



SAR EVALUATION REPORT

Applicant Name:
Samsung Electronics Co., Ltd.
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Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:
06/28/2021-07/31/2021
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M2106100066-01.A3L (Rev 1)

FCC ID: A3LSMF711JPN

APPLICANT: SAMSUNG ELECTRONICS CO., LTD.


DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model: SCG12, SC-54B

Equipment Class	Band & Mode	Tx Frequency	SAR			
			1g Head (W/kg)	1g Body-Worn (W/kg)	1g Hotspot (W/kg)	10g Phablet (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.18	0.25	0.95	N/A
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	< 0.1	0.50	0.89	2.39
PCE	UMTS 850	826.40 - 846.60 MHz	0.40	0.47	0.88	N/A
PCE	LTE Band 12	699.7 - 715.3 MHz	0.17	0.18	0.41	N/A
PCE	LTE Band 13	779.5 - 784.5 MHz	0.16	0.26	0.77	N/A
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.31	0.38	0.85	N/A
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	0.11	0.67	0.95	2.89
PCE	LTE Band 41	2498.5 - 2687.5 MHz	0.12	0.24	0.84	1.12
DTS	2.4 GHz WLAN	2412 - 2472 MHz	0.25	< 0.1	0.34	N/A
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	N/A	N/A
NII	U-NII-2A	5260 - 5320 MHz	< 0.1	< 0.1	N/A	0.65
NII	U-NII-2C	5500 - 5720 MHz	< 0.1	< 0.1	N/A	0.59
NII	U-NII-3	5745 - 5825 MHz	< 0.1	< 0.1	0.36	N/A
DSS/DTS	Bluetooth	2402 - 2480 MHz	0.19	<0.1	0.32	N/A
Simultaneous SAR per KDB 690783 D01v01r03:			0.96	0.91	1.59	3.95

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

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 0 of this report; for North American frequency bands only.

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


Randy Ortanez
President



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1 DEVICE UNDER TEST




1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2472 MHz
U-NII-1	Voice/Data	5180 - 5240 MHz
U-NII-2A	Voice/Data	5260 - 5320 MHz
U-NII-2C	Voice/Data	5500 - 5720 MHz
U-NII-3	Voice/Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz

1.2 Power Reduction for SAR

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

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

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1.3 Nominal and Maximum Output Power Specifications

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




1.3.1 2G/3G/4G Output Power

GSM/GPRS/EDGE 850										
Power Level		Voice (in dBm)	Data - Burst Average GMSK (in dBm)				Data - Burst Average 8-PSK (in dBm)			
		1 TX Slot	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots
Max	Max allowed power	33.0	33.0	32.0	30.0	28.0	27.5	25.5	23.5	22.5
	Nominal	32.0	32.0	31.0	29.0	27.0	26.5	24.5	22.5	21.5
Hotspot Mode Active	Max allowed power	N/A	32.0	31.0	29.0	27.0	27.0	24.5	22.5	21.5
	Nominal	N/A	31.0	30.0	28.0	26.0	26.0	23.5	21.5	20.5
GSM/GPRS/EDGE 1900										
Power Level		Voice (in dBm)	Data - Burst Average GMSK (in dBm)				Data - Burst Average 8-PSK (in dBm)			
		1 TX Slot	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots
Max	Max allowed power	30.0	30.0	28.5	26.5	24.5	26.5	24.0	22.0	21.0
	Nominal	29.0	29.0	27.5	25.5	23.5	25.5	23.0	21.0	20.0
Hotspot Mode Active	Max allowed power	N/A	25.0	23.5	21.5	19.5	22.0	19.5	17.0	16.0
	Nominal	N/A	24.0	22.5	20.5	18.5	21.0	18.5	16.0	15.0
Proximity Sensor and/or Earjack Mode Active	Max allowed power	27.0	27.0	25.5	23.5	21.5	24.0	21.5	19.0	18.0
	Nominal	26.0	26.0	24.5	22.5	20.5	23.0	20.5	18.0	17.0

UMTS Band 5 (850 MHz)				
Power Level		Modulated Average Output Power (in dBm)		
		3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6
Max	Max allowed power	25.5	24.5	24.5
	Nominal	24.5	23.5	23.5
Hotspot Mode Active	Max allowed power	24.0	23.0	23.0
	Nominal	23.0	22.0	22.0

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Mode / Band		Modulated Average Output Power (in dBm)		
		Max	Hotspot Mode Active	Proximity Sensor and/or Earjack Mode Active
LTE FDD Band 12	Max allowed power	24.0	24.0	24.0
	Nominal	23.0	23.0	23.0
LTE FDD Band 13	Max allowed power	24.0	24.0	24.0
	Nominal	23.0	23.0	23.0
LTE FDD Band 5	Max allowed power	25.7	24.0	25.7
	Nominal	24.7	23.0	24.7
LTE FDD Band 4	Max allowed power	24.0	19.0	21.0
	Nominal	23.0	18.0	20.0
LTE TDD Band 41	Max allowed power	25.0	19.5	22.0
	Nominal	24.0	18.5	21.0




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1.3.2 2.4 GHz Maximum Bluetooth and SISO/MIMO WLAN Output Power

Note: Targets for 802.11ax RU operations can be found in Appendix I

Mode	Band	IEEE 802.11 (in dBm)															
		SISO								MIMO							
		Antenna 1/2															
		b		g		n		ax (SU)		b (CDD + STBC)		g (CDD + STBC)		n (CDD+STBC, SDM)		ax (SU) (CDD+STBC, SDM)	
Maximum / Nominal Power	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	
2.4 GHz WIFI	2.45 GHz	18.5	17.5	18.0	17.0	18.0	17.0	18.0	17.0	21.5	20.5	21.0	20.0	21.0	20.0	21.0	20.0
		ch. 12: 6.0 ch. 13: 0.0	5.0 -1.0	ch. 12: 6.0 ch. 13: 0.0	5.0 -1.0	ch. 12: 6.0 ch. 13: 0.0	5.0 -1.0	ch. 12: 6.0 ch. 13: 0.0	5.0 -1.0	ch. 12: 9.0 ch. 13: 3.0	8.0 2.0	ch. 12: 9.0 ch. 13: 3.0	8.0 2.0	ch. 12: 9.0 ch. 13: 3.0	8.0 2.0	ch. 12: 9.0 ch. 13: 3.0	8.0 2.0

Mode		Single Antenna	
		Antenna 1	Antenna 2
Bluetooth (in dBm)	Maximum	16.0	17.0
	Nominal	15.0	16.0
Bluetooth EDR (in dBm)	Maximum	13.5	14.5
	Nominal	12.5	13.5
Bluetooth LE 2Mbps (in dBm)	Maximum	6.0	
	Nominal	5.0	
Bluetooth LE 1Mbps, 125/500 kbps (in dBm)	Maximum	6.0	
	Nominal	5.0	

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1.3.3 2.4 GHz Reduced Bluetooth and WLAN Output Power

Note: Targets for 802.11ax RU operations can be found in Appendix I

The below table is applicable in the following conditions:




- Simultaneous conditions with 5 GHz WLAN

Mode	Band	IEEE 802.11 (in dBm)															
		SISO								MIMO							
		Antenna 1/2															
		b		g		n		ax (SU)		^b (CDD + STBC)		^g (CDD + STBC)		ⁿ (CDD+STBC, SDM)		^{ax} (SU) (CDD+STBC, SDM)	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.
2.4 GHz WIFI	2.45 GHz	15.0	14.0	15.0	14.0	15.0	14.0	15.0	14.0	18.0	17.0	18.0	17.0	18.0	17.0	18.0	17.0
		ch. 12: 6.0	5.0	ch. 12: 6.0	5.0	ch. 12: 6.0	5.0	ch. 12: 6.0	5.0	ch. 12: 9.0	8.0	ch. 12: 9.0	8.0	ch. 12: 9.0	8.0	ch. 12: 9.0	8.0
		ch. 13: 0.0	-1.0	ch. 13: 0.0	-1.0	ch. 13: 0.0	-1.0	ch. 13: 0.0	-1.0	ch. 13: 3.0	2.0	ch. 13: 3.0	2.0	ch. 13: 3.0	2.0	ch. 13: 3.0	2.0

The below table is applicable in the following conditions:

- RCV Active
- RCV active during simultaneous conditions with 5 GHz WLAN




Mode	Band	IEEE 802.11 (in dBm)															
		SISO								MIMO							
		Antenna 1/2															
		b		g		n		ax (SU)		^b (CDD + STBC)		^g (CDD + STBC)		ⁿ (CDD+STBC, SDM)		^{ax} (SU) (CDD+STBC, SDM)	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.
2.4 GHz WIFI	2.45 GHz	13.0	12.0	13.0	12.0	13.0	12.0	13.0	12.0	16.0	15.0	16.0	15.0	16.0	15.0	16.0	15.0
		ch. 12: 6.0	5.0	ch. 12: 6.0	5.0	ch. 12: 6.0	5.0	ch. 12: 6.0	5.0	ch. 12: 9.0	8.0	ch. 12: 9.0	8.0	ch. 12: 9.0	8.0	ch. 12: 9.0	8.0
		ch. 13: 0.0	-1.0	ch. 13: 0.0	-1.0	ch. 13: 0.0	-1.0	ch. 13: 0.0	-1.0	ch. 13: 3.0	2.0	ch. 13: 3.0	2.0	ch. 13: 3.0	2.0	ch. 13: 3.0	2.0

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The below table is applicable I the following conditions:

- RCV Active




Mode		Single Antenna	
		Antenna 1	Antenna 2
Bluetooth (in dBm)	Maximum	10.0	
	Nominal	9.0	
Bluetooth EDR (in dBm)	Maximum	10.0	
	Nominal	9.0	
Bluetooth LE 2Mbps (in dBm)	Maximum	6.0	
	Nominal	5.0	
Bluetooth LE 1Mbps, 125/500 kbps (in dBm)	Maximum	6.0	
	Nominal	5.0	

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1.3.4 5 GHz Maximum SISO/MIMO WLAN Output Power

Note: Targets for 802.11ax RU operations can be found in Appendix I

Mode	Band	IEEE 802.11 (in dBm)															
		SISO								MIMO							
		Antenna 1/2															
		a		n		ac		ax (SU)		^a (CDD + STBC)		ⁿ (CDD+STBC, SDM)		^{ac} (CDD+STBC, SDM)		^{ax} (SU) (CDD+STBC, SDM)	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.
5 GHz WiFi (20MHz BW)	5200 MHz	18.0	17.0	18.0	17.0	18.0	17.0	18.0	17.0	21.0	20.0	21.0	20.0	21.0	20.0	21.0	20.0
		ch. 36: 16.5	15.5	ch. 36: 15.5	14.5	ch. 36: 15.5	14.5	ch. 36: 15.5	14.5	ch. 36: 19.5	18.5	ch. 36: 18.5	17.5	ch. 36: 18.5	17.5	ch. 36: 18.5	17.5
	5300 MHz	18.0	17.0	18.0	17.0	18.0	17.0	18.0	17.0	21.0	20.0	21.0	20.0	21.0	20.0	21.0	20.0
				ch. 64: 17.0	16.0	ch. 64: 17.0	16.0	ch. 64: 17.0	16.0			ch. 64: 20.0	19.0	ch. 64: 20.0	19.0	ch. 64: 20.0	19.0
	5500 MHz	18.0	17.0	18.0	17.0	18.0	17.0	18.0	17.0	21.0	20.0	21.0	20.0	21.0	20.0	21.0	20.0
				ch. 100: 17.0	16.0	ch. 100: 17.0	16.0	ch. 100: 17.0	16.0			ch. 100: 20.0	19.0	ch. 100: 20.0	19.0	ch. 100: 20.0	19.0
	5800 MHz	18.0	17.0	18.0	17.0	18.0	17.0	18.0	17.0	21.0	20.0	21.0	20.0	21.0	20.0	21.0	20.0
5 GHz WiFi (40MHz BW)	5200 MHz			17.0	16.0	17.0	16.0	17.0	16.0			20.0	19.0	20.0	19.0	20.0	19.0
				ch. 38: 14.0	13.0	ch. 38: 14.0	13.0	ch. 38: 14.0	13.0			ch. 38: 17.0	16.0	ch. 38: 17.0	16.0	ch. 38: 17.0	16.0
	5300 MHz			17.0	16.0	17.0	16.0	17.0	16.0			20.0	19.0	20.0	19.0	20.0	19.0
				ch. 62: 15.0	14.0	ch. 62: 15.0	14.0	ch. 62: 15.0	14.0			ch. 62: 18.0	17.0	ch. 62: 18.0	17.0	ch. 62: 18.0	17.0
	5500 MHz			17.0	16.0	17.0	16.0	17.0	16.0			20.0	19.0	20.0	19.0	20.0	19.0
				ch. 102: 15.5	14.5	ch. 102: 15.5	14.5	ch. 102: 15.5	14.5			ch. 102: 18.5	17.5	ch. 102: 18.5	17.5	ch. 102: 18.5	17.5
	5800 MHz			17.0	16.0	17.0	16.0	17.0	16.0			20.0	19.0	20.0	19.0	20.0	19.0
5 GHz WiFi (80MHz BW)	5200 MHz					12.5	11.5	12.5	11.5					15.5	14.5	15.5	14.5
	5300 MHz					13.0	12.0	13.0	12.0					16.0	15.0	16.0	15.0
	5500 MHz					16.0	15.0	16.0	15.0					19.0	18.0	19.0	18.0
					ch. 106: 15.0	14.0	ch. 106: 15.0	14.0					ch. 106: 18.0	17.0	ch. 106: 18.0	17.0	
	5800 MHz					16.0	15.0	16.0	15.0					19.0	18.0	19.0	18.0

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1.3.5 5 GHz Reduced SISO/MIMO WLAN Output Power

Note: Targets for 802.11ax RU operations can be found in Appendix I

The below table is applicable in the following conditions:

- Simultaneous conditions with 2.4 GHz WLAN




Mode	Band	IEEE 802.11 (in dBm)															
		SISO								MIMO							
		Antenna 1/2															
		a		n		ac		ax (SU)		^a (CDD + STBC)		ⁿ (CDD+STBC, SDM)		^{ac} (CDD+STBC, SDM)		^{ax (SU)} (CDD+STBC, SDM)	
Maximum / Nominal Power	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	
5 GHz WIFI (20MHz BW)	5200 MHz	15.0	14.0	15.0	14.0	15.0	14.0	15.0	14.0	18.0	17.0	18.0	17.0	18.0	17.0	18.0	17.0
	5300 MHz	15.0	14.0	15.0	14.0	15.0	14.0	15.0	14.0	18.0	17.0	18.0	17.0	18.0	17.0	18.0	17.0
	5500 MHz	15.0	14.0	15.0	14.0	15.0	14.0	15.0	14.0	18.0	17.0	18.0	17.0	18.0	17.0	18.0	17.0
	5800 MHz	15.0	14.0	15.0	14.0	15.0	14.0	15.0	14.0	18.0	17.0	18.0	17.0	18.0	17.0	18.0	17.0
5 GHz WIFI (40MHz BW)	5200 MHz			15.0	14.0	15.0	14.0	15.0	14.0			18.0	17.0	18.0	17.0	18.0	17.0
				ch. 38: 14.0	13.0	ch. 38: 14.0	13.0	ch. 38: 14.0	13.0			ch. 38: 17.0	16.0	ch. 38: 17.0	16.0	ch. 38: 17.0	16.0
	5300 MHz			15.0	14.0	15.0	14.0	15.0	14.0			18.0	17.0	18.0	17.0	18.0	17.0
	5500 MHz			15.0	14.0	15.0	14.0	15.0	14.0			18.0	17.0	18.0	17.0	18.0	17.0
	5800 MHz			15.0	14.0	15.0	14.0	15.0	14.0			18.0	17.0	18.0	17.0	18.0	17.0
5 GHz WIFI (80MHz BW)	5200 MHz					12.5	11.5	12.5	11.5					15.5	14.5	15.5	14.5
	5300 MHz					13.0	12.0	13.0	12.0					16.0	15.0	16.0	15.0
	5500 MHz					15.0	14.0	15.0	14.0					18.0	17.0	18.0	17.0
	5800 MHz					15.0	14.0	15.0	14.0					18.0	17.0	18.0	17.0

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The below table is applicable in the following conditions:

- RCV Active
- RCV active during simultaneous conditions with 2.4 GHz WLAN

Mode	Band	IEEE 802.11 (in dBm)																							
		SISO								MIMO															
		Antenna 1/2								a				n				ac				ax (SU)			
		a		n		ac		ax (SU)		(CDD + STBC)		(CDD+STBC, SDM)		(CDD+STBC, SDM)		(CDD+STBC, SDM)									
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.								
5 GHz WIFI (20MHz BW)	5200 MHz	11.0	10.0	11.0	10.0	11.0	10.0	11.0	10.0	14.0	13.0	14.0	13.0	14.0	13.0	14.0	13.0								
	5300 MHz	11.0	10.0	11.0	10.0	11.0	10.0	11.0	10.0	14.0	13.0	14.0	13.0	14.0	13.0	14.0	13.0								
	5500 MHz	11.0	10.0	11.0	10.0	11.0	10.0	11.0	10.0	14.0	13.0	14.0	13.0	14.0	13.0	14.0	13.0								
	5800 MHz	11.0	10.0	11.0	10.0	11.0	10.0	11.0	10.0	14.0	13.0	14.0	13.0	14.0	13.0	14.0	13.0								
5 GHz WIFI (40MHz BW)	5200 MHz			11.0	10.0	11.0	10.0	11.0	10.0			14.0	13.0	14.0	13.0	14.0	13.0								
	5300 MHz			11.0	10.0	11.0	10.0	11.0	10.0			14.0	13.0	14.0	13.0	14.0	13.0								
	5500 MHz			11.0	10.0	11.0	10.0	11.0	10.0			14.0	13.0	14.0	13.0	14.0	13.0								
	5800 MHz			11.0	10.0	11.0	10.0	11.0	10.0			14.0	13.0	14.0	13.0	14.0	13.0								
5 GHz WIFI (80MHz BW)	5200 MHz					11.0	10.0	11.0	10.0					14.0	13.0	14.0	13.0								
	5300 MHz					11.0	10.0	11.0	10.0					14.0	13.0	14.0	13.0								
	5500 MHz					11.0	10.0	11.0	10.0					14.0	13.0	14.0	13.0								
	5800 MHz					11.0	10.0	11.0	10.0					14.0	13.0	14.0	13.0								




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1.4 DUT Antenna Locations

A diagram showing the location of the device antennas for both open and closed configurations can be found in Appendix E. When the device is open, the overall dimensions of this device are > 9 x 5 cm. Since the diagonal dimension of this device when open is > 160 mm and <200 mm, it is considered a “phablet.” and operates similar to a traditional portable handset. In the closed configuration, only a simple display/interaction of notifications occurs and overall dimensions are < 9 x5 cm. Therefore, when the device is closed, the only testing considered is for body-worn and hotspot.

**Table 1-1
Device Edges/Sides for SAR Testing Open**

Device Sides/Edges for SAR Testing						
Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850	Yes	Yes	No	Yes	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	Yes	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	Yes
LTE Band 12	Yes	Yes	No	Yes	Yes	Yes
LTE Band 13	Yes	Yes	No	Yes	Yes	Yes
LTE Band 5 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 4 (AWS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 41	Yes	Yes	No	Yes	No	Yes
2.4 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
2.4 GHz WLAN MIMO	Yes	Yes	Yes	No	Yes	Yes
5 GHz WLAN Ant 1	Yes	Yes	Yes	No	Yes	No
5 GHZ WLAN MIMO	Yes	Yes	Yes	No	Yes	Yes
Bluetooth Ant 1	Yes	Yes	Yes	No	Yes	No
Bluetooth Ant 2	Yes	Yes	Yes	No	No	Yes

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**Table 1-2
Device Edges/Sides for SAR Testing Closed**

Device Sides/Edges for SAR Testing						
Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850	Yes	Yes	No	Yes	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	Yes	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	Yes
LTE Band 12	Yes	Yes	No	Yes	Yes	Yes
LTE Band 13	Yes	Yes	No	Yes	Yes	Yes
LTE Band 5 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 4 (AWS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 41	Yes	Yes	No	Yes	No	Yes
2.4 GHz WLAN Ant 2	Yes	Yes	No	Yes	No	Yes
2.4 GHz WLAN MIMO	Yes	Yes	No	Yes	Yes	Yes
5 GHz WLAN Ant 1	Yes	Yes	No	Yes	Yes	No
5 GHZ WLAN MIMO	Yes	Yes	No	Yes	Yes	Yes
Bluetooth Ant 1	Yes	Yes	No	Yes	Yes	No
Bluetooth Ant 2	Yes	Yes	No	Yes	No	Yes

Note: Particular DUT edges were not required to be evaluated for wireless router SAR or phablet SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v02r01 Section III and FCC KDB Publication 648474 D04v01r03. The distances between the transmit antennas and the edges of the device are included in the filing. When wireless router mode is enabled, U-NII-1, U-NII-2A, U-NII-2C operations are disabled.

1.5 Near Field Communications (NFC) Antenna

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

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1.6 Simultaneous Transmission Capabilities




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

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

**Table 1-3
Simultaneous Transmission Scenarios**

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Phablet	Notes
1	GSM voice + 5 GHz WLAN Ant 1	Yes	Yes	N/A	Yes	
2	GSM voice + 2.4 GHz Bluetooth Ant 1	Yes [^]	Yes	N/A	Yes	[^] Bluetooth Tethering is considered
3	GSM voice + 2.4 GHz Bluetooth Ant 2	Yes [^]	Yes	N/A	Yes	[^] Bluetooth Tethering is considered
4	GSM voice + 2.4 GHz WLAN MIMO	Yes	Yes	N/A	Yes	
5	GSM voice + 5 GHz WLAN MIMO	Yes	Yes	N/A	Yes	
6	GSM voice + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	Yes	Yes	N/A	Yes	
7	GSM voice + 2.4 GHz Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2	Yes [^]	Yes	N/A	Yes	[^] Bluetooth Tethering is considered
8	GSM voice + 2.4 GHz Bluetooth Ant 1 + 5 GHz WLAN MIMO	Yes [^]	Yes	N/A	Yes	[^] Bluetooth Tethering is considered
9	GSM voice + 2.4 GHz Bluetooth Ant 2 + 5 GHz WLAN MIMO	Yes [^]	Yes	N/A	Yes	[^] Bluetooth Tethering is considered
10	GSM voice + 2.4 GHz Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN MIMO	Yes [^]	Yes	N/A	Yes	[^] Bluetooth Tethering is considered
11	GSM voice + 2.4 GHz Bluetooth Ant 1 + 5 GHz WLAN Ant 1	Yes [^]	Yes	N/A	Yes	[^] Bluetooth Tethering is considered
12	GSM voice + 2.4 GHz Bluetooth Ant 2 + 5 GHz WLAN Ant 1	Yes [^]	Yes	N/A	Yes	[^] Bluetooth Tethering is considered
13	GSM voice + 2.4 GHz Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1	Yes [^]	Yes	N/A	Yes	[^] Bluetooth Tethering is considered
14	UMTS + 5 GHz WLAN Ant 1	Yes	Yes	Yes	Yes	
15	UMTS + 2.4 GHz Bluetooth Ant 1	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
16	UMTS + 2.4 GHz Bluetooth Ant 2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
17	UMTS + 2.4 GHz WLAN MIMO	Yes	Yes	Yes	Yes	
18	UMTS + 5 GHz WLAN MIMO	Yes	Yes	Yes	Yes	
19	UMTS + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	Yes	Yes	Yes	Yes	
20	UMTS + 2.4 GHz Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
21	UMTS + 2.4 GHz Bluetooth Ant 1 + 5 GHz WLAN MIMO	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
22	UMTS + 2.4 GHz Bluetooth Ant 2 + 5 GHz WLAN MIMO	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
23	UMTS + 2.4 GHz Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN MIMO	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
24	UMTS + 2.4 GHz Bluetooth Ant 1 + 5 GHz WLAN Ant 1	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
25	UMTS + 2.4 GHz Bluetooth Ant 2 + 5 GHz WLAN Ant 1	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
26	UMTS + 2.4 GHz Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
27	LTE + 5 GHz WLAN Ant 1	Yes	Yes	Yes	Yes	
28	LTE + 2.4 GHz Bluetooth Ant 1	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
29	LTE + 2.4 GHz Bluetooth Ant 2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
30	LTE + 2.4 GHz WLAN MIMO	Yes	Yes	Yes	Yes	
31	LTE + 5 GHz WLAN MIMO	Yes	Yes	Yes	Yes	
32	LTE + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	Yes	Yes	Yes	Yes	
33	LTE + 2.4 GHz Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
34	LTE + 2.4 GHz Bluetooth Ant 1 + 5 GHz WLAN MIMO	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
35	LTE + 2.4 GHz Bluetooth Ant 2 + 5 GHz WLAN MIMO	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
36	LTE + 2.4 GHz Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN MIMO	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
37	LTE + 2.4 GHz Bluetooth Ant 1 + 5 GHz WLAN Ant 1	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
38	LTE + 2.4 GHz Bluetooth Ant 2 + 5 GHz WLAN Ant 1	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
39	LTE + 2.4 GHz Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1	Yes [^]	Yes	Yes [^]	Yes	[^] Bluetooth Tethering is considered
40	GPRS/EDGE + 5 GHz WLAN Ant 1	N/A	N/A	Yes	Yes	
41	GPRS/EDGE + 2.4 GHz Bluetooth Ant 1	N/A	N/A	Yes [^]	Yes	[^] Bluetooth Tethering is considered
42	GPRS/EDGE + 2.4 GHz Bluetooth Ant 2	N/A	N/A	Yes [^]	Yes	[^] Bluetooth Tethering is considered
43	GPRS/EDGE + 2.4 GHz WLAN MIMO	N/A	N/A	Yes	Yes	
44	GPRS/EDGE + 5 GHz WLAN MIMO	N/A	N/A	Yes	Yes	
45	GPRS/EDGE + 2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	N/A	N/A	Yes	Yes	
46	GPRS/EDGE + 2.4 GHz Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2	N/A	N/A	Yes [^]	Yes	[^] Bluetooth Tethering is considered
47	GPRS/EDGE + 2.4 GHz Bluetooth Ant 1 + 5 GHz WLAN MIMO	N/A	N/A	Yes [^]	Yes	[^] Bluetooth Tethering is considered
48	GPRS/EDGE + 2.4 GHz Bluetooth Ant 2 + 5 GHz WLAN MIMO	N/A	N/A	Yes [^]	Yes	[^] Bluetooth Tethering is considered
49	GPRS/EDGE + 2.4 GHz Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN MIMO	N/A	N/A	Yes [^]	Yes	[^] Bluetooth Tethering is considered
50	GPRS/EDGE + 2.4 GHz Bluetooth Ant 1 + 5 GHz WLAN Ant 1	N/A	N/A	Yes [^]	Yes	[^] Bluetooth Tethering is considered
51	GPRS/EDGE + 2.4 GHz Bluetooth Ant 2 + 5 GHz WLAN Ant 1	N/A	N/A	Yes [^]	Yes	[^] Bluetooth Tethering is considered
52	GPRS/EDGE + 2.4 GHz Bluetooth Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1	N/A	N/A	Yes [^]	Yes	[^] Bluetooth Tethering is considered

1. All licensed modes share the same antenna path and cannot transmit simultaneously.
2. When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.

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3. Per the manufacturer, WIFI Direct is not expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Therefore, there are no simultaneous transmission scenarios involving WIFI direct beyond that listed in the above table.
4. 5 GHz Wireless Router is only supported for the U-NII-3 by S/W, therefore U-NII-1, U-NII2A, and U-NII2C were not evaluated for wireless router conditions.
5. This device supports 2x2 MIMO Tx for WLAN 802.11b/a/g/n/ac/ax. 802.11 b/a/g/n/ac/ax supports CDD and STBC and 802.11n/ac/ax additionally supports SDM. 2.4 GHz WLAN antenna can transmit independently or together when operating with MIMO.
6. This device supports VoWIFI.
7. This device supports Bluetooth Tethering.
8. This device supports VoLTE.

1.7 Miscellaneous SAR Test Considerations

When on the device dimensions when closed, hotspot SAR in the closed configuration was performed at 5mm per KDB Publication 941225 D06v02r01.

(A) WIFI/BT

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

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




This device supports IEEE 802.11ax with the following features:

- a) Up to 80 MHz Bandwidth only for 5 GHz
- b) Up to 20 MHz Bandwidth only for 2.4 GHz
- c) No aggregate channel configurations
- d) 2 Tx antenna output
- e) Up to 1024 QAM is supported
- f) TDWR and Band gap channels are supported for 5 GHz
- g) MU-MIMO UL Operations are not supported

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

Per April 2019 TCB Workshop Notes, SAR testing was not required for 802.11ax when applying the initial test configuration procedures of KDB 248227, with 802.11ax considered a higher order 802.11 mode.

This device supports channel 1-13 for 2.4 GHz WLAN. However, because channel 12/13 targets are not higher than that of channels 1-11, default channels for SAR testing are determined per FCC KDB 248227 D01v02r02.

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(B) Licensed Transmitter(s)

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




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

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

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

Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg.

This device supports downlink 4x4 MIMO operations for some LTE Bands. Per May 2017 TCB Workshop Notes, SAR for 4x4 DL MIMO was not needed since the maximum average output power in 4x4 DL MIMO mode was not more than 0.25 dB higher than the maximum output power with 4x4 DL MIMO inactive. Additionally, SAR for 4x4 MIMO Downlink Carrier Aggregation was not needed since the maximum average output power in 4x4 MIMO Downlink Carrier Aggregation mode was not more than 0.25 dB higher than the maximum output power with 4x4 MIMO Downlink and downlink carrier aggregation inactive.




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1.8 Guidance Applied

- IEC/IEEE 62209-1528
- FCC KDB Publication 941225 D01v03r01, D05v02r04, D05Av01r02, D06v02r01 (2G/3G/4G and Hotspot)
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v06 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 648474 D04v01r03 (Phablet Procedures)
- FCC KDB Publication 616217 D04v01r02 (Proximity Sensor)
- October 2013 TCB Workshop Notes (GPRS Testing Considerations)
- May 2017 TCB Workshop Notes (LTE 4x4 Downlink MIMO, LTE Band 41 Power Class 3)
- April 2018 TCB Workshop Notes (LTE Carrier Aggregation)

1.9 Device Serial Numbers




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

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2

LTE INFORMATION

LTE Information					
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 13 (779.5 - 784.5 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)				
	LTE Band 41 (2498.5 - 2687.5 MHz)				
Channel Bandwidths	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 13: 5 MHz, 10 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 12: 1.4 MHz	699.7 (23017)		707.5 (23095)		715.3 (23173)
LTE Band 12: 3 MHz	700.5 (23025)		707.5 (23095)		714.5 (23165)
LTE Band 12: 5 MHz	701.5 (23035)		707.5 (23095)		713.5 (23155)
LTE Band 12: 10 MHz	704 (23060)		707.5 (23095)		711 (23130)
LTE Band 13: 5 MHz	779.5 (23205)		782 (23230)		784.5 (23255)
LTE Band 13: 10 MHz	N/A		782 (23230)		N/A
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)		836.5 (20525)		848.3 (20643)
LTE Band 5 (Cell): 3 MHz	825.5 (20415)		836.5 (20525)		847.5 (20635)
LTE Band 5 (Cell): 5 MHz	826.5 (20425)		836.5 (20525)		846.5 (20625)
LTE Band 5 (Cell): 10 MHz	829 (20450)		836.5 (20525)		844 (20600)
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)		1732.5 (20175)		1754.3 (20393)
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)		1732.5 (20175)		1753.5 (20385)
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)		1732.5 (20175)		1752.5 (20375)
LTE Band 4 (AWS): 10 MHz	1715 (20000)		1732.5 (20175)		1750 (20350)
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)		1732.5 (20175)		1747.5 (20325)
LTE Band 4 (AWS): 20 MHz	1720 (20050)		1732.5 (20175)		1745 (20300)
LTE Band 41: 5 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 10 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 15 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
UE Category	DL UE Cat 20, UL UE Cat 13				
Modulations Supported in UL	QPSK, 16QAM, 64QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3-6.2.5? (manufacturer attestation to be provided)	YES				
A-MPR (Additional MPR) disabled for SAR Testing?	YES				
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations				
LTE Additional Information	This device does not support full CA features on 3GPP Release 15. It supports carrier aggregation and downlink MIMO featured as shown in Appendix H. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 15 Features are not supported: Relay, HetNet, Enhanced MIMO, eICIC, WIFI Offloading, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

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

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

3.1 SAR Definition

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

Equation 3-1
SAR Mathematical Equation

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




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

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

where:

- σ = conductivity of the tissue-simulating material (S/m)
- ρ = mass density of the tissue-simulating material (kg/m³)
- 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]

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4 DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

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

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):
 - a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
 - b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
 - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

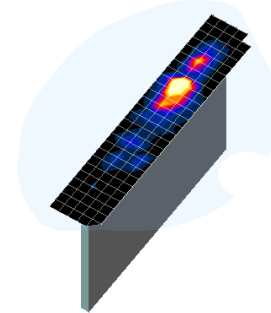





Figure 4-1 point
Sample SAR Area Scan was

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

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

*Also compliant to IEEE 1528-2013 Table 6

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5

DEFINITION OF REFERENCE POINTS

5.1 EAR REFERENCE POINT

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

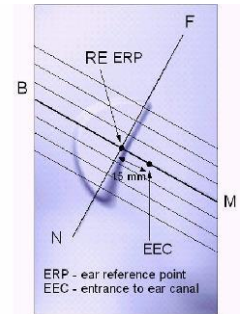


Figure 5-1
Close-Up Side view of ERP

5.2 HANDSET REFERENCE POINTS

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



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

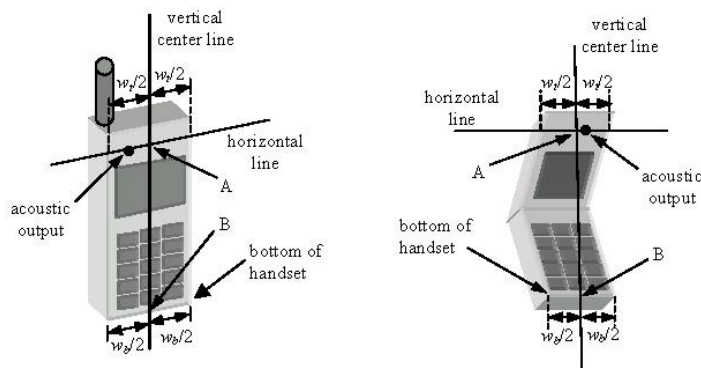





Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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6 TEST CONFIGURATION POSITIONS

6.1 Device Holder

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

6.2 Positioning for Cheek

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

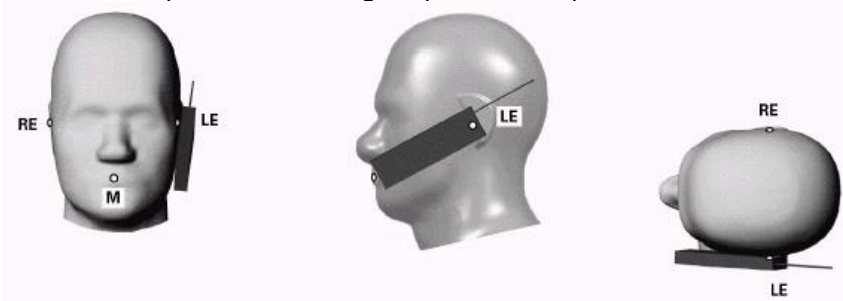





Figure 6-1 Front, Side and Top View of Cheek Position

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the pinna.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the reference plane.
4. The phone was then rotated around the vertical centerline until the phone (horizontal line) was symmetrical with 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 / 15° 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 15 degrees.
2. The phone was then rotated around the horizontal line by 15 degrees.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the handset touched the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. In this situation, the tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 6-2).

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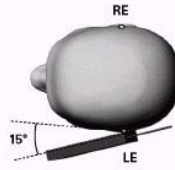
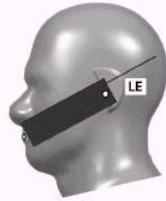
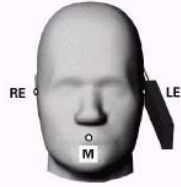


Figure 6-2 Front, Side and Top View of Ear/15° Tilt Position

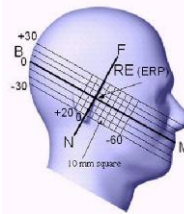


Figure 6-3 Side view w/ relevant markings

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

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

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

6.5 Body-Worn Accessory Configurations

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

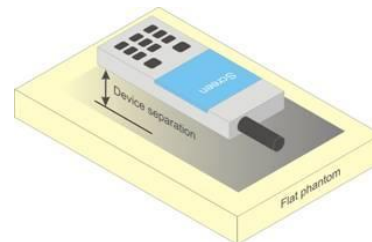


Figure 6-4 Sample Body-Worn Diagram

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

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

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

6.6 Extremity Exposure Configurations



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

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

6.7 Wireless Router Configurations

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

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

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6.8 Phablet Configurations




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

6.9 Proximity Sensor Considerations

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

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

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

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

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

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

8.1 Measured and Reported SAR

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

8.2 3G SAR Test Reduction Procedure

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

8.3 Procedures Used to Establish RF Signal for SAR




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

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

8.4 SAR Measurement Conditions for UMTS

8.4.1 Output Power Verification

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

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8.4.2 Head SAR Measurements

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

8.4.3 Body SAR Measurements

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

8.4.4 SAR Measurements with Rel 5 HSDPA

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

8.4.5 SAR Measurements with Rel 6 HSUPA

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

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

8.5 SAR Measurement Conditions for LTE




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

8.5.1 Spectrum Plots for RB Configurations

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

8.5.2 MPR

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

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8.5.3 A-MPR

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




8.5.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r04:

- a. Per Section 5.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
 - i. The required channel and offset combination with the highest maximum output power is required for SAR.
 - ii. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
 - iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
- b. Per Section 5.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 5.2.1.
- c. Per Section 5.2.3, QPSK SAR is not required for the 100% allocation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
- d. Per Section 5.2.4 and 5.3, SAR tests for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sections 5.2.1 through 5.2.3 is less than or equal to $\frac{1}{2}$ dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is < 1.45 W/kg.

8.5.5 TDD

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

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8.5.6 Downlink Only Carrier Aggregation

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

8.6 SAR Testing with 802.11 Transmitters

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

8.6.1 General Device Setup

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




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

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

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

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

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

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8.6.4 Initial Test Position Procedure

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

8.6.5 2.4 GHz SAR Test Requirements




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

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

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

8.6.6 OFDM Transmission Mode and SAR Test Channel Selection

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

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8.6.7 Initial Test Configuration Procedure

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



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

8.6.8 Subsequent Test Configuration Procedures

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

8.6.9 MIMO SAR considerations

Per KDB Publication 248227 D01v02r02, the simultaneous SAR provisions in KDB Publication 447498 D01v06 should be applied to determine simultaneous transmission SAR test exclusion for WIFI MIMO. If the sum of 1g single transmission chain SAR measurements is < 1.6 W/kg, no additional SAR measurements for MIMO are required. Alternatively, SAR for MIMO can be measured with all antennas transmitting simultaneously at the specified maximum output power of MIMO operation. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

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9.1 GSM Conducted Powers

Table 9-1
Maximum Conducted Power

Maximum Burst-Averaged Output Power										
Band	Channel	Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
		GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 850	128	32.70	32.68	31.88	29.49	27.75	27.05	25.41	23.47	22.40
	190	32.62	32.62	31.72	29.57	27.48	26.91	25.44	23.33	22.14
	251	32.12	32.19	31.53	29.39	27.22	26.74	25.05	23.02	22.04
GSM 1900	512	28.86	28.84	27.77	26.36	24.29	24.54	23.68	21.53	20.63
	661	28.90	28.97	27.94	26.32	24.36	24.81	23.91	21.68	20.68
	810	28.68	28.71	27.67	25.79	23.99	24.52	23.48	21.44	20.50

Calculated Maximum Frame-Averaged Output Power										
Band	Channel	Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
		GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 850	128	23.50	23.48	25.69	25.06	24.57	17.85	19.22	19.04	19.22
	190	23.42	23.42	25.53	25.14	24.30	17.71	19.25	18.90	18.96
	251	22.92	22.99	25.34	24.96	24.04	17.54	18.86	18.59	18.86
GSM 1900	512	19.66	19.64	21.58	21.93	21.11	15.34	17.49	17.10	17.45
	661	19.70	19.77	21.75	21.89	21.18	15.61	17.72	17.25	17.50
	810	19.48	19.51	21.48	21.36	20.81	15.32	17.29	17.01	17.32

GSM 850	Frame Avg.Targets:	22.80	22.80	24.81	24.57	23.82	17.30	18.31	18.07	18.32
GSM 1900		19.80	19.80	21.31	21.07	20.32	16.30	16.81	16.57	16.82



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**Table 9-2
Reduced Conducted Powers- Hotspot Mode Active**

Maximum Burst-Averaged Output Power									
Band	Channel	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
		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	31.41	30.65	29.00	26.81	26.76	24.50	22.50	21.49
	190	31.43	30.45	28.12	26.82	26.52	24.40	22.50	21.50
	251	31.44	30.61	28.80	26.52	26.40	24.03	22.30	21.20
GSM 1900	512	23.44	22.31	20.82	18.90	20.20	18.43	16.60	15.62
	661	23.76	22.62	21.02	19.20	21.00	18.74	17.00	15.98
	810	23.66	22.72	20.98	18.99	20.99	18.63	16.99	16.00

Calculated Maximum Frame-Averaged Output Power									
Band	Channel	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
		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	22.21	24.46	24.57	23.63	17.56	18.31	18.07	18.31
	190	22.23	24.26	23.69	23.64	17.32	18.21	18.07	18.32
	251	22.24	24.42	24.37	23.34	17.20	17.84	17.87	18.02
GSM 1900	512	14.24	16.12	16.39	15.72	11.00	12.24	12.17	12.44
	661	14.56	16.43	16.59	16.02	11.80	12.55	12.57	12.80
	810	14.46	16.53	16.55	15.81	11.79	12.44	12.56	12.82

GSM 850	Frame Avg.Targets:	21.80	23.81	23.57	22.82	16.80	17.31	17.07	17.32
GSM 1900		14.80	16.31	16.07	15.32	11.80	12.31	11.57	11.82



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**Table 9-3
Reduced Conducted Powers- Grip Sensor or Earjack Mode Active**

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 1900	512	25.50	25.68	24.53	22.88	21.06	22.35	20.45	18.52	17.41
	661	26.04	25.92	24.56	22.72	20.95	23.44	21.36	18.95	17.75
	810	25.94	25.44	24.41	22.73	20.58	23.35	21.28	18.97	17.70

Calculated Maximum Frame-Averaged Output Power										
Band	Channel	Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
		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 1900	512	16.30	16.48	18.34	18.45	17.88	13.15	14.26	14.09	14.23
	661	16.84	16.72	18.37	18.29	17.77	14.24	15.17	14.52	14.57
	810	16.74	16.24	18.22	18.30	17.40	14.15	15.09	14.54	14.52

GSM 1900	Frame Avg.Targets:	16.80	16.80	18.31	18.07	17.32	13.80	14.31	13.57	13.82
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Note:

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

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

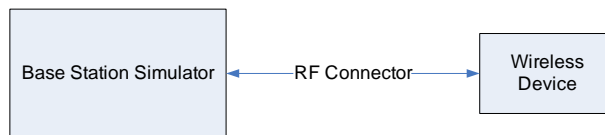







Figure 9-1
Power Measurement Setup

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9.2 UMTS Conducted Powers

Table 9-4
Maximum Conducted Power

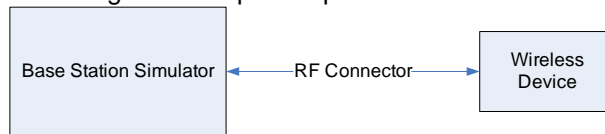
3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	
99	WCDMA	12.2 kbps RMC	24.27	24.23	24.00	-
99		12.2 kbps AMR	24.25	24.25	24.03	-
6	HSDPA	Subtest 1	23.42	23.40	23.17	0
6		Subtest 2	23.39	23.38	23.14	0
6		Subtest 3	22.88	22.89	22.65	0.5
6		Subtest 4	22.89	22.88	22.64	0.5
6	HSUPA	Subtest 1	23.37	23.38	23.15	0
6		Subtest 2	21.38	21.37	21.15	2
6		Subtest 3	22.38	22.37	22.15	1
6		Subtest 4	21.39	21.37	21.14	2
6		Subtest 5	23.39	23.37	23.15	0

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**Table 9-5
Reduced Conducted Powers- Hotspot Mode Active**

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	
99	WCDMA	12.2 kbps RMC	23.73	23.53	23.32	-
99		12.2 kbps AMR	23.70	23.56	23.32	-
6	HSDPA	Subtest 1	22.07	21.89	21.62	0
6		Subtest 2	22.08	21.92	21.63	0
6		Subtest 3	21.59	21.43	21.13	0.5
6		Subtest 4	21.58	21.41	21.16	0.5
6	HSUPA	Subtest 1	22.89	22.72	22.44	0
6		Subtest 2	20.89	20.71	20.44	2
6		Subtest 3	21.87	21.70	21.43	1
6		Subtest 4	20.88	20.72	20.44	2
6		Subtest 5	22.89	22.72	22.45	0

It is expected by the manufacturer that MPR for some HSPA subtests may be up to 2 dB more than specified by 3GPP, but also as low as 0 dB according to the chipset implementation in this model.



**Figure 9-2
Power Measurement Setup**

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9.3 LTE Conducted Powers




Note: Per FCC KDB Publication 941225 D05v02r05, LTE SAR for the lower bandwidths was not required for testing since the maximum average output power of all required channels and configurations was not more than 0.5 dB higher than the highest bandwidth and the reported LTE SAR for the highest bandwidth was less than 1.45 W/kg. Lower bandwidth conducted powers for all LTE bands can be found in Appendix F.

9.3.1 LTE Band 12

**Table 9-6
LTE Band 12 Maximum Conducted Powers - 10 MHz Bandwidth**

LTE Band 12 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23095 (707.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	23.29	0	0
	1	25	23.28		0
	1	49	23.27		0
	25	0	22.40	0-1	1
	25	12	22.38		1
	25	25	22.30		1
	50	0	22.27		1
16QAM	1	0	22.34	0-1	1
	1	25	22.40		1
	1	49	22.48		1
	25	0	21.41	0-2	2
	25	12	21.48		2
	25	25	21.38		2
	50	0	21.34		2
64QAM	1	0	21.44	0-2	2
	1	25	21.72		2
	1	49	21.46		2
	25	0	20.35	0-3	3
	25	12	20.45		3
	25	25	20.40		3
	50	0	20.29		3



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

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9.3.2 LTE Band 13

**Table 9-7
LTE Band 13 Maximum Conducted Powers - 10 MHz Bandwidth**

LTE Band 13 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23230 (782.0 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	23.18	0	0
	1	25	23.02		0
	1	49	23.15		0
	25	0	22.30	0-1	1
	25	12	22.36		1
	25	25	22.37		1
	50	0	22.29		1
16QAM	1	0	22.09	0-1	1
	1	25	22.05		1
	1	49	22.07		1
	25	0	21.43	0-2	2
	25	12	21.53		2
	25	25	21.46		2
	50	0	21.40		2
64QAM	1	0	21.42	0-2	2
	1	25	21.58		2
	1	49	21.53		2
	25	0	20.34	0-3	3
	25	12	20.47		3
	25	25	20.46		3
	50	0	20.26		3




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9.3.3 LTE Band 5

Table 9-8
LTE Band 5 (Cell) Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 5 (Cell) 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20525 (836.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	25.08	0	0
	1	25	25.11		0
	1	49	25.06		0
	25	0	24.16	0-1	1
	25	12	24.23		1
	25	25	24.20		1
	50	0	24.17		1
16QAM	1	0	24.57	0-1	1
	1	25	24.59		1
	1	49	24.53		1
	25	0	23.23	0-2	2
	25	12	23.32		2
	25	25	23.25		2
	50	0	23.16		2
64QAM	1	0	23.12	0-2	2
	1	25	23.18		2
	1	49	23.10		2
	25	0	22.25	0-3	3
	25	12	22.36		3
	25	25	22.29		3
	50	0	22.18		3



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

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**Table 9-9
LTE Band 5 (Cell) Reduced Conducted Powers- Hotspot Mode Active - 10 MHz Bandwidth**

LTE Band 5 (Cell) 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20525 (836.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	23.14	0	0
	1	25	23.09		0
	1	49	23.13		0
	25	0	23.15	0-1	0
	25	12	23.04		0
	25	25	23.17		0
	50	0	23.10		0
16QAM	1	0	23.62	0-1	0
	1	25	23.45		0
	1	49	23.46		0
	25	0	22.98	0-2	0.3
	25	12	22.88		0.3
	25	25	22.96		0.3
	50	0	22.85		0.3
64QAM	1	0	23.09	0-2	0.3
	1	25	23.12		0.3
	1	49	23.08		0.3
	25	0	22.00	0-3	1.3
	25	12	21.99		1.3
	25	25	21.96		1.3
	50	0	21.91		1.3

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



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9.3.4 LTE Band 4

Table 9-10
LTE Band 4 (AWS) Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 4 (AWS) 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20175 (1732.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	22.91	0	0
	1	50	23.12		0
	1	99	22.82		0
	50	0	22.15	0-1	1
	50	25	22.29		1
	50	50	22.04		1
	100	0	22.10		1
16QAM	1	0	22.43	0-1	1
	1	50	22.60		1
	1	99	22.43		1
	50	0	21.16	0-2	2
	50	25	21.26		2
	50	50	21.08		2
	100	0	21.14		2
64QAM	1	0	21.32	0-2	2
	1	50	21.53		2
	1	99	21.21		2
	50	0	20.27	0-3	3
	50	25	20.32		3
	50	50	20.18		3
	100	0	20.14		3

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

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**Table 9-11
LTE Band 4 (AWS) Reduced Conducted Powers - Hotspot Mode Active - 20 MHz Bandwidth**

LTE Band 4 (AWS) 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20175 (1732.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	18.52	0	0
	1	50	18.19		0
	1	99	18.02		0
	50	0	18.37	0-1	0
	50	25	18.51		0
	50	50	18.62		0
	100	0	18.51		0
16QAM	1	0	18.54	0-1	0
	1	50	18.74		0
	1	99	18.74		0
	50	0	18.41	0-2	0
	50	25	18.47		0
	50	50	18.57		0
	100	0	18.56		0
64QAM	1	0	18.46	0-2	0
	1	50	18.63		0
	1	99	18.52		0
	50	0	18.49	0-3	0
	50	25	18.51		0
	50	50	18.54		0
	100	0	18.29		0

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






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Table 9-12
LTE Band 4 (AWS) Reduced Conducted Powers - Grip Sensor and/or Earjack Mode Active - 20 MHz Bandwidth

LTE Band 4 (AWS) 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20175 (1732.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	19.95	0	0
	1	50	19.99		0
	1	99	19.60		0
	50	0	20.00	0-1	0
	50	25	20.10		0
	50	50	20.01		0
	100	0	19.97		0
16QAM	1	0	19.98	0-1	0
	1	50	20.39		0
	1	99	20.09		0
	50	0	20.07	0-2	0
	50	25	20.19		0
	50	50	20.03		0
	100	0	20.02		0
64QAM	1	0	20.02	0-2	0
	1	50	20.28		0
	1	99	20.06		0
	50	0	20.00	0-3	0
	50	25	20.21		0
	50	50	20.06		0
	100	0	20.04		0

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

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9.3.5 LTE Band 41

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

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.73	24.19	23.85	24.26	24.36	0	0
	1	50	23.83	24.13	24.26	24.54	24.86		0
	1	99	24.00	24.13	24.10	24.16	24.74		0
	50	0	22.73	23.17	23.19	23.49	23.71	0-1	1
	50	25	22.95	23.24	23.36	23.59	23.87		1
	50	50	22.96	23.13	23.34	23.54	23.94		1
16QAM	100	0	22.86	23.14	23.27	23.49	23.78	0-1	1
	1	0	22.90	23.37	23.36	23.41	23.45		1
	1	50	22.97	23.23	23.37	23.74	23.96		1
	1	99	23.10	23.29	23.41	23.31	23.85	0-2	1
	50	0	21.76	22.17	22.24	22.58	22.72		2
	50	25	21.95	22.29	22.39	22.67	22.87		2
64QAM	50	50	21.98	22.19	22.38	22.61	22.96	0-2	2
	100	0	21.88	22.21	22.28	22.54	22.80		2
	1	0	21.77	22.27	21.86	22.26	22.33		0-2
	1	50	21.90	22.23	22.31	22.64	22.91	2	
	1	99	22.02	22.22	22.07	22.28	22.78	2	
	64QAM	50	0	20.81	21.28	21.26	21.64	21.79	0-3
50		25	21.03	21.36	21.43	21.73	21.97	3	
50		50	21.04	21.23	21.39	21.66	21.98	3	
100		0	20.91	21.22	21.31	21.57	21.83	3	






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Table 9-14
LTE Band 41 Reduced Conducted Powers - Hotspot Mode Active - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth											
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]		
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)				
Conducted Power [dBm]											
QPSK	1	0	18.20	18.87	18.38	18.86	18.89	0	0		
	1	50	18.13	18.89	18.68	19.14	19.42		0		
	1	99	18.35	18.82	18.37	18.81	19.38		0		
	16QAM	50	0	18.28	18.94	18.71	19.16	19.31	0-1	0	
		50	25	18.37	18.96	18.77	19.23	19.44		0	
		50	50	18.37	18.86	18.80	19.12	19.46		0	
64QAM		100	0	18.32	18.92	18.77	19.16	19.34	0-1	0	
		1	0	18.45	18.62	18.45	18.96	18.87		0	
		1	50	18.33	18.63	18.80	19.28	19.45		0	
	64QAM	1	99	18.45	18.60	18.57	18.80	19.24	0-2	0	
		50	0	18.26	18.81	18.72	19.15	19.32		0	
		50	25	18.40	18.89	18.86	19.21	19.41		0	
64QAM		50	50	18.35	18.74	18.79	19.20	19.46	0-2	0	
		100	0	18.35	18.84	18.80	19.04	19.46		0	
		1	0	18.06	18.64	18.18	18.53	18.79		0-3	0
	64QAM	1	50	18.10	18.52	18.45	18.93	19.13	0-3		0
		1	99	18.11	18.53	18.21	18.46	19.04			0
		50	0	18.34	18.84	18.81	19.21	19.44		0	
64QAM		50	25	18.49	18.94	18.88	19.27	19.50	0-3	0	
		50	50	18.45	18.86	18.86	19.19	19.50		0	
		100	0	18.40	18.88	18.83	19.07	19.45		0	

Table 9-15
LTE Band 41 Reduced Conducted Powers - Grip Sensor and/or Earjack Mode Active - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth											
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]		
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)				
Conducted Power [dBm]											
QPSK	1	0	20.67	21.43	21.02	21.24	21.40	0	0		
	1	50	20.76	21.42	21.26	21.38	21.34		0		
	1	99	21.00	21.36	20.98	20.87	21.20		0		
	16QAM	50	0	20.71	21.49	21.31	21.43	21.25	0-1	0	
		50	25	20.90	21.58	21.42	21.44	21.44		0	
		50	50	20.92	21.41	21.37	21.30	21.49		0	
16QAM		100	0	20.80	21.40	21.32	21.34	21.35	0-1	0	
		1	0	20.89	21.56	21.00	21.31	20.92		0	
		1	50	20.86	21.43	21.31	21.44	21.43		0	
	64QAM	1	99	20.97	21.48	21.04	20.80	21.29	0-2	0	
		50	0	20.73	21.49	21.34	21.46	21.32		0	
		50	25	20.94	21.58	21.43	21.44	21.45		0	
64QAM		50	50	20.96	21.43	21.36	21.31	21.50	0-2	0	
		100	0	20.87	21.47	21.34	21.37	21.40		0	
		1	0	20.44	21.30	20.77	21.01	20.68		0-3	0
	64QAM	1	50	20.57	21.20	21.07	21.14	21.15	0-3		0
		1	99	20.72	21.13	20.76	20.62	20.99			0
		50	0	20.75	21.56	21.38	21.52	21.38		0	
64QAM		50	25	20.96	21.64	21.49	21.53	21.51	0-3	0	
		50	50	21.00	21.47	21.42	21.39	21.55		0	
		100	0	20.87	21.46	21.34	21.39	21.40		0	

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9.3.6 LTE Band 41 LTE Uplink Carrier Aggregation Conducted Powers

Table 9-16
LTE Uplink Carrier Aggregation Maximum Conducted Powers - 20 MHz Bandwidth

PCC							SCC							Power	
PCC Band	PCC Bandwidth [MHz]	PCC (UL/DL) Channel	PCC (UL/DL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL/DL) Channel	SCC (UL/DL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
LTE B41	20	41490	2680.0	QPSK	1	0	LTE B41	20	41292	2660.2	QPSK	1	99	24.69	24.36

Table 9-17
LTE Uplink Carrier Aggregation Reduced Conducted Powers - Hotspot Mode Active - 20 MHz Bandwidth




PCC							SCC							Power	
PCC Band	PCC Bandwidth [MHz]	PCC (UL/DL) Channel	PCC (UL/DL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL/DL) Channel	SCC (UL/DL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
LTE B41	20	40620	2593.0	QPSK	1	0	LTE B41	20	40422	2573.2	QPSK	1	99	18.65	18.38

Table 9-18
LTE Uplink Carrier Aggregation Reduced Conducted Powers - Grip Sensor and/or Earjack Mode Active - 20 MHz Bandwidth

PCC							SCC							Power	
PCC Band	PCC Bandwidth [MHz]	PCC (UL/DL) Channel	PCC (UL/DL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL/DL) Channel	SCC (UL/DL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
LTE B41	20	40185	2549.5	QPSK	1	0	LTE B41	20	39987	2529.7	QPSK	1	99	21.59	21.43



Figure 9-3
Power Measurement Setup

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9.4 WLAN Conducted Powers

Table 9-19
2.4 GHz WLAN Maximum Average RF Power – Ant 2

2.4GHz Conducted Power [dBm]					
Freq [MHz]	Channel	IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ax
		Average	Average	Average	Average
2412	1	18.23	17.67	17.81	17.36
2437	6	18.40	17.78	17.39	17.34
2462	11	18.37	17.38	17.56	17.89

Table 9-20
2.4 GHz WLAN Maximum Average RF Power – MIMO

2.4GHz 802.11b Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
2412	1	18.49	18.23	21.37
2437	6	18.06	18.40	21.24
2462	11	18.21	18.37	21.30

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**Table 9-21
5 GHz WLAN Maximum Average RF Power – Ant 1**

5GHz (20MHz) Conducted Power [dBm]					
Freq [MHz]	Channel	IEEE Transmission Mode			
		802.11a	802.11n	802.11ac	802.11ax
		Average	Average	Average	Average
5180	36	16.12	15.16	15.47	15.32
5200	40	17.60	17.44	17.56	17.87
5220	44	17.54	17.72	17.74	17.66
5240	48	17.36	17.21	17.34	17.67
5260	52	17.45	17.33	17.35	17.72
5280	56	17.47	17.32	17.47	17.55
5300	60	17.66	17.54	17.43	17.42
5320	64	17.49	16.23	16.56	16.32
5500	100	17.83	16.74	16.88	16.87
5600	120	17.92	17.82	17.82	17.92
5620	124	17.77	17.77	17.62	17.99
5720	144	17.78	17.52	17.77	17.64
5745	149	17.87	17.89	17.92	17.99
5785	157	17.59	17.52	17.55	17.84
5825	165	17.86	17.66	17.74	17.82




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Table 9-22
5 GHz WLAN Maximum Average RF Power – MIMO

5GHz (20MHz) 802.11n Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
5180	36	15.16	15.17	18.18
5200	40	17.44	17.88	20.68
5220	44	17.72	17.97	20.86
5240	48	17.21	17.97	20.62
5260	52	17.33	17.90	20.63
5280	56	17.32	17.88	20.62
5300	60	17.54	17.67	20.62
5320	64	16.23	16.95	19.62
5520	104	17.56	17.56	20.57
5600	120	17.82	17.87	20.86
5620	124	17.77	17.81	20.80
5720	144	17.52	17.36	20.45
5745	149	17.89	17.76	20.84
5785	157	17.52	17.52	20.53
5825	165	17.66	17.39	20.54




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Table 9-23

2.4 GHz WLAN Reduced Average RF Power for conditions with RCV active and/or RCV active During Conditions with 5 GHz WLAN – Ant 2

2.4GHz Conducted Power [dBm]					
Freq [MHz]	Channel	IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ax
		Average	Average	Average	Average
2412	1	12.64	12.43	12.84	12.54
2437	6	12.99	12.58	12.63	12.47
2462	11	12.85	12.49	12.77	12.89

Table 9-24

2.4 GHz WLAN Reduced Average RF Power for conditions with RCV active and/or RCV active During Conditions with 5 GHz WLAN – MIMO

2.4GHz 802.11n Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
2412	1	12.59	12.84	15.73
2437	6	12.65	12.63	15.65
2462	11	12.84	12.63	15.75

Table 9-25

5 GHz WLAN Reduced Average RF Power for Conditions with RCV active or RCV active During Conditions with 2.4 GHz WLAN– Ant 1

5GHz (80MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11ac	802.11ax
		Average	Average
5210	42	10.50	10.52
5290	58	10.69	10.29
5530	106	10.86	10.49
5610	122	10.59	10.97
5690	138	10.96	10.91
5775	155	10.85	10.71




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Table 9-26
5 GHz WLAN Reduced Average RF Power for Conditions with RCV active and/or RCV active During
Conditions with 2.4 GHz WLAN – MIMO

5GHz (80MHz) 802.11ac Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
5210	42	10.50	10.74	13.63
5290	58	10.69	10.95	13.83
5530	106	10.86	10.82	13.85
5610	122	10.59	10.76	13.69
5690	138	10.96	10.73	13.86
5775	155	10.85	10.67	13.77

Table 9-27
5 GHz WLAN Reduced Average RF Power during Conditions with 2.4 GHz WLAN – Ant 1

5GHz (40MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11n	802.11ac	802.11ax
		Average	Average	Average
5190	38	13.20	13.82	13.45
5230	46	14.53	14.76	14.68
5270	54	14.48	14.56	14.75
5310	62	14.43	14.44	14.65

5GHz (80MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11ac	802.11ax
		Average	Average
5530	106	14.75	14.89
5610	122	14.62	14.58
5690	138	14.74	14.63
5775	155	14.69	14.64



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Table 9-28
5 GHz WLAN Reduced Average RF Power during Conditions with 2.4 GHz WLAN – MIMO

5GHz (40MHz) 802.11n Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
5190	38	13.70	13.82	16.77
5230	46	14.47	14.80	17.65
5270	54	14.52	14.66	17.60
5310	62	14.39	14.45	17.43
5GHz (80MHz) 802.11ac Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
5530	106	14.23	14.69	17.48
5610	122	14.36	14.99	17.70
5690	138	14.36	14.67	17.53
5775	155	14.53	14.79	17.67

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

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

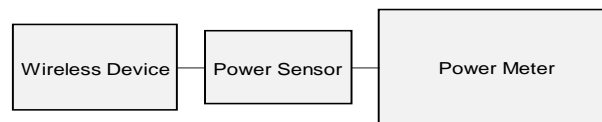





Figure 9-4
Power Measurement Setup

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9.5 Bluetooth Conducted Powers

Table 9-29
Bluetooth Antenna 1 Maximum Average RF Power

Frequency [MHz]	Data Rate [Mbps]	Mod.	Power Scheme	Channel No.	Avg Conducted Power	
					[dBm]	[mW]
2402	1.0	GFSK	ePA	0	14.18	26.182
2441	1.0	GFSK	ePA	39	15.43	34.914
2480	1.0	GFSK	ePA	78	14.13	25.882
2402	2.0	$\pi/4$ -DQPSK	ePA	0	12.16	16.444
2441	2.0	$\pi/4$ -DQPSK	ePA	39	12.88	19.409
2480	2.0	$\pi/4$ -DQPSK	ePA	78	12.16	16.444
2402	3.0	8DPSK	ePA	0	11.88	15.417
2441	3.0	8DPSK	ePA	39	12.93	19.634
2480	3.0	8DPSK	ePA	78	11.92	15.560

Table 9-30
Bluetooth Antenna 2 Maximum Average RF Power

Frequency [MHz]	Data Rate [Mbps]	Mod.	Power Scheme	Channel No.	Avg Conducted Power	
					[dBm]	[mW]
2402	1.0	GFSK	ePA	0	14.97	31.405
2441	1.0	GFSK	ePA	39	16.61	45.814
2480	1.0	GFSK	ePA	78	15.66	36.813
2402	2.0	$\pi/4$ -DQPSK	ePA	0	12.40	17.378
2441	2.0	$\pi/4$ -DQPSK	ePA	39	13.96	24.889
2480	2.0	$\pi/4$ -DQPSK	ePA	78	12.31	17.022
2402	3.0	8DPSK	ePA	0	12.40	17.378
2441	3.0	8DPSK	ePA	39	14.29	26.853
2480	3.0	8DPSK	ePA	78	13.33	21.528




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**Table 9-31
Bluetooth Antenna 1 BT Reduced RCV Active Conducted Power**

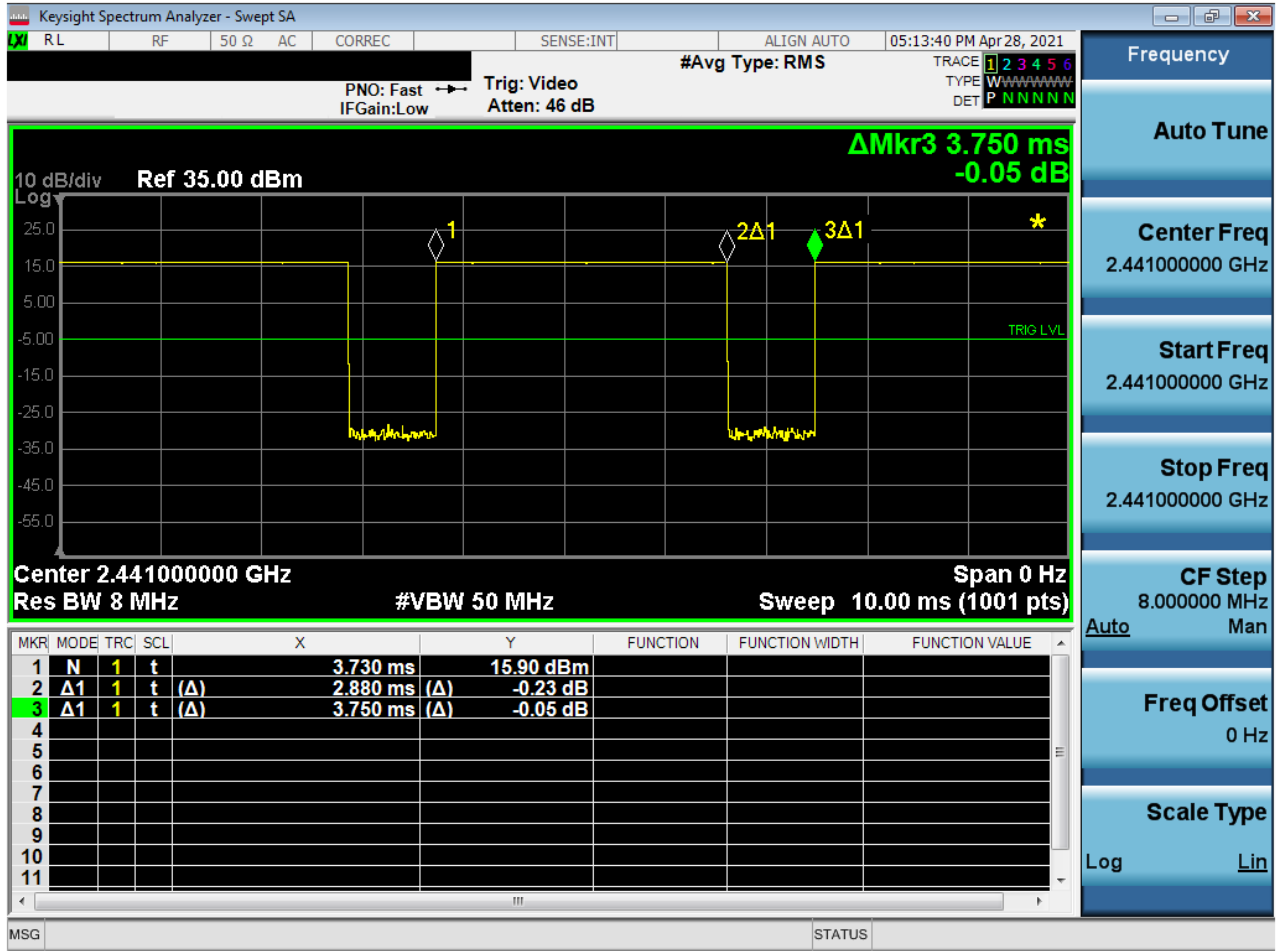
Frequency [MHz]	Data Rate [Mbps]	Mod.	Power Scheme	Channel No.	Avg Conducted Power	
					[dBm]	[mW]
2402	1.0	GFSK	ePA	0	7.80	6.026
2441	1.0	GFSK	ePA	39	8.62	7.278
2480	1.0	GFSK	ePA	78	7.74	5.938

**Table 9-32
Bluetooth Antenna 2 BT Reduced RCV Active Conducted Power**

Frequency [MHz]	Data Rate [Mbps]	Mod.	Power Scheme	Channel No.	Avg Conducted Power	
					[dBm]	[mW]
2402	1.0	GFSK	ePA	0	7.79	6.008
2441	1.0	GFSK	ePA	39	9.29	8.492
2480	1.0	GFSK	ePA	78	8.94	7.828




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**Figure 9-5
Bluetooth Antenna 1 Transmission Plot**

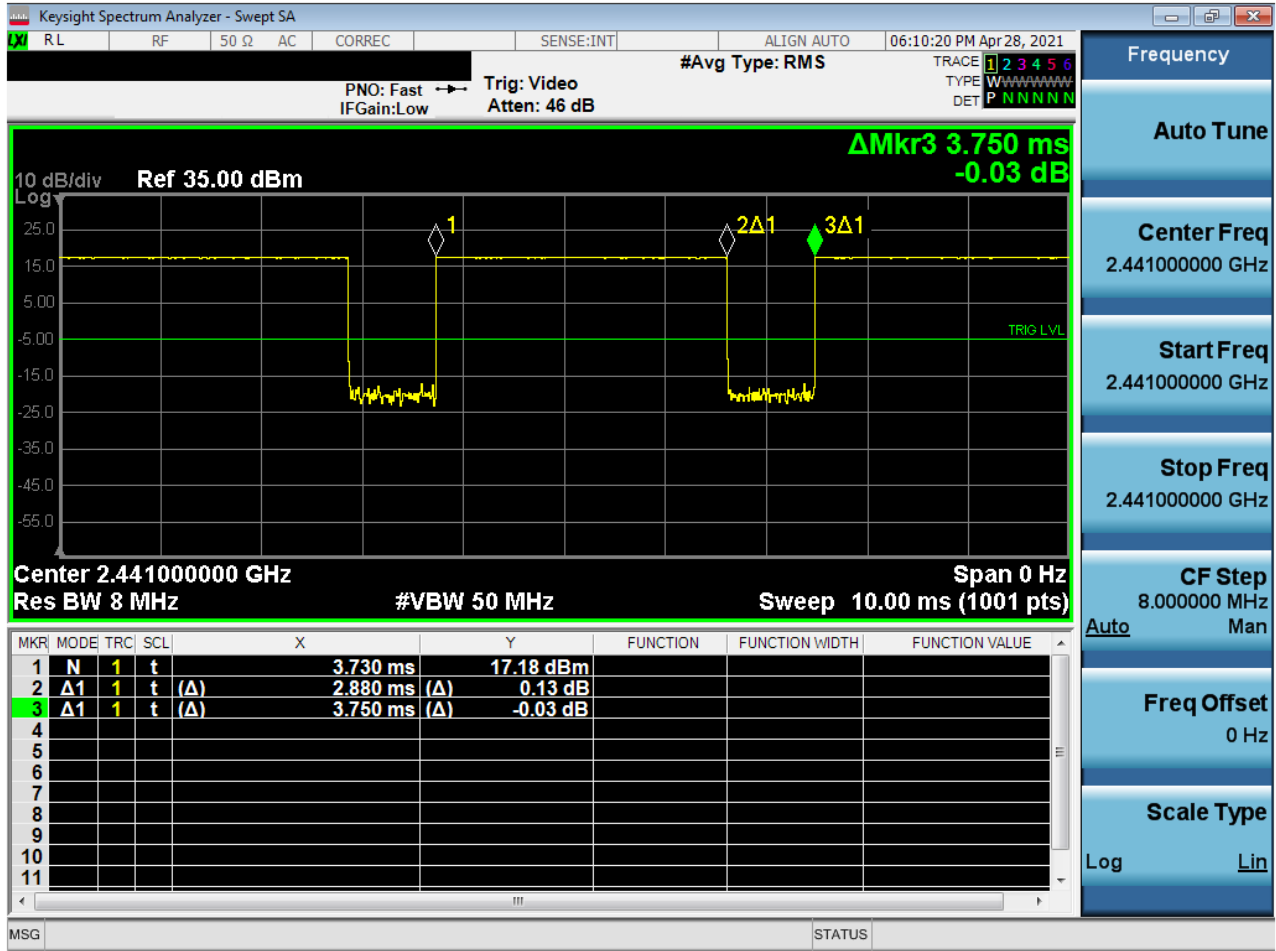


**Equation 9-1
Bluetooth Antenna 1 Duty Cycle Calculation**

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.88ms}{3.75ms} * 100\% = 76.8\%$$

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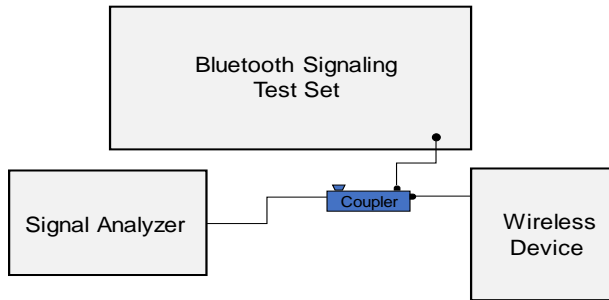
**Figure 9-6
Bluetooth Antenna 2 Transmission Plot**






**Equation 9-2
Bluetooth Antenna 2 Duty Cycle Calculation**

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.88ms}{3.75ms} * 100\% = 76.8\%$$

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**Figure 9-7
Power Measurement Setup**




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10 SYSTEM VERIFICATION

10.1 Tissue Verification




**Table 10-1
Measured Head Tissue Properties**

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
07/05/2021	750 Head	20.9	680	0.867	41.498	0.888	42.305	-2.36%	-1.91%
			695	0.873	41.440	0.889	42.227	-1.80%	-1.86%
			700	0.875	41.418	0.889	42.201	-1.57%	-1.86%
			710	0.878	41.368	0.890	42.149	-1.35%	-1.85%
			725	0.883	41.301	0.891	42.071	-0.90%	-1.83%
			750	0.892	41.239	0.894	41.942	-0.22%	-1.68%
			770	0.900	41.227	0.895	41.838	0.56%	-1.46%
			785	0.906	41.188	0.896	41.760	1.12%	-1.37%
			800	0.912	41.122	0.897	41.682	1.67%	-1.34%
06/28/2021	835 Head	22.5	820	0.872	40.329	0.899	41.578	-3.00%	-3.00%
			835	0.887	40.137	0.900	41.500	-1.44%	-3.28%
			850	0.902	39.946	0.916	41.500	-1.53%	-3.74%
07/06/2021	1750 Head	19.6	1710	1.370	39.245	1.348	40.142	1.63%	-2.23%
			1720	1.380	39.201	1.354	40.126	1.92%	-2.31%
			1745	1.405	39.078	1.368	40.087	2.70%	-2.52%
			1750	1.410	39.053	1.371	40.079	2.84%	-2.56%
			1770	1.431	38.956	1.383	40.047	3.47%	-2.72%
07/12/2021	1900 Head	22.1	1790	1.453	38.861	1.394	40.016	4.23%	-2.89%
			1850	1.395	39.674	1.400	40.000	-0.36%	-0.82%
			1860	1.405	39.628	1.400	40.000	0.36%	-0.93%
			1880	1.426	39.541	1.400	40.000	1.86%	-1.15%
			1900	1.448	39.462	1.400	40.000	3.43%	-1.34%
07/07/2021	2450 Head	24.0	1905	1.453	39.441	1.400	40.000	3.79%	-1.40%
			1910	1.458	39.421	1.400	40.000	4.14%	-1.45%
			2400	1.784	37.366	1.756	39.289	1.59%	-4.89%
			2450	1.820	37.301	1.800	39.200	1.11%	-4.84%
			2480	1.841	37.270	1.833	39.162	0.44%	-4.83%
			2500	1.856	37.248	1.855	39.136	0.05%	-4.82%
			2510	1.864	37.235	1.866	39.123	-0.11%	-4.83%
			2535	1.884	37.199	1.893	39.092	-0.48%	-4.84%
			2550	1.895	37.179	1.909	39.073	-0.73%	-4.85%
			2560	1.903	37.167	1.920	39.060	-0.89%	-4.85%
			2600	1.934	37.112	1.964	39.009	-1.53%	-4.86%
			2650	1.972	37.039	2.018	38.945	-2.28%	-4.89%
			2680	1.995	36.992	2.051	38.907	-2.73%	-4.92%
07/11/2021	2450 Head	22.0	2700	2.009	36.958	2.073	38.882	-3.09%	-4.95%
			2300	1.730	37.901	1.670	39.500	3.59%	-4.05%
			2310	1.738	37.884	1.679	39.480	3.51%	-4.04%
			2320	1.745	37.870	1.687	39.460	3.44%	-4.03%
			2400	1.804	37.747	1.756	39.289	2.73%	-3.92%
			2450	1.842	37.663	1.800	39.200	2.33%	-3.92%
			2480	1.863	37.625	1.833	39.162	1.64%	-3.92%
			2500	1.878	37.594	1.855	39.136	1.24%	-3.94%
			2510	1.885	37.575	1.866	39.123	1.02%	-3.96%
			2535	1.905	37.529	1.893	39.092	0.63%	-4.00%
			2550	1.918	37.504	1.909	39.073	0.47%	-4.02%
			2560	1.926	37.491	1.920	39.060	0.31%	-4.02%
			2600	1.955	37.442	1.964	39.009	-0.46%	-4.02%
			2650	1.994	37.356	2.018	38.945	-1.19%	-4.08%
			2680	2.018	37.315	2.051	38.907	-1.61%	-4.09%
07/31/2021	2450 Head	22.9	2700	2.034	37.285	2.073	38.882	-1.88%	-4.11%
			2300	1.681	39.004	1.670	39.500	0.66%	-1.26%
			2310	1.692	38.970	1.679	39.480	0.77%	-1.29%
			2320	1.703	38.934	1.687	39.460	0.95%	-1.33%
			2400	1.789	38.668	1.756	39.289	1.88%	-1.58%
			2450	1.844	38.502	1.800	39.200	2.44%	-1.78%
			2480	1.876	38.410	1.833	39.162	2.35%	-1.92%
			2500	1.898	38.340	1.855	39.136	2.32%	-2.03%
			2510	1.909	38.303	1.866	39.123	2.30%	-2.10%
			2535	1.939	38.211	1.893	39.092	2.43%	-2.25%
			2550	1.957	38.159	1.909	39.073	2.51%	-2.34%
			2560	1.968	38.127	1.920	39.060	2.50%	-2.39%
			2600	2.012	37.995	1.964	39.009	2.44%	-2.60%
			2650	2.067	37.803	2.018	38.945	2.43%	-2.93%
			2680	2.101	37.697	2.051	38.907	2.44%	-3.11%
2700	2.123	37.629	2.073	38.882	2.41%	-3.22%			

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**Table 10-2
Measured Head Tissue Properties**

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
07/09/2021	5200-5800 Head	21.0	5180	4.484	34.671	4.635	36.009	-3.26%	-3.72%
			5190	4.493	34.651	4.645	35.998	-3.27%	-3.74%
			5200	4.502	34.631	4.655	35.986	-3.29%	-3.77%
			5210	4.514	34.605	4.666	35.975	-3.26%	-3.81%
			5220	4.526	34.580	4.676	35.963	-3.21%	-3.85%
			5240	4.551	34.543	4.696	35.940	-3.09%	-3.89%
			5250	4.561	34.526	4.706	35.929	-3.08%	-3.90%
			5260	4.573	34.509	4.717	35.917	-3.05%	-3.92%
			5270	4.585	34.488	4.727	35.906	-3.00%	-3.95%
			5280	4.597	34.472	4.737	35.894	-2.96%	-3.96%
			5290	4.607	34.463	4.748	35.883	-2.97%	-3.96%
			5300	4.615	34.462	4.758	35.871	-3.01%	-3.93%
			5310	4.626	34.452	4.768	35.860	-2.98%	-3.93%
			5320	4.639	34.433	4.778	35.849	-2.91%	-3.95%
			5500	4.835	34.138	4.963	35.643	-2.58%	-4.22%
			5510	4.849	34.124	4.973	35.632	-2.49%	-4.23%
			5520	4.862	34.110	4.983	35.620	-2.43%	-4.24%
			5530	4.876	34.097	4.994	35.609	-2.36%	-4.25%
			5540	4.887	34.086	5.004	35.597	-2.34%	-4.24%
			5550	4.898	34.075	5.014	35.586	-2.31%	-4.25%
			5560	4.909	34.068	5.024	35.574	-2.29%	-4.23%
			5580	4.927	34.032	5.045	35.551	-2.34%	-4.27%
			5600	4.949	33.982	5.065	35.529	-2.29%	-4.35%
			5610	4.963	33.963	5.076	35.518	-2.23%	-4.38%
			5620	4.976	33.946	5.086	35.506	-2.16%	-4.39%
			5640	4.999	33.916	5.106	35.483	-2.10%	-4.42%
			5660	5.021	33.906	5.127	35.460	-2.07%	-4.38%
			5670	5.029	33.898	5.137	35.449	-2.10%	-4.38%
			5680	5.037	33.885	5.147	35.437	-2.14%	-4.38%
			5690	5.046	33.863	5.158	35.426	-2.17%	-4.41%
			5700	5.057	33.840	5.168	35.414	-2.15%	-4.44%
			5710	5.068	33.819	5.178	35.403	-2.12%	-4.47%
5720	5.079	33.794	5.188	35.391	-2.10%	-4.51%			
5745	5.109	33.743	5.214	35.363	-2.01%	-4.58%			
5750	5.114	33.737	5.219	35.357	-2.01%	-4.58%			
5755	5.120	33.733	5.224	35.351	-1.99%	-4.58%			
5765	5.129	33.727	5.234	35.340	-2.01%	-4.56%			
5775	5.136	33.719	5.245	35.329	-2.08%	-4.56%			
5785	5.144	33.703	5.255	35.317	-2.11%	-4.57%			
5795	5.153	33.685	5.265	35.305	-2.13%	-4.59%			
5805	5.162	33.670	5.275	35.294	-2.14%	-4.60%			
5825	5.182	33.618	5.296	35.271	-2.15%	-4.69%			

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**Table 10-3
Measured Body Tissue Properties**

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
06/28/2021	750 Body	21.2	680	0.932	55.715	0.958	55.804	-2.71%	-0.16%
			695	0.938	55.682	0.959	55.745	-2.19%	-0.11%
			700	0.940	55.671	0.959	55.726	-1.98%	-0.10%
			710	0.944	55.650	0.960	55.687	-1.67%	-0.07%
			725	0.950	55.622	0.961	55.629	-1.14%	-0.01%
			750	0.959	55.560	0.964	55.531	-0.52%	0.05%
			770	0.967	55.504	0.965	55.453	0.21%	0.09%
			785	0.973	55.458	0.966	55.395	0.72%	0.11%
06/30/2021	750 Body	21.1	680	0.938	55.090	0.958	55.804	-2.09%	-1.28%
			695	0.944	55.052	0.959	55.745	-1.56%	-1.24%
			700	0.946	55.039	0.959	55.726	-1.36%	-1.23%
			710	0.950	55.015	0.960	55.687	-1.04%	-1.21%
			725	0.956	54.980	0.961	55.629	-0.52%	-1.17%
			750	0.965	54.919	0.964	55.531	0.10%	-1.10%
			770	0.973	54.867	0.965	55.453	0.83%	-1.06%
			785	0.978	54.826	0.966	55.395	1.24%	-1.03%
07/06/2021	750 Body	22.1	680	0.966	54.228	0.958	55.804	0.84%	-2.82%
			695	0.971	54.187	0.959	55.745	1.25%	-2.79%
			700	0.973	54.174	0.959	55.726	1.46%	-2.79%
			710	0.976	54.148	0.960	55.687	1.67%	-2.76%
			725	0.982	54.111	0.961	55.629	2.19%	-2.73%
			750	0.991	54.057	0.964	55.531	2.80%	-2.65%
			770	0.998	54.005	0.965	55.453	3.42%	-2.61%
			785	1.004	53.963	0.966	55.395	3.93%	-2.59%
06/29/2021	835 Body	22.7	800	1.010	53.927	0.967	55.336	4.45%	-2.55%
			820	0.932	53.974	0.969	55.258	-3.82%	-2.32%
			835	0.948	53.843	0.970	55.200	-2.27%	-2.46%
			850	0.963	53.707	0.988	55.154	-2.53%	-2.62%
07/04/2021	835 Body	22.4	820	0.923	52.714	0.969	55.258	-4.75%	-4.60%
			835	0.938	52.574	0.970	55.200	-3.30%	-4.76%
			850	0.954	52.435	0.988	55.154	-3.44%	-4.93%
06/28/2021	1750 Body	22.6	1710	1.483	52.831	1.463	53.537	1.37%	-1.32%
			1720	1.493	52.784	1.469	53.511	1.63%	-1.36%
			1745	1.520	52.668	1.485	53.445	2.36%	-1.45%
			1750	1.525	52.648	1.488	53.432	2.49%	-1.47%
			1770	1.546	52.570	1.501	53.379	3.00%	-1.52%
06/30/2021	1750 Body	23.0	1790	1.567	52.502	1.514	53.326	3.50%	-1.55%
			1710	1.487	52.518	1.463	53.537	1.64%	-1.90%
			1720	1.498	52.479	1.469	53.511	1.97%	-1.93%
			1745	1.525	52.371	1.485	53.445	2.69%	-2.01%
			1750	1.530	52.349	1.488	53.432	2.82%	-2.03%
07/13/2021	1750 Body	23.5	1770	1.552	52.272	1.501	53.379	3.40%	-2.07%
			1790	1.574	52.203	1.514	53.326	3.96%	-2.11%
			1710	1.414	52.329	1.463	53.537	-3.35%	-2.26%
			1720	1.425	52.294	1.469	53.511	-3.00%	-2.27%
			1745	1.451	52.198	1.485	53.445	-2.29%	-2.33%
07/13/2021	1750 Body	23.5	1750	1.456	52.178	1.488	53.432	-2.15%	-2.35%
			1770	1.477	52.102	1.501	53.379	-1.60%	-2.39%
			1790	1.497	52.033	1.514	53.326	-1.12%	-2.42%
			1710	1.414	52.329	1.463	53.537	-3.35%	-2.26%

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**Table 10-4
Measured Body Tissue Properties**

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
07/05/2021	1900 Body	23.2	1850	1.523	52.199	1.520	53.300	0.20%	-2.07%
			1860	1.534	52.173	1.520	53.300	0.92%	-2.11%
			1880	1.553	52.100	1.520	53.300	2.17%	-2.25%
			1900	1.574	52.007	1.520	53.300	3.55%	-2.43%
			1905	1.580	51.985	1.520	53.300	3.95%	-2.47%
07/12/2021	1900 Body	22.4	1850	1.519	52.832	1.520	53.300	-0.07%	-0.88%
			1860	1.530	52.793	1.520	53.300	0.66%	-0.95%
			1880	1.552	52.721	1.520	53.300	2.11%	-1.09%
			1900	1.575	52.655	1.520	53.300	3.62%	-1.21%
			1905	1.580	52.638	1.520	53.300	3.95%	-1.24%
07/15/2021	1900 Body	23.3	1850	1.529	51.538	1.520	53.300	0.59%	-3.31%
			1860	1.540	51.503	1.520	53.300	1.32%	-3.37%
			1880	1.562	51.437	1.520	53.300	2.76%	-3.50%
			1900	1.584	51.377	1.520	53.300	4.21%	-3.61%
			1905	1.590	51.361	1.520	53.300	4.61%	-3.64%
07/06/2021	2450 Body	24.5	1910	1.596	51.344	1.520	53.300	5.00%	-3.67%
			2300	1.741	52.641	1.809	52.900	-3.76%	-0.49%
			2310	1.754	52.601	1.816	52.887	-3.41%	-0.54%
			2320	1.768	52.568	1.826	52.873	-3.18%	-0.58%
			2400	1.872	52.308	1.902	52.767	-1.58%	-0.87%
			2450	1.940	52.122	1.950	52.700	-0.51%	-1.10%
			2480	1.982	52.033	1.993	52.662	-0.55%	-1.19%
			2500	2.007	51.959	2.021	52.636	-0.69%	-1.29%
			2510	2.019	51.916	2.035	52.623	-0.79%	-1.34%
			2535	2.051	51.804	2.071	52.592	-0.97%	-1.50%
			2550	2.073	51.749	2.092	52.573	-0.91%	-1.57%
			2560	2.088	51.715	2.106	52.560	-0.85%	-1.61%
			2600	2.142	51.597	2.163	52.509	-0.97%	-1.74%
			2650	2.205	51.383	2.234	52.445	-1.30%	-2.02%
07/08/2021	2450 Body	24.3	2680	2.250	51.281	2.277	52.407	-1.19%	-2.15%
			2700	2.278	51.227	2.305	52.382	-1.17%	-2.20%
			2300	1.741	53.194	1.809	52.900	-3.76%	0.56%
			2310	1.754	53.163	1.816	52.887	-3.41%	0.52%
			2320	1.768	53.137	1.826	52.873	-3.18%	0.50%
			2400	1.875	52.878	1.902	52.767	-1.42%	0.21%
			2450	1.944	52.696	1.950	52.700	-0.31%	-0.01%
			2480	1.984	52.582	1.993	52.662	-0.45%	-0.15%
			2500	2.011	52.505	2.021	52.636	-0.49%	-0.25%
			2510	2.024	52.465	2.035	52.623	-0.54%	-0.30%
			2535	2.058	52.361	2.071	52.592	-0.63%	-0.44%
			2550	2.078	52.306	2.092	52.573	-0.67%	-0.51%
			2560	2.092	52.268	2.106	52.560	-0.66%	-0.56%
			2600	2.145	52.132	2.163	52.509	-0.83%	-0.72%
07/14/2021	2450 Body	24.2	2650	2.212	51.947	2.234	52.445	-0.98%	-0.95%
			2680	2.254	51.840	2.277	52.407	-1.01%	-1.08%
			2700	2.281	51.775	2.305	52.382	-1.04%	-1.16%
			2300	1.867	50.972	1.809	52.900	3.21%	-3.64%
			2310	1.879	50.942	1.816	52.887	3.47%	-3.68%
			2320	1.890	50.914	1.826	52.873	3.50%	-3.71%
			2400	1.981	50.690	1.902	52.767	4.15%	-3.94%
			2450	2.039	50.556	1.950	52.700	4.56%	-4.07%
			2480	2.074	50.475	1.993	52.662	4.06%	-4.15%
			2500	2.097	50.414	2.021	52.636	3.76%	-4.22%
			2510	2.109	50.384	2.035	52.623	3.64%	-4.25%
			2535	2.140	50.311	2.071	52.592	3.33%	-4.34%
			2550	2.159	50.271	2.092	52.573	3.20%	-4.38%
			2560	2.171	50.245	2.106	52.560	3.09%	-4.40%
2600	2.220	50.126	2.163	52.509	2.64%	-4.54%			
2650	2.281	49.964	2.234	52.445	2.10%	-4.73%			
2680	2.317	49.874	2.277	52.407	1.76%	-4.83%			
2700	2.341	49.808	2.305	52.382	1.56%	-4.91%			

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**Table 10-5
Measured Body Tissue Properties**



Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
07/04/2021	5200-5800 Body	24.5	5180	5.215	48.069	5.276	49.041	-1.16%	-1.98%
			5190	5.228	48.047	5.288	49.028	-1.13%	-2.00%
			5200	5.241	48.023	5.299	49.014	-1.09%	-2.02%
			5210	5.254	48.000	5.311	49.001	-1.07%	-2.04%
			5220	5.270	47.989	5.323	48.987	-1.00%	-2.04%
			5240	5.300	47.947	5.346	48.960	-0.86%	-2.07%
			5250	5.311	47.917	5.358	48.947	-0.88%	-2.10%
			5260	5.321	47.907	5.369	48.933	-0.89%	-2.10%
			5270	5.337	47.901	5.381	48.919	-0.82%	-2.08%
			5280	5.353	47.890	5.393	48.906	-0.74%	-2.08%
			5290	5.367	47.878	5.404	48.892	-0.68%	-2.07%
			5300	5.383	47.868	5.416	48.879	-0.61%	-2.07%
			5310	5.399	47.860	5.428	48.865	-0.53%	-2.06%
			5320	5.417	47.837	5.439	48.851	-0.40%	-2.08%
			5500	5.668	47.542	5.650	48.607	0.32%	-2.19%
			5510	5.683	47.527	5.661	48.594	0.39%	-2.20%
			5520	5.701	47.517	5.673	48.580	0.49%	-2.19%
			5530	5.718	47.506	5.685	48.566	0.58%	-2.18%
			5540	5.732	47.500	5.696	48.553	0.63%	-2.17%
			5550	5.747	47.490	5.708	48.539	0.68%	-2.16%
			5560	5.762	47.475	5.720	48.526	0.73%	-2.17%
			5580	5.786	47.428	5.743	48.499	0.75%	-2.21%
			5600	5.814	47.383	5.766	48.471	0.83%	-2.24%
			5610	5.828	47.365	5.778	48.458	0.87%	-2.26%
			5620	5.845	47.346	5.790	48.444	0.95%	-2.27%
			5640	5.875	47.321	5.813	48.417	1.07%	-2.26%
			5660	5.901	47.310	5.837	48.390	1.10%	-2.23%
			5670	5.913	47.299	5.848	48.376	1.11%	-2.23%
			5680	5.925	47.280	5.860	48.363	1.11%	-2.24%
			5690	5.939	47.251	5.872	48.349	1.14%	-2.27%
			5700	5.952	47.226	5.883	48.336	1.17%	-2.30%
			5710	5.965	47.208	5.895	48.322	1.19%	-2.31%
5720	5.980	47.190	5.907	48.309	1.24%	-2.32%			
5745	6.019	47.142	5.936	48.275	1.40%	-2.35%			
5750	6.026	47.137	5.942	48.268	1.41%	-2.34%			
5755	6.031	47.136	5.947	48.261	1.41%	-2.33%			
5765	6.041	47.131	5.959	48.248	1.38%	-2.32%			
5775	6.052	47.117	5.971	48.234	1.36%	-2.32%			
5785	6.065	47.104	5.982	48.220	1.39%	-2.31%			
5795	6.079	47.084	5.994	48.207	1.42%	-2.33%			
5800	6.088	47.078	6.000	48.200	1.47%	-2.33%			
5805	6.095	47.068	6.006	48.193	1.48%	-2.33%			
5825	6.119	47.004	6.029	48.166	1.49%	-2.41%			

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**Table 10-6
Measured Body Tissue Properties**

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
07/11/2021	5200-5800 Body	24.0	5180	5.160	47.582	5.276	49.041	-2.20%	-2.98%
			5190	5.173	47.570	5.288	49.028	-2.17%	-2.97%
			5200	5.188	47.547	5.299	49.014	-2.09%	-2.99%
			5210	5.199	47.525	5.311	49.001	-2.11%	-3.01%
			5220	5.211	47.514	5.323	48.987	-2.10%	-3.01%
			5240	5.244	47.465	5.346	48.960	-1.91%	-3.05%
			5250	5.256	47.432	5.358	48.947	-1.90%	-3.10%
			5260	5.266	47.403	5.369	48.933	-1.92%	-3.13%
			5270	5.277	47.394	5.381	48.919	-1.93%	-3.12%
			5280	5.293	47.390	5.393	48.906	-1.85%	-3.10%
			5290	5.308	47.384	5.404	48.892	-1.78%	-3.08%
			5300	5.321	47.377	5.416	48.879	-1.75%	-3.07%
			5310	5.336	47.358	5.428	48.865	-1.69%	-3.08%
			5320	5.350	47.339	5.439	48.851	-1.64%	-3.10%
			5500	5.596	47.023	5.650	48.607	-0.96%	-3.26%
			5510	5.611	47.005	5.661	48.594	-0.88%	-3.27%
			5520	5.627	46.996	5.673	48.580	-0.81%	-3.26%
			5530	5.643	46.980	5.685	48.566	-0.74%	-3.27%
			5540	5.657	46.956	5.696	48.553	-0.68%	-3.29%
			5550	5.671	46.936	5.708	48.539	-0.65%	-3.30%
			5560	5.685	46.922	5.720	48.526	-0.61%	-3.31%
			5580	5.715	46.892	5.743	48.499	-0.49%	-3.31%
			5600	5.740	46.849	5.766	48.471	-0.45%	-3.35%
			5610	5.754	46.835	5.778	48.458	-0.42%	-3.35%
			5620	5.768	46.823	5.790	48.444	-0.38%	-3.35%
			5640	5.794	46.786	5.813	48.417	-0.33%	-3.37%
			5660	5.824	46.751	5.837	48.390	-0.22%	-3.39%
			5670	5.838	46.736	5.848	48.376	-0.17%	-3.39%
			5680	5.851	46.724	5.860	48.363	-0.15%	-3.39%
			5690	5.864	46.706	5.872	48.349	-0.14%	-3.40%
			5700	5.878	46.687	5.883	48.336	-0.08%	-3.41%
			5710	5.891	46.672	5.895	48.322	-0.07%	-3.41%
5720	5.905	46.650	5.907	48.309	-0.03%	-3.43%			
5745	5.941	46.600	5.936	48.275	0.08%	-3.47%			
5750	5.947	46.593	5.942	48.268	0.08%	-3.47%			
5755	5.953	46.588	5.947	48.261	0.10%	-3.47%			
5765	5.964	46.572	5.959	48.248	0.08%	-3.47%			
5775	5.977	46.548	5.971	48.234	0.10%	-3.50%			
5785	5.988	46.528	5.982	48.220	0.10%	-3.51%			
5795	6.000	46.516	5.994	48.207	0.10%	-3.51%			
5800	6.007	46.511	6.000	48.200	0.12%	-3.50%			
5805	6.016	46.505	6.006	48.193	0.17%	-3.50%			
5825	6.045	46.449	6.029	48.166	0.27%	-3.56%			

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




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10.2 Test System Verification

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

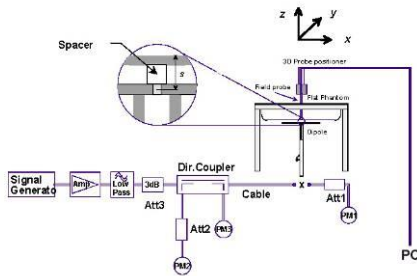
Table 10-7
System Verification Results – 1g

SAR System	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp. (C)	Liquid Temp. (C)	Input Power (W)	Source SN	Probe SN	Measured SAR1g (W/kg)	1W Target SAR1g (W/kg)	1W Normalized SAR 1g (W/kg)	Deviation1g (%)
E	750	HEAD	07/05/2021	22.2	20.7	0.2	1161	7571	1.68	8.03	8.400	4.61%
E	835	HEAD	06/28/2021	22.7	22.5	0.2	4d132	7571	1.92	9.66	9.600	-0.62%
P	1750	HEAD	07/06/2021	21.5	20.2	0.1	1148	7308	3.31	35.90	33.100	-7.80%
I	1900	HEAD	07/12/2021	22.0	21.7	0.1	5d149	7551	3.98	39.30	39.800	1.27%
E	2450	HEAD	07/07/2021	25.0	24.0	0.1	719	7571	5.28	51.40	52.800	2.72%
E	2450	HEAD	07/11/2021	24.0	22.0	0.1	719	7571	5.39	51.40	53.900	4.86%
E	2450	HEAD	07/31/2021	24.2	22.9	0.1	719	7571	5.46	51.40	54.600	6.23%
E	2600	HEAD	07/11/2021	24.0	22.0	0.1	1064	7571	5.83	58.10	58.300	0.34%
K	5250	HEAD	07/09/2021	23.5	21.0	0.1	1191	7538	3.82	79.80	76.400	-4.26%
K	5600	HEAD	07/09/2021	23.5	21.0	0.1	1191	7538	4.18	81.80	83.600	2.20%
K	5750	HEAD	07/09/2021	23.5	21.0	0.1	1191	7538	3.81	79.30	76.200	-3.91%
G	750	BODY	06/28/2021	22.0	21.2	0.2	1003	7357	1.71	8.61	8.550	-0.70%
G	750	BODY	06/30/2021	22.6	21.0	0.2	1003	7357	1.78	8.61	8.900	3.37%
G	750	BODY	07/06/2021	23.2	22.1	0.2	1161	7357	1.78	8.43	8.900	5.58%
H	835	BODY	06/29/2021	25.0	23.0	0.2	4d047	7410	1.97	9.47	9.850	4.01%
H	835	BODY	07/04/2021	24.8	22.8	0.2	4d133	7409	2.04	9.75	10.200	4.62%
P	1750	BODY	06/28/2021	21.2	21.4	0.1	1148	7308	3.73	36.30	37.300	2.75%
P	1750	BODY	06/30/2021	21.6	21.3	0.1	1148	7308	3.62	36.30	36.200	-0.28%
D	1750	BODY	07/13/2021	24.1	23.5	0.1	1150	3589	3.86	36.60	38.600	5.46%
D	1900	BODY	07/05/2021	23.0	23.2	0.1	5d149	3589	4.07	39.40	40.700	3.30%
I	1900	BODY	07/15/2021	23.4	22.3	0.1	5d149	7551	4.30	39.40	43.000	9.14%
L	2450	BODY	07/06/2021	21.0	24.5	0.1	981	7539	4.80	50.10	48.000	-4.19%
L	2450	BODY	07/08/2021	22.1	24.3	0.1	981	7539	4.85	50.10	48.500	-3.19%
K	2450	BODY	07/14/2021	23.6	24.2	0.1	719	7538	5.16	50.70	51.600	1.78%
K	2600	BODY	07/14/2021	23.6	24.2	0.1	1064	7538	5.54	55.60	55.400	-0.36%
J	5250	BODY	07/04/2021	21.3	22.5	0.1	1191	7526	3.52	74.60	70.400	-5.63%
J	5250	BODY	07/11/2021	22.1	22.0	0.1	1191	7526	3.65	74.60	73.000	-2.14%
J	5600	BODY	07/04/2021	21.3	22.5	0.1	1191	7526	3.62	78.10	72.400	-7.30%
J	5600	BODY	07/11/2021	22.1	22.0	0.1	1191	7526	3.72	78.10	74.400	-4.74%
J	5750	BODY	07/04/2021	21.3	22.5	0.1	1191	7526	3.59	74.90	71.800	-4.14%
J	5750	BODY	07/11/2021	22.1	22.0	0.1	1191	7526	3.50	74.90	70.000	-6.54%

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**Table 10-8
System Verification Results – 10g**

SAR System	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp. (C)	Liquid Temp. (C)	Input Power (W)	Source SN	Probe SN	Measured SAR10g (W/kg)	1W Target SAR10g (W/kg)	1W Normalized SAR10g (W/kg)	Deviation10g (%)
P	1750	BODY	06/30/2021	21.6	21.3	0.1	1148	7308	1.900	19.30	19.000	-1.55%
D	1900	BODY	07/12/2021	23.3	22.4	0.1	5d080	3589	2.150	20.60	21.500	4.37%
K	2450	BODY	07/14/2021	23.6	24.2	0.1	719	7538	2.360	23.90	23.600	-1.26%
K	2600	BODY	07/14/2021	23.6	24.2	0.1	1064	7538	2.440	25.00	24.400	-2.40%
J	5250	BODY	07/04/2021	21.3	22.5	0.1	1191	7526	0.990	21.00	19.800	-5.71%
J	5600	BODY	07/04/2021	21.3	22.5	0.1	1191	7526	1.000	21.70	20.000	-7.83%
J	5750	BODY	07/04/2021	21.3	22.5	0.1	1191	7526	1.010	20.80	20.200	-2.88%



**Figure 10-1
System Verification Setup Diagram**



**Figure 10-2
System Verification Setup Photo**

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11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

**Table 11-1
GSM 850 Head SAR - Open**




MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
824.20	128	GSM 850	GSM	33.0	32.70	0.10	Right	Cheek	0080M	1:8.3	0.171	1.072	0.183	A1
824.20	128	GSM 850	GSM	33.0	32.70	0.01	Right	Tilt	0080M	1:8.3	0.082	1.072	0.088	
824.20	128	GSM 850	GSM	33.0	32.70	0.11	Left	Cheek	0080M	1:8.3	0.113	1.072	0.121	
824.20	128	GSM 850	GSM	33.0	32.70	0.06	Left	Tilt	0080M	1:8.3	0.066	1.072	0.071	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram						

**Table 11-2
GMS 1900 Head SAR - Open**

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	# of Time Slots	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1850.20	512	GSM 1900	GSM	30.0	28.86	0.13	Right	Cheek	0405M	1	1:8.3	0.035	1.300	0.046	
1850.20	512	GSM 1900	GSM	30.0	28.86	-0.19	Right	Tilt	0405M	1	1:8.3	0.029	1.300	0.038	
1850.20	512	GSM 1900	GSM	30.0	28.86	0.03	Left	Cheek	0405M	1	1:8.3	0.052	1.300	0.068	A2
1850.20	512	GSM 1900	GSM	30.0	28.86	0.10	Left	Tilt	0405M	1	1:8.3	0.023	1.300	0.030	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram							

**Table 11-3
UMTS 850 Head SAR – Open**

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
826.40	4132	UMTS 850	RMC	25.5	24.27	-0.06	Right	Cheek	0080M	1:1	0.302	1.327	0.401	A3
826.40	4132	UMTS 850	RMC	25.5	24.27	0.01	Right	Tilt	0080M	1:1	0.158	1.327	0.210	
826.40	4132	UMTS 850	RMC	25.5	24.27	0.14	Left	Cheek	0080M	1:1	0.203	1.327	0.269	
826.40	4132	UMTS 850	RMC	25.5	24.27	0.02	Left	Tilt	0080M	1:1	0.127	1.327	0.169	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram						

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**Table 11-4
LTE Band 12 Head SAR - Open**



MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
707.50	23095	Md	LTE Band 12	10	24.0	23.29	-0.09	0	Right	Cheek	QPSK	1	0	0080M	1:1	0.148	1.178	0.174	A4
707.50	23095	Md	LTE Band 12	10	23.0	22.40	-0.06	1	Right	Cheek	QPSK	25	0	0080M	1:1	0.101	1.148	0.116	
707.50	23095	Md	LTE Band 12	10	24.0	23.29	-0.04	0	Right	Tilt	QPSK	1	0	0080M	1:1	0.058	1.178	0.068	
707.50	23095	Md	LTE Band 12	10	23.0	22.40	0.10	1	Right	Tilt	QPSK	25	0	0080M	1:1	0.040	1.148	0.046	
707.50	23095	Md	LTE Band 12	10	24.0	23.29	0.09	0	Left	Cheek	QPSK	1	0	0080M	1:1	0.120	1.178	0.141	
707.50	23095	Md	LTE Band 12	10	23.0	22.40	0.05	1	Left	Cheek	QPSK	25	0	0080M	1:1	0.094	1.148	0.108	
707.50	23095	Md	LTE Band 12	10	24.0	23.29	0.09	0	Left	Tilt	QPSK	1	0	0080M	1:1	0.056	1.178	0.066	
707.50	23095	Md	LTE Band 12	10	23.0	22.40	0.14	1	Left	Tilt	QPSK	25	0	0080M	1:1	0.041	1.148	0.047	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

**Table 11-5
LTE Band 13 Head SAR - Open**

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
782.00	23230	Md	LTE Band 13	10	24.0	23.18	-0.04	0	Right	Cheek	QPSK	1	0	0030M	1:1	0.132	1.208	0.159	A5
782.00	23230	Md	LTE Band 13	10	23.0	22.37	0.03	1	Right	Cheek	QPSK	25	25	0030M	1:1	0.113	1.156	0.131	
782.00	23230	Md	LTE Band 13	10	24.0	23.18	-0.13	0	Right	Tilt	QPSK	1	0	0030M	1:1	0.080	1.208	0.097	
782.00	23230	Md	LTE Band 13	10	23.0	22.37	-0.07	1	Right	Tilt	QPSK	25	25	0030M	1:1	0.061	1.156	0.071	
782.00	23230	Md	LTE Band 13	10	24.0	23.18	-0.14	0	Left	Cheek	QPSK	1	0	0030M	1:1	0.125	1.208	0.151	
782.00	23230	Md	LTE Band 13	10	23.0	22.37	0.09	1	Left	Cheek	QPSK	25	25	0030M	1:1	0.107	1.156	0.124	
782.00	23230	Md	LTE Band 13	10	24.0	23.18	-0.18	0	Left	Tilt	QPSK	1	0	0030M	1:1	0.076	1.208	0.092	
782.00	23230	Md	LTE Band 13	10	23.0	22.37	0.16	1	Left	Tilt	QPSK	25	25	0030M	1:1	0.060	1.156	0.069	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

**Table 11-6
LTE Band 5 (Cell) Head SAR – Open**

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
836.50	20525	Md	LTE Band 5 (Cell)	10	25.7	25.11	-0.02	0	Right	Cheek	QPSK	1	25	0080M	1:1	0.274	1.146	0.314	A6
836.50	20525	Md	LTE Band 5 (Cell)	10	24.7	24.23	-0.02	1	Right	Cheek	QPSK	25	12	0080M	1:1	0.220	1.114	0.245	
836.50	20525	Md	LTE Band 5 (Cell)	10	25.7	25.11	0.01	0	Right	Tilt	QPSK	1	25	0080M	1:1	0.148	1.146	0.170	
836.50	20525	Md	LTE Band 5 (Cell)	10	24.7	24.23	0.11	1	Right	Tilt	QPSK	25	12	0080M	1:1	0.118	1.114	0.118	
836.50	20525	Md	LTE Band 5 (Cell)	10	25.7	25.11	0.19	0	Left	Cheek	QPSK	1	25	0080M	1:1	0.233	1.146	0.267	
836.50	20525	Md	LTE Band 5 (Cell)	10	24.7	24.23	0.06	1	Left	Cheek	QPSK	25	12	0080M	1:1	0.190	1.114	0.212	
836.50	20525	Md	LTE Band 5 (Cell)	10	25.7	25.11	0.08	0	Left	Tilt	QPSK	1	25	0080M	1:1	0.145	1.146	0.166	
836.50	20525	Md	LTE Band 5 (Cell)	10	24.7	24.23	0.03	1	Left	Tilt	QPSK	25	12	0080M	1:1	0.117	1.114	0.130	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

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**Table 11-7
LTE Band 4 (AWS) Head SAR - Open**



MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
1732.50	20175	Md	LTE Band 4 (AWS)	20	24.0	23.12	0.16	0	Right	Cheek	QPSK	1	50	0006M	1:1	0.087	1.225	0.107	A7
1732.50	20175	Md	LTE Band 4 (AWS)	20	23.0	22.29	0.18	1	Right	Cheek	QPSK	50	25	0006M	1:1	0.061	1.178	0.072	
1732.50	20175	Md	LTE Band 4 (AWS)	20	24.0	23.12	0.14	0	Right	Tilt	QPSK	1	50	0006M	1:1	0.032	1.225	0.039	
1732.50	20175	Md	LTE Band 4 (AWS)	20	23.0	22.29	0.12	1	Right	Tilt	QPSK	50	25	0006M	1:1	0.019	1.178	0.022	
1732.50	20175	Md	LTE Band 4 (AWS)	20	24.0	23.12	0.12	0	Left	Cheek	QPSK	1	50	0006M	1:1	0.039	1.225	0.048	
1732.50	20175	Md	LTE Band 4 (AWS)	20	23.0	22.29	0.11	1	Left	Cheek	QPSK	50	25	0006M	1:1	0.030	1.178	0.035	
1732.50	20175	Md	LTE Band 4 (AWS)	20	24.0	23.12	0.18	0	Left	Tilt	QPSK	1	50	0006M	1:1	0.033	1.225	0.040	
1732.50	20175	Md	LTE Band 4 (AWS)	20	23.0	22.29	0.19	1	Left	Tilt	QPSK	50	25	0006M	1:1	0.020	1.178	0.024	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

**Table 11-8
LTE Band 41 Head SAR - Open**

MEASUREMENT RESULTS																					
1 CC Uplink 2 CC Uplink Power Class	Component Carrier	FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
		MHz	Ch.														(W/kg)		(W/kg)		
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	25.0	24.86	0.11	0	Right	Cheek	QPSK	1	50	0080M	1:1.58	0.068	1.033	0.070	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.0	23.94	0.10	1	Right	Cheek	QPSK	50	50	0080M	1:1.58	0.058	1.014	0.059	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	25.0	24.86	0.15	0	Right	Tilt	QPSK	1	50	0080M	1:1.58	0.053	1.033	0.055	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.0	23.94	0.18	1	Right	Tilt	QPSK	50	50	0080M	1:1.58	0.044	1.014	0.045	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	25.0	24.36	0.17	0	Left	Cheek	QPSK	1	0	0080M	1:1.58	0.099	1.159	0.115	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	25.0	24.86	0.03	0	Left	Cheek	QPSK	1	50	0080M	1:1.58	0.119	1.033	0.123	A8
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.0	23.94	0.13	1	Left	Cheek	QPSK	50	50	0080M	1:1.58	0.105	1.014	0.106	
2 CC Uplink - Power Class 3	PCC	2680.00	41490	High	LTE Band 41	20	25.0	24.69	0.19	0	Left	Cheek	QPSK	1	0	0080M	1:1.58	0.112	1.074	0.120	
	SCC	2660.20	41292											1	99						
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	25.0	24.86	0.11	0	Left	Tilt	QPSK	1	50	0080M	1:1.58	0.046	1.033	0.048	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.0	23.94	0.15	1	Left	Tilt	QPSK	50	50	0080M	1:1.58	0.041	1.014	0.042	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram											

**Table 11-9
DTS Head SAR - Open**

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													(W/kg)	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	13.0	12.99	0.12	Right	Cheek	2	0710M	1	99.9	0.580	0.243	1.002	1.001	0.244	
2437	6	802.11b	DSSS	22	13.0	12.99	0.12	Right	Tilt	2	0710M	1	99.9	0.383	-	1.002	1.001	-	
2437	6	802.11b	DSSS	22	13.0	12.99	0.13	Left	Cheek	2	0710M	1	99.9	0.089	-	1.002	1.001	-	
2437	6	802.11b	DSSS	22	13.0	12.99	-0.01	Left	Tilt	2	0710M	1	99.9	0.075	-	1.002	1.001	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

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**Table 11-10
DTS MIMO Head SAR – Open**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
2462	11	802.11n	OFDM	20	13.0	12.84	13.0	12.63	0.05	Right	Cheek	MIMO	0710M	13	99.7	0.668	0.348	1.089	1.003	0.380	A9
2462	11	802.11n	OFDM	20	13.0	12.84	13.0	12.63	0.15	Right	Tilt	MIMO	0710M	13	99.7	0.388	-	1.089	1.003	-	
2462	11	802.11n	OFDM	20	13.0	12.84	13.0	12.63	0.17	Left	Cheek	MIMO	0710M	13	99.7	0.244	-	1.089	1.003	-	
2462	11	802.11n	OFDM	20	13.0	12.84	13.0	12.63	0.15	Left	Tilt	MIMO	0710M	13	99.7	0.251	-	1.089	1.003	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram											

Note: To achieve the 16.0 dBm maximum allowed MIMO power shown in the documentation each antenna transmits at a maximum allowed power of 13.0 dBm.

**Table 11-11
NII SISO Head SAR - Open**

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5290	58	802.11ac	OFDM	80	11.0	10.69	0.07	Right	Cheek	1	0880M	29.3	99.7	0.060	-	1.074	1.003	-	
5290	58	802.11ac	OFDM	80	11.0	10.69	0.17	Right	Tilt	1	0880M	29.3	99.7	0.058	-	1.074	1.003	-	
5290	58	802.11ac	OFDM	80	11.0	10.69	0.13	Left	Cheek	1	0880M	29.3	99.7	0.085	0.052	1.074	1.003	0.056	
5290	58	802.11ac	OFDM	80	11.0	10.69	0.13	Left	Tilt	1	0880M	29.3	99.7	0.084	-	1.074	1.003	-	
5690	138	802.11ac	OFDM	80	11.0	10.96	0.14	Right	Cheek	1	0880M	29.3	99.7	0.096	-	1.009	1.003	-	
5690	138	802.11ac	OFDM	80	11.0	10.96	0.07	Right	Tilt	1	0880M	29.3	99.7	0.094	-	1.009	1.003	-	
5690	138	802.11ac	OFDM	80	11.0	10.96	-0.13	Left	Cheek	1	0880M	29.3	99.7	0.106	-	1.009	1.003	-	
5690	138	802.11ac	OFDM	80	11.0	10.96	0.21	Left	Tilt	1	0880M	29.3	99.7	0.109	0.077	1.009	1.003	0.078	
5775	155	802.11ac	OFDM	80	11.0	10.85	0.13	Right	Cheek	1	0880M	29.3	99.7	0.091	-	1.035	1.003	-	
5775	155	802.11ac	OFDM	80	11.0	10.85	-0.18	Right	Tilt	1	0880M	29.3	99.7	0.076	-	1.035	1.003	-	
5775	155	802.11ac	OFDM	80	11.0	10.85	0.01	Left	Cheek	1	0880M	29.3	99.7	0.105	-	1.035	1.003	-	
5775	155	802.11ac	OFDM	80	11.0	10.85	0.02	Left	Tilt	1	0880M	29.3	99.7	0.117	0.069	1.035	1.003	0.072	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

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**Table 11-12
NII MIMO Head SAR - Open**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
5290	58	802.11ac	OFDM	80	11.0	10.69	11.0	10.95	0.04	Right	Cheek	MIMO	0880M	58.5	99.7	0.197	0.165	1.074	1.003	0.178	A10
5290	58	802.11ac	OFDM	80	11.0	10.69	11.0	10.95	-0.05	Right	Tilt	MIMO	0880M	58.5	99.7	0.119	-	1.074	1.003	-	
5290	58	802.11ac	OFDM	80	11.0	10.69	11.0	10.95	-0.04	Left	Cheek	MIMO	0880M	58.5	99.7	0.095	-	1.074	1.003	-	
5290	58	802.11ac	OFDM	80	11.0	10.69	11.0	10.95	-0.14	Left	Tilt	MIMO	0880M	58.5	99.7	0.098	-	1.074	1.003	-	
5690	138	802.11ac	OFDM	80	11.0	10.96	11.0	10.73	-0.04	Right	Cheek	MIMO	0880M	58.5	99.7	0.145	0.104	1.064	1.003	0.111	
5690	138	802.11ac	OFDM	80	11.0	10.96	11.0	10.73	-0.04	Right	Tilt	MIMO	0880M	58.5	99.7	0.089	-	1.064	1.003	-	
5690	138	802.11ac	OFDM	80	11.0	10.96	11.0	10.73	-0.05	Left	Cheek	MIMO	0880M	58.5	99.7	0.104	-	1.064	1.003	-	
5690	138	802.11ac	OFDM	80	11.0	10.96	11.0	10.73	-0.19	Left	Tilt	MIMO	0880M	58.5	99.7	0.100	-	1.064	1.003	-	
5775	155	802.11ac	OFDM	80	11.0	10.85	11.0	10.67	0.04	Right	Cheek	MIMO	0880M	58.5	99.7	0.287	0.164	1.079	1.003	0.177	
5775	155	802.11ac	OFDM	80	11.0	10.85	11.0	10.67	-0.02	Right	Tilt	MIMO	0880M	58.5	99.7	0.162	-	1.079	1.003	-	
5775	155	802.11ac	OFDM	80	11.0	10.85	11.0	10.67	0.04	Left	Cheek	MIMO	0880M	58.5	99.7	0.162	-	1.079	1.003	-	
5775	155	802.11ac	OFDM	80	11.0	10.85	11.0	10.67	0.05	Left	Tilt	MIMO	0880M	58.5	99.7	0.142	-	1.079	1.003	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram											

Note: To achieve the 14.0 dBm maximum allowed MIMO power shown in the documentation each antenna transmits at a maximum allowed power of 11.0 dBm.

**Table 11-13
DSS Head SAR - Open**

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)			(W/kg)	
2441.00	39	Bluetooth	FHSS	10.0	8.62	0.15	Right	Cheek	1	0710M	1	76.80	0.039	1.374	1.302	0.070	
2441.00	39	Bluetooth	FHSS	10.0	8.62	0.17	Right	Tilt	1	0710M	1	76.80	0.027	1.374	1.302	0.048	
2441.00	39	Bluetooth	FHSS	10.0	8.62	0.16	Left	Cheek	1	0710M	1	76.80	0.072	1.374	1.302	0.129	
2441.00	39	Bluetooth	FHSS	10.0	8.62	0.04	Left	Tilt	1	0710M	1	76.80	0.063	1.374	1.302	0.113	
2441.00	39	Bluetooth	FHSS	10.0	9.29	0.14	Right	Cheek	2	0710M	1	76.80	0.123	1.178	1.302	0.189	A11
2441.00	39	Bluetooth	FHSS	10.0	9.29	0.18	Right	Tilt	2	0710M	1	76.80	0.069	1.178	1.302	0.106	
2441.00	39	Bluetooth	FHSS	10.0	9.29	0.13	Left	Cheek	2	0710M	1	76.80	0.024	1.178	1.302	0.037	
2441.00	39	Bluetooth	FHSS	10.0	9.29	0.19	Left	Tilt	2	0710M	1	76.80	0.018	1.178	1.302	0.028	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram							

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11.2 Standalone Body-Worn SAR Data

Table 11-14
GSM/UMTS Body-Worn SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Configuration	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
824.20	128	GSM 850	GSM	33.0	32.70	-0.01	15 mm	Open	0015M	1	1:8.3	back	0.120	1.072	0.129	
824.20	128	GSM 850	GSM	33.0	32.70	-0.01	15 mm	Closed	0006M	1	1:8.3	back	0.236	1.072	0.253	A12
1850.20	512	GSM 1900	GSM	30.0	28.86	-0.01	15 mm	Open	0006M	1	1:8.3	back	0.385	1.300	0.501	A14
1850.20	512	GSM 1900	GSM	30.0	28.86	0.04	15 mm	Closed	0006M	1	1:8.3	back	0.157	1.300	0.204	
826.40	4132	UMTS 850	RMC	25.5	24.27	0.02	15 mm	Open	0030M	N/A	1:1	back	0.249	1.327	0.330	
826.40	4132	UMTS 850	RMC	25.5	24.27	-0.02	15 mm	Closed	0030M	N/A	1:1	back	0.352	1.327	0.467	A16
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-15
LTE Body-Worn SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Configuration	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
707.50	23095	Mid	LTE Band 12	10	24.0	23.29	-0.03	0	Open	0026M	QPSK	1	0	15 mm	back	1:1	0.149	1.178	0.176	A18
707.50	23095	Mid	LTE Band 12	10	23.0	22.40	-0.01	1	Open	0026M	QPSK	25	0	15 mm	back	1:1	0.123	1.148	0.141	
707.50	23095	Mid	LTE Band 12	10	24.0	23.29	-0.02	0	Closed	0037M	QPSK	1	0	15 mm	back	1:1	0.108	1.178	0.127	
707.50	23095	Mid	LTE Band 12	10	23.0	22.40	0.00	1	Closed	0037M	QPSK	25	0	15 mm	back	1:1	0.102	1.148	0.117	
782.00	23230	Mid	LTE Band 13	10	24.0	23.18	-0.18	0	Open	0026M	QPSK	1	0	15 mm	back	1:1	0.131	1.208	0.158	
782.00	23230	Mid	LTE Band 13	10	23.0	22.37	0.02	1	Open	0026M	QPSK	25	25	15 mm	back	1:1	0.119	1.156	0.138	
782.00	23230	Mid	LTE Band 13	10	24.0	23.18	-0.01	0	Closed	0026M	QPSK	1	0	15 mm	back	1:1	0.215	1.208	0.260	A20
782.00	23230	Mid	LTE Band 13	10	23.0	22.37	0.08	1	Closed	0026M	QPSK	25	25	15 mm	back	1:1	0.183	1.156	0.212	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.7	25.11	-0.02	0	Open	0030M	QPSK	1	25	15 mm	back	1:1	0.231	1.146	0.265	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.7	24.23	0.01	1	Open	0030M	QPSK	25	12	15 mm	back	1:1	0.187	1.114	0.208	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.7	25.11	-0.02	0	Closed	0030M	QPSK	1	25	15 mm	back	1:1	0.328	1.146	0.376	A22
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.7	24.23	-0.05	1	Closed	0030M	QPSK	25	12	15 mm	back	1:1	0.270	1.114	0.301	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.12	0.03	0	Open	0006M	QPSK	1	50	15 mm	back	1:1	0.545	1.225	0.668	A24
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.0	22.29	0.01	1	Open	0006M	QPSK	50	25	15 mm	back	1:1	0.448	1.178	0.528	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.12	-0.10	0	Closed	0006M	QPSK	1	50	15 mm	back	1:1	0.222	1.225	0.272	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.0	22.29	-0.03	1	Closed	0006M	QPSK	50	25	15 mm	back	1:1	0.183	1.178	0.216	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram												

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**Table 11-16
LTE Band 41 Body-Worn SAR**

MEASUREMENT RESULTS																						
1 CC Uplink / 2 CC Uplink, Power Class	Component Carrier	FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Configuration	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
		MHz	Ch.															(W/kg)		(W/kg)		
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	25.0	24.36	0.01	0	Open	0080M	QPSK	1	0	15 mm	back	1:1.58	0.201	1.159	0.233	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	25.0	24.86	0.02	0	Open	0080M	QPSK	1	50	15 mm	back	1:1.58	0.229	1.033	0.237	A26
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.0	23.94	-0.08	1	Open	0080M	QPSK	50	50	15 mm	back	1:1.58	0.160	1.014	0.162	
2 CC Uplink - Power Class 3	PCC	2680.00	41490	High	LTE Band 41	20	25.0	24.69	0.05	0	Open	0080M	QPSK	1	0	15 mm	back	1:1.58	0.226	1.074	0.243	
	SCC	2660.20	41292																			
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	25.0	24.86	-0.05	0	Closed	0080M	QPSK	1	50	15 mm	back	1:1.58	0.192	1.033	0.198	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.0	23.94	0.05	1	Closed	0080M	QPSK	50	50	15 mm	back	1:1.58	0.151	1.014	0.153	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram									

**Table 11-17
DTS Body-Worn SISO SAR**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Configuration	Device Serial Number	Data Rate [Mbps]	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)	(W/kg)			(W/kg)		
2437	6	802.11b	DSSS	22	18.5	18.40	0.17	15 mm	2	Open	0710M	1	back	99.9	0.058	0.047	1.023	1.001	0.048		
2437	6	802.11b	DSSS	22	18.5	18.40	-0.13	15 mm	2	Closed	0710M	1	back	99.9	0.011	0.009	1.023	1.001	0.009		
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram								




**Table 11-18
DTS MIMO Body-Worn SAR**

MEASUREMENT RESULTS																						
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Configuration	Device Serial Number	Data Rate [Mbps]	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.																(W/kg)	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	18.5	18.49	18.5	18.23	-0.03	15 mm	MIMO	Open	0710M	1	back	99.9	0.182	0.145	1.064	1.001	0.154	A28
2412	1	802.11b	DSSS	22	18.5	18.49	18.5	18.23	0.10	15 mm	MIMO	Closed	0710M	1	back	99.9	0.060	0.048	1.064	1.001	0.051	
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: To achieve the 21.5 dBm maximum allowed MIMO power shown in the documentation each antenna transmits at a maximum allowed power of 18.5 dBm.

**Table 11-19
NII SISO Body-Worn SAR**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Configuration	Device Serial Number	Data Rate [Mbps]	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)	(W/kg)			(W/kg)		
5300	60	802.11a	OFDM	20	18.0	17.66	-0.11	15 mm	1	Open	0880M	6	back	98.9	0.059	0.029	1.081	1.011	0.032		
5300	60	802.11a	OFDM	20	18.0	17.66	0.01	15 mm	1	Closed	0880M	6	back	98.9	0.007	0.000	1.081	1.011	0.000		
5600	120	802.11a	OFDM	20	18.0	17.92	-0.12	15 mm	1	Open	0880M	6	back	98.9	0.079	0.045	1.019	1.011	0.046		
5600	120	802.11a	OFDM	20	18.0	17.92	0.13	15 mm	1	Closed	0880M	6	back	98.9	0.000	0.000	1.019	1.011	0.000		
5745	149	802.11a	OFDM	20	18.0	17.87	0.13	15 mm	1	Open	0880M	6	back	98.9	0.092	0.056	1.030	1.011	0.058		
5745	149	802.11a	OFDM	20	18.0	17.87	0.11	15 mm	1	Closed	0880M	6	back	98.9	0.018	0.000	1.030	1.011	0.000		
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram								

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**Table 11-20
NII MIMO Body-Worn SAR**

MEASUREMENT RESULTS																						
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Configuration	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.																(W/kg)	(W/kg)			(W/kg)	
5260	52	802.11n	OFDM	20	18.0	17.33	18.0	17.90	0.01	15 mm	MIMO	Open	0880M	13	back	99.7	0.112	0.077	1.167	1.003	0.090	A30
5260	52	802.11n	OFDM	20	18.0	17.33	18.0	17.90	-0.13	15 mm	MIMO	Closed	0880M	13	back	99.7	0.061	0.037	1.167	1.003	0.043	
5600	120	802.11n	OFDM	20	18.0	17.82	18.0	17.87	-0.10	15 mm	MIMO	Open	0880M	13	back	99.7	0.103	0.055	1.042	1.003	0.057	
5600	120	802.11n	OFDM	20	18.0	17.82	18.0	17.87	-0.05	15 mm	MIMO	Closed	0880M	13	back	99.7	0.005	0.000	1.042	1.003	0.000	
5745	149	802.11n	OFDM	20	18.0	17.89	18.0	17.76	0.18	15 mm	MIMO	Open	0880M	13	back	99.7	0.075	0.050	1.057	1.003	0.053	
5745	149	802.11n	OFDM	20	18.0	17.89	18.0	17.76	-0.15	15 mm	MIMO	Closed	0880M	13	back	99.7	0.011	0.004	1.057	1.003	0.004	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT										Body												
Spatial Peak										1.6 W/kg (mW/g)												
Uncontrolled Exposure/General Population										averaged over 1 gram												



Note: To achieve the 21.0 dBm maximum allowed MIMO power shown in the documentation each antenna transmits at a maximum allowed power of 18.0 dBm.

**Table 11-21
DSS Body-Worn SAR - Open**

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	16.0	15.43	0.03	15 mm	1	0710M	1	back	76.8	0.032	1.140	1.302	0.047	A32
2441	39	Bluetooth	FHSS	17.0	16.61	0.14	15 mm	2	0710M	1	back	76.80	0.027	1.094	1.302	0.038	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT										Body							
Spatial Peak										1.6 W/kg (mW/g)							
Uncontrolled Exposure/General Population										averaged over 1 gram							

**Table 11-22
DSS Body-Worn SAR - Closed**

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	16.0	15.43	-0.03	15 mm	1	0710M	1	back	76.80	0.011	1.140	1.302	0.016	
2441	39	Bluetooth	FHSS	17.0	16.61	-0.10	15 mm	2	0710M	1	back	76.80	0.004	1.094	1.302	0.006	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT										Body							
Spatial Peak										1.6 W/kg (mW/g)							
Uncontrolled Exposure/General Population										averaged over 1 gram							



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11.3 Standalone Hotspot SAR Data

**Table 11-23
GPRS/UMTS Hotspot SAR Data**




MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Configuration	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
824.20	128	GSM 850	GPRS	29.0	29.00	-0.14	10 mm	Open	0015M	3	1:2.76	back	0.319	1.000	0.319	
824.20	128	GSM 850	GPRS	29.0	29.00	0.01	10 mm	Open	0015M	3	1:2.76	front	0.250	1.000	0.250	
824.20	128	GSM 850	GPRS	29.0	29.00	-0.17	10 mm	Open	0015M	3	1:2.76	bottom	0.159	1.000	0.159	
824.20	128	GSM 850	GPRS	29.0	29.00	-0.05	10 mm	Open	0015M	3	1:2.76	right	0.286	1.000	0.286	
824.20	128	GSM 850	GPRS	29.0	29.00	0.09	10 mm	Open	0015M	3	1:2.76	left	0.088	1.000	0.088	
824.20	128	GSM 850	GPRS	29.0	29.00	-0.15	5 mm	Closed	0080M	3	1:2.76	back	0.949	1.000	0.949	A13
836.60	190	GSM 850	GPRS	29.0	28.12	-0.11	5 mm	Closed	0080M	3	1:2.76	back	0.738	1.225	0.904	
848.80	251	GSM 850	GPRS	29.0	28.80	-0.15	5 mm	Closed	0080M	3	1:2.76	back	0.697	1.047	0.730	
824.20	128	GSM 850	GPRS	29.0	29.00	0.00	5 mm	Closed	0080M	3	1:2.76	front	0.203	1.000	0.203	
824.20	128	GSM 850	GPRS	29.0	29.00	-0.05	5 mm	Closed	0080M	3	1:2.76	bottom	0.226	1.000	0.226	
824.20	128	GSM 850	GPRS	29.0	29.00	0.01	5 mm	Closed	0080M	3	1:2.76	right	0.111	1.000	0.111	
824.20	128	GSM 850	GPRS	29.0	29.00	0.09	5 mm	Closed	0080M	3	1:2.76	left	0.172	1.000	0.172	
824.20	128	GSM 850	GPRS	29.0	29.00	-0.13	5 mm	Closed	0080M	3	1:2.76	back	0.816	1.000	0.816	
1880.00	661	GSM 1900	GPRS	21.5	21.02	-0.04	10 mm	Open	0006M	3	1:2.76	back	0.353	1.117	0.394	
1880.00	661	GSM 1900	GPRS	21.5	21.02	-0.19	10 mm	Open	0006M	3	1:2.76	front	0.254	1.117	0.284	
1880.00	661	GSM 1900	GPRS	21.5	21.02	-0.05	10 mm	Open	0006M	3	1:2.76	bottom	0.523	1.117	0.584	
1880.00	661	GSM 1900	GPRS	21.5	21.02	0.12	10 mm	Open	0006M	3	1:2.76	right	0.050	1.117	0.056	
1880.00	661	GSM 1900	GPRS	21.5	21.02	0.17	10 mm	Open	0006M	3	1:2.76	left	0.133	1.117	0.149	
1880.00	661	GSM 1900	GPRS	21.5	21.02	0.03	5 mm	Closed	0710M	3	1:2.76	back	0.380	1.117	0.424	
1880.00	661	GSM 1900	GPRS	21.5	21.02	0.02	5 mm	Closed	0710M	3	1:2.76	front	0.130	1.117	0.145	
1850.20	512	GSM 1900	GPRS	21.5	20.82	-0.10	5 mm	Closed	0710M	3	1:2.76	bottom	0.678	1.169	0.793	
1880.00	661	GSM 1900	GPRS	21.5	21.02	-0.05	5 mm	Closed	0710M	3	1:2.76	bottom	0.704	1.117	0.786	
1909.80	810	GSM 1900	GPRS	21.5	20.98	-0.02	5 mm	Closed	0710M	3	1:2.76	bottom	0.793	1.127	0.894	A15
1880.00	661	GSM 1900	GPRS	21.5	21.02	0.04	5 mm	Closed	0710M	3	1:2.76	right	0.042	1.117	0.047	
1880.00	661	GSM 1900	GPRS	21.5	21.02	-0.02	5 mm	Closed	0710M	3	1:2.76	left	0.097	1.117	0.108	
826.40	4132	UMTS 850	RMC	24.0	23.73	-0.11	10 mm	Open	0080M	N/A	1:1	back	0.291	1.064	0.310	
826.40	4132	UMTS 850	RMC	24.0	23.73	-0.02	10 mm	Open	0080M	N/A	1:1	front	0.175	1.064	0.186	
826.40	4132	UMTS 850	RMC	24.0	23.73	-0.02	10 mm	Open	0080M	N/A	1:1	bottom	0.120	1.064	0.128	
826.40	4132	UMTS 850	RMC	24.0	23.73	0.01	10 mm	Open	0080M	N/A	1:1	right	0.227	1.064	0.242	
826.40	4132	UMTS 850	RMC	24.0	23.73	-0.01	10 mm	Open	0080M	N/A	1:1	left	0.083	1.064	0.088	
826.40	4132	UMTS 850	RMC	24.0	23.73	-0.13	5 mm	Closed	0006M	N/A	1:1	back	0.718	1.064	0.764	
836.60	4183	UMTS 850	RMC	24.0	23.53	-0.03	5 mm	Closed	0006M	N/A	1:1	back	0.789	1.114	0.879	A17
846.60	4233	UMTS 850	RMC	24.0	23.32	-0.03	5 mm	Closed	0006M	N/A	1:1	back	0.687	1.169	0.803	
826.40	4132	UMTS 850	RMC	24.0	23.73	0.03	5 mm	Closed	0006M	N/A	1:1	front	0.166	1.064	0.177	
826.40	4132	UMTS 850	RMC	24.0	23.73	-0.05	5 mm	Closed	0006M	N/A	1:1	bottom	0.218	1.064	0.232	
826.40	4132	UMTS 850	RMC	24.0	23.73	0.10	5 mm	Closed	0006M	N/A	1:1	right	0.096	1.064	0.102	
826.40	4132	UMTS 850	RMC	24.0	23.73	-0.12	5 mm	Closed	0006M	N/A	1:1	left	0.131	1.064	0.139	
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 entries represent variability measurements.

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**Table 11-24
LTE Band 12 Hotspot SAR**

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Configuration	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
707.50	23095	Mid	LTE Band 12	10	24.0	23.29	0.03	0	Open	0026M	QPSK	1	0	10 mm	back	1:1	0.173	1.178	0.204	
707.50	23095	Mid	LTE Band 12	10	23.0	22.40	0.04	1	Open	0026M	QPSK	25	0	10 mm	back	1:1	0.144	1.148	0.165	
707.50	23095	Mid	LTE Band 12	10	24.0	23.29	-0.01	0	Open	0026M	QPSK	1	0	10 mm	front	1:1	0.166	1.178	0.196	
707.50	23095	Mid	LTE Band 12	10	23.0	22.40	0.01	1	Open	0026M	QPSK	25	0	10 mm	front	1:1	0.136	1.148	0.156	
707.50	23095	Mid	LTE Band 12	10	24.0	23.29	0.06	0	Open	0026M	QPSK	1	0	10 mm	bottom	1:1	0.037	1.178	0.044	
707.50	23095	Mid	LTE Band 12	10	23.0	22.40	0.11	1	Open	0026M	QPSK	25	0	10 mm	bottom	1:1	0.026	1.148	0.030	
707.50	23095	Mid	LTE Band 12	10	24.0	23.29	0.04	0	Open	0026M	QPSK	1	0	10 mm	right	1:1	0.159	1.178	0.187	
707.50	23095	Mid	LTE Band 12	10	23.0	22.40	0.11	1	Open	0026M	QPSK	25	0	10 mm	right	1:1	0.135	1.148	0.155	
707.50	23095	Mid	LTE Band 12	10	24.0	23.29	-0.02	0	Open	0026M	QPSK	1	0	10 mm	left	1:1	0.163	1.178	0.192	
707.50	23095	Mid	LTE Band 12	10	23.0	22.40	-0.05	1	Open	0026M	QPSK	25	0	10 mm	left	1:1	0.132	1.148	0.152	
707.50	23095	Mid	LTE Band 12	10	24.0	23.29	-0.11	0	Closed	0037M	QPSK	1	0	5 mm	back	1:1	0.346	1.178	0.408	A19
707.50	23095	Mid	LTE Band 12	10	23.0	22.40	-0.10	1	Closed	0037M	QPSK	25	0	5 mm	back	1:1	0.319	1.148	0.366	
707.50	23095	Mid	LTE Band 12	10	24.0	23.29	-0.08	0	Closed	0037M	QPSK	1	0	5 mm	front	1:1	0.067	1.178	0.079	
707.50	23095	Mid	LTE Band 12	10	23.0	22.40	0.15	1	Closed	0037M	QPSK	25	0	5 mm	front	1:1	0.048	1.148	0.055	
707.50	23095	Mid	LTE Band 12	10	24.0	23.29	-0.07	0	Closed	0037M	QPSK	1	0	5 mm	bottom	1:1	0.058	1.178	0.068	
707.50	23095	Mid	LTE Band 12	10	23.0	22.40	-0.03	1	Closed	0037M	QPSK	25	0	5 mm	bottom	1:1	0.043	1.148	0.049	
707.50	23095	Mid	LTE Band 12	10	24.0	23.29	0.20	0	Closed	0037M	QPSK	1	0	5 mm	right	1:1	0.080	1.178	0.094	
707.50	23095	Mid	LTE Band 12	10	23.0	22.40	0.09	1	Closed	0037M	QPSK	25	0	5 mm	right	1:1	0.063	1.148	0.072	
707.50	23095	Mid	LTE Band 12	10	24.0	23.29	0.09	0	Closed	0037M	QPSK	1	0	5 mm	left	1:1	0.087	1.178	0.102	
707.50	23095	Mid	LTE Band 12	10	23.0	22.40	0.00	1	Closed	0037M	QPSK	25	0	5 mm	left	1:1	0.070	1.148	0.080	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram												

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**Table 11-25
LTE Band 13 Hotspot SAR**

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Configuration	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
782.00	23230	Mid	LTE Band 13	10	24.0	23.18	-0.02	0	Open	0026M	QPSK	1	0	10 mm	back	1:1	0.238	1.208	0.288	
782.00	23230	Mid	LTE Band 13	10	23.0	22.37	-0.07	1	Open	0026M	QPSK	25	25	10 mm	back	1:1	0.214	1.156	0.247	
782.00	23230	Mid	LTE Band 13	10	24.0	23.18	-0.06	0	Open	0026M	QPSK	1	0	10 mm	front	1:1	0.182	1.208	0.220	
782.00	23230	Mid	LTE Band 13	10	23.0	22.37	-0.04	1	Open	0026M	QPSK	25	25	10 mm	front	1:1	0.165	1.156	0.191	
782.00	23230	Mid	LTE Band 13	10	24.0	23.18	0.01	0	Open	0026M	QPSK	1	0	10 mm	bottom	1:1	0.099	1.208	0.120	
782.00	23230	Mid	LTE Band 13	10	23.0	22.37	-0.04	1	Open	0026M	QPSK	25	25	10 mm	bottom	1:1	0.090	1.156	0.104	
782.00	23230	Mid	LTE Band 13	10	24.0	23.18	0.11	0	Open	0026M	QPSK	1	0	10 mm	right	1:1	0.174	1.208	0.210	
782.00	23230	Mid	LTE Band 13	10	23.0	22.37	-0.01	1	Open	0026M	QPSK	25	25	10 mm	right	1:1	0.144	1.156	0.166	
782.00	23230	Mid	LTE Band 13	10	24.0	23.18	0.03	0	Open	0026M	QPSK	1	0	10 mm	left	1:1	0.048	1.208	0.058	
782.00	23230	Mid	LTE Band 13	10	23.0	22.37	0.10	1	Open	0026M	QPSK	25	25	10 mm	left	1:1	0.045	1.156	0.052	
782.00	23230	Mid	LTE Band 13	10	24.0	23.18	-0.17	0	Closed	0026M	QPSK	1	0	5 mm	back	1:1	0.639	1.208	0.772	A21
782.00	23230	Mid	LTE Band 13	10	23.0	22.37	-0.13	1	Closed	0026M	QPSK	25	25	5 mm	back	1:1	0.552	1.156	0.638	
782.00	23230	Mid	LTE Band 13	10	24.0	23.18	0.08	0	Closed	0026M	QPSK	1	0	5 mm	front	1:1	0.223	1.208	0.269	
782.00	23230	Mid	LTE Band 13	10	23.0	22.37	0.09	1	Closed	0026M	QPSK	25	25	5 mm	front	1:1	0.191	1.156	0.221	
782.00	23230	Mid	LTE Band 13	10	24.0	23.18	0.08	0	Closed	0026M	QPSK	1	0	5 mm	bottom	1:1	0.158	1.208	0.191	
782.00	23230	Mid	LTE Band 13	10	23.0	22.37	0.00	1	Closed	0026M	QPSK	25	25	5 mm	bottom	1:1	0.137	1.156	0.158	
782.00	23230	Mid	LTE Band 13	10	24.0	23.18	-0.02	0	Closed	0026M	QPSK	1	0	5 mm	right	1:1	0.077	1.208	0.093	
782.00	23230	Mid	LTE Band 13	10	23.0	22.37	0.07	1	Closed	0026M	QPSK	25	25	5 mm	right	1:1	0.067	1.156	0.077	
782.00	23230	Mid	LTE Band 13	10	24.0	23.18	0.14	0	Closed	0026M	QPSK	1	0	5 mm	left	1:1	0.133	1.208	0.161	
782.00	23230	Mid	LTE Band 13	10	23.0	22.37	0.07	1	Closed	0026M	QPSK	25	25	5 mm	left	1:1	0.122	1.156	0.141	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram												

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**Table 11-26
LTE Band 5 (Cell) Hotspot SAR**




MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Configuration	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.14	-0.05	0	Open	0080M	QPSK	1	0	10 mm	back	1:1	0.258	1.219	0.315	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.17	-0.03	0	Open	0080M	QPSK	25	25	10 mm	back	1:1	0.256	1.211	0.310	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.14	0.03	0	Open	0080M	QPSK	1	0	10 mm	front	1:1	0.180	1.219	0.219	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.17	0.02	0	Open	0080M	QPSK	25	25	10 mm	front	1:1	0.177	1.211	0.214	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.14	0.10	0	Open	0080M	QPSK	1	0	10 mm	bottom	1:1	0.046	1.219	0.056	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.17	0.02	0	Open	0080M	QPSK	25	25	10 mm	bottom	1:1	0.044	1.211	0.053	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.14	0.04	0	Open	0080M	QPSK	1	0	10 mm	right	1:1	0.185	1.219	0.226	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.17	0.02	0	Open	0080M	QPSK	25	25	10 mm	right	1:1	0.179	1.211	0.217	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.14	0.03	0	Open	0080M	QPSK	1	0	10 mm	left	1:1	0.141	1.219	0.172	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.17	0.02	0	Open	0080M	QPSK	25	25	10 mm	left	1:1	0.146	1.211	0.177	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.14	-0.04	0	Closed	0080M	QPSK	1	0	5 mm	back	1:1	0.693	1.219	0.845	A23
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.17	-0.02	0	Closed	0080M	QPSK	25	25	5 mm	back	1:1	0.679	1.211	0.822	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.10	-0.06	0	Closed	0080M	QPSK	50	0	5 mm	back	1:1	0.680	1.230	0.836	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.14	-0.04	0	Closed	0080M	QPSK	1	0	5 mm	front	1:1	0.119	1.219	0.145	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.17	-0.04	0	Closed	0080M	QPSK	25	25	5 mm	front	1:1	0.121	1.211	0.147	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.14	-0.02	0	Closed	0080M	QPSK	1	0	5 mm	bottom	1:1	0.116	1.219	0.144	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.17	0.01	0	Closed	0080M	QPSK	25	25	5 mm	bottom	1:1	0.110	1.211	0.133	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.14	0.05	0	Closed	0080M	QPSK	1	0	5 mm	right	1:1	0.076	1.219	0.093	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.17	0.06	0	Closed	0080M	QPSK	25	25	5 mm	right	1:1	0.076	1.211	0.092	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.14	0.10	0	Closed	0080M	QPSK	1	0	5 mm	left	1:1	0.182	1.219	0.222	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.17	-0.01	0	Closed	0080M	QPSK	25	25	5 mm	left	1:1	0.183	1.211	0.222	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram											

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**Table 11-27
LTE Band 4 (AWS) Hotspot SAR**




MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Configuration	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.52	-0.01	0	Open	0006M	QPSK	1	0	10 mm	back	1:1	0.394	1.117	0.440	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.62	0.01	0	Open	0006M	QPSK	50	50	10 mm	back	1:1	0.418	1.091	0.456	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.52	0.12	0	Open	0006M	QPSK	1	0	10 mm	front	1:1	0.309	1.117	0.345	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.62	0.01	0	Open	0006M	QPSK	50	50	10 mm	front	1:1	0.329	1.091	0.359	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.52	-0.04	0	Open	0006M	QPSK	1	0	10 mm	bottom	1:1	0.552	1.117	0.617	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.62	-0.02	0	Open	0006M	QPSK	50	50	10 mm	bottom	1:1	0.585	1.091	0.638	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.52	-0.18	0	Open	0006M	QPSK	1	0	10 mm	right	1:1	0.029	1.117	0.032	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.62	0.05	0	Open	0006M	QPSK	50	50	10 mm	right	1:1	0.031	1.091	0.034	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.52	0.05	0	Open	0006M	QPSK	1	0	10 mm	left	1:1	0.053	1.117	0.059	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.62	0.09	0	Open	0006M	QPSK	50	50	10 mm	left	1:1	0.053	1.091	0.058	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.52	-0.01	0	Closed	0006M	QPSK	1	0	5 mm	back	1:1	0.597	1.117	0.667	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.62	-0.07	0	Closed	0006M	QPSK	50	50	5 mm	back	1:1	0.617	1.091	0.673	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.52	-0.06	0	Closed	0006M	QPSK	1	0	5 mm	front	1:1	0.100	1.117	0.112	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.62	0.00	0	Closed	0006M	QPSK	50	50	5 mm	front	1:1	0.106	1.091	0.116	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.52	-0.11	0	Closed	0006M	QPSK	1	0	5 mm	bottom	1:1	0.800	1.117	0.894	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.62	-0.13	0	Closed	0006M	QPSK	50	50	5 mm	bottom	1:1	0.840	1.091	0.916	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.51	-0.20	0	Closed	0006M	QPSK	100	0	5 mm	bottom	1:1	0.852	1.119	0.953	A25
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.52	0.14	0	Closed	0006M	QPSK	1	0	5 mm	right	1:1	0.022	1.117	0.025	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.62	0.12	0	Closed	0006M	QPSK	50	50	5 mm	right	1:1	0.023	1.091	0.025	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.52	-0.02	0	Closed	0006M	QPSK	1	0	5 mm	left	1:1	0.140	1.117	0.156	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.62	-0.08	0	Closed	0006M	QPSK	50	50	5 mm	left	1:1	0.160	1.091	0.175	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	19.0	18.51	-0.01	0	Closed	0006M	QPSK	100	0	5 mm	bottom	1:1	0.847	1.119	0.948	
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 entries represent variability measurements.

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**Table 11-28
LTE Band 41 Hotspot SAR**

MEASUREMENT RESULTS																						
1 CC Uplink 2 CC Uplink, Power Class	Component Carrier	FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Configuration	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
		Mhz	Ch.															(W/kg)		(W/kg)		
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.42	0.00	0	Open	0080M	QPSK	1	50	10 mm	back	1:1.58	0.128	1.019	0.130	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.46	-0.01	0	Open	0080M	QPSK	50	50	10 mm	back	1:1.58	0.128	1.009	0.129	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.42	-0.03	0	Open	0080M	QPSK	1	50	10 mm	front	1:1.58	0.085	1.019	0.087	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.46	-0.07	0	Open	0080M	QPSK	50	50	10 mm	front	1:1.58	0.084	1.009	0.085	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.42	0.00	0	Open	0080M	QPSK	1	50	10 mm	bottom	1:1.58	0.271	1.019	0.276	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.46	-0.04	0	Open	0080M	QPSK	50	50	10 mm	bottom	1:1.58	0.273	1.009	0.275	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.42	-0.14	0	Open	0080M	QPSK	1	50	10 mm	left	1:1.58	0.074	1.019	0.075	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.46	-0.07	0	Open	0080M	QPSK	50	50	10 mm	left	1:1.58	0.081	1.009	0.082	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.42	0.00	0	Closed	0080M	QPSK	1	50	5 mm	back	1:1.58	0.328	1.019	0.334	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.46	0.02	0	Closed	0080M	QPSK	50	50	5 mm	back	1:1.58	0.330	1.009	0.333	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.42	0.14	0	Closed	0080M	QPSK	1	50	5 mm	front	1:1.58	0.043	1.019	0.044	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.46	-0.02	0	Closed	0080M	QPSK	50	50	5 mm	front	1:1.58	0.047	1.009	0.047	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	19.5	18.35	0.00	0	Closed	0080M	QPSK	1	99	5 mm	bottom	1:1.58	0.587	1.303	0.765	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	19.5	18.89	0.01	0	Closed	0080M	QPSK	1	50	5 mm	bottom	1:1.58	0.611	1.151	0.703	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	19.5	18.38	0.05	0	Closed	0080M	QPSK	1	0	5 mm	bottom	1:1.58	0.639	1.294	0.827	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	19.5	18.68	0.04	0	Closed	0080M	QPSK	1	50	5 mm	bottom	1:1.58	0.681	1.208	0.823	
1 CC Uplink - Power Class 3	N/A	2636.50	41055	Md-High	LTE Band 41	20	19.5	19.14	0.02	0	Closed	0080M	QPSK	1	50	5 mm	bottom	1:1.58	0.744	1.086	0.808	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.42	0.19	0	Closed	0080M	QPSK	1	50	5 mm	bottom	1:1.58	0.661	1.019	0.674	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	19.5	18.37	0.05	0	Closed	0080M	QPSK	50	25	5 mm	bottom	1:1.58	0.584	1.297	0.757	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	19.5	18.96	0.04	0	Closed	0080M	QPSK	50	25	5 mm	bottom	1:1.58	0.622	1.132	0.704	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	19.5	18.80	0.13	0	Closed	0080M	QPSK	50	50	5 mm	bottom	1:1.58	0.692	1.175	0.813	
1 CC Uplink - Power Class 3	N/A	2636.50	41055	Md-High	LTE Band 41	20	19.5	19.23	0.08	0	Closed	0080M	QPSK	50	25	5 mm	bottom	1:1.58	0.751	1.064	0.799	A27
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.46	-0.05	0	Closed	0080M	QPSK	50	50	5 mm	bottom	1:1.58	0.652	1.009	0.658	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.34	0.10	0	Closed	0080M	QPSK	100	0	5 mm	bottom	1:1.58	0.644	1.038	0.668	
2 CC Uplink - Power Class 3	PCC	2593.00	40620	Mid	LTE Band 41	20	19.5	18.65	0.02	0	Closed	0080M	QPSK	1	99	5 mm	Bottom	1:1.58	0.693	1.216	0.843	
	SCC	2573.20	40422																			
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.42	0.02	0	Closed	0080M	QPSK	1	50	5 mm	left	1:1.58	0.203	1.019	0.207	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	19.5	19.46	0.00	0	Closed	0080M	QPSK	50	50	5 mm	left	1:1.58	0.213	1.009	0.215	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram												

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**Table 11-29
DTS SISO Hotspot SAR**

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Configuration	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.														W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	18.5	18.40	-0.21	10 mm	2	Open	0710M	1	back	99.9	0.133	-	1.023	1.001	-	
2437	6	802.11b	DSSS	22	18.5	18.40	0.01	10 mm	2	Open	0710M	1	front	99.9	0.203	0.148	1.023	1.001	0.152	
2437	6	802.11b	DSSS	22	18.5	18.40	0.05	10 mm	2	Open	0710M	1	top	99.9	0.093	-	1.023	1.001	-	
2437	6	802.11b	DSSS	22	18.5	18.40	0.03	10 mm	2	Open	0710M	1	left	99.9	0.180	-	1.023	1.001	-	
2437	6	802.11b	DSSS	22	18.5	18.40	-0.04	5 mm	2	Closed	0710M	1	back	99.9	0.049	0.040	1.023	1.001	0.041	
2437	6	802.11b	DSSS	22	18.5	18.40	-0.13	5 mm	2	Closed	0710M	1	front	99.9	0.234	-	1.023	1.001	-	
2437	6	802.11b	DSSS	22	18.5	18.40	0.00	5 mm	2	Closed	0710M	1	bottom	99.9	0.231	0.163	1.023	1.001	0.167	
2437	6	802.11b	DSSS	22	18.5	18.40	-0.03	5 mm	2	Closed	0710M	1	left	99.9	0.366	0.329	1.023	1.001	0.337	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram										



**Table 11-30
DTS MIMO Hotspot SAR**

MEASUREMENT RESULTS																						
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Configuration	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.																W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	18.5	18.49	18.5	18.23	-0.02	10 mm	MIMO	Open	0710M	1	back	99.9	0.374	0.315	1.064	1.001	0.335	
2412	1	802.11b	DSSS	22	18.5	18.49	18.5	18.23	0.04	10 mm	MIMO	Open	0710M	1	front	99.9	0.367	-	1.064	1.001	-	
2412	1	802.11b	DSSS	22	18.5	18.49	18.5	18.23	-0.06	10 mm	MIMO	Open	0710M	1	top	99.9	0.213	-	1.064	1.001	-	
2412	1	802.11b	DSSS	22	18.5	18.49	18.5	18.23	-0.01	10 mm	MIMO	Open	0710M	1	right	99.9	0.075	-	1.064	1.001	-	
2412	1	802.11b	DSSS	22	18.5	18.49	18.5	18.23	0.01	10 mm	MIMO	Open	0710M	1	left	99.9	0.325	-	1.064	1.001	-	
2412	1	802.11b	DSSS	22	18.5	18.49	18.5	18.23	-0.06	5 mm	MIMO	Closed	0710M	1	back	99.9	0.214	0.176	1.064	1.001	0.187	
2412	1	802.11b	DSSS	22	18.5	18.49	18.5	18.23	0.01	5 mm	MIMO	Closed	0710M	1	front	99.9	0.558	0.493	1.064	1.001	0.525	A29
2412	1	802.11b	DSSS	22	18.5	18.49	18.5	18.23	0.00	5 mm	MIMO	Closed	0710M	1	bottom	99.9	0.446	0.355	1.064	1.001	0.378	
2412	1	802.11b	DSSS	22	18.5	18.49	18.5	18.23	0.00	5 mm	MIMO	Closed	0710M	1	right	99.9	0.177	-	1.064	1.001	-	
2412	1	802.11b	DSSS	22	18.5	18.49	18.5	18.23	0.12	5 mm	MIMO	Closed	0710M	1	left	99.9	0.450	0.359	1.064	1.001	0.362	
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: To achieve the 21.5 dBm maximum allowed MIMO power shown in the documentation each antenna transmits at a maximum allowed power of 18.5 dBm.

**Table 11-31
NII SISO Hotspot SAR**

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Configuration	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.														W/kg	(W/kg)			(W/kg)	
5745	149	802.11a	OFDM	20	18.0	17.87	-0.07	10 mm	1	Open	0880M	6	back	98.9	0.202	-	1.030	1.011	-	
5745	149	802.11a	OFDM	20	18.0	17.87	0.12	10 mm	1	Open	0880M	6	front	98.9	0.155	-	1.030	1.011	-	
5745	149	802.11a	OFDM	20	18.0	17.87	0.15	10 mm	1	Open	0880M	6	top	98.9	0.374	0.256	1.030	1.011	0.267	
5745	149	802.11a	OFDM	20	18.0	17.87	0.13	10 mm	1	Open	0880M	6	right	98.9	0.105	-	1.030	1.011	-	
5745	149	802.11a	OFDM	20	18.0	17.87	-0.05	5 mm	1	Closed	0880M	6	back	98.9	0.096	0.065	1.030	1.011	0.068	
5745	149	802.11a	OFDM	20	18.0	17.87	0.02	5 mm	1	Closed	0880M	6	front	98.9	0.405	-	1.030	1.011	-	
5745	149	802.11a	OFDM	20	18.0	17.87	-0.03	5 mm	1	Closed	0880M	6	bottom	98.9	0.506	0.349	1.030	1.011	0.363	
5745	149	802.11a	OFDM	20	18.0	17.87	0.05	5 mm	1	Closed	0880M	6	right	98.9	0.174	-	1.030	1.011	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram										

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**Table 11-32
NII SISO Hotspot SAR for Conditions with 2.4 GHz WLAN SAR – Closed**

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5775	155	802.11ac	OFDM	80	15.0	14.69	-0.18	5 mm	1	0710M	29.3	back	99.7	0.000	-	1.074	1.003	-	
5775	155	802.11ac	OFDM	80	15.0	14.69	-0.12	5 mm	1	0710M	29.3	front	99.7	0.154	-	1.074	1.003	-	
5775	155	802.11ac	OFDM	80	15.0	14.69	-0.19	5 mm	1	0710M	29.3	bottom	99.7	0.189	0.099	1.074	1.003	0.107	
5775	155	802.11ac	OFDM	80	15.0	14.69	0.15	5 mm	1	0710M	29.3	right	99.7	0.015	-	1.074	1.003	-	
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: 5 GHZ WLAN SISO was additionally evaluated at the maximum allowed output power during operations with Simultaneous 5 GHz WLAN and 2.4 GHz WLAN. 2.4 GHz WIFI was not transmitting during the above evaluations.

**Table 11-33
NII MIMO Hotspot SAR**



MEASUREMENT RESULTS																						
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Configuration	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.																W/kg	(W/kg)			(W/kg)	
5745	149	802.11n	OFDM	20	18.0	17.89	18.0	17.76	0.07	10 mm	MIMO	Open	0880M	13	back	99.7	0.145	-	1.057	1.003	-	
5745	149	802.11n	OFDM	20	18.0	17.89	18.0	17.76	0.13	10 mm	MIMO	Open	0880M	13	front	99.7	0.147	-	1.057	1.003	-	
5745	149	802.11n	OFDM	20	18.0	17.89	18.0	17.76	0.14	10 mm	MIMO	Open	0880M	13	top	99.7	0.225	0.176	1.057	1.003	0.187	
5745	149	802.11n	OFDM	20	18.0	17.89	18.0	17.76	0.10	10 mm	MIMO	Open	0880M	13	right	99.7	0.078	-	1.057	1.003	-	
5745	149	802.11n	OFDM	20	18.0	17.89	18.0	17.76	0.11	10 mm	MIMO	Open	0880M	13	left	99.7	0.133	-	1.057	1.003	-	
5745	149	802.11n	OFDM	20	18.0	17.89	18.0	17.76	0.01	5 mm	MIMO	Closed	0880M	13	back	99.7	0.134	-	1.057	1.003	-	
5745	149	802.11n	OFDM	20	18.0	17.89	18.0	17.76	0.09	5 mm	MIMO	Closed	0880M	13	front	99.7	0.530	0.356	1.057	1.003	0.377	
5745	149	802.11n	OFDM	20	18.0	17.89	18.0	17.76	-0.09	5 mm	MIMO	Closed	0880M	13	bottom	99.7	0.728	0.463	1.057	1.003	0.491	A31
5745	149	802.11n	OFDM	20	18.0	17.89	18.0	17.76	-0.18	5 mm	MIMO	Closed	0880M	13	right	99.7	0.121	-	1.057	1.003	-	
5745	149	802.11n	OFDM	20	18.0	17.89	18.0	17.76	-0.08	5 mm	MIMO	Closed	0880M	13	left	99.7	0.440	-	1.057	1.003	-	
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: To achieve the 21.0 dBm maximum allowed MIMO power shown in the documentation each antenna transmits at a maximum allowed power of 18.0 dBm.

**Table 11-34
NII MIMO Hotspot SAR for Conditions with 2.4 GHz WLAN SAR - Closed**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
5775	155	802.11ac	OFDM	80	15.0	14.53	15.0	14.79	-0.13	5 mm	MIMO	0880M	58.5	back	99.7	0.020	-	1.114	1.003	-	
5775	155	802.11ac	OFDM	80	15.0	14.53	15.0	14.79	0.01	5 mm	MIMO	0880M	58.5	front	99.7	0.115	-	1.114	1.003	-	
5775	155	802.11ac	OFDM	80	15.0	14.53	15.0	14.79	-0.14	5 mm	MIMO	0880M	58.5	bottom	99.7	0.142	0.044	1.114	1.003	0.049	
5775	155	802.11ac	OFDM	80	15.0	14.53	15.0	14.79	-0.15	5 mm	MIMO	0880M	58.5	right	99.7	0.007	-	1.114	1.003	-	
5775	155	802.11ac	OFDM	80	15.0	14.53	15.0	14.79	-0.18	5 mm	MIMO	0880M	58.5	left	99.7	0.074	-	1.114	1.003	-	
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: 5 GHZ WLAN MIMO was additionally evaluated at the maximum allowed output power during operations with Simultaneous 5 GHz WLAN and 2.4 GHz WLAN. 2.4 GHz WIFI was not transmitting during the above evaluations.




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**Table 11-35
DSS Hotspot SAR – Open**

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	16.0	15.43	-0.09	10 mm	1	0710M	1	back	76.80	0.077	1.140	1.302	0.114	
2441	39	Bluetooth	FHSS	16.0	15.43	-0.14	10 mm	1	0710M	1	front	76.80	0.052	1.140	1.302	0.077	
2441	39	Bluetooth	FHSS	16.0	15.43	-0.11	10 mm	1	0710M	1	top	76.80	0.029	1.140	1.302	0.043	
2441	39	Bluetooth	FHSS	16.0	15.43	0.03	10 mm	1	0710M	1	right	76.80	0.022	1.140	1.302	0.033	
2441	39	Bluetooth	FHSS	17.0	16.61	-0.16	10 mm	2	0710M	1	back	76.80	0.068	1.094	1.302	0.097	
2441	39	Bluetooth	FHSS	17.0	16.61	-0.07	10 mm	2	0710M	1	front	76.80	0.081	1.094	1.302	0.115	
2441	39	Bluetooth	FHSS	17.0	16.61	0.07	10 mm	2	0710M	1	top	76.80	0.045	1.094	1.302	0.064	
2441	39	Bluetooth	FHSS	17.0	16.61	-0.14	10 mm	2	0710M	1	left	76.80	0.079	1.094	1.302	0.113	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram										

**Table 11-36
DSS Hotspot SAR - Closed**

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	16.0	15.43	-0.08	5 mm	1	0710M	1	back	76.80	0.036	1.140	1.302	0.053	
2441	39	Bluetooth	FHSS	16.0	15.43	0.05	5 mm	1	0710M	1	front	76.80	0.147	1.140	1.302	0.218	
2441	39	Bluetooth	FHSS	16.0	15.43	-0.13	5 mm	1	0710M	1	bottom	76.80	0.073	1.140	1.302	0.108	
2441	39	Bluetooth	FHSS	16.0	15.43	0.04	5 mm	1	0710M	1	right	76.80	0.041	1.140	1.302	0.061	
2441	39	Bluetooth	FHSS	17.0	16.61	0.01	5 mm	2	0710M	1	back	76.80	0.020	1.094	1.302	0.028	
2441	39	Bluetooth	FHSS	17.0	16.61	-0.01	5 mm	2	0710M	1	front	76.80	0.151	1.094	1.302	0.215	
2441	39	Bluetooth	FHSS	17.0	16.61	0.00	5 mm	2	0710M	1	bottom	76.80	0.101	1.094	1.302	0.144	
2441	39	Bluetooth	FHSS	17.0	16.61	-0.09	5 mm	2	0710M	1	left	76.80	0.227	1.094	1.302	0.323	A33
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram										



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11.4 Standalone Phablet SAR Data

**Table 11-37
GPRS1900 Phablet SAR Data - Open**

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1850.20	512	GSM 1900	GPRS	26.5	26.36	0.11	8 mm	0006M	3	1:2.76	back	0.730	1.033	0.754	
1850.20	512	GSM 1900	GPRS	26.5	26.36	0.05	6 mm	0006M	3	1:2.76	front	0.823	1.033	0.850	
1850.20	512	GSM 1900	GPRS	26.5	26.36	0.05	11 mm	0006M	3	1:2.76	bottom	0.684	1.033	0.707	
1850.20	512	GSM 1900	GPRS	26.5	26.36	-0.05	0 mm	0006M	3	1:2.76	right	0.244	1.033	0.252	
1850.20	512	GSM 1900	GPRS	26.5	26.36	0.04	0 mm	0006M	3	1:2.76	left	0.224	1.033	0.231	
1850.20	512	GSM 1900	GPRS	23.5	22.88	0.06	0 mm	0006M	3	1:2.76	back	1.900	1.153	2.191	
1880.00	661	GSM 1900	GPRS	23.5	22.72	0.10	0 mm	0006M	3	1:2.76	back	1.960	1.197	2.346	
1909.80	810	GSM 1900	GPRS	23.5	22.73	0.04	0 mm	0006M	3	1:2.76	back	2.000	1.194	2.388	A34
1850.20	512	GSM 1900	GPRS	23.5	22.88	0.06	0 mm	0006M	3	1:2.76	front	1.330	1.153	1.533	
1850.20	512	GSM 1900	GPRS	23.5	22.88	-0.02	0 mm	0006M	3	1:2.76	bottom	1.280	1.153	1.476	
1909.80	810	GSM 1900	GPRS	23.5	22.73	-0.01	0 mm	0006M	3	1:2.76	back	1.970	1.194	2.352	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Phablet 4.0 W/kg (mW/g) averaged over 10 grams								




Note: Blue entries represent variability measurements.

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**Table 11-38
LTE Band 4 (AWS) Phablet SAR – Open**

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.12	0.04	0	0006M	QPSK	1	50	8 mm	back	1:1	0.897	1.225	1.099	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.0	22.29	-0.01	1	0006M	QPSK	50	25	8 mm	back	1:1	0.729	1.178	0.859	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.12	0.14	0	0006M	QPSK	1	50	6 mm	front	1:1	0.886	1.225	1.085	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.0	22.29	-0.04	1	0006M	QPSK	50	25	6 mm	front	1:1	0.776	1.178	0.914	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.12	0.00	0	0006M	QPSK	1	50	11 mm	bottom	1:1	0.721	1.225	0.883	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.0	22.29	-0.02	1	0006M	QPSK	50	25	11 mm	bottom	1:1	0.606	1.178	0.714	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.12	-0.05	0	0006M	QPSK	1	50	0 mm	right	1:1	0.230	1.225	0.282	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.0	22.29	0.00	1	0006M	QPSK	50	25	0 mm	right	1:1	0.186	1.178	0.219	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.0	23.12	-0.11	0	0006M	QPSK	1	50	0 mm	left	1:1	0.294	1.225	0.360	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.0	22.29	-0.06	1	0006M	QPSK	50	25	0 mm	left	1:1	0.241	1.178	0.284	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	19.99	0.03	0	0006M	QPSK	1	50	0 mm	back	1:1	2.170	1.262	2.739	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.10	0.10	0	0006M	QPSK	50	25	0 mm	back	1:1	2.350	1.230	2.891	A35
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	19.97	0.06	0	0006M	QPSK	100	0	0 mm	back	1:1	2.250	1.268	2.853	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	19.99	-0.03	0	0006M	QPSK	1	50	0 mm	front	1:1	1.460	1.262	1.843	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.10	0.01	0	0006M	QPSK	50	25	0 mm	front	1:1	1.550	1.230	1.907	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	19.99	0.01	0	0006M	QPSK	1	50	0 mm	bottom	1:1	1.600	1.262	2.019	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.10	-0.05	0	0006M	QPSK	50	25	0 mm	bottom	1:1	1.690	1.230	2.079	
1745.00	20300	High	LTE Band 4 (AWS)	20	21.0	19.97	-0.05	0	0006M	QPSK	100	0	0 mm	bottom	1:1	1.680	1.268	2.130	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	21.0	20.10	0.16	0	0006M	QPSK	50	25	0 mm	back	1:1	2.340	1.230	2.878	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Phablet 4.0 W/kg (mW/g) averaged over 10 grams											

Note: Blue entries represent variability measurements.




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**Table 11-39
LTE Band 41 Phablet SAR - Open**

MEASUREMENT RESULTS																					
1 CC Uplink 2 CC Uplink Power Class	Component Carrier	FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #	
		MHz	Ch.														(W/kg)		(W/kg)		
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	25.0	24.86	0.02	0	0080M	QPSK	1	50	8 mm	back	1:1.58	0.340	1.033	0.351	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.0	23.94	0.01	1	0080M	QPSK	50	50	8 mm	back	1:1.58	0.267	1.014	0.271	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	25.0	24.86	-0.03	0	0080M	QPSK	1	50	6 mm	front	1:1.58	0.291	1.033	0.301	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.0	23.94	-0.03	1	0080M	QPSK	50	50	6 mm	front	1:1.58	0.231	1.014	0.234	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	25.0	24.86	0.02	0	0080M	QPSK	1	50	11 mm	bottom	1:1.58	0.404	1.033	0.417	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.0	23.94	-0.01	1	0080M	QPSK	50	50	11 mm	bottom	1:1.58	0.323	1.014	0.328	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	25.0	24.86	0.06	0	0080M	QPSK	1	50	0 mm	left	1:1.58	0.869	1.033	0.898	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	24.0	23.94	-0.01	1	0080M	QPSK	50	50	0 mm	left	1:1.58	0.719	1.014	0.729	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	22.0	21.43	-0.01	0	0080M	QPSK	1	0	0 mm	back	1:1.58	0.980	1.140	1.117	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	22.0	21.58	0.02	0	0080M	QPSK	50	25	0 mm	back	1:1.58	1.010	1.102	1.113	A36
2 CC Uplink - Power Class 3	PCC	2549.50	40185	Low-Mid	LTE Band 41	20	22.0	21.59	-0.10	0	0080M	QPSK	1	0	0 mm	back	1:1.58	0.966	1.099	1.062	
	SCC	2529.70	39987																		
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	22.0	21.43	-0.10	0	0080M	QPSK	1	0	0 mm	front	1:1.58	0.415	1.140	0.473	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	22.0	21.58	0.04	0	0080M	QPSK	50	25	0 mm	front	1:1.58	0.428	1.102	0.472	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	22.0	21.43	0.01	0	0080M	QPSK	1	0	0 mm	bottom	1:1.58	0.800	1.140	0.912	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	22.0	21.58	0.00	0	0080M	QPSK	50	25	0 mm	bottom	1:1.58	0.827	1.102	0.911	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Phablet 4.0 W/kg (mW/g) averaged over 10 grams											

**Table 11-40
WLAN SISO Phablet SAR - Open**




MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.													(W/kg)	(W/kg)	(W/kg)			
5300	60	802.11a	OFDM	20	18.0	17.66	-0.02	0 mm	1	0880M	6	back	98.9	2.220	-	1.081	1.011	-	
5300	60	802.11a	OFDM	20	18.0	17.66	0.01	0 mm	1	0880M	6	front	98.9	3.650	-	1.081	1.011	-	
5300	60	802.11a	OFDM	20	18.0	17.66	0.01	0 mm	1	0880M	6	top	98.9	5.390	0.592	1.081	1.011	0.647	
5300	60	802.11a	OFDM	20	18.0	17.66	0.21	0 mm	1	0880M	6	right	98.9	0.438	-	1.081	1.011	-	
5600	120	802.11a	OFDM	20	18.0	17.92	0.00	0 mm	1	0880M	6	back	98.9	2.470	-	1.019	1.011	-	
5600	120	802.11a	OFDM	20	18.0	17.92	-0.02	0 mm	1	0880M	6	front	98.9	2.950	0.570	1.019	1.011	0.587	
5600	120	802.11a	OFDM	20	18.0	17.92	0.10	0 mm	1	0880M	6	top	98.9	2.720	-	1.019	1.011	-	
5600	120	802.11a	OFDM	20	18.0	17.92	0.02	0 mm	1	0880M	6	right	98.9	0.987	-	1.019	1.011	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Phablet 4.0 W/kg (mW/g) averaged over 10 grams									

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**Table 11-41
WLAN MIMO Phablet SAR - Open**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.															W/kg	(W/kg)	(W/kg)	(W/kg)		
5260	52	802.11n	OFDM	20	18.0	17.33	18.0	17.90	0.03	0 mm	MIMO	0880M	13	back	99.7	1.960	-	1.167	1.003	-	
5260	52	802.11n	OFDM	20	18.0	17.33	18.0	17.90	0.00	0 mm	MIMO	0880M	13	front	99.7	4.680	0.907	1.167	1.003	1.062	A37
5260	52	802.11n	OFDM	20	18.0	17.33	18.0	17.90	0.03	0 mm	MIMO	0880M	13	top	99.7	2.910	-	1.167	1.003	-	
5260	52	802.11n	OFDM	20	18.0	17.33	18.0	17.90	-0.01	0 mm	MIMO	0880M	13	right	99.7	0.290	-	1.167	1.003	-	
5260	52	802.11n	OFDM	20	18.0	17.33	18.0	17.90	0.04	0 mm	MIMO	0880M	13	left	99.7	4.530	0.888	1.167	1.003	1.039	
5600	120	802.11n	OFDM	20	18.0	17.82	18.0	17.87	0.00	0 mm	MIMO	0880M	13	back	99.7	2.570	-	1.042	1.003	-	
5600	120	802.11n	OFDM	20	18.0	17.82	18.0	17.87	-0.04	0 mm	MIMO	0880M	13	front	99.7	2.870	0.589	1.042	1.003	0.616	
5600	120	802.11n	OFDM	20	18.0	17.82	18.0	17.87	0.10	0 mm	MIMO	0880M	13	top	99.7	2.553	-	1.042	1.003	-	
5600	120	802.11n	OFDM	20	18.0	17.82	18.0	17.87	0.03	0 mm	MIMO	0880M	13	right	99.7	0.737	-	1.042	1.003	-	
5600	120	802.11n	OFDM	20	18.0	17.82	18.0	17.87	-0.03	0 mm	MIMO	0880M	13	left	99.7	2.270	-	1.042	1.003	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Phablet 4.0 W/kg (mW/g) averaged over 10 grams											

Note: To achieve the 21.0 dBm maximum allowed MIMO power shown in the documentation each antenna transmits at a maximum allowed power of 18.0 dBm.

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11.5 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEC/IEEE 62209-1528, and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 15 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01r03, body-worn SAR was evaluated without a headset connected to the device. Since the standalone reported body-worn SAR was ≤ 1.2 W/kg, no additional body-worn SAR evaluations using a headset cable were required.
8. Per FCC KDB 865664 D01v01r04, variability SAR tests were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 13.1 for variability analysis.
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v02r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
10. Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is > 160 mm and < 200 mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information).
11. Unless otherwise noted, when 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds below.
12. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information).
13. This device has an open and closed configuration. When closed, 1g SAR test are required for back side at a test separation distance of 15mm for body-worn, and on all surfaces and edges with an antenna ≤ 25 mm from that surface or edge at a test separation distance 5mm for hotspot.

GSM Test Notes:

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



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UMTS Notes:

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

LTE Notes:

1. LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r04. The general test procedures used for testing can be found in Section 8.5.4.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).
4. Per FCC KDB Publication 447498 D01v06, when the reported LTE Band 41 SAR measured at the highest output power channel in a given a test configuration was > 0.6 W/kg for 1g evaluations, testing at the other channels was required for such test configurations.
5. TDD LTE was tested per the guidance provided in FCC KDB Publication 941225 D05v02r04. Testing was performed using UL-DL configuration 0 with 6 UL subframes and 2 S subframes using extended cyclic prefix only and special subframe configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Section 4, the duty factor for special subframe configuration 6 using extended cyclic prefix is 0.633.
6. Per KDB Publication 941225 D05Av01r02, SAR for downlink only LTE CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.
7. For LTE Band 41 SAR was first measured with only a single carrier active in the uplink (carrier aggregation not active). For each exposure condition, the uplink CA scenario with two component carriers was additionally tested for the configuration with the highest reported SAR when carrier aggregation was not active. The SCC was configured with the closest available contiguous channel. The two component carriers were configured so the resource blocks are physically allocated side by side to achieve the maximum output power.




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WLAN Notes:

1. For held-to-ear, hotspot, and phablet operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg for 1g evaluations, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 8.6.5 for more information.
3. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg for 1g evaluations. See Section 8.6.5 for more information.
4. When the maximum reported 1g averaged SAR is ≤ 0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured.
5. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated EMC test reports.
6. Per KDB Publication 248227 D01v02r02, SAR for MIMO was evaluated by following the simultaneous SAR provisions from KDB Publication 447498 D01v06 by either evaluating the sum of the 1g SAR values of each antenna transmitting independently or making a SAR measurement with both antennas transmitting simultaneously. Please see Section 12 for complete analysis.
7. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

Bluetooth Notes

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

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12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 Introduction




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

12.2 Simultaneous Transmission Procedures

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

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

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

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12.3 Head SAR Simultaneous Transmission Analysis

Table 12-1
Simultaneous Transmission Scenario with 5 GHz WLAN Antenna 1 (Held to Ear)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Head SAR	GSM 850	0.183	0.078	0.261
	GSM 1900	0.068	0.078	0.146
	UMTS 850	0.401	0.078	0.479
	LTE Band 12	0.174	0.078	0.252
	LTE Band 13	0.159	0.078	0.237
	LTE Band 5 (Cell)	0.314	0.078	0.392
	LTE Band 4 (AWS)	0.107	0.078	0.185
	LTE Band 41	0.123	0.078	0.201

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

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Head SAR	GSM 850	0.183	0.178	0.361
	GSM 1900	0.068	0.178	0.246
	UMTS 850	0.401	0.178	0.579
	LTE Band 12	0.174	0.178	0.352
	LTE Band 13	0.159	0.178	0.337
	LTE Band 5 (Cell)	0.314	0.178	0.492
	LTE Band 4 (AWS)	0.107	0.178	0.285
	LTE Band 41	0.123	0.178	0.301




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Table 12-3
Simultaneous Transmission Scenario with 2.4 GHz MIMO WLAN (Held to Ear)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Head SAR	GSM 850	0.183	0.380	0.563
	GSM 1900	0.068	0.380	0.448
	UMTS 850	0.401	0.380	0.781
	LTE Band 12	0.174	0.380	0.554
	LTE Band 13	0.159	0.380	0.539
	LTE Band 5 (Cell)	0.314	0.380	0.694
	LTE Band 4 (AWS)	0.107	0.380	0.487
	LTE Band 41	0.123	0.380	0.503

Table 12-4
Simultaneous Transmission Scenario with Bluetooth Antenna 1 (Held to Ear)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Head SAR	GSM 850	0.183	0.129	0.312
	GSM 1900	0.068	0.129	0.197
	UMTS 850	0.401	0.129	0.530
	LTE Band 12	0.174	0.129	0.303
	LTE Band 13	0.159	0.129	0.288
	LTE Band 5 (Cell)	0.314	0.129	0.443
	LTE Band 4 (AWS)	0.107	0.129	0.236
	LTE Band 41	0.123	0.129	0.252




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Table 12-5
Simultaneous Transmission Scenario with Bluetooth Antenna 2 (Held to Ear)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Head SAR	GSM 850	0.183	0.189	0.372
	GSM 1900	0.068	0.189	0.257
	UMTS 850	0.401	0.189	0.590
	LTE Band 12	0.174	0.189	0.363
	LTE Band 13	0.159	0.189	0.348
	LTE Band 5 (Cell)	0.314	0.189	0.503
	LTE Band 4 (AWS)	0.107	0.189	0.296
	LTE Band 41	0.123	0.189	0.312

Table 12-6
Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 5 GHz Antenna 1 WLAN (Held to Ear)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Head SAR	GSM 850	0.183	0.129	0.078	0.390
	GSM 1900	0.068	0.129	0.078	0.275
	UMTS 850	0.401	0.129	0.078	0.608
	LTE Band 12	0.174	0.129	0.078	0.381
	LTE Band 13	0.159	0.129	0.078	0.366
	LTE Band 5 (Cell)	0.314	0.129	0.078	0.521
	LTE Band 4 (AWS)	0.107	0.129	0.078	0.314
	LTE Band 41	0.123	0.129	0.078	0.330




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Table 12-7

Simultaneous Transmission Scenario with Bluetooth Antenna 2 and 5 GHz Antenna 1 WLAN (Held to Ear)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Head SAR	GSM 850	0.183	0.189	0.078	0.450
	GSM 1900	0.068	0.189	0.078	0.335
	UMTS 850	0.401	0.189	0.078	0.668
	LTE Band 12	0.174	0.189	0.078	0.441
	LTE Band 13	0.159	0.189	0.078	0.426
	LTE Band 5 (Cell)	0.314	0.189	0.078	0.581
	LTE Band 4 (AWS)	0.107	0.189	0.078	0.374
	LTE Band 41	0.123	0.189	0.078	0.390




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Table 12-8

Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 5GHz MIMO WLAN (Held to Ear)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Head SAR	GSM 850	0.183	0.129	0.178	0.490
	GSM 1900	0.068	0.129	0.178	0.375
	UMTS 850	0.401	0.129	0.178	0.708
	LTE Band 12	0.174	0.129	0.178	0.481
	LTE Band 13	0.159	0.129	0.178	0.466
	LTE Band 5 (Cell)	0.314	0.129	0.178	0.621
	LTE Band 4 (AWS)	0.107	0.129	0.178	0.414
	LTE Band 41	0.123	0.129	0.178	0.430

Table 12-9

Simultaneous Transmission Scenario with Bluetooth Antenna 2 and 5GHz MIMO WLAN (Held to Ear)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Head SAR	GSM 850	0.183	0.189	0.178	0.550
	GSM 1900	0.068	0.189	0.178	0.435
	UMTS 850	0.401	0.189	0.178	0.768
	LTE Band 12	0.174	0.189	0.178	0.541
	LTE Band 13	0.159	0.189	0.178	0.526
	LTE Band 5 (Cell)	0.314	0.189	0.178	0.681
	LTE Band 4 (AWS)	0.107	0.189	0.178	0.474
	LTE Band 41	0.123	0.189	0.178	0.490




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Table 12-10
Simultaneous Transmission Scenario with 2.4 GHz MIMO WLAN and 5GHz MIMO WLAN (Held to Ear)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Head SAR	GSM 850	0.183	0.380	0.178	0.741
	GSM 1900	0.068	0.380	0.178	0.626
	UMTS 850	0.401	0.380	0.178	0.959
	LTE Band 12	0.174	0.380	0.178	0.732
	LTE Band 13	0.159	0.380	0.178	0.717
	LTE Band 5 (Cell)	0.314	0.380	0.178	0.872
	LTE Band 4 (AWS)	0.107	0.380	0.178	0.665
	LTE Band 41	0.123	0.380	0.178	0.681

Table 12-11
Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 2.4 GHz WLAN Antenna 2 (Held to Ear)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Head SAR	GSM 850	0.183	0.129	0.244	0.556
	GSM 1900	0.068	0.129	0.244	0.441
	UMTS 850	0.401	0.129	0.244	0.774
	LTE Band 12	0.174	0.129	0.244	0.547
	LTE Band 13	0.159	0.129	0.244	0.532
	LTE Band 5 (Cell)	0.314	0.129	0.244	0.687
	LTE Band 4 (AWS)	0.107	0.129	0.244	0.480
	LTE Band 41	0.123	0.129	0.244	0.496






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Table 12-12
Simultaneous Transmission Scenario with Bluetooth Antenna 1, 2.4 GHz Antenna 2 WLAN,
and 5 GHz Antenna 1 WLAN (Held to Ear)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	
Head SAR	GSM 850	0.183	0.129	0.078	0.244	0.634
	GSM 1900	0.068	0.129	0.078	0.244	0.519
	UMTS 850	0.401	0.129	0.078	0.244	0.852
	LTE Band 12	0.174	0.129	0.078	0.244	0.625
	LTE Band 13	0.159	0.129	0.078	0.244	0.610
	LTE Band 5 (Cell)	0.314	0.129	0.078	0.244	0.765
	LTE Band 4 (AWS)	0.107	0.129	0.078	0.244	0.558
	LTE Band 41	0.123	0.129	0.078	0.244	0.574

Table 12-13
Simultaneous Transmission Scenario with Bluetooth Antenna 1, 2.4 GHz Antenna 2 WLAN, and 5 GHz
MIMO WLAN (Held to Ear)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	
Head SAR	GSM 850	0.183	0.129	0.244	0.178	0.734
	GSM 1900	0.068	0.129	0.244	0.178	0.619
	UMTS 850	0.401	0.129	0.244	0.178	0.952
	LTE Band 12	0.174	0.129	0.244	0.178	0.725
	LTE Band 13	0.159	0.129	0.244	0.178	0.710
	LTE Band 5 (Cell)	0.314	0.129	0.244	0.178	0.865
	LTE Band 4 (AWS)	0.107	0.129	0.244	0.178	0.658
	LTE Band 41	0.123	0.129	0.244	0.178	0.674

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12.4 Open Body-Worn Simultaneous Transmission Analysis

Table 12-14
Simultaneous Transmission Scenario with 5 GHz WLAN Antenna 1 (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Body - Worn SAR	GSM 850	0.129	0.058	0.187
	GSM 1900	0.501	0.058	0.559
	UMTS 850	0.330	0.058	0.388
	LTE Band 12	0.176	0.058	0.234
	LTE Band 13	0.158	0.058	0.216
	LTE Band 5 (Cell)	0.265	0.058	0.323
	LTE Band 4 (AWS)	0.668	0.058	0.726
	LTE Band 41	0.243	0.058	0.301

Table 12-15
Simultaneous Transmission Scenario with 5 GHz MIMO WLAN (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Body - Worn SAR	GSM 850	0.129	0.090	0.219
	GSM 1900	0.501	0.090	0.591
	UMTS 850	0.330	0.090	0.420
	LTE Band 12	0.176	0.090	0.266
	LTE Band 13	0.158	0.090	0.248
	LTE Band 5 (Cell)	0.265	0.090	0.355
	LTE Band 4 (AWS)	0.668	0.090	0.758
	LTE Band 41	0.243	0.090	0.333




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Table 12-16
Simultaneous Transmission Scenario with 2.4 GHz MIMO WLAN (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Body - Worn SAR	GSM 850	0.129	0.154	0.283
	GSM 1900	0.501	0.154	0.655
	UMTS 850	0.330	0.154	0.484
	LTE Band 12	0.176	0.154	0.330
	LTE Band 13	0.158	0.154	0.312
	LTE Band 5 (Cell)	0.265	0.154	0.419
	LTE Band 4 (AWS)	0.668	0.154	0.822
	LTE Band 41	0.243	0.154	0.397

Table 12-17
Simultaneous Transmission Scenario with Bluetooth Antenna 1 (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Body - Worn SAR	GSM 850	0.129	0.047	0.176
	GSM 1900	0.501	0.047	0.548
	UMTS 850	0.330	0.047	0.377
	LTE Band 12	0.176	0.047	0.223
	LTE Band 13	0.158	0.047	0.205
	LTE Band 5 (Cell)	0.265	0.047	0.312
	LTE Band 4 (AWS)	0.668	0.047	0.715
	LTE Band 41	0.243	0.047	0.290



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Table 12-18
Simultaneous Transmission Scenario with Bluetooth Antenna 2 (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Body - Worn SAR	GSM 850	0.129	0.038	0.167
	GSM 1900	0.501	0.038	0.539
	UMTS 850	0.330	0.038	0.368
	LTE Band 12	0.176	0.038	0.214
	LTE Band 13	0.158	0.038	0.196
	LTE Band 5 (Cell)	0.265	0.038	0.303
	LTE Band 4 (AWS)	0.668	0.038	0.706
	LTE Band 41	0.243	0.038	0.281

Table 12-19
Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 5 GHz Antenna 1 WLAN (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Body - Worn SAR	GSM 850	0.129	0.047	0.058	0.234
	GSM 1900	0.501	0.047	0.058	0.606
	UMTS 850	0.330	0.047	0.058	0.435
	LTE Band 12	0.176	0.047	0.058	0.281
	LTE Band 13	0.158	0.047	0.058	0.263
	LTE Band 5 (Cell)	0.265	0.047	0.058	0.370
	LTE Band 4 (AWS)	0.668	0.047	0.058	0.773
	LTE Band 41	0.243	0.047	0.058	0.348




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Table 12-20

Simultaneous Transmission Scenario with Bluetooth Antenna 2 and 5 GHz Antenna 1 WLAN (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Body - Worn SAR	GSM 850	0.129	0.038	0.058	0.225
	GSM 1900	0.501	0.038	0.058	0.597
	UMTS 850	0.330	0.038	0.058	0.426
	LTE Band 12	0.176	0.038	0.058	0.272
	LTE Band 13	0.158	0.038	0.058	0.254
	LTE Band 5 (Cell)	0.265	0.038	0.058	0.361
	LTE Band 4 (AWS)	0.668	0.038	0.058	0.764
	LTE Band 41	0.243	0.038	0.058	0.339

Table 12-21

Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 5GHz MIMO WLAN (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Body - Worn SAR	GSM 850	0.129	0.047	0.090	0.266
	GSM 1900	0.501	0.047	0.090	0.638
	UMTS 850	0.330	0.047	0.090	0.467
	LTE Band 12	0.176	0.047	0.090	0.313
	LTE Band 13	0.158	0.047	0.090	0.295
	LTE Band 5 (Cell)	0.265	0.047	0.090	0.402
	LTE Band 4 (AWS)	0.668	0.047	0.090	0.805
	LTE Band 41	0.243	0.047	0.090	0.380




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Table 12-22
Simultaneous Transmission Scenario with Bluetooth Antenna 2 and 5GHz MIMO WLAN
(Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Body - Worn SAR	GSM 850	0.129	0.038	0.090	0.257
	GSM 1900	0.501	0.038	0.090	0.629
	UMTS 850	0.330	0.038	0.090	0.458
	LTE Band 12	0.176	0.038	0.090	0.304
	LTE Band 13	0.158	0.038	0.090	0.286
	LTE Band 5 (Cell)	0.265	0.038	0.090	0.393
	LTE Band 4 (AWS)	0.668	0.038	0.090	0.796
	LTE Band 41	0.243	0.038	0.090	0.371

Table 12-23
Simultaneous Transmission Scenario with 2.4 GHz MIMO WLAN and 5 GHz MIMO WLAN
(Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Body - Worn SAR	GSM 850	0.129	0.154	0.090	0.373
	GSM 1900	0.501	0.154	0.090	0.745
	UMTS 850	0.330	0.154	0.090	0.574
	LTE Band 12	0.176	0.154	0.090	0.420
	LTE Band 13	0.158	0.154	0.090	0.402
	LTE Band 5 (Cell)	0.265	0.154	0.090	0.509
	LTE Band 4 (AWS)	0.668	0.154	0.090	0.912
	LTE Band 41	0.243	0.154	0.090	0.487




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Table 12-24
Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 2.4 GHz WLAN Antenna 2
(Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Body - Worn SAR	GSM 850	0.129	0.047	0.048	0.224
	GSM 1900	0.501	0.047	0.048	0.596
	UMTS 850	0.330	0.047	0.048	0.425
	LTE Band 12	0.176	0.047	0.048	0.271
	LTE Band 13	0.158	0.047	0.048	0.253
	LTE Band 5 (Cell)	0.265	0.047	0.048	0.360
	LTE Band 4 (AWS)	0.668	0.047	0.048	0.763
	LTE Band 41	0.243	0.047	0.048	0.338

Table 12-25
Simultaneous Transmission Scenario with Bluetooth Antenna 1, 2.4 GHz Antenna 2 WLAN,
and 5 GHz Antenna 1 WLAN (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	
Body - Worn SAR	GSM 850	0.129	0.047	0.048	0.058	0.282
	GSM 1900	0.501	0.047	0.048	0.058	0.654
	UMTS 850	0.330	0.047	0.048	0.058	0.483
	LTE Band 12	0.176	0.047	0.048	0.058	0.329
	LTE Band 13	0.158	0.047	0.048	0.058	0.311
	LTE Band 5 (Cell)	0.265	0.047	0.048	0.058	0.418
	LTE Band 4 (AWS)	0.668	0.047	0.048	0.058	0.821
	LTE Band 41	0.243	0.047	0.048	0.058	0.396






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Table 12-26
Simultaneous Transmission Scenario with Bluetooth Antenna 1, 2.4 GHz Antenna 2 WLAN, and 5 GHz MIMO WLAN (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
Body - Worn SAR	GSM 850	0.129	0.047	0.048	0.090	0.314
	GSM 1900	0.501	0.047	0.048	0.090	0.686
	UMTS 850	0.330	0.047	0.048	0.090	0.515
	LTE Band 12	0.176	0.047	0.048	0.090	0.361
	LTE Band 13	0.158	0.047	0.048	0.090	0.343
	LTE Band 5 (Cell)	0.265	0.047	0.048	0.090	0.450
	LTE Band 4 (AWS)	0.668	0.047	0.048	0.090	0.853
	LTE Band 41	0.243	0.047	0.048	0.090	0.428

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12.5 Open Hotspot SAR Simultaneous Transmission Analysis

Table 12-27

Simultaneous Transmission Scenario with 5 GHz WLAN Antenna 1 (Hotspot at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Hotspot SAR	GPRS 850	0.319	0.267	0.586
	GPRS 1900	0.584	0.267	0.851
	UMTS 850	0.310	0.267	0.577
	LTE Band 12	0.204	0.267	0.471
	LTE Band 13	0.288	0.267	0.555
	LTE Band 5 (Cell)	0.315	0.267	0.582
	LTE Band 4 (AWS)	0.638	0.267	0.905
	LTE Band 41	0.276	0.267	0.543

Table 12-28

Simultaneous Transmission Scenario with 5 GHz MIMO WLAN (Hotspot at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Hotspot SAR	GPRS 850	0.319	0.187	0.506
	GPRS 1900	0.584	0.187	0.771
	UMTS 850	0.310	0.187	0.497
	LTE Band 12	0.204	0.187	0.391
	LTE Band 13	0.288	0.187	0.475
	LTE Band 5 (Cell)	0.315	0.187	0.502
	LTE Band 4 (AWS)	0.638	0.187	0.825
	LTE Band 41	0.276	0.187	0.463




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Table 12-29
Simultaneous Transmission Scenario with 2.4 GHz MIMO WLAN (Hotspot at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Hotspot SAR	GPRS 850	0.319	0.335	0.654
	GPRS 1900	0.584	0.335	0.919
	UMTS 850	0.310	0.335	0.645
	LTE Band 12	0.204	0.335	0.539
	LTE Band 13	0.288	0.335	0.623
	LTE Band 5 (Cell)	0.315	0.335	0.650
	LTE Band 4 (AWS)	0.638	0.335	0.973
	LTE Band 41	0.276	0.335	0.611

Table 12-30
Simultaneous Transmission Scenario with Bluetooth Antenna 1 (Hotspot at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Hotspot SAR	GPRS 850	0.319	0.114	0.433
	GPRS 1900	0.584	0.114	0.698
	UMTS 850	0.310	0.114	0.424
	LTE Band 12	0.204	0.114	0.318
	LTE Band 13	0.288	0.114	0.402
	LTE Band 5 (Cell)	0.315	0.114	0.429
	LTE Band 4 (AWS)	0.638	0.114	0.752
	LTE Band 41	0.276	0.114	0.390



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Table 12-31
Simultaneous Transmission Scenario with Bluetooth Antenna 2 (Hotspot at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Hotspot SAR	GPRS 850	0.319	0.115	0.434
	GPRS 1900	0.584	0.115	0.699
	UMTS 850	0.310	0.115	0.425
	LTE Band 12	0.204	0.115	0.319
	LTE Band 13	0.288	0.115	0.403
	LTE Band 5 (Cell)	0.315	0.115	0.430
	LTE Band 4 (AWS)	0.638	0.115	0.753
	LTE Band 41	0.276	0.115	0.391

Table 12-32
Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 5 GHz Antenna 1 WLAN (Hotspot at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Hotspot SAR	GPRS 850	0.319	0.267	0.114	0.700
	GPRS 1900	0.584	0.267	0.114	0.965
	UMTS 850	0.310	0.267	0.114	0.691
	LTE Band 12	0.204	0.267	0.114	0.585
	LTE Band 13	0.288	0.267	0.114	0.669
	LTE Band 5 (Cell)	0.315	0.267	0.114	0.696
	LTE Band 4 (AWS)	0.638	0.267	0.114	1.019
	LTE Band 41	0.276	0.267	0.114	0.657



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Table 12-33
Simultaneous Transmission Scenario with Bluetooth Antenna 2 and 5 GHz Antenna 1 WLAN
(Hotspot at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Hotspot SAR	GPRS 850	0.319	0.115	0.267	0.701
	GPRS 1900	0.584	0.115	0.267	0.966
	UMTS 850	0.310	0.115	0.267	0.692
	LTE Band 12	0.204	0.115	0.267	0.586
	LTE Band 13	0.288	0.115	0.267	0.670
	LTE Band 5 (Cell)	0.315	0.115	0.267	0.697
	LTE Band 4 (AWS)	0.638	0.115	0.267	1.020
	LTE Band 41	0.276	0.115	0.267	0.658

Table 12-34
Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 5GHz MIMO WLAN
(Hotspot at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Hotspot SAR	GPRS 850	0.319	0.114	0.187	0.620
	GPRS 1900	0.584	0.114	0.187	0.885
	UMTS 850	0.310	0.114	0.187	0.611
	LTE Band 12	0.204	0.114	0.187	0.505
	LTE Band 13	0.288	0.114	0.187	0.589
	LTE Band 5 (Cell)	0.315	0.114	0.187	0.616
	LTE Band 4 (AWS)	0.638	0.114	0.187	0.939
	LTE Band 41	0.276	0.114	0.187	0.577




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Table 12-35
Simultaneous Transmission Scenario with Bluetooth Antenna 2 and 5GHz MIMO WLAN
(Hotspot at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Hotspot SAR	GPRS 850	0.319	0.115	0.187	0.621
	GPRS 1900	0.584	0.115	0.187	0.886
	UMTS 850	0.310	0.115	0.187	0.612
	LTE Band 12	0.204	0.115	0.187	0.506
	LTE Band 13	0.288	0.115	0.187	0.590
	LTE Band 5 (Cell)	0.315	0.115	0.187	0.617
	LTE Band 4 (AWS)	0.638	0.115	0.187	0.940
	LTE Band 41	0.276	0.115	0.187	0.578

Table 12-36
Simultaneous Transmission Scenario with 2.4 GHz MIMO WLAN and 5 GHz MIMO WLAN
(Hotspot at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Hotspot SAR	GPRS 850	0.319	0.335	0.187	0.841
	GPRS 1900	0.584	0.335	0.187	1.106
	UMTS 850	0.310	0.335	0.187	0.832
	LTE Band 12	0.204	0.335	0.187	0.726
	LTE Band 13	0.288	0.335	0.187	0.810
	LTE Band 5 (Cell)	0.315	0.335	0.187	0.837
	LTE Band 4 (AWS)	0.638	0.335	0.187	1.160
	LTE Band 41	0.276	0.335	0.187	0.798




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Table 12-37
Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 2.4 GHz WLAN Antenna 2
(Hotspot at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Hotspot SAR	GPRS 850	0.319	0.114	0.152	0.585
	GPRS 1900	0.584	0.114	0.152	0.850
	UMTS 850	0.310	0.114	0.152	0.576
	LTE Band 12	0.204	0.114	0.152	0.470
	LTE Band 13	0.288	0.114	0.152	0.554
	LTE Band 5 (Cell)	0.315	0.114	0.152	0.581
	LTE Band 4 (AWS)	0.638	0.114	0.152	0.904
	LTE Band 41	0.276	0.114	0.152	0.542

Table 12-38
Simultaneous Transmission Scenario with Bluetooth Antenna 1, 2.4 GHz Antenna 2 WLAN,
and 5 GHz Antenna 1 WLAN (Hotspot at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	
Hotspot SAR	GPRS 850	0.319	0.114	0.152	0.267	0.852
	GPRS 1900	0.584	0.114	0.152	0.267	1.117
	UMTS 850	0.310	0.114	0.152	0.267	0.843
	LTE Band 12	0.204	0.114	0.152	0.267	0.737
	LTE Band 13	0.288	0.114	0.152	0.267	0.821
	LTE Band 5 (Cell)	0.315	0.114	0.152	0.267	0.848
	LTE Band 4 (AWS)	0.638	0.114	0.152	0.267	1.171
	LTE Band 41	0.276	0.114	0.152	0.267	0.809







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Table 12-39
Simultaneous Transmission Scenario with Bluetooth Antenna 1, 2.4 GHz Antenna 2 WLAN, and 5 GHz MIMO WLAN (Hotspot at 1.0 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
Hotspot SAR	GPRS 850	0.319	0.114	0.152	0.187	0.772
	GPRS 1900	0.584	0.114	0.152	0.187	1.037
	UMTS 850	0.310	0.114	0.152	0.187	0.763
	LTE Band 12	0.204	0.114	0.152	0.187	0.657
	LTE Band 13	0.288	0.114	0.152	0.187	0.741
	LTE Band 5 (Cell)	0.315	0.114	0.152	0.187	0.768
	LTE Band 4 (AWS)	0.638	0.114	0.152	0.187	1.091
	LTE Band 41	0.276	0.114	0.152	0.187	0.729

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12.6 Phablet Simultaneous Transmission Analysis

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

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




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

Table 12-40
Simultaneous Transmission Scenario with 5 GHz WLAN Antenna 1

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	GPRS 1900	2.388	0.647	3.035
	LTE Band 4 (AWS)	2.891	0.647	3.538
	LTE Band 41	1.117	0.647	1.764

Table 12-41
Simultaneous Transmission Scenario with 5 GHz MIMO WLAN

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	GPRS 1900	2.388	1.062	3.450
	LTE Band 4 (AWS)	2.891	1.062	3.953
	LTE Band 41	1.117	1.062	2.179

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12.7 Closed Body-Worn Simultaneous Transmission Analysis

Table 12-42
Simultaneous Transmission Scenario with 5 GHz WLAN Antenna 1 (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Body - Worn SAR	GSM 850	0.253	0.000	0.253
	GSM 1900	0.204	0.000	0.204
	UMTS 850	0.467	0.000	0.467
	LTE Band 12	0.127	0.000	0.127
	LTE Band 13	0.260	0.000	0.260
	LTE Band 5 (Cell)	0.376	0.000	0.376
	LTE Band 4 (AWS)	0.272	0.000	0.272
	LTE Band 41	0.198	0.000	0.198

Table 12-43
Simultaneous Transmission Scenario with 5 GHz MIMO WLAN (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Body - Worn SAR	GSM 850	0.253	0.043	0.296
	GSM 1900	0.204	0.043	0.247
	UMTS 850	0.467	0.043	0.510
	LTE Band 12	0.127	0.043	0.170
	LTE Band 13	0.260	0.043	0.303
	LTE Band 5 (Cell)	0.376	0.043	0.419
	LTE Band 4 (AWS)	0.272	0.043	0.315
	LTE Band 41	0.198	0.043	0.241




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Table 12-44
Simultaneous Transmission Scenario with 2.4 GHz MIMO WLAN (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Body - Worn SAR	GSM 850	0.253	0.051	0.304
	GSM 1900	0.204	0.051	0.255
	UMTS 850	0.467	0.051	0.518
	LTE Band 12	0.127	0.051	0.178
	LTE Band 13	0.260	0.051	0.311
	LTE Band 5 (Cell)	0.376	0.051	0.427
	LTE Band 4 (AWS)	0.272	0.051	0.323
	LTE Band 41	0.198	0.051	0.249

Table 12-45
Simultaneous Transmission Scenario with Bluetooth Antenna 1 (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Body - Worn SAR	GSM 850	0.253	0.016	0.269
	GSM 1900	0.204	0.016	0.220
	UMTS 850	0.467	0.016	0.483
	LTE Band 12	0.127	0.016	0.143
	LTE Band 13	0.260	0.016	0.276
	LTE Band 5 (Cell)	0.376	0.016	0.392
	LTE Band 4 (AWS)	0.272	0.016	0.288
	LTE Band 41	0.198	0.016	0.214




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Table 12-46
Simultaneous Transmission Scenario with Bluetooth Antenna 2 (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Body - Worn SAR	GSM 850	0.253	0.006	0.259
	GSM 1900	0.204	0.006	0.210
	UMTS 850	0.467	0.006	0.473
	LTE Band 12	0.127	0.006	0.133
	LTE Band 13	0.260	0.006	0.266
	LTE Band 5 (Cell)	0.376	0.006	0.382
	LTE Band 4 (AWS)	0.272	0.006	0.278
	LTE Band 41	0.198	0.006	0.204




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Table 12-47
Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 5 GHz Antenna 1 WLAN
(Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Body - Worn SAR	GSM 850	0.253	0.016	0.000	0.269
	GSM 1900	0.204	0.016	0.000	0.220
	UMTS 850	0.467	0.016	0.000	0.483
	LTE Band 12	0.127	0.016	0.000	0.143
	LTE Band 13	0.260	0.016	0.000	0.276
	LTE Band 5 (Cell)	0.376	0.016	0.000	0.392
	LTE Band 4 (AWS)	0.272	0.016	0.000	0.288
	LTE Band 41	0.198	0.016	0.000	0.214

Table 12-48
Simultaneous Transmission Scenario with Bluetooth Antenna 2 and 5 GHz Antenna 1 WLAN
(Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Body - Worn SAR	GSM 850	0.253	0.006	0.000	0.259
	GSM 1900	0.204	0.006	0.000	0.210
	UMTS 850	0.467	0.006	0.000	0.473
	LTE Band 12	0.127	0.006	0.000	0.133
	LTE Band 13	0.260	0.006	0.000	0.266
	LTE Band 5 (Cell)	0.376	0.006	0.000	0.382
	LTE Band 4 (AWS)	0.272	0.006	0.000	0.278
	LTE Band 41	0.198	0.006	0.000	0.204




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Table 12-49
Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 5GHz MIMO WLAN
(Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Body - Worn SAR	GSM 850	0.253	0.016	0.043	0.312
	GSM 1900	0.204	0.016	0.043	0.263
	UMTS 850	0.467	0.016	0.043	0.526
	LTE Band 12	0.127	0.016	0.043	0.186
	LTE Band 13	0.260	0.016	0.043	0.319
	LTE Band 5 (Cell)	0.376	0.016	0.043	0.435
	LTE Band 4 (AWS)	0.272	0.016	0.043	0.331
	LTE Band 41	0.198	0.016	0.043	0.257

Table 12-50
Simultaneous Transmission Scenario with Bluetooth Antenna 2 and 5GHz MIMO WLAN
(Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Body - Worn SAR	GSM 850	0.253	0.006	0.043	0.302
	GSM 1900	0.204	0.006	0.043	0.253
	UMTS 850	0.467	0.006	0.043	0.516
	LTE Band 12	0.127	0.006	0.043	0.176
	LTE Band 13	0.260	0.006	0.043	0.309
	LTE Band 5 (Cell)	0.376	0.006	0.043	0.425
	LTE Band 4 (AWS)	0.272	0.006	0.043	0.321
	LTE Band 41	0.198	0.006	0.043	0.247




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Table 12-51
Simultaneous Transmission Scenario with 2.4 GHz MIMO WLAN and 5GHz MIMO WLAN
(Body-Work at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Body - Worn SAR	GSM 850	0.253	0.051	0.043	0.347
	GSM 1900	0.204	0.051	0.043	0.298
	UMTS 850	0.467	0.051	0.043	0.561
	LTE Band 12	0.127	0.051	0.043	0.221
	LTE Band 13	0.260	0.051	0.043	0.354
	LTE Band 5 (Cell)	0.376	0.051	0.043	0.470
	LTE Band 4 (AWS)	0.272	0.051	0.043	0.366
	LTE Band 41	0.198	0.051	0.043	0.292

Table 12-52
Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 2.4 GHz WLAN Antenna 2
(Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Body - Worn SAR	GSM 850	0.253	0.016	0.009	0.278
	GSM 1900	0.204	0.016	0.009	0.229
	UMTS 850	0.467	0.016	0.009	0.492
	LTE Band 12	0.127	0.016	0.009	0.152
	LTE Band 13	0.260	0.016	0.009	0.285
	LTE Band 5 (Cell)	0.376	0.016	0.009	0.401
	LTE Band 4 (AWS)	0.272	0.016	0.009	0.297
	LTE Band 41	0.198	0.016	0.009	0.223







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Table 12-53
Simultaneous Transmission Scenario with Bluetooth Antenna 1, 2.4 GHz Antenna 2 WLAN,
and 5 GHz Antenna 1 WLAN (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	
Body - Worn SAR	GSM 850	0.253	0.016	0.009	0.000	0.278
	GSM 1900	0.204	0.016	0.009	0.000	0.229
	UMTS 850	0.467	0.016	0.009	0.000	0.492
	LTE Band 12	0.127	0.016	0.009	0.000	0.152
	LTE Band 13	0.260	0.016	0.009	0.000	0.285
	LTE Band 5 (Cell)	0.376	0.016	0.009	0.000	0.401
	LTE Band 4 (AWS)	0.272	0.016	0.009	0.000	0.297
	LTE Band 41	0.198	0.016	0.009	0.000	0.223

Table 12-54
Simultaneous Transmission Scenario with Bluetooth Antenna 1, 2.4 GHz Antenna 2 WLAN, and 5 GHz
MIMO WLAN (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	
Body - Worn SAR	GSM 850	0.253	0.016	0.009	0.043	0.321
	GSM 1900	0.204	0.016	0.009	0.043	0.272
	UMTS 850	0.467	0.016	0.009	0.043	0.535
	LTE Band 12	0.127	0.016	0.009	0.043	0.195
	LTE Band 13	0.260	0.016	0.009	0.043	0.328
	LTE Band 5 (Cell)	0.376	0.016	0.009	0.043	0.444
	LTE Band 4 (AWS)	0.272	0.016	0.009	0.043	0.340
	LTE Band 41	0.198	0.016	0.009	0.043	0.266

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12.8 Closed Hotspot SAR Simultaneous Transmission Analysis

Table 12-55
Simultaneous Transmission Scenario with 5 GHz WLAN Antenna 1 (Hotspot at 0.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Hotspot SAR	GPRS 850	0.949	0.363	1.312
	GPRS 1900	0.894	0.363	1.257
	UMTS 850	0.879	0.363	1.242
	LTE Band 12	0.408	0.363	0.771
	LTE Band 13	0.772	0.363	1.135
	LTE Band 5 (Cell)	0.845	0.363	1.208
	LTE Band 4 (AWS)	0.953	0.363	1.316
	LTE Band 41	0.843	0.363	1.206

Table 12-56
Simultaneous Transmission Scenario with 5 GHz MIMO WLAN (Hotspot at 0.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Hotspot SAR	GPRS 850	0.949	0.491	1.440
	GPRS 1900	0.894	0.491	1.385
	UMTS 850	0.879	0.491	1.370
	LTE Band 12	0.408	0.491	0.899
	LTE Band 13	0.772	0.491	1.263
	LTE Band 5 (Cell)	0.845	0.491	1.336
	LTE Band 4 (AWS)	0.953	0.491	1.444
	LTE Band 41	0.843	0.491	1.334




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Table 12-57
Simultaneous Transmission Scenario with 2.4 GHz MIMO WLAN (Hotspot at 0.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Hotspot SAR	GPRS 850	0.949	0.525	1.474
	GPRS 1900	0.894	0.525	1.419
	UMTS 850	0.879	0.525	1.404
	LTE Band 12	0.408	0.525	0.933
	LTE Band 13	0.772	0.525	1.297
	LTE Band 5 (Cell)	0.845	0.525	1.370
	LTE Band 4 (AWS)	0.953	0.525	1.478
	LTE Band 41	0.843	0.525	1.368

Table 12-58
Simultaneous Transmission Scenario with Bluetooth Antenna 1 (Hotspot at 0.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Hotspot SAR	GPRS 850	0.949	0.218	1.167
	GPRS 1900	0.894	0.218	1.112
	UMTS 850	0.879	0.218	1.097
	LTE Band 12	0.408	0.218	0.626
	LTE Band 13	0.772	0.218	0.990
	LTE Band 5 (Cell)	0.845	0.218	1.063
	LTE Band 4 (AWS)	0.953	0.218	1.171
	LTE Band 41	0.843	0.218	1.061




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Table 12-59
Simultaneous Transmission Scenario with Bluetooth Antenna 2 (Hotspot at 0.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	
Hotspot SAR	GPRS 850	0.949	0.323	1.272
	GPRS 1900	0.894	0.323	1.217
	UMTS 850	0.879	0.323	1.202
	LTE Band 12	0.408	0.323	0.731
	LTE Band 13	0.772	0.323	1.095
	LTE Band 5 (Cell)	0.845	0.323	1.168
	LTE Band 4 (AWS)	0.953	0.323	1.276
	LTE Band 41	0.843	0.323	1.166

Table 12-60
Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 5 GHz Antenna 1 WLAN (Hotspot at 0.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Hotspot SAR	GPRS 850	0.949	0.218	0.363	1.530
	GPRS 1900	0.894	0.218	0.363	1.475
	UMTS 850	0.879	0.218	0.363	1.460
	LTE Band 12	0.408	0.218	0.363	0.989
	LTE Band 13	0.772	0.218	0.363	1.353
	LTE Band 5 (Cell)	0.845	0.218	0.363	1.426
	LTE Band 4 (AWS)	0.953	0.218	0.363	1.534
	LTE Band 41	0.843	0.218	0.363	1.424



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Table 12-61

Simultaneous Transmission Scenario with Bluetooth Antenna 2 and 5 GHz Antenna 1 WLAN (Hotspot at 0.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Hotspot SAR	GPRS 850	0.949	0.323	0.363	See Table Below
	GPRS 1900	0.894	0.323	0.363	1.580
	UMTS 850	0.879	0.323	0.363	1.565
	LTE Band 12	0.408	0.323	0.363	1.094
	LTE Band 13	0.772	0.323	0.363	1.458
	LTE Band 5 (Cell)	0.845	0.323	0.363	1.531
	LTE Band 4 (AWS)	0.953	0.323	0.363	See Table Below
	LTE Band 41	0.843	0.323	0.363	1.529

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3			1	2	3	1+2+3
Body SAR	Back	0.949	0.028	0.068	1.045	Body SAR	Back	0.673	0.028	0.068	0.769
	Front	0.203	0.215	0.363*	0.781		Front	0.116	0.215	0.363*	0.694
	Bottom	0.226	0.144	0.363	0.733		Bottom	0.953	0.144	0.363	1.460
	Right	0.111	-	0.363*	0.474		Right	0.025	-	0.363*	0.388
	Left	0.172	0.323	-	0.495		Left	0.175	0.323	-	0.498




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Table 12-62
Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 5GHz MIMO WLAN
(Hotspot at 0.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	GPRS 850	0.949	0.218	0.491	See Table Below
	GPRS 1900	0.894	0.218	0.491	See Table Below
	UMTS 850	0.879	0.218	0.491	1.588
	LTE Band 12	0.408	0.218	0.491	1.117
	LTE Band 13	0.772	0.218	0.491	1.481
	LTE Band 5 (Cell)	0.845	0.218	0.491	1.554
	LTE Band 4 (AWS)	0.953	0.218	0.491	See Table Below
	LTE Band 41	0.843	0.218	0.491	1.552

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3			1	2	3	1+2+3
Body SAR	Back	0.949	0.053	0.491*	1.493	Body SAR	Back	0.424	0.053	0.491*	0.968
	Front	0.203	0.218	0.377	0.798		Front	0.145	0.218	0.377	0.740
	Bottom	0.226	0.108	0.491	0.825		Bottom	0.894	0.108	0.491	1.493
	Right	0.111	0.061	0.491*	0.663		Right	0.047	0.061	0.491*	0.599
	Left	0.172	-	0.491*	0.663		Left	0.108	-	0.491*	0.599

Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body SAR	Back	0.673	0.053	0.491*	1.217
	Front	0.116	0.218	0.377	0.711
	Bottom	0.953	0.108	0.491	1.552
	Right	0.025	0.061	0.491*	0.577
	Left	0.175	-	0.491*	0.666




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Table 12-63

Simultaneous Transmission Scenario with Bluetooth Antenna 2 and 5GHz MIMO WLAN (Hotspot at 0.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	GPRS 850	0.949	0.323	0.491	See Table Below
	GPRS 1900	0.894	0.323	0.491	See Table Below
	UMTS 850	0.879	0.323	0.491	See Table Below
	LTE Band 12	0.408	0.323	0.491	1.222
	LTE Band 13	0.772	0.323	0.491	1.586
	LTE Band 5 (Cell)	0.845	0.323	0.491	See Table Below
	LTE Band 4 (AWS)	0.953	0.323	0.491	See Table Below
	LTE Band 41	0.843	0.323	0.491	See Table Below

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 5 (Cell) SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3			1	2	3	1+2+3
Body SAR	Back	0.949	0.028	0.491*	1.468	Body SAR	Back	0.845	0.028	0.491*	1.364
	Front	0.203	0.215	0.377	0.795		Front	0.147	0.215	0.377	0.739
	Bottom	0.226	0.144	0.491	0.861		Bottom	0.144	0.144	0.491	0.779
	Right	0.111	-	0.491*	0.602		Right	0.093	-	0.491*	0.584
	Left	0.172	0.323	0.491*	0.986		Left	0.222	0.323	0.491*	1.036
Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3			1	2	3	1+2+3
Body SAR	Back	0.424	0.028	0.491*	0.943	Body SAR	Back	0.673	0.028	0.491*	1.192
	Front	0.145	0.215	0.377	0.737		Front	0.116	0.215	0.377	0.708
	Bottom	0.894	0.144	0.491	1.529		Bottom	0.953	0.144	0.491	1.588
	Right	0.047	-	0.491*	0.538		Right	0.025	-	0.491*	0.516
	Left	0.108	0.323	0.491*	0.922		Left	0.175	0.323	0.491*	0.989
Simult Tx	Configuration	UMTS 850 SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 41 SAR (W/kg)	2.4 GHz Bluetooth Ant 2 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3			1	2	3	1+2+3
Body SAR	Back	0.879	0.028	0.491*	1.398	Body SAR	Back	0.334	0.028	0.491*	0.853
	Front	0.177	0.215	0.377	0.769		Front	0.047	0.215	0.377	0.639
	Bottom	0.232	0.144	0.491	0.867		Bottom	0.843	0.144	0.491	1.478
	Right	0.102	-	0.491*	0.593		Right	-	-	0.491*	0.491
	Left	0.139	0.323	0.491*	0.953		Left	0.215	0.323	0.491*	1.029




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Table 12-64
Simultaneous Transmission Scenario with 2.4 GHz WLAN MIMO and 5 GHz WLAN MIMO
(Hotspot at 0.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO at 17 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Hotspot SAR	GPRS 850	0.949	0.525	0.049	1.523
	GPRS 1900	0.894	0.525	0.049	1.468
	UMTS 850	0.879	0.525	0.049	1.453
	LTE Band 12	0.408	0.525	0.049	0.982
	LTE Band 13	0.772	0.525	0.049	1.346
	LTE Band 5 (Cell)	0.845	0.525	0.049	1.419
	LTE Band 4 (AWS)	0.953	0.525	0.049	1.527
	LTE Band 41	0.843	0.525	0.049	1.417

Table 12-65
Simultaneous Transmission Scenario with Bluetooth Antenna 1 and 2.4 GHz WLAN Antenna 2
(Hotspot at 0.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Hotspot SAR	GPRS 850	0.949	0.218	0.340	1.507
	GPRS 1900	0.894	0.218	0.340	1.452
	UMTS 850	0.879	0.218	0.340	1.437
	LTE Band 12	0.408	0.218	0.340	0.966
	LTE Band 13	0.772	0.218	0.340	1.330
	LTE Band 5 (Cell)	0.845	0.218	0.340	1.403
	LTE Band 4 (AWS)	0.953	0.218	0.340	1.511
	LTE Band 41	0.843	0.218	0.340	1.401




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Table 12-66
Simultaneous Transmission Scenario with Bluetooth Antenna 1, 2.4 GHz Antenna 2 WLAN,
and 5 GHz Antenna 1 WLAN (Hotspot at 0.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN Ant 1 at 17 dB SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)							
		1	2	3	4	1+2+3+4							
Hotspot SAR	GPRS 850	0.949	0.218	0.107	0.337	See Table Below							
	GPRS 1900	0.894	0.218	0.107	0.337	1.556							
	UMTS 850	0.879	0.218	0.107	0.337	1.541							
	LTE Band 12	0.408	0.218	0.107	0.337	1.070							
	LTE Band 13	0.772	0.218	0.107	0.337	1.434							
	LTE Band 5 (Cell)	0.845	0.218	0.107	0.337	1.507							
	LTE Band 4 (AWS)	0.953	0.218	0.107	0.337	See Table Below							
	LTE Band 41	0.843	0.218	0.107	0.337	1.505							
Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN Ant 1 at 17 dB SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	5 GHz WLAN Ant 1 at 17 dB SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4			1	2	3	4	1+2+3+4
Body SAR	Back	0.949	0.053	0.107*	0.041	1.150	Body SAR	Back	0.673	0.053	0.107*	0.041	0.874
	Front	0.203	0.218	0.107*	0.337*	0.865		Front	0.116	0.218	0.107*	0.337*	0.778
	Bottom	0.226	0.108	0.107	0.167	0.608		Bottom	0.953	0.108	0.107	0.167	1.335
	Right	0.111	0.061	0.107*	-	0.279		Right	0.025	0.061	0.107*	-	0.193
	Left	0.172	-	-	0.337	0.509		Left	0.175	-	-	0.337	0.512






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Table 12-67
Simultaneous Transmission Scenario with Bluetooth Antenna 1, 2.4 GHz Antenna 2 WLAN, and 5 GHz MIMO WLAN (Hotspot at 0.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	5 GHz WLAN MIMO at 17 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	4	1+2+3+4
Hotspot SAR	GPRS 850	0.949	0.218	0.337	0.049	1.553
	GPRS 1900	0.894	0.218	0.337	0.049	1.498
	UMTS 850	0.879	0.218	0.337	0.049	1.483
	LTE Band 12	0.408	0.218	0.337	0.049	1.012
	LTE Band 13	0.772	0.218	0.337	0.049	1.376
	LTE Band 5 (Cell)	0.845	0.218	0.337	0.049	1.449
	LTE Band 4 (AWS)	0.953	0.218	0.337	0.049	1.557
	LTE Band 41	0.843	0.218	0.337	0.049	1.447

12.9 Simultaneous Transmission Conclusion

The above numerical summed SAR results are sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528- 2013 Section 6.3.4.1.

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13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability




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

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

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

**Table 13-1
Body SAR Measurement Variability Results**

BODY VARIABILITY RESULTS															
Band	FREQUENCY		Mode	Service	# of Time Slots	Side	Configuration	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	824.20	128	GSM850	GPRS	3	back	Closed	5 mm	0.949	0.816	1.16	N/A	N/A	N/A	N/A
1750	1732.50	20175	LTE Band 4 (AWS), 20 MHz Bandwidth	QPSK, 100 RB, 0 RB Offset	N/A	bottom	Closed	5 mm	0.852	0.847	1.01	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram							




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**Table 13-2
Phablet SAR Measurement Variability Results**

PHABLET VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	# of Time Slots	Side	Spacing	Measured SAR (10g)	1st Repeated SAR (10g)	Ratio	2nd Repeated SAR (10g)	Ratio	3rd Repeated SAR (10g)	Ratio
	MHz	Ch.						(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1750	1732.50	20175	LTE Band 4 (AWS), 20 MHz Bandwidth	QPSK, 50 RB, 25 RB Offset	N/A	back	0 mm	2.350	2.340	1.00	N/A	N/A	N/A	N/A
1900	1909.80	810	GSM 1900	GPRS	3	back	0 mm	2.000	1.970	1.02	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Phablet 4.0 W/kg (mW/g) averaged over 10 grams							

13.2 Measurement Uncertainty



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

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Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	CBT	N/A	CBT	3051A00187
Agilent	E4438C	ESG Vector Signal Generator	12/14/2020	Biennial	12/14/2022	MY42082385
Agilent	E4438C	ESG Vector Signal Generator	8/10/2020	Annual	8/10/2021	MY47270002
Agilent	E4432B	ESG-D Series Signal Generator	2/24/2021	Annual	2/24/2022	US40053896
Agilent	N5182A	MXG Vector Signal Generator	12/1/2020	Annual	12/1/2021	MY47428837
Agilent	8753E5	S-Parameter Network Analyzer	2/2/2021	Annual	2/2/2022	US39170122
Agilent	8753E5	S-Parameter Vector Network Analyzer	12/15/2020	Annual	12/15/2021	MY40003841
Agilent	E5515C	Wireless Communications Test Set	2/4/2021	Annual	2/4/2022	GB43193563
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB44450273
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46170464
Amplifier Research	1551G6	Amplifier	CBT	N/A	CBT	353317
Amplifier Research	1551G6	Amplifier	CBT	N/A	CBT	433978
Anritsu	MN8110B	I/O Adaptor	CBT	N/A	CBT	6261747881
Anritsu	ML2495A	Power Meter	1/18/2021	Annual	1/18/2022	941001
Anritsu	ML2496A	Power Meter	3/3/2021	Annual	3/3/2022	1306009
Anritsu	MA2411B	Pulse Power Sensor	12/18/2020	Annual	12/18/2021	1126066
Anritsu	MA2411B	Pulse Power Sensor	2/5/2021	Annual	2/5/2022	846215
Anritsu	MT8821C	Radio Communication Analyzer	3/23/2021	Annual	3/23/2022	6201144418
Anritsu	MT8821C	Radio Communication Analyzer	2/1/2021	Annual	2/1/2022	6201664756
Anritsu	MT8821C	Radio Communication Analyzer	4/16/2021	Annual	4/16/2022	6200901190
Anritsu	MA24106A	USB Power Sensor	3/2/2021	Annual	3/2/2022	1244524
Anritsu	MA24106A	USB Power Sensor	9/15/2020	Annual	9/15/2021	1520505
Anritsu	MT8862A	Wireless Connectivity Test Set	10/29/2020	Annual	10/29/2021	6261782395
COMTECH	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M155A00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Control Company	4352	Long Stem Thermometer	3/2/2021	Annual	3/2/2022	160508097
Control Company	4352	Long Stem Thermometer	5/16/2020	Biennial	5/16/2022	200294567
Control Company	4040	Therm./Clock/Humidity Monitor	2/17/2020	Biennial	2/17/2022	200113269
Control Company	4040	Therm./Clock/Humidity Monitor	3/12/2021	Biennial	3/12/2023	210201956
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	N9020A	MXA Signal Analyzer	2/24/2021	Annual	2/24/2022	MY48010233
Keysight Technologies	N9020A	MXA Signal Analyzer	8/14/2020	Annual	8/14/2021	US46470561
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	9/12/2020	Annual	9/1/2021	MY53401181
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	SLP-240D+	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
Insize	1108-150	Digital Caliper	1/17/2020	Biennial	1/17/2022	409193536
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	NC-100	Torque Wrench	8/4/2020	Biennial	8/4/2022	1445
Pasternack	NC-100	Torque Wrench	8/4/2020	Biennial	8/4/2022	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	5/10/2021	Annual	5/10/2022	109892
Rohde & Schwarz	CMW500	Radio Communication Tester	1/19/2021	Annual	1/19/2022	111427
Rohde & Schwarz	CMW500	Radio Communication Tester	10/16/2020	Annual	10/16/2021	101699
Rohde & Schwarz	ZNLE6	Vector Network Analyzer	9/29/2020	Annual	9/29/2021	101307
SPEAG	D750V3	750 MHz SAR Dipole	3/16/2020	Biennial	3/16/2022	1003
SPEAG	D750V3	750 MHz SAR Dipole	10/19/2018	Triennial	10/19/2021	1161
SPEAG	D835V2	835 MHz SAR Dipole	3/13/2019	Triennial	3/13/2022	4d047
SPEAG	D835V2	835 MHz SAR Dipole	1/21/2021	Annual	1/21/2022	4d132
SPEAG	D835V2	835 MHz SAR Dipole	10/19/2018	Triennial	10/19/2021	4d133
SPEAG	D1750V2	1750 MHz SAR Dipole	5/12/2020	Biennial	5/12/2022	1148
SPEAG	D1750V2	1750 MHz SAR Dipole	10/22/2018	Triennial	10/22/2021	1150
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Triennial	10/23/2021	5d149
SPEAG	D2450V2	2450 MHz SAR Dipole	8/14/2020	Annual	8/14/2021	749
SPEAG	D2450V2	2450 MHz SAR Dipole	1/19/2021	Annual	1/19/2022	981
SPEAG	D2600V2	2600 MHz SAR Dipole	6/14/2019	Triennial	6/14/2022	1064
SPEAG	D5GHV2	5 GHz SAR Dipole	9/10/2020	Annual	9/10/2021	1191
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/18/2021	Annual	3/18/2022	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/15/2020	Annual	7/15/2021	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/16/2020	Annual	10/16/2021	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/5/2021	Annual	6/15/2022	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/7/2021	Annual	4/7/2022	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/10/2021	Annual	3/10/2022	1415
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/10/2020	Annual	9/10/2021	1449
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/11/2020	Annual	8/11/2021	1450
SPEAG	DAE4	Dasy Data Acquisition Electronics	12/7/2020	Annual	12/7/2021	1533
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/13/2021	Annual	1/13/2022	1558
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/12/2021	Annual	5/1/2022	1070
SPEAG	DAK-3.5	Dielectric Assessment Kit	10/14/2020	Annual	10/14/2021	1091
SPEAG	EX3DV4	SAR Probe	1/20/2021	Annual	1/20/2022	3589
SPEAG	EX3DV4	SAR Probe	7/31/2020	Annual	7/31/2021	7308
SPEAG	EX3DV4	SAR Probe	4/19/2021	Annual	4/19/2022	7357
SPEAG	EX3DV4	SAR Probe	6/21/2021	Annual	6/21/2022	7409
SPEAG	EX3DV4	SAR Probe	7/20/2020	Annual	7/20/2021	7410
SPEAG	EX3DV4	SAR Probe	3/16/2021	Annual	3/16/2022	7526
SPEAG	EX3DV4	SAR Probe	11/23/2020	Annual	11/23/2021	7538
SPEAG	EX3DV4	SAR Probe	10/20/2020	Annual	10/20/2021	7539
SPEAG	EX3DV4	SAR Probe	10/20/2020	Annual	10/20/2021	7551
SPEAG	EX3DV4	SAR Probe	12/11/2020	Annual	12/11/2021	7571

Notes:




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

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15 MEASUREMENT UNCERTAINTIES

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	7	N	1	1	1	7.0	7.0	∞
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	0.7	0.7	0.9	0.9	∞
Boundary Effect	E.2.3	2	R	1.73	1	1	1.2	1.2	∞
Linearity	E.2.4	0.3	N	1	1	1	0.3	0.3	∞
System Detection Limits	E.2.4	0.25	R	1.73	1	1	0.1	0.1	∞
Modulation Response	E.2.5	4.8	R	1.73	1	1	2.8	2.8	∞
Readout Electronics	E.2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1	1	1.5	1.5	∞
RF Ambient Conditions - Noise	E.6.1	3	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	3	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.8	R	1.73	1	1	0.5	0.5	∞
Probe Positioning w/ respect to Phantom	E.6.3	6.7	R	1.73	1	1	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	4	R	1.73	1	1	2.3	2.3	∞
Test Sample Related									
Test Sample Positioning	E.4.2	3.12	N	1	1	1	3.1	3.1	35
Device Holder Uncertainty	E.4.1	1.67	N	1	1	1	1.7	1.7	5
Output Power Variation - SAR drift measurement	E.2.9	5	R	1.73	1	1	2.9	2.9	∞
SAR Scaling	E.6.5	0	R	1.73	1	1	0.0	0.0	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	E.3.3	4.3	N	1	0.78	0.71	3.3	3.0	76
Liquid Permittivity - measurement uncertainty	E.3.3	4.2	N	1	0.23	0.26	1.0	1.1	75
Liquid Conductivity - Temperature Uncertainty	E.3.4	3.4	R	1.73	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Uncertainty	E.3.4	0.6	R	1.73	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)	RSS						12.2	12.0	191
Expanded Uncertainty (95% CONFIDENCE LEVEL)	k=2						24.4	24.0	

The above measurement uncertainties are according to IEEE Std. 1528-2013




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16 CONCLUSION

16.1 Measurement Conclusion



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

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



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