.36	0.40	0.36
PCE	CDMA/EVDO BC0 (§22H)	824.70 - 848.31 MHz	0.38	0.52	0.36
PCE	PCS CDMA/EVDO	1851.25 - 1908.75 MHz	0.48	0.54	0.62
PCE	LTE Band 71	665.5 - 695.5 MHz	0.22	0.41	0.41
PCE	LTE Band 12	699.7 - 715.3 MHz	0.30	0.44	0.44
PCE	LTE Band 13	779.5 - 784.5 MHz	0.35	0.60	0.60
PCE	LTE Band 26 (Cell)	814.7 - 848.3 MHz	0.36	0.41	0.41
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	N/A	N/A	N/A
PCE	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.27	0.75	0.75
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A
PCE	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.42	0.58	0.92
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	N/A	N/A	N/A
PCE	LTE Band 41	2498.5 - 2687.5 MHz	0.13	1.14	1.14
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.42	0.57	0.57
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	0.44
NII	U-NII-2A	5260 - 5320 MHz	0.38	0.49	N/A
NII	U-NII-2C	5500 - 5720 MHz	0.67	0.56	N/A
NII	U-NII-3	5745 - 5825 MHz	0.64	0.60	0.60
DSS/DTS	Bluetooth	2402 - 2480 MHz	< 0.1	< 0.1	< 0.1
Simultaneous SAR per KDB 690783 D01v01r03:			1.19	1.38	1.55

Note: This revised Test Report (S/N: 1M2002250026-01-R1.ZNF) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

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

Randy Ortanez
President

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

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
CDMA/EVDO BC10 (§90S)	Voice/Data	817.90 - 823.10 MHz
CDMA/EVDO BC0 (§22H)	Voice/Data	824.70 - 848.31 MHz
PCS CDMA/EVDO	Voice/Data	1851.25 - 1908.75 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

1.2 Power Reduction for SAR

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

1.3 Nominal and Maximum Output Power Specifications

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

1.3.1 Maximum Output Power

CDMA BC10 (815 MHz)			
	Modulated Average Output Power (in dBm)		
	1x-RTT	EVDO Rev 0	EVDO Rev A
Max allowed power	25.2	25.2	25.2
Nominal	24.7	24.7	24.7
CDMA BC0 (835 MHz)			
	Modulated Average Output Power (in dBm)		
	1x-RTT	EVDO Rev 0	EVDO Rev A
Max allowed power	25.2	25.2	25.2
Nominal	24.7	24.7	24.7
CDMA BC1 (1900 MHz)			
	Modulated Average Output Power (in dBm)		
	1x-RTT	EVDO Rev 0	EVDO Rev A
Max allowed power	24.7	24.7	24.7
Nominal	24.2	24.2	24.2

GSM/GPRS/EDGE 850									
	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 allowed power	32.7	32.7	31.7	29.7	28.7	27.7	25.7	24.7	23.7
Nominal	32.2	32.2	31.2	29.2	28.2	27.2	25.2	24.2	23.2
GSM/GPRS/EDGE 1900									
	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 allowed power	30.7	30.7	28.7	26.7	25.7	26.7	24.7	23.7	22.7
Nominal	30.2	30.2	28.2	26.2	25.2	26.2	24.2	23.2	22.2

UMTS Band 5 (850 MHz)			
	Modulated Average Output Power (in dBm)		
	3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6
Max allowed power	25.2	25.2	25.2
Nominal	24.7	24.7	24.7
UMTS Band 4 (1750 MHz)			
	Modulated Average Output Power (in dBm)		
	3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6
Max allowed power	24.7	24.7	24.7
Nominal	24.2	24.2	24.2
UMTS Band 2 (1900 MHz)			
	Modulated Average Output Power (in dBm)		
	3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6
Max allowed power	24.7	24.7	24.7
Nominal	24.2	24.2	24.2

Mode / Band		Modulated Average Output Power (in dBm)
LTE FDD Band 71	Max allowed power	25.2
	Nominal	24.7
LTE FDD Band 12	Max allowed power	25.2
	Nominal	24.7
LTE FDD Band 13	Max allowed power	25.2
	Nominal	24.7
LTE FDD Band 5	Max allowed power	25.2
	Nominal	24.7
LTE FDD Band 26	Max allowed power	25.2
	Nominal	24.7
LTE FDD Band 4	Max allowed power	24.7
	Nominal	24.2
LTE FDD Band 66	Max allowed power	24.7
	Nominal	24.2
LTE FDD Band 2	Max allowed power	24.7
	Nominal	24.2
LTE FDD Band 25	Max allowed power	24.7
	Nominal	24.2
LTE TDD Band 41 (PC3)	Max allowed power	24.7
	Nominal	24.2
LTE TDD Band 41 (PC2)	Max allowed power	27.7
	Nominal	27.2

Mode	Band	IEEE 802.11 (in dBm)					
		b		g		n	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
2.4 GHz WIFI	2.45 GHz	23.0	22.0	21.0 ch. 1: 18.0 ch. 11: 18.5	20.0 17.0 17.5	20.0 ch. 1: 17.5 ch. 11: 18.0	19.0 16.5 17.0

Bluetooth (in dBm)	
Max	**Nom**
9.5	8.5

Bluetooth LE (in dBm)	
Max	**Nom**
3.5	2.5

Mode	Band	IEEE 802.11 (in dBm)					
		a		n		ac	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
5 GHz WIFI (20MHz BW)	5200 MHz	19.0	18.0	18.5	17.5	18.5	17.5
		ch. 36: 17.0	16.0	ch. 36: 17.0	16.0	ch. 36: 17.0	16.0
	5300 MHz	19.0	18.0	18.5	17.5	18.5	17.5
		ch. 64: 17.0	16.0	ch. 64: 17.0	16.0	ch. 64: 17.0	16.0
	5500 MHz	19.5	18.5	19.0	18.0	19.0	18.0
		ch. 100: 17.0	16.0	ch. 100: 17.0	16.0	ch. 100: 17.0	16.0
		ch. 104: 19.0	18.0	ch. 104: 18.5	17.5	ch. 104: 18.5	17.5
		ch. 108: 19.0	18.0	ch. 108: 18.5	17.5	ch. 108: 18.5	17.5
		ch. 112: 19.0	18.0	ch. 112: 18.5	17.5	ch. 112: 18.5	17.5
		ch. 116: 19.0	18.0	ch. 116: 18.5	17.5	ch. 116: 18.5	17.5
		ch. 120: 19.0	18.0	ch. 120: 18.5	17.5	ch. 120: 18.5	17.5
		ch. 124: 19.0	18.0	ch. 124: 18.5	17.5	ch. 124: 18.5	17.5
		ch. 128: 19.0	18.0	ch. 128: 18.5	17.5	ch. 128: 18.5	17.5
	5800 MHz	19.5	18.5	19.0	18.0	19.0	18.0
5 GHz WIFI (40MHz BW)	5200 MHz			16.5	15.5	16.5	15.5
				ch. 38: 15.5	14.5	ch. 38: 15.5	14.5
	5300 MHz			16.5	15.5	16.5	15.5
				ch. 62: 15.5	14.5	ch. 62: 15.5	14.5
	5500 MHz			17.0	16.0	17.0	16.0
				ch. 102: 14.0	13.0	ch. 102: 14.0	13.0
				ch. 110: 16.5	15.5	ch. 110: 16.5	15.5
				ch. 118: 16.5	15.5	ch. 118: 16.5	15.5
	5800 MHz			17.0	16.0	17.0	16.0
5 GHz WIFI (80MHz BW)	5200 MHz					15.5	14.5
	5300 MHz					15.5	14.5
	5500 MHz					16.0	15.0
						ch. 106: 13.0	12.0
						ch. 122: 15.5	14.5
	5800 MHz					16.0	15.0

1.3.2 Reduced Output Power

Mode	Band	IEEE 802.11 (in dBm)					
		b		g		n	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
2.4 GHz WIFI	2.45 GHz	21.0	20.0	21.0	20.0	20.0	19.0
				ch. 1: 18.0	17.0	ch. 1: 17.5	16.5
				ch. 11: 18.5	17.5	ch. 11: 18.0	17.0

Mode	Band	IEEE 802.11 (in dBm)					
		a		n		ac	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
5 GHz WIFI (20MHz BW)	5200 MHz	17.0	16.0	17.0	16.0	17.0	16.0
	5300 MHz	17.0	16.0	17.0	16.0	17.0	16.0
	5500 MHz	17.5	16.5	17.5	16.5	17.5	16.5
		ch. 100: 17.0	16.0	ch. 100: 17.0	16.0	ch. 100: 17.0	16.0
		ch. 104: 17.0	16.0	ch. 104: 17.0	16.0	ch. 104: 17.0	16.0
		ch. 108: 17.0	16.0	ch. 108: 17.0	16.0	ch. 108: 17.0	16.0
		ch. 112: 17.0	16.0	ch. 112: 17.0	16.0	ch. 112: 17.0	16.0
		ch. 116: 17.0	16.0	ch. 116: 17.0	16.0	ch. 116: 17.0	16.0
		ch. 120: 17.0	16.0	ch. 120: 17.0	16.0	ch. 120: 17.0	16.0
		ch. 124: 17.0	16.0	ch. 124: 17.0	16.0	ch. 124: 17.0	16.0
		ch. 128: 17.0	16.0	ch. 128: 17.0	16.0	ch. 128: 17.0	16.0
	5800 MHz	17.5	16.5	17.5	16.5	17.5	16.5
5 GHz WIFI (40MHz BW)	5200 MHz			16.5	15.5	16.5	15.5
				ch. 38: 15.5	14.5	ch. 38: 15.5	14.5
	5300 MHz			16.5	15.5	16.5	15.5
				ch. 62: 15.5	14.5	ch. 62: 15.5	14.5
	5500 MHz			17.0	16.0	17.0	16.0
				ch. 102: 14.0	13.0	ch. 102: 14.0	13.0
				ch. 110: 16.5	15.5	ch. 110: 16.5	15.5
				ch. 118: 16.5	15.5	ch. 118: 16.5	15.5
	5800 MHz			17.0	16.0	17.0	16.0
5 GHz WIFI (80MHz BW)	5200 MHz					15.5	14.5
	5300 MHz					15.5	14.5
	5500 MHz					16.0	15.0
						ch. 106: 13.0	12.0
						ch. 122: 15.5	14.5
	5800 MHz					16.0	15.0

1.4 DUT Antenna Locations

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

Table 1-1
Device Edges/Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850	Yes	Yes	No	Yes	No	Yes
GPRS 1900	Yes	Yes	No	Yes	Yes	No
UMTS 850	Yes	Yes	No	Yes	No	Yes
UMTS 1750	Yes	Yes	No	Yes	Yes	No
UMTS 1900	Yes	Yes	No	Yes	Yes	No
EVDO BC10 (§90S)	Yes	Yes	No	Yes	No	Yes
EVDO BC0 (§22H)	Yes	Yes	No	Yes	No	Yes
PCS EVDO	Yes	Yes	No	Yes	Yes	No
LTE Band 71	Yes	Yes	No	Yes	No	Yes
LTE Band 12	Yes	Yes	No	Yes	No	Yes
LTE Band 13	Yes	Yes	No	Yes	No	Yes
LTE Band 26 (Cell)	Yes	Yes	No	Yes	No	Yes
LTE Band 66 (AWS)	Yes	Yes	No	Yes	Yes	No
LTE Band 25 (PCS)	Yes	Yes	No	Yes	Yes	No
LTE Band 41	Yes	Yes	No	Yes	Yes	No
2.4 GHz WLAN	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN	Yes	Yes	Yes	No	No	Yes
Bluetooth	Yes	Yes	Yes	No	No	Yes

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

1.5 Simultaneous Transmission Capabilities

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

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

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Notes
1	1x CDMA voice + 2.4 GHz WI-FI	Yes	Yes	N/A	
2	1x CDMA voice + 5 GHz WI-FI	Yes	Yes	N/A	
3	1x CDMA voice + 2.4 GHz Bluetooth	Yes^	Yes	N/A	^ Bluetooth Tethering is considered
4	1x CDMA voice + 2.4 GHz Bluetooth + 5 GHz WI-FI	Yes^	Yes	N/A	^ Bluetooth Tethering is considered
5	GSM voice + 2.4 GHz WI-FI	Yes	Yes	N/A	
6	GSM voice + 5 GHz WI-FI	Yes	Yes	N/A	
7	GSM voice + 2.4 GHz Bluetooth	Yes^	Yes	N/A	^ Bluetooth Tethering is considered
8	GSM voice + 2.4 GHz Bluetooth + 5 GHz WI-FI	Yes^	Yes	N/A	^ Bluetooth Tethering is considered
9	UMTS + 2.4 GHz WI-FI	Yes	Yes	Yes	
10	UMTS + 5 GHz WI-FI	Yes	Yes	Yes	
11	UMTS + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	^ Bluetooth Tethering is considered
12	UMTS + 2.4 GHz Bluetooth + 5 GHz WI-FI	Yes^	Yes	Yes^	^ Bluetooth Tethering is considered
13	LTE + 2.4 GHz WI-FI	Yes	Yes	Yes	
14	LTE + 5 GHz WI-FI	Yes	Yes	Yes	
15	LTE + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	^ Bluetooth Tethering is considered
16	LTE + 2.4 GHz Bluetooth + 5 GHz WI-FI	Yes^	Yes	Yes^	^ Bluetooth Tethering is considered
17	CDMA/EVDO data + 2.4 GHz WI-FI	Yes*	Yes*	Yes	* Pre-installed VOIP applications are considered
18	CDMA/EVDO data + 5 GHz WI-FI	Yes*	Yes*	Yes	* Pre-installed VOIP applications are considered
19	CDMA/EVDO data + 2.4 GHz Bluetooth	Yes*^	Yes*	Yes^	* Pre-installed VOIP applications are considered ^ Bluetooth Tethering is considered
20	CDMA/EVDO data + 2.4 GHz Bluetooth + 5 GHz WI-FI	Yes*^	Yes*	Yes^	* Pre-installed VOIP applications are considered ^ Bluetooth Tethering is considered
21	GPRS/EDGE + 2.4 GHz WI-FI	Yes*	Yes*	Yes	* Pre-installed VOIP applications are considered
22	GPRS/EDGE + 5 GHz WI-FI	Yes*	Yes*	Yes	* Pre-installed VOIP applications are considered
23	GPRS/EDGE + 2.4 GHz Bluetooth	Yes*^	Yes*	Yes^	* Pre-installed VOIP applications are considered ^ Bluetooth Tethering is considered
24	GPRS/EDGE + 2.4 GHz Bluetooth + 5 GHz WI-FI	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 only supported for the U-NII-1 and U-NII-3 by S/W, therefore U-NII-2A and U-NII-2C were not evaluated for wireless router conditions.
6. This device supports VOLTE.
7. This device supports VOWIFI.
8. This device supports Bluetooth Tethering.

1.6 Miscellaneous SAR Test Considerations

(A) WIFI/BT

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

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.

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

(B) Licensed Transmitter(s)

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

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

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

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

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 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 Band 41 with two component carriers in the uplink. SAR Measurements and conducted powers were evaluated per 2017 Fall TCB Workshop Notes.

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.

1.7 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 941225 D01v03r01, D05v02r04, D05Av01r02, D06v02r01 (2G/3G/4G and Hotspot)
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v06 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)
- 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)

1.8 Device Serial Numbers

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

2 LTE INFORMATION

LTE Information					
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 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 7, 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 11. It supports carrier aggregation features as shown in Section 9 and Appendix F. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 11 Features are not supported: WIFI Offloading, Relay, HetNet, Enhanced MIMO, eICIC, 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:

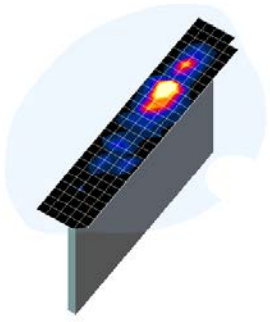


Figure 4-1
Sample SAR Area Scan

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].

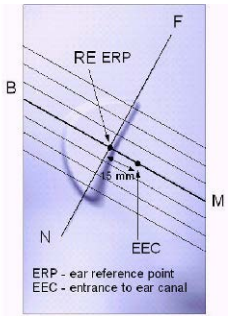


Figure 5-1
Close-Up Side view of ERP

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.

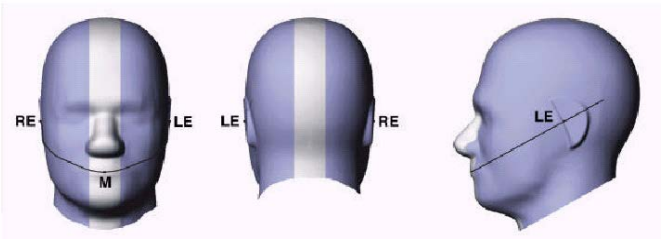


Figure 5-2
Front, back and side view of SAM Twin Phantom

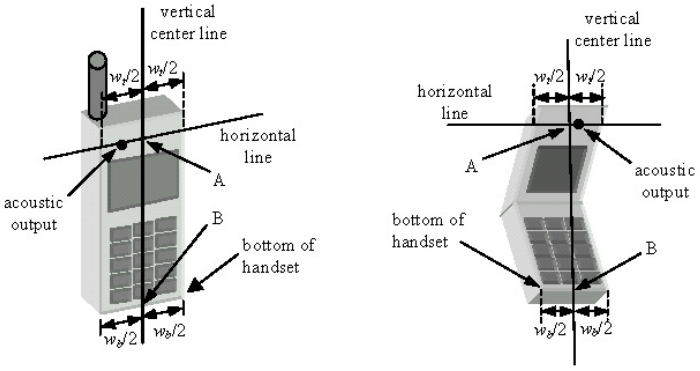


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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).

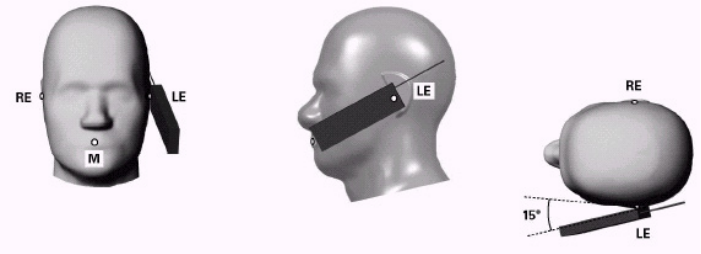


Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

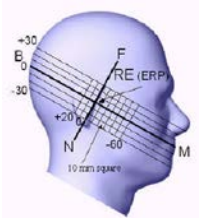


Figure 6-3
Side view w/ relevant markings

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.

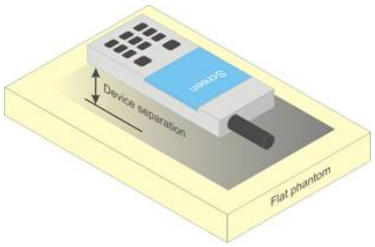


Figure 6-4
Sample Body-Worn Diagram

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.

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 CDMA2000

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

8.4.1 Output Power Verification

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

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

Table 8-1
Parameters for Max. Power for RC1

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

Table 8-2
Parameters for Max. Power for RC3

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

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

8.4.2 Head SAR Measurements

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

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

8.4.3 Body-worn SAR Measurements

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

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

8.4.4 Body-worn SAR Measurements for EVDO Devices

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

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

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

8.4.5 Body SAR Measurements for EVDO Hotspot

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

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

8.5 SAR Measurement Conditions for UMTS

8.5.1 Output Power Verification

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

8.5.2 Head SAR Measurements

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

8.5.3 Body SAR Measurements

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

8.5.4 SAR Measurements with Rel 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, for the highest reported SAR configuration in

12.2 kbps RMC without HSDPA. Handsets with both HSDPA and HSUPA are tested according to Release 6 HSPA test procedures.

8.5.5 SAR Measurements with Rel 6 HSUPA

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

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

8.6 SAR Measurement Conditions for LTE

LTE modes are tested according to FCC KDB 941225 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).

8.6.1 Spectrum Plots for RB Configurations

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

8.6.2 MPR

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

8.6.3 A-MPR

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

8.6.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 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.

8.6.5 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.

8.6.6 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.

8.7 SAR Testing with 802.11 Transmitters

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

8.7.1 General Device Setup

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

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

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

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

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

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

8.7.4 Initial Test Position Procedure

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

8.7.5 2.4 GHz SAR Test Requirements

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

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

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

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

8.7.6 OFDM Transmission Mode and SAR Test Channel Selection

When the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is

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

8.7.7 Initial Test Configuration Procedure

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

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

8.7.8 Subsequent Test Configuration Procedures

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

9 RF CONDUCTED POWERS

9.1 CDMA Conducted Powers

Table 9-1
Maximum Conducted Power

Band	Channel	Rule Part	Frequency	SO55 [dBm]	SO55 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
	F-RC		MHz	RC1	RC3	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	564	90S	820.1	24.78	24.80	23.80	25.10	25.06	25.07
Cellular	1013	22H	824.7	24.76	24.82	23.80	25.09	25.02	25.03
	384	22H	836.52	24.80	24.87	23.85	25.15	25.10	25.11
	777	22H	848.31	24.86	24.91	23.93	25.19	25.12	25.02
PCS	25	24E	1851.25	24.23	24.27	23.25	24.52	24.53	24.56
	600	24E	1880	24.23	24.25	23.26	24.51	24.57	24.51
	1175	24E	1908.75	24.24	24.27	23.29	24.57	24.62	24.65

Note: RC1 is only applicable for IS-95 compatibility. For FCC Rule Part 90S, Per FCC KDB Publication 447498 D01v06 4.1.g), only one channel is required since the device operates within the transmission range of 817.90 – 823.10 MHz**.**

Figure 9-1
Power Measurement Setup

9.2 GSM Conducted Powers

Table 9-2
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	32.56	32.44	31.36	29.66	**28.59**	27.70	25.13	24.25	22.85
	190	32.57	32.56	31.47	29.70	**28.70**	27.65	25.42	24.23	23.12
	251	32.56	32.60	31.50	29.68	**28.63**	27.63	25.50	24.36	23.29
GSM 1900	512	30.69	30.70	28.67	26.68	**25.67**	26.14	24.50	23.25	22.70
	661	30.60	30.60	28.70	26.59	**25.70**	26.17	24.51	23.25	22.66
	810	30.70	30.68	28.64	26.70	**25.69**	26.29	24.61	23.46	22.69

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	23.36	23.24	25.17	25.23	**25.41**	18.50	18.94	19.82	19.67
	190	23.37	23.36	25.28	25.27	**25.52**	18.45	19.23	19.80	19.94
	251	23.36	23.40	25.31	25.25	**25.45**	18.43	19.31	19.93	20.11
GSM 1900	512	21.49	21.50	22.48	22.25	**22.49**	16.94	18.31	18.82	19.52
	661	21.40	21.40	22.51	22.16	**22.52**	16.97	18.32	18.82	19.48
	810	21.50	21.48	22.45	22.27	**22.51**	17.09	18.42	19.03	19.51

GSM 850	**Frame Avg.Targets:**	23.00	23.00	25.01	24.77	**25.02**	18.00	19.01	19.77	20.02
GSM 1900		21.00	21.00	22.01	21.77	**22.02**	17.00	18.01	18.77	19.02

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 9-2
Power Measurement Setup

9.3 UMTS Conducted Powers

Table 9-3
Maximum Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			AWS Band [dBm]			PCS Band [dBm]			MPR [dB]
			4132	4183	4233	1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	24.95	24.97	25.06	24.40	24.39	24.36	24.55	24.45	24.53	-
99		12.2 kbps AMR	24.92	24.98	25.05	24.36	24.39	24.37	24.50	24.43	24.52	-
6	HSDPA	Subtest 1	24.11	24.15	24.11	23.61	23.44	23.44	23.59	23.42	23.48	1
6		Subtest 2	24.06	24.10	24.13	23.55	23.39	23.40	23.54	23.35	23.44	1
6		Subtest 3	23.57	23.63	23.60	23.07	22.90	22.91	23.05	22.92	22.92	1.5
6		Subtest 4	23.56	23.49	23.64	23.04	22.91	22.90	23.04	22.77	22.93	1.5
6	HSUPA	Subtest 1	22.12	22.13	22.15	21.65	21.49	21.49	21.70	21.54	21.53	3
6		Subtest 2	22.14	22.12	22.18	21.53	21.39	21.43	21.56	21.40	21.45	3
6		Subtest 3	23.12	23.11	23.15	22.56	22.43	22.46	22.60	22.46	22.47	2
6		Subtest 4	21.65	21.65	21.69	21.06	20.91	20.93	21.08	21.11	21.01	3.5
6		Subtest 5	23.07	23.09	23.10	22.53	22.43	22.39	22.59	22.41	22.40	2

This device does not support DC-HSDPA.

Figure 9-3
Power Measurement Setup

9.4 LTE Conducted Powers

9.4.1 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	24.90	0	0
	1	50	**25.00**		0
	1	99	24.68		0
	50	0	23.92	0-1	1
	50	25	**23.96**		1
	50	50	23.92		1
	100	0	23.91		1
16QAM	1	0	24.10	0-1	1
	1	50	24.12		1
	1	99	23.95		1
	50	0	22.97	0-2	2
	50	25	22.99		2
	50	50	22.91		2
	100	0	23.01		2
64QAM	1	0	23.09	0-2	2
	1	50	23.12		2
	1	99	22.97		2
	50	0	21.94	0-3	3
	50	25	21.99		3
	50	50	21.87		3
	100	0	21.96		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.

Table 9-5
LTE Band 71 Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 71 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 133297 (680.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.60	0	0
	1	36	24.71		0
	1	74	24.55		0
	36	0	23.80	0-1	1
	36	18	23.81		1
	36	37	23.79		1
	75	0	23.80		1
16QAM	1	0	24.07	0-1	1
	1	36	24.13		1
	1	74	23.93		1
	36	0	22.86	0-2	2
	36	18	22.89		2
	36	37	22.81		2
	75	0	22.85		2
64QAM	1	0	22.91	0-2	2
	1	36	22.97		2
	1	74	22.78		2
	36	0	21.90	0-3	3
	36	18	21.94		3
	36	37	21.92		3
	75	0	21.83		3

Note: LTE Band 71 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.

Table 9-6
LTE Band 71 Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 71 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 133172 (668.0 MHz)	Mid Channel 133297 (680.5 MHz)	High Channel 133422 (693.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.80	24.71	24.65	0	0
	1	25	24.94	24.83	24.86		0
	1	49	24.75	24.59	24.69		0
	25	0	23.87	23.86	23.83	0-1	1
	25	12	23.91	23.83	23.81		1
	25	25	23.95	23.81	23.75		1
	50	0	23.94	23.85	23.82		1
16QAM	1	0	24.15	23.93	23.68	0-1	1
	1	25	24.19	24.05	23.80		1
	1	49	24.11	23.86	23.69		1
	25	0	23.04	22.94	22.95	0-2	2
	25	12	23.09	22.92	22.92		2
	25	25	23.13	22.88	22.84		2
	50	0	23.07	22.91	22.83		2
64QAM	1	0	22.78	22.89	22.96	0-2	2
	1	25	22.91	22.98	22.93		2
	1	49	22.76	22.79	22.99		2
	25	0	22.05	21.99	21.96	0-3	3
	25	12	22.10	22.01	21.91		3
	25	25	22.13	21.96	21.85		3
	50	0	22.08	21.89	21.90		3

Table 9-7
LTE Band 71 Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 71 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 133147 (665.5 MHz)	Mid Channel 133297 (680.5 MHz)	High Channel 133447 (695.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.76	24.64	24.76	0	0
	1	12	24.99	24.88	24.99		0
	1	24	24.81	24.58	24.79		0
	12	0	23.95	23.79	23.79	0-1	1
	12	6	23.91	23.81	23.81		1
	12	13	23.89	23.76	23.77		1
	25	0	23.88	23.77	23.82		1
16QAM	1	0	24.20	23.67	23.68	0-1	1
	1	12	24.19	23.89	23.93		1
	1	24	24.18	23.78	23.73		1
	12	0	22.96	22.93	22.87	0-2	2
	12	6	23.05	22.97	22.85		2
	12	13	23.01	22.88	22.81		2
	25	0	22.98	22.87	22.81		2
64QAM	1	0	23.05	23.14	22.83	0-2	2
	1	12	23.00	23.20	23.07		2
	1	24	23.10	23.11	22.91		2
	12	0	21.83	21.92	21.86	0-3	3
	12	6	21.96	21.93	21.89		3
	12	13	21.92	21.87	21.85		3
	25	0	21.97	21.89	21.84		3

9.4.2 LTE Band 12

Table 9-8
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	24.91	0	0
	1	25	**25.01**		0
	1	49	24.84		0
	25	0	24.01	0-1	1
	25	12	**24.02**		1
	25	25	23.97		1
	50	0	23.98		1
16QAM	1	0	24.18	0-1	1
	1	25	24.20		1
	1	49	23.96		1
	25	0	23.02	0-2	2
	25	12	23.02		2
	25	25	22.99		2
	50	0	23.00		2
64QAM	1	0	23.11	0-2	2
	1	25	23.17		2
	1	49	22.97		2
	25	0	22.05	0-3	3
	25	12	22.06		3
	25	25	22.04		3
	50	0	22.14		3

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

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

LTE Band 12 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23035 (701.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23155 (713.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.74	24.72	24.65	0	0
	1	12	24.98	24.95	24.90		0
	1	24	24.95	24.70	24.62		0
	12	0	23.79	23.86	23.80	0-1	1
	12	6	23.85	23.89	23.84		1
	12	13	23.82	23.83	23.71		1
	25	0	23.80	23.85	23.71		1
16QAM	1	0	24.15	23.98	23.58	0-1	1
	1	12	24.12	24.02	23.87		1
	1	24	24.14	23.74	23.69		1
	12	0	22.89	22.87	22.83	0-2	2
	12	6	22.97	22.91	22.91		2
	12	13	22.92	22.88	22.79		2
	25	0	22.93	22.87	22.78		2
64QAM	1	0	22.95	22.89	23.04	0-2	2
	1	12	23.12	23.06	23.18		2
	1	24	22.93	22.88	23.08		2
	12	0	21.82	21.87	21.89	0-3	3
	12	6	21.91	21.93	21.92		3
	12	13	21.88	21.89	21.84		3
	25	0	21.90	21.89	21.84		3

Table 9-10
LTE Band 12 Maximum Conducted Powers - 3 MHz Bandwidth

LTE Band 12 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23025 (700.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23165 (714.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.70	24.69	24.72	0	0
	1	7	24.82	24.78	24.85		0
	1	14	24.70	24.67	24.67		0
	8	0	23.78	23.85	23.74	0-1	1
	8	4	23.82	23.86	23.79		1
	8	7	23.77	23.81	23.72		1
	15	0	23.78	23.82	23.76		1
16QAM	1	0	23.75	23.64	24.10	0-1	1
	1	7	23.83	23.67	24.02		1
	1	14	23.68	23.51	24.07		1
	8	0	22.88	22.80	22.90	0-2	2
	8	4	22.91	22.84	22.81		2
	8	7	22.80	22.79	22.86		2
	15	0	22.88	22.81	22.78		2
64QAM	1	0	23.05	22.90	22.56	0-2	2
	1	7	23.18	22.99	22.72		2
	1	14	23.04	22.88	22.68		2
	8	0	21.92	21.88	21.89	0-3	3
	8	4	21.94	21.91	21.93		3
	8	7	21.88	21.88	21.90		3
	15	0	21.91	21.90	21.85		3

Table 9-11
LTE Band 12 Maximum Conducted Powers -1.4 MHz Bandwidth

LTE Band 12 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23017 (699.7 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23173 (715.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.67	24.61	24.75	0	0
	1	2	24.73	24.66	24.80		0
	1	5	24.68	24.65	24.78		0
	3	0	24.85	24.83	24.80		0
	3	2	24.88	24.86	24.83		0
	3	3	24.87	24.55	24.82		0
	6	0	23.79	23.87	23.76	0-1	1
16QAM	1	0	24.15	23.53	23.51	0-1	1
	1	2	24.16	23.49	23.56		1
	1	5	24.13	23.54	23.52		1
	3	0	24.19	23.85	23.86		1
	3	2	24.10	23.92	23.91		1
	3	3	24.06	23.94	23.89		1
	6	0	22.72	23.01	22.97	0-2	2
64QAM	1	0	22.71	22.79	22.95	0-2	2
	1	2	22.79	22.85	23.08		2
	1	5	22.62	22.86	22.93		2
	3	0	22.92	22.83	23.04		2
	3	2	22.95	22.84	23.03		2
	3	3	22.94	22.84	23.05		2
	6	0	22.19	22.01	21.81	0-3	3

9.4.3 LTE Band 13

Table 9-12
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	24.71	0	0
	1	25	**25.02**		0
	1	49	24.78		0
	25	0	23.91	0-1	1
	25	12	**23.99**		1
	25	25	23.97		1
	50	0	23.98		1
16QAM	1	0	24.02	0-1	1
	1	25	24.20		1
	1	49	23.94		1
	25	0	22.94	0-2	2
	25	12	23.02		2
	25	25	22.98		2
	50	0	22.95		2
64QAM	1	0	23.00	0-2	2
	1	25	23.15		2
	1	49	22.88		2
	25	0	21.94	0-3	3
	25	12	22.01		3
	25	25	21.98		3
	50	0	21.99		3

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

LTE Band 13 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	24.65	0	0
	1	12	24.83		0
	1	24	24.59		0
	12	0	23.85	0-1	1
	12	6	23.94		1
	12	13	23.88		1
	25	0	23.89		1
16QAM	1	0	23.88	0-1	1
	1	12	24.04		1
	1	24	23.82		1
	12	0	22.89	0-2	2
	12	6	22.99		2
	12	13	22.98		2
	25	0	22.95		2
64QAM	1	0	23.03	0-2	2
	1	12	22.96		2
	1	24	22.95		2
	12	0	21.92	0-3	3
	12	6	21.97		3
	12	13	21.96		3
	25	0	21.89		3

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

9.4.4 LTE Band 26 (Cell)

Table 9-14
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	24.98	0	0
	1	36	**25.12**		0
	1	74	24.89		0
	36	0	24.01	0-1	1
	36	18	**24.08**		1
	36	37	24.07		1
	75	0	24.06		1
16QAM	1	0	24.20	0-1	1
	1	36	24.19		1
	1	74	24.15		1
	36	0	22.96	0-2	2
	36	18	23.01		2
	36	37	23.08		2
	75	0	23.08		2
64QAM	1	0	23.09	0-2	2
	1	36	22.96		2
	1	74	22.96		2
	36	0	22.07	0-3	3
	36	18	22.07		3
	36	37	22.07		3
	75	0	22.01		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.

Table 9-15
LTE Band 26 (Cell) Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 26 (Cell) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26740 (819.0 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 26990 (844.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.85	24.75	24.87	0	0
	1	25	24.98	24.96	25.10		0
	1	49	24.87	24.83	24.98		0
	25	0	24.07	24.04	24.11	0-1	1
	25	12	24.05	24.00	24.04		1
	25	25	24.07	24.01	23.89		1
	50	0	24.09	24.06	23.99		1
16QAM	1	0	23.76	23.70	24.10	0-1	1
	1	25	23.88	24.01	24.14		1
	1	49	23.81	23.95	24.08		1
	25	0	23.20	23.05	23.18	0-2	2
	25	12	23.11	23.16	23.11		2
	25	25	23.19	23.14	22.97		2
	50	0	23.19	23.11	23.04		2
64QAM	1	0	23.16	23.16	22.86	0-2	2
	1	25	23.12	23.13	22.99		2
	1	49	23.14	23.15	22.82		2
	25	0	22.14	22.16	22.20	0-3	3
	25	12	22.19	22.12	22.17		3
	25	25	22.18	22.14	21.98		3
	50	0	22.09	22.17	22.08		3

Table 9-16
LTE Band 26 (Cell) Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 26 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26715 (816.5 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27015 (846.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.73	24.81	24.91	0	0
	1	12	24.99	24.99	25.10		0
	1	24	24.75	24.82	25.01		0
	12	0	24.00	24.00	24.02	0-1	1
	12	6	24.05	24.03	24.03		1
	12	13	23.96	24.01	23.91		1
	25	0	23.99	23.98	23.93		1
16QAM	1	0	23.98	23.85	24.16	0-1	1
	1	12	24.13	24.07	24.13		1
	1	24	23.93	23.87	24.20		1
	12	0	23.08	23.10	23.11	0-2	2
	12	6	23.17	23.13	23.12		2
	12	13	23.08	23.10	23.01		2
	25	0	23.09	23.08	23.08		2
64QAM	1	0	23.12	23.19	23.05	0-2	2
	1	12	23.19	23.20	23.15		2
	1	24	23.12	23.00	23.09		2
	12	0	22.06	22.07	22.02	0-3	3
	12	6	22.11	22.11	22.03		3
	12	13	22.01	22.07	21.93		3
	25	0	22.03	22.10	22.06		3

Table 9-17
LTE Band 26 (Cell) Maximum Conducted Powers - 3 MHz Bandwidth

LTE Band 26 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26705 (815.5 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27025 (847.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.88	24.83	24.83	0	0
	1	7	24.91	24.97	24.97		0
	1	14	24.86	24.86	24.94		0
	8	0	24.01	23.90	24.01	0-1	1
	8	4	24.03	23.94	24.06		1
	8	7	24.00	23.93	24.05		1
	15	0	24.02	23.97	23.98		1
16QAM	1	0	23.81	24.19	23.79	0-1	1
	1	7	23.91	24.12	23.94		1
	1	14	23.74	24.10	23.78		1
	8	0	23.01	23.09	23.04	0-2	2
	8	4	23.05	23.11	23.03		2
	8	7	23.03	23.10	22.98		2
	15	0	23.01	23.04	23.01		2
64QAM	1	0	23.16	23.17	23.12	0-2	2
	1	7	23.14	23.20	23.19		2
	1	14	23.07	23.20	23.17		2
	8	0	22.05	22.02	22.03	0-3	3
	8	4	22.07	22.04	22.02		3
	8	7	22.06	22.01	22.00		3
	15	0	22.08	21.95	21.99		3

Table 9-18
LTE Band 26 (Cell) Maximum Conducted Powers -1.4 MHz Bandwidth

LTE Band 26 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26697 (814.7 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27033 (848.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.94	24.93	24.81	0	0
	1	2	24.99	24.99	25.02		0
	1	5	24.87	24.96	24.99		0
	3	0	25.03	25.01	24.97		0
	3	2	25.09	25.03	25.00		0
	3	3	25.11	25.02	24.99		0
	6	0	24.03	23.94	24.08	0-1	1
16QAM	1	0	23.73	23.72	24.18	0-1	1
	1	2	23.78	23.70	24.15		1
	1	5	23.79	23.77	24.06		1
	3	0	24.20	24.16	24.19		1
	3	2	24.18	24.18	24.20		1
	3	3	24.19	24.19	24.14		1
	6	0	23.12	23.18	22.91	0-2	2
64QAM	1	0	23.04	23.19	22.73	0-2	2
	1	2	23.16	23.16	22.88		2
	1	5	23.16	23.17	22.75		2
	3	0	23.14	23.19	23.08		2
	3	2	23.15	23.11	23.11		2
	3	3	23.17	23.08	23.12		2
	6	0	22.19	22.06	22.15	0-3	3

9.4.5 LTE Band 66 (AWS)

Table 9-19
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	24.44	24.30	24.39	0	0
	1	50	24.62	24.54	**24.63**		0
	1	99	24.37	24.31	24.35		0
	50	0	23.64	23.52	**23.68**	0-1	1
	50	25	23.63	23.62	23.62		1
	50	50	23.58	23.56	23.55		1
	100	0	23.63	23.52	23.58		1
16QAM	1	0	23.68	23.50	23.70	0-1	1
	1	50	23.66	23.46	23.64		1
	1	99	23.54	23.41	23.60		1
	50	0	22.67	22.62	22.20	0-2	2
	50	25	22.68	22.63	22.67		2
	50	50	22.67	22.62	22.62		2
	100	0	22.66	22.58	22.61		2
64QAM	1	0	22.65	22.58	22.66	0-2	2
	1	50	22.56	22.64	22.64		2
	1	99	22.62	22.62	22.62		2
	50	0	21.67	21.63	21.70	0-3	3
	50	25	21.69	21.66	21.68		3
	50	50	21.67	21.59	21.63		3
	100	0	21.65	21.60	21.60		3

Table 9-20
LTE Band 66 (AWS) Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.61	24.38	24.45	0	0
	1	36	24.65	24.54	24.50		0
	1	74	24.53	24.45	24.39		0
	36	0	23.68	23.67	23.68	0-1	1
	36	18	23.69	23.70	23.67		1
	36	37	23.65	23.68	23.61		1
	75	0	23.70	23.69	23.63		1
16QAM	1	0	23.39	23.30	23.56	0-1	1
	1	36	23.49	23.50	23.67		1
	1	74	23.51	23.38	23.54		1
	36	0	22.64	22.68	22.64	0-2	2
	36	18	22.67	22.66	22.69		2
	36	37	22.63	22.69	22.66		2
	75	0	22.66	22.65	22.68		2
64QAM	1	0	22.40	22.63	22.35	0-2	2
	1	36	22.48	22.67	22.43		2
	1	74	22.34	22.63	22.29		2
	36	0	21.70	21.69	21.69	0-3	3
	36	18	21.69	21.66	21.67		3
	36	37	21.65	21.65	21.69		3
	75	0	21.68	21.68	21.68		3

Table 9-21
LTE Band 66 (AWS) Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.58	24.41	24.48	0	0
	1	25	24.66	24.59	24.63		0
	1	49	24.46	24.45	24.44		0
	25	0	23.60	23.57	23.64	0-1	1
	25	12	23.61	23.59	23.63		1
	25	25	23.63	23.64	23.55		1
	50	0	23.60	23.63	23.62		1
16QAM	1	0	23.66	23.25	23.49	0-1	1
	1	25	23.58	23.37	23.55		1
	1	49	23.57	23.26	23.41		1
	25	0	22.65	22.70	22.70	0-2	2
	25	12	22.67	22.68	22.67		2
	25	25	22.68	22.70	22.67		2
	50	0	22.66	22.64	22.59		2
64QAM	1	0	22.48	22.57	22.69	0-2	2
	1	25	22.53	22.68	22.67		2
	1	49	22.37	22.62	22.68		2
	25	0	21.66	21.66	21.57	0-3	3
	25	12	21.68	21.68	21.63		3
	25	25	21.63	21.67	21.69		3
	50	0	21.68	21.65	21.68		3

Table 9-22
LTE Band 66 (AWS) Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.58	24.32	24.45	0	0
	1	12	24.68	24.59	24.66		0
	1	24	24.50	24.33	24.42		0
	12	0	23.59	23.56	23.55	0-1	1
	12	6	23.66	23.57	23.61		1
	12	13	23.56	23.59	23.56		1
	25	0	23.59	23.55	23.55		1
16QAM	1	0	23.70	23.44	23.66	0-1	1
	1	12	23.62	23.57	23.31		1
	1	24	23.37	23.46	23.66		1
	12	0	22.66	22.66	22.67	0-2	2
	12	6	22.68	22.69	22.67		2
	12	13	22.66	22.65	22.70		2
	25	0	22.63	22.63	22.68		2
64QAM	1	0	22.62	22.63	22.57	0-2	2
	1	12	22.61	22.52	22.60		2
	1	24	22.65	22.69	22.63		2
	12	0	21.63	21.61	21.59	0-3	3
	12	6	21.68	21.67	21.68		3
	12	13	21.66	21.64	21.61		3
	25	0	21.67	21.62	21.69		3

Table 9-23
LTE Band 66 (AWS) Maximum Conducted Powers - 3 MHz Bandwidth

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131987 (1711.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132657 (1778.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.64	24.39	24.44	0	0
	1	7	24.70	24.58	24.60		0
	1	14	24.55	24.42	24.52		0
	8	0	23.63	23.55	23.54	0-1	1
	8	4	23.65	23.54	23.61		1
	8	7	23.59	23.56	23.57		1
	15	0	23.61	23.55	23.55		1
16QAM	1	0	23.68	23.27	23.40	0-1	1
	1	7	23.57	23.39	23.52		1
	1	14	23.67	23.25	23.38		1
	8	0	22.69	22.56	22.64	0-2	2
	8	4	22.63	22.61	22.67		2
	8	7	22.61	22.59	22.61		2
	15	0	22.66	22.60	22.65		2
64QAM	1	0	22.47	22.58	22.66	0-2	2
	1	7	22.59	22.66	22.63		2
	1	14	22.48	22.64	22.66		2
	8	0	21.63	21.59	21.65	0-3	3
	8	4	21.67	21.61	21.67		3
	8	7	21.70	21.59	21.61		3
	15	0	21.68	21.62	21.62		3

Table 9-24
LTE Band 66 (AWS) Maximum Conducted Powers -1.4 MHz Bandwidth

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131979 (1710.7 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132665 (1779.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.56	24.45	24.42	0	0
	1	2	24.61	24.55	24.51		0
	1	5	24.52	24.48	24.48		0
	3	0	24.62	24.60	24.60		0
	3	2	24.68	24.62	24.63		0
	3	3	24.69	24.66	24.62		0
	6	0	23.65	23.54	23.53	0-1	1
16QAM	1	0	23.28	23.26	23.27	0-1	1
	1	2	23.32	23.33	23.30		1
	1	5	23.29	23.31	23.34		1
	3	0	23.68	23.69	23.69		1
	3	2	23.70	23.70	23.70		1
	3	3	23.70	23.69	23.70		1
	6	0	22.64	22.68	22.68	0-2	2
64QAM	1	0	22.53	22.65	22.37	0-2	2
	1	2	22.57	22.62	22.47		2
	1	5	22.60	22.66	22.35		2
	3	0	22.68	22.64	22.68		2
	3	2	22.69	22.70	22.70		2
	3	3	22.64	22.67	22.69		2
	6	0	21.65	21.56	21.59	0-3	3

9.4.6 LTE Band 25 (PCS)

Table 9-25
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	24.44	24.36	24.41	0	0
	1	50	**24.57**	24.55	24.55		0
	1	99	24.31	24.37	24.35		0
	50	0	23.61	23.58	23.64	0-1	1
	50	25	**23.66**	23.64	23.61		1
	50	50	23.60	23.61	23.41		1
	100	0	23.57	23.60	23.52		1
16QAM	1	0	23.69	23.65	23.68	0-1	1
	1	50	23.70	23.70	23.70		1
	1	99	23.53	23.64	23.61		1
	50	0	22.64	22.69	22.68	0-2	2
	50	25	22.69	22.68	22.68		2
	50	50	22.67	22.61	22.46		2
	100	0	22.55	22.60	22.54		2
64QAM	1	0	22.70	22.55	22.61	0-2	2
	1	50	22.62	22.69	22.64		2
	1	99	22.60	22.67	22.60		2
	50	0	21.65	21.60	21.64	0-3	3
	50	25	21.70	21.68	21.70		3
	50	50	21.64	21.64	21.48		3
	100	0	21.64	21.56	21.45		3

Table 9-26
LTE Band 25 (PCS) Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 25 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26115 (1857.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26615 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.51	24.40	24.47	0	0
	1	36	24.55	24.47	24.56		0
	1	74	24.44	24.42	24.43		0
	36	0	23.62	23.58	23.67	0-1	1
	36	18	23.65	23.61	23.68		1
	36	37	23.64	23.61	23.54		1
	75	0	23.61	23.59	23.60		1
16QAM	1	0	23.69	23.65	23.69	0-1	1
	1	36	23.64	23.61	23.68		1
	1	74	23.65	23.68	23.69		1
	36	0	22.64	22.61	22.69	0-2	2
	36	18	22.63	22.64	22.67		2
	36	37	22.61	22.63	22.57		2
	75	0	22.62	22.61	22.61		2
64QAM	1	0	22.61	22.69	22.66	0-2	2
	1	36	22.69	22.68	22.69		2
	1	74	22.68	22.67	22.65		2
	36	0	21.67	21.63	21.65	0-3	3
	36	18	21.66	21.66	21.70		3
	36	37	21.67	21.66	21.61		3
	75	0	21.63	21.63	21.62		3

Table 9-27
LTE Band 25 (PCS) Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 25 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26090 (1855.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26640 (1910.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.52	24.46	24.46	0	0
	1	25	24.57	24.42	24.57		0
	1	49	24.44	24.42	24.42		0
	25	0	23.60	23.57	23.70	0-1	1
	25	12	23.59	23.54	23.62		1
	25	25	23.61	23.58	23.48		1
	50	0	23.62	23.60	23.63		1
16QAM	1	0	23.63	23.69	23.70	0-1	1
	1	25	23.61	23.67	23.68		1
	1	49	23.64	23.60	23.69		1
	25	0	22.63	22.60	22.70	0-2	2
	25	12	22.62	22.59	22.68		2
	25	25	22.63	22.63	22.55		2
	50	0	22.61	22.62	22.65		2
64QAM	1	0	22.69	22.68	22.69	0-2	2
	1	25	22.70	22.69	22.65		2
	1	49	22.67	22.70	22.67		2
	25	0	21.63	21.60	21.70	0-3	3
	25	12	21.62	21.57	21.67		3
	25	25	21.61	21.62	21.54		3
	50	0	21.65	21.56	21.68		3

Table 9-28
LTE Band 25 (PCS) Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 25 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26065 (1852.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26665 (1912.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.42	24.31	24.43	0	0
	1	12	24.67	24.56	24.65		0
	1	24	24.36	24.34	24.66		0
	12	0	23.58	23.45	23.65	0-1	1
	12	6	23.61	23.50	23.64		1
	12	13	23.60	23.51	23.52		1
	25	0	23.60	23.59	23.62		1
16QAM	1	0	23.70	23.68	23.67	0-1	1
	1	12	23.69	23.61	23.69		1
	1	24	23.62	23.59	23.70		1
	12	0	22.64	22.60	22.70	0-2	2
	12	6	22.69	22.59	22.67		2
	12	13	22.66	22.56	22.69		2
	25	0	22.63	22.54	22.65		2
64QAM	1	0	22.70	22.60	22.69	0-2	2
	1	12	22.67	22.68	22.69		2
	1	24	22.66	22.59	22.68		2
	12	0	21.69	21.53	21.70	0-3	3
	12	6	21.70	21.63	21.65		3
	12	13	21.69	21.61	21.63		3
	25	0	21.65	21.58	21.66		3

Table 9-29
LTE Band 25 (PCS) Maximum Conducted Powers - 3 MHz Bandwidth

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26055 (1851.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26675 (1913.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.57	24.43	24.50	0	0
	1	7	24.68	24.60	24.61		0
	1	14	24.52	24.45	24.46		0
	8	0	23.61	23.47	23.59	0-1	1
	8	4	23.64	23.52	23.59		1
	8	7	23.59	23.46	23.53		1
	15	0	23.65	23.50	23.61		1
16QAM	1	0	23.70	23.68	23.69	0-1	1
	1	7	23.69	23.69	23.70		1
	1	14	23.68	23.70	23.69		1
	8	0	22.69	22.61	22.69	0-2	2
	8	4	22.70	22.65	22.64		2
	8	7	22.70	22.62	22.66		2
	15	0	22.67	22.56	22.65		2
64QAM	1	0	22.66	22.70	22.64	0-2	2
	1	7	22.66	22.68	22.67		2
	1	14	22.65	22.69	22.68		2
	8	0	21.58	21.58	21.70	0-3	3
	8	4	21.70	21.62	21.32		3
	8	7	21.69	21.58	21.69		3
	15	0	21.68	21.56	21.70		3

Table 9-30
LTE Band 25 (PCS) Maximum Conducted Powers -1.4 MHz Bandwidth

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26047 (1850.7 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26683 (1914.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.46	24.39	24.40	0	0
	1	2	24.58	24.51	24.51		0
	1	5	24.46	24.40	24.38		0
	3	0	24.54	24.48	24.49		0
	3	2	24.56	24.51	24.51		0
	3	3	24.55	24.48	24.52		0
	6	0	23.61	23.55	23.60	0-1	1
16QAM	1	0	23.69	23.65	23.70	0-1	1
	1	2	23.70	23.69	23.68		1
	1	5	23.70	23.69	23.70		1
	3	0	23.61	23.53	23.63		1
	3	2	23.63	23.59	23.65		1
	3	3	23.59	23.54	23.63		1
	6	0	22.66	22.64	22.69	0-2	2
64QAM	1	0	22.70	22.68	22.69	0-2	2
	1	2	22.69	22.69	22.67		2
	1	5	22.67	22.67	22.68		2
	3	0	22.66	22.60	22.68		2
	3	2	22.69	22.65	22.70		2
	3	3	22.67	22.62	22.70		2
	6	0	21.67	21.61	21.69	0-3	3

9.4.7 LTE Band 41 PC3

Table 9-31
LTE Band 41 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	24.23	24.11	24.22	24.03	24.34	0	0
	1	50	24.51	24.31	24.35	24.26	**24.55**		0
	1	99	24.54	24.05	24.01	24.01	24.29		0
	50	0	23.33	23.34	23.38	23.18	**23.51**	0-1	1
	50	25	23.41	23.30	23.33	23.25	23.45		1
	50	50	23.32	23.22	23.18	23.16	23.43		1
	100	0	23.38	23.31	23.26	23.10	23.50		1
16QAM	1	0	23.30	23.26	23.34	23.21	23.44	0-1	1
	1	50	23.58	23.15	23.53	23.45	23.65		1
	1	99	23.33	23.21	23.17	23.18	23.45		1
	50	0	22.46	22.47	22.44	22.26	22.55	0-2	2
	50	25	22.19	22.40	22.37	22.28	22.50		2
	50	50	22.44	22.31	22.25	22.23	22.48		2
	100	0	22.47	22.33	22.35	22.27	22.52		2
64QAM	1	0	21.96	21.88	21.96	21.94	22.02	0-2	2
	1	50	22.21	22.05	22.09	21.94	22.21		2
	1	99	21.98	21.82	22.12	22.01	22.02		2
	50	0	21.44	21.42	21.39	21.23	21.54	0-3	3
	50	25	21.46	21.36	21.35	21.23	21.51		3
	50	50	21.44	21.30	21.48	21.20	21.44		3
	100	0	21.49	21.37	21.33	21.12	21.49		3

Table 9-32
LTE Band 41 Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			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	24.23	24.13	24.13	23.92	24.19	0	0
	1	36	24.38	24.15	24.17	24.00	24.30		0
	1	74	24.23	24.05	23.97	23.91	24.22		0
	36	0	23.41	23.31	23.27	23.07	23.35	0-1	1
	36	18	23.42	23.29	23.23	23.10	23.37		1
	36	37	23.38	23.23	23.16	23.06	23.35		1
	75	0	23.34	23.27	23.20	23.05	23.33		1
16QAM	1	0	23.20	23.20	23.20	23.03	23.26	0-1	1
	1	36	23.33	23.25	23.15	22.98	23.36		1
	1	74	23.22	23.12	23.05	22.99	23.24		1
	36	0	22.34	22.24	22.19	22.00	22.27	0-2	2
	36	18	22.32	22.22	22.17	22.03	22.28		2
	36	37	22.35	22.18	22.08	21.96	22.25		2
	75	0	22.33	22.29	22.19	22.09	22.30		2
64QAM	1	0	21.96	21.89	21.88	21.70	21.91	0-2	2
	1	36	22.06	21.98	21.87	21.75	22.04		2
	1	74	21.95	21.84	21.74	21.77	21.93		2
	36	0	21.35	21.26	21.23	21.02	21.32	0-3	3
	36	18	21.38	21.23	21.21	21.03	21.36		3
	36	37	21.38	21.21	21.11	21.02	21.30		3
	75	0	21.37	21.28	21.20	21.04	21.35		3

REV 21.4 M
09/11/2019

Table 9-33
LTE Band 41 Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 41 10 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	24.31	24.17	24.22	23.98	24.31	0	0
	1	25	24.35	24.12	24.06	23.94	24.35		0
	1	49	24.35	24.15	24.10	23.93	24.32		0
	25	0	23.41	23.29	23.30	23.11	23.44	0-1	1
	25	12	23.42	23.33	23.29	23.13	23.41		1
	25	25	23.38	23.22	23.22	23.10	23.42		1
	50	0	23.40	23.30	23.28	23.09	23.45		1
16QAM	1	0	23.29	23.19	23.29	23.03	23.35	0-1	1
	1	25	23.25	23.17	23.26	23.02	23.34		1
	1	49	23.24	23.22	23.20	23.00	23.37		1
	25	0	22.46	22.35	22.37	22.15	22.45	0-2	2
	25	12	22.52	22.38	22.32	22.18	22.43		2
	25	25	22.47	22.32	22.30	22.13	22.43		2
	50	0	22.41	22.35	22.27	22.17	22.45		2
64QAM	1	0	22.05	21.96	21.93	21.71	22.04	0-2	2
	1	25	22.06	21.93	21.84	21.72	22.00		2
	1	49	22.08	21.94	21.84	21.73	22.07		2
	25	0	21.40	21.29	21.31	21.06	21.33	0-3	3
	25	12	21.20	21.28	21.25	21.11	21.38		3
	25	25	21.38	21.27	21.21	21.05	21.33		3
	50	0	21.45	21.37	21.32	21.15	21.47		3

Table 9-34
LTE Band 41 Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 41 5 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	24.26	24.05	24.08	23.88	24.23	0	0
	1	12	24.39	24.34	24.35	24.05	24.36		0
	1	24	24.22	24.10	24.04	23.88	24.23		0
	12	0	23.34	23.26	23.24	22.97	23.37	0-1	1
	12	6	23.38	23.31	23.29	23.04	23.44		1
	12	13	23.38	23.25	23.18	23.01	23.37		1
	25	0	23.37	23.24	23.21	22.98	23.34		1
16QAM	1	0	23.22	23.14	23.10	23.01	23.27	0-1	1
	1	12	23.44	23.40	23.13	23.20	23.41		1
	1	24	23.23	23.16	23.05	22.93	23.30		1
	12	0	22.29	22.16	22.13	21.91	22.27	0-2	2
	12	6	22.37	22.13	22.09	21.94	22.32		2
	12	13	22.26	22.14	22.04	21.84	22.24		2
	25	0	22.39	22.30	22.21	22.02	22.36		2
64QAM	1	0	21.97	21.88	21.81	21.84	21.95	0-2	2
	1	12	22.18	22.08	22.01	21.82	22.11		2
	1	24	21.90	21.84	21.70	21.65	21.94		2
	12	0	21.27	21.15	21.11	20.94	21.27	0-3	3
	12	6	21.35	21.20	21.12	20.99	21.32		3
	12	13	21.30	21.15	21.03	20.92	21.26		3
	25	0	21.36	21.24	21.17	21.02	21.30		3

9.4.8 LTE Band 41 PC2

Table 9-35
LTE Band 41 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	27.13	27.08	27.13	26.92	27.02	0	0
	1	50	**27.43**	27.28	27.27	27.11	27.27		0
	1	99	27.16	26.97	26.92	26.89	27.11		0
	50	0	**26.39**	26.30	26.28	26.08	26.37	0-1	1
	50	25	26.36	26.26	26.27	26.12	26.38		1
	50	50	26.33	26.19	26.14	26.06	26.31		1
	100	0	26.38	26.30	26.25	26.11	25.95		1
16QAM	1	0	26.30	26.28	26.38	26.21	26.41	0-1	1
	1	50	26.62	26.51	26.53	26.37	26.60		1
	1	99	26.36	26.23	26.21	26.15	26.38		1
	50	0	25.49	25.34	25.37	25.17	25.45	0-2	2
	50	25	25.45	25.32	24.97	25.19	25.44		2
	50	50	25.38	25.24	25.20	25.14	25.38		2
	100	0	25.41	25.30	25.30	25.21	25.21		2
64QAM	1	0	25.14	25.09	25.15	25.00	25.21	0-2	2
	1	50	25.41	25.27	25.33	25.19	25.42		2
	1	99	25.19	25.02	24.98	24.96	25.18		2
	50	0	24.40	24.33	24.37	24.17	24.44	0-3	3
	50	25	24.43	24.31	24.32	24.22	24.38		3
	50	50	24.37	24.21	24.16	24.16	24.38		3
	100	0	24.40	24.28	24.10	24.15	24.42		3

Table 9-36
LTE Band 41 Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			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	27.12	27.04	27.03	26.82	27.04	0	0
	1	36	27.20	27.11	27.07	26.89	27.19		0
	1	74	27.13	26.97	26.90	26.80	27.04		0
	36	0	26.29	26.20	26.18	25.97	26.23	0-1	1
	36	18	26.30	26.21	26.15	25.98	26.21		1
	36	37	26.28	26.15	26.08	25.95	26.16		1
	75	0	26.24	26.16	26.11	25.95	26.22		1
16QAM	1	0	26.31	26.28	26.30	26.11	26.31	0-1	1
	1	36	26.43	26.34	26.32	26.16	26.38		1
	1	74	26.30	26.20	26.18	26.05	26.32		1
	36	0	25.24	25.11	25.15	24.96	25.18	0-2	2
	36	18	25.25	25.12	25.10	24.95	25.21		2
	36	37	25.24	25.10	25.04	24.93	25.19		2
	75	0	25.27	25.16	25.14	24.99	25.25		2
64QAM	1	0	25.11	25.07	25.09	24.91	25.11	0-2	2
	1	36	25.20	25.13	25.10	24.97	25.21		2
	1	74	25.12	25.00	24.94	24.86	25.10		2
	36	0	24.30	24.23	24.22	24.00	24.23	0-3	3
	36	18	24.29	24.25	24.15	23.99	24.26		3
	36	37	24.30	24.17	24.11	24.03	24.22		3
	75	0	24.31	24.25	24.20	24.03	24.28		3

Table 9-37
LTE Band 41 Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 41 10 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	27.19	27.09	27.08	26.87	27.13	0	0
	1	25	27.41	27.22	27.20	26.99	27.27		0
	1	49	27.17	27.06	26.96	26.87	27.15		0
	25	0	26.25	26.20	26.20	26.02	26.28	0-1	1
	25	12	26.29	26.18	26.19	26.01	26.29		1
	25	25	26.21	26.19	26.12	26.00	26.29		1
	50	0	26.32	26.21	26.14	26.01	26.31		1
16QAM	1	0	26.38	26.32	26.35	26.17	26.29	0-1	1
	1	25	26.55	26.46	26.42	26.25	26.41		1
	1	49	26.38	26.29	26.24	26.13	26.40		1
	25	0	25.36	25.26	25.27	25.11	25.35	0-2	2
	25	12	25.37	25.28	25.24	25.09	25.35		2
	25	25	25.31	25.24	25.21	25.13	25.36		2
	50	0	25.35	25.25	25.24	25.08	25.33		2
64QAM	1	0	25.20	25.18	25.15	24.97	25.22	0-2	2
	1	25	25.32	25.20	25.23	25.07	25.32		2
	1	49	25.23	25.19	25.02	24.96	25.23		2
	25	0	24.29	24.23	24.25	24.07	24.32	0-3	3
	25	12	24.34	24.25	24.17	24.09	24.31		3
	25	25	24.31	24.31	24.19	24.06	24.29		3
	50	0	24.42	24.25	24.27	24.12	24.37		3

Table 9-38
LTE Band 41 Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 41 5 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	27.16	27.02	27.03	26.81	27.09	0	0
	1	12	27.31	27.13	27.09	26.91	27.17		0
	1	24	27.15	27.01	26.95	26.82	27.07		0
	12	0	26.27	26.20	26.12	25.97	26.31	0-1	1
	12	6	26.26	26.17	26.17	26.00	26.30		1
	12	13	26.22	26.16	26.09	25.96	26.20		1
	25	0	26.16	26.10	26.11	25.95	26.22		1
16QAM	1	0	26.36	26.26	26.30	26.09	26.34	0-1	1
	1	12	26.47	26.34	26.32	26.17	26.41		1
	1	24	26.31	26.26	26.20	26.08	26.32		1
	12	0	25.25	25.12	25.14	24.97	25.30	0-2	2
	12	6	25.27	25.16	25.13	24.99	25.23		2
	12	13	25.23	25.12	25.06	24.94	25.19		2
	25	0	25.30	25.23	25.20	25.07	25.30		2
64QAM	1	0	25.15	24.99	25.05	24.89	25.12	0-2	2
	1	12	25.24	25.08	25.11	24.97	25.21		2
	1	24	25.11	25.05	25.00	24.88	25.13		2
	12	0	24.30	24.14	24.17	24.01	24.20	0-3	3
	12	6	24.22	24.19	24.16	23.96	24.24		3
	12	13	24.24	24.16	24.11	23.89	24.19		3
	25	0	24.24	24.18	24.13	23.96	24.24		3

9.4.9 LTE Uplink Carrier Aggregation Conducted Powers

Table 9-39
LTE Uplink Carrier Aggregation 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	24.12	24.22
CA_41C	LTE B41	20	41490	2680.0	QPSK	1	0	LTE B41	20	41292	2660.2	QPSK	1	99	24.60	24.34

Table 9-40
LTE Uplink Carrier Aggregation Maximum Conducted Powers – PC2

	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 PC2	20	40620	2593.0	QPSK	1	0	LTE B41 PC2	20	40422	2573.2	QPSK	1	99	27.26	27.13
CA_41C	LTE B41 PC2	20	41490	2680.0	QPSK	1	0	LTE B41 PC2	20	41292	2660.2	QPSK	1	99	27.45	27.02

Notes:

1. This device supports uplink carrier aggregation for LTE CA_41C with a maximum of two 20 MHz 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 Maximum 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 9-4
Power Measurement Setup

9.5 WLAN Conducted Powers

Table 9-41
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
2412	1	22.41	17.44	16.96
2417	2	N/A	20.19	19.21
2437	6	22.31	20.22	19.20
2457	10	N/A	20.17	19.25
2462	11	22.19	17.99	17.31

Table 9-42
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	16.56	16.39	16.40
5200	40	18.72	17.71	17.82
5220	44	18.49	17.73	17.71
5240	48	18.52	17.75	17.62
5260	52	18.35	17.73	17.71
5280	56	18.35	17.79	17.76
5300	60	18.23	17.78	17.71
5320	64	16.61	16.46	16.44
5500	100	16.89	16.69	16.63
5520	104	18.66	18.01	17.94
5600	120	18.34	17.65	17.63
5620	124	18.35	17.80	17.62
5660	132	18.65	18.49	18.35
5720	144	18.78	18.55	18.37
5745	149	18.82	18.30	18.23
5785	157	18.84	18.44	18.56
5825	165	19.22	18.44	18.43

Table 9-43
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
		Average	Average	Average
2412	1	20.35	17.44	16.96
2417	2		20.19	19.21
2437	6	20.54	20.22	19.20
2457	10		20.17	19.25
2462	11	20.52	17.99	17.31

Table 9-44
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	16.56	16.39	16.40
5200	40	16.90	16.75	16.75
5220	44	16.96	16.75	16.78
5240	48	16.99	16.79	16.70
5260	52	16.98	16.79	16.89
5280	56	16.97	16.71	16.81
5300	60	16.86	16.79	16.82
5320	64	16.61	16.46	16.44
5500	100	16.89	16.69	16.63
5600	120	16.81	16.64	16.68
5620	124	16.70	16.60	16.71
5660	132	17.01	17.02	17.01
5720	144	17.14	17.07	17.04
5745	149	17.23	17.08	17.06
5785	157	17.31	17.19	17.21
5825	165	17.43	17.18	17.26

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.

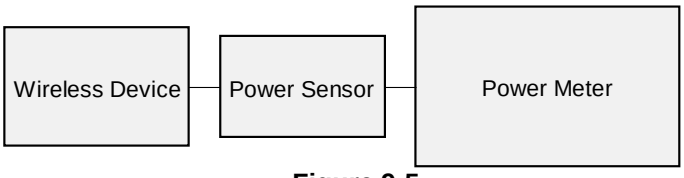


Figure 9-5
Power Measurement Setup

9.6 Bluetooth Conducted Powers

Table 9-45
Bluetooth Average RF Power

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
			[dBm]	[mW]
2402	1.0	0	7.63	5.789
2441	1.0	39	8.78	7.559
2480	1.0	78	7.64	5.805
2402	2.0	0	5.44	3.500
2441	2.0	39	5.95	3.938
2480	2.0	78	4.86	3.059
2402	3.0	0	5.51	3.555
2441	3.0	39	6.01	3.992
2480	3.0	78	4.91	3.097

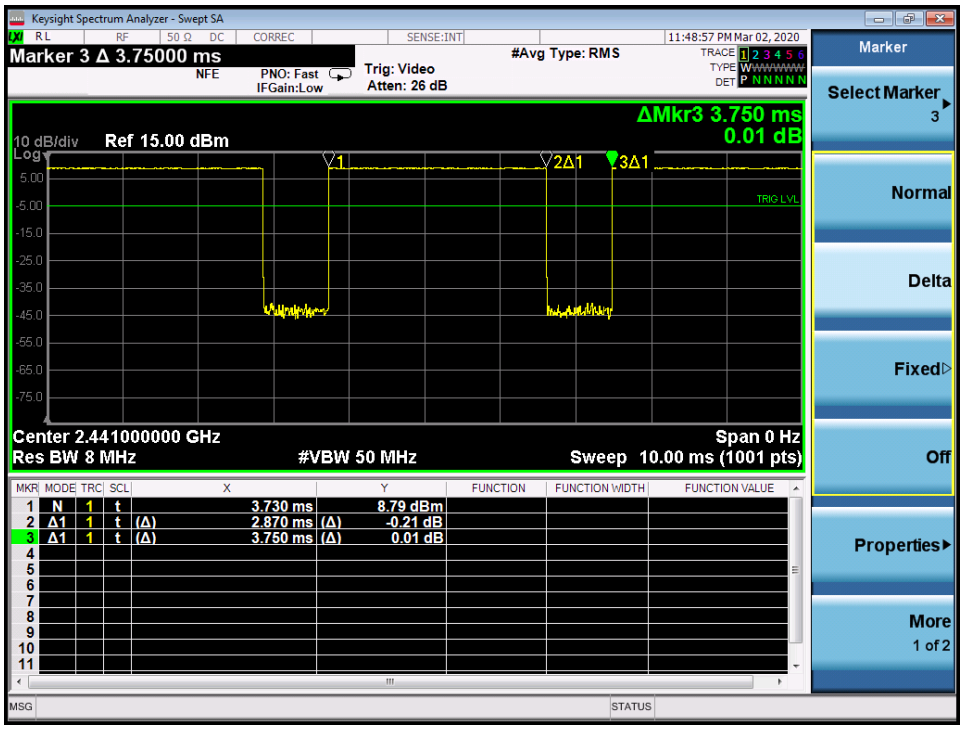


Figure 9-6
Bluetooth Transmission Plot

Equation 9-1
Bluetooth Duty Cycle Calculation

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.87ms}{3.75ms} * 100\% = 76.5\%$$

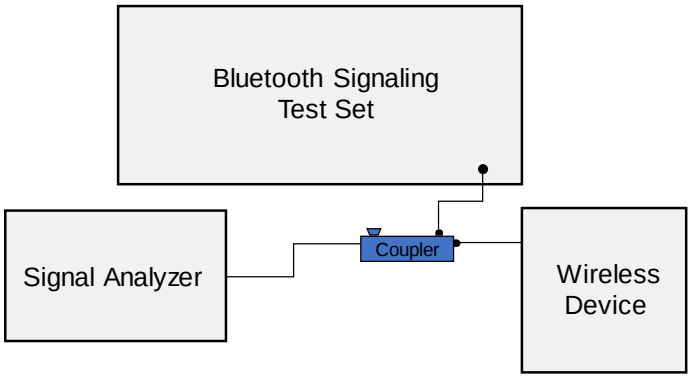


Figure 9-7
Power Measurement Setup

10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Head Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
02/26/2020	750 Head	20.4	680	0.844	40.664	0.888	42.305	-4.95%	-3.88%
			695	0.849	40.619	0.889	42.227	-4.50%	-3.81%
			700	0.851	40.604	0.889	42.201	-4.27%	-3.78%
			710	0.854	40.574	0.890	42.149	-4.04%	-3.74%
			725	0.859	40.527	0.891	42.071	-3.59%	-3.67%
			740	0.864	40.476	0.893	41.994	-3.25%	-3.61%
			750	0.868	40.444	0.894	41.942	-2.91%	-3.57%
			755	0.870	40.430	0.894	41.916	-2.68%	-3.55%
			770	0.876	40.390	0.895	41.838	-2.12%	-3.46%
			785	0.881	40.355	0.896	41.760	-1.67%	-3.36%
			800	0.886	40.322	0.897	41.682	-1.23%	-3.26%
03/02/2020	835 Head	21.3	820	0.863	39.963	0.899	41.578	-4.00%	-3.88%
			835	0.878	39.760	0.900	41.500	-2.44%	-4.19%
			850	0.891	39.570	0.916	41.500	-2.73%	-4.65%
02/26/2020	1750 Head	20.4	1710	1.317	38.478	1.348	40.142	-2.30%	-4.15%
			1720	1.323	38.463	1.354	40.126	-2.29%	-4.14%
			1745	1.339	38.425	1.368	40.087	-2.12%	-4.15%
			1750	1.342	38.416	1.371	40.079	-2.12%	-4.15%
			1770	1.354	38.379	1.383	40.047	-2.10%	-4.17%
			1790	1.366	38.340	1.394	40.016	-2.01%	-4.19%
03/05/2020	1900 Head	22.4	1850	1.380	40.783	1.400	40.000	-1.43%	1.96%
			1860	1.391	40.742	1.400	40.000	-0.64%	1.85%
			1880	1.413	40.665	1.400	40.000	0.93%	1.66%
			1900	1.434	40.580	1.400	40.000	2.43%	1.45%
			1905	1.439	40.559	1.400	40.000	2.79%	1.40%
			1910	1.445	40.539	1.400	40.000	3.21%	1.35%
3/5/2020	2450 Head	21.7	2300	1.733	38.629	1.670	39.500	3.77%	-2.21%
			2310	1.740	38.616	1.679	39.480	3.63%	-2.19%
			2320	1.748	38.605	1.687	39.460	3.62%	-2.17%
			2400	1.809	38.492	1.756	39.289	3.02%	-2.03%
			2450	1.846	38.414	1.800	39.200	2.56%	-2.01%
			2500	1.885	38.332	1.855	39.136	1.62%	-2.05%
			2510	1.893	38.317	1.866	39.123	1.45%	-2.06%
			2535	1.912	38.272	1.893	39.092	1.00%	-2.10%
			2550	1.923	38.244	1.909	39.073	0.73%	-2.12%
			2560	1.932	38.223	1.920	39.060	0.63%	-2.14%
			2600	1.964	38.158	1.964	39.009	0.00%	-2.18%
			2650	2.006	38.061	2.018	38.945	-0.59%	-2.27%
			2680	2.032	38.007	2.051	38.907	-0.93%	-2.31%
			2700	2.048	37.979	2.073	38.882	-1.21%	-2.32%
03/12/2020	2450 Head	22.2	2300	1.743	38.211	1.670	39.500	4.37%	-3.26%
			2310	1.750	38.202	1.679	39.480	4.23%	-3.24%
			2320	1.758	38.193	1.687	39.460	4.21%	-3.21%
			2400	1.818	38.080	1.756	39.289	3.53%	-3.08%
			2450	1.856	38.009	1.800	39.200	3.11%	-3.04%
			2500	1.897	37.929	1.855	39.136	2.26%	-3.08%
			2510	1.906	37.916	1.866	39.123	2.14%	-3.09%
			2535	1.925	37.883	1.893	39.092	1.69%	-3.09%
			2550	1.937	37.853	1.909	39.073	1.47%	-3.12%
			2560	1.946	37.833	1.920	39.060	1.35%	-3.14%
			2600	1.980	37.763	1.964	39.009	0.81%	-3.19%
			2650	2.020	37.669	2.018	38.945	0.10%	-3.28%
			2680	2.045	37.606	2.051	38.907	-0.29%	-3.34%
			2700	2.061	37.571	2.073	38.882	-0.58%	-3.37%
03/09/2020	5200~5800 Head	21.1	5180	4.512	35.542	4.635	36.009	-2.65%	-1.30%
			5190	4.519	35.529	4.645	35.998	-2.71%	-1.30%
			5200	4.529	35.515	4.655	35.986	-2.71%	-1.31%
			5210	4.539	35.493	4.666	35.975	-2.72%	-1.34%
			5220	4.549	35.468	4.676	35.963	-2.72%	-1.38%
			5240	4.571	35.417	4.696	35.940	-2.66%	-1.46%
			5250	4.582	35.399	4.706	35.929	-2.63%	-1.48%
			5260	4.596	35.383	4.717	35.917	-2.57%	-1.49%
			5270	4.609	35.370	4.727	35.906	-2.50%	-1.49%
			5280	4.620	35.354	4.737	35.894	-2.47%	-1.50%
			5290	4.631	35.343	4.748	35.883	-2.46%	-1.50%
			5300	4.641	35.333	4.758	35.871	-2.46%	-1.50%
			5310	4.648	35.320	4.768	35.860	-2.52%	-1.51%
			5320	4.656	35.295	4.778	35.849	-2.55%	-1.55%
			5500	4.856	34.968	4.963	35.643	-2.16%	-1.89%
			5510	4.871	34.955	4.973	35.632	-2.05%	-1.90%
			5520	4.881	34.943	4.983	35.620	-2.05%	-1.90%
			5530	4.890	34.931	4.994	35.609	-2.08%	-1.90%
			5540	4.896	34.920	5.004	35.597	-2.16%	-1.90%
			5550	4.904	34.894	5.014	35.586	-2.19%	-1.94%
			5560	4.914	34.873	5.024	35.574	-2.19%	-1.97%
			5580	4.939	34.831	5.045	35.551	-2.10%	-2.03%
			5600	4.966	34.796	5.065	35.529	-1.95%	-2.06%
			5610	4.978	34.775	5.076	35.518	-1.93%	-2.09%
			5620	4.990	34.758	5.086	35.506	-1.89%	-2.11%
			5640	5.017	34.742	5.106	35.483	-1.74%	-2.09%
			5660	5.033	34.699	5.127	35.460	-1.83%	-2.15%
			5670	5.044	34.679	5.137	35.449	-1.81%	-2.17%
			5680	5.056	34.660	5.147	35.437	-1.77%	-2.19%
			5690	5.068	34.635	5.158	35.426	-1.74%	-2.23%
			5700	5.079	34.614	5.168	35.414	-1.72%	-2.26%
			5710	5.093	34.606	5.178	35.403	-1.64%	-2.25%
			5720	5.105	34.594	5.188	35.391	-1.60%	-2.25%
			5745	5.133	34.555	5.214	35.363	-1.55%	-2.28%
			5750	5.138	34.547	5.219	35.357	-1.55%	-2.29%
			5755	5.143	34.542	5.224	35.351	-1.55%	-2.29%
			5765	5.152	34.527	5.234	35.340	-1.57%	-2.30%
			5775	5.162	34.517	5.245	35.329	-1.58%	-2.30%
			5785	5.174	34.498	5.255	35.317	-1.54%	-2.32%
			5795	5.184	34.479	5.265	35.305	-1.54%	-2.34%
			5800	5.189	34.466	5.270	35.300	-1.54%	-2.36%
			5805	5.196	34.459	5.275	35.294	-1.50%	-2.37%
			5825	5.223	34.421	5.296	35.271	-1.38%	-2.41%

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
03/09/2020	700 Body	21.5	680	0.919	54.095	0.958	55.604	-4.07%	-2.69%
			690	0.924	54.051	0.959	55.745	-3.65%	-3.04%
			700	0.925	54.032	0.959	55.739	-3.55%	-3.04%
			710	0.929	53.976	0.960	55.697	-3.23%	-3.07%
			725	0.933	53.843	0.961	55.629	-2.91%	-3.21%
			740	0.936	53.680	0.963	55.570	-2.80%	-3.44%
			750	0.937	53.527	0.964	55.531	-2.80%	-3.61%
			755	0.938	53.464	0.964	55.512	-2.70%	-3.69%
			770	0.941	53.295	0.965	55.453	-2.49%	-3.89%
			785	0.944	53.186	0.966	55.395	-2.28%	-3.99%
			800	0.950	53.135	0.967	55.338	-1.76%	-3.98%
03/04/2020	835 Body	21.3	820	0.946	54.343	0.969	55.258	-2.37%	-1.66%
			835	0.961	54.192	0.970	55.200	-0.93%	-1.83%
03/16/2020	835 Body	22.0	850	0.976	54.041	0.988	55.154	-1.21%	-2.02%
			835	0.941	53.680	0.969	55.258	-2.89%	-2.90%
			825	0.956	54.915	0.970	55.200	-1.44%	-0.52%
			850	0.971	54.777	0.988	55.154	-1.72%	-0.68%
02/26/2020	1750 Body	20.9	1710	1.438	55.742	1.463	53.537	-2.39%	4.12%
			1720	1.440	55.709	1.469	53.511	-1.97%	4.13%
			1745	1.468	55.639	1.485	53.445	-1.14%	4.11%
			1750	1.474	55.625	1.488	53.432	-0.94%	4.10%
			1770	1.496	55.565	1.501	53.379	-0.33%	4.10%
03/02/2020	1750 Body	22.0	1790	1.517	55.491	1.514	53.326	0.20%	4.06%
			1710	1.423	55.849	1.463	53.537	-2.73%	4.32%
			1720	1.434	55.818	1.469	53.511	-2.38%	4.31%
			1745	1.463	55.744	1.485	53.445	-1.48%	4.30%
			1750	1.469	55.737	1.488	53.432	-1.28%	4.30%
			1720	1.481	55.664	1.501	53.379	-0.67%	4.28%
			1790	1.512	55.594	1.514	53.326	-0.13%	4.29%
03/12/2020	1900 Body	24.0	1850	1.597	53.624	1.520	53.300	-0.86%	0.14%
			1860	1.529	53.582	1.520	53.300	0.07%	0.20%
			1880	1.541	53.533	1.520	53.300	1.38%	0.32%
			1900	1.563	53.470	1.520	53.300	2.83%	0.43%
			1905	1.568	53.452	1.520	53.300	3.16%	0.47%
			1910	1.574	53.435	1.520	53.300	3.55%	0.50%
03/16/2020	1900 Body	22.7	1850	1.520	52.191	1.520	53.300	-0.05%	-2.08%
			1880	1.521	52.157	1.520	53.300	0.07%	-2.24%
			1880	1.543	52.090	1.520	53.300	1.51%	-2.27%
			1900	1.560	52.022	1.520	53.300	2.63%	-2.40%
			1905	1.571	52.004	1.520	53.300	3.36%	-2.43%
			1910	1.576	51.987	1.520	53.300	3.68%	-2.46%
03/02/2020	2450 Body	22.5	2300	1.860	52.422	1.809	52.900	2.82%	-0.90%
			2310	1.871	52.398	1.814	52.887	3.03%	-0.92%
			2320	1.883	52.371	1.826	52.873	3.12%	-0.95%
			2400	1.979	52.157	1.902	52.767	4.05%	-1.16%
			2450	2.039	51.998	1.950	52.700	4.56%	-1.33%
			2500	2.088	51.848	2.021	52.638	3.81%	-1.50%
			2510	2.111	51.818	2.035	52.623	3.73%	-1.53%
			2535	2.142	51.741	2.071	52.592	3.43%	-1.62%
			2550	2.160	51.697	2.092	52.573	3.25%	-1.67%
			2560	2.172	51.670	2.106	52.560	3.13%	-1.69%
			2600	2.217	51.546	2.163	52.509	2.50%	-1.83%
			2650	2.281	51.379	2.234	52.445	2.10%	-2.03%
			2680	2.317	51.300	2.277	52.407	1.78%	-2.12%
03/05/2020	2450 Body	23.5	2300	2.331	51.243	2.305	52.392	1.13%	-2.17%
			2300	1.830	51.894	1.809	52.900	1.16%	-1.90%
			2310	1.841	51.836	1.814	52.887	1.38%	-1.99%
			2320	1.853	51.808	1.826	52.873	1.42%	-2.01%
			2400	1.940	51.585	1.902	52.767	2.00%	-2.24%
			2450	1.997	51.452	1.950	52.700	2.41%	-2.37%
			2500	2.054	51.307	2.021	52.638	1.63%	-2.52%
			2510	2.066	51.278	2.035	52.623	1.52%	-2.56%
			2535	2.096	51.206	2.071	52.592	1.21%	-2.63%
			2550	2.114	51.174	2.092	52.573	1.05%	-2.66%
			2560	2.126	51.150	2.106	52.560	0.95%	-2.68%
			2600	2.172	51.058	2.163	52.509	0.42%	-2.82%
			2650	2.230	50.964	2.234	52.445	-0.18%	-2.99%
			2680	2.268	50.798	2.277	52.407	-0.40%	-3.07%
03/16/2020	2450 Body	22.5	2700	2.293	50.737	2.305	52.392	-0.52%	-3.15%
			2300	1.864	52.621	1.809	52.900	3.04%	-0.53%
			2310	1.875	52.592	1.814	52.887	3.25%	-0.56%
			2320	1.886	52.561	1.826	52.873	3.29%	-0.59%
			2400	1.979	52.332	1.902	52.767	4.05%	-0.82%
			2450	2.039	52.156	1.950	52.700	4.61%	-0.96%
			2500	2.096	52.002	2.021	52.638	3.71%	-1.15%
			2510	2.108	52.003	2.035	52.623	3.59%	-1.18%
			2535	2.138	51.942	2.071	52.592	3.24%	-1.24%
			2550	2.157	51.897	2.092	52.573	3.11%	-1.27%
			2560	2.169	51.861	2.106	52.560	2.99%	-1.29%
			2600	2.219	51.753	2.163	52.509	2.59%	-1.44%
			2650	2.279	51.607	2.234	52.445	2.01%	-1.60%
			2680	2.318	51.513	2.277	52.407	1.80%	-1.71%
			2700	2.343	51.443	2.305	52.392	1.65%	-1.79%
03/09/2020	5200~5800 Body	23	5180	5.421	47.394	5.276	49.041	2.76%	-3.36%
			5190	5.421	47.383	5.289	49.028	2.52%	-3.36%
			5200	5.434	47.383	5.299	49.014	2.55%	-3.33%
			5210	5.447	47.369	5.311	49.001	2.56%	-3.33%
			5220	5.457	47.348	5.323	48.987	2.52%	-3.35%
			5240	5.481	47.310	5.346	48.960	2.53%	-3.37%
			5250	5.494	47.286	5.358	48.947	2.54%	-3.38%
			5260	5.508	47.270	5.369	48.933	2.59%	-3.43%
			5270	5.524	47.256	5.381	48.919	2.65%	-3.44%
			5280	5.537	47.214	5.393	48.906	2.67%	-3.46%
			5290	5.550	47.200	5.404	48.892	2.70%	-3.46%
			5300	5.563	47.184	5.416	48.878	2.73%	-3.45%
			5310	5.577	47.151	5.428	48.865	2.75%	-3.43%
			5320	5.588	47.170	5.439	48.851	2.74%	-3.44%
			5330	5.602	46.871	5.450	48.837	2.99%	-3.57%
			5510	5.835	46.838	5.661	48.594	3.07%	-3.61%
			5520	5.848	46.811	5.673	48.580	3.08%	-3.64%
			5530	5.860	46.799	5.685	48.566	3.08%	-3.64%
			5540	5.871	46.793	5.696	48.553	3.07%	-3.62%
			5550	5.884	46.772	5.708	48.539	3.08%	-3.64%
			5560	5.897	46.758	5.720	48.526	3.09%	-3.64%
			5580	5.921	46.743	5.743	48.499	3.10%	-3.62%
			5600	5.953	46.707	5.766	48.471	3.24%	-3.64%
			5610	5.965	46.677	5.778	48.458	3.24%	-3.68%
			5620	5.980	46.653	5.790	48.444	3.28%	-3.70%
			5640	6.014	46.629	5.813	48.417	3.48%	-3.73%
			5650	6.030	46.582	5.827	48.390	3.46%	-3.74%
			5670	6.053	46.578	5.848	48.376	3.51%	-3.72%
			5680	6.065	46.572	5.860	48.363	3.50%	-3.70%
			5690	6.079	46.552	5.872	48.349	3.53%	-3.72%
			5700	6.091	46.533	5.883	48.336	3.54%	-3.73%
			5710	6.105	46.523	5.895	48.322	3.58%	-3.72%
			5720	6.119	46.506	5.907	48.309	3.59%	-3.73%
			5745	6.154	46.441	5.936	48.275	3.67%	-3.80%
			5750	6.160	46.428	5.942	48.269	3.67%	-3.81%
			5755	6.167	46.414	5.947	48.261	3.70%	-3.83%
			5765	6.179	46.401	5.959	48.248	3.69%	-3.83%
			5775	6.192	46.407	5.971	48.234	3.70%	-3.79%
			5785	6.210	46.408	5.982	48.220	3.81%	-3.78%
			5795	6.227	46.400	5.994	48.207	3.90%	-3.79%
			5800	6.239	46.382	6.000	48.200	3.82%	-3.79%
			5805	6.234	46.380	6.006	48.193	3.80%	-3.75%
			5825	6.263	46.342	6.029	48.166	3.88%	-3.79%
03/17/2020	5200~5800 Body	23	5180	5.429	47.464	5.276	49.041	2.90%	-3.22%
			5190	5.445	47.429	5.289	49.028	2.97%	-3.28%
			5200	5.460	47.403	5.299	49.014	3.04%	-3.28%
			5210	5.460	47.417	5.311	49.001	2.77%	-3.23%
			5220	5.468	47.376	5.323	48.987	2.72%	-3.28%
			5240	5.500	47.361	5.346	48.960	2.89%	-3.27%
			5250	5.527	47.383	5.358	48.947	3.08%	-3.20%
			5260	5.530	47.308	5.369	48.933	3.00%	-3.32%
			5270	5.541	47.274	5.381	48.919	3.01%	-3.39%
			5280	5.566	47.256	5.393	48.906	3.21%	-3.37%
			5290	5.577	47.230	5.404	48.892	3.20%	-3.38%
			5300	5.584	47.261	5.416	48.879	3.20%	-3.31%
			5310	5.593	47.255	5.428	48.865	3.04%	-3.29%
			5320	5.604	47.230	5.439	48.851	3.02%	-3.32%
			5500	5.814	46.926	5.650	48.607	3.01%	-3.50%
			5510	5.863	46.890	5.661	48.594	3.57%	-3.53%
			5520	5.882	46.892	5.673	48.580	3.68%	-3.47%
			5530	5.888	46.878	5.685	48.566	3.57%	-3.48%
			5540	5.912	46.854	5.696	48.553	3.79%	-3.48%
			5550	5.924	46.855	5.708	48.539	3.78%	-3.47%
			5560	5.926	46.797	5.720	48.526	3.60%	-3.58%
			5580	5.948	46.764	5.743	48.499	3.57%	-3.58%
			5600	5.950	46.757	5.766	48.471	3.68%	-3.54%
			5610	6.004	46.755	5.778	48.458	3.91%	-3.56%
			5620	6.035	46.692	5.790	48.444	4.08%	-3.62%
			5640	6.040	46.712	5.813	48.417	3.91%	-3.52%
			5650	6.074	46.628	5.827	48.390	4.06%	-3.64%
			5670	6.085	46.604	5.848	48.376	4.05%	-3.65%
			5680	6.089	46.581	5.860	48.363	4.08%	-3.68%
			5690	6.101	46.582	5.872	48.349	3.90%	-3.65%
			5700	6.125	46.556	5.883	48.336	4.13%	-3.68%
			5710	6.139	46.541	5.895	48.322	4.14%	-3.69%
			5720	6.152	46.523	5.907	48.309	4.15%	-3.68%
			5745	6.191	46.512	5.936	48.275	4.30%	-3.65%
			5750	6.197	46.477	5.942	48.269	4.53%	-3.73%
			5755	6.201	46.501	5.947	48.261	4.27%	-3.65%
			5765	6.215	46.459	5.959	48.248	4.30%	-3.73%
			5775	6.218	46.447	5.971	48.234	4.14%	-3.76%
			5785	6.240	46.462	5.982	48.220	4.31%	-3.65%
			5795	6.259	46.455	5.994	48.207	4.54%	-3.72%
			5800	6.259	46.391	6.000	48.200	4.32%	-3.78%
			5805	6.276	46.393	6.006	48.193	4.50%	-3.76%
			5825	6.295	46.356	6.029	48.166	4.43%	-3.78%

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

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	$Deviation_{1g}$ (%)
L	750	HEAD	02/26/2020	21.2	20.4	0.200	1054	7410	1.680	8.290	8.400	1.33%
H	835	HEAD	03/02/2020	22.7	21.3	0.200	4d133	7406	1.890	9.430	9.450	0.21%
L	1750	HEAD	02/26/2020	21.2	20.4	0.100	1150	7410	3.770	36.500	37.700	3.29%
G	1900	HEAD	03/05/2020	22.7	22.4	0.100	5d080	7409	4.120	39.800	41.200	3.52%
E	2450	HEAD	03/05/2020	23.2	23.0	0.100	719	3589	5.420	53.100	54.200	2.07%
E	2600	HEAD	03/12/2020	22.9	21.2	0.100	1064	3589	5.870	58.100	58.700	1.03%
H	5250	HEAD	03/09/2020	22.1	21.1	0.050	1057	7406	3.680	79.200	73.600	-7.07%
H	5600	HEAD	03/09/2020	22.1	21.1	0.050	1057	7406	3.900	84.100	78.000	-7.25%
H	5750	HEAD	03/09/2020	22.1	21.1	0.050	1057	7406	3.780	80.500	75.600	-6.09%
K	750	BODY	03/09/2020	23.0	21.5	0.200	1161	7547	1.690	8.430	8.450	0.24%
D	835	BODY	03/04/2020	21.9	21.3	0.200	4d047	7488	1.790	9.470	8.950	-5.49%
H	835	BODY	03/16/2020	22.7	22.0	0.200	4d132	7406	1.980	9.960	9.900	-0.60%
I	1750	BODY	02/26/2020	21.2	20.9	0.100	1148	7357	3.850	37.700	38.500	2.12%
I	1750	BODY	03/02/2020	22.8	22.0	0.100	1148	7357	3.910	37.700	39.100	3.71%
J	1900	BODY	03/12/2020	22.0	23.5	0.100	5d148	7571	4.180	39.100	41.800	6.91%
P	1900	BODY	03/16/2020	24.5	22.0	0.100	5d149	7551	4.100	39.400	41.000	4.06%
K	2450	BODY	03/02/2020	23.0	22.5	0.100	797	7547	5.070	51.100	50.700	-0.78%
K	2450	BODY	03/05/2020	23.5	23.0	0.100	719	7547	5.030	50.800	50.300	-0.98%
K	2450	BODY	03/16/2020	23.2	22.5	0.100	797	7547	5.050	51.100	50.500	-1.17%
K	2600	BODY	03/02/2020	23.0	22.5	0.100	1004	7547	5.610	54.800	56.100	2.37%
K	2600	BODY	03/16/2020	23.2	22.5	0.100	1004	7547	5.260	54.800	52.600	-4.01%
G	5250	BODY	03/09/2020	22.5	22.3	0.050	1191	7409	3.610	77.000	72.200	-6.23%
G	5600	BODY	03/09/2020	22.5	22.3	0.050	1191	7409	3.980	78.600	79.600	1.27%
G	5750	BODY	03/09/2020	22.5	22.3	0.050	1191	7409	3.710	76.900	74.200	-3.51%
G	5750	BODY	03/17/2020	22.8	22.3	0.050	1237	7409	3.740	75.900	74.800	-1.45%

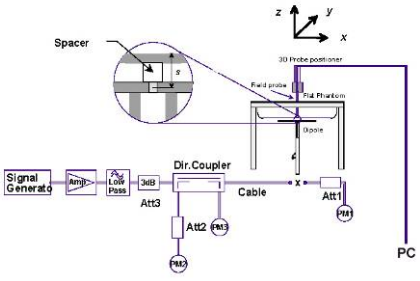


Figure 10-1
System Verification Setup Diagram

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	32.7	32.57	-0.15	Right	Cheek	10342	1	1:8.3	0.155	1.030	0.160	
836.60	190	GSM 850	GSM	32.7	32.57	0.09	Right	Tilt	10342	1	1:8.3	0.111	1.030	0.114	
836.60	190	GSM 850	GSM	32.7	32.57	0.06	Left	Cheek	10342	1	1:8.3	0.269	1.030	0.277	
836.60	190	GSM 850	GSM	32.7	32.57	-0.06	Left	Tilt	10342	1	1:8.3	0.154	1.030	0.159	
836.60	190	GSM 850	GPRS	28.7	28.70	-0.08	Right	Cheek	10342	4	1:2.076	0.338	1.000	0.338	
836.60	190	GSM 850	GPRS	28.7	28.70	0.01	Right	Tilt	10342	4	1:2.076	0.211	1.000	0.211	
836.60	190	GSM 850	GPRS	28.7	28.70	-0.01	Left	Cheek	10342	4	1:2.076	0.393	1.000	0.393	A1
836.60	190	GSM 850	GPRS	28.7	28.70	0.15	Left	Tilt	10342	4	1:2.076	0.227	1.000	0.227	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-2
GSM 1900 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	# of Time Slots	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GSM	30.7	30.60	0.05	Right	Cheek	10342	1	1:8.3	0.138	1.023	0.141	
1880.00	661	GSM 1900	GSM	30.7	30.60	0.12	Right	Tilt	10342	1	1:8.3	0.113	1.023	0.116	
1880.00	661	GSM 1900	GSM	30.7	30.60	0.12	Left	Cheek	10342	1	1:8.3	0.147	1.023	0.150	
1880.00	661	GSM 1900	GSM	30.7	30.60	0.03	Left	Tilt	10342	1	1:8.3	0.076	1.023	0.078	
1880.00	661	GSM 1900	GPRS	25.7	25.70	0.17	Right	Cheek	10342	4	1:2.076	0.172	1.000	0.172	
1880.00	661	GSM 1900	GPRS	25.7	25.70	-0.13	Right	Tilt	10342	4	1:2.076	0.144	1.000	0.144	
1880.00	661	GSM 1900	GPRS	25.7	25.70	0.06	Left	Cheek	10342	4	1:2.076	0.182	1.000	0.182	A2
1880.00	661	GSM 1900	GPRS	25.7	25.70	-0.19	Left	Tilt	10342	4	1:2.076	0.097	1.000	0.097	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-3
UMTS 850 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	25.2	24.97	0.18	Right	Cheek	10342	1:1	0.192	1.054	0.202	
836.60	4183	UMTS 850	RMC	25.2	24.97	0.20	Right	Tilt	10342	1:1	0.123	1.054	0.130	
836.60	4183	UMTS 850	RMC	25.2	24.97	0.07	Left	Cheek	10342	1:1	0.322	1.054	0.339	A3
836.60	4183	UMTS 850	RMC	25.2	24.97	0.05	Left	Tilt	10342	1:1	0.164	1.054	0.173	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-4
UMTS 1750 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1732.40	1412	UMTS 1750	RMC	24.7	24.39	0.09	Right	Cheek	10227	1:1	0.242	1.074	0.260	A4
1732.40	1412	UMTS 1750	RMC	24.7	24.39	0.17	Right	Tilt	10227	1:1	0.197	1.074	0.212	
1732.40	1412	UMTS 1750	RMC	24.7	24.39	-0.20	Left	Cheek	10227	1:1	0.185	1.074	0.199	
1732.40	1412	UMTS 1750	RMC	24.7	24.39	0.06	Left	Tilt	10227	1:1	0.156	1.074	0.168	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-5
UMTS 1900 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	9400	UMTS 1900	RMC	24.7	24.45	0.12	Right	Cheek	10334	1:1	0.396	1.059	0.419	A5
1880.00	9400	UMTS 1900	RMC	24.7	24.45	-0.02	Right	Tilt	10334	1:1	0.303	1.059	0.321	
1880.00	9400	UMTS 1900	RMC	24.7	24.45	0.19	Left	Cheek	10334	1:1	0.326	1.059	0.345	
1880.00	9400	UMTS 1900	RMC	24.7	24.45	0.03	Left	Tilt	10334	1:1	0.195	1.059	0.207	
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
CDMA BC10 (§90S) 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)	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.2	24.80	0.02	Right	Cheek	10334	1:1	0.332	1.096	0.364	A6
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.2	24.80	-0.11	Right	Tilt	10334	1:1	0.193	1.096	0.212	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.2	24.80	-0.04	Left	Cheek	10334	1:1	0.326	1.096	0.357	
820.10	564	CDMA BC10 (§90S)	RC3 / SO55	25.2	24.80	-0.01	Left	Tilt	10334	1:1	0.189	1.096	0.207	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.2	25.07	0.01	Right	Cheek	10334	1:1	0.251	1.030	0.259	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.2	25.07	0.06	Right	Tilt	10334	1:1	0.146	1.030	0.150	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.2	25.07	0.05	Left	Cheek	10334	1:1	0.161	1.030	0.166	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. A	25.2	25.07	0.16	Left	Tilt	10334	1:1	0.095	1.030	0.098	
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
CDMA BC0 (§22H) 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)	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.2	24.87	0.05	Right	Cheek	10334	1:1	0.332	1.079	0.358	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.2	24.87	0.02	Right	Tilt	10334	1:1	0.194	1.079	0.209	
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.2	24.87	-0.18	Left	Cheek	10334	1:1	0.355	1.079	0.383	A7
836.52	384	CDMA BC0 (§22H)	RC3 / SO55	25.2	24.87	-0.05	Left	Tilt	10334	1:1	0.208	1.079	0.224	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.2	25.11	0.02	Right	Cheek	10334	1:1	0.249	1.021	0.254	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.2	25.11	0.03	Right	Tilt	10334	1:1	0.148	1.021	0.151	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.2	25.11	0.03	Left	Cheek	10334	1:1	0.177	1.021	0.181	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. A	25.2	25.11	-0.04	Left	Tilt	10334	1:1	0.114	1.021	0.116	
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
PCS CDMA 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	600	PCS CDMA	RC3 / SO55	24.7	24.25	0.12	Right	Cheek	10334	1:1	0.429	1.109	**0.476**	A8
1880.00	600	PCS CDMA	RC3 / SO55	24.7	24.25	-0.01	Right	Tilt	10334	1:1	0.279	1.109	0.309	
1880.00	600	PCS CDMA	RC3 / SO55	24.7	24.25	0.14	Left	Cheek	10334	1:1	0.367	1.109	0.407	
1880.00	600	PCS CDMA	RC3 / SO55	24.7	24.25	-0.02	Left	Tilt	10334	1:1	0.199	1.109	0.221	
1880.00	600	PCS CDMA	EVDO Rev. A	24.7	24.51	0.00	Right	Cheek	10334	1:1	0.414	1.045	0.433	
1880.00	600	PCS CDMA	EVDO Rev. A	24.7	24.51	-0.13	Right	Tilt	10334	1:1	0.266	1.045	0.278	
1880.00	600	PCS CDMA	EVDO Rev. A	24.7	24.51	0.17	Left	Cheek	10334	1:1	0.318	1.045	0.332	
1880.00	600	PCS CDMA	EVDO Rev. A	24.7	24.51	0.12	Left	Tilt	10334	1:1	0.175	1.045	0.183	

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 11-9
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)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
680.50	133297	Mid	LTE Band 71	20	25.2	25.00	0.05	0	Right	Cheek	QPSK	1	50	10318	1:1	0.206	1.047	0.216	
680.50	133297	Mid	LTE Band 71	20	24.2	23.96	0.13	1	Right	Cheek	QPSK	50	25	10318	1:1	0.160	1.057	0.169	
680.50	133297	Mid	LTE Band 71	20	25.2	25.00	-0.17	0	Right	Tilt	QPSK	1	50	10318	1:1	0.084	1.047	0.088	
680.50	133297	Mid	LTE Band 71	20	24.2	23.96	0.08	1	Right	Tilt	QPSK	50	25	10318	1:1	0.065	1.057	0.069	
680.50	133297	Mid	LTE Band 71	20	25.2	25.00	0.03	0	Left	Cheek	QPSK	1	50	10318	1:1	0.214	1.047	0.224	A9
680.50	133297	Mid	LTE Band 71	20	24.2	23.96	0.12	1	Left	Cheek	QPSK	50	25	10318	1:1	0.181	1.057	0.191	
680.50	133297	Mid	LTE Band 71	20	25.2	25.00	0.09	0	Left	Tilt	QPSK	1	50	10318	1:1	0.108	1.047	0.113	
680.50	133297	Mid	LTE Band 71	20	24.2	23.96	0.04	1	Left	Tilt	QPSK	50	25	10318	1:1	0.090	1.057	0.095	

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 12 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.2	25.01	0.02	0	Right	Cheek	QPSK	1	25	10318	1:1	0.230	1.045	0.240	
707.50	23095	Mid	LTE Band 12	10	24.2	24.02	0.14	1	Right	Cheek	QPSK	25	12	10318	1:1	0.194	1.042	0.202	
707.50	23095	Mid	LTE Band 12	10	25.2	25.01	-0.03	0	Right	Tilt	QPSK	1	25	10318	1:1	0.132	1.045	0.138	
707.50	23095	Mid	LTE Band 12	10	24.2	24.02	-0.11	1	Right	Tilt	QPSK	25	12	10318	1:1	0.103	1.042	0.107	
707.50	23095	Mid	LTE Band 12	10	25.2	25.01	-0.07	0	Left	Cheek	QPSK	1	25	10318	1:1	0.291	1.045	0.304	A10
707.50	23095	Mid	LTE Band 12	10	24.2	24.02	0.00	1	Left	Cheek	QPSK	25	12	10318	1:1	0.238	1.042	0.248	
707.50	23095	Mid	LTE Band 12	10	25.2	25.01	0.07	0	Left	Tilt	QPSK	1	25	10318	1:1	0.183	1.045	0.191	
707.50	23095	Mid	LTE Band 12	10	24.2	24.02	-0.05	1	Left	Tilt	QPSK	25	12	10318	1:1	0.143	1.042	0.149	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																Head 1.6 W/kg (mW/g) averaged over 1 gram			

Table 11-11
LTE Band 13 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
782.00	23230	Mid	LTE Band 13	10	25.2	25.02	0.15	0	Right	Cheek	QPSK	1	25	10318	1:1	0.310	1.042	0.323	
782.00	23230	Mid	LTE Band 13	10	24.2	23.99	-0.05	1	Right	Cheek	QPSK	25	12	10318	1:1	0.251	1.050	0.264	
782.00	23230	Mid	LTE Band 13	10	25.2	25.02	0.16	0	Right	Tilt	QPSK	1	25	10318	1:1	0.160	1.042	0.167	
782.00	23230	Mid	LTE Band 13	10	24.2	23.99	0.00	1	Right	Tilt	QPSK	25	12	10318	1:1	0.134	1.050	0.141	
782.00	23230	Mid	LTE Band 13	10	25.2	25.02	0.01	0	Left	Cheek	QPSK	1	25	10318	1:1	0.336	1.042	0.350	A11
782.00	23230	Mid	LTE Band 13	10	24.2	23.99	0.09	1	Left	Cheek	QPSK	25	12	10318	1:1	0.276	1.050	0.290	
782.00	23230	Mid	LTE Band 13	10	25.2	25.02	0.01	0	Left	Tilt	QPSK	1	25	10318	1:1	0.180	1.042	0.188	
782.00	23230	Mid	LTE Band 13	10	24.2	23.99	-0.06	1	Left	Tilt	QPSK	25	12	10318	1:1	0.155	1.050	0.163	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																Head 1.6 W/kg (mW/g) averaged over 1 gram			

Table 11-12
LTE Band 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	25.2	25.12	-0.05	0	Right	Cheek	QPSK	1	36	10342	1:1	0.357	1.019	0.364	A12
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.08	0.06	1	Right	Cheek	QPSK	36	18	10342	1:1	0.293	1.028	0.301	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.2	25.12	0.07	0	Right	Tilt	QPSK	1	36	10342	1:1	0.179	1.019	0.182	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.08	0.16	1	Right	Tilt	QPSK	36	18	10342	1:1	0.111	1.028	0.114	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.2	25.12	0.02	0	Left	Cheek	QPSK	1	36	10342	1:1	0.301	1.019	0.307	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.08	0.09	1	Left	Cheek	QPSK	36	18	10342	1:1	0.248	1.028	0.255	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.2	25.12	0.01	0	Left	Tilt	QPSK	1	36	10342	1:1	0.156	1.019	0.159	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.08	0.05	1	Left	Tilt	QPSK	36	18	10342	1:1	0.127	1.028	0.131	
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
LTE Band 66 (AWS) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.63	-0.06	0	Right	Cheek	QPSK	1	50	10318	1:1	0.269	1.016	0.273	A13
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.68	-0.05	1	Right	Cheek	QPSK	50	0	10318	1:1	0.219	1.005	0.220	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.63	0.07	0	Right	Tilt	QPSK	1	50	10318	1:1	0.254	1.016	0.258	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.68	0.02	1	Right	Tilt	QPSK	50	0	10318	1:1	0.183	1.005	0.184	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.63	0.14	0	Left	Cheek	QPSK	1	50	10318	1:1	0.266	1.016	0.270	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.68	0.13	1	Left	Cheek	QPSK	50	0	10318	1:1	0.190	1.005	0.191	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.63	0.21	0	Left	Tilt	QPSK	1	50	10318	1:1	0.141	1.016	0.143	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.68	0.07	1	Left	Tilt	QPSK	50	0	10318	1:1	0.111	1.005	0.112	
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
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	24.7	24.57	0.01	0	Right	Cheek	QPSK	1	50	10334	1:1	0.370	1.030	0.381	
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.7	23.66	-0.02	1	Right	Cheek	QPSK	50	25	10334	1:1	0.272	1.009	0.274	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.7	24.57	0.06	0	Right	Tilt	QPSK	1	50	10334	1:1	0.269	1.030	0.277	
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.7	23.66	0.21	1	Right	Tilt	QPSK	50	25	10334	1:1	0.197	1.009	0.199	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.7	24.57	0.03	0	Left	Cheek	QPSK	1	50	10334	1:1	0.410	1.030	0.422	A14
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.7	23.66	0.02	1	Left	Cheek	QPSK	50	25	10334	1:1	0.302	1.009	0.305	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.7	24.57	0.06	0	Left	Tilt	QPSK	1	50	10334	1:1	0.216	1.030	0.222	
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.7	23.66	0.18	1	Left	Tilt	QPSK	50	25	10334	1:1	0.151	1.009	0.152	
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 11-15
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	2680.00	41490	High	LTE Band 41	20	24.7	24.34	0.17	0	Right	Cheek	QPSK	1	0	10342	1:1.58	0.079	1.086	0.086	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.7	24.55	0.12	0	Right	Cheek	QPSK	1	50	10342	1:1.58	0.087	1.035	0.090	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	23.7	23.51	0.14	1	Right	Cheek	QPSK	50	0	10342	1:1.58	0.065	1.045	0.068	
1 CC Uplink - Power Class 2	N/A	2680.00	41490	High	LTE Band 41	20	27.7	27.02	0.01	0	Right	Cheek	QPSK	1	0	10342	1:2.31	0.109	1.169	0.127	
1 CC Uplink - Power Class 2	N/A	2680.00	41490	High	LTE Band 41	20	27.7	27.27	0.12	0	Right	Cheek	QPSK	1	50	10342	1:2.31	0.115	1.104	0.127	
2 CC Uplink - Power Class 3	PCC	2680.00	41490	High	LTE Band 41	20	24.7	24.60	0.16	0	Right	Cheek	QPSK	1	0	10342	1:1.58	0.088	1.023	0.090	
	SCC	2660.20	41292												99						
2 CC Uplink - Power Class 2	PCC	2680.00	41490	High	LTE Band 41	20	27.7	27.45	0.12	0	Right	Cheek	QPSK	1	0	10342	1:2.31	0.126	1.059	0.133	A15
	SCC	2660.20	41292												99						
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.7	24.55	0.09	0	Right	Tilt	QPSK	1	50	10342	1:1.58	0.049	1.035	0.051	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	23.7	23.51	0.19	1	Right	Tilt	QPSK	50	0	10342	1:1.58	0.037	1.045	0.039	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.7	24.55	0.18	0	Left	Cheek	QPSK	1	50	10342	1:1.58	0.054	1.035	0.056	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	23.7	23.51	0.12	1	Left	Cheek	QPSK	50	0	10342	1:1.58	0.040	1.045	0.042	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.7	24.55	0.15	0	Left	Tilt	QPSK	1	50	10342	1:1.58	0.076	1.035	0.079	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	23.7	23.51	0.14	1	Left	Tilt	QPSK	50	0	10342	1:1.58	0.054	1.045	0.056	
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 11-16
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	21.0	20.54	0.13	Right	Cheek	10227	1	99.4	0.568	0.374	1.112	1.006	**0.418**	A16
2437	6	802.11b	DSSS	22	21.0	20.54	0.03	Right	Tilt	10227	1	99.4	0.406	0.294	1.112	1.006	0.329	
2437	6	802.11b	DSSS	22	21.0	20.54	0.01	Left	Cheek	10227	1	99.4	0.211	-	1.112	1.006	-	
2437	6	802.11b	DSSS	22	21.0	20.54	0.02	Left	Tilt	10227	1	99.4	0.184	-	1.112	1.006	-	
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 11-17
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)	
5260	52	802.11a	OFDM	20	17.0	16.98	0.13	Right	Cheek	10219	6	96.9	0.753	-	1.005	1.032	-	
5260	52	802.11a	OFDM	20	17.0	16.98	0.08	Right	Tilt	10219	6	96.9	0.827	0.362	1.005	1.032	0.375	
5260	52	802.11a	OFDM	20	17.0	16.98	0.14	Left	Cheek	10219	6	96.9	0.568	-	1.005	1.032	-	
5260	52	802.11a	OFDM	20	17.0	16.98	0.09	Left	Tilt	10219	6	96.9	0.581	-	1.005	1.032	-	
5720	144	802.11a	OFDM	20	17.5	17.14	0.14	Right	Cheek	10219	6	96.9	1.198	0.570	1.086	1.032	0.639	
5500	100	802.11a	OFDM	20	17.0	16.89	0.10	Right	Tilt	10219	6	96.9	0.969	0.454	1.026	1.032	0.481	
5660	132	802.11a	OFDM	20	17.5	17.01	0.15	Right	Tilt	10219	6	96.9	1.089	0.567	1.119	1.032	0.655	
5720	144	802.11a	OFDM	20	17.5	17.14	0.14	Right	Tilt	10219	6	96.9	1.252	0.596	1.086	1.032	**0.668**	
5720	144	802.11a	OFDM	20	17.5	17.14	0.12	Left	Cheek	10219	6	96.9	0.846	-	1.086	1.032	-	
5720	144	802.11a	OFDM	20	17.5	17.14	-0.13	Left	Tilt	10219	6	96.9	0.991	-	1.086	1.032	-	
5825	165	802.11a	OFDM	20	17.5	17.43	0.21	Right	Cheek	10219	6	96.9	1.226	0.610	1.016	1.032	0.640	A17
5825	165	802.11a	OFDM	20	17.5	17.43	0.12	Right	Tilt	10219	6	96.9	1.127	0.577	1.016	1.032	0.605	
5825	165	802.11a	OFDM	20	17.5	17.43	0.14	Left	Cheek	10219	6	96.9	0.915	-	1.016	1.032	-	
5825	165	802.11a	OFDM	20	17.5	17.43	0.12	Left	Tilt	10219	6	96.9	0.989	-	1.016	1.032	-	
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 11-18
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	10.0	8.78	-0.11	Right	Cheek	10219	1	76.5	0.029	1.323	1.307	**0.050**	A18
2441.00	39	Bluetooth	FHSS	10.0	8.78	0.14	Right	Tilt	10219	1	76.5	0.019	1.323	1.307	0.033	
2441.00	39	Bluetooth	FHSS	10.0	8.78	0.16	Left	Cheek	10219	1	76.5	0.011	1.323	1.307	0.019	
2441.00	39	Bluetooth	FHSS	10.0	8.78	0.11	Left	Tilt	10219	1	76.5	0.010	1.323	1.307	0.017	
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 11-19
GSM/UMTS/CDMA Body-Worn SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	32.7	32.57	-0.04	10 mm	10342	1	1:8.3	back	0.338	1.030	0.348	
836.60	190	GSM 850	GPRS	28.7	28.70	0.13	10 mm	10342	4	1:2.076	back	0.564	1.000	0.564	A19
1880.00	661	GSM 1900	GSM	30.7	30.60	0.04	10 mm	10342	1	1:8.3	back	0.229	1.023	0.234	
1880.00	661	GSM 1900	GPRS	25.7	25.70	0.00	10 mm	10342	4	1:2.076	back	0.273	1.000	0.273	A20
836.60	4183	UMTS 850	RMC	25.2	24.97	0.10	10 mm	10318	N/A	1:1	back	0.413	1.054	0.435	A22
1712.40	1312	UMTS 1750	RMC	24.7	24.40	-0.08	10 mm	10334	N/A	1:1	back	0.684	1.072	0.733	
1732.40	1412	UMTS 1750	RMC	24.7	24.39	0.11	10 mm	10334	N/A	1:1	back	0.699	1.074	0.751	A23
1752.60	1513	UMTS 1750	RMC	24.7	24.36	-0.08	10 mm	10334	N/A	1:1	back	0.626	1.081	0.677	
1852.40	9262	UMTS 1900	RMC	24.7	24.55	-0.02	10 mm	10334	N/A	1:1	back	0.620	1.035	0.642	
1880.00	9400	UMTS 1900	RMC	24.7	24.45	-0.16	10 mm	10334	N/A	1:1	back	0.586	1.059	0.621	
1907.60	9538	UMTS 1900	RMC	24.7	24.53	-0.03	10 mm	10334	N/A	1:1	back	0.623	1.040	0.648	A24
820.10	564	CDMA BC10 (§90S)	TDSO / SO32	25.2	25.10	-0.03	10 mm	10318	N/A	1:1	back	0.392	1.023	0.401	A26
836.52	384	CDMA BC0 (§22H)	TDSO / SO32	25.2	25.15	-0.13	10 mm	10318	N/A	1:1	back	0.514	1.012	0.520	A28
1880.00	600	PCS CDMA	TDSO / SO32	24.7	24.51	-0.02	10 mm	10334	N/A	1:1	back	0.516	1.045	0.539	A30
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
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	25.2	25.00	-0.04	0	10334	QPSK	1	50	10 mm	back	1:1	0.395	1.047	0.414	A32
680.50	133297	Mid	LTE Band 71	20	24.2	23.96	0.00	1	10334	QPSK	50	25	10 mm	back	1:1	0.308	1.057	0.326	
707.50	23095	Mid	LTE Band 12	10	25.2	25.01	0.08	0	10334	QPSK	1	25	10 mm	back	1:1	0.418	1.045	0.437	A33
707.50	23095	Mid	LTE Band 12	10	24.2	24.02	0.08	1	10334	QPSK	25	12	10 mm	back	1:1	0.328	1.042	0.342	
782.00	23230	Mid	LTE Band 13	10	25.2	25.02	-0.05	0	10334	QPSK	1	25	10 mm	back	1:1	0.572	1.042	0.596	A34
782.00	23230	Mid	LTE Band 13	10	24.2	23.99	-0.04	1	10334	QPSK	25	12	10 mm	back	1:1	0.446	1.050	0.468	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.2	25.12	0.00	0	10326	QPSK	1	36	10 mm	back	1:1	0.405	1.019	0.413	A35
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.08	-0.03	1	10326	QPSK	36	18	10 mm	back	1:1	0.338	1.028	0.347	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.7	24.62	-0.12	0	10334	QPSK	1	50	10 mm	back	1:1	0.725	1.019	0.739	A36
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.7	24.54	0.02	0	10334	QPSK	1	50	10 mm	back	1:1	0.724	1.038	0.752	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.63	0.02	0	10334	QPSK	1	50	10 mm	back	1:1	0.656	1.016	0.666	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.68	0.03	1	10334	QPSK	50	0	10 mm	back	1:1	0.527	1.005	0.530	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.7	24.57	-0.04	0	10334	QPSK	1	50	10 mm	back	1:1	0.563	1.030	0.580	A37
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.7	23.66	-0.02	1	10334	QPSK	50	25	10 mm	back	1:1	0.424	1.009	0.428	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population															Body 1.6 W/kg (mW/g) averaged over 1 gram				

Table 11-21
LTE Band 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	2506.00	39750	Low	LTE Band 41	20	24.7	24.54	0.06	0	10318	QPSK	1	99	10 mm	back	1:1.58	0.593	1.038	0.616	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	24.7	24.31	0.01	0	10318	QPSK	1	50	10 mm	back	1:1.58	0.709	1.094	0.776	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	24.7	24.22	0.00	0	10318	QPSK	1	0	10 mm	back	1:1.58	0.713	1.117	0.796	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	24.7	24.35	0.08	0	10318	QPSK	1	50	10 mm	back	1:1.58	0.736	1.084	0.798	
1 CC Uplink - Power Class 3	N/A	2636.50	41055	Mid-High	LTE Band 41	20	24.7	24.26	-0.02	0	10318	QPSK	1	50	10 mm	back	1:1.58	0.674	1.107	0.746	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.7	24.55	-0.03	0	10318	QPSK	1	50	10 mm	back	1:1.58	0.607	1.035	0.628	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	23.7	23.51	0.10	1	10318	QPSK	50	0	10 mm	back	1:1.58	0.414	1.045	0.433	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	23.7	23.50	0.01	1	10318	QPSK	100	0	10 mm	back	1:1.58	0.473	1.047	0.495	
1 CC Uplink - Power Class 2	N/A	2593.00	40620	Mid	LTE Band 41	20	27.7	27.13	-0.02	0	10318	QPSK	1	0	10 mm	back	1:2.31	0.923	1.140	1.052	
1 CC Uplink - Power Class 2	N/A	2593.00	40620	Mid	LTE Band 41	20	27.7	27.27	-0.04	0	10318	QPSK	1	50	10 mm	back	1:2.31	1.030	1.104	**1.137**	A39
2 CC Uplink - Power Class 3	PCC	2593.00	40620	Mid	LTE Band 41	20	24.7	24.12	0.04	0	10318	QPSK	1	0	10 mm	back	1:1.58	0.663	1.143	0.758	
	SCC	2573.20	40422											99							
2 CC Uplink - Power Class 2	PCC	2593.00	40620	Mid	LTE Band 41	20	27.7	27.26	-0.13	0	10318	QPSK	1	0	10 mm	back	1:2.31	0.905	1.107	1.002	
	SCC	2573.20	40422											99							
1 CC Uplink - Power Class 2	N/A	2593.00	40620	Mid	LTE Band 41	20	27.7	27.27	-0.04	0	10318	QPSK	1	50	10 mm	back	1:2.31	0.988	1.104	1.091	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																Body 1.6 W/kg (mW/g) averaged over 1 gram					

Note: Blue entry represents variability measurement.

Table 11-22
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	22.41	0.02	10 mm	10219	1	back	99.4	0.809	0.497	1.146	1.006	**0.573**	A40
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
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	18.35	-0.12	10 mm	10227	6	back	96.9	0.807	0.405	1.161	1.032	0.485	
5720	144	802.11a	OFDM	20	19.5	18.78	0.05	10 mm	10227	6	back	96.9	0.810	0.461	1.180	1.032	0.561	
5825	165	802.11a	OFDM	20	19.5	19.22	-0.12	10 mm	10227	6	back	96.9	1.133	0.541	1.067	1.032	**0.596**	A41
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
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	10.0	8.78	0.18	10 mm	10219	1	back	76.5	0.020	1.324	1.307	**0.035**	A42
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 11-25
GPRS/UMTS/CDMA Hotspot SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of 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	28.7	28.70	0.13	10 mm	10342	4	1:2.076	back	0.564	1.000	0.564	A19
836.60	190	GSM 850	GPRS	28.7	28.70	-0.13	10 mm	10342	4	1:2.076	front	0.498	1.000	0.498	
836.60	190	GSM 850	GPRS	28.7	28.70	-0.12	10 mm	10342	4	1:2.076	bottom	0.218	1.000	0.218	
836.60	190	GSM 850	GPRS	28.7	28.70	-0.10	10 mm	10342	4	1:2.076	left	0.473	1.000	0.473	
1880.00	661	GSM 1900	GPRS	25.7	25.70	0.00	10 mm	10342	4	1:2.076	back	0.273	1.000	0.273	
1880.00	661	GSM 1900	GPRS	25.7	25.70	0.19	10 mm	10342	4	1:2.076	front	0.378	1.000	0.378	A21
1880.00	661	GSM 1900	GPRS	25.7	25.70	0.04	10 mm	10342	4	1:2.076	bottom	0.315	1.000	0.315	
1880.00	661	GSM 1900	GPRS	25.7	25.70	-0.13	10 mm	10342	4	1:2.076	right	0.152	1.000	0.152	
836.60	4183	UMTS 850	RMC	25.2	24.97	0.10	10 mm	10318	N/A	1:1	back	0.413	1.054	0.435	A22
836.60	4183	UMTS 850	RMC	25.2	24.97	0.00	10 mm	10318	N/A	1:1	front	0.364	1.054	0.384	
836.60	4183	UMTS 850	RMC	25.2	24.97	0.02	10 mm	10318	N/A	1:1	bottom	0.193	1.054	0.203	
836.60	4183	UMTS 850	RMC	25.2	24.97	-0.02	10 mm	10318	N/A	1:1	left	0.312	1.054	0.329	
1712.40	1312	UMTS 1750	RMC	24.7	24.40	-0.08	10 mm	10334	N/A	1:1	back	0.684	1.072	0.733	
1732.40	1412	UMTS 1750	RMC	24.7	24.39	0.11	10 mm	10334	N/A	1:1	back	0.699	1.074	0.751	A23
1752.60	1513	UMTS 1750	RMC	24.7	24.36	-0.08	10 mm	10334	N/A	1:1	back	0.626	1.081	0.677	
1732.40	1412	UMTS 1750	RMC	24.7	24.39	-0.06	10 mm	10334	N/A	1:1	front	0.650	1.074	0.698	
1732.40	1412	UMTS 1750	RMC	24.7	24.39	0.06	10 mm	10334	N/A	1:1	bottom	0.517	1.074	0.555	
1732.40	1412	UMTS 1750	RMC	24.7	24.39	0.06	10 mm	10334	N/A	1:1	right	0.162	1.074	0.174	
1880.00	9400	UMTS 1900	RMC	24.7	24.45	-0.16	10 mm	10334	N/A	1:1	back	0.586	1.059	0.621	
1852.40	9262	UMTS 1900	RMC	24.7	24.55	0.06	10 mm	10334	N/A	1:1	front	0.760	1.035	0.787	A25
1880.00	9400	UMTS 1900	RMC	24.7	24.45	0.05	10 mm	10334	N/A	1:1	front	0.736	1.059	0.779	
1907.60	9538	UMTS 1900	RMC	24.7	24.53	-0.10	10 mm	10334	N/A	1:1	front	0.730	1.040	0.759	
1880.00	9400	UMTS 1900	RMC	24.7	24.45	0.01	10 mm	10334	N/A	1:1	bottom	0.691	1.059	0.732	
1880.00	9400	UMTS 1900	RMC	24.7	24.45	-0.03	10 mm	10334	N/A	1:1	right	0.400	1.059	0.424	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.2	25.06	0.01	10 mm	10318	N/A	1:1	back	0.351	1.033	0.363	A27
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.2	25.06	-0.01	10 mm	10318	N/A	1:1	front	0.347	1.033	0.358	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.2	25.06	0.04	10 mm	10318	N/A	1:1	bottom	0.169	1.033	0.175	
820.10	564	CDMA BC10 (§90S)	EVDO Rev. 0	25.2	25.06	-0.02	10 mm	10318	N/A	1:1	left	0.339	1.033	0.350	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.2	25.10	0.05	10 mm	10318	N/A	1:1	back	0.353	1.023	0.361	A29
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.2	25.10	-0.01	10 mm	10318	N/A	1:1	front	0.302	1.023	0.309	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.2	25.10	0.06	10 mm	10318	N/A	1:1	bottom	0.189	1.023	0.193	
836.52	384	CDMA BC0 (§22H)	EVDO Rev. 0	25.2	25.10	-0.01	10 mm	10318	N/A	1:1	left	0.288	1.023	0.295	
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.57	-0.09	10 mm	10334	N/A	1:1	back	0.416	1.030	0.428	
1851.25	25	PCS CDMA	EVDO Rev. 0	24.7	24.53	0.04	10 mm	10334	N/A	1:1	front	0.575	1.040	0.598	
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.57	-0.21	10 mm	10334	N/A	1:1	front	0.599	1.030	0.617	A31
1908.75	1175	PCS CDMA	EVDO Rev. 0	24.7	24.62	0.04	10 mm	10334	N/A	1:1	front	0.575	1.019	0.586	
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.57	-0.06	10 mm	10334	N/A	1:1	bottom	0.438	1.030	0.451	
1880.00	600	PCS CDMA	EVDO Rev. 0	24.7	24.57	0.03	10 mm	10334	N/A	1:1	right	0.259	1.030	0.267	
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 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	25.2	25.00	-0.04	0	10334	QPSK	1	50	10 mm	back	1:1	0.395	1.047	0.414	A32
680.50	133297	Mid	LTE Band 71	20	24.2	23.96	0.00	1	10334	QPSK	50	25	10 mm	back	1:1	0.308	1.057	0.326	
680.50	133297	Mid	LTE Band 71	20	25.2	25.00	0.01	0	10334	QPSK	1	50	10 mm	front	1:1	0.280	1.047	0.293	
680.50	133297	Mid	LTE Band 71	20	24.2	23.96	0.01	1	10334	QPSK	50	25	10 mm	front	1:1	0.220	1.057	0.233	
680.50	133297	Mid	LTE Band 71	20	25.2	25.00	0.05	0	10334	QPSK	1	50	10 mm	bottom	1:1	0.114	1.047	0.119	
680.50	133297	Mid	LTE Band 71	20	24.2	23.96	0.05	1	10334	QPSK	50	25	10 mm	bottom	1:1	0.085	1.057	0.090	
680.50	133297	Mid	LTE Band 71	20	25.2	25.00	0.00	0	10334	QPSK	1	50	10 mm	left	1:1	0.378	1.047	0.396	
680.50	133297	Mid	LTE Band 71	20	24.2	23.96	0.03	1	10334	QPSK	50	25	10 mm	left	1:1	0.294	1.057	0.311	
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 12 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.2	25.01	0.08	0	10334	QPSK	1	25	10 mm	back	1:1	0.418	1.045	0.437	A33
707.50	23095	Mid	LTE Band 12	10	24.2	24.02	0.08	1	10334	QPSK	25	12	10 mm	back	1:1	0.328	1.042	0.342	
707.50	23095	Mid	LTE Band 12	10	25.2	25.01	-0.01	0	10334	QPSK	1	25	10 mm	front	1:1	0.355	1.045	0.371	
707.50	23095	Mid	LTE Band 12	10	24.2	24.02	-0.01	1	10334	QPSK	25	12	10 mm	front	1:1	0.273	1.042	0.284	
707.50	23095	Mid	LTE Band 12	10	25.2	25.01	0.08	0	10334	QPSK	1	25	10 mm	bottom	1:1	0.142	1.045	0.148	
707.50	23095	Mid	LTE Band 12	10	24.2	24.02	0.02	1	10334	QPSK	25	12	10 mm	bottom	1:1	0.105	1.042	0.109	
707.50	23095	Mid	LTE Band 12	10	25.2	25.01	0.08	0	10334	QPSK	1	25	10 mm	left	1:1	0.402	1.045	0.420	
707.50	23095	Mid	LTE Band 12	10	24.2	24.02	0.08	1	10334	QPSK	25	12	10 mm	left	1:1	0.302	1.042	0.315	
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 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	25.2	25.02	-0.05	0	10334	QPSK	1	25	10 mm	back	1:1	0.572	1.042	0.596	A34
782.00	23230	Mid	LTE Band 13	10	24.2	23.99	-0.04	1	10334	QPSK	25	12	10 mm	back	1:1	0.446	1.050	0.468	
782.00	23230	Mid	LTE Band 13	10	25.2	25.02	0.03	0	10334	QPSK	1	25	10 mm	front	1:1	0.430	1.042	0.448	
782.00	23230	Mid	LTE Band 13	10	24.2	23.99	0.02	1	10334	QPSK	25	12	10 mm	front	1:1	0.339	1.050	0.356	
782.00	23230	Mid	LTE Band 13	10	25.2	25.02	0.13	0	10334	QPSK	1	25	10 mm	bottom	1:1	0.199	1.042	0.207	
782.00	23230	Mid	LTE Band 13	10	24.2	23.99	0.07	1	10334	QPSK	25	12	10 mm	bottom	1:1	0.151	1.050	0.159	
782.00	23230	Mid	LTE Band 13	10	25.2	25.02	-0.07	0	10334	QPSK	1	25	10 mm	left	1:1	0.412	1.042	0.429	
782.00	23230	Mid	LTE Band 13	10	24.2	23.99	-0.01	1	10334	QPSK	25	12	10 mm	left	1:1	0.316	1.050	0.332	
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 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	25.2	25.12	0.00	0	10326	QPSK	1	36	10 mm	back	1:1	0.405	1.019	0.413	A35
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.08	-0.03	1	10326	QPSK	36	18	10 mm	back	1:1	0.338	1.028	0.347	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.2	25.12	-0.04	0	10326	QPSK	1	36	10 mm	front	1:1	0.383	1.019	0.390	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.08	-0.01	1	10326	QPSK	36	18	10 mm	front	1:1	0.316	1.028	0.325	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.2	25.12	0.00	0	10326	QPSK	1	36	10 mm	bottom	1:1	0.194	1.019	0.198	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.08	-0.05	1	10326	QPSK	36	18	10 mm	bottom	1:1	0.157	1.028	0.161	
831.50	26865	Mid	LTE Band 26 (Cell)	15	25.2	25.12	-0.04	0	10326	QPSK	1	36	10 mm	left	1:1	0.302	1.019	0.308	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.2	24.08	0.01	1	10326	QPSK	36	18	10 mm	left	1:1	0.256	1.028	0.263	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 11-30
LTE Band 66 (AWS) Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.7	24.62	-0.12	0	10334	QPSK	1	50	10 mm	back	1:1	0.725	1.019	0.739	A36
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.7	24.54	0.02	0	10334	QPSK	1	50	10 mm	back	1:1	0.724	1.038	0.752	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.63	0.02	0	10334	QPSK	1	50	10 mm	back	1:1	0.656	1.016	0.666	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.68	0.03	1	10334	QPSK	50	0	10 mm	back	1:1	0.527	1.005	0.530	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.7	24.62	-0.13	0	10334	QPSK	1	50	10 mm	front	1:1	0.614	1.019	0.626	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.7	24.54	0.01	0	10334	QPSK	1	50	10 mm	front	1:1	0.711	1.038	0.738	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.63	0.11	0	10334	QPSK	1	50	10 mm	front	1:1	0.692	1.016	0.703	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.68	-0.08	1	10334	QPSK	50	0	10 mm	front	1:1	0.526	1.005	0.529	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.63	-0.03	0	10334	QPSK	1	50	10 mm	bottom	1:1	0.561	1.016	0.570	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.68	0.05	1	10334	QPSK	50	0	10 mm	bottom	1:1	0.422	1.005	0.424	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.7	24.63	0.09	0	10334	QPSK	1	50	10 mm	right	1:1	0.232	1.016	0.236	
1770.00	132572	High	LTE Band 66 (AWS)	20	23.7	23.68	0.09	1	10334	QPSK	50	0	10 mm	right	1:1	0.165	1.005	0.166	
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 11-31
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	24.7	24.57	-0.04	0	10334	QPSK	1	50	10 mm	back	1:1	0.563	1.030	0.580	
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.7	23.66	-0.02	1	10334	QPSK	50	25	10 mm	back	1:1	0.424	1.009	0.428	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.7	24.57	-0.04	0	10334	QPSK	1	50	10 mm	front	1:1	0.892	1.030	0.919	A38
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.7	24.55	0.02	0	10334	QPSK	1	50	10 mm	front	1:1	0.872	1.035	0.903	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.7	24.55	0.02	0	10334	QPSK	1	50	10 mm	front	1:1	0.838	1.035	0.867	
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.7	23.66	0.02	1	10334	QPSK	50	25	10 mm	front	1:1	0.650	1.009	0.656	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	23.7	23.60	0.01	1	10334	QPSK	100	0	10 mm	front	1:1	0.660	1.023	0.675	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.7	24.57	0.02	0	10334	QPSK	1	50	10 mm	bottom	1:1	0.621	1.030	0.640	
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.7	23.66	-0.02	1	10334	QPSK	50	25	10 mm	bottom	1:1	0.444	1.009	0.448	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.7	24.57	0.00	0	10334	QPSK	1	50	10 mm	right	1:1	0.285	1.030	0.294	
1860.00	26140	Low	LTE Band 25 (PCS)	20	23.7	23.66	-0.01	1	10334	QPSK	50	25	10 mm	right	1:1	0.213	1.009	0.215	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.7	24.57	0.05	0	10334	QPSK	1	50	10 mm	front	1:1	0.872	1.030	0.898	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram						

Note: Blue entry represents variability measurement.

Table 11-32
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	2506.00	39750	Low	LTE Band 41	20	24.7	24.54	0.06	0	10318	QPSK	1	99	10 mm	back	1:1.58	0.593	1.038	0.616	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	24.7	24.31	0.01	0	10318	QPSK	1	50	10 mm	back	1:1.58	0.709	1.094	0.776	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	24.7	24.22	0.00	0	10318	QPSK	1	0	10 mm	back	1:1.58	0.713	1.117	0.796	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	24.7	24.35	0.08	0	10318	QPSK	1	50	10 mm	back	1:1.58	0.736	1.084	0.798	
1 CC Uplink - Power Class 3	N/A	2636.50	41055	Mid-High	LTE Band 41	20	24.7	24.26	-0.02	0	10318	QPSK	1	50	10 mm	back	1:1.58	0.674	1.107	0.746	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.7	24.55	-0.03	0	10318	QPSK	1	50	10 mm	back	1:1.58	0.607	1.035	0.628	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	23.7	23.51	0.10	1	10318	QPSK	50	0	10 mm	back	1:1.58	0.414	1.045	0.433	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	23.7	23.50	0.01	1	10318	QPSK	100	0	10 mm	back	1:1.58	0.473	1.047	0.495	
1 CC Uplink - Power Class 2	N/A	2593.00	40620	Mid	LTE Band 41	20	27.7	27.13	-0.02	0	10318	QPSK	1	0	10 mm	back	1:2.31	0.923	1.140	1.052	
1 CC Uplink - Power Class 2	N/A	2593.00	40620	Mid	LTE Band 41	20	27.7	27.27	-0.04	0	10318	QPSK	1	50	10 mm	back	1:2.31	1.030	1.104	1.137	A39
2 CC Uplink - Power Class 3	PCC	2593.00	40620	Mid	LTE Band 41	20	24.7	24.12	0.04	0	10318	QPSK	1	0	10 mm	back	1:1.58	0.663	1.143	0.758	
	SCC	2573.20	40422										1	99							
2 CC Uplink - Power Class 2	PCC	2593.00	40620	Mid	LTE Band 41	20	27.7	27.26	-0.13	0	10318	QPSK	1	0	10 mm	back	1:2.31	0.905	1.107	1.002	
	SCC	2573.20	40422										1	99							
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.7	24.55	0.18	0	10318	QPSK	1	50	10 mm	front	1:1.58	0.097	1.035	0.100	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	23.7	23.51	0.19	1	10318	QPSK	50	0	10 mm	front	1:1.58	0.073	1.045	0.076	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.7	24.55	0.04	0	10318	QPSK	1	50	10 mm	bottom	1:1.58	0.475	1.035	0.492	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	23.7	23.51	0.03	1	10318	QPSK	50	0	10 mm	bottom	1:1.58	0.375	1.045	0.392	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.7	24.55	-0.16	0	10318	QPSK	1	50	10 mm	right	1:1.58	0.150	1.035	0.155	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	23.7	23.51	-0.01	1	10318	QPSK	50	0	10 mm	right	1:1.58	0.118	1.045	0.123	
1 CC Uplink - Power Class 2	N/A	2593.00	40620	Mid	LTE Band 41	20	27.7	27.27	-0.04	0	10318	QPSK	1	50	10 mm	back	1:2.31	0.988	1.104	1.091	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																Body 1.6 W/kg (mW/g) averaged over 1 gram					

Note: Blue entry represents variability measurement.

Table 11-33
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	22.41	0.02	10 mm	10219	1	back	99.4	0.809	0.497	1.146	1.006	**0.573**	A40
2412	1	802.11b	DSSS	22	23.0	22.41	-0.07	10 mm	10219	1	front	99.4	0.191	-	1.146	1.006	-	
2412	1	802.11b	DSSS	22	23.0	22.41	0.15	10 mm	10219	1	top	99.4	0.227	0.149	1.146	1.006	0.172	
2412	1	802.11b	DSSS	22	23.0	22.41	0.12	10 mm	10219	1	left	99.4	0.225	-	1.146	1.006	-	
5200	40	802.11a	OFDM	20	19.0	18.72	-0.15	10 mm	10227	6	back	96.9	0.708	0.399	1.067	1.032	0.439	
5200	40	802.11a	OFDM	20	19.0	18.72	0.18	10 mm	10227	6	front	96.9	0.224	-	1.067	1.032	-	
5200	40	802.11a	OFDM	20	19.0	18.72	0.15	10 mm	10227	6	top	96.9	0.382	0.176	1.067	1.032	0.194	
5200	40	802.11a	OFDM	20	19.0	18.72	0.15	10 mm	10227	6	left	96.9	0.336	-	1.067	1.032	-	
5825	165	802.11a	OFDM	20	19.5	19.22	-0.12	10 mm	10227	6	back	96.9	1.133	0.541	1.067	1.032	**0.596**	A41
5825	165	802.11a	OFDM	20	19.5	19.22	0.13	10 mm	10227	6	front	96.9	0.388	-	1.067	1.032	-	
5825	165	802.11a	OFDM	20	19.5	19.22	0.16	10 mm	10227	6	top	96.9	0.511	-	1.067	1.032	-	
5825	165	802.11a	OFDM	20	19.5	19.22	0.11	10 mm	10227	6	left	96.9	0.665	0.289	1.067	1.032	0.318	
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 11-34
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) (W/kg)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g) (W/kg)	Plot #
MHz	Ch.															
2441	39	Bluetooth	FHSS	10.0	8.78	0.18	10 mm	10219	1	back	76.5	0.020	1.324	1.307	**0.035**	A42
2441	39	Bluetooth	FHSS	10.0	8.78	-0.13	10 mm	10219	1	front	76.5	0.008	1.324	1.307	0.014	
2441	39	Bluetooth	FHSS	10.0	8.78	0.06	10 mm	10219	1	top	76.5	0.006	1.324	1.307	0.010	
2441	39	Bluetooth	FHSS	10.0	8.78	-0.13	10 mm	10219	1	left	76.5	0.005	1.324	1.307	0.009	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram								

11.4 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01r03, body-worn SAR was evaluated without a headset connected to the device. Since the standalone reported body-worn SAR was ≤ 1.2 W/kg, no additional body-worn SAR evaluations using a headset cable were required.
8. Per FCC KDB 865664 D01v01r04, variability SAR tests were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 13 for variability analysis.
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v02r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
10. The orange highlights throughout the report represents the highest SAR per FCC 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.

CDMA Notes:

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

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 8.6.4.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 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 FCC Guidance, all SAR tests were performed using Power Class 3. SAR with power class 2 at the available duty factor was additionally performed for the power class 3 configuration with the highest SAR configuration for each exposure conditions. Please see Section 14 for linearity results.
8. For LTE Band 41, per FCC guidance, SAR was first measured with only a single carrier active in the uplink (carrier aggregation not active). For each exposure condition, the uplink CA scenario with two component carriers was additionally tested for the configuration with the highest SAR when carrier aggregation was not active. The SCC was configured with the closest available contiguous channel. The two component carriers were configured so the resource blocks are physically allocated side by side to achieve the maximum output power.

9. This device supports LTE Band 41 ULCA active with Power Class 2. Highest SAR test configuration for each exposure condition in Power Class 3 with ULCA active was repeated with Power Class 2 with ULCA active.

WLAN Notes:

1. For held-to-ear and hotspot operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg 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 8.7.5 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 8.7.6 for more information.
4. When the maximum reported 1g averaged SAR is ≤0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg 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 9.6 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 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	0.393	0.418	0.811
	GSM/GPRS 1900	0.182	0.418	0.600
	UMTS 850	0.339	0.418	0.757
	UMTS 1750	0.260	0.418	0.678
	UMTS 1900	0.419	0.418	0.837
	CDMA/EVDO BC10 (§90S)	0.364	0.418	0.782
	CDMA/EVDO BC0 (§22H)	0.383	0.418	0.801
	PCS CDMA/EVDO	0.476	0.418	**0.894**
	LTE Band 71	0.224	0.418	0.642
	LTE Band 12	0.304	0.418	0.722
	LTE Band 13	0.350	0.418	0.768
	LTE Band 26 (Cell)	0.364	0.418	0.782
	LTE Band 66 (AWS)	0.273	0.418	0.691
	LTE Band 25 (PCS)	0.422	0.418	0.840
	LTE Band 41	0.133	0.418	0.551

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	0.393	0.668	1.061
	GSM/GPRS 1900	0.182	0.668	0.850
	UMTS 850	0.339	0.668	1.007
	UMTS 1750	0.260	0.668	0.928
	UMTS 1900	0.419	0.668	1.087
	CDMA/EVDO BC10 (§90S)	0.364	0.668	1.032
	CDMA/EVDO BC0 (§22H)	0.383	0.668	1.051
	PCS CDMA/EVDO	0.476	0.668	**1.144**
	LTE Band 71	0.224	0.668	0.892
	LTE Band 12	0.304	0.668	0.972
	LTE Band 13	0.350	0.668	1.018
	LTE Band 26 (Cell)	0.364	0.668	1.032
	LTE Band 66 (AWS)	0.273	0.668	0.941
	LTE Band 25 (PCS)	0.422	0.668	1.090
	LTE Band 41	0.133	0.668	0.801

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM/GPRS 850	0.393	0.050	0.443
	GSM/GPRS 1900	0.182	0.050	0.232
	UMTS 850	0.339	0.050	0.389
	UMTS 1750	0.260	0.050	0.310
	UMTS 1900	0.419	0.050	0.469
	CDMA/EVDO BC10 (§90S)	0.364	0.050	0.414
	CDMA/EVDO BC0 (§22H)	0.383	0.050	0.433
	PCS CDMA/EVDO	0.476	0.050	**0.526**
	LTE Band 71	0.224	0.050	0.274
	LTE Band 12	0.304	0.050	0.354
	LTE Band 13	0.350	0.050	0.400
	LTE Band 26 (Cell)	0.364	0.050	0.414
	LTE Band 66 (AWS)	0.273	0.050	0.323
	LTE Band 25 (PCS)	0.422	0.050	0.472
	LTE Band 41	0.133	0.050	0.183

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	GSM/GPRS 850	0.393	0.050	0.668	1.111
	GSM/GPRS 1900	0.182	0.050	0.668	0.900
	UMTS 850	0.339	0.050	0.668	1.057
	UMTS 1750	0.260	0.050	0.668	0.978
	UMTS 1900	0.419	0.050	0.668	1.137
	CDMA/EVDO BC10 (§90S)	0.364	0.050	0.668	1.082
	CDMA/EVDO BC0 (§22H)	0.383	0.050	0.668	1.101
	PCS CDMA/EVDO	0.476	0.050	0.668	**1.194**
	LTE Band 71	0.224	0.050	0.668	0.942
	LTE Band 12	0.304	0.050	0.668	1.022
	LTE Band 13	0.350	0.050	0.668	1.068
	LTE Band 26 (Cell)	0.364	0.050	0.668	1.082
	LTE Band 66 (AWS)	0.273	0.050	0.668	0.991
	LTE Band 25 (PCS)	0.422	0.050	0.668	1.140
	LTE Band 41	0.133	0.050	0.668	0.851

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)	SPLSR
		1	2	1+2	1+2
Body-Worn	GSM/GPRS 850	0.564	0.573	1.137	N/A
	GSM/GPRS 1900	0.273	0.573	0.846	N/A
	UMTS 850	0.435	0.573	1.008	N/A
	UMTS 1750	0.751	0.573	1.324	N/A
	UMTS 1900	0.648	0.573	1.221	N/A
	CDMA BC10 (§90S)	0.401	0.573	0.974	N/A
	CDMA BC0 (§22H)	0.520	0.573	1.093	N/A
	PCS CDMA	0.539	0.573	1.112	N/A
	LTE Band 71	0.414	0.573	0.987	N/A
	LTE Band 12	0.437	0.573	1.010	N/A
	LTE Band 13	0.596	0.573	1.169	N/A
	LTE Band 26 (Cell)	0.413	0.573	0.986	N/A
	LTE Band 66 (AWS)	0.752	0.573	**1.325**	N/A
	LTE Band 25 (PCS)	0.580	0.573	1.153	N/A
	LTE Band 41	1.137	0.573	See Note 1	0.02

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

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)	SPLSR
		1	2	1+2	1+2
Body-Worn	GSM/GPRS 850	0.564	0.596	1.160	N/A
	GSM/GPRS 1900	0.273	0.596	0.869	N/A
	UMTS 850	0.435	0.596	1.031	N/A
	UMTS 1750	0.751	0.596	1.347	N/A
	UMTS 1900	0.648	0.596	1.244	N/A
	CDMA BC10 (§90S)	0.401	0.596	0.997	N/A
	CDMA BC0 (§22H)	0.520	0.596	1.116	N/A
	PCS CDMA	0.539	0.596	1.135	N/A
	LTE Band 71	0.414	0.596	1.010	N/A
	LTE Band 12	0.437	0.596	1.033	N/A
	LTE Band 13	0.596	0.596	1.192	N/A
	LTE Band 26 (Cell)	0.413	0.596	1.009	N/A
	LTE Band 66 (AWS)	0.752	0.596	**1.348**	N/A
	LTE Band 25 (PCS)	0.580	0.596	1.176	N/A
	LTE Band 41	1.137	0.596	See Note 1	0.02

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

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM/GPRS 850	0.564	0.035	0.599
	GSM/GPRS 1900	0.273	0.035	0.308
	UMTS 850	0.435	0.035	0.470
	UMTS 1750	0.751	0.035	0.786
	UMTS 1900	0.648	0.035	0.683
	CDMA BC10 (§90S)	0.401	0.035	0.436
	CDMA BC0 (§22H)	0.520	0.035	0.555
	PCS CDMA	0.539	0.035	0.574
	LTE Band 71	0.414	0.035	0.449
	LTE Band 12	0.437	0.035	0.472
	LTE Band 13	0.596	0.035	0.631
	LTE Band 26 (Cell)	0.413	0.035	0.448
	LTE Band 66 (AWS)	0.752	0.035	0.787
	LTE Band 25 (PCS)	0.580	0.035	0.615
	LTE Band 41	1.137	0.035	**1.172**

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body-Worn	GSM/GPRS 850	0.564	0.035	0.596	1.195
	GSM/GPRS 1900	0.273	0.035	0.596	0.904
	UMTS 850	0.435	0.035	0.596	1.066
	UMTS 1750	0.751	0.035	0.596	1.382
	UMTS 1900	0.648	0.035	0.596	1.279
	CDMA BC10 (§90S)	0.401	0.035	0.596	1.032
	CDMA BC0 (§22H)	0.520	0.035	0.596	1.151
	PCS CDMA	0.539	0.035	0.596	1.170
	LTE Band 71	0.414	0.035	0.596	1.045
	LTE Band 12	0.437	0.035	0.596	1.068
	LTE Band 13	0.596	0.035	0.596	1.227
	LTE Band 26 (Cell)	0.413	0.035	0.596	1.044
	LTE Band 66 (AWS)	0.752	0.035	0.596	**1.383**
	LTE Band 25 (PCS)	0.580	0.035	0.596	1.211
	LTE Band 41	1.137	0.035	0.596	See Note 2

Note 2: Please see section 12.7 for detailed simultaneous transmission analysis.

12.5 Hotspot SAR Simultaneous Transmission Analysis

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

(*) 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	0.564	0.573	1.137
	GPRS 1900	0.378	0.573	0.951
	UMTS 850	0.435	0.573	1.008
	UMTS 1750	0.751	0.573	1.324
	UMTS 1900	0.787	0.573	1.360
	EVDO BC10 (§90S)	0.363	0.573	0.936
	EVDO BC0 (§22H)	0.361	0.573	0.934
	PCS EVDO	0.617	0.573	1.190
	LTE Band 71	0.414	0.573	0.987
	LTE Band 12	0.437	0.573	1.010
	LTE Band 13	0.596	0.573	1.169
	LTE Band 26 (Cell)	0.413	0.573	0.986
	LTE Band 66 (AWS)	0.752	0.573	1.325
	LTE Band 25 (PCS)	0.919	0.573	**1.492**
	LTE Band 41	1.137	0.573	See Table Below

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Hotspot SAR	Back	1.137	0.573	See Note 1	0.02
	Front	0.100	0.573*	**0.673**	N/A
	Top	-	0.172	0.172	N/A
	Bottom	0.492	-	0.492	N/A
	Right	0.155	-	0.155	N/A
	Left	-	0.573*	0.573	N/A

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

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	0.564	0.596	1.160
	GPRS 1900	0.378	0.596	0.974
	UMTS 850	0.435	0.596	1.031
	UMTS 1750	0.751	0.596	1.347
	UMTS 1900	0.787	0.596	1.383
	EVDO BC10 (§90S)	0.363	0.596	0.959
	EVDO BC0 (§22H)	0.361	0.596	0.957
	PCS EVDO	0.617	0.596	1.213
	LTE Band 71	0.414	0.596	1.010
	LTE Band 12	0.437	0.596	1.033
	LTE Band 13	0.596	0.596	1.192
	LTE Band 26 (Cell)	0.413	0.596	1.009
	LTE Band 66 (AWS)	0.752	0.596	1.348
	LTE Band 25 (PCS)	0.919	0.596	**1.515**
	LTE Band 41	1.137	0.596	See Table Below

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Hotspot SAR	Back	1.137	0.596	See Note 1	0.02
	Front	0.100	0.596*	**0.696**	N/A
	Top	-	0.194	0.194	N/A
	Bottom	0.492	-	0.492	N/A
	Right	0.155	-	0.155	N/A
	Left	-	0.318	0.318	N/A

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

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.564	0.035	0.599
	GPRS 1900	0.378	0.035	0.413
	UMTS 850	0.435	0.035	0.470
	UMTS 1750	0.751	0.035	0.786
	UMTS 1900	0.787	0.035	0.822
	EVDO BC10 (§90S)	0.363	0.035	0.398
	EVDO BC0 (§22H)	0.361	0.035	0.396
	PCS EVDO	0.617	0.035	0.652
	LTE Band 71	0.414	0.035	0.449
	LTE Band 12	0.437	0.035	0.472
	LTE Band 13	0.596	0.035	0.631
	LTE Band 26 (Cell)	0.413	0.035	0.448
	LTE Band 66 (AWS)	0.752	0.035	0.787
	LTE Band 25 (PCS)	0.919	0.035	0.954
	LTE Band 41	1.137	0.035	**1.172**

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	GPRS 850	0.564	0.035	0.596	1.195
	GPRS 1900	0.378	0.035	0.596	1.009
	UMTS 850	0.435	0.035	0.596	1.066
	UMTS 1750	0.751	0.035	0.596	1.382
	UMTS 1900	0.787	0.035	0.596	1.418
	EVDO BC10 (§90S)	0.363	0.035	0.596	0.994
	EVDO BC0 (§22H)	0.361	0.035	0.596	0.992
	PCS EVDO	0.617	0.035	0.596	1.248
	LTE Band 71	0.414	0.035	0.596	1.045
	LTE Band 12	0.437	0.035	0.596	1.068
	LTE Band 13	0.596	0.035	0.596	1.227
	LTE Band 26 (Cell)	0.413	0.035	0.596	1.044
	LTE Band 66 (AWS)	0.752	0.035	0.596	1.383
	LTE Band 25 (PCS)	0.919	0.035	0.596	**1.550**
	LTE Band 41	1.137	0.035	0.596	See Table Below

Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	Bluetooth SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	Back	1.137	0.035	0.596	See Note 2
	Front	0.100	0.014	0.596*	**0.710**
	Top	-	0.010	0.194	0.204
	Bottom	0.492	-	-	0.492
	Right	0.155	-	-	0.155
	Left	-	0.009	0.318	0.327

Note 2: Please see section 12.7 for detailed simultaneous transmission analysis.

12.6 SPLSR Evaluation and Analysis

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

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

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

12.6.1 Body-worn and Hotspot Back Side SPLSR Evaluation and Analysis

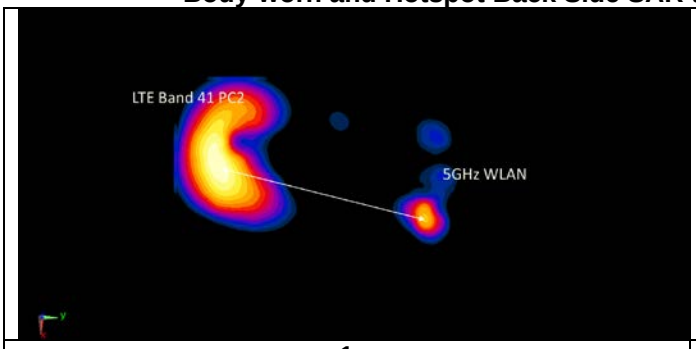
Table 12-13
Peak SAR Locations for Body-worn and Hotspot Back Side

Mode/Band	x (mm)	y (mm)
2.4 GHz WLAN	-4.60	69.60
5 GHz WLAN	1.00	55.00
LTE Band 41 PC2	-32.20	-68.40

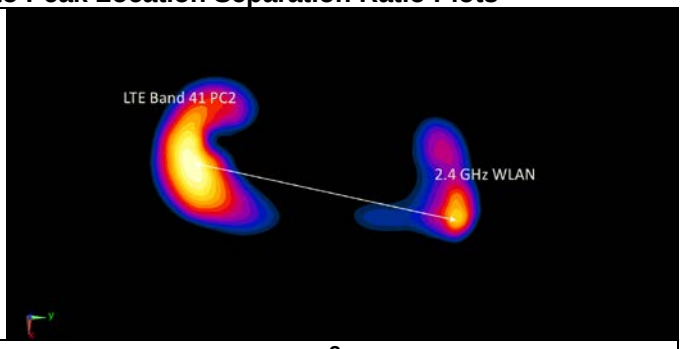
Table 12-14
Body-worn and Hotspot Back Side SAR to Peak Location Separation Ratio Calculations

Antenna Pair		Standalone SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio	Plot Number
Ant "a"	Ant "b"	a	b	a+b	D_{a-b}	$(a+b)^{1.5}/D_{a-b}$	
LTE Band 41 PC2	5 GHz WLAN	1.137	0.596	1.733	127.79	0.02	1
LTE Band 41 PC2	2.4 GHz WLAN	1.137	0.573	1.71	140.73	0.02	2

Table 12-15
Body-worn and Hotspot Back Side SAR to Peak Location Separation Ratio Plots



1



2

12.7 Additional Simultaneous SAR Evaluation and Analysis for Main Band, Bluetooth and 5 GHz WLAN Operations

Per KDB Publication 865664, when the sum of the transmitters potentially operating simultaneously is greater than the 1.6 W/kg and the sum to peak SAR location separation ratio between any pair of transmitters is more than 0.04 for 1g, SAR tests are required for simultaneous transmission to determine the aggregate 1g SAR. When required, each transmitter is tested for simultaneous transmission in the configuration, channel and operating mode that resulted in the highest SAR during the stand-alone evaluation.

The Bluetooth and 5GHz WLAN transmitters are co-located antenna pair and spatially separated from 2G/3G/4G antenna. Per November 2019 TCB Workshop Notes, enlarged volumetric scans on co-located antenna pair were performed for the Bluetooth and 5GHz WLAN. The SPLSR procedure for the spatially separated 2G/3G/4G antenna and aggregated SAR distribution of the co-located Bluetooth/5GHz WLAN antenna pair was applied according to KDB Publication 447498.

12.7.1 Body-worn and Hotspot Back Side Volumetric SAR Evaluation and Analysis for Bluetooth, and 5GHz WLAN Simultaneous Transmission

Table 12-16
Simultaneous Transmission SAR Analysis

Band/Mode	Configuration	Frequency [MHz]	Measured Standalone 1g SAR [W/kg]	Conducted Power [dBm]	Maximum Allowed Power [dBm]	Duty Cycle (%)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Volumetric 1g SAR [W/kg]	Scaled Volumetric 1g SAR [W/kg]	Volumetric SAR Plot Number
5 GHz WLAN	Back Side, IEEE 802.11a, 20 MHz, Ch. 165, 6 Mbps, 10mm	5825	0.541	19.22	19.5	96.9	1.067	1.032	0.529	0.583	A43
Bluetooth	Back Side, Ch. 39, 1 Mbps, 10mm	2441	0.02	8.78	10.0	76.5	1.324	1.307	0.028	0.048	A44

Simultaneous Transmission Bands/Modes		Scaled Multi-Band SAR (W/kg)	Simultaneous SAR Plot Number
5 GHz WLAN	Bluetooth	0.605	A45

Note:
1. All volumetric zoom scans were performed with DASY52 SAR system version 52.10. Post processor SEMCAD X Versions 14.6.14 (7483) multiband combiner requires enlarged zoom scans to overlap but does not require measurement point resolutions within the volumes to be identical for interpolation and superposition.
2. Each antenna was evaluated independently using the channel/configuration that produced the highest measured SAR when the standalone SAR was tested.
3. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v05. The simultaneous transmission SAR results of the individual transmitters were scaled using SEMCAD X during processing.
4. The Bluetooth and 5 GHz WIFI SAR values above represent the aggregate distributions from the simultaneous transmission (volumetric) SAR evaluation.

12.7.2 Body-worn and Hotspot SPLSR Evaluation and Analysis for Main Band, Bluetooth and 5GHz WLAN simultaneous Transmission

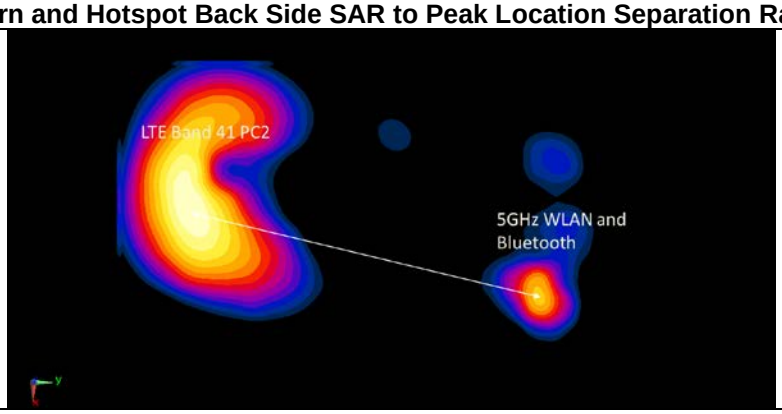
Table 12-17
Peak SAR Locations for Body-worn and Hotspot Back Side

Mode/Band	x (mm)	y (mm)	Reported SAR (W/kg)
5 GHz WLAN and Bluetooth	3.00	56.00	0.605
LTE Band 41 PC2	-32.20	-68.40	1.137

Table 12-18
Body-worn and Hotspot Back Side SAR to Peak Location Separation Ratio Calculations

Antenna Pair		Standalone SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio	Plot Number
Ant "a"	Ant "b"	a	b	a+b	D_{a-b}	$(a+b)^{1.5}/D_{a-b}$	
LTE Band 41 PC2	5 GHz WLAN and Bluetooth	1.137	0.605	1.742	129.28	0.02	1

Table 12-19
Body-worn and Hotspot Back Side SAR to Peak Location Separation Ratio Plots



1

12.8 Simultaneous Transmission Conclusion

The above numerical summed SAR results, SPLSR and Volumetric analysis are sufficient to determine that simultaneous transmission cases will not exceed the SAR limit per FCC KDB Publication 447498 D01v06 and IEEE 1528- 2013 Section 6.3.4.1.2

13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

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

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

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

Table 13-1
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1900	1860.00	26140	LTE Band 25 (PCS), 20 MHz Bandwidth	QPSK, 1 RB, 50 RB Offset	front	10 mm	0.892	0.872	1.02	N/A	N/A	N/A	N/A
2600	2593.00	40620	LTE Band 41 PC2, 20 MHz Bandwidth	QPSK, 1 RB, 50 RB Offset	back	10 mm	1.030	0.988	1.04	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram						

13.2 Measurement Uncertainty

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

14 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. When ULCA is active, the linearity between the Power Class 2 with ULCA active and Power Class 3 with ULCA active 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 were required since the linearity between power classes was < 10% and all reported SAR values were < 1.4 W/kg for 1g.

LTE Band 41 SAR testing 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.

Table 14-1
LTE Band 41 Head Linearity Data

	LTE Band 41 PC3	LTE Band 41 PC2
Maximum Allowed Output Power (dBm)	24.70	27.70
Measured Output Power (dBm)	24.34	27.02
Measured SAR (W/kg)	0.079	0.109
Measured Power (mW)	271.64	503.50
Duty Cycle	63.3%	43.3%
Frame Averaged Output Power (mW)	171.95	218.02
% deviation from expected linearity		8.27%

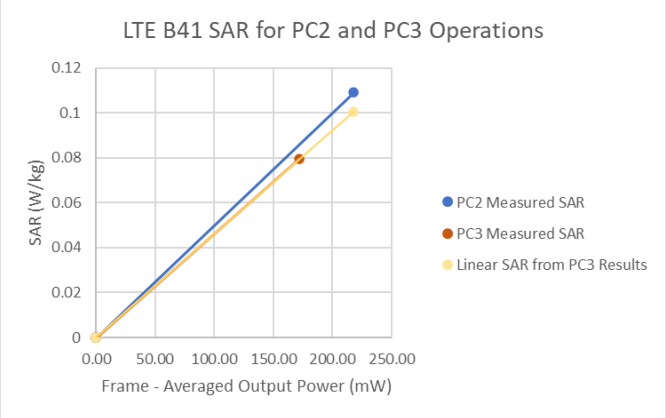


Figure 14-1
LTE Band 41 Head Linearity

Table 14-2
LTE Band 41 ULCA Head Linearity Data

	LTE Band 41 PC3	LTE Band 41 PC2
Maximum Allowed Output Power (dBm)	24.70	27.70
Measured Output Power (dBm)	24.60	27.45
Measured SAR (W/kg)	0.088	0.126
Measured Power (mW)	288.40	555.90
Duty Cycle	63.3%	43.3%
Frame Averaged Output Power (mW)	182.56	240.71
% deviation from expected linearity		8.22%

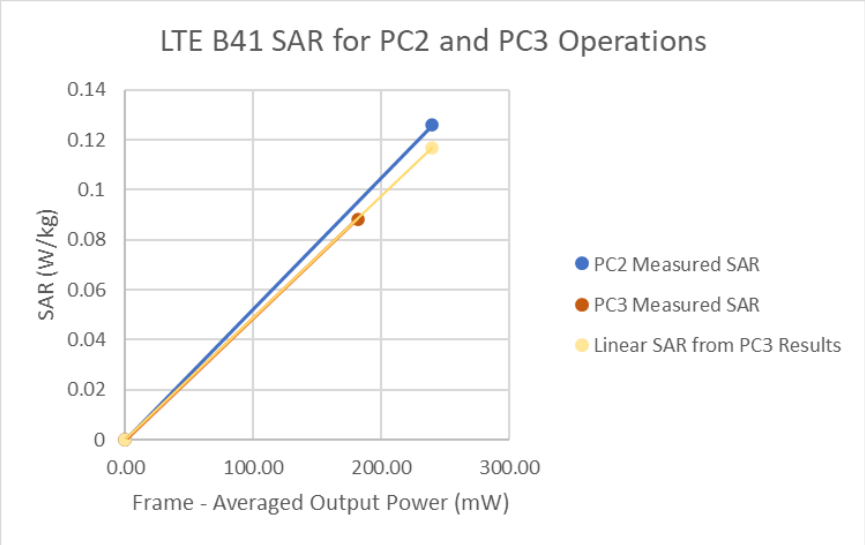


Figure 14-2
LTE Band 41 ULCA Head Linearity

Table 14-3
LTE Band 41 Body-Worn and Hotspot Linearity Data

	LTE Band 41 PC3	LTE Band 41 PC2
Maximum Allowed Output Power (dBm)	24.70	27.70
Measured Output Power (dBm)	24.35	27.27
Measured SAR (W/kg)	0.736	1.030
Measured Power (mW)	272.27	533.33
Duty Cycle	63.3%	43.3%
Frame Averaged Output Power (mW)	172.35	230.93
% deviation from expected linearity		4.44%

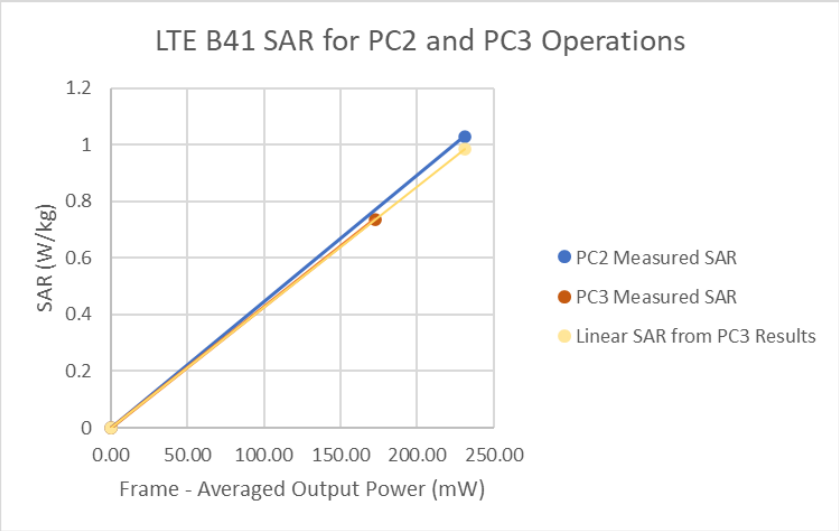


Figure 14-3
LTE Band 41 Body-Worn and Hotspot Linearity

Table 14-4
LTE Band 41 ULCA Body-Worn and Hotspot Linearity Data

	LTE Band 41 PC3	LTE Band 41 PC2
Maximum Allowed Output Power (dBm)	24.70	27.70
Measured Output Power (dBm)	24.12	27.26
Measured SAR (W/kg)	0.663	0.905
Measured Power (mW)	258.23	532.11
Duty Cycle	63.3%	43.3%
Frame Averaged Output Power (mW)	163.46	230.40
% deviation from expected linearity		-3.16%

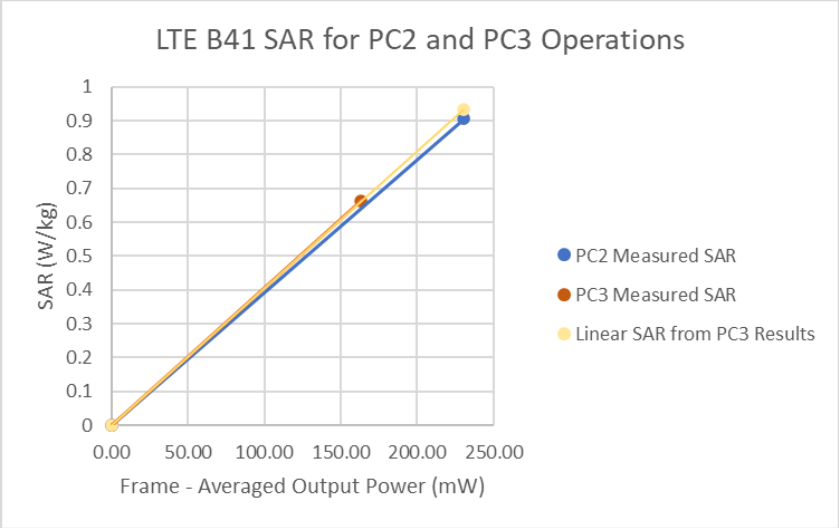


Figure 14-4
LTE Band 41 ULCA Body-Worn and Hotspot Linearity

15 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Vector Network Analyzer	9/19/2019	Annual	9/19/2020	MY40003841
Agilent	8753ES	S-Parameter Network Analyzer	8/26/2019	Annual	8/26/2020	MY40000670
Agilent	E4438C	ESG Vector Signal Generator	5/22/2019	Annual	5/22/2020	MY45091346
Agilent	E4438C	ESG Vector Signal Generator	5/23/2019	Annual	5/23/2020	MY47270002
Agilent	E4438C	ESG Vector Signal Generator	3/8/2019	Biennial	3/8/2021	MY42082385
Agilent	E4438C	ESG Vector Signal Generator	3/11/2019	Biennial	3/11/2021	MY45090700
Agilent	E5515C	Wireless Communications Test Set	6/26/2019	Annual	6/26/2020	MY50267125
Agilent	E5515C	Wireless Communications Test Set	9/25/2019	Annual	9/25/2020	GB43304278
Agilent	E5515C	Wireless Communications Test Set	2/7/2018	Triennial	2/7/2021	GB43304447
Agilent	N5182A	MXG Vector Signal Generator	7/10/2019	Annual	7/10/2020	MY47420800
Agilent	N9020A	MXA Signal Analyzer	4/20/2019	Annual	4/20/2020	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	6/12/2019	Annual	6/12/2020	MY52350166
Agilent	E5515C	Wireless Communications Test Set	2/28/2018	Biennial	2/28/2020	GB41450275
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433972
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433974
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433975
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433976
Anritsu	MA24106A	USB Power Sensor	5/6/2019	Annual	5/6/2020	1231538
Anritsu	MA24106A	USB Power Sensor	7/8/2019	Annual	7/8/2020	1248508
Anritsu	MA24106A	USB Power Sensor	4/17/2019	Annual	4/17/2020	1344556
Anritsu	MA24106A	USB Power Sensor	7/15/2019	Annual	7/15/2020	1349513
Anritsu	MA2411B	Pulse Power Sensor	6/11/2019	Annual	6/11/2020	1207364
Anritsu	MA2411B	Pulse Power Sensor	8/8/2019	Annual	8/8/2020	1339008
Anritsu	MT8820C	Radio Communication Analyzer	3/29/2019	Annual	3/29/2020	6201300731
Anritsu	MT8821C	Radio Communication Analyzer	8/16/2019	Annual	8/16/2020	6201144418
Anritsu	MT8821C	Radio Communication Analyzer	11/22/2019	Annual	11/22/2020	6262044715
Anritsu	MT8821C	Radio Communication Analyzer	5/13/2019	Annual	5/13/2020	6201524637
Anritsu	MT8862A	Wireless Connectivity Test Set	8/8/2019	Annual	8/8/2020	6261782395
Anritsu	ML2496A	Power Meter	11/6/2019	Annual	11/6/2020	1405003
Control Company	4040	Therm./Clock/Humidity Monitor	6/29/2019	Biennial	6/29/2021	192291470
Control Company	4040	Therm./Clock/Humidity Monitor	6/29/2019	Biennial	6/29/2021	192291455
Control Company	4040	Therm./Clock/Humidity Monitor	6/29/2019	Biennial	6/29/2021	192291460
Control Company	4040	Therm./Clock/Humidity Monitor	6/29/2019	Biennial	6/29/2021	192291463
Control Company	4352	Long Stem Thermometer	6/26/2019	Biennial	6/26/2021	192282744
Control Company	4352	Long Stem Thermometer	6/26/2019	Biennial	6/26/2021	192282753
Control Company	4352	Ultra Long Stem Thermometer	11/29/2018	Biennial	11/29/2020	181766801
Control Company	4352	Ultra Long Stem Thermometer	11/29/2018	Biennial	11/29/2020	181766777
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
Keysight Technologies	N6705B	DC Power Analyzer	4/27/2019	Biennial	4/27/2021	MY53004059
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
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	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mitutoyo	CD-6"CSX	Digital Caliper	4/18/2018	Biennial	4/18/2020	13264165
Pasternack	NC-100	Torque Wrench	5/23/2018	Biennial	5/23/2020	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMW500	Radio Communication Tester	8/26/2019	Annual	8/26/2020	100976
Rohde & Schwarz	CMW500	Radio Communication Tester	8/27/2019	Annual	8/27/2020	116743
Rohde & Schwarz	CMW500	Radio Communication Tester	10/4/2019	Annual	10/4/2020	166462
Rohde & Schwarz	ZNLE6	Vector Network Analyzer	10/11/2019	Annual	10/11/2020	101307
Rohde& Schwarz	CMW500	Wideband Radio Communication Tester	7/12/2019	Annual	7/12/2020	145645
Rohde& Schwarz	CMW500	Wideband Radio Communication Tester	7/24/2019	Annual	7/24/2020	151849
Rohde & Schwarz	CMU200	Base Station Simulator	6/3/2019	Annual	6/3/2020	109892
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/7/2019	Annual	5/7/2020	1070
SPEAG	DAK-3.5	Dielectric Assessment Kit	10/22/2019	Annual	10/22/2020	1091
SPEAG	D750V3	750 MHz Dipole	3/18/2019	Annual	3/18/2020	1054
SPEAG	D835V2	835 MHz SAR Dipole	10/19/2018	Biennial	10/19/2020	4d133
SPEAG	D1750V2	1750 MHz SAR Dipole	10/22/2018	Biennial	10/22/2020	1150
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Biennial	10/23/2020	5d080
SPEAG	D2450V2	2450 MHz SAR Dipole	8/14/2019	Annual	8/14/2020	719
SPEAG	D2600V2	2600 MHz SAR Dipole	6/14/2019	Annual	6/14/2020	1064
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/16/2018	Triennial	1/16/2021	1057
SPEAG	D750V3	750 MHz SAR Dipole	10/19/2018	Biennial	10/19/2020	1161
SPEAG	D835V2	835 MHz SAR Dipole	3/13/2019	Annual	3/13/2020	4d047
SPEAG	D835V2	835 MHz SAR Dipole	1/13/2020	Annual	1/13/2021	4d132
SPEAG	D1750V2	1750 MHz SAR Dipole	5/15/2019	Annual	5/15/2020	1148
SPEAG	D1900V2	1900 MHz SAR Dipole	2/21/2019	Biennial	2/21/2021	5d148
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Biennial	10/23/2020	5d149
SPEAG	D2450V2	2450 MHz SAR Dipole	9/11/2017	Triennial	9/11/2020	797
SPEAG	D2600V2	2600 MHz SAR Dipole	4/11/2018	Biennial	4/11/2020	1004
SPEAG	D5GHzV2	5 GHz SAR Dipole	9/17/2019	Annual	9/17/2020	1191
SPEAG	D5GHzV2	5 GHz SAR Dipole	8/10/2018	Biennial	8/10/2020	1237
SPEAG	EX3DV4	SAR Probe	7/16/2019	Annual	7/16/2020	7410
SPEAG	EX3DV4	SAR Probe	5/16/2019	Annual	5/16/2020	7406
SPEAG	EX3DV4	SAR Probe	6/19/2019	Annual	6/19/2020	7409
SPEAG	EX3DV4	SAR Probe	1/21/2020	Annual	1/21/2021	3589
SPEAG	EX3DV4	SAR Probe	7/15/2019	Annual	7/15/2020	7547
SPEAG	EX3DV4	SAR Probe	1/21/2020	Annual	1/21/2021	7488
SPEAG	EX3DV4	SAR Probe	4/24/2019	Annual	4/24/2020	7357
SPEAG	EX3DV4	SAR Probe	12/11/2019	Annual	12/11/2020	7571
SPEAG	EX3DV4	SAR Probe	9/19/2019	Annual	9/19/2020	7551
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2019	Annual	7/11/2020	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/8/2019	Annual	5/8/2020	728
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/20/2019	Annual	6/20/2020	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/13/2020	Annual	1/13/2021	1558
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2019	Annual	7/11/2020	1323
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/13/2020	Annual	1/13/2021	1530
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/18/2019	Annual	4/18/2020	1407
SPEAG	DAE4	Data Acquisition Electronics	12/5/2019	Annual	12/5/2020	1533
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/17/2019	Annual	9/17/2020	1333

Note:
1. 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.
2. Each equipment item was used solely within its respective calibration period.

REV 21.4 M
09/11/2019

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]

18 REFERENCES

[1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, Aug. 1996.

[2] ANSI/IEEE C95.1-2005, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, 2006.

[3] ANSI/IEEE C95.1-1992, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, Sept. 1992.

[4] ANSI/IEEE C95.3-2002, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave, New York: IEEE, December 2002.

[5] IEEE Standards Coordinating Committee 39 –Standards Coordinating Committee 34 – IEEE Std. 1528-2013, IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

[6] NCRP, National Council on Radiation Protection and Measurements, Biological Effects and Exposure Criteria for RadioFrequency Electromagnetic Fields, NCRP Report No. 86, 1986. Reprinted Feb. 1995.

[7] T. Schmid, O. Egger, N. Kuster, Automated E-field scanning system for dosimetric assessments, IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.

[8] K. Pokovic, T. Schmid, N. Kuster, Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies, ICECOM97, Oct. 1997, pp. 1 -124.

[9] K. Pokovic, T. Schmid, and N. Kuster, E-field Probe with improved isotropy in brain simulating liquids, Proceedings of the ELMAR, Zadar, Croatia, June 23-25, 1996, pp. 172-175.

[10] Schmid & Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.

[11] V. Hombach, K. Meier, M. Burkhardt, E. Kuhn, N. Kuster, The Dependence of EM Energy Absorption upon Human Modeling at 900 MHz, IEEE Transaction on Microwave Theory and Techniques, vol. 44 no. 10, Oct. 1996, pp. 1865-1873.

[12] N. Kuster and Q. Balzano, Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300MHz, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.

[13] G. Hartsgrove, A. Kraszewski, A. Surowiec, Simulated Biological Materials for Electromagnetic Radiation Absorption Studies, University of Ottawa, Bioelectromagnetics, Canada: 1987, pp. 29-36.

[14] Q. Balzano, O. Garay, T. Manning Jr., Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.

[15] W. Gander, Computermathematick, Birkhaeuser, Basel, 1992.

[16] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, Numerical Recipes in C, The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.

[17] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.

[18] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), Human Exposure to Electromagnetic Fields High-frequency: 10kHz-300GHz, Jan. 1995.

[19] Prof. Dr. Niels Kuster, ETH, Eidgenössische Technische Hoschschule Zürich, Dosimetric Evaluation of the Cellular Phone.

[20] IEC 62209-1, Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Part 1: Devices used next to the ear (Frequency range of 300 MHz to 6 GHz), July 2016.

[21] Innovation, Science, Economic Development Canada RSS-102 Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) Issue 5, March 2015.

[22] Health Canada Safety Code 6 Limits of Human Exposure to Radio Frequency Electromagnetic Fields in the Frequency Range from 3 kHz – 300 GHz, 2015

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

[24] SAR Measurement Guidance for IEEE 802.11 Transmitters, KDB Publication 248227 D01

[25] FCC SAR Considerations for Handsets with Multiple Transmitters and Antennas, KDB Publications 648474 D03-D04

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

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

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

[29] Anexo à Resolução No. 533, de 10 de Septembro de 2009.

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