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SAR EVALUATION REPORT

Applicant Name:
Samsung Electronics, Co. Ltd.
129, Samsung-ro, Maetan Dong,
Yeongtong-gu, Suwon-si,
Gyeonggi-do, 443-742, Republic of Korea

Date of Testing:
02/10/13 - 02/25/13
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
0Y1302120259-R2.A3L

FCC ID: **A3LSCHI545**

APPLICANT: **SAMSUNG ELECTRONICS, CO. LTD.**

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model(s): SCH-I545

Equipment Class	Band & Mode	Tx Frequency	Measured Conducted Power [dBm]	SAR		
				1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	33.14	0.13	0.41	0.52
PCE	UMTS 850	826.40 - 846.60 MHz	22.95	0.10	0.33	0.33
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	29.88	0.10	0.51	0.57
PCE	UMTS 1900	1852.4 - 1907.6 MHz	22.86	0.19	1.03	1.03
PCE	Cell. CDMA/EVDO	824.70 - 848.31 MHz	24.41	0.25	0.87	1.06
PCE	PCS CDMA/EVDO	1851.25 - 1908.75 MHz	24.45	0.16	0.84	0.84
PCE	LTE Band 13	782 MHz	23.13	0.19	0.30	0.35
PCE	LTE Band 4 (AWS)	1712.5 - 1752.5 MHz	23.36	0.12	0.52	0.52
DTS	2.4 GHz WLAN	2412 - 2462 MHz	17.16	0.45	0.26	0.26
DTS	5.8 GHz WLAN	5745 - 5825 MHz	13.60	0.19	0.12	
UNII	5.2 GHz WLAN	5180 - 5240 MHz	14.03	0.47	0.40	
UNII	5.3 GHz WLAN	5260 - 5320 MHz	14.01	0.28	0.37	
UNII	5.5 GHz WLAN	5500 - 5700 MHz	14.10	0.20	0.20	
DSS/DTS	Bluetooth	2402 - 2480 MHz	8.83	N/A		
Simultaneous SAR per KDB 690783 D01v01r02:				0.75	1.43	1.32

Note: Powers in the above table represent output powers for the SAR test configurations and may not represent the highest output powers for all configurations for each mode.

Note: This revised Test Report (S/N: 0Y1302120259-R2.A3L) supersedes and replaces the previously issued test report on the same subject EUT 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 1.9 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

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
Cell. CDMA/EVDO	Voice/Data	824.70 - 848.31 MHz
PCS CDMA/EVDO	Voice/Data	1851.25 - 1908.75 MHz
LTE Band 13	Data	782 MHz
LTE Band 4 (AWS)	Data	1712.5 - 1752.5 MHz
2.4 GHz WLAN	Data	2412 - 2462 MHz
5.8 GHz WLAN	Data	5745 - 5825 MHz
5.2 GHz WLAN	Data	5180 - 5240 MHz
5.3 GHz WLAN	Data	5260 - 5320 MHz
5.5 GHz WLAN	Data	5500 - 5700 MHz
Bluetooth	Data	2402 - 2480 MHz

1.2 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 D01v05.

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (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*
GSM/GPRS/EDGE 850	Maximum	**33.5**	**33.5**	**31.5**	**30.0**	**29.0**	**27.5**	**27.0**	**23.0**	**22.0**
	Nominal	**33.0**	**33.0**	**31.0**	**29.5**	**28.5**	**27.0**	**26.5**	**22.5**	**21.5**
GSM/GPRS/EDGE 1900	Maximum	**30.5**	**30.5**	**28.5**	**26.5**	**25.5**	**25.5**	**25.5**	**21.0**	**20.0**
	Nominal	**30.0**	**30.0**	**28.0**	**26.0**	**25.0**	**25.0**	**25.0**	**20.5**	**19.5**

Mode / Band		Modulated Average		
		3GPP RMC	*3GPP HSDPA*	*3GPP HSUPA*
UMTS Band 5 (850 MHz)	Maximum	**23.0**	**22.0**	**21.0**
	Nominal	**22.5**	**21.5**	**20.5**
UMTS Band 2 (1900 MHz)	Maximum	**23.0**	**22.0**	**21.0**
	Nominal	**22.5**	**21.5**	**20.5**

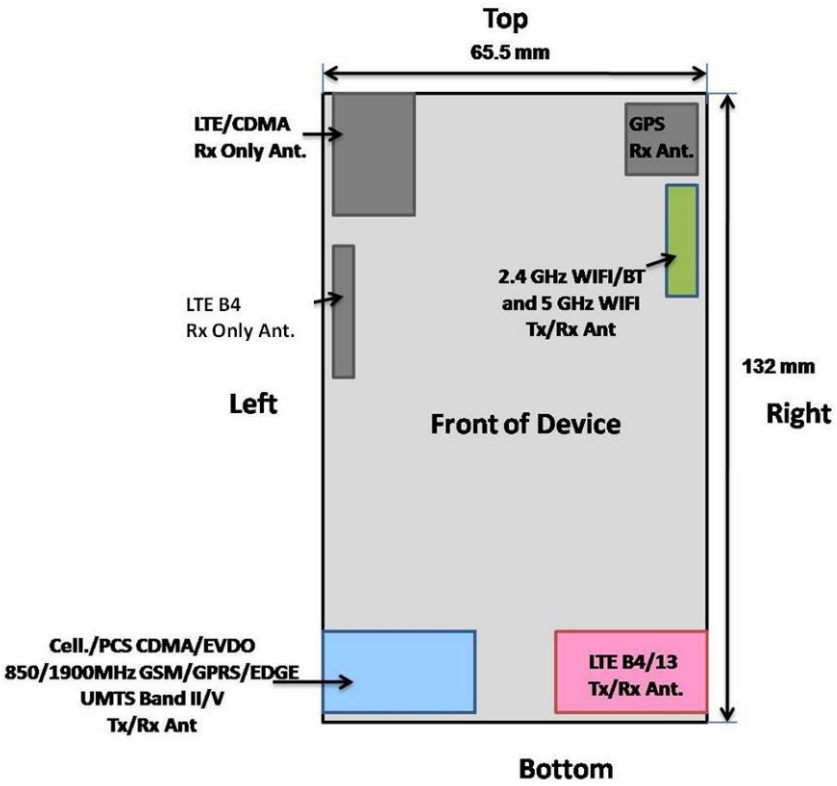
Mode / Band		Modulated Average (dBm)
Cell. CDMA/EVDO	Maximum	**25.0**
	Nominal	**24.5**
PCS CDMA/EVDO	Maximum	**25.0**
	Nominal	**24.5**

Mode / Band			Modulated Average (dBm)
Cell. CDMA	SVLTE LTE is reducing	Maximum	**18.5**
		Nominal	**18.0**
PCS CDMA	SVLTE LTE is reducing	Maximum	**18.5**
		Nominal	**18.0**

Mode / Band			Modulated Average (dBm)
LTE Band 13	Maximum	Maximum	**23.5**
		Nominal	**23.0**
	Reduced (CDMA Power ≥ Threshold Power)	Maximum	**19.5**
		Nominal	**19.0**
LTE Band 4	Maximum	Maximum	**23.5**
		Nominal	**23.0**
	Reduced (CDMA Power ≥ Threshold Power)	Maximum	**19.5**
		Nominal	**19.0**

Mode / Band		Modulated Average (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	**17.5**
	Nominal	**17.0**
IEEE 802.11g (2.4 GHz)	Maximum	**14.5**
	Nominal	**14.0**
IEEE 802.11n (2.4 GHz)	Maximum	**13.5**
	Nominal	**13.0**
IEEE 802.11a (5 GHz)	Maximum	**14.5**
	Nominal	**14.0**
IEEE 802.11n (5 GHz)	Maximum	**13.5**
	Nominal	**13.0**
IEEE 802.11ac (5 GHz)	Maximum	**12.0**
	Nominal	**11.5**
Bluetooth	Maximum	**9.5**
	Nominal	**9.0**

1.3 DUT Antenna Locations



Note: Exact antenna dimensions and separation distances are shown in the Technical Descriptions in the FCC Filing.

Figure 1-1
DUT Antenna Locations

Table 1-1
Mobile Hotspot Sides for SAR Testing

Mobile Hotspot Sides for SAR Testing						
Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850	Yes	Yes	No	Yes	No	Yes
UMTS 850	Yes	Yes	No	Yes	No	Yes
GPRS 1900	Yes	Yes	No	Yes	No	Yes
UMTS 1900	Yes	Yes	No	Yes	No	Yes
Cell. CDMA/EVDO	Yes	Yes	No	Yes	No	Yes
PCS CDMA/EVDO	Yes	Yes	No	Yes	No	Yes
LTE Band 13	Yes	Yes	No	Yes	Yes	No
LTE Band 4 (AWS)	Yes	Yes	No	Yes	Yes	No
2.4 GHz WLAN	Yes	Yes	Yes	No	Yes	No

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 D06v01 guidance, page 2. The antenna document shows the distances between the transmit antennas and the edges of the device. When the wireless router mode is enabled, all 5 GHz bands are disabled. Therefore 5 GHz WIFI is not considered in this section.

1.4 Near Field Communications (NFC) Antenna

This DUT has NFC operations. The NFC antenna is integrated into the standard battery. The SAR tests were performed with the standard battery (model: B600BZ).

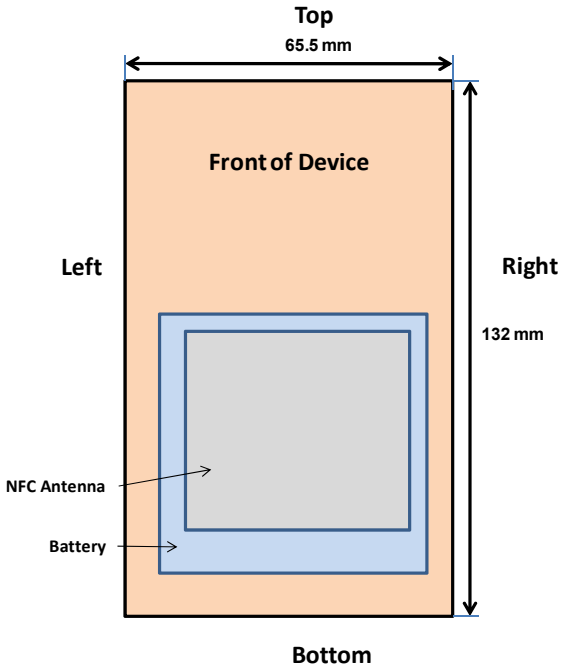


Figure 1-2
NFC Antenna Locations

1.5 Power Reduction for SAR

This device uses power reduction mechanisms for LTE during SVLTE operation (1x-RTT CDMA voice + LTE data) for SAR compliance. See Section 10 for more details.

1.6 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D05v01, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 1-3 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

Figure 1-3
Simultaneous Transmission Paths

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v05 3) procedures.

Table 1-2
Simultaneous Transmission Scenarios

Ref.	Simultaneous Transmit Configurations	Power Reduction	IEEE 1528, Supp C	Supplement C	FCC KDB 941225 D06 edges/sides	Note
1	1X CDMA 850 Voice + LTE B13 Data	LTE	Yes	10mm	N/A	SVLTE
2	1X CDMA 1900 Voice + LTE B13 Data	LTE	Yes	10mm	N/A	SVLTE
3	1X CDMA 850 Voice + LTE B4 Data	LTE	Yes	10mm	N/A	SVLTE
4	1X CDMA 1900 Voice + LTE B4 Data	LTE	Yes	10mm	N/A	SVLTE
5	1X CDMA 850 Voice + 2.4 GHz Bluetooth	N/A	N/A	10mm	N/A	
6	1X CDMA 1900 Voice + 2.4 GHz Bluetooth	N/A	N/A	10mm	N/A	
7	GSM850 Voice + 2.4 GHz Bluetooth	N/A	N/A	10mm	N/A	
8	GSM1900 Voice + 2.4 GHz Bluetooth	N/A	N/A	10mm	N/A	
9	WCDMA 850 Voice + 2.4 GHz Bluetooth	N/A	N/A	10mm	N/A	
10	WCDMA 1900 Voice + 2.4 GHz Bluetooth	N/A	N/A	10mm	N/A	
11	1X CDMA 850 Voice + 2.4 GHz WIFI / 5 GHz WIFI	N/A	Yes	10mm	N/A	
12	1X CDMA 1900 Voice + 2.4 GHz WIFI / 5 GHz WIFI	N/A	Yes	10mm	N/A	
13	GSM850 Voice + 2.4 GHz WIFI / 5 GHz WIFI	N/A	Yes	10mm	N/A	
14	GSM1900 Voice + 2.4 GHz WIFI / 5 GHz WIFI	N/A	Yes	10mm	N/A	
15	WCDMA 850 Voice + 2.4 GHz WIFI / 5 GHz WIFI	N/A	Yes	10mm	N/A	
16	WCDMA 1900 Voice + 2.4 GHz WIFI / 5 GHz WIFI	N/A	Yes	10mm	N/A	
17	1X CDMA 850 Voice + LTE B13 Data + 2.4 GHz Bluetooth	LTE	N/A	10mm	N/A	SVLTE
18	1X CDMA 1900 Voice + LTE B13 Data + 2.4 GHz Bluetooth	LTE	N/A	10mm	N/A	SVLTE
19	1X CDMA 850 Voice + LTE B4 Data + 2.4 GHz Bluetooth	LTE	N/A	10mm	N/A	SVLTE
20	1X CDMA 1900 Voice + LTE B4 Data + 2.4 GHz Bluetooth	LTE	N/A	10mm	N/A	SVLTE
21	1X CDMA 850 Voice + LTE B13 Data + 2.4 GHz WIFI	LTE	Yes	10mm	Yes	Voice + LTE + WIFI Hotspot
22	1X CDMA 1900 Voice + LTE B13 Data + 2.4 GHz WIFI	LTE	Yes	10mm	Yes	Voice + LTE + WIFI Hotspot
23	1X CDMA 850 Voice + LTE B4 Data + 2.4 GHz WIFI	LTE	Yes	10mm	Yes	Voice + LTE + WIFI Hotspot
24	1X CDMA 1900 Voice + LTE B4 Data + 2.4 GHz WIFI	LTE	Yes	10mm	Yes	Voice + LTE + WIFI Hotspot
25	1X CDMA 850 Data / EVDO 850 Data + 2.4 GHz WIFI	N/A	Yes*	10mm	Yes	1X CDMA Data / EVDO +WIFI Hotspot
26	1X CDMA 1900 Data / EVDO 1900 Data + 2.4 GHz WIFI	N/A	Yes*	10mm	Yes	1X CDMA Data / EVDO +WIFI Hotspot
27	WCDMA 850 Data + 2.4 GHz WIFI	N/A	Yes**	10mm	Yes	WCDMA + WIFI Hotspot
28	WCDMA 1900 Data + 2.4 GHz WIFI	N/A	Yes**	10mm	Yes	WCDMA + WIFI Hotspot
29	LTE B13 Data + 2.4 GHz WIFI	N/A	Yes*	10mm	Yes	LTE+WIFI Hotspot
30	LTE B4 Data + 2.4 GHz WIFI	N/A	Yes*	10mm	Yes	LTE+WIFI Hotspot
31	GPRS/EDGE 850 Data + 2.4 GHz WIFI	N/A	N/A	N/A	Yes	GPRS/EDGE + WIFI Hotspot
32	GPRS/EDGE 1900 Data + 2.4 GHz WIFI	N/A	N/A	N/A	Yes	GPRS/EDGE + WIFI Hotspot
33	1X CDMA 850 Voice + EVDO 850 Data	N/A	N/A	N/A	N/A	Not Supported by HW (Non-SVDO)
34	1X CDMA 850 Voice + EVDO 1900 Data	N/A	N/A	N/A	N/A	Not Supported by HW (Non-SVDO)
35	1X CDMA 1900 Voice + EVDO 850 Data	N/A	N/A	N/A	N/A	Not Supported by HW (Non-SVDO)
36	1X CDMA 1900 Voice + EVDO 1900 Data	N/A	N/A	N/A	N/A	Not Supported by HW (Non-SVDO)
37	1X CDMA 850 Voice + EVDO 850 Data + 2.4 GHz WIFI	N/A	N/A	N/A	N/A	Not Supported by HW (Non-SVDO)
38	1X CDMA 1900 Voice + EVDO 850 Data + 2.4 GHz WIFI	N/A	N/A	N/A	N/A	Not Supported by HW (Non-SVDO)
39	1X CDMA 850 Voice + EVDO 1900 Data + 2.4 GHz WIFI	N/A	N/A	N/A	N/A	Not Supported by HW (Non-SVDO)
40	1X CDMA 1900 Voice + EVDO 1900 Data + 2.4 GHz WIFI	N/A	N/A	N/A	N/A	Not Supported by HW (Non-SVDO)
41	GSM 850/1900 Voice + 850/1900 1X-RTT CDMA Data	N/A	N/A	N/A	N/A	Not Supported by SW
42	GSM 850/1900 Voice + EVDO/GPRS/EDGE Data	N/A	N/A	N/A	N/A	Not Supported by HW
43	GSM 850/1900 Voice + LTE B13/B4	N/A	N/A	N/A	N/A	Not Supported by HW
44	GSM 850/1900 Voice + 850/1900 1X-RTT CDMA + 2.4/5 GHz WIFI	N/A	N/A	N/A	N/A	Not Supported by HW
45	GSM 850/1900 Voice + EVDO/GPRS/EDGE + 2.4/5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by SW
46	GSM 850/1900 Voice + LTE B13/B4 + 2.4/5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by HW
47	1X CDMA 850 Voice + LTE B13 Data + 5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by SW (5GHz WiFi Hotspot)
48	1X CDMA 1900 Voice + LTE B13 Data + 5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by SW (5GHz WiFi Hotspot)
49	1X CDMA 850 Voice + LTE B4 Data + 5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by SW (5GHz WiFi Hotspot)
50	1X CDMA 1900 Voice + LTE B4 Data + 5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by SW (5GHz WiFi Hotspot)
51	1X CDMA 850 Data / EVDO 850 Data + 5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by SW (5GHz WiFi Hotspot)
52	1X CDMA 1900 Data / EVDO 1900 Data + 5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by SW (5GHz WiFi Hotspot)
53	UMTS 850 Data + 5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by SW (5GHz WiFi Hotspot)
54	UMTS 1900 Data + 5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by SW (5GHz WiFi Hotspot)
55	LTE B13 Data + 5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by SW (5GHz WiFi Hotspot)
56	LTE B4 Data + 5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by SW (5GHz WiFi Hotspot)
57	GPRS/EDGE 850 Data + 5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by SW (5GHz WiFi Hotspot)
58	GPRS/EDGE 1900 Data + 5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by SW (5GHz WiFi Hotspot)
59	850/1900 GPRS/EDGE Data + LTE B13/B4 Data	N/A	N/A	N/A	N/A	Not supported by HW
60	850/1900 EVDO Data + 850/1900 GPRS/EDGE Data	N/A	N/A	N/A	N/A	Not supported by SW
61	850/1900 EVDO data + LTE B13/B4 MHz Data	N/A	N/A	N/A	N/A	Not supported by SW
62	WCDMA 850/1900 Voice + 850/1900 1X-RTT CDMA Data	N/A	N/A	N/A	N/A	Not Supported by SW
63	WCDMA 850/1900 Voice + EVDO/GPRS/EDGE Data	N/A	N/A	N/A	N/A	Not Supported by HW
64	WCDMA 850/1900 Voice + LTE B13/B4	N/A	N/A	N/A	N/A	Not Supported by HW
65	WCDMA 850/1900 Voice + 850/1900 1X-RTT CDMA + 2.4/5 GHz WIFI	N/A	N/A	N/A	N/A	Not Supported by SW
66	WCDMA 850/1900 Voice + EVDO/GPRS/EDGE + 2.4/5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by HW
67	WCDMA 850/1900 Voice + LTE B13/B4 + 2.4/5 GHz WIFI	N/A	N/A	N/A	N/A	Not supported by HW

Notes:

1. CDMA and EVDO share the same antenna path and cannot transmit simultaneously. (Non-SVDO)

2. Bluetooth and 2.4 GHz WLAN share the same antenna path and cannot transmit simultaneously.

3. GSM/WCDMA/LTE use one modem and transciever IC.The signals can not be transmitted simultaneously.

4. This model cannot act as a master device in 5GHz WiFi, so this model is not capable of 5GHz WiFi hotspot. This cannot be changed by any S/W modification by any party after it is manufactured.

(*)=for VoIP 3rd party apps possibly installed and used by end - user

(**)=When the user utilizes multiple service in WCDMA 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 WCDMA+WLAN scenario also represents the WCDMA Voice/DATA+WLAN Hotspot scenario.

1.7 Wireless Charging Cover

This DUT may be used with a standard battery cover or with an optional wireless charging battery cover. Per FCC KDB Publication 648474 D04, SAR was measured using the standard battery cover and then repeated with the wireless charging battery cover for the highest reported SAR for each wireless technology, frequency band, operating mode, and exposure condition. No other additional test with wireless charging cover was required since all reported SAR were less than 1.2 W/kg.

1.8 SAR Test Exclusions Applied

(A) WIFI/BT

Since Wireless Router operations are not allowed by the chipset firmware using 5 GHz WIFI, only 2.4 GHz WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v01.

Per FCC KDB 447498 D01 v05, the SAR exclusion threshold for distances <50mm is defined by the following equation:

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

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, Bluetooth SAR was not required; [(9/10)* √2.441] = 1.4< 3.0.

This device supports 20 MHz and 40 MHz Bandwidths for IEEE 802.11n for 5 GHz WIFI only. IEEE 802.11n was not evaluated for SAR since the average output power of 20 MHz and 40 MHz bandwidths was not more than 0.25 dB higher than the average output power of IEEE 802.11a.

This device supports IEEE 802.11ac with the following features:

a) 80 MHz Bandwidth only
b) No aggregate channel configurations
c) 1 Tx antenna output
d) 256 QAM is supported
e) No new 5 GHz channels

Per October 2012 TCB workshop notes, SAR testing for 802.11ac was not required since the average output power was not more than 0.25 dB higher than the output power of IEEE 802.11a mode.

(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 D01v02.

LTE Band 4 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 D05v02.

1.9 Guidance Applied

- FCC OET Bulletin 65 Supplement C [June 2001]
- IEEE 1528-2003
- FCC KDB Publication 941225 D01-D06 (2G/3G/4G and Hotspot)
- FCC KDB Publication 248227 D01v01r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v05 (General SAR Guidance)
- FCC KDB Publication 865664 D01-D02 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 648474 D04 (Wireless Charging Battery Cover)

1.10 Device Serial Numbers

Several samples were used with identical hardware to support SAR testing. The manufacture confirmed all samples have the same physical, mechanical and thermal characteristics and are electrically identical to production units.

Mode/Band	Serial Number
GSM/GPRS/EDGE 850	32F60
UMTS 850	32F60
GSM/GPRS/EDGE 1900	32F60
UMTS 1900	32F60
2.4 GHz WLAN	32FB2/32FAF
5 GHz WLAN	32FAF

Mode/Band	Condition	Serial Number
Cell. CDMA/EVDO	Maximum	32FB2
	SVLTE	32F6F
PCS CDMA/EVDO	Maximum	32FB2
	SVLTE	32F6F
LTE Band 13	Maximum	32FAF
	Reduced	32FA3
LTE Band 4	Maximum	32FAF
	Reduced	32FA3

2 LTE INFORMATION

LTE Information			
FCC ID	**A3LSCHI545**		
Form Factor	Portable Handset		
Frequency Range of each LTE transmission band	LTE Band 13 (782 MHz)		
	LTE Band 4 (AWS) (1712.5 - 1752.5 MHz)		
Channel Bandwidths	LTE Band 13: 10 MHz		
	LTE Band 4 (AWS): 5 MHz, 10 MHz, 15 MHz, 20 MHz		
Channel Numbers and Frequencies (MHz)	Low	Mid	High
LTE Band 13: 10 MHz		782 (23230)	
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)
UE Category	3		
Modulations Supported in UL	QPSK, 16QAM		
LTE Transmitter and Antenna Implementation	This device uses 1 Tx/Rx antenna and 2 Rx Antennas for LTE		
Description of LTE Tx and Ant. Implementation	LTE and CDMA operate on separate transmission paths		
Hotspot with LTE+WIFI	YES		
Hotspot with LTE+WIFI active with 1XVoice sessions?	YES		
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	See section 9 and 10		
A-MPR (Additional MPR) disabled for SAR Testing?	YES		
Conducted power Table provided for 1RB (low, mid and high offset), 50% RB (low, mid, and high offset), and 100% RB	YES		

3 INTRODUCTION

The FCC and Industry Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. [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 [24]. 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:

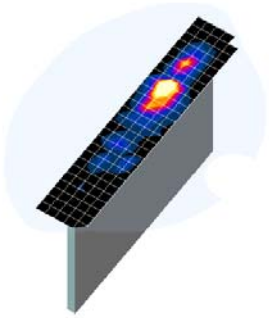


Figure 4-1
Sample SAR Area Scan

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 D01v01 (See Table 4-1).

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 D01v01 (See Table 4-1). 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. The data was extrapolated to the surface of the outer-shell of the phantom. The combined distance extrapolated was the combined distance from the center of the dipoles 2.7mm away from the tip of the probe housing plus the 1.2 mm distance between the surface and the lowest measuring point. 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 D01v01

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

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) is perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Figure 5-1). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

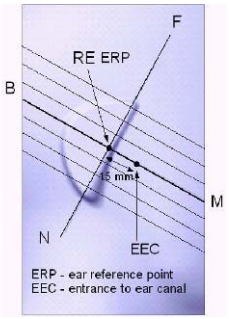


Figure 5-1
Close-Up Side view of ERP

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 "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point" (See Figure 5-3). The "test device reference point" was than located at the same level as the center of the ear reference point. The test device was positioned so that the "vertical centerline" was bisecting the front surface of the handset at it's top and bottom edges, positioning the "ear reference point" on the outer surface of the both the left and right head phantoms on the ear reference point.

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

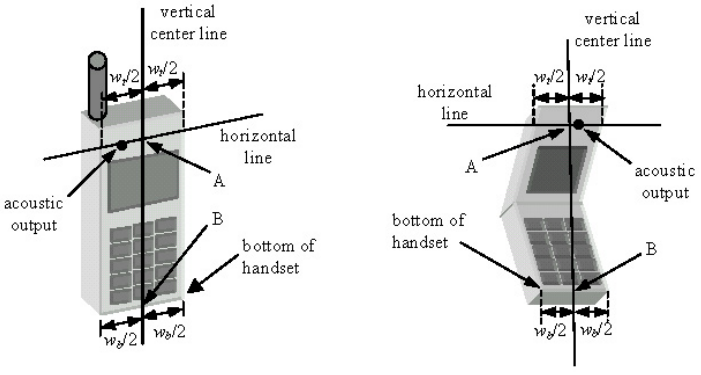


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

6 TEST CONFIGURATION POSITIONS FOR HANDSETS

6.1 Device Holder

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

6.2 Positioning for Cheek

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.

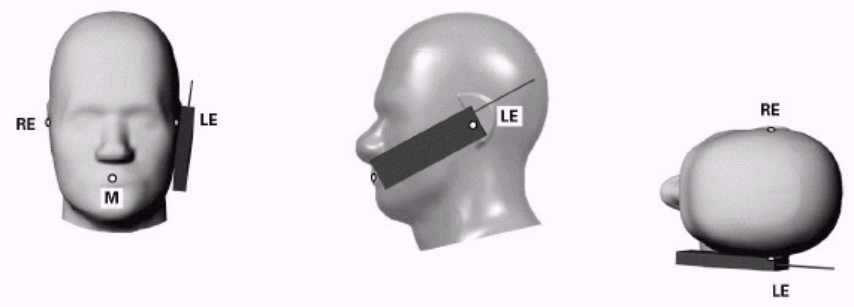


Figure 6-1 Front, Side and Top View of Cheek Position

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

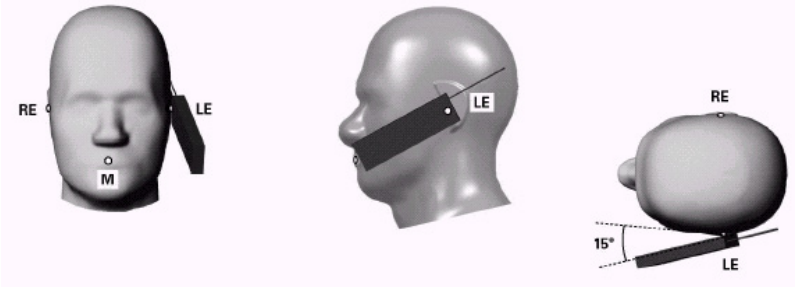


Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

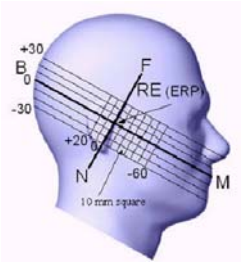


Figure 6-3
Side view w/ relevant markings

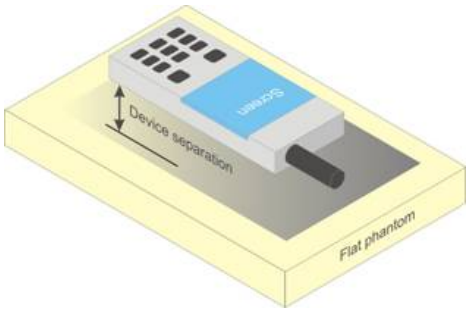


Figure 6-4
Sample Body-Worn Diagram

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.

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04_v01. 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.

The latest IEEE 1528 committee developments propose the usage of a tilted phantom when the antenna of the phone is mounted at the bottom or in all cases the peak absorption is in the chin region. Both SAM heads of the TwinSAM-Chin20 are rotated 20 degrees around the NF line. Each head can be removed individually from the table for emptying and cleaning.

Figure 6-5 Twin SAM Chin20

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 D04_v01, 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 D01_v05 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.

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 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 D06 v01 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 D01v05 publication 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)
SPATIAL PEAK SAR Brain	1.6	8.0
SPATIAL AVERAGE SAR Whole Body	0.08	0.4
SPATIAL PEAK SAR Hands, Feet, Ankles, Wrists	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 were performed using a base station simulator under digital average power.

8.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v05, 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 D01v01r02.

8.2 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01 "SAR Measurement Procedures for 3G Devices" v02, October 2007.

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

8.3 SAR Measurement Conditions for CDMA2000

The following procedures were performed according to FCC KDB Publication 941225 D01 "SAR Measurement Procedures for 3G Devices" v02, October 2007.

8.3.1 Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by "SAR Measurement Procedures for 3G Devices" v02, October 2007. 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
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
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.

8.3.2 Head SAR Measurements

SAR for head exposure configurations is measured in RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55. SAR for RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1 using the exposure configuration that results in the highest SAR for that channel in RC3.

Head SAR was additionally evaluated using EVDO Rev. A to support compliance for VoIP operations. See Section 8.3.4 for EVDO Rev. A configuration parameters.

8.3.3 Body SAR Measurements

SAR for body 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. SAR for multiple code channels (FCH + SCH_n) is not required when the maximum average output of each RF channel is less than ¼ dB higher than that measured with FCH only. Otherwise, SAR is measured on the maximum output channel (FCH + SCH_n) with FCH at full rate and SCH_0 enabled at 9600 bps using the exposure configuration that results in the highest SAR for that channel with FCH only. When multiple code channels are enabled, the DUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts. Body SAR was measured using TDSO / SO32 with power control bits in the "All Up".

Body SAR in RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1; with Loopback Service Option SO55, at full rate, using the body exposure configuration that results in the highest SAR for that channel in RC3.

8.3.4 Handsets with EVDO

For handsets with Ev-Do capabilities, when the maximum average output of each channel in Rev. 0 is less than ¼ dB higher than that measured in RC3 (1x RTT), body SAR for EV-DO is not required. Otherwise, SAR for Rev. 0 is measured on the maximum output channel at 153.6 kbps using the body exposure configuration that results in the highest SAR for that channel in RC3. SAR for Rev. A is not required when the maximum average output of each channel is less than that measured in Rev. 0 or less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel for Rev. A using a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations. A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots would be configured in the downlink for both Rev. 0 and Rev. A.

8.3.5 Body SAR Measurements for EVDO Hotspot

Hotspot Body SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 per KDB Publication 941225 D01 procedures for "1x Ev-Do data Devices". SAR for Subtype 2 Physical layer configurations is not required for Rev. A when the maximum average output of each RF channels is less than that measured in Subtype 0/1 Physical layer configurations. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for the RF channels 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.

SAR is not required for 1x RTT for Ev-Do devices that also support 1x RTT voice and/or data operations, when the maximum average output of each channel is less than 1⁄4 dB higher than that measured in Subtype 0/1 Physical Layer configurations for Rev. 0. Otherwise, CDMA "Body-SAR Measurement" procedures for "CDMA 2000 1x Handsets" were applied.

8.4 SAR Measurement Conditions for UMTS

8.4.1 Output Power Verification

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

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in section 5.2 of 3GPP TS 34.121 (release 5), using the appropriate RMC with TPC (transmit power control) set to all "1s" or applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc) are tabulated in this test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations are identified.

8.4.2 Head SAR Measurements for Handsets

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

8.4.3 Body SAR Measurements

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

8.4.4 SAR Measurements for Handsets with Rel 5 HSDPA

Body SAR for HSDPA is not required for handsets with HSDPA capabilities when the maximum average output power of each RF channel with HSDPA active is less than 0.25 dB higher than that measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is ≤ 75% of the SAR limit. Otherwise, SAR is measured for HSDPA, using an FRC with H-Set 1

in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration measured in 12.2 kbps RMC without HSDPA, on the maximum output channel with the body exposure configuration that resulted in the highest SAR in 12.2 kbps RMC mode for that RF channel.

The H-set used in FRC for HSDPA should be configured according to the UE category of a test device. The number of HS-DSCH/HSPDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the applicable H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the FRC for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 2 ms to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors of βc=9 and βd=15, and power offset parameters of ΔACK= ΔNACK =5 and ΔCQI=2 is used. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the FRC.

8.4.5 SAR Measurements for Handsets with Rel 6 HSUPA

Body SAR for HSUPA is not required when the maximum average output of each RF channel with HSUPA/HSDPA active is less than 0.25 dB higher than as measured without HSUPA/HSDPA using 12.2 kbps RMC and maximum SAR for 12.2 kbps RMC is ≤ 75 % of the SAR limit. Otherwise SAR is measured on the maximum output channel for the body exposure configuration produced highest SAR in 12.2 kbps RMC for that RF channel, using the additional procedures under “Release 6 HSPA data devices”

Head SAR for VOIP operations under HSPA is not required when maximum average output of each RF channel with HSPA is less than 0.25 dB higher than as measured using 12.2 kbps RMC. Otherwise SAR is measured using same HSPA configuration as used for body SAR.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}: 47/15 β_{ed2}: 47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (4)	15/15 (4)	64	15/15 (4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

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

8.5 SAR Measurement Conditions for LTE

LTE modes were tested according to FCC KDB 941225 D05v02 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 was 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.

8.5.1 Spectrum Plots for RB Configurations

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

8.5.2 MPR

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

8.5.3 A-MPR

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

8.5.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r01:

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 SAR Testing with 802.11 Transmitters

Normal network operating configurations are not suitable for measuring the SAR of 802.11 a/b/g/n/ac transmitters. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v01r02 for more details.

8.6.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

8.6.2 Frequency Channel Configurations [27]

For 2.4 GHz, the highest average RF output power channel between the low, mid and high channel at the lowest data rate was selected for SAR evaluation in 802.11b mode. 802.11g/n modes and higher data rates for 802.11b were additionally evaluated for SAR if the output power of the respective mode was 0.25 dB or higher than the powers of the SAR configurations tested in the 802.11b mode.

For 5 GHz, the highest average RF output power channel across the default test channels at the lowest data rate was selected for SAR evaluation in 802.11a. When the adjacent channels are higher in power then the default channels, these “required channels” were considered instead of the default channels for SAR testing. 802.11n modes and higher data rates for 802.11a/n/ac were evaluated only if the respective mode was 0.25 dB or higher than the 802.11a mode.

If the maximum extrapolated peak SAR of the zoom scan for the highest output channel was less than 1.6 W/kg or if the 1g averaged SAR was less than 0.8 W/kg, SAR testing was not required for the other test channels in the band.

9 RF CONDUCTED POWERS

9.1 CDMA Conducted Powers

Band	Channel	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	1013	824.7	24.30	24.32	24.24	24.24	24.41	24.39
	384	836.52	24.37	24.22	24.39	24.30	24.33	24.32
	777	848.31	24.13	24.11	24.03	24.13	24.16	24.07
PCS	25	1851.25	24.42	24.32	24.35	24.29	24.24	24.22
	600	1880	24.41	24.44	24.47	24.45	24.43	24.37
	1175	1908.75	24.50	24.48	24.38	24.41	24.40	24.39

Note: RC1 is only applicable for IS-95 compatibility.

Per KDB Publication 941225 D01v02:

1. Head SAR was tested with SO55 RC3. SO55 RC1 was not required since the average output power was not more than 0.25 dB than the SO55 RC3 powers.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. Ev-Do and TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers.
3. Hotspot SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0. If the average output power of Subtype 2 for Rev. A is less than the Rev. 0 power levels, then Rev. A SAR is not required. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for that RF channel in Rev. 0.
4. CDMA 1x-RTT SAR was additionally required to be evaluated for Hotspot exposure conditions to support simultaneous transmission capabilities.
5. Head SAR was additionally evaluated with EVDO Rev. A to determine compliance for held-to-ear VoIP operations.

Figure 9-1
Power Measurement Setup

9.2 GSM Conducted Powers

		Maximum Burst-Averaged Output Power								
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 850	128	33.37	33.47	31.48	**29.99**	**28.63**	27.16	26.93	22.99	21.84
	190	33.14	33.37	31.33	**29.92**	**28.45**	27.07	26.88	22.95	21.91
	251	33.01	33.07	31.01	**29.61**	**28.12**	26.83	26.65	22.86	21.53
GSM 1900	512	29.77	29.71	**28.16**	26.44	**25.12**	25.50	25.30	20.99	19.43
	661	29.88	29.92	**28.03**	26.34	**24.91**	25.12	25.07	20.63	19.28
	810	30.26	30.22	**28.44**	26.50	**25.22**	25.46	25.22	20.96	19.50
		Calculated Maximum Frame-Averaged Output Power								
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 850	128	24.34	24.44	25.46	**25.73**	**25.62**	18.13	20.91	18.73	18.83
	190	24.11	24.34	25.31	**25.66**	**25.44**	18.04	20.86	18.69	18.90
	251	23.98	24.04	24.99	**25.35**	**25.11**	17.80	20.63	18.60	18.52
GSM 1900	512	20.74	20.68	**22.14**	22.18	**22.11**	16.47	19.28	16.73	16.42
	661	20.85	20.89	**22.01**	22.08	**21.90**	16.09	19.05	16.37	16.27
	810	21.23	21.19	**22.42**	22.24	**22.21**	16.43	19.20	16.70	16.49

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. The bolded GPRS modes were selected for SAR testing according to the highest frame-averaged output power table according to KDB 941225 D03v01.
3. 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.
4. EDGE (8-PSK) output powers were measured with MCS7 on the base station simulator. MCS7 coding scheme was used to measure the output powers for EDGE since investigation has shown that choosing MCS7 coding scheme will ensure 8-PSK modulation. It has been shown that MCS levels that produce 8PSK modulation do not have an impact on output power.
5. This device does not support evolved EDGE (eEDGE)

GSM Class: B
GPRS Multislot class: 33 (Max 4 Tx uplink slots)
EDGE Multislot class: 33 (Max 4 Tx uplink slots)
DTM Multislot Class: N/A

Figure 9-2
Power Measurement Setup

9.3 UMTS Conducted Powers

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	22.97	22.95	22.99	22.70	22.86	22.65	-
99		12.2 kbps AMR	22.95	22.90	22.94	22.61	22.83	22.60	-
6	HSDPA	Subtest 1	21.96	21.99	21.98	21.74	21.85	21.69	0
6		Subtest 2	21.97	21.97	21.93	21.81	21.89	21.76	0
6		Subtest 3	21.40	21.48	21.50	21.29	21.33	21.20	0.5
6		Subtest 4	21.40	21.37	21.45	21.17	21.30	21.17	0.5
6	HSUPA	Subtest 1	20.90	20.95	20.97	20.79	20.90	20.81	0
6		Subtest 2	20.87	20.92	20.98	20.54	20.76	20.60	2
6		Subtest 3	20.56	20.64	20.89	20.16	20.28	20.39	1
6		Subtest 4	20.57	20.67	20.71	20.90	20.98	20.97	2
6		Subtest 5	20.65	20.73	20.97	20.69	20.89	20.79	0

UMTS SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v02. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

This device does not support DC-HSDPA.

It is expected by the manufacturer that MPR for some HSUPA subtests may be up to 1 dB more than specified by 3GPP, but also as low as 0 dB according to the chipset implementation in this model.

Figure 9-3
Power Measurement Setup

9.4 LTE Conducted Powers

9.4.1 LTE Band 13

Table 9-1
LTE Band 13 Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Mid	782.0	23230	10	QPSK	1	0	**23.13**	0	0
	782.0	23230	10	QPSK	1	25	23.03	0	0
	782.0	23230	10	QPSK	1	49	22.89	0	0
	782.0	23230	10	QPSK	25	0	21.93	1	0-1
	782.0	23230	10	QPSK	25	12	**21.95**	1	0-1
	782.0	23230	10	QPSK	25	25	21.90	1	0-1
	782.0	23230	10	QPSK	50	0	21.95	1	0-1
	782.0	23230	10	16QAM	1	0	22.20	1	0-1
	782.0	23230	10	16QAM	1	25	22.26	1	0-1
	782.0	23230	10	16QAM	1	49	22.02	1	0-1
	782.0	23230	10	16QAM	25	0	20.88	2	0-2
	782.0	23230	10	16QAM	25	12	20.91	2	0-2
	782.0	23230	10	16QAM	25	25	20.89	2	0-2
	782.0	23230	10	16QAM	50	0	20.84	2	0-2

Note: LTE Band 13 at 10 MHz Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

9.4.2 LTE Band 4 (AWS)

Table 9-2
LTE Band 4 (AWS) Conducted Powers - 20 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Mid	1732.5	20175	20	QPSK	1	0	23.06	0	0
	1732.5	20175	20	QPSK	1	50	**23.36**	0	0
	1732.5	20175	20	QPSK	1	99	23.06	0	0
	1732.5	20175	20	QPSK	50	0	22.12	1	0-1
	1732.5	20175	20	QPSK	50	25	**22.23**	1	0-1
	1732.5	20175	20	QPSK	50	50	22.09	1	0-1
	1732.5	20175	20	QPSK	100	0	22.17	1	0-1
	1732.5	20175	20	16QAM	1	0	22.35	1	0-1
	1732.5	20175	20	16QAM	1	50	22.47	1	0-1
	1732.5	20175	20	16QAM	1	99	22.38	1	0-1
	1732.5	20175	20	16QAM	50	0	21.10	2	0-2
	1732.5	20175	20	16QAM	50	25	21.24	2	0-2
	1732.5	20175	20	16QAM	50	50	21.25	2	0-2
	1732.5	20175	20	16QAM	100	0	21.16	2	0-2

Note: LTE Band 4 at 20 MHz Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

Table 9-3
LTE Band 4 (AWS) Conducted Powers - 15 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1717.5	20025	15	QPSK	1	0	22.76	0	0
	1717.5	20025	15	QPSK	1	36	23.01	0	0
	1717.5	20025	15	QPSK	1	74	23.08	0	0
	1717.5	20025	15	QPSK	36	0	21.76	1	0-1
	1717.5	20025	15	QPSK	36	18	21.96	1	0-1
	1717.5	20025	15	QPSK	36	37	22.03	1	0-1
	1717.5	20025	15	QPSK	75	0	21.91	1	0-1
	1717.5	20025	15	16QAM	1	0	22.12	1	0-1
	1717.5	20025	15	16QAM	1	36	22.33	1	0-1
	1717.5	20025	15	16QAM	1	74	22.37	1	0-1
	1717.5	20025	15	16QAM	36	0	20.83	2	0-2
	1717.5	20025	15	16QAM	36	18	20.98	2	0-2
	1717.5	20025	15	16QAM	36	37	21.06	2	0-2
	1717.5	20025	15	16QAM	75	0	20.92	2	0-2
Mid	1732.5	20175	15	QPSK	1	0	23.21	0	0
	1732.5	20175	15	QPSK	1	36	23.41	0	0
	1732.5	20175	15	QPSK	1	74	23.37	0	0
	1732.5	20175	15	QPSK	36	0	22.18	1	0-1
	1732.5	20175	15	QPSK	36	18	22.29	1	0-1
	1732.5	20175	15	QPSK	36	37	22.21	1	0-1
	1732.5	20175	15	QPSK	75	0	22.12	1	0-1
	1732.5	20175	15	16QAM	1	0	22.36	1	0-1
	1732.5	20175	15	16QAM	1	36	22.50	1	0-1
	1732.5	20175	15	16QAM	1	74	22.48	1	0-1
	1732.5	20175	15	16QAM	36	0	21.19	2	0-2
	1732.5	20175	15	16QAM	36	18	21.15	2	0-2
	1732.5	20175	15	16QAM	36	37	21.32	2	0-2
	1732.5	20175	15	16QAM	75	0	21.24	2	0-2
High	1747.5	20325	15	QPSK	1	0	23.16	0	0
	1747.5	20325	15	QPSK	1	36	22.88	0	0
	1747.5	20325	15	QPSK	1	74	22.92	0	0
	1747.5	20325	15	QPSK	36	0	22.00	1	0-1
	1747.5	20325	15	QPSK	36	18	21.89	1	0-1
	1747.5	20325	15	QPSK	36	37	21.72	1	0-1
	1747.5	20325	15	QPSK	75	0	21.77	1	0-1
	1747.5	20325	15	16QAM	1	0	22.43	1	0-1
	1747.5	20325	15	16QAM	1	36	22.16	1	0-1
	1747.5	20325	15	16QAM	1	74	22.38	1	0-1
	1747.5	20325	15	16QAM	36	0	21.02	2	0-2
	1747.5	20325	15	16QAM	36	18	20.87	2	0-2
	1747.5	20325	15	16QAM	36	37	20.78	2	0-2
	1747.5	20325	15	16QAM	75	0	20.92	2	0-2

Table 9-4
LTE Band 4 (AWS) Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1715	20000	10	QPSK	1	0	22.80	0	0
	1715	20000	10	QPSK	1	25	22.92	0	0
	1715	20000	10	QPSK	1	49	23.14	0	0
	1715	20000	10	QPSK	25	0	21.82	1	0-1
	1715	20000	10	QPSK	25	12	21.80	1	0-1
	1715	20000	10	QPSK	25	25	21.91	1	0-1
	1715	20000	10	QPSK	50	0	21.74	1	0-1
	1715	20000	10	16QAM	1	0	22.21	1	0-1
	1715	20000	10	16QAM	1	25	22.26	1	0-1
	1715	20000	10	16QAM	1	49	22.39	1	0-1
	1715	20000	10	16QAM	25	0	20.83	2	0-2
	1715	20000	10	16QAM	25	12	20.90	2	0-2
	1715	20000	10	16QAM	25	25	21.01	2	0-2
	1715	20000	10	16QAM	50	0	20.76	2	0-2
Mid	1732.5	20175	10	QPSK	1	0	23.11	0	0
	1732.5	20175	10	QPSK	1	25	23.34	0	0
	1732.5	20175	10	QPSK	1	49	23.41	0	0
	1732.5	20175	10	QPSK	25	0	22.23	1	0-1
	1732.5	20175	10	QPSK	25	12	22.22	1	0-1
	1732.5	20175	10	QPSK	25	25	22.14	1	0-1
	1732.5	20175	10	QPSK	50	0	22.11	1	0-1
	1732.5	20175	10	16QAM	1	0	22.43	1	0-1
	1732.5	20175	10	16QAM	1	25	22.45	1	0-1
	1732.5	20175	10	16QAM	1	49	22.50	1	0-1
	1732.5	20175	10	16QAM	25	0	21.23	2	0-2
	1732.5	20175	10	16QAM	25	12	21.28	2	0-2
	1732.5	20175	10	16QAM	25	25	21.18	2	0-2
	1732.5	20175	10	16QAM	50	0	21.13	2	0-2
High	1750	20350	10	QPSK	1	0	22.89	0	0
	1750	20350	10	QPSK	1	25	22.96	0	0
	1750	20350	10	QPSK	1	49	22.98	0	0
	1750	20350	10	QPSK	25	0	21.82	1	0-1
	1750	20350	10	QPSK	25	12	21.85	1	0-1
	1750	20350	10	QPSK	25	25	21.71	1	0-1
	1750	20350	10	QPSK	50	0	21.66	1	0-1
	1750	20350	10	16QAM	1	0	22.28	1	0-1
	1750	20350	10	16QAM	1	25	22.30	1	0-1
	1750	20350	10	16QAM	1	49	22.28	1	0-1
	1750	20350	10	16QAM	25	0	20.93	2	0-2
	1750	20350	10	16QAM	25	12	20.94	2	0-2
	1750	20350	10	16QAM	25	25	20.84	2	0-2
	1750	20350	10	16QAM	50	0	20.78	2	0-2

Table 9-5
LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1712.5	19975	5	QPSK	1	0	22.82	0	0
	1712.5	19975	5	QPSK	1	12	23.06	0	0
	1712.5	19975	5	QPSK	1	24	23.05	0	0
	1712.5	19975	5	QPSK	12	0	21.78	1	0-1
	1712.5	19975	5	QPSK	12	6	21.75	1	0-1
	1712.5	19975	5	QPSK	12	13	21.83	1	0-1
	1712.5	19975	5	QPSK	25	0	21.65	1	0-1
	1712.5	19975	5	16-QAM	1	0	22.12	1	0-1
	1712.5	19975	5	16-QAM	1	12	22.26	1	0-1
	1712.5	19975	5	16-QAM	1	24	22.28	1	0-1
	1712.5	19975	5	16-QAM	12	0	20.77	2	0-2
	1712.5	19975	5	16-QAM	12	6	20.76	2	0-2
	1712.5	19975	5	16-QAM	12	13	20.82	2	0-2
	1712.5	19975	5	16-QAM	25	0	20.76	2	0-2
Mid	1732.5	20175	5	QPSK	1	0	23.34	0	0
	1732.5	20175	5	QPSK	1	12	23.48	0	0
	1732.5	20175	5	QPSK	1	24	23.43	0	0
	1732.5	20175	5	QPSK	12	0	22.32	1	0-1
	1732.5	20175	5	QPSK	12	6	22.25	1	0-1
	1732.5	20175	5	QPSK	12	13	22.25	1	0-1
	1732.5	20175	5	QPSK	25	0	22.10	1	0-1
	1732.5	20175	5	16-QAM	1	0	22.49	1	0-1
	1732.5	20175	5	16-QAM	1	12	22.50	1	0-1
	1732.5	20175	5	16-QAM	1	24	22.50	1	0-1
	1732.5	20175	5	16-QAM	12	0	21.37	2	0-2
	1732.5	20175	5	16-QAM	12	6	21.24	2	0-2
	1732.5	20175	5	16-QAM	12	13	21.26	2	0-2
	1732.5	20175	5	16-QAM	25	0	21.11	2	0-2
High	1752.5	20375	5	QPSK	1	0	22.90	0	0
	1752.5	20375	5	QPSK	1	12	22.84	0	0
	1752.5	20375	5	QPSK	1	24	23.00	0	0
	1752.5	20375	5	QPSK	12	0	21.89	1	0-1
	1752.5	20375	5	QPSK	12	6	21.93	1	0-1
	1752.5	20375	5	QPSK	12	13	21.93	1	0-1
	1752.5	20375	5	QPSK	25	0	21.82	1	0-1
	1752.5	20375	5	16-QAM	1	0	22.28	1	0-1
	1752.5	20375	5	16-QAM	1	12	22.15	1	0-1
	1752.5	20375	5	16-QAM	1	24	22.39	1	0-1
	1752.5	20375	5	16-QAM	12	0	20.98	2	0-2
	1752.5	20375	5	16-QAM	12	6	20.91	2	0-2
	1752.5	20375	5	16-QAM	12	13	21.00	2	0-2
	1752.5	20375	5	16-QAM	25	0	20.94	2	0-2

9.5 WLAN Conducted Powers

Table 9-6
IEEE 802.11b Average RF Power

Mode	Freq	Channel	802.11b (2.4 GHz) Conducted Power [dBm]			
			Data Rate [Mbps]			
	[MHz]		1	2	5.5	11
802.11b	2412	1*	16.95	16.43	16.35	16.44
802.11b	2437	6*	**17.16**	16.66	16.67	16.64
802.11b	2462	11*	16.79	16.31	16.29	16.32

Table 9-7
IEEE 802.11g Average RF Power

Mode	Freq	Channel	802.11g (2.4 GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6	9	12	18	24	36	48	54
802.11g	2412	1	13.74	13.62	13.79	13.75	13.66	13.69	13.78	13.61
802.11g	2437	6	13.89	13.87	13.99	13.96	13.89	13.87	14.01	13.73
802.11g	2462	11	13.55	13.47	13.59	13.64	13.64	13.52	13.60	13.52

Table 9-8
IEEE 802.11n Average RF Power

Mode	Freq	Channel	802.11n (2.4 GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6.5	13	20	26	39	52	58	65
802.11n	2412	1	12.68	12.76	12.67	12.68	12.73	12.84	12.72	12.71
802.11n	2437	6	12.97	12.89	13.03	13.00	12.86	12.92	12.94	12.91
802.11n	2462	11	12.68	12.67	12.71	12.68	12.61	12.63	12.81	12.63

Table 9-9
IEEE 802.11a Average RF Power

Mode	Freq	Channel	802.11a (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6	9	12	18	24	36	48	54
802.11a	5180	36*	**14.03**	13.94	14.05	14.04	13.97	13.93	14.05	13.81
802.11a	5200	40	13.85	13.99	13.90	13.92	13.91	13.95	13.95	13.81
802.11a	5220	44	**13.86**	13.84	13.86	13.96	13.90	13.83	13.98	13.64
802.11a	5240	48*	13.79	13.86	13.93	13.78	13.87	13.83	13.99	13.79
802.11a	5260	52*	13.79	13.83	13.81	13.91	13.92	13.87	13.93	13.75
802.11a	5280	56	**14.01**	14.02	13.97	14.07	14.04	13.99	14.11	13.94
802.11a	5300	60	13.88	14.02	14.06	13.97	13.99	14.00	14.24	13.94
802.11a	5320	64*	13.93	13.98	13.91	13.98	13.93	13.96	14.00	13.83
802.11a	5500	100	**14.10**	14.09	14.14	14.20	14.09	14.10	14.18	14.01
802.11a	5520	104*	14.04	14.08	14.14	14.11	14.04	14.09	14.25	13.99
802.11a	5540	108	14.00	14.02	14.08	14.03	13.98	14.06	14.26	14.00
802.11a	5560	112	13.96	13.96	13.97	14.07	13.87	13.94	14.08	13.88
802.11a	5580	116*	13.87	13.93	14.00	13.97	13.90	13.85	14.01	13.89
802.11a	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5620	124*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5660	132	13.68	13.57	13.53	13.65	13.69	13.59	13.78	13.60
802.11a	5680	136*	13.59	13.59	13.65	13.59	13.64	13.58	13.63	13.47
802.11a	5700	140	13.41	13.55	13.58	13.60	13.44	13.45	13.59	13.43
802.11a	5745	149*	**13.60**	13.59	13.61	13.74	13.66	13.61	13.75	13.57
802.11a	5765	153	13.49	13.59	13.64	13.64	13.57	13.56	13.67	13.47
802.11a	5785	157*	13.49	13.42	13.55	13.56	13.47	13.47	13.62	13.37
802.11a	5805	161*	13.41	13.36	13.51	13.51	13.50	13.40	13.56	13.34
802.11a	5825	165	13.40	13.41	13.37	13.47	13.42	13.41	13.51	13.28

Per FCC KDB Publication 443999 and RSS-210 A9.2(3), transmission on channels which overlap the 5600-5650 MHz is prohibited as a client. This device does not transmit any beacons or initiate any transmissions in 5.3 and 5.5 GHz Band.

(*) – indicates default channels per KDB Publication 248227 D01v01r02. When the adjacent channels are higher in power then the default channels, these “required channels” are considered for SAR testing instead of the default channels.

Table 9-10
IEEE 802.11n Average RF Power – 20 MHz Bandwidth

Mode	Freq	Channel	20MHz BW 802.11n (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6.5	13	20	26	39	52	58	65
802.11n	5180	36	12.97	12.99	13.00	12.92	13.04	13.08	13.07	13.06
802.11n	5200	40	12.95	12.95	13.00	12.97	13.06	13.03	13.01	13.06
802.11n	5220	44	12.89	13.04	12.91	12.99	12.92	12.90	13.03	13.01
802.11n	5240	48	12.84	12.93	12.92	12.93	12.92	12.95	13.02	12.96
802.11n	5260	52	13.03	13.14	12.99	13.06	12.92	13.03	13.11	13.05
802.11n	5280	56	12.90	12.95	13.04	12.90	13.07	13.02	12.99	13.03
802.11n	5300	60	12.81	12.96	12.96	13.00	12.97	13.00	13.01	12.95
802.11n	5320	64	12.84	12.91	12.94	12.78	12.94	12.99	12.99	13.02
802.11n	5500	100	13.17	13.12	13.14	13.11	13.13	13.18	13.23	13.24
802.11n	5520	104	13.09	13.09	13.00	13.01	13.11	13.10	13.01	13.18
802.11n	5540	108	12.97	13.03	12.97	13.05	13.06	13.08	13.03	13.03
802.11n	5560	112	12.95	12.99	12.98	12.96	12.85	12.96	12.97	12.98
802.11n	5580	116	12.87	12.88	12.84	12.84	12.94	12.91	12.89	12.94
802.11a	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5660	132	12.64	12.55	12.68	12.63	12.69	12.60	12.60	12.64
802.11n	5680	136	12.57	12.55	12.57	12.58	12.61	12.51	12.64	12.51
802.11n	5700	140	12.51	12.54	12.52	12.43	12.48	12.46	12.53	12.49
802.11n	5745	149	12.86	12.75	12.87	12.82	12.84	12.78	12.88	12.86
802.11n	5765	153	12.82	12.75	12.79	12.78	12.79	12.86	12.89	12.87
802.11n	5785	157	12.84	12.78	12.77	12.72	12.72	12.68	12.80	12.78
802.11n	5805	161	12.70	12.64	12.73	12.69	12.71	12.67	12.77	12.63
802.11n	5825	165	12.68	12.55	12.61	12.63	12.71	12.74	12.64	12.54

Table 9-11
IEEE 802.11n Average RF Power – 40 MHz Bandwidth

Mode	Freq	Channel	40MHz BW 802.11n (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		13.5/15	27/30	40.5/45	54/60	81/90	108/120	121.5/135	135/150
802.11n	5190	38	12.13	12.20	12.22	12.09	12.19	12.20	12.30	12.06
802.11n	5230	46	12.08	12.10	12.11	12.02	12.19	12.15	12.16	12.17
802.11n	5270	54	11.57	11.53	11.55	11.42	11.64	11.66	11.50	11.56
802.11n	5310	62	11.40	11.44	11.45	11.38	11.34	11.50	11.45	11.47
802.11n	5510	102	12.32	12.31	12.43	12.27	12.44	12.47	12.50	12.49
802.11n	5550	110	12.27	12.35	12.17	12.28	12.28	12.26	12.36	12.35
802.11n	5590	118	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5630	126	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5670	134	11.87	11.88	11.97	11.92	11.94	11.99	12.00	11.88
802.11n	5755	151	11.94	11.91	11.93	11.81	11.95	11.86	11.97	11.94
802.11n	5795	159	11.83	11.76	11.72	11.76	11.78	11.79	11.83	11.90

Table 9-12
IEEE 802.11ac Average RF Power – 80 MHz Bandwidth

Mode	Freq	Channel	80MHz BW 802.11ac (5GHz) Conducted Power [dBm]									
			Data Rate [Mbps]									
	[MHz]		29.3/32.5	58.5/65	87.8/97.5	117/130	175.5/195	234/260	263.3/292.5	292.5/325	351/390	390/433.3
802.11ac	5210	42	11.39	11.47	11.56	11.51	11.50	11.52	11.47	11.52	11.52	11.51
802.11ac	5290	58	11.12	11.03	11.05	11.05	11.17	11.09	11.07	11.14	10.98	11.07
802.11ac	5530	106	11.16	11.13	11.24	11.15	11.19	11.22	11.10	11.18	11.21	11.22
802.11ac	5775	155	10.74	10.81	10.80	10.77	11.02	10.98	10.91	11.02	11.03	11.04

Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes:

- For 2.4 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11b were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
- For 5 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11a were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n 20 MHz and 40 MHz, and 802.11ac 80MHz) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
- When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.
- The bolded data rate and channel above were tested for SAR.

Figure 9-4
Power Measurement Setup

10 LTE POWER REDUCTION

10.1 Introduction to LTE Power Reduction

This device is capable of Simultaneous Voice and LTE (SVLTE) calls, with the voice call supported by a CDMA 1x-RTT transmitter and the data connection supported by a separate LTE transmitter. A LTE power reduction scheme is applied during a LTE connection operating simultaneously with 1x-RTT voice calls. The maximum transmit power of LTE is limited depending on the CDMA 1x voice transmit power level. When CDMA 1x Voice is operating at a certain range of high power levels, the maximum LTE transmit power is limited. When CDMA 1x Voice transmit power is below a certain threshold transmit power level, LTE can transmit at the maximum power. Target levels of power reduction and CDMA voice threshold levels are provided in Table 10-1.

Table 10-1
SVLTE Power Reduction Scheme

Mode	Voice Avg Power(P) 1x 850/1900 MHz (dBm)	Max. B13/B4 LTE Data Avg Power (dBm)
SVLTE	P ≥ 18	19
	P < 18	23

10.2 Output Power Verification

Per KDB Publication 941225 D05v02 Section 4.4, output powers were measured in SVLTE mode to determine that the power reduction mechanism was operating reliably and consistently. The power reduction was investigated by simultaneously connecting the device to both LTE and CDMA base station simulators. LTE output powers were measured through conducted RF connections by first connecting the device in a LTE data call and subsequently a CDMA 1x-RTT call. CDMA powers were controlled by configuring the CDMA base station simulator to active bits. The LTE output power was monitored while changing the cell output power level. The power reduction targets and threshold level described in Table 10-1 were confirmed. Please see results in Table 10-2.

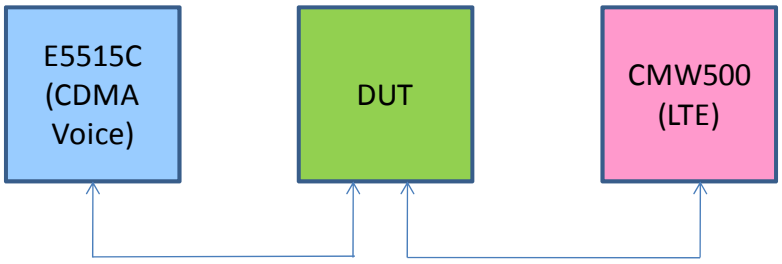


Figure 10-1
SVLTE Conducted Power Measurement Setup

Table 10-2
SVLTE Power Reduction Verification Results

1xRTT CDMA Voice Band	BC0 1xRTT CDMA Voice Channel	BC0 1xRTT CDMA Voice Tx [dBm]	LTE Band 13 Conducted Power (dBm)													
			Mid													
			QPSK 1 RB, Low Edge	QPSK 1 RB, Mid Edge	QPSK 1 RB, Upper Edge	QPSK 50% RB, Low Edge	QPSK 50% RB, Mid Edge	QPSK 50% RB, Upper Edge	QPSK 100% RB 0RB offset	16 QAM 1 RB, Low Edge	16 QAM 1 RB, Mid Edge	16 QAM 1 RB, Upper Edge	16 QAM 50% RB, Low Edge	16 QAM 50% RB, Mid Edge	16 QAM 50% RB, Upper Edge	16 QAM 100% RB 0RB offset
850 MHz	384	25	18.75	18.92	18.99	18.85	18.97	19.08	18.93	18.72	18.99	19.04	18.94	19.05	19.03	18.80
		24	18.74	18.94	18.98	18.87	18.97	19.03	18.92	18.83	18.98	19.05	18.92	19.06	19.02	18.83
		23	18.73	18.96	18.98	18.90	18.97	19.04	18.90	18.82	19.00	19.07	18.95	19.05	19.00	18.81
		22	18.74	18.98	18.99	18.92	18.98	19.06	18.92	18.80	18.87	19.03	18.94	19.03	19.11	18.80
		21	18.74	18.99	19.00	18.93	18.99	19.00	18.91	18.78	18.99	19.04	18.95	19.01	19.08	18.84
		20	18.75	18.95	19.01	18.95	19.00	19.01	18.90	18.77	19.02	19.07	18.92	19.02	19.08	18.83
		19	18.76	18.95	18.96	18.95	19.02	19.05	18.93	18.79	18.98	19.06	18.95	19.00	19.07	18.82
		18	18.77	18.94	19.00	18.94	19.03	19.04	18.93	18.80	19.00	19.05	18.94	19.01	19.05	18.82
		17	22.83	22.89	22.81	21.95	22.06	22.04	21.91	22.01	22.14	22.15	21.02	21.13	21.14	20.79
		16	22.82	22.85	22.84	21.96	22.05	22.04	21.95	22.01	22.12	22.14	21.01	21.12	21.13	20.78
		15	22.75	22.87	22.81	21.97	22.01	22.05	21.90	22.03	22.13	22.10	21.03	21.11	21.14	20.87
		14	22.79	22.88	22.82	21.99	22.04	22.05	21.91	22.02	22.15	22.13	21.02	21.14	21.15	20.84
		13	22.83	22.88	22.88	22.00	22.03	22.02	21.92	22.01	22.10	22.19	21.04	21.09	21.13	20.85
		12	22.84	22.87	22.84	22.00	22.00	22.01	21.90	22.03	22.11	22.18	21.02	21.08	21.14	20.83
		11	22.92	22.86	22.90	21.99	22.01	22.03	21.91	22.07	22.15	22.16	21.05	21.08	21.12	20.84

1xRTT CDMA Voice Band	BC1 1xRTT CDMA Voice Channel	BC1 1xRTT CDMA Voice Tx [dBm]	LTE Band 13 Conducted Power (dBm)													
			Mid													
			QPSK 1 RB, Low Edge	QPSK 1 RB, Mid Edge	QPSK 1 RB, Upper Edge	QPSK 50% RB, Low Edge	QPSK 50% RB, Mid Edge	QPSK 50% RB, Upper Edge	QPSK 100% RB 0RB offset	16 QAM 1 RB, Low Edge	16 QAM 1 RB, Mid Edge	16 QAM 1 RB, Upper Edge	16 QAM 50% RB, Low Edge	16 QAM 50% RB, Mid Edge	16 QAM 50% RB, Upper Edge	16 QAM 100% RB 0RB offset
1900 MHz	600	25	18.74	18.92	19.00	18.96	19.07	19.08	18.91	18.89	19.03	19.06	18.94	19.03	19.09	18.82
		24	18.73	18.93	19.01	18.95	19.05	19.07	18.90	18.85	19.02	19.07	18.93	19.04	19.06	18.80
		23	18.75	18.90	19.02	18.96	19.05	19.09	18.91	18.86	19.03	19.09	18.94	19.03	19.07	18.82
		22	18.77	18.94	19.00	18.95	19.04	19.08	18.92	18.87	19.04	19.08	18.95	19.07	19.05	18.81
		21	18.76	18.95	18.98	18.97	19.07	19.05	18.94	18.85	19.01	19.03	18.97	19.08	19.03	18.80
		20	18.72	18.93	18.99	18.98	19.03	19.03	18.95	18.86	19.02	19.07	18.98	19.08	19.04	18.78
		19	18.78	18.95	19.01	19.00	19.05	19.04	18.93	18.84	19.00	19.06	18.97	19.09	19.03	18.79
		18	18.72	18.94	19.02	19.00	19.06	19.03	18.85	18.82	19.00	19.06	18.94	19.10	19.05	18.80
		17	22.81	22.91	22.92	22.02	22.12	22.14	21.86	22.04	22.12	22.11	21.05	21.11	21.16	20.82
		16	22.77	22.90	22.91	22.06	22.10	22.10	21.87	22.05	22.14	22.13	21.04	21.12	21.16	20.83
		15	22.76	22.91	22.90	22.04	22.11	22.09	21.86	22.08	22.13	22.15	21.03	21.11	21.17	20.84
		14	22.76	22.92	22.91	22.04	22.10	22.08	21.88	22.04	22.11	22.16	21.06	21.12	21.09	20.83
		13	22.74	22.93	22.92	22.06	22.12	22.07	21.90	22.00	22.13	22.15	21.07	21.14	21.15	20.85
		12	22.78	22.91	22.91	22.05	22.13	22.05	21.87	21.98	22.13	22.12	21.05	21.13	21.14	20.84
		11	22.79	22.92	22.92	22.06	22.13	22.15	21.88	21.97	22.12	22.13	20.98	21.16	21.12	20.85

1xRTT CDMA Voice Band	BC0 1xRTT CDMA Voice Channel	BC0 1xRTT CDMA Voice Tx [dBm]	LTE Band 4 Conducted Power (dBm) - 20 MHz BW													
			Mid													
			QPSK 1 RB, Low Edge	QPSK 1 RB, Mid Edge	QPSK 1 RB, Upper Edge	QPSK 50% RB, Low Edge	QPSK 50% RB, Mid Edge	QPSK 50% RB, Upper Edge	QPSK 100% RB 0RB offset	16 QAM 1 RB, Low Edge	16 QAM 1 RB, Mid Edge	16 QAM 1 RB, Upper Edge	16 QAM 50% RB, Low Edge	16 QAM 50% RB, Mid Edge	16 QAM 50% RB, Upper Edge	16 QAM 100% RB 0RB offset
850 MHz	384	25	19.18	19.41	19.02	18.91	19.07	19.01	19.04	19.21	19.41	19.06	18.92	19.08	18.95	18.97
		24	19.21	19.37	19.10	18.99	19.11	19.12	19.03	19.31	19.40	19.11	18.91	19.12	18.94	19.01
		23	19.21	19.37	19.02	18.98	19.15	19.05	19.01	19.32	19.43	19.02	18.91	19.10	18.97	19.08
		22	19.22	19.36	19.05	19.02	19.19	19.06	18.95	19.31	19.42	19.04	18.88	19.04	18.92	19.02
		21	19.16	19.34	19.07	19.05	19.22	19.07	19.00	19.28	19.40	19.11	18.96	19.05	18.91	18.99
		20	19.18	19.35	19.07	19.06	19.21	19.03	19.04	19.24	19.41	19.13	18.95	19.13	18.98	19.20
		19	19.20	19.25	19.03	19.10	19.20	19.10	19.03	19.23	19.42	19.17	18.94	19.11	19.00	19.00
		18	19.23	19.32	19.03	18.94	19.09	19.05	19.06	19.27	19.42	19.15	18.89	19.07	18.91	18.92
		17	23.04	23.23	22.94	21.98	22.09	21.96	21.97	22.09	22.28	21.94	20.85	21.13	20.94	20.97
		16	23.12	23.26	22.91	21.97	22.11	22.01	22.06	22.13	22.22	22.01	20.95	21.15	21.10	20.98
		15	23.11	23.33	22.92	21.95	22.12	22.06	22.00	22.15	22.24	22.07	20.97	21.10	21.06	21.06
		14	23.16	23.31	22.91	21.90	22.14	22.08	22.01	22.21	22.26	22.10	20.99	21.03	21.04	21.13
		13	23.06	23.31	22.94	21.91	22.18	21.99	22.05	22.24	22.28	22.22	20.91	21.08	21.02	21.11
		12	23.10	23.32	22.97	21.92	22.21	22.00	22.02	22.19	22.32	22.01	20.92	21.12	21.00	21.10
		11	23.07	23.25	22.89	21.95	22.11	21.99	22.00	22.10	22.30	21.96	20.88	21.07	20.97	20.98

1xRTT CDMA Voice Band	BC1 1xRTT CDMA Voice Channel	BC1 1xRTT CDMA Voice Tx [dBm]	LTE Band 4 Conducted Power (dBm) - 20 MHz BW													
			Mid													
			QPSK 1 RB, Low Edge	QPSK 1 RB, Mid Edge	QPSK 1 RB, Upper Edge	QPSK 50% RB, Low Edge	QPSK 50% RB, Mid Edge	QPSK 50% RB, Upper Edge	QPSK 100% RB 0RB offset	16 QAM 1 RB, Low Edge	16 QAM 1 RB, Mid Edge	16 QAM 1 RB, Upper Edge	16 QAM 50% RB, Low Edge	16 QAM 50% RB, Mid Edge	16 QAM 50% RB, Upper Edge	16 QAM 100% RB 0RB offset
1900 MHz	600	25	19.19	19.35	19.07	18.96	19.12	18.98	19.05	19.21	19.45	19.10	18.91	19.06	18.95	18.96
		24	19.21	19.36	19.11	18.97	19.15	19.00	19.02	19.28	19.44	19.11	18.93	19.07	19.01	18.97
		23	19.22	19.39	19.12	18.96	19.16	19.07	19.01	19.31	19.43	19.09	18.91	19.11	19.02	19.03
		22	19.27	19.40	19.15	18.98	19.20	19.06	19.00	19.23	19.44	19.12	18.97	19.10	18.98	19.00
		21	19.25	19.37	19.13	18.94	19.21	19.02	19.06	19.25	19.41	19.11	18.96	19.06	19.01	19.01
		20	19.21	19.38	19.18	18.91	19.16	19.10	18.97	19.31	19.42	19.10	18.95	19.07	19.05	18.96
		19	19.19	19.41	19.08	18.95	19.15	19.06	19.04	19.32	19.43	19.08	18.93	19.11	18.99	19.02
		18	19.22	19.38	19.02	18.99	19.14	19.01	19.07	19.24	19.44	19.07	18.95	19.08	18.95	18.96
		17	23.03	23.22	22.93	21.98	22.14	22.04	21.97	22.15	22.31	21.93	20.97	21.09	20.95	20.93
		16	23.12	23.27	22.91	21.99	22.24	22.10	22.10	22.10	22.32	22.00	20.92	21.12	21.00	20.94
		15	23.24	23.24	22.93	22.01	22.10	22.03	22.08	22.10	22.33	22.01	20.97	21.10	21.02	20.91
		14	23.15	23.26	22.97	22.04	22.15	22.17	22.06	22.12	22.34	22.02	20.96	21.08	21.03	20.85
		13	23.24	23.31	22.88	22.03	22.17	22.11	22.05	22.11	22.35	22.05	20.94	21.15	21.05	20.88
		12	23.26	23.35	22.80	22.01	22.20	22.16	22.01	22.12	22.31	22.07	20.95	21.13	21.01	20.93
		11	23.05	23.23	22.91	21.98	22.16	22.06	21.99	22.13	22.33	21.92	20.94	21.11	20.93	20.91

10.3 SVLTE SAR Testing Procedures

Per KDB 941225 D05v02 Section 4.4 B), SAR testing was additionally performed at the reduced CDMA and LTE power levels with respect to the simultaneous transmission scenarios. Additional samples were tuned to fixed reduced power levels to represent the SVLTE condition in a standalone environment. While the power reduction mechanism is activated at the CDMA Voice power level of 18 dBm, simultaneous SAR summations of maximum power LTE were evaluated at this reduced fixed CDMA voice power level. SAR was additionally evaluated at reduced power LTE levels to perform simultaneous SAR analysis when CDMA voice is at maximum power.

10.3.1 Reduced LTE B13 Conducted Powers

Table 10-3
Reduced LTE Band 13 Conducted Power – 10MHz Bandwidths

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Mid	782.0	23230	10	QPSK	1	0	19.35	0	0
	782.0	23230	10	QPSK	1	25	**19.38**	0	0
	782.0	23230	10	QPSK	1	49	19.33	0	0
	782.0	23230	10	QPSK	25	0	19.17	0	0-1
	782.0	23230	10	QPSK	25	12	19.12	0	0-1
	782.0	23230	10	QPSK	25	25	**19.21**	0	0-1
	782.0	23230	10	QPSK	50	0	19.14	0	0-1
	782.0	23230	10	16QAM	1	0	19.11	0	0-1
	782.0	23230	10	16QAM	1	25	19.19	0	0-1
	782.0	23230	10	16QAM	1	49	19.13	0	0-1
	782.0	23230	10	16QAM	25	0	19.12	0	0-2
	782.0	23230	10	16QAM	25	12	19.10	0	0-2
	782.0	23230	10	16QAM	25	25	19.23	0	0-2
	782.0	23230	10	16QAM	50	0	18.95	0	0-2

10.3.2 Reduced LTE B4 Conducted Powers

Table 10-4
Reduced LTE Band 4 Conducted Power – 20MHz Bandwidths

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Mid	1732.5	20175	20	QPSK	1	0	19.21	0	0
	1732.5	20175	20	QPSK	1	50	**19.44**	0	0
	1732.5	20175	20	QPSK	1	99	19.24	0	0
	1732.5	20175	20	QPSK	50	0	19.19	0	0-1
	1732.5	20175	20	QPSK	50	25	19.23	0	0-1
	1732.5	20175	20	QPSK	50	50	**19.32**	0	0-1
	1732.5	20175	20	QPSK	100	0	19.21	0	0-1
	1732.5	20175	20	16QAM	1	0	19.08	0	0-1
	1732.5	20175	20	16QAM	1	50	19.26	0	0-1
	1732.5	20175	20	16QAM	1	99	19.05	0	0-1
	1732.5	20175	20	16QAM	50	0	19.10	0	0-2
	1732.5	20175	20	16QAM	50	25	19.15	0	0-2
	1732.5	20175	20	16QAM	50	50	19.27	0	0-2
	1732.5	20175	20	16QAM	100	0	19.14	0	0-2

Table 10-5
Reduced LTE Band 4 Conducted Power – 15MHz Bandwidths

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1717.5	20025	15	QPSK	1	0	19.31	0	0
	1717.5	20025	15	QPSK	1	36	19.35	0	0
	1717.5	20025	15	QPSK	1	74	19.22	0	0
	1717.5	20025	15	QPSK	36	0	19.14	0	0-1
	1717.5	20025	15	QPSK	36	18	19.21	0	0-1
	1717.5	20025	15	QPSK	36	37	19.00	0	0-1
	1717.5	20025	15	QPSK	75	0	19.17	0	0-1
	1717.5	20025	15	16QAM	1	0	19.35	0	0-1
	1717.5	20025	15	16QAM	1	36	19.41	0	0-1
	1717.5	20025	15	16QAM	1	74	19.29	0	0-1
	1717.5	20025	15	16QAM	36	0	19.15	0	0-2
	1717.5	20025	15	16QAM	36	18	19.09	0	0-2
	1717.5	20025	15	16QAM	36	37	19.08	0	0-2
	1717.5	20025	15	16QAM	75	0	19.06	0	0-2
Mid	1732.5	20175	15	QPSK	1	0	19.15	0	0
	1732.5	20175	15	QPSK	1	36	19.50	0	0
	1732.5	20175	15	QPSK	1	74	19.43	0	0
	1732.5	20175	15	QPSK	36	0	19.19	0	0-1
	1732.5	20175	15	QPSK	36	18	19.37	0	0-1
	1732.5	20175	15	QPSK	36	37	19.24	0	0-1
	1732.5	20175	15	QPSK	75	0	19.17	0	0-1
	1732.5	20175	15	16QAM	1	0	19.04	0	0-1
	1732.5	20175	15	16QAM	1	36	19.39	0	0-1
	1732.5	20175	15	16QAM	1	74	19.33	0	0-1
	1732.5	20175	15	16QAM	36	0	19.16	0	0-2
	1732.5	20175	15	16QAM	36	18	19.31	0	0-2
	1732.5	20175	15	16QAM	36	37	19.21	0	0-2
	1732.5	20175	15	16QAM	75	0	19.15	0	0-2
High	1747.5	20325	15	QPSK	1	0	19.33	0	0
	1747.5	20325	15	QPSK	1	36	19.11	0	0
	1747.5	20325	15	QPSK	1	74	19.37	0	0
	1747.5	20325	15	QPSK	36	0	18.89	0	0-1
	1747.5	20325	15	QPSK	36	18	18.94	0	0-1
	1747.5	20325	15	QPSK	36	37	19.02	0	0-1
	1747.5	20325	15	QPSK	75	0	18.92	0	0-1
	1747.5	20325	15	16QAM	1	0	19.22	0	0-1
	1747.5	20325	15	16QAM	1	36	18.94	0	0-1
	1747.5	20325	15	16QAM	1	74	19.28	0	0-1
	1747.5	20325	15	16QAM	36	0	18.88	0	0-2
	1747.5	20325	15	16QAM	36	18	18.97	0	0-2
	1747.5	20325	15	16QAM	36	37	18.96	0	0-2
	1747.5	20325	15	16QAM	75	0	19.00	0	0-2

Table 10-6
Reduced LTE Band 4 Conducted Power – 10MHz Bandwidths

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1715	20000	10	QPSK	1	0	19.11	0	0
	1715	20000	10	QPSK	1	25	19.32	0	0
	1715	20000	10	QPSK	1	49	19.09	0	0
	1715	20000	10	QPSK	25	0	19.10	0	0-1
	1715	20000	10	QPSK	25	12	19.23	0	0-1
	1715	20000	10	QPSK	25	25	19.22	0	0-1
	1715	20000	10	QPSK	50	0	19.19	0	0-1
	1715	20000	10	16QAM	1	0	18.99	0	0-1
	1715	20000	10	16QAM	1	25	19.20	0	0-1
	1715	20000	10	16QAM	1	49	18.95	0	0-1
	1715	20000	10	16QAM	25	0	19.22	0	0-2
	1715	20000	10	16QAM	25	12	19.27	0	0-2
	1715	20000	10	16QAM	25	25	19.20	0	0-2
	1715	20000	10	16QAM	50	0	19.15	0	0-2
Mid	1732.5	20175	10	QPSK	1	0	19.24	0	0
	1732.5	20175	10	QPSK	1	25	19.45	0	0
	1732.5	20175	10	QPSK	1	49	19.42	0	0
	1732.5	20175	10	QPSK	25	0	19.28	0	0-1
	1732.5	20175	10	QPSK	25	12	19.31	0	0-1
	1732.5	20175	10	QPSK	25	25	19.36	0	0-1
	1732.5	20175	10	QPSK	50	0	19.22	0	0-1
	1732.5	20175	10	16QAM	1	0	19.05	0	0-1
	1732.5	20175	10	16QAM	1	25	19.22	0	0-1
	1732.5	20175	10	16QAM	1	49	19.33	0	0-1
	1732.5	20175	10	16QAM	25	0	19.35	0	0-2
	1732.5	20175	10	16QAM	25	12	19.38	0	0-2
	1732.5	20175	10	16QAM	25	25	19.42	0	0-2
	1732.5	20175	10	16QAM	50	0	19.12	0	0-2
High	1750	20350	10	QPSK	1	0	19.00	0	0
	1750	20350	10	QPSK	1	25	19.06	0	0
	1750	20350	10	QPSK	1	49	19.25	0	0
	1750	20350	10	QPSK	25	0	18.98	0	0-1
	1750	20350	10	QPSK	25	12	18.93	0	0-1
	1750	20350	10	QPSK	25	25	18.86	0	0-1
	1750	20350	10	QPSK	50	0	18.92	0	0-1
	1750	20350	10	16QAM	1	0	18.82	0	0-1
	1750	20350	10	16QAM	1	25	18.89	0	0-1
	1750	20350	10	16QAM	1	49	19.14	0	0-1
	1750	20350	10	16QAM	25	0	18.93	0	0-2
	1750	20350	10	16QAM	25	12	18.93	0	0-2
	1750	20350	10	16QAM	25	25	18.92	0	0-2
	1750	20350	10	16QAM	50	0	18.88	0	0-2

Table 10-7
Reduced LTE Band 4 Conducted Power – 5MHz Bandwidths

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1712.5	19975	5	QPSK	1	0	18.97	0	0
	1712.5	19975	5	QPSK	1	12	18.97	0	0
	1712.5	19975	5	QPSK	1	24	19.19	0	0
	1712.5	19975	5	QPSK	12	0	19.15	0	0-1
	1712.5	19975	5	QPSK	12	6	19.18	0	0-1
	1712.5	19975	5	QPSK	12	13	19.20	0	0-1
	1712.5	19975	5	QPSK	25	0	19.09	0	0-1
	1712.5	19975	5	16-QAM	1	0	18.78	0	0-1
	1712.5	19975	5	16-QAM	1	12	18.83	0	0-1
	1712.5	19975	5	16-QAM	1	24	18.81	0	0-1
	1712.5	19975	5	16-QAM	12	0	19.18	0	0-2
	1712.5	19975	5	16-QAM	12	6	19.19	0	0-2
	1712.5	19975	5	16-QAM	12	13	19.21	0	0-2
	1712.5	19975	5	16-QAM	25	0	19.06	0	0-2
Mid	1732.5	20175	5	QPSK	1	0	19.05	0	0
	1732.5	20175	5	QPSK	1	12	19.16	0	0
	1732.5	20175	5	QPSK	1	24	19.11	0	0
	1732.5	20175	5	QPSK	12	0	18.98	0	0-1
	1732.5	20175	5	QPSK	12	6	19.02	0	0-1
	1732.5	20175	5	QPSK	12	13	18.96	0	0-1
	1732.5	20175	5	QPSK	25	0	18.92	0	0-1
	1732.5	20175	5	16-QAM	1	0	18.96	0	0-1
	1732.5	20175	5	16-QAM	1	12	18.92	0	0-1
	1732.5	20175	5	16-QAM	1	24	19.03	0	0-1
	1732.5	20175	5	16-QAM	12	0	18.86	0	0-2
	1732.5	20175	5	16-QAM	12	6	18.81	0	0-2
	1732.5	20175	5	16-QAM	12	13	18.91	0	0-2
	1732.5	20175	5	16-QAM	25	0	18.78	0	0-2
High	1752.5	20375	5	QPSK	1	0	18.78	0	0
	1752.5	20375	5	QPSK	1	12	18.92	0	0
	1752.5	20375	5	QPSK	1	24	18.92	0	0
	1752.5	20375	5	QPSK	12	0	18.83	0	0-1
	1752.5	20375	5	QPSK	12	6	18.91	0	0-1
	1752.5	20375	5	QPSK	12	13	18.88	0	0-1
	1752.5	20375	5	QPSK	25	0	18.73	0	0-1
	1752.5	20375	5	16-QAM	1	0	18.80	0	0-1
	1752.5	20375	5	16-QAM	1	12	18.91	0	0-1
	1752.5	20375	5	16-QAM	1	24	18.85	0	0-1
	1752.5	20375	5	16-QAM	12	0	18.94	0	0-2
	1752.5	20375	5	16-QAM	12	6	18.99	0	0-2
	1752.5	20375	5	16-QAM	12	13	18.83	0	0-2
	1752.5	20375	5	16-QAM	25	0	18.72	0	0-2

10.3.3 Fixed CDMA Conducted Powers

Table 10-8
Fixed CDMA Conducted Powers

Band	Channel	Rule Part	Frequency	SO55 [dBm]	SO55 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]
	F-RC		MHz	RC1	RC3	FCH+SCH	FCH
Cellular	1013	22H	824.7	18.48	18.49	18.47	18.49
	384	22H	836.52	18.39	18.47	18.43	18.47
	777	22H	848.31	18.31	18.27	18.38	18.40
PCS	25	24E	1851.25	18.05	18.07	18.08	18.08
	600	24E	1880	18.11	18.09	18.20	18.08
	1175	24E	1908.75	18.12	18.21	18.16	18.18

Note:
1. RC1 is only applicable for IS-95 compatibility.
2. There is no power reduction applied to the CDMA Voice modes, however the device with output powers represented in the table above was tuned down (for SAR Test purposes only) to analyze simultaneous SAR scenarios in the SVLTE condition where LTE is operating at maximum output power in conjunction with a lower CDMA voice level (see Table 10-1).

Per KDB Publication 941225 D01v02:
1. Head SAR was tested with SO55 RC3. SO55 RC1 was not required since the average output power was not more than 0.25 dB than the SO55 RC3 powers.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers.
3. CDMA 1x-RTT SAR was required to be evaluated for Hotspot exposure conditions to support simultaneous transmission capabilities.

Figure 10-2
Power Measurement Setup

11 SYSTEM VERIFICATION

11.1 Tissue Verification

Table 11-1
Measured 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
02/11/2013	740H	23.2	740	0.895	40.756	0.889	41.953	0.67%	-2.85%
			755	0.908	40.528	0.891	41.876	1.91%	-3.22%
			770	0.921	40.327	0.892	41.806	3.25%	-3.54%
			785	0.935	40.151	0.894	41.735	4.59%	-3.80%
02/13/2013	835H	23.4	820	0.894	40.158	0.898	41.571	-0.45%	-3.40%
			835	0.908	39.969	0.900	41.500	0.89%	-3.69%
			850	0.923	39.759	0.916	41.500	0.76%	-4.20%
02/16/2013	835H	22.8	820	0.915	42.513	0.898	41.571	1.89%	2.27%
			835	0.931	42.408	0.900	41.500	3.44%	2.19%
			850	0.949	42.127	0.916	41.500	3.60%	1.51%
02/12/2013	1750H	23.4	1710	1.326	40.488	1.348	40.136	-1.63%	0.88%
			1750	1.367	40.278	1.370	40.100	-0.22%	0.44%
			1790	1.402	40.090	1.394	40.020	0.57%	0.17%
02/12/2013	1900H	21.0	1850	1.343	38.347	1.400	40.000	-4.07%	-4.13%
			1880	1.362	38.198	1.400	40.000	-2.71%	-4.51%
			1910	1.392	38.043	1.400	40.000	-0.57%	-4.89%
02/14/2013	1900H	23.0	1850	1.355	39.452	1.400	40.000	-3.21%	-1.37%
			1880	1.385	39.316	1.400	40.000	-1.07%	-1.71%
			1910	1.416	39.151	1.400	40.000	1.14%	-2.12%
02/20/2013	2450H	23.7	2401	1.812	38.296	1.758	39.298	3.07%	-2.55%
			2450	1.862	38.106	1.800	39.200	3.44%	-2.79%
			2499	1.927	37.910	1.852	39.135	4.05%	-3.13%
02/18/2013	5200 - 5800H	23.9	5180	4.643	36.957	4.639	36.020	0.09%	2.60%
			5200	4.618	37.176	4.660	36.000	-0.90%	3.27%
			5220	4.645	37.117	4.680	35.980	-0.75%	3.16%
			5280	4.762	36.507	4.740	35.920	0.46%	1.63%
			5300	4.815	36.609	4.760	35.900	1.16%	1.97%
			5500	4.916	36.374	4.965	35.650	-0.99%	2.03%
			5745	5.315	35.953	5.215	35.355	1.92%	1.69%
			5800	5.390	35.299	5.270	35.300	2.28%	0.00%
02/12/2013	740B	22.8	740	0.970	53.239	0.963	55.570	0.73%	-4.19%
			755	0.982	53.107	0.964	55.512	1.87%	-4.33%
			770	0.998	52.935	0.965	55.453	3.42%	-4.54%
			785	1.013	52.789	0.966	55.395	4.87%	-4.70%
02/13/2013	835B	24.3	820	0.984	53.933	0.969	55.258	1.55%	-2.40%
			835	0.998	53.789	0.970	55.200	2.89%	-2.56%
			850	1.016	53.567	0.988	55.154	2.83%	-2.88%
02/16/2013	835B	23.3	820	0.975	54.154	0.969	55.258	0.62%	-2.00%
			835	0.988	53.996	0.970	55.200	1.86%	-2.18%
			850	1.004	53.897	0.988	55.154	1.62%	-2.28%
02/22/2013	835B	23.1	820	0.979	55.567	0.969	55.258	1.03%	0.56%
			835	1.001	55.060	0.970	55.200	3.20%	-0.25%
			850	1.020	54.659	0.988	55.154	3.24%	-0.90%
02/10/2013	1750B	24.0	1710	1.421	52.490	1.460	53.540	-2.67%	-1.96%
			1750	1.461	52.300	1.490	53.430	-1.95%	-2.11%
			1790	1.499	52.190	1.510	53.330	-0.73%	-2.14%
02/13/2013	1900B	23.8	1850	1.472	52.178	1.520	53.300	-3.16%	-2.11%
			1880	1.507	52.045	1.520	53.300	-0.86%	-2.35%
			1910	1.540	51.917	1.520	53.300	1.32%	-2.59%
02/25/2013	1900B	20.3	1850	1.491	51.176	1.520	53.300	-1.91%	-3.98%
			1880	1.519	51.175	1.520	53.300	-0.07%	-3.99%
			1910	1.544	50.923	1.520	53.300	1.58%	-4.46%
02/20/2013	2450B	24.5	2401	1.923	51.233	1.903	52.765	1.05%	-2.90%
			2450	1.982	51.037	1.950	52.700	1.64%	-3.16%
			2499	2.055	50.823	2.019	52.638	1.78%	-3.45%
02/19/2013	5200 - 5800B	22.8	5180	5.188	48.319	5.276	49.041	-1.67%	-1.47%
			5200	5.224	48.368	5.299	49.014	-1.42%	-1.32%
			5220	5.246	48.266	5.323	48.987	-1.45%	-1.47%
			5280	5.323	48.184	5.393	48.879	-1.30%	-1.42%
			5300	5.362	48.203	5.416	48.851	-1.00%	-1.33%
			5500	5.603	47.923	5.650	48.580	-0.83%	-1.35%
			5745	5.895	47.497	5.936	48.248	-0.69%	-1.56%
			5800	5.992	47.430	6.000	48.200	-0.13%	-1.60%

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 IEEE 1528 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.

11.2 Test System Verification

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

Table 11-2
System Verification Results

System Verification TARGET & MEASURED											
Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	Deviation (%)
750	HEAD	02/11/2013	21.9	22.0	0.170	1003	3022	1.430	8.460	8.412	-0.57%
835	HEAD	02/13/2013	24.4	23.4	0.100	4d119	3022	0.984	9.420	9.840	4.46%
835	HEAD	02/16/2013	23.7	22.9	0.100	4d119	3022	0.970	9.420	9.700	2.97%
1750	HEAD	02/12/2013	23.9	22.2	0.100	1051	3288	3.440	36.600	34.400	-6.01%
1900	HEAD	02/12/2013	23.0	21.1	0.100	5d149	3263	3.870	39.300	38.700	-1.53%
1900	HEAD	02/14/2013	24.2	22.8	0.100	5d149	3263	4.030	39.300	40.300	2.54%
2450	HEAD	02/20/2013	24.5	23.5	0.100	719	3022	5.380	52.700	53.800	2.09%
5200	HEAD	02/18/2013	23.4	22.0	0.100	1057	3589	7.010	75.900	70.100	-7.64%
5300	HEAD	02/18/2013	23.3	22.1	0.100	1057	3589	7.320	76.900	73.200	-4.81%
5500	HEAD	02/18/2013	23.5	22.3	0.100	1057	3589	7.580	80.100	75.800	-5.37%
5800	HEAD	02/18/2013	23.7	22.5	0.100	1057	3589	7.750	76.100	77.500	1.84%
750	BODY	02/12/2013	23.9	23.3	0.100	1003	3287	0.887	8.830	8.870	0.45%
835	BODY	02/13/2013	24.7	24.2	0.100	4d133	3213	0.957	9.600	9.570	-0.31%
835	BODY	02/16/2013	23.3	21.9	0.100	4d026	3287	1.010	9.580	10.100	5.43%
835	BODY	02/22/2013	24.8	23.2	0.100	4d026	3287	1.010	9.580	10.100	5.43%
1750	BODY	02/10/2013	23.3	22.3	0.100	1051	3288	4.040	37.600	40.400	7.45%
1900	BODY	02/13/2013	24.1	22.1	0.100	5d149	3263	4.040	39.300	40.400	2.80%
1900	BODY	02/25/2013	22.3	20.3	0.100	5d148	3288	3.930	40.800	39.300	-3.68%
2450	BODY	02/20/2013	24.2	22.9	0.040	797	3263	1.980	49.600	49.500	-0.20%
5200	BODY	02/19/2013	23.8	22.6	0.100	1057	3589	6.980	75.500	69.800	-7.55%
5300	BODY	02/19/2013	23.8	22.7	0.100	1057	3589	7.190	75.300	71.900	-4.52%
5500	BODY	02/19/2013	23.9	22.7	0.100	1057	3589	7.600	80.800	76.000	-5.94%
5800	BODY	02/19/2013	24.0	22.8	0.100	1057	3589	7.120	75.100	71.200	-5.19%

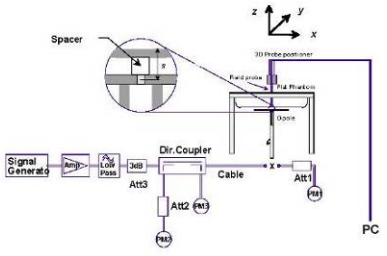


Figure 11-1
System Verification Setup Diagram

Figure 11-2
System Verification Setup Photo

12 SAR DATA SUMMARY

12.1 Standalone Head SAR Data

Table 12-1
GSM 850 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Back Cover Type	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.5	33.14	0.02	Right	Cheek	Standard	32F60	1:8.3	0.101	1.086	0.110	
836.60	190	GSM 850	GSM	33.5	33.14	0.01	Right	Tilt	Standard	32F60	1:8.3	0.063	1.086	0.068	
836.60	190	GSM 850	GSM	33.5	33.14	0.06	Left	Cheek	Standard	32F60	1:8.3	0.117	1.086	0.127	A1
836.60	190	GSM 850	GSM	33.5	33.14	0.09	Left	Cheek	Wireless Charging	32F60	1:8.3	0.094	1.086	0.102	
836.60	190	GSM 850	GSM	33.5	33.14	-0.02	Left	Tilt	Standard	32F60	1:8.3	0.074	1.086	0.080	
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 12-2
UMTS 850 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Back Cover Type	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	23	22.95	0.07	Right	Cheek	Standard	32F60	1:1	0.088	1.012	0.089	
836.60	4183	UMTS 850	RMC	23	22.95	0.04	Right	Tilt	Standard	32F60	1:1	0.056	1.012	0.056	
836.60	4183	UMTS 850	RMC	23	22.95	0.07	Left	Cheek	Standard	32F60	1:1	0.098	1.012	0.099	A2
836.60	4183	UMTS 850	RMC	23	22.95	0.03	Left	Cheek	Wireless Charging	32F60	1:1	0.076	1.012	0.077	
836.60	4183	UMTS 850	RMC	23	22.95	0.04	Left	Tilt	Standard	32F60	1:1	0.062	1.012	0.063	
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 12-3
GSM 1900 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Back Cover Type	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GSM	30.5	29.88	0.19	Right	Cheek	Standard	32F60	1:8.3	0.054	1.153	0.063	
1880.00	661	GSM 1900	GSM	30.5	29.88	0.12	Right	Tilt	Standard	32F60	1:8.3	0.035	1.153	0.040	
1880.00	661	GSM 1900	GSM	30.5	29.88	0.10	Left	Cheek	Standard	32F60	1:8.3	0.085	1.153	0.099	A3
1880.00	661	GSM 1900	GSM	30.5	29.88	0.10	Left	Cheek	Wireless Charging	32F60	1:8.3	0.063	1.153	0.072	
1880.00	661	GSM 1900	GSM	30.5	29.88	0.15	Left	Tilt	Standard	32F60	1:8.3	0.035	1.153	0.041	
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 12-4
UMTS 1900 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Back Cover Type	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	9400	UMTS 1900	RMC	23.0	22.86	0.05	Right	Cheek	Standard	32F60	1:1	0.113	1.033	0.117	
1880.00	9400	UMTS 1900	RMC	23.0	22.86	0.02	Right	Tilt	Standard	32F60	1:1	0.067	1.033	0.069	
1880.00	9400	UMTS 1900	RMC	23.0	22.86	-0.06	Left	Cheek	Standard	32F60	1:1	0.182	1.033	0.188	A4
1880.00	9400	UMTS 1900	RMC	23.0	22.86	0.05	Left	Cheek	Wireless Charging	32F60	1:1	0.117	1.033	0.121	
1880.00	9400	UMTS 1900	RMC	23.0	22.86	0.15	Left	Tilt	Standard	32F60	1:1	0.055	1.033	0.057	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram								

Table 12-5
Cell. CDMA Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Back Cover Type	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.52	384	Cell. CDMA	RC3 / SO55	25.0	24.22	-0.07	Right	Cheek	Standard	32FB2	1:1	0.179	1.197	0.214	
836.52	384	Cell. CDMA	RC3 / SO55	25.0	24.22	0.01	Right	Tilt	Standard	32FB2	1:1	0.117	1.197	0.140	
836.52	384	Cell. CDMA	RC3 / SO55	25.0	24.22	-0.01	Left	Cheek	Standard	32FB2	1:1	0.209	1.197	**0.250**	
836.52	384	Cell. CDMA	RC3 / SO55	25.0	24.22	-0.11	Left	Cheek	Wireless Charging	32FB2	1:1	0.165	1.197	0.197	
836.52	384	Cell. CDMA	RC3 / SO55	25.0	24.22	0.00	Left	Tilt	Standard	32FB2	1:1	0.153	1.197	0.183	
836.52	384	Cell. CDMA	RC3 / SO55	18.5	18.47	-0.05	Right	Cheek	Standard	32F6F	1:1	0.056	1.007	0.056	
836.52	384	Cell. CDMA	RC3 / SO55	18.5	18.47	0.05	Right	Tilt	Standard	32F6F	1:1	0.036	1.007	0.036	
836.52	384	Cell. CDMA	RC3 / SO55	18.5	18.47	0.03	Left	Cheek	Standard	32F6F	1:1	0.065	1.007	0.065	
836.52	384	Cell. CDMA	RC3 / SO55	18.5	18.47	0.12	Left	Tilt	Standard	32F6F	1:1	0.038	1.007	0.038	
836.52	384	Cell. CDMA	EVDO Rev. A	25.0	24.32	0.02	Right	Cheek	Standard	32FB2	1:1	0.189	1.169	0.221	
836.52	384	Cell. CDMA	EVDO Rev. A	25.0	24.32	0.00	Right	Tilt	Standard	32FB2	1:1	0.120	1.169	0.140	
836.52	384	Cell. CDMA	EVDO Rev. A	25.0	24.32	-0.02	Left	Cheek	Standard	32FB2	1:1	0.213	1.169	0.249	A5
836.52	384	Cell. CDMA	EVDO Rev. A	25.0	24.32	0.18	Left	Cheek	Wireless Charging	32FB2	1:1	0.173	1.169	0.202	
836.52	384	Cell. CDMA	EVDO Rev. A	25.0	24.32	-0.03	Left	Tilt	Standard	32FB2	1:1	0.130	1.169	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 12-6
PCS CDMA Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Back Cover Type	Device Serial Number	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.														
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.44	0.14	Right	Cheek	Standard	32FB2	1:1	0.068	1.138	0.077	
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.44	0.17	Right	Tilt	Standard	32FB2	1:1	0.023	1.138	0.026	
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.44	0.00	Left	Cheek	Standard	32FB2	1:1	0.120	1.138	0.137	
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.44	-0.01	Left	Cheek	Wireless Charging	32FB2	1:1	0.108	1.138	0.123	
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.44	0.13	Left	Tilt	Standard	32FB2	1:1	0.019	1.138	0.022	
1880.00	600	PCS CDMA	RC3 / SO55	18.5	18.09	0.19	Right	Cheek	Standard	32F6F	1:1	0.028	1.099	0.031	
1880.00	600	PCS CDMA	RC3 / SO55	18.5	18.09	0.03	Right	Tilt	Standard	32F6F	1:1	0.017	1.099	0.018	
1880.00	600	PCS CDMA	RC3 / SO55	18.5	18.09	-0.07	Left	Cheek	Standard	32F6F	1:1	0.057	1.099	0.063	
1880.00	600	PCS CDMA	RC3 / SO55	18.5	18.09	0.14	Left	Tilt	Standard	32F6F	1:1	0.011	1.099	0.012	
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.37	0.11	Right	Cheek	Standard	32FB2	1:1	0.077	1.156	0.089	
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.37	0.12	Right	Tilt	Standard	32FB2	1:1	0.034	1.156	0.040	
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.37	0.08	Left	Cheek	Standard	32FB2	1:1	0.142	1.156	0.164	A6
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.37	0.11	Left	Cheek	Wireless Charging	32FB2	1:1	0.115	1.156	0.133	
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.37	0.07	Left	Tilt	Standard	32FB2	1:1	0.042	1.156	0.049	
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 12-7
LTE Band 13 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Back Cover Type	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.																			
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.13	0.06	0	Right	Cheek	QPSK	1	0	32FAF	1:1	0.176	1.089	0.192	A7
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	21.95	0.07	1	Right	Cheek	QPSK	25	12	32FAF	1:1	0.132	1.135	0.150	
782.00	23230	Mid	LTE Band 13	10	Wireless Charging	23.5	23.13	0.06	0	Right	Cheek	QPSK	1	0	32FAF	1:1	0.134	1.089	0.146	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.13	0.03	0	Right	Tilt	QPSK	1	0	32FAF	1:1	0.120	1.089	0.131	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	21.95	0.10	1	Right	Tilt	QPSK	25	12	32FAF	1:1	0.086	1.135	0.098	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.13	0.01	0	Left	Cheek	QPSK	1	0	32FAF	1:1	0.151	1.089	0.164	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	21.95	0.15	1	Left	Cheek	QPSK	25	12	32FAF	1:1	0.111	1.135	0.126	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.13	0.14	0	Left	Tilt	QPSK	1	0	32FAF	1:1	0.104	1.089	0.113	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	21.95	0.12	1	Left	Tilt	QPSK	25	12	32FAF	1:1	0.074	1.135	0.084	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.38	0.10	0	Right	Cheek	QPSK	1	25	32FA3	1:1	0.069	1.028	0.070	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.21	0.08	0	Right	Cheek	QPSK	25	25	32FA3	1:1	0.053	1.069	0.057	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.38	0.07	0	Right	Tilt	QPSK	1	25	32FA3	1:1	0.045	1.028	0.046	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.21	0.02	0	Right	Tilt	QPSK	25	25	32FA3	1:1	0.035	1.069	0.037	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.38	0.06	0	Left	Cheek	QPSK	1	25	32FA3	1:1	0.049	1.028	0.050	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.21	0.07	0	Left	Cheek	QPSK	25	25	32FA3	1:1	0.038	1.069	0.040	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.38	0.03	0	Left	Tilt	QPSK	1	25	32FA3	1:1	0.034	1.028	0.035	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.21	0.02	0	Left	Tilt	QPSK	25	25	32FA3	1:1	0.027	1.069	0.029	
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 12-8
LTE Band 4 (AWS) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Back Cover Type	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	Scaled SAR (1g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.36	0.05	0	Right	Cheek	QPSK	1	50	32FAF	1:1	0.076	1.033	0.079	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	22.23	0.13	1	Right	Cheek	QPSK	50	25	32FAF	1:1	0.057	1.064	0.061	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.36	-0.05	0	Right	Tilt	QPSK	1	50	32FAF	1:1	0.075	1.033	0.078	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	22.23	0.06	1	Right	Tilt	QPSK	50	25	32FAF	1:1	0.059	1.064	0.063	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.36	0.10	0	Left	Cheek	QPSK	1	50	32FAF	1:1	0.116	1.033	0.120	A8
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	22.23	0.11	1	Left	Cheek	QPSK	50	25	32FAF	1:1	0.088	1.064	0.093	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Wireless Charging	23.5	23.36	0.13	0	Left	Cheek	QPSK	1	50	32FAF	1:1	0.102	1.033	0.105	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.36	0.04	0	Left	Tilt	QPSK	1	50	32FAF	1:1	0.049	1.033	0.051	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	22.23	0.02	1	Left	Tilt	QPSK	50	25	32FAF	1:1	0.051	1.064	0.054	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.44	0.17	0	Right	Cheek	QPSK	1	50	32FA3	1:1	0.023	1.014	0.023	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.32	0.03	0	Right	Cheek	QPSK	50	50	32FA3	1:1	0.027	1.042	0.028	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.44	0.06	0	Right	Tilt	QPSK	1	50	32FA3	1:1	0.011	1.014	0.011	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.32	0.05	0	Right	Tilt	QPSK	50	50	32FA3	1:1	0.014	1.042	0.015	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.44	0.13	0	Left	Cheek	QPSK	1	50	32FA3	1:1	0.030	1.014	0.030	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.32	0.10	0	Left	Cheek	QPSK	50	50	32FA3	1:1	0.030	1.042	0.031	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.44	0.03	0	Left	Tilt	QPSK	1	50	32FA3	1:1	0.011	1.014	0.011	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.32	0.05	0	Left	Tilt	QPSK	50	50	32FA3	1:1	0.011	1.042	0.011	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 12-9
DTS Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Back Cover Type	Device Serial Number	Data Rate (Mbps)	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
2437	6	IEEE 802.11b	DSSS	17.5	17.16	0.08	Right	Cheek	Standard	32FB2	1	1:1	0.145	1.081	0.157	
2437	6	IEEE 802.11b	DSSS	17.5	17.16	0.06	Right	Tilt	Standard	32FB2	1	1:1	0.128	1.081	0.138	
2437	6	IEEE 802.11b	DSSS	17.5	17.16	-0.01	Left	Cheek	Standard	32FB2	1	1:1	0.418	1.081	**0.452**	A9
2437	6	IEEE 802.11b	DSSS	17.5	17.16	0.16	Left	Cheek	Wireless Charging	32FB2	1	1:1	0.276	1.081	0.298	
2437	6	IEEE 802.11b	DSSS	17.5	17.16	-0.05	Left	Tilt	Standard	32FB2	1	1:1	0.170	1.081	0.184	
5745	149	IEEE 802.11a	OFDM	14.5	13.60	0.13	Right	Touch	Standard	32FAF	6	1:1	0.016	1.230	0.020	
5745	149	IEEE 802.11a	OFDM	14.5	13.60	0.18	Right	Tilt	Standard	32FAF	6	1:1	0.001	1.230	0.001	
5745	149	IEEE 802.11a	OFDM	14.5	13.60	0.14	Left	Touch	Standard	32FAF	6	1:1	0.154	1.230	0.189	A10
5745	149	IEEE 802.11a	OFDM	14.5	13.60	0.06	Left	Tilt	Standard	32FAF	6	1:1	0.010	1.230	0.013	
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 12-10
NII Head SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Back Cover Type	Device Serial Number	Data Rate (Mbps)	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.															
5180	36	IEEE 802.11a	OFDM	14.5	14.03	0.15	Right	Touch	Standard	32FAF	6	1:1	0.034	1.114	0.038	
5180	36	IEEE 802.11a	OFDM	14.5	14.03	-0.05	Right	Tilt	Standard	32FAF	6	1:1	0.031	1.114	0.035	
5180	36	IEEE 802.11a	OFDM	14.5	14.03	0.15	Left	Touch	Standard	32FAF	6	1:1	0.423	1.114	**0.471**	A11
5220	44	IEEE 802.11a	OFDM	14.5	13.86	0.07	Left	Touch	Standard	32FAF	6	1:1	0.292	1.159	0.338	
5180	36	IEEE 802.11a	OFDM	14.5	14.03	0.05	Left	Touch	Wireless Charging	32FAF	6	1:1	0.183	1.114	0.204	
5180	36	IEEE 802.11a	OFDM	14.5	14.03	0.15	Left	Tilt	Standard	32FAF	6	1:1	0.077	1.114	0.085	
5280	56	IEEE 802.11a	OFDM	14.5	14.01	0.03	Right	Touch	Standard	32FAF	6	1:1	0.032	1.119	0.036	
5280	56	IEEE 802.11a	OFDM	14.5	14.01	-0.12	Right	Tilt	Standard	32FAF	6	1:1	0.001	1.119	0.001	
5280	56	IEEE 802.11a	OFDM	14.5	14.01	0.02	Left	Touch	Standard	32FAF	6	1:1	0.250	1.119	0.280	
5280	56	IEEE 802.11a	OFDM	14.5	14.01	0.18	Left	Tilt	Standard	32FAF	6	1:1	0.068	1.119	0.076	
5500	100	IEEE 802.11a	OFDM	14.5	14.10	0.03	Right	Touch	Standard	32FAF	6	1:1	0.022	1.096	0.024	
5500	100	IEEE 802.11a	OFDM	14.5	14.10	0.00	Right	Tilt	Standard	32FAF	6	1:1	0.011	1.096	0.012	
5500	100	IEEE 802.11a	OFDM	14.5	14.10	0.04	Left	Touch	Standard	32FAF	6	1:1	0.181	1.096	0.198	
5500	100	IEEE 802.11a	OFDM	14.5	14.10	0.03	Left	Tilt	Standard	32FAF	6	1:1	0.028	1.096	0.031	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							**Head 1.6 W/kg (mW/g) averaged over 1 gram**									

12.2 Standalone Body-Worn SAR Data

Table 12-11
GSM/UMTS/CDMA Body-Worn SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Back Cover Type	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.															
836.60	190	GSM 850	GSM	33.5	33.14	-0.02	10 mm	Standard	32F60	1	1:8.3	back	0.373	1.086	0.405	A12
836.60	190	GSM 850	GSM	33.5	33.14	0.07	10 mm	Wireless Charging	32F60	1	1:8.3	back	0.230	1.086	0.250	
836.60	4183	UMTS 850	RMC	23.0	22.95	0.00	10 mm	Standard	32F60	N/A	1:1	back	0.322	1.012	0.326	A14
836.60	4183	UMTS 850	RMC	23.0	22.95	-0.04	10 mm	Wireless Charging	32F60	N/A	1:1	back	0.190	1.012	0.192	
1880.00	661	GSM 1900	GSM	30.5	29.88	0.04	10 mm	Standard	32F60	1	1:8.3	back	0.442	1.153	0.510	A15
1880.00	661	GSM 1900	GSM	30.5	29.88	-0.03	10 mm	Wireless Charging	32F60	1	1:8.3	back	0.405	1.153	0.467	
1852.40	9262	UMTS 1900	RMC	23.0	22.70	-0.05	10 mm	Standard	32F60	N/A	1:1	back	0.683	1.072	0.732	
1880.00	9400	UMTS 1900	RMC	23.0	22.86	-0.05	10 mm	Standard	32F60	N/A	1:1	back	0.799	1.033	0.825	
1907.60	9538	UMTS 1900	RMC	23.0	22.65	0.20	10 mm	Standard	32F60	N/A	1:1	back	0.841	1.084	0.912	
1907.60	9538	UMTS 1900	RMC	23.0	22.65	-0.08	10 mm	Wireless Charging	32F60	N/A	1:1	back	0.628	1.084	0.681	
1907.60	9538	UMTS 1900	RMC	23.0	22.65	-0.06	10 mm	Standard	32F60	N/A	1:1	back	0.948	1.084	**1.028**	A17
824.70	1013	Cell. CDMA	TDSO / SO32	25.0	24.24	0.06	10 mm	Standard	32FB2	N/A	1:1	back	0.532	1.191	0.634	
836.52	384	Cell. CDMA	TDSO / SO32	25.0	24.30	-0.01	10 mm	Standard	32FB2	N/A	1:1	back	0.743	1.175	0.873	A18
848.31	777	Cell. CDMA	TDSO / SO32	25.0	24.13	-0.16	10 mm	Standard	32FB2	N/A	1:1	back	0.699	1.222	0.854	
836.52	384	Cell. CDMA	TDSO / SO32	25.0	24.30	0.03	10 mm	Wireless Charging	32FB2	N/A	1:1	back	0.481	1.175	0.565	
836.52	384	Cell. CDMA	TDSO / SO32	18.5	18.47	-0.05	10 mm	Standard	32F6F	N/A	1:1	back	0.233	1.007	0.235	
1851.25	25	PCS CDMA	TDSO / SO32	25.0	24.29	-0.02	10 mm	Standard	32FB2	N/A	1:1	back	0.697	1.178	0.821	
1880.00	600	PCS CDMA	TDSO / SO32	25.0	24.45	0.07	10 mm	Standard	32FB2	N/A	1:1	back	0.706	1.135	0.801	
1908.75	1175	PCS CDMA	TDSO / SO32	25.0	24.41	-0.07	10 mm	Standard	32FB2	N/A	1:1	back	0.737	1.146	0.844	A20
1908.75	1175	PCS CDMA	TDSO / SO32	25.0	24.41	-0.06	10 mm	Wireless Charging	32FB2	N/A	1:1	back	0.486	1.146	0.557	
1880.00	600	PCS CDMA	TDSO / SO32	18.5	18.08	-0.05	10 mm	Standard	32F6F	N/A	1:1	back	0.305	1.102	0.336	
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 12-12
LTE Body-Worn SAR

MEASUREMENT RESULTS																					
FREQUENCY			Mode	Bandwidth [MHz]	Back Cover Type	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) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.																			
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.13	0.03	0	32FAF	QPSK	1	0	10 mm	back	1:1	0.271	1.089	0.295	A21
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	21.95	-0.06	1	32FAF	QPSK	25	12	10 mm	back	1:1	0.191	1.135	0.217	
782.00	23230	Mid	LTE Band 13	10	Wireless Charging	23.5	23.13	0.07	0	32FAF	QPSK	1	0	10 mm	back	1:1	0.243	1.089	0.265	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.38	-0.02	0	32FA3	QPSK	1	25	10 mm	back	1:1	0.084	1.028	0.086	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.21	0.02	0	32FA3	QPSK	25	25	10 mm	back	1:1	0.072	1.069	0.077	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.36	0.04	0	32FAF	QPSK	1	50	10 mm	back	1:1	0.506	1.033	0.523	A23
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	22.23	0.02	1	32FAF	QPSK	50	25	10 mm	back	1:1	0.392	1.064	0.417	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Wireless Charging	23.5	23.36	-0.16	0	32FAF	QPSK	1	50	10 mm	back	1:1	0.209	1.033	0.216	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.44	0.04	0	32FA3	QPSK	1	50	10 mm	back	1:1	0.094	1.014	0.095	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.32	0.01	0	32FA3	QPSK	50	50	10 mm	back	1:1	0.100	1.042	0.104	
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 12-13
DTS Body-Worn SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Back Cover Type	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.															
2437	6	IEEE 802.11b	DSSS	17.5	17.16	0.04	10 mm	Standard	32FAF	1	back	1:1	0.241	1.081	**0.261**	A24
2437	6	IEEE 802.11b	DSSS	17.5	17.16	-0.02	10 mm	Wireless Charging	32FAF	1	back	1:1	0.162	1.081	0.175	
5745	149	IEEE 802.11a	OFDM	14.5	13.60	-0.08	10 mm	Standard	32FAF	6	back	1:1	0.099	1.230	0.121	A25
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 12-14
NII Body-Worn SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Back Cover Type	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.															
5180	36	IEEE 802.11a	OFDM	14.5	14.03	-0.10	10 mm	Standard	32FAF	6	back	1:1	0.361	1.114	**0.402**	A26
5220	44	IEEE 802.11a	OFDM	14.5	13.86	-0.12	10 mm	Standard	32FAF	6	back	1:1	0.315	1.159	0.365	
5180	36	IEEE 802.11a	OFDM	14.5	14.03	0.16	10 mm	Wireless Charging	32FAF	6	back	1:1	0.204	1.114	0.227	
5280	56	IEEE 802.11a	OFDM	14.5	14.01	-0.11	10 mm	Standard	32FAF	6	back	1:1	0.328	1.119	0.367	
5500	100	IEEE 802.11a	OFDM	14.5	14.10	-0.12	10 mm	Standard	32FAF	6	back	1:1	0.185	1.096	0.203	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram								

12.3 Standalone Wireless Router SAR Data

Table 12-15
GPRS/UMTS Hotspot SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Back Cover Type	Device Serial Number	# of GPRS Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
836.60	190	GSM 850	GPRS	30.0	29.92	0.07	10 mm	Standard	32F60	3	1:2.76	back	0.508	1.019	0.517	A13
824.20	128	GSM 850	GPRS	29.0	28.63	-0.06	10 mm	Standard	32F60	4	1:2.076	back	0.445	1.089	0.485	
836.60	190	GSM 850	GPRS	30.0	29.92	-0.11	10 mm	Wireless Charging	32F60	3	1:2.76	back	0.303	1.019	0.309	
836.60	190	GSM 850	GPRS	30.0	29.92	-0.17	10 mm	Standard	32F60	3	1:2.76	front	0.248	1.019	0.253	
836.60	190	GSM 850	GPRS	30.0	29.92	0.09	10 mm	Standard	32F60	3	1:2.76	bottom	0.096	1.019	0.098	
836.60	190	GSM 850	GPRS	30.0	29.92	0.01	10 mm	Standard	32F60	3	1:2.76	left	0.397	1.019	0.404	
836.60	4183	UMTS 850	RMC	23.0	22.95	0.00	10 mm	Standard	32F60	N/A	1:1	back	0.322	1.012	0.326	A14
836.60	4183	UMTS 850	RMC	23.0	22.95	-0.04	10 mm	Wireless Charging	32F60	N/A	1:1	back	0.190	1.012	0.192	
836.60	4183	UMTS 850	RMC	23.0	22.95	-0.04	10 mm	Standard	32F60	N/A	1:1	front	0.130	1.012	0.132	
836.60	4183	UMTS 850	RMC	23.0	22.95	0.09	10 mm	Standard	32F60	N/A	1:1	bottom	0.070	1.012	0.071	
836.60	4183	UMTS 850	RMC	23.0	22.95	-0.06	10 mm	Standard	32F60	N/A	1:1	left	0.184	1.012	0.186	
1880.00	661	GSM 1900	GPRS	25.5	24.91	0.03	10 mm	Standard	32F60	4	1:2.076	back	0.497	1.146	0.569	
1880.00	661	GSM 1900	GPRS	28.5	28.03	0.08	10 mm	Standard	32F60	2	1:4.15	back	0.500	1.114	0.557	A16
1880.00	661	GSM 1900	GPRS	28.5	28.03	-0.05	10 mm	Wireless Charging	32F60	2	1:4.15	back	0.370	1.114	0.412	
1880.00	661	GSM 1900	GPRS	28.5	28.03	-0.03	10 mm	Standard	32F60	2	1:4.15	front	0.156	1.114	0.174	
1880.00	661	GSM 1900	GPRS	28.5	28.03	-0.02	10 mm	Standard	32F60	2	1:4.15	bottom	0.226	1.114	0.252	
1880.00	661	GSM 1900	GPRS	28.5	28.03	0.04	10 mm	Standard	32F60	2	1:4.15	left	0.076	1.114	0.084	
1852.40	9262	UMTS 1900	RMC	23.0	22.70	-0.05	10 mm	Standard	32F60	N/A	1:1	back	0.683	1.072	0.732	
1880.00	9400	UMTS 1900	RMC	23.0	22.86	-0.05	10 mm	Standard	32F60	N/A	1:1	back	0.799	1.033	0.825	
1907.60	9538	UMTS 1900	RMC	23.0	22.65	0.20	10 mm	Standard	32F60	N/A	1:1	back	0.841	1.084	0.912	
1907.60	9538	UMTS 1900	RMC	23.0	22.65	-0.08	10 mm	Wireless Charging	32F60	N/A	1:1	back	0.628	1.084	0.681	
1880.00	9400	UMTS 1900	RMC	23.0	22.86	-0.06	10 mm	Standard	32F60	N/A	1:1	front	0.206	1.033	0.213	
1880.00	9400	UMTS 1900	RMC	23.0	22.86	0.12	10 mm	Standard	32F60	N/A	1:1	bottom	0.349	1.033	0.360	
1880.00	9400	UMTS 1900	RMC	23.0	22.86	0.10	10 mm	Standard	32F60	N/A	1:1	left	0.121	1.033	0.125	
1907.60	9538	UMTS 1900	RMC	23.0	22.65	-0.06	10 mm	Standard	32F60	N/A	1:1	back	0.948	1.084	1.028	A17
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:

a) Blue entry represents variability measurement.
b) Per FCC KDB Publication 447498 D01v05, since the maximum output power variation across the required test channels is > 0.5dB, low channel was tested for GPRS850 4 GPRS slots back side.

Table 12-16
CDMA/EVDO Hotspot SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Back Cover Type	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
824.70	1013	Cell. CDMA	TDSO / SO32	25.0	24.24	0.05	10 mm	Standard	32FB2	1:1	back	0.532	1.191	0.634	
836.52	384	Cell. CDMA	TDSO / SO32	25.0	24.30	-0.01	10 mm	Standard	32FB2	1:1	back	0.743	1.175	0.873	
848.31	777	Cell. CDMA	TDSO / SO32	25.0	24.13	-0.16	10 mm	Standard	32FB2	1:1	back	0.699	1.222	0.854	
836.52	384	Cell. CDMA	TDSO / SO32	25.0	24.30	0.03	10 mm	Wireless Charging	32FB2	1:1	back	0.481	1.175	0.565	
836.52	384	Cell. CDMA	TDSO / SO32	25.0	24.30	-0.01	10 mm	Standard	32FB2	1:1	front	0.286	1.175	0.336	
836.52	384	Cell. CDMA	TDSO / SO32	25.0	24.30	-0.07	10 mm	Standard	32FB2	1:1	bottom	0.116	1.175	0.136	
836.52	384	Cell. CDMA	TDSO / SO32	25.0	24.30	-0.09	10 mm	Standard	32FB2	1:1	left	0.572	1.175	0.672	
836.52	384	Cell. CDMA	TDSO / SO32	18.5	18.47	-0.05	10 mm	Standard	32F6F	1:1	back	0.233	1.007	0.235	
836.52	384	Cell. CDMA	TDSO / SO32	18.5	18.47	0.00	10 mm	Standard	32F6F	1:1	front	0.074	1.007	0.075	
836.52	384	Cell. CDMA	TDSO / SO32	18.5	18.47	-0.02	10 mm	Standard	32F6F	1:1	bottom	0.053	1.007	0.053	
836.52	384	Cell. CDMA	TDSO / SO32	18.5	18.47	-0.01	10 mm	Standard	32F6F	1:1	left	0.134	1.007	0.135	
824.70	1013	Cell. CDMA	EVDO Rev. 0	25.0	24.41	0.06	10 mm	Standard	32FB2	1:1	back	0.599	1.146	0.686	
836.52	384	Cell. CDMA	EVDO Rev. 0	25.0	24.33	-0.07	10 mm	Standard	32FB2	1:1	back	0.878	1.167	1.024	A19
848.31	777	Cell. CDMA	EVDO Rev. 0	25.0	24.16	0.00	10 mm	Standard	32FB2	1:1	back	0.876	1.213	**1.063**	
836.52	384	Cell. CDMA	EVDO Rev. 0	25.0	24.33	-0.08	10 mm	Wireless Charging	32FB2	1:1	back	0.451	1.167	0.526	
836.52	384	Cell. CDMA	EVDO Rev. 0	25.0	24.33	-0.01	10 mm	Standard	32FB2	1:1	front	0.344	1.167	0.401	
836.52	384	Cell. CDMA	EVDO Rev. 0	25.0	24.33	0.01	10 mm	Standard	32FB2	1:1	bottom	0.135	1.167	0.158	
836.52	384	Cell. CDMA	EVDO Rev. 0	25.0	24.33	-0.04	10 mm	Standard	32FB2	1:1	left	0.580	1.167	0.677	
836.52	384	Cell. CDMA	EVDO Rev. 0	25.0	24.33	-0.08	10 mm	Standard	32FB2	1:1	back	0.804	1.167	0.938	
1851.25	25	PCS CDMA	TDSO / SO32	25.0	24.29	-0.04	10 mm	Standard	32FB2	1:1	back	0.697	1.178	0.821	
1880.00	600	PCS CDMA	TDSO / SO32	25.0	24.45	0.02	10 mm	Standard	32FB2	1:1	back	0.706	1.135	0.801	
1908.75	1175	PCS CDMA	TDSO / SO32	25.0	24.41	-0.07	10 mm	Standard	32FB2	1:1	back	0.737	1.146	0.844	A20
1908.75	1175	PCS CDMA	TDSO / SO32	25.0	24.41	-0.06	10 mm	Wireless Charging	32FB2	1:1	back	0.486	1.146	0.557	
1880.00	600	PCS CDMA	TDSO / SO32	25.0	24.45	-0.04	10 mm	Standard	32FB2	1:1	front	0.185	1.135	0.210	
1880.00	600	PCS CDMA	TDSO / SO32	25.0	24.45	0.02	10 mm	Standard	32FB2	1:1	bottom	0.250	1.135	0.284	
1880.00	600	PCS CDMA	TDSO / SO32	25.0	24.45	0.02	10 mm	Standard	32FB2	1:1	left	0.101	1.135	0.115	
1880.00	600	PCS CDMA	TDSO / SO32	18.5	18.08	-0.05	10 mm	Standard	32F6F	1:1	back	0.305	1.102	0.336	
1880.00	600	PCS CDMA	TDSO / SO32	18.5	18.08	0.00	10 mm	Standard	32F6F	1:1	front	0.073	1.102	0.080	
1880.00	600	PCS CDMA	TDSO / SO32	18.5	18.08	-0.02	10 mm	Standard	32F6F	1:1	bottom	0.115	1.102	0.127	
1880.00	600	PCS CDMA	TDSO / SO32	18.5	18.08	0.14	10 mm	Standard	32F6F	1:1	left	0.044	1.102	0.048	
1851.25	25	PCS CDMA	EVDO Rev. 0	25.0	24.24	-0.02	10 mm	Standard	32FB2	1:1	back	0.649	1.191	0.773	
1880.00	600	PCS CDMA	EVDO Rev. 0	25.0	24.43	0.07	10 mm	Standard	32FB2	1:1	back	0.716	1.140	0.816	
1908.75	1175	PCS CDMA	EVDO Rev. 0	25.0	24.40	0.08	10 mm	Standard	32FB2	1:1	back	0.648	1.148	0.744	
1880.00	600	PCS CDMA	EVDO Rev. 0	25.0	24.43	0.00	10 mm	Wireless Charging	32FB2	1:1	back	0.449	1.140	0.512	
1880.00	600	PCS CDMA	EVDO Rev. 0	25.0	24.43	0.01	10 mm	Standard	32FB2	1:1	front	0.179	1.140	0.204	
1880.00	600	PCS CDMA	EVDO Rev. 0	25.0	24.43	0.00	10 mm	Standard	32FB2	1:1	bottom	0.293	1.140	0.334	
1880.00	600	PCS CDMA	EVDO Rev. 0	25.0	24.43	-0.03	10 mm	Standard	32FB2	1:1	left	0.107	1.140	0.122	
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 12-17
LTE Band 13 Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Back Cover Type	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	Scaled SAR (1g)	Plot #
MHz	Ch.	High															(W/kg)		(W/kg)	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.13	0.03	0	32FAF	QPSK	1	0	10 mm	back	1:1	0.271	1.089	0.295	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	21.95	-0.06	1	32FAF	QPSK	25	12	10 mm	back	1:1	0.191	1.135	0.217	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.13	-0.09	0	32FAF	QPSK	1	0	10 mm	front	1:1	0.218	1.089	0.237	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	21.95	-0.06	1	32FAF	QPSK	25	12	10 mm	front	1:1	0.149	1.135	0.169	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.13	-0.10	0	32FAF	QPSK	1	0	10 mm	bottom	1:1	0.199	1.089	0.217	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	21.95	-0.11	1	32FAF	QPSK	25	12	10 mm	bottom	1:1	0.172	1.135	0.195	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.13	-0.01	0	32FAF	QPSK	1	0	10 mm	right	1:1	0.320	1.089	0.348	A22
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	21.95	0.06	1	32FAF	QPSK	25	12	10 mm	right	1:1	0.237	1.135	0.269	
782.00	23230	Mid	LTE Band 13	10	Wireless Charging	23.5	23.13	0.05	0	32FAF	QPSK	1	0	10 mm	right	1:1	0.283	1.089	0.308	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.38	-0.02	0	32FA3	QPSK	1	25	10 mm	back	1:1	0.084	1.028	0.086	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.21	0.02	0	32FA3	QPSK	25	25	10 mm	back	1:1	0.072	1.069	0.077	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.38	0.03	0	32FA3	QPSK	1	25	10 mm	front	1:1	0.075	1.028	0.077	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.21	0.13	0	32FA3	QPSK	25	25	10 mm	front	1:1	0.061	1.069	0.065	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.38	0.01	0	32FA3	QPSK	1	25	10 mm	bottom	1:1	0.070	1.028	0.072	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.21	0.06	0	32FA3	QPSK	25	25	10 mm	bottom	1:1	0.059	1.069	0.063	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.38	0.00	0	32FA3	QPSK	1	25	10 mm	right	1:1	0.128	1.028	0.132	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	19.21	0.04	0	32FA3	QPSK	25	25	10 mm	right	1:1	0.107	1.069	0.114	
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 12-18
LTE Band 4 (AWS) Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Back Cover Type	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	Scaled SAR (1g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.36	0.04	0	32FAF	QPSK	1	50	10 mm	back	1:1	0.506	1.033	0.523	A23
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	22.23	0.02	1	32FAF	QPSK	50	25	10 mm	back	1:1	0.392	1.064	0.417	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Wireless Charging	23.5	23.36	-0.16	0	32FAF	QPSK	1	50	10 mm	back	1:1	0.209	1.033	0.216	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.36	-0.04	0	32FAF	QPSK	1	50	10 mm	front	1:1	0.205	1.033	0.212	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	22.23	0.07	1	32FAF	QPSK	50	25	10 mm	front	1:1	0.158	1.064	0.168	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.36	-0.12	0	32FAF	QPSK	1	50	10 mm	bottom	1:1	0.182	1.033	0.188	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	22.23	-0.01	1	32FAF	QPSK	50	25	10 mm	bottom	1:1	0.146	1.064	0.155	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.36	0.04	0	32FAF	QPSK	1	50	10 mm	right	1:1	0.057	1.033	0.059	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	22.23	0.06	1	32FAF	QPSK	50	25	10 mm	right	1:1	0.044	1.064	0.046	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.44	0.04	0	32FA3	QPSK	1	50	10 mm	back	1:1	0.094	1.014	0.095	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.32	0.01	0	32FA3	QPSK	50	50	10 mm	back	1:1	0.100	1.042	0.104	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.44	0.03	0	32FA3	QPSK	1	50	10 mm	front	1:1	0.052	1.014	0.053	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.32	0.06	0	32FA3	QPSK	50	50	10 mm	front	1:1	0.057	1.042	0.059	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.44	-0.09	0	32FA3	QPSK	1	50	10 mm	bottom	1:1	0.077	1.014	0.078	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.32	-0.06	0	32FA3	QPSK	50	50	10 mm	bottom	1:1	0.080	1.042	0.084	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.44	0.07	0	32FA3	QPSK	1	50	10 mm	right	1:1	0.028	1.014	0.029	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	19.32	-0.05	0	32FA3	QPSK	50	50	10 mm	right	1:1	0.030	1.042	0.032	
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 12-19
WLAN Hotspot SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Back Cover Type	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
2437	6	IEEE 802.11b	DSSS	17.5	17.16	0.04	10 mm	Standard	32FAF	1	back	1:1	0.241	1.081	**0.261**	A24
2437	6	IEEE 802.11b	DSSS	17.5	17.16	-0.02	10 mm	Wireless Charging	32FAF	1	back	1:1	0.162	1.081	0.175	
2437	6	IEEE 802.11b	DSSS	17.5	17.16	0.03	10 mm	Standard	32FAF	1	front	1:1	0.066	1.081	0.071	
2437	6	IEEE 802.11b	DSSS	17.5	17.16	-0.05	10 mm	Standard	32FAF	1	top	1:1	0.044	1.081	0.047	
2437	6	IEEE 802.11b	DSSS	17.5	17.16	0.19	10 mm	Standard	32FAF	1	right	1:1	0.161	1.081	0.174	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population											Body 1.6 W/kg (mW/g) averaged over 1 gram					

12.4 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2003, FCC/OET Bulletin 65, Supplement C [June 2001] and FCC KDB Publication 447498 D01v05.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery with NFC antenna was used for all SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v05.
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 D04v01, SAR was evaluated without a headset connected to the device. Since the standalone reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.
8. Per FCC KDB 865664 D01 v01, variability SAR tests were performed when the measured SAR results for a frequency band were greater than 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 14 for variability analysis.
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.6 for more details).
10. This DUT may be used with a standard battery cover or with an optional wireless charging battery cover. Per FCC KDB Publication 648474 D04, SAR was measured using the standard battery cover and then repeated with the wireless charging battery cover for the highest reported SAR for each wireless technology, frequency band, operating mode, and exposure condition. No other additional testing with the wireless charging battery cover was not required since all reported SAR were under 1.2 W/kg.

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 D03v01: The source-based time-averaged output power was evaluated for all multi-slot operations. The multi-slot configurations with the highest frame averaged output power and maximum allowed powers were evaluated for SAR.
3. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.

CDMA Notes:

1. Head SAR for CDMA2000 mode was tested under RC3/SO55 per FCC KDB Publication 941225 D01v02.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. EVDO and TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers, per FCC KDB Publication 941225 D01v02.
3. CDMA Wireless Router SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 according to KDB 941225 D01 procedures for data devices. If the average output power of Subtype 2 for Rev. A is less than the Rev. 0 power levels, then EVDO Rev. A SAR is not

required. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for that RF channel in Rev. 0.
4. Head SAR was additionally evaluated using EVDO Rev. A to determine compliance for VoIP operations.
5. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.
6. CDMA 1x-RTT SAR was required to be evaluated for Hotspot exposure conditions to support simultaneous transmission capabilities.

UMTS Notes:
1. UMTS mode in Body SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v02. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.
2. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.

LTE Notes:
1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r01. Implementation of the general test procedures can be found in Section 8.5.4.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator.

WLAN Notes:
1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 2.4 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11b. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
2. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 5 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11a. Other IEEE 802.11 modes (including 802.11n 20 MHz and 40 MHz bandwidths, and 802.11ac 80MHz) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
3. When Hotspot is enabled, all 5 GHz bands are disabled. Therefore no 5 GHz WIFI Wireless Router SAR Data was required.
4. WIFI transmission was verified using an uncalibrated spectrum analyzer.
5. SAR testing on other default channels was required since the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is >1.6 W/kg.

13 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

13.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v05 are applicable to handsets with built-in unlicensed transmitters such as 802.11a/b/g/n and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

13.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05 IV.C.1.iii, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v05 4.3.2 2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

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

Table 13-1
Estimated SAR

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated SAR (Body)
	[MHz]	[dBm]	[mm]	[W/kg]
Bluetooth	2441	9.50	10	**0.187**

Note: Held-to ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission.

13.3 Head SAR Simultaneous Transmission Analysis

Table 13-2
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Held to Ear)

Simult Tx	Configuration	GSM 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.110	0.157	0.267	Head SAR	Right Cheek	0.089	0.157	0.246
	Right Tilt	0.068	0.138	0.206		Right Tilt	0.056	0.138	0.194
	Left Cheek	0.127	0.452	0.579		Left Cheek	0.099	0.452	0.551
	Left Tilt	0.080	0.184	0.264		Left Tilt	0.063	0.184	0.247
Simult Tx	Configuration	GSM 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.063	0.157	0.220	Head SAR	Right Cheek	0.117	0.157	0.274
	Right Tilt	0.040	0.138	0.178		Right Tilt	0.069	0.138	0.207
	Left Cheek	0.099	0.452	0.551		Left Cheek	0.188	0.452	0.640
	Left Tilt	0.041	0.184	0.225		Left Tilt	0.057	0.184	0.241

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	Cell. EVDO Rev. A SAR	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.214	0.157	0.371	Head SAR	Right Cheek	0.221	0.157	0.378
	Right Tilt	0.140	0.138	0.278		Right Tilt	0.140	0.138	0.278
	Left Cheek	0.250	0.452	0.702		Left Cheek	0.249	0.452	0.701
	Left Tilt	0.183	0.184	0.367		Left Tilt	0.152	0.184	0.336
Simult Tx	Configuration	PCS CDMA SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO Rev. A SAR	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.077	0.157	0.234	Head SAR	Right Cheek	0.089	0.157	0.246
	Right Tilt	0.026	0.138	0.164		Right Tilt	0.040	0.138	0.178
	Left Cheek	0.137	0.452	0.589		Left Cheek	0.164	0.452	0.616
	Left Tilt	0.022	0.184	0.206		Left Tilt	0.049	0.184	0.233
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.192	0.157	0.349	Head SAR	Right Cheek	0.079	0.157	0.236
	Right Tilt	0.131	0.138	0.269		Right Tilt	0.078	0.138	0.216
	Left Cheek	0.164	0.452	0.616		Left Cheek	0.120	0.452	0.572
	Left Tilt	0.113	0.184	0.297		Left Tilt	0.054	0.184	0.238

Table 13-3
Simultaneous Transmission Scenario with 5 GHz WLAN (Held to Ear)

Simult Tx	Configuration	GSM 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.110	0.038	0.148	Head SAR	Right Cheek	0.089	0.038	0.127
	Right Tilt	0.068	0.035	0.103		Right Tilt	0.056	0.035	0.091
	Left Cheek	0.127	0.471	0.598		Left Cheek	0.099	0.471	0.570
	Left Tilt	0.080	0.085	0.165		Left Tilt	0.063	0.085	0.148
Simult Tx	Configuration	GSM 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.063	0.038	0.101	Head SAR	Right Cheek	0.117	0.038	0.155
	Right Tilt	0.040	0.035	0.075		Right Tilt	0.069	0.035	0.104
	Left Cheek	0.099	0.471	0.570		Left Cheek	0.188	0.471	0.659
	Left Tilt	0.041	0.085	0.126		Left Tilt	0.057	0.085	0.142
Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS CDMA SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.214	0.038	0.252	Head SAR	Right Cheek	0.077	0.038	0.115
	Right Tilt	0.140	0.035	0.175		Right Tilt	0.026	0.035	0.061
	Left Cheek	0.250	0.471	0.721		Left Cheek	0.137	0.471	0.608
	Left Tilt	0.183	0.085	0.268		Left Tilt	0.022	0.085	0.107

13.4 Body-Worn Simultaneous Transmission Analysis

Table 13-4
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body-Worn at 10 mm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	GSM 850	0.405	0.261	0.666
Back Side	UMTS 850	0.326	0.261	0.587
Back Side	GSM 1900	0.510	0.261	0.771
Back Side	UMTS 1900	1.028	0.261	1.289
Back Side	Cell. CDMA	0.873	0.261	1.134
Back Side	PCS CDMA	0.844	0.261	1.105
Back Side	LTE Band 13	0.295	0.261	0.556
Back Side	LTE Band 4 (AWS)	0.523	0.261	0.784

Table 13-5
Simultaneous Transmission Scenario with 5 GHz WLAN (Body-Worn at 10 mm)

Configuration	Mode	2G/3G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	GSM 850	0.405	0.402	0.807
Back Side	UMTS 850	0.326	0.402	0.728
Back Side	GSM 1900	0.510	0.402	0.912
Back Side	UMTS 1900	1.028	0.402	**1.430**
Back Side	Cell. CDMA	0.873	0.402	1.275
Back Side	PCS CDMA	0.844	0.402	1.246

Table 13-6
Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 10 mm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Back Side	GSM 850	0.405	0.187	0.592
Back Side	UMTS 850	0.326	0.187	0.513
Back Side	GSM 1900	0.510	0.187	0.697
Back Side	UMTS 1900	1.028	0.187	1.215
Back Side	Cell. CDMA	0.873	0.187	1.060
Back Side	PCS CDMA	0.844	0.187	1.031
Back Side	LTE Band 13	0.295	0.187	0.482
Back Side	LTE Band 4 (AWS)	0.523	0.187	0.710

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

13.5 Hotspot SAR Simultaneous Transmission Analysis

Per FCC KDB Publication 941225 D06v01, the devices edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR ("-").

Table 13-7
Simultaneous Transmission Scenario (Hotspot at 1.0 cm)

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.517	0.261	0.778	Body SAR	Back	0.326	0.261	0.587
	Front	0.253	0.071	0.324		Front	0.132	0.071	0.203
	Top	-	0.047	0.047		Top	-	0.047	0.047
	Bottom	0.098	-	0.098		Bottom	0.071	-	0.071
	Right	-	0.174	0.174		Right	-	0.174	0.174
	Left	0.404	-	0.404		Left	0.186	-	0.186
Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.569	0.261	0.830	Body SAR	Back	1.028	0.261	1.289
	Front	0.174	0.071	0.245		Front	0.213	0.071	0.284
	Top	-	0.047	0.047		Top	-	0.047	0.047
	Bottom	0.252	-	0.252		Bottom	0.360	-	0.360
	Right	-	0.174	0.174		Right	-	0.174	0.174
	Left	0.084	-	0.084		Left	0.125	-	0.125
Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	1.063	0.261	1.324	Body SAR	Back	0.816	0.261	1.077
	Front	0.401	0.071	0.472		Front	0.204	0.071	0.275
	Top	-	0.047	0.047		Top	-	0.047	0.047
	Bottom	0.158	-	0.158		Bottom	0.334	-	0.334
	Right	-	0.174	0.174		Right	-	0.174	0.174
	Left	0.677	-	0.677		Left	0.122	-	0.122
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.295	0.261	0.556	Body SAR	Back	0.523	0.261	0.784
	Front	0.237	0.071	0.308		Front	0.212	0.071	0.283
	Top	-	0.047	0.047		Top	-	0.047	0.047
	Bottom	0.217	-	0.217		Bottom	0.188	-	0.188
	Right	0.348	0.174	0.522		Right	0.059	0.174	0.233
	Left	-	-	0.000		Left	-	-	0.000

13.6 SVLTE Simultaneous Transmission Analysis

Table 13-8
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Held to Ear)

Simult Tx	CDMA Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	
		Tx Antenna	1	2	3	1+2	1+2+3
		Target Power (dBm)	24.5	19	17		
Head SAR	P ≥ 18	Right Cheek	0.214	0.070	0.157	0.284	0.441
		Right Tilt	0.140	0.046	0.138	0.186	0.324
		Left Cheek	0.250	0.050	0.452	0.300	0.752
		Left Tilt	0.183	0.035	0.184	0.218	0.402
		Target Power (dBm)	18	23	17		
	P < 18	Right Cheek	0.056	0.192	0.157	0.248	0.405
		Right Tilt	0.036	0.131	0.138	0.167	0.305
		Left Cheek	0.065	0.164	0.452	0.229	0.681
		Left Tilt	0.038	0.113	0.184	0.151	0.335

Simult Tx	CDMA Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	
		Tx Antenna	1	2	3	1+2	1+2+3
		Target Power (dBm)	24.5	19	17		
Head SAR	P ≥ 18	Right Cheek	0.077	0.070	0.157	0.147	0.304
		Right Tilt	0.026	0.046	0.138	0.072	0.210
		Left Cheek	0.137	0.050	0.452	0.187	0.639
		Left Tilt	0.022	0.035	0.184	0.057	0.241
		Target Power (dBm)	18	23	17		
	P < 18	Right Cheek	0.031	0.192	0.157	0.223	0.380
		Right Tilt	0.018	0.131	0.138	0.149	0.287
		Left Cheek	0.063	0.164	0.452	0.227	0.679
		Left Tilt	0.012	0.113	0.184	0.125	0.309

Simult Tx	CDMA Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	
		Tx Antenna	1	2	3	1+2	1+2+3
		Target Power (dBm)	24.5	19	17		
Head SAR	P ≥ 18	Right Cheek	0.214	0.028	0.157	0.242	0.399
		Right Tilt	0.140	0.015	0.138	0.155	0.293
		Left Cheek	0.250	0.031	0.452	0.281	0.733
		Left Tilt	0.183	0.011	0.184	0.194	0.378
		Target Power (dBm)	18	23	17		
	P < 18	Right Cheek	0.056	0.079	0.157	0.135	0.292
		Right Tilt	0.036	0.078	0.138	0.114	0.252
		Left Cheek	0.065	0.120	0.452	0.185	0.637
		Left Tilt	0.038	0.054	0.184	0.092	0.276

Simult Tx	CDMA Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	
		Tx Antenna	1	2	3	1+2	1+2+3
		Target Power (dBm)	24.5	19	17		
Head SAR	P ≥ 18	Right Cheek	0.077	0.028	0.157	0.105	0.262
		Right Tilt	0.026	0.015	0.138	0.041	0.179
		Left Cheek	0.137	0.031	0.452	0.168	0.620
		Left Tilt	0.022	0.011	0.184	0.033	0.217
		Target Power (dBm)	18	23	17		
	P < 18	Right Cheek	0.031	0.079	0.157	0.110	0.267
		Right Tilt	0.018	0.078	0.138	0.096	0.234
		Left Cheek	0.063	0.120	0.452	0.183	0.635
		Left Tilt	0.012	0.054	0.184	0.066	0.250

Table 13-9
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body-Worn at 10 mm)

CDMA Power Level (dBm)	Mode	CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	
	Tx Antenna	1	2	3		
	Target Power (dBm)	24.5	19	17	1+2	1+2+3
P ≥ 18	Cell. CDMA	0.873	0.086	0.261	0.959	1.220
	PCS CDMA	0.844	0.086	0.261	0.930	1.191
	Target Power (dBm)	18	23	17		
P < 18	Cell. CDMA	0.235	0.295	0.261	0.530	0.791
	PCS CDMA	0.336	0.295	0.261	0.631	0.892
CDMA Power Level (dBm)	Mode	CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	
	Tx Antenna	1	2	3		
	Target Power (dBm)	24.5	19	17	1+2	1+2+3
P ≥ 18	Cell. CDMA	0.873	0.104	0.261	0.977	1.238
	PCS CDMA	0.844	0.104	0.261	0.948	1.209
	Target Power (dBm)	18	23	17		
P < 18	Cell. CDMA	0.235	0.523	0.261	0.758	1.019
	PCS CDMA	0.336	0.523	0.261	0.859	1.120

Table 13-10
Simultaneous Transmission Scenario with 2.4 GHz Bluetooth (Body-Worn at 10 mm)

CDMA Power Level (dBm)	Mode	CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)	
	Tx Antenna	1	2	3		
	Target Power (dBm)	24.5	19	9	1+2	1+2+3
P ≥ 18	Cell. CDMA	0.873	0.086	0.187	0.959	1.146
	PCS CDMA	0.844	0.086	0.187	0.930	1.117
	Target Power (dBm)	18	23	9		
P < 18	Cell. CDMA	0.235	0.295	0.187	0.530	0.717
	PCS CDMA	0.336	0.295	0.187	0.631	0.818
CDMA Power Level (dBm)	Mode	CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)	
	Tx Antenna	1	2	3		
	Target Power (dBm)	24.5	19	9	1+2	1+2+3
P ≥ 18	Cell. CDMA	0.873	0.104	0.187	0.977	1.164
	PCS CDMA	0.844	0.104	0.187	0.948	1.135
	Target Power (dBm)	18	23	9		
P < 18	Cell. CDMA	0.235	0.523	0.187	0.758	0.945
	PCS CDMA	0.336	0.523	0.187	0.859	1.046

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

Table 13-11
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Hotspot at 10 mm)

Simult Tx	CDMA Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3	1+2+3
		Target Power (dBm)	24.5	19	17	
Body SAR	P ≥ 18	Back	0.873	0.086	0.261	**1.220**
		Front	0.336	0.077	0.071	0.484
		Top	-	-	0.047	0.047
		Bottom	0.136	0.072	-	0.208
		Right	-	0.132	0.174	0.306
		Left	0.672	-	-	0.672
		Target Power (dBm)	18	23	17	
	P < 18	Back	0.235	0.295	0.261	0.791
		Front	0.075	0.237	0.071	0.383
		Top	-	-	0.047	0.047
		Bottom	0.053	0.217	-	0.270
		Right	-	0.348	0.174	0.522
		Left	0.135	-	-	0.135
Simult Tx	CDMA Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3	1+2+3
		Target Power (dBm)	24.5	19	17	
Body SAR	P ≥ 18	Back	0.844	0.086	0.261	**1.191**
		Front	0.210	0.077	0.071	0.358
		Top	-	-	0.047	0.047
		Bottom	0.284	0.072	-	0.356
		Right	-	0.132	0.174	0.306
		Left	0.115	-	-	0.115
		Target Power (dBm)	18	23	17	
	P < 18	Back	0.336	0.295	0.261	0.892
		Front	0.080	0.237	0.071	0.388
		Top	-	-	0.047	0.047
		Bottom	0.127	0.217	-	0.344
		Right	-	0.348	0.174	0.522
		Left	0.048	-	-	0.048

Simult Tx	CDMA Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3	1+2+3
		Target Power (dBm)	24.5	19	17	
Body SAR	P ≥ 18	Back	0.873	0.104	0.261	**1.238**
		Front	0.336	0.059	0.071	0.466
		Top	-	-	0.047	0.047
		Bottom	0.136	0.084	-	0.220
		Right	-	0.032	0.174	0.206
		Left	0.672	-	-	0.672
		Target Power (dBm)	18	23	17	
	P < 18	Back	0.235	0.523	0.261	1.019
		Front	0.075	0.212	0.071	0.358
		Top	-	-	0.047	0.047
		Bottom	0.053	0.188	-	0.241
		Right	-	0.059	0.174	0.233
		Left	0.135	-	-	0.135

Simult Tx	CDMA Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3	1+2+3
		Target Power (dBm)	24.5	19	17	
Body SAR	P ≥ 18	Back	0.844	0.104	0.261	**1.209**
		Front	0.210	0.059	0.071	0.340
		Top	-	-	0.047	0.047
		Bottom	0.284	0.084	-	0.368
		Right	-	0.032	0.174	0.206
		Left	0.115	-	-	0.115
		Target Power (dBm)	18	23	17	
	P < 18	Back	0.336	0.523	0.261	1.120
		Front	0.080	0.212	0.071	0.363
		Top	-	-	0.047	0.047
		Bottom	0.127	0.188	-	0.315
		Right	-	0.059	0.174	0.233
		Left	0.048	-	-	0.048

13.7 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v05.

14 SAR MEASUREMENT VARIABILITY

14.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01, 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 preformed 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 1-g 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 14-1
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)	
835	836.52	384	Cell. CDMA	EVDO Rev. 0	back	10 mm	0.878	0.804	1.09	N/A	N/A	N/A	N/A
1900	1907.60	9538	UMTS 1900	RMC	back	10 mm	0.841	0.948	1.13	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						

14.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg for all frequency bands. Therefore, per KDB Publication 865664 D01v01, the extended measurement uncertainty analysis per IEEE 1528-2003 was not required.

15 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/5/2012	Annual	4/5/2013	MY45470194
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/3/2012	Annual	4/3/2013	US37390350
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/4/2012	Annual	4/4/2013	JP38020182
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/10/2012	Annual	10/10/2013	3613A00315
Agilent	85070E	Dielectric Probe Kit	3/8/2012	Annual	3/8/2013	MY44300633
Agilent	8648D	Signal Generator	4/3/2012	Annual	4/3/2013	3629U00687
Agilent	85047A	S-Parameter Test Set	N/A	N/A	N/A	2904A00579
Agilent	MA24106A	USB Power Sensor	12/7/2012	Annual	12/7/2013	1244515
Agilent	MA24106A	USB Power Sensor	12/7/2012	Annual	12/7/2013	1244512
Agilent	E5515C	Wireless Communications Test Set	9/24/2012	Annual	9/24/2013	GB43163447
Agilent	E5515C	Wireless Communications Test Set	4/4/2012	Annual	4/4/2013	US41140256
Amplifier Research	5S1G4	5W, 800MHz-4.2GHz	CBT	N/A	CBT	21910
Anritsu	ML2495A	Power Meter	10/11/2012	Annual	10/11/2013	1039008
Anritsu	ML2496A	Power Meter	11/28/2012	Annual	11/28/2013	1138001
Anritsu	ML2438A	Power Meter	12/4/2012	Annual	12/4/2013	1070030
Anritsu	MA2411B	Power Sensor	3/5/2012	Annual	3/5/2013	846215
Anritsu	MA2481A	Power Sensor	4/5/2012	Annual	4/5/2013	5605
Anritsu	MA2411B	Pulse Power Sensor	12/4/2012	Annual	12/4/2013	1207364
Anritsu	MA2411B	Pulse Power Sensor	12/5/2012	Annual	12/5/2013	1126066
Anritsu	MA2411B	Pulse Sensor	9/19/2012	Annual	9/19/2013	1027293
Anritsu	MT8820C	Radio Communication Tester	11/6/2012	Annual	11/6/2013	6200901190
Anritsu	MA24106A	USB Power Sensor	8/22/2012	Annual	8/22/2013	1231538
Anritsu	MA24106A	USB Power Sensor	8/22/2012	Annual	8/22/2013	1231535
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1S5A00-009
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/10/2012	Annual	10/10/2013	1833460
Gigatronics	8651A	Universal Power Meter	10/10/2012	Annual	10/10/2013	8650319
Intelligent Weigh	PD-3000	Electronic Balance	3/27/2012	Annual	3/27/2013	11081534
Intelligent Weighing	PD-3000	Electronic Balance	6/29/2012	Annual	6/29/2013	120405017
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	5/22/2012	Annual	5/22/2013	109892
Rohde & Schwarz	NRVD	Dual Channel Power Meter	10/12/2012	Biennial	10/12/2014	101695
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	2/8/2013	Annual	2/8/2014	101699
Rohde & Schwarz	NRV-Z32	Peak Power Sensor	10/12/2012	Biennial	10/12/2014	836019/013
Rohde & Schwarz	SMIQ03B	Signal Generator	4/5/2012	Annual	4/5/2013	DE27259
Rohde & Schwarz	SME06	Signal Generator	10/11/2012	Annual	10/11/2013	832026
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
SPEAG	D1750V2	1750 MHz SAR Dipole	4/24/2012	Annual	4/24/2013	1051
SPEAG	D1900V2	1900 MHz SAR Dipole	2/22/2012	Annual	2/22/2013	5d149
SPEAG	D1900V2	1900 MHz SAR Dipole	2/6/2013	Annual	2/6/2014	5d148
SPEAG	D2450V2	2450 MHz SAR Dipole	8/23/2012	Annual	8/23/2013	719
SPEAG	D2450V2	2450 MHz SAR Dipole	1/8/2013	Annual	1/8/2014	797
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/11/2013	Annual	1/11/2014	1057
SPEAG	D750V3	750 MHz Dipole	1/7/2013	Annual	1/7/2014	1003
SPEAG	D835V2	835 MHz SAR Dipole	2/17/2012	Annual	2/17/2013	4d133
SPEAG	D835V2	835 MHz SAR Dipole	4/20/2012	Annual	4/20/2013	4d119
SPEAG	D835V2	835 MHz SAR Dipole	8/23/2012	Annual	8/23/2013	4d026
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/19/2012	Annual	4/19/2013	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/7/2012	Annual	5/7/2013	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/24/2012	Annual	8/24/2013	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/19/2012	Annual	9/19/2013	1323
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/13/2012	Annual	11/13/2013	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/17/2013	Annual	1/17/2014	1272
SPEAG	DAK-3.5	Dielectic Assessment Kit	6/19/2012	Annual	6/19/2013	1070
SPEAG	DAK-3.5	Dielectric Assessment Kit	12/11/2012	Annual	12/11/2013	1091
SPEAG	ES3DV3	SAR Probe	4/24/2012	Annual	4/24/2013	3213
SPEAG	ES3DV3	SAR Probe	5/18/2012	Annual	5/18/2013	3263
SPEAG	ES3DV2	SAR Probe	8/28/2012	Annual	8/28/2013	3022
SPEAG	ES3DV3	SAR Probe	9/20/2012	Annual	9/20/2013	3288
SPEAG	ES3DV3	SAR Probe	11/15/2012	Annual	11/15/2013	3287
SPEAG	EX3DV4	SAR Probe	1/17/2013	Annual	1/17/2014	3589
Tektronix	RSA-6114A	Real Time Spectrum Analyzer	4/5/2012	Annual	4/5/2013	B010177
VWR	23226-658	Long Stem Thermometer	3/30/2012	Biennial	3/30/2014	122179874
VWR	23226-658	Long Stem Thermometer	5/16/2012	Biennial	5/16/2014	122295544
VWR	62344-925	Mini-Thermometer	10/24/2011	Biennial	10/24/2013	111886414
VWR	62344-925	Mini-Thermometer	10/24/2011	Biennial	10/24/2013	111886441
VWR	36934-158	Wall-Mounted Thermometer	9/30/2011	Biennial	9/30/2013	111859323
VWR	36934-158	Wall-Mounted Thermometer	9/30/2011	Biennial	9/30/2013	111859332

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. All Calibrated Equipments were used within their calibration period.

16 MEASUREMENT UNCERTAINTIES

Applicable for frequencies less than 3000 MHz.

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	**IEEE 1528 Sec.**	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i 1gm**	**c_i 10 gms**	**1gm u_i (± %)**	**10gms u_i (± %)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	6.0	N	1	1.0	1.0	6.0	6.0	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	1.0	1.0	1.3	1.3	∞
Boundary Effect	E.2.3	0.4	N	1	1.0	1.0	0.4	0.4	∞
Linearity	E.2.4	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	E.2.5	5.1	N	1	1.0	1.0	5.1	5.1	∞
Readout Electronics	E.2.6	1.0	N	1	1.0	1.0	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	E.6.3	2.9	R	1.73	1.0	1.0	1.7	1.7	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1.0	1.0	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	6.0	N	1	1.0	1.0	6.0	6.0	287
Device Holder Uncertainty	E.4.1	3.32	R	1.73	1.0	1.0	1.9	1.9	∞
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	3.8	N	1	0.64	0.43	2.4	1.6	6
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - measurement uncertainty	E.3.3	4.5	N	1	0.60	0.49	2.7	2.2	6
Combined Standard Uncertainty (k=1)			RSS				12.1	11.7	299
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				24.2	23.5	

The above measurement uncertainties are according to IEEE Std. 1528-2003

Applicable for frequencies up to 6 GHz.

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	**IEEE 1528 Sec.**	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i 1gm**	**c_i 10 gms**	**1gm u_i (± %)**	**10gms u_i (± %)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	6.55	N	1	1.0	1.0	6.6	6.6	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	1.0	1.0	1.3	1.3	∞
Boundary Effect	E.2.3	0.4	N	1	1.0	1.0	0.4	0.4	∞
Linearity	E.2.4	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	E.2.5	5.1	N	1	1.0	1.0	5.1	5.1	∞
Readout Electronics	E.2.6	1.0	N	1	1.0	1.0	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	E.6.3	2.9	R	1.73	1.0	1.0	1.7	1.7	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1.0	1.0	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	6.0	N	1	1.0	1.0	6.0	6.0	287
Device Holder Uncertainty	E.4.1	3.32	R	1.73	1.0	1.0	1.9	1.9	∞
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	3.8	N	1	0.64	0.43	2.4	1.6	6
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - measurement uncertainty	E.3.3	4.5	N	1	0.60	0.49	2.7	2.2	6
Combined Standard Uncertainty (k=1)			RSS				12.4	12.0	299
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				24.7	24.0	

The above measurement uncertainties are according to IEEE Std. 1528-2003

17 CONCLUSION

17.1 Measurement Conclusion

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

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

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