



SAR EVALUATION REPORT

Applicant Name:
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Date of Testing:
 01/03/22 – 01/28/22
Test Site/Location:
 PCTEST Lab, Columbia, MD, USA
Document Serial No.:
 1M2112200163-01.A3L (Rev1)

FCC ID: **A3LSMM336B**

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

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model(s): SM-M336B/DS

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	0.22	0.40	1.00	N/A
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	0.11	0.16	0.25	1.75
PCE	UMTS 850	826.40 - 846.60 MHz	0.30	0.41	0.89	N/A
PCE	UMTS 1750	1712.4 - 1752.6 MHz	0.22	0.40	0.43	2.89
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.26	0.31	0.44	2.74
PCE	LTE Band 12	699.7 - 715.3 MHz	0.17	0.35	0.46	N/A
PCE	LTE Band 17	706.5 - 713.5 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 26 (Cell)	814.7 - 848.3 MHz	0.20	0.29	0.64	N/A
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.25	0.37	0.86	N/A
PCE	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.21	0.38	0.30	2.57
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	0.18	0.24	0.32	2.11
PCE	LTE Band 41	2498.5 - 2687.5 MHz	0.37	0.25	0.32	1.65
PCE	NR Band n5 (Cell)	826.5 - 846.5 MHz	0.29	0.39	0.87	N/A
PCE	NR Band n66 (AWS)	1712.5 - 1777.5 MHz	0.22	0.35	0.34	2.64
DTS	2.4 GHz WLAN	2412 - 2472 MHz	0.17	< 0.1	0.20	N/A
NII	U-NII-1	5180 - 5240 MHz	N/A	0.15	N/A	0.46
NII	U-NII-2A	5260 - 5320 MHz	0.34	0.16	N/A	0.60
NII	U-NII-2C	5500 - 5720 MHz	0.14	0.10	N/A	0.38
NII	U-NII-3	5745 - 5825 MHz	0.18	< 0.1	0.12	N/A
DSS/DTS	Bluetooth	2402 - 2480 MHz	< 0.1	< 0.1	< 0.1	N/A
Simultaneous SAR per KDB 690783 D01v01r03:			0.86	0.91	1.33	3.49

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 1.9 of this report; for North American frequency bands only.

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

Randy Ortanez
 President






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

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 17	Voice/Data	706.5 - 713.5 MHz
LTE Band 26 (Cell)	Voice/Data	814.7 - 848.3 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
NR Band n5 (Cell)	Data	826.5 - 846.5 MHz
NR Band n66 (AWS)	Data	1712.5 - 1777.5 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	Data	13.56 MHz

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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 during all voice or VoIP held to ear scenarios. Per FCC Guidance, the held-to-ear exposure conditions were evaluated at reduced power according to the head SAR positions described in IEEE 1528-2013. Detailed descriptions of the power reduction mechanism are included in the operational description.



1.3 Nominal and Maximum Output Power Specifications

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




1.3.1 2G/3G/4G/5G 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
Maximum	Max Allowed	34.5	34.5	32.5	31.3	29.5	28.0	26.5	25.3	23.5
	Nominal	33.5	33.5	31.5	30.3	28.5	27.0	25.5	24.3	22.5
Proximity Sensor Active	Max Allowed	34.5	34.5	32.5	31.3	29.5	28.0	26.5	25.3	23.5
	Nominal	33.5	33.5	31.5	30.3	28.5	27.0	25.5	24.3	22.5
RCV Mode Active	Max Allowed	34.5	34.5	32.5	31.3	29.5	28.0	26.5	25.3	23.5
	Nominal	33.5	33.5	31.5	30.3	28.5	27.0	25.5	24.3	22.5
Hotspot Mode Active	Max Allowed	N/A	34.5	32.5	31.3	29.5	28.0	26.5	25.3	23.5
	Nominal	N/A	33.5	31.5	30.3	28.5	27.0	25.5	24.3	22.5
Earjack Active	Max Allowed	34.5	34.5	32.5	31.3	29.5	28.0	26.5	25.3	23.5
	Nominal	33.5	33.5	31.5	30.3	28.5	27.0	25.5	24.3	22.5
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
Maximum	Max Allowed	31.0	31.0	28.5	27.5	26.0	27.0	25.5	24.3	22.5
	Nominal	30.0	30.0	27.5	26.5	25.0	26.0	24.5	23.3	21.5
Proximity Sensor Active	Max Allowed	29.0	29.0	26.5	25.5	24.0	25.0	23.5	22.3	20.5
	Nominal	28.0	28.0	25.5	24.5	23.0	24.0	22.5	21.3	19.5
RCV Mode Active	Max Allowed	31.0	31.0	28.5	27.5	26.0	27.0	25.5	24.3	22.5
	Nominal	30.0	30.0	27.5	26.5	25.0	26.0	24.5	23.3	21.5
Hotspot Mode Active	Max Allowed	N/A	29.0	26.5	25.5	24.0	25.0	23.5	22.3	20.5
	Nominal	N/A	28.0	25.5	24.5	23.0	24.0	22.5	21.3	19.5
Earjack Active	Max Allowed	29.0	29.0	26.5	25.5	24.0	25.0	23.5	22.3	20.5
	Nominal	28.0	28.0	25.5	24.5	23.0	24.0	22.5	21.3	19.5

For GSM, the above powers listed are GSM burst average values.




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UMTS Band 5 (850 MHz)					
Power Level		Modulated Average Output Power			
		3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6	3GPP DC-HSDPA Rel 8
Maximum	Max Allowed	25.3	24.3	23.8	24.3
	Nominal	24.3	23.3	22.8	23.3
Proximity Sensor Active	Max Allowed	25.3	24.3	23.8	24.3
	Nominal	24.3	23.3	22.8	23.3
RCV Mode Active	Max Allowed	25.3	24.3	23.8	24.3
	Nominal	24.3	23.3	22.8	23.3
Hotspot Mode Active	Max Allowed	25.3	24.3	23.8	24.3
	Nominal	24.3	23.3	22.8	23.3
Earjack Active	Max Allowed	25.3	24.3	23.8	24.3
	Nominal	24.3	23.3	22.8	23.3
UMTS Band 4 (1750 MHz)					
Power Level		Modulated Average Output Power			
		3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6	3GPP DC-HSDPA Rel 8
Maximum	Max Allowed	24.5	23.5	23.0	23.5
	Nominal	23.5	22.5	22.0	22.5
Proximity Sensor Active	Max Allowed	22.0	22.0	21.0	22.0
	Nominal	21.0	21.0	20.0	21.0
RCV Mode Active	Max Allowed	22.0	22.0	21.0	22.0
	Nominal	21.0	21.0	20.0	21.0
Hotspot Mode Active	Max Allowed	22.0	22.0	21.0	22.0
	Nominal	21.0	21.0	20.0	21.0
Earjack Active	Max Allowed	22.0	22.0	21.0	22.0
	Nominal	21.0	21.0	20.0	21.0
UMTS Band 2 (1900 MHz)					
Power Level		Modulated Average Output Power			
		3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6	3GPP DC-HSDPA Rel 8
Maximum	Max Allowed	24.5	23.5	23.0	23.5
	Nominal	23.5	22.5	22.0	22.5
Proximity Sensor Active	Max Allowed	22.0	22.0	21.0	22.0
	Nominal	21.0	21.0	20.0	21.0
RCV Mode Active	Max Allowed	22.0	22.0	21.0	22.0
	Nominal	21.0	21.0	20.0	21.0
Hotspot Mode Active	Max Allowed	22.0	22.0	21.0	22.0
	Nominal	21.0	21.0	20.0	21.0
Earjack Active	Max Allowed	22.0	22.0	21.0	22.0
	Nominal	21.0	21.0	20.0	21.0

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Mode / Band	Antenna		Modulated Average Output Power (in dBm)				
			Maximum	Proximity Sensor Active	RCV Mode Active	Hotspot Mode Active	Earjack Active
LTE Band 12	A	Max Allowed	25.0	25.0	25.0	25.0	25.0
		Nominal	24.0	24.0	24.0	24.0	24.0
LTE Band 17	A	Max Allowed	25.0	25.0	25.0	25.0	25.0
		Nominal	24.0	24.0	24.0	24.0	24.0
LTE Band 26 (Cell)	A	Max Allowed	24.5	24.5	24.5	24.5	24.5
		Nominal	23.5	23.5	23.5	23.5	23.5
LTE Band 5 (Cell)	A	Max Allowed	25.3	25.3	25.3	25.3	25.3
		Nominal	24.3	24.3	24.3	24.3	24.3
LTE Band 66 (AWS)	B	Max Allowed	24.5	21.0	24.5	21.0	21.0
		Nominal	23.5	20.0	23.5	20.0	20.0
LTE Band 4 (AWS)	B	Max Allowed	24.5	21.0	24.5	21.0	21.0
		Nominal	23.5	20.0	23.5	20.0	20.0
LTE Band 2 (PCS)	B	Max Allowed	24.5	21.0	24.5	21.0	21.0
		Nominal	23.5	20.0	23.5	20.0	20.0
LTE Band 41	B	Max Allowed	24.5	21.0	24.5	21.0	21.0
		Nominal	23.5	20.0	23.5	20.0	20.0

Mode / Band	Antenna		Modulated Average Output Power (in dBm)				
			Maximum	Proximity Sensor Active	RCV Mode Active	Hotspot Mode Active	Earjack Active
NR Band n5 (Cell)	A	Max Allowed	25.0	25.0	25.0	25.0	25.0
		Nominal	24.0	24.0	24.0	24.0	24.0
NR Band n66 (AWS)	B	Max Allowed	24.0	21.0	24.0	21.0	21.0
		Nominal	23.0	20.0	23.0	20.0	20.0

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1.3.2 2.4 GHz Maximum Bluetooth and WLAN Output Power

Mode	Band	IEEE 802.11 (in dBm)					
		SISO					
		b		g		n	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
2.4 GHz WIFI	2.45 GHz	18.0	17.0	16.0	15.0	16.0	15.0
		ch. 12: 9.0	8.0	ch. 12: 9.0	8.0	ch. 11: 15.0	14.0
		ch. 13: 9.0	8.0	ch. 13: 8.0	7.0	ch. 12: 9.0	8.0
						ch. 13: 7.0	6.0




Mode	Modulated Average (dBm)	
	Maximum	Nominal
Bluetooth 1Mbps	11.5	10.5
Bluetooth EDR	9.5	8.5
Bluetooth LE	9.5	8.5

1.3.3 2.4 GHz Reduced WLAN Output Powers

The below table is applicable in the following conditions:




- RCV Active

Mode	Band	IEEE 802.11 (in dBm)					
		SISO					
		b		g		n	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
2.4 GHz WIFI	2.45 GHz	14.0	13.0	14.0	13.0	14.0	13.0
		ch. 12: 9.0	8.0	ch. 12: 9.0	8.0	ch. 12: 9.0	8.0
		ch. 13: 9.0	8.0	ch. 13: 8.0	7.0	ch. 13: 7.0	6.0

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1.3.4 5 GHz Maximum WLAN Output Power

Mode	Band	IEEE 802.11 (in dBm)					
		SISO					
		a		n		ac	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
5 GHz WIFI (20MHz BW)	5200 MHz	9.5	8.5	11.5	10.5	11.5	10.5
	5300 MHz	9.0	8.0	11.0	10.0	11.0	10.0
	5500 MHz	12.0	11.0	12.5	11.5	12.5	11.5
	5800 MHz	13.5	12.5	13.5	12.5	14.0	13.0
5 GHz WIFI (40MHz BW)	5200 MHz	[REDACTED]		ch. 38: 10.5	9.5	ch. 38: 10.5	9.5
				ch. 46: 12.0	11.0	ch. 46: 11.0	10.0
	5300 MHz			ch. 54: 11.0	10.0	ch. 54: 9.0	8.0
				ch. 62: 8.5	7.5	ch. 62: 8.5	7.5
	5500 MHz			15.0	14.0	15.0	14.0
	5800 MHz			ch. 102: 10.5	9.5	ch. 102: 10.5	9.5
				15.0	14.0	15.0	14.0
5 GHz WIFI (80MHz BW)	5200 MHz	[REDACTED]				7.5	6.5
	5300 MHz					5.5	4.5
	5500 MHz					14.0	13.0
						ch. 106: 8.0	7.0
	5800 MHz					14.0	13.0



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1.3.5 5 GHz Reduced WLAN Output Powers

The below table is applicable in the following conditions:

- RCV Active

Mode	Band	IEEE 802.11 (in dBm)					
		SISO					
		a		n		ac	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
5 GHz WIFI (20MHz BW)	5200 MHz	9.5	8.5	11.0	10.0	11.0	10.0
	5300 MHz	9.0	8.0	11.0	10.0	11.0	10.0
	5500 MHz	11.0	10.0	11.0	10.0	11.0	10.0
	5800 MHz	11.0	10.0	11.0	10.0	11.0	10.0
5 GHz WIFI (40MHz BW)	5200 MHz			11.0	10.0	11.0	10.0
				ch. 38: 10.5	9.5	ch. 38: 10.5	9.5
	5300 MHz			11.0	10.0	9.0	8.0
				ch. 62: 8.5	7.5	ch. 62: 8.5	7.5
	5500 MHz	11.0	10.0	11.0	10.0		
		ch. 102: 10.5	9.5	ch. 102: 10.5	9.5		
	5800 MHz	11.0	10.0	11.0	10.0		
5 GHz WIFI (80MHz BW)	5200 MHz					7.5	6.5
	5300 MHz					5.5	4.5
	5500 MHz					11.0	10.0
						ch. 106: 8.0	7.0
	5800 MHz			11.0	10.0		

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1.4 DUT Antenna Locations

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




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

Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850	Yes	Yes	No	Yes	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	No	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	Yes
UMTS 1750	Yes	Yes	No	Yes	No	Yes
UMTS 1900	Yes	Yes	No	Yes	No	Yes
LTE Band 12	Yes	Yes	No	Yes	Yes	Yes
LTE Band 26 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 5 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 66 (AWS)	Yes	Yes	No	Yes	No	Yes
LTE Band 2 (PCS)	Yes	Yes	No	Yes	No	Yes
LTE Band 41	Yes	Yes	No	Yes	No	Yes
NR Band n5 (Cell)	Yes	Yes	No	Yes	Yes	Yes
NR Band n66 (AWS)	Yes	Yes	No	Yes	No	Yes
2.4 GHz WLAN	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN	Yes	Yes	Yes	No	No	Yes
Bluetooth	Yes	Yes	Yes	No	No	Yes

Note: Particular DUT edges were not required to be evaluated for wireless router SAR 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, and 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 1-2
Simultaneous Transmission Scenarios**

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Phablet	Notes
1	GSM voice + 2.4 GHz Bluetooth	Yes^	Yes	N/A	Yes	^ Bluetooth Tethering is considered
2	GSM voice + 2.4 GHz WLAN	Yes	Yes	N/A	Yes	
3	GSM voice + 5 GHz WLAN	Yes	Yes	N/A	Yes	
4	GSM voice + 2.4 GHz Bluetooth + 5 GHz WLAN	Yes^	Yes	N/A	Yes	^ Bluetooth Tethering is considered
5	UMTS + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
6	UMTS + 2.4 GHz WLAN	Yes	Yes	Yes	Yes	
7	UMTS + 5 GHz WLAN	Yes	Yes	Yes	Yes	
8	UMTS + 2.4 GHz Bluetooth + 5 GHz WLAN	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
9	LTE + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
10	LTE + 2.4 GHz WLAN	Yes	Yes	Yes	Yes	
11	LTE + 5 GHz WLAN	Yes	Yes	Yes	Yes	
12	LTE + 2.4 GHz Bluetooth + 5 GHz WLAN	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
13	LTE + NR	Yes	Yes	N/A	Yes	
14	LTE + NR + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
15	LTE + NR + 2.4 GHz WLAN	Yes	Yes	Yes	Yes	
16	LTE + NR + 5 GHz WLAN	Yes	Yes	Yes	Yes	
17	LTE + NR + 2.4 GHz Bluetooth + 5 GHz WLAN	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
18	NR + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
19	NR + 2.4 GHz WLAN	Yes	Yes	Yes	Yes	
20	NR + 5 GHz WLAN	Yes	Yes	Yes	Yes	
21	NR + 2.4 GHz Bluetooth + 5 GHz WLAN	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
22	GPRS/EDGE + 2.4 GHz Bluetooth	N/A	N/A	Yes^	Yes	^ Bluetooth Tethering is considered
23	GPRS/EDGE + 2.4 GHz WLAN	N/A	N/A	Yes	Yes	
24	GPRS/EDGE + 5 GHz WLAN	N/A	N/A	Yes	Yes	
25	GPRS/EDGE + 2.4 GHz Bluetooth + 5 GHz WLAN	N/A	N/A	Yes^	Yes	^ Bluetooth Tethering is considered

- 2.4 GHz WLAN and 2.4 GHz Bluetooth share the same antenna path and cannot transmit simultaneously.
- 2.4 GHz WLAN and 5 GHz WLAN share the same antenna path and cannot transmit simultaneously.
- LTE + 5G NR FR1 Scenarios are limited to EN-DC combinations with anchor bands as shown in the NR FR1 checklist
- 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.
- 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.
- 5 GHz Wireless Router is only supported for the U-NII-3 by S/W, therefore U-NII-1, U-NII-2A, and U-NII-2C were not evaluated for wireless router conditions.
- This device supports VOLTE.
- This device supports VOWIFI.
- This device supports Bluetooth Tethering.

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1.7 Miscellaneous SAR Test Considerations

(A) WIFI/BT

This device supports channel 1-13 for 2.4 GHz WLAN. Because channel 12/13 targets are not higher than that of channels 1-11, channels 1, 6, and 11 were considered for SAR testing per FCC KDB 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 WIFI and 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.

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, and U-NII-2C WLAN, phablet SAR tests were performed. Phablet SAR was not evaluated for 2.4 GHz WLAN and 2.4 GHz Bluetooth, and U-NII-3 WLAN operations since wireless router 1g SAR was < 1.2 W/kg.

(B) Licensed Transmitter(s)

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

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



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

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

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

NR implementation supports SA and NSA mode. In EN-DC mode, NR operates with the LTE Bands shown in the NR FR1 checklist acting as anchor bands. Per FCC guidance, SAR tests for NR Bands and LTE Anchor Bands were performed separately due to limitations in SAR probe calibration factors.

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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.

1.8 Guidance Applied

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

LTE Information					
Form Factor	Portable Handset				
	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 17 (706.5 - 713.5 MHz)				
	LTE Band 26 (Cell) (814.7 - 848.3 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 66 (AWS) (1710.7 - 1779.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)				
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)				
	LTE Band 41 (2498.5 - 2687.5 MHz)				
	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 17: 5 MHz, 10 MHz				
	LTE Band 26 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 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 17: 5 MHz	706.5 (23755)		710 (23790)	713.5 (23825)	
LTE Band 17: 10 MHz	709 (23780)		710 (23790)	711 (23800)	
LTE Band 26 (Cell): 1.4 MHz	814.7 (26697)		831.5 (26865)	848.3 (27033)	
LTE Band 26 (Cell): 3 MHz	815.5 (26705)		831.5 (26865)	847.5 (27025)	
LTE Band 26 (Cell): 5 MHz	816.5 (26715)		831.5 (26865)	846.5 (27015)	
LTE Band 26 (Cell): 10 MHz	819 (26740)		831.5 (26865)	844 (26990)	
LTE Band 26 (Cell): 15 MHz	821.5 (26765)		831.5 (26865)	841.5 (26965)	
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)		836.5 (20525)	848.3 (20643)	
LTE Band 5 (Cell): 3 MHz	825.5 (20415)		836.5 (20525)	847.5 (20635)	
LTE Band 5 (Cell): 5 MHz	826.5 (20425)		836.5 (20525)	846.5 (20625)	
LTE Band 5 (Cell): 10 MHz	829 (20450)		836.5 (20525)	844 (20600)	
LTE Band 66 (AWS): 1.4 MHz	1710.7 (131979)		1745 (132322)	1779.3 (132665)	
LTE Band 66 (AWS): 3 MHz	1711.5 (131987)		1745 (132322)	1778.5 (132657)	
LTE Band 66 (AWS): 5 MHz	1712.5 (131997)		1745 (132322)	1777.5 (132647)	
LTE Band 66 (AWS): 10 MHz	1715 (132022)		1745 (132322)	1775 (132622)	
LTE Band 66 (AWS): 15 MHz	1717.5 (132047)		1745 (132322)	1772.5 (132597)	
LTE Band 66 (AWS): 20 MHz	1720 (132072)		1745 (132322)	1770 (132572)	
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)		1732.5 (20175)	1754.3 (20393)	
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)		1732.5 (20175)	1753.5 (20385)	
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)		1732.5 (20175)	1752.5 (20375)	
LTE Band 4 (AWS): 10 MHz	1715 (20000)		1732.5 (20175)	1750 (20350)	
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)		1732.5 (20175)	1747.5 (20325)	
LTE Band 4 (AWS): 20 MHz	1720 (20050)		1732.5 (20175)	1745 (20300)	
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)		1880 (18900)	1909.3 (19193)	
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)		1880 (18900)	1908.5 (19185)	
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)		1880 (18900)	1907.5 (19175)	
LTE Band 2 (PCS): 10 MHz	1855 (18650)		1880 (18900)	1905 (19150)	
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)		1880 (18900)	1902.5 (19125)	
LTE Band 2 (PCS): 20 MHz	1860 (18700)		1880 (18900)	1900 (19100)	
LTE Band 41: 5 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 10 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 15 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
UE Category	DL UE Cat 18, UL UE Cat 18				
Modulations Supported in UL	QPSK, 16QAM, 64QAM, 256QAM				
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 downlink MIMO features as shown in Appendix I. 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, eCIC, WIFI Offloading, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

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NR Information			
Form Factor	Portable Handset		
	NR Band n5 (Cell) (826.5 - 846.5 MHz)		
	NR Band n66 (AWS) (1712.5 - 1777.5 MHz)		
	NR Band n5 (Cell): 5 MHz, 10 MHz, 15 MHz, 20 MHz		
	NR Band n66 (AWS): 5 MHz, 10 MHz, 15 MHz, 20 MHz		
Channel Numbers and Frequencies (MHz)	Low	Mid	High
NR Band n5 (Cell): 5 MHz	826.5 (165300)	836.5 (167300)	846.5 (169300)
NR Band n5 (Cell): 10 MHz	829 (165800)	836.5 (167300)	844 (168800)
NR Band n5 (Cell): 15 MHz	831.5 (166300)	836.5 (167300)	841.5 (168300)
NR Band n5 (Cell): 20 MHz	834 (166800)	836.5 (167300)	839 (167800)
NR Band n66 (AWS): 5 MHz	1712.5 (342500)	1745 (349000)	1777.5 (355500)
NR Band n66 (AWS): 10 MHz	1715 (343000)	1745 (349000)	1775 (355000)
NR Band n66 (AWS): 15 MHz	1717.5 (343500)	1745 (349000)	1772.5 (354500)
NR Band n66 (AWS): 20 MHz	1720 (344000)	1745 (349000)	1770 (354000)
SCS for NR Band n5/n66	15 kHz		
Modulations Supported in UL	DFT-s-OFDM: $\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM CP-OFDM: QPSK, 16QAM, 64QAM, 256QAM		
A-MPR (Additional MPR) disabled for SAR Testing?	YES		
EN-DC Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations		
LTE Anchor Bands for NR Band n5 (Cell)	N/A		
LTE Anchor Bands for NR Band n66 (AWS)	LTE Band 5		

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3 INTRODUCTION

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

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

3.1 SAR Definition

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

Equation 3-1
SAR Mathematical Equation

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




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

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

where:

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

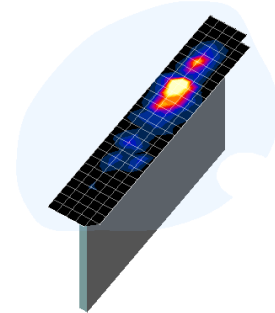




Figure 4-1
Sample SAR Area Scan

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	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≤ 4	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≤ 3	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≤ 2.5	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≤ 2	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 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].

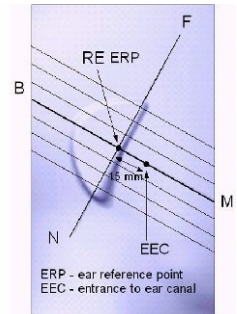


Figure 5-1
Close-Up Side view
of ERP

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.

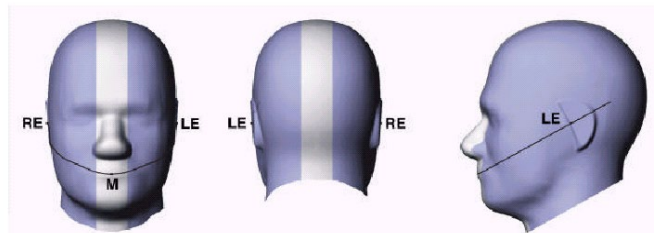


Figure 5-2
Front, back and side view of SAM Twin Phantom

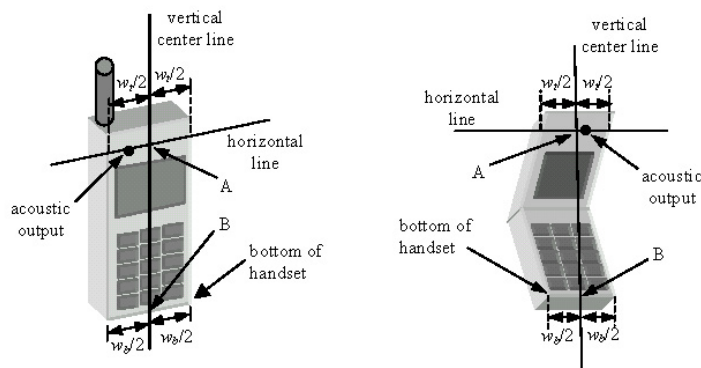




Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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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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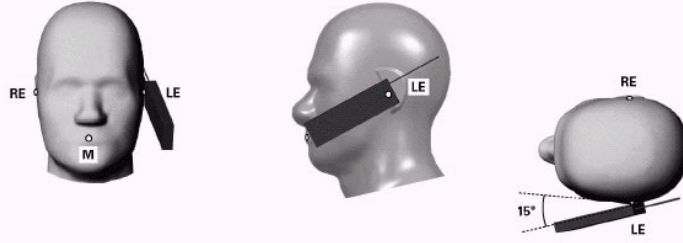


Figure 6-2 Front, Side and Top View of Ear/15° Tilt Position

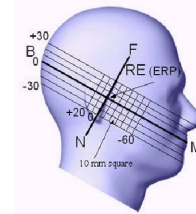


Figure 6-3 Side view w/ relevant markings

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.

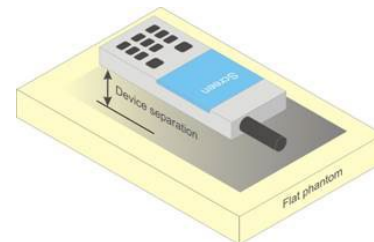




Figure 6-4 Sample Body-Worn Diagram

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Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

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

6.6 Extremity Exposure Configurations




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

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

6.7 Wireless Router Configurations

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

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

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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 non-reduced output power level. FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device at these additional test positions. Sensor triggering distance summary data is included in Appendix G.

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

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

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

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8 FCC MEASUREMENT PROCEDURES

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

8.1 Measured and Reported SAR

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

8.2 3G SAR Test Reduction Procedure

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

8.3 Procedures Used to Establish RF Signal for SAR



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

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

8.4 SAR Measurement Conditions for UMTS

8.4.1 Output Power Verification

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

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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.

8.4.6 SAR Measurement Conditions for DC-HSDPA

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

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).

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8.5.1 Spectrum Plots for RB Configurations

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

8.5.2 MPR

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

8.5.3 A-MPR

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



8.5.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r04:

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

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measurements are required for downlink only carrier aggregation configurations when the average output power with downlink only carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink only carrier aggregation inactive.

8.6 SAR Testing with 802.11 Transmitters

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

8.6.1 General Device Setup

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

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

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




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

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

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

8.6.4 Initial Test Position Procedure

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

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remaining test positions is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.5 2.4 GHz SAR Test Requirements

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

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

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




8.6.6 OFDM Transmission Mode and SAR Test Channel Selection

When the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n and 802.11ac or 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11a, then 802.11n and 802.11ac or 802.11g then 802.11n, is used for SAR measurement. Per April 2019 TCB Workshop guidance, 802.11ax was considered the highest order 802.11 mode. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

8.6.7 Initial Test Configuration Procedure




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

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

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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.

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9 RF CONDUCTED POWERS

9.1 GSM Conducted Powers

**Table 9-1
Maximum Conducted Powers**

Maximum Burst-Averaged Output Power										
		Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 850	128	33.58	33.59	31.73	30.39	28.91	26.98	25.00	23.56	22.24
	190	33.56	33.63	31.59	30.06	28.73	27.05	24.88	23.59	21.95
	251	33.61	33.69	31.67	30.04	28.80	27.32	25.34	23.48	21.98
GSM 1900	512	29.83	29.43	27.48	26.07	24.47	24.79	23.45	22.21	20.70
	661	29.58	29.61	27.32	25.82	24.33	25.14	23.10	22.13	20.64
	810	29.71	29.73	27.61	26.00	24.52	25.06	23.14	22.33	20.06
Calculated Maximum Frame-Averaged Output Power										
		Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 850	128	24.38	24.39	25.54	25.96	25.73	17.78	18.81	19.13	19.06
	190	24.36	24.43	25.40	25.63	25.55	17.85	18.69	19.16	18.77
	251	24.41	24.49	25.48	25.61	25.62	18.12	19.15	19.05	18.80
GSM 1900	512	20.63	20.23	21.29	21.64	21.29	15.59	17.26	17.78	17.52
	661	20.38	20.41	21.13	21.39	21.15	15.94	16.91	17.70	17.46
	810	20.51	20.53	21.42	21.57	21.34	15.86	16.95	17.90	16.88
GSM 850	Frame	24.30	24.30	25.31	25.87	25.32	17.80	19.31	19.87	19.32
GSM 1900	Avg. Targets:	20.80	20.80	21.31	22.07	21.82	16.80	18.31	18.87	18.32




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Table 9-2

Reduced Conducted Powers - Phablet with grip sensor active, Hotspot mode active, and/or Earjack active

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 1900	512	27.50	27.76	25.76	24.13	22.20	23.20	21.08	20.24	18.74
	661	27.56	27.33	25.52	23.77	22.14	23.13	21.76	19.95	18.44
	810	27.46	27.57	25.42	23.76	22.19	23.26	21.05	20.02	18.37
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	18.30	18.56	19.57	19.70	19.02	14.00	14.89	15.81	15.56
	661	18.36	18.13	19.33	19.34	18.96	13.93	15.57	15.52	15.26
	810	18.26	18.37	19.23	19.33	19.01	14.06	14.86	15.59	15.19
GSM 1900	Frame Avg. Targets:	18.80	18.80	19.31	20.07	19.82	14.80	16.31	16.87	16.32

Note:

- 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.
- 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.
- 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 9-3
Maximum Conducted Powers

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	24.01	24.21	24.40	23.25	23.40	23.55	22.96	23.07	23.14	-
99		12.2 kbps AMR	24.00	24.18	24.35	23.22	23.37	23.50	22.96	23.02	23.13	-
6	HSDPA	Subtest 1	24.00	24.17	24.30	23.18	23.37	23.48	22.96	22.93	22.96	0
6		Subtest 2	22.65	22.88	23.12	22.68	23.03	23.03	22.30	22.40	22.46	0
6		Subtest 3	21.82	21.88	22.06	21.68	21.78	21.95	21.33	21.35	21.38	0.5
6		Subtest 4	21.80	21.85	22.03	21.60	21.74	21.98	21.36	21.40	21.44	0.5
6	HSUPA	Subtest 1	22.70	22.80	23.05	22.08	22.13	22.35	21.80	21.89	21.93	0
6		Subtest 2	20.70	20.79	21.00	20.46	20.62	20.95	20.29	20.33	20.40	2
6		Subtest 3	21.87	22.00	22.19	21.56	21.58	21.79	21.12	21.10	21.21	1
6		Subtest 4	20.68	20.82	21.08	20.42	20.66	20.89	20.23	20.25	20.31	2
6		Subtest 5	23.66	23.70	23.80	22.10	22.22	22.44	21.85	21.83	21.90	0
8	DC-HSDPA	Subtest 1	23.88	24.11	24.03	23.07	23.08	23.28	22.63	22.77	22.75	0
8		Subtest 2	23.99	24.13	24.05	23.04	23.14	23.17	22.74	22.81	22.79	0
8		Subtest 3	23.56	23.70	23.61	22.96	22.89	22.84	22.72	22.84	22.78	0.5
8		Subtest 4	23.54	23.69	23.65	22.92	22.93	22.87	22.71	22.87	22.82	0.5

Table 9-4

Reduced Conducted Powers - Phablet with grip sensor active, Hotspot mode active, RCV, and/or Earjack active

3GPP Release Version	Mode	3GPP 34.121 Subtest	AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	21.13	21.26	21.52	21.20	21.26	21.25	-
99		12.2 kbps AMR	21.08	21.26	21.49	21.03	21.06	21.07	-
6	HSDPA	Subtest 1	21.12	21.28	21.51	20.90	20.88	20.85	0
6		Subtest 2	21.47	21.32	21.51	20.98	20.88	20.82	0
6		Subtest 3	21.15	21.23	21.41	20.76	20.83	20.87	0.5
6		Subtest 4	21.11	21.21	21.47	20.78	20.80	20.83	0.5
6	HSUPA	Subtest 1	20.03	20.11	20.30	19.64	19.66	19.80	0
6		Subtest 2	19.95	20.00	20.24	19.50	19.62	19.72	2
6		Subtest 3	19.93	19.99	19.25	19.59	19.60	19.71	1
6		Subtest 4	19.74	19.81	20.01	19.28	19.34	19.42	2
6		Subtest 5	20.80	20.88	20.96	20.74	20.81	20.83	0
8	DC-HSDPA	Subtest 1	21.06	21.23	21.31	20.72	20.89	20.82	0
8		Subtest 2	21.01	21.10	21.29	20.70	20.85	20.84	0
8		Subtest 3	21.05	21.14	21.24	20.65	20.80	20.79	0.5
8		Subtest 4	21.01	21.12	21.25	20.67	20.84	20.81	0.5

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DC-HSDPA considerations

- 3GPP Specification 34.121-1 Release 8 Ver 8.10.0 was used for DC-HSDPA guidance
- H-Set 12 (QPSK) was confirmed to be used during DC-HSDPA measurements
- The DUT supports UE category 24 for HSDPA

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

9.3 LTE Conducted Powers

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



Note: Some bands do 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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9.3.1 LTE Band 12

**Table 9-5
LTE Band 12 Maximum Conducted Powers - 10 MHz Bandwidth**



LTE Band 12 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23095 (707.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	23.75	0	0
	1	25	23.80		0
	1	49	23.56		0
	25	0	23.00	0-1	1
	25	12	22.93		1
	25	25	22.91		1
	50	0	22.95		1
16QAM	1	0	23.15	0-1	1
	1	25	23.10		1
	1	49	22.75		1
	25	0	22.12	0-2	2
	25	12	21.92		2
	25	25	21.85		2
	50	0	21.98		2
64QAM	1	0	21.94	0-2	2
	1	25	22.39		2
	1	49	21.79		2
	25	0	21.09	0-3	3
	25	12	20.95		3
	25	25	20.80		3
	50	0	20.95		3
256QAM	1	0	19.16	0-5	5
	1	25	19.20		5
	1	49	18.89		5
	25	0	19.18		5
	25	12	18.95		5
	25	25	18.86		5
	50	0	18.88		5

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9.3.2 LTE Band 26

**Table 9-6
TE Band 26 (Cell) Maximum Conducted Powers- 15 MHz Bandwidth**




LTE Band 26 (Cell) 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26865 (831.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	23.73	0	0
	1	36	23.80		0
	1	74	23.52		0
	36	0	22.95	0-1	1
	36	18	22.96		1
	36	37	22.89		1
	75	0	22.95		1
16QAM	1	0	23.00	0-1	1
	1	36	22.98		1
	1	74	22.98		1
	36	0	21.99	0-2	2
	36	18	21.98		2
	36	37	21.93		2
	75	0	21.97		2
64QAM	1	0	21.97	0-2	2
	1	36	22.00		2
	1	74	21.99		2
	36	0	20.98	0-3	3
	36	18	20.99		3
	36	37	20.96		3
	75	0	20.99		3
256QAM	1	0	19.00	0-5	5
	1	36	18.98		5
	1	74	18.95		5
	36	0	19.00		5
	36	18	18.94		5
	36	37	18.71		5
	75	0	18.99		5

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9.3.3 LTE Band 5

**Table 9-7
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	24.14	0	0	
	1	25	23.96		0	
	1	49	24.04		0	
	16QAM	25	0	23.42	0-1	1
		25	12	23.31		1
		25	25	23.27		1
		50	0	23.41		1
64QAM	1	0	23.54	0-1	1	
	1	25	23.63		1	
	1	49	23.65		1	
	256QAM	25	0	22.63	0-2	2
		25	12	22.30		2
		25	25	22.24		2
64QAM	50	0	22.42	0-2	2	
	1	0	22.53		0-2	2
	1	25	22.64			2
	256QAM	1	49	22.50		0-3
		25	0	21.48	3	
		25	12	21.22	3	
		25	25	21.15	3	
256QAM	50	0	21.41	0-5	3	
	1	0	19.54		5	
	1	25	19.38		5	
	1	49	19.50		5	
	25	0	19.56		5	
	25	12	19.24		5	
	25	25	19.23		5	
50	0	19.34	5			

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9.3.4 LTE Band 66




**Table 9-8
LTE Band 66 (AWS) Maximum Conducted Powers – 20 MHz Bandwidth**

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			132072 (1720.0 MHz)	132322 (1745.0 MHz)	132572 (1770.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.00	23.05	23.21	0	0
	1	50	23.70	23.38	23.52		0
	1	99	23.46	23.00	23.21		0
	50	0	22.80	22.79	22.81	0-1	1
	50	25	22.85	22.59	22.82		1
	50	50	22.81	22.44	22.72		1
100	0	22.70	22.49	22.69	1		
16QAM	1	0	22.71	22.37	22.65	0-1	1
	1	50	22.88	22.90	23.06		1
	1	99	22.95	22.37	22.67		1
	50	0	21.60	21.84	21.81	0-2	2
	50	25	21.85	21.61	21.80		2
	50	50	21.78	21.33	21.65		2
100	0	21.59	21.54	21.66	2		
64QAM	1	0	21.60	21.26	21.55	0-2	2
	1	50	21.85	21.90	21.80		2
	1	99	21.71	21.14	21.48		2
	50	0	20.55	20.59	20.86	0-3	3
	50	25	20.87	20.49	20.76		3
	50	50	20.74	20.37	20.65		3
100	0	20.58	20.40	20.62	3		
256QAM	1	0	18.31	18.39	18.40	0-5	5
	1	50	18.92	18.69	18.94		5
	1	99	18.82	18.00	18.39		5
	50	0	18.52	18.69	18.66		5
	50	25	18.64	18.34	18.68		5
	50	50	18.58	18.26	18.48		5
100	0	18.51	18.38	18.59	5		

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**Table 9-9
LTE Band 66 (AWS) Reduced Conducted Powers - Phablet with grip sensor active, Hotspot mode active,
and/or Earjack active - 20 MHz Bandwidth**

LTE Band 66 (AWS) 20 MHz Bandwidth								
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]	
			132072 (1720.0 MHz)	132322 (1745.0 MHz)	132572 (1770.0 MHz)			
			Conducted Power [dBm]					
QPSK	1	0	20.00	20.05	20.21	0	0	
	1	50	20.17	20.13	20.58		0	
	1	99	20.12	20.15	20.26		0	
	50	0	20.27	20.41	20.67	0-1	0	
	50	25	20.79	20.43	20.80		0	
	50	50	20.69	20.41	20.63		0	
16QAM	100	0	20.46	20.42	20.57	0-1	0	
	1	0	20.60	20.47	20.52		0-1	0
	1	50	20.85	20.60	20.79			0
	1	99	20.82	20.59	20.32	0-2		0
	50	0	20.60	20.54	20.89		0	
	50	25	20.76	20.45	20.77		0	
64QAM	50	50	20.68	20.41	20.64	0-2	0	
	100	0	20.58	20.41	20.59		0	
	1	0	20.52	20.47	20.62		0-2	0
	1	50	20.71	20.55	20.77	0		
	1	99	20.71	20.51	20.53	0-3		0
	50	0	20.54	20.56	20.77		0	
50	25	20.76	20.53	20.77	0			
256QAM	50	50	20.79	20.44	20.63	0-3	0	
	100	0	20.61	20.54	20.57		0	
	1	0	18.84	18.48	18.63		0-5	1.5
	1	50	19.11	18.60	18.98	1.5		
	1	99	18.97	18.25	18.67	1.5		
	50	0	18.53	18.40	18.70	1.5		
50	25	18.79	18.46	18.72	1.5			
50	50	18.71	18.35	18.57	1.5			
100	0	18.63	18.42	18.60	1.5			

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9.3.5 LTE Band 2

Table 9-10
LTE Band 2 (PCS) Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 2 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			18700 (1860.0 MHz)	18900 (1880.0 MHz)	19100 (1900.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.00	23.12	23.32	0	0
	1	50	23.25	24.04	23.20		0
	1	99	23.07	23.10	22.96		0
	50	0	22.52	22.41	22.64	0-1	1
	50	25	22.44	22.71	22.64		1
	50	50	22.18	22.52	22.66		1
	100	0	22.59	22.31	22.60	1	
16QAM	1	0	22.14	22.10	22.54	0-1	1
	1	50	22.45	23.02	22.53		1
	1	99	22.07	22.31	22.04		1
	50	0	21.45	21.42	21.72	0-2	2
	50	25	21.39	21.55	21.59		2
	50	50	21.03	21.51	21.61		2
	100	0	21.47	21.27	21.55	2	
64QAM	1	0	21.27	21.10	21.63	0-2	2
	1	50	21.61	22.00	21.26		2
	1	99	21.23	21.27	21.29		2
	50	0	20.43	20.42	20.82	0-3	3
	50	25	20.40	20.67	20.64		3
	50	50	20.23	20.51	20.60		3
	100	0	20.52	20.25	20.49	3	
256QAM	1	0	18.26	18.36	18.53	0-5	5
	1	50	18.71	19.00	18.45		5
	1	99	18.13	18.34	17.99		5
	50	0	18.45	18.27	18.68		5
	50	25	18.31	18.59	18.51		5
	50	50	18.10	18.38	18.47		5
	100	0	18.54	18.33	18.43	5	






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Table 9-11
LTE Band 2 (PCS) Reduced Conducted Powers - Phablet with grip sensor active, Hotspot mode active, and/or Earjack active - 20 MHz Bandwidth

LTE Band 2 (PCS) 20 MHz Bandwidth								
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]	
			18700 (1860.0 MHz)	18900 (1880.0 MHz)	19100 (1900.0 MHz)			
			Conducted Power [dBm]					
QPSK	1	0	19.98	20.40	20.26	0	0	
	1	50	20.03	20.14	20.14		0	
	1	99	19.95	19.95	19.86		0	
	50	0	20.59	20.51	20.52	0-1	0	
	50	25	20.34	20.57	20.57		0	
	50	50	20.12	20.60	20.58		0	
16QAM	100	0	20.38	20.39	20.38	0-1	0	
	1	0	20.24	20.76	20.50		0-1	0
	1	50	20.50	20.38	20.47			0
	1	99	20.32	20.37	20.37	0-2		0
	50	0	20.56	20.63	20.35		0	
	50	25	20.36	20.61	20.66		0	
64QAM	50	50	20.13	20.58	20.57	0-2	0	
	100	0	20.53	20.51	20.57		0	
	1	0	20.48	20.75	20.56		0-2	0
	1	50	20.50	20.49	20.83	0		
	1	99	20.02	20.32	20.65	0-3		0
	50	0	20.41	20.76	20.70		0	
50	25	20.36	20.63	20.65	0			
256QAM	50	50	20.15	20.59	20.64	0-3	0	
	100	0	20.47	20.55	20.52		0	
	1	0	18.46	18.52	18.65		0-5	1.5
	1	50	18.77	18.50	18.70	1.5		
	1	99	18.25	18.54	18.59	1.5		
	50	0	18.83	18.58	18.78	1.5		
50	25	18.27	18.50	18.52	1.5			
50	50	18.25	18.49	18.48	1.5			
100	0	18.43	18.55	18.50	1.5			

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9.3.1

LTE Band 41

Table 9-12
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	23.85	23.52	23.81	23.45	23.96	0	0
	1	50	23.94	23.54	23.87	23.44	23.83		0
	1	99	23.95	23.64	23.86	23.52	23.52		0
	50	0	22.80	22.92	22.84	22.80	23.37	0-1	1
	50	25	22.86	22.94	22.87	22.86	23.33		1
	50	50	22.95	22.94	22.72	22.90	23.36		1
100	0	22.90	22.92	22.77	22.92	23.33	1		
16QAM	1	0	22.02	22.03	22.03	21.95	22.43	0-1	1
	1	50	22.07	22.10	21.92	21.96	22.43		1
	1	99	22.03	22.04	22.03	22.00	22.41		1
	50	0	21.75	21.82	21.88	21.85	22.21	0-2	2
	50	25	21.77	21.86	21.89	21.85	22.25		2
	50	50	21.80	21.84	21.83	21.88	22.15		2
100	0	21.74	21.79	21.87	21.80	22.13	2		
64QAM	1	0	21.03	21.15	20.89	21.13	21.63	0-2	2
	1	50	21.00	21.17	20.98	21.28	21.66		2
	1	99	21.07	21.15	20.98	21.22	21.60		2
	50	0	20.80	20.87	20.80	20.80	21.21	0-3	3
	50	25	20.80	20.90	20.80	20.79	21.22		3
	50	50	20.82	20.88	20.84	20.81	21.19		3
100	0	20.76	20.84	20.81	20.64	21.21	3		
256QAM	1	0	17.96	18.30	18.83	18.14	18.75	0-5	5
	1	50	17.98	18.29	18.84	18.02	18.77		5
	1	99	18.04	18.25	18.80	18.04	18.69		5
	50	0	18.70	18.71	18.78	18.71	19.03		5
	50	25	18.69	18.69	18.83	18.76	19.02		5
	50	50	18.70	18.68	18.83	18.81	19.00		5
100	0	18.64	18.70	18.73	18.72	19.01	5		




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Table 9-13
LTE Band 41 Reduced Conducted Powers - Phablet with grip sensor active, Hotspot mode active, and/or Earjack 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	19.80	19.60	20.18	20.35	20.07	0	0
	1	50	19.75	19.55	20.04	20.09	19.59		0
	1	99	19.88	19.58	19.88	20.11	19.66		0
	50	0	19.83	20.12	20.35	20.43	20.35	0-1	0
	50	25	20.20	20.16	20.33	20.45	20.27		0
	50	50	20.16	20.17	20.31	20.42	20.22		0
100	0	20.03	20.13	20.16	20.34	20.17	0		
16QAM	1	0	20.03	20.31	20.35	20.45	20.18	0-1	0
	1	50	20.33	20.33	20.25	20.47	20.09		0
	1	99	20.40	20.38	20.31	20.38	20.12		0
	50	0	20.18	20.20	20.33	20.41	20.28	0-2	0
	50	25	20.35	20.24	20.31	20.43	20.15		0
	50	50	20.22	20.20	20.28	20.41	20.22		0
100	0	20.20	20.17	20.29	20.38	20.23	0		
64QAM	1	0	20.12	20.14	20.26	20.47	20.22	0-2	0
	1	50	20.07	20.16	20.15	20.23	20.19		0
	1	99	20.18	20.23	20.18	20.20	20.09		0
	50	0	20.21	20.21	20.35	20.33	20.36	0-3	0
	50	25	20.24	20.23	20.33	20.44	20.25		0
	50	50	20.26	20.22	20.30	20.42	20.28		0
100	0	20.25	20.16	20.27	20.32	20.24	0		
256QAM	1	0	18.15	18.13	18.25	18.35	18.06	0-5	1.5
	1	50	18.19	18.16	18.22	18.22	18.10		1.5
	1	99	18.17	18.18	18.15	18.23	18.08		1.5
	50	0	18.18	18.20	18.35	18.25	18.32		1.5
	50	25	18.22	18.23	18.00	18.41	18.21		1.5
	50	50	18.24	18.22	18.30	18.39	18.23		1.5
100	0	18.15	18.16	18.25	18.36	18.22	1.5		



Figure 9-3
Power Measurement Setup

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9.4 NR Conducted Powers




Note: Per October 2020 TCB Workshop Guidance, NR FR1 SAR evaluations are being generally based on adapting the existing LTE SAR procedures (FCC KDB Publication 941225 D05v02r05). Therefore, NR SAR for the lower bandwidths was not required for testing based on the measured output power and the reported NR SAR for the highest bandwidth. Lower bandwidth conducted powers for all NR bands can be found in appendix H.

Note: Some bands do not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

9.4.1 NR Band n5

Table 9-12
NR Band n5 Maximum Conducted Power – 20 MHz Bandwidth

NR Band n5 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			167300 (836.5 MHz) Conducted Power [dBm]		
DFT-s-OFDM $\pi/2$ BPSK	1	1	23.76	0	0.0
	1	53	23.96		0.0
	1	104	23.75		0.0
	50	0	23.36	0-0.5	0.5
	50	28	23.85	0	0.0
	50	56	23.34	0-0.5	0.5
	100	0	23.35		0.5
DFT-s-OFDM QPSK	1	1	23.74	0	0.0
	1	53	23.91		0.0
	1	104	23.67		0.0
	50	0	22.86	0-1	1.0
	50	28	23.85	0	0.0
	50	56	22.81	0-1	1.0
	100	0	22.87		1.0
DFT-s-OFDM 16QAM	1	1	22.79	0-1	1.0
CP-OFDM QPSK	1	1	22.23	0-1.5	1.5

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9.4.2

NR Band n66

Table 9-13
NR Band n66 Maximum Conducted Power – 20 MHz Bandwidth

NR Band n66 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Channel			MPR Allowed per 3GPP [dB]	MPR [dB]
			344000 (1720 MHz)	349000 (1745 MHz)	354000 (1770 MHz)		
			Conducted Power [dBm]				
DFT-s-OFDM $\pi/2$ BPSK	1	1	22.84	23.13	23.10	0	0.0
	1	53	23.29	23.40	23.39		0.0
	1	104	23.16	23.26	23.21		0.0
	50	0	22.54	22.31	22.34	0-0.5	0.5
	50	28	23.04	23.34	23.39	0	0.0
	50	56	22.53	22.31	22.35	0-0.5	0.5
	100	0	22.48	22.31	22.30		0.5
DFT-s-OFDM QPSK	1	1	22.99	23.17	23.13	0	0.0
	1	53	23.27	23.40	23.46		0.0
	1	104	23.14	23.27	23.20		0.0
	50	0	22.15	22.30	22.34	0-1	1.0
	50	28	23.25	23.35	23.38	0	0.0
	50	56	22.26	22.34	22.35	0-1	1.0
	100	0	22.22	22.29	22.28		1.0
DFT-s-OFDM 16QAM	1	1	21.90	21.99	22.00	0-1	1.0
CP-OFDM QPSK	1	1	21.51	21.67	21.53	0-1.5	1.5

Table 9-14
NR Band n66 Reduced Conducted Powers - Phablet with grip sensor active, Hotspot mode active, and/or Earjack active – 20 MHz Bandwidth

NR Band n66 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Channel			MPR Allowed per 3GPP [dB]	MPR [dB]
			344000 (1720 MHz)	349000 (1745 MHz)	354000 (1770 MHz)		
			Conducted Power [dBm]				
DFT-s-OFDM $\pi/2$ BPSK	1	1	19.65	19.91	19.87	0	0.0
	1	53	20.07	20.22	20.29		0.0
	1	104	19.95	20.05	20.01		0.0
	50	0	19.91	20.09	20.12	0-0.5	0.0
	50	28	20.01	20.14	20.19	0	0.0
	50	56	20.03	20.08	20.12	0-0.5	0.0
	100	0	19.99	20.01	20.13		0.0
DFT-s-OFDM QPSK	1	1	19.67	19.97	19.86	0	0.0
	1	53	20.00	20.20	20.09		0.0
	1	104	19.95	20.08	20.02		0.0
	50	0	19.90	20.11	20.11	0-1	0.0
	50	28	20.00	20.18	20.16	0	0.0
	50	56	20.00	20.11	20.17	0-1	0.0
	100	0	19.98	20.15	20.11		0.0
DFT-s-OFDM 16QAM	1	1	19.91	20.14	19.92	0-1	0.0
CP-OFDM QPSK	1	1	19.71	20.04	20.03	0-1.5	0.0



Figure 9-3
Power Measurement Setup

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9.5 WLAN Conducted Powers

Table 9-14
2.4 GHz WLAN Maximum Average RF Power

Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
		Average	Average	Average
2412	1	17.97	15.98	15.90
2437	6	17.45	15.90	15.70
2457	10			15.67
2462	11	17.23	15.87	14.51

Table 9-15
2.4 GHz WLAN Reduced Average RF Power with RCV Active

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
		Average	Average	Average
2412	1	13.74	13.18	13.33
2437	6	13.59	13.34	13.48
2462	11	13.23	13.24	13.08

Table 9-16
5 GHz WLAN Maximum Average RF Power

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
		Average	Average
5190	38	10.34	10.20
5230	46	11.61	10.92
5270	54	10.52	8.52
5310	62	8.44	8.39
5510	102	10.12	10.46
5550	110	14.64	14.84
5590	118	14.86	14.83
5630	126	14.91	14.89
5710	142	14.59	14.81
5755	151	14.44	14.77
5795	159	14.54	14.65



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Table 9-17
5 GHz WLAN Reduced Average RF Power with RCV Active

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
		Average	Average
5190	38	10.34	10.20
5230	46	10.87	10.92
5270	54	10.52	8.52
5310	62	8.44	8.39

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
		Average
5530	106	7.82
5610	122	10.36
5690	138	10.72
5775	155	10.60

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.

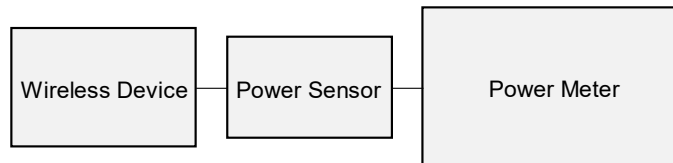







Figure 9-4
Power Measurement Setup

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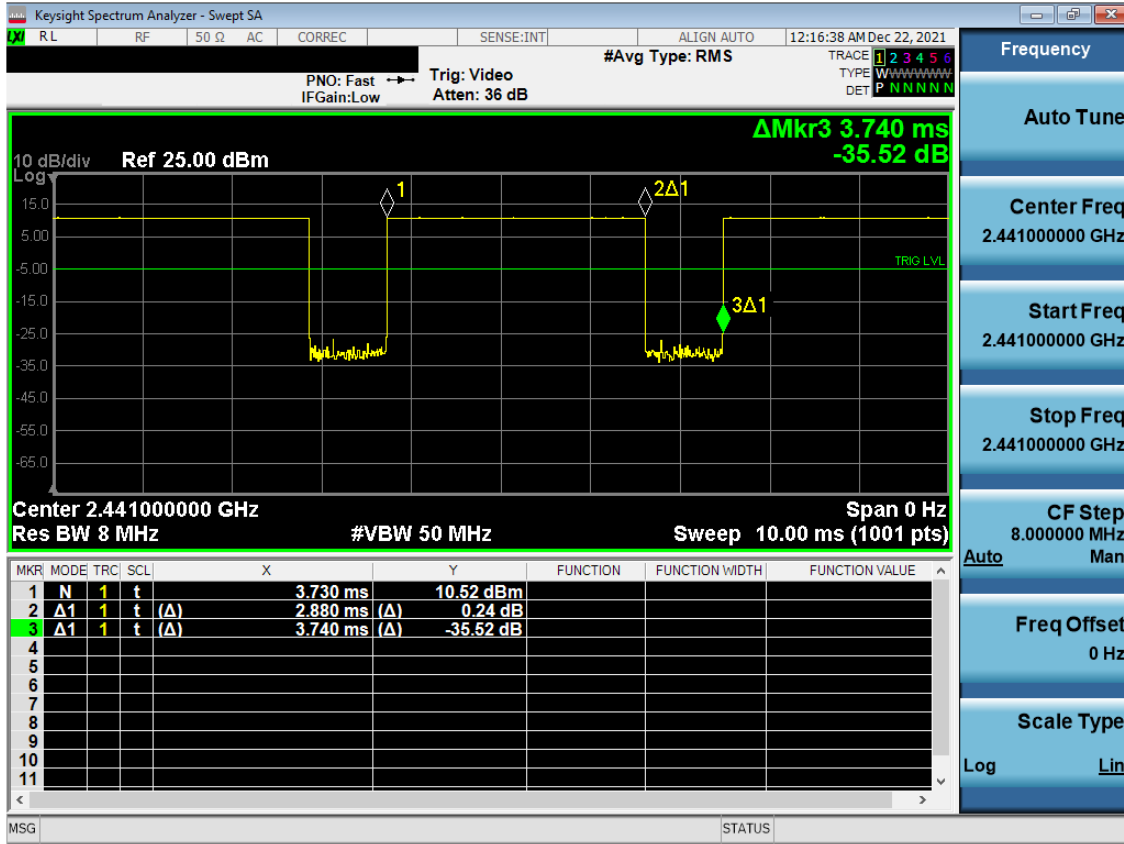
9.6 Bluetooth Conducted Powers

Table 9-18
Bluetooth 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	11.47	14.031
2441	1.0	GFSK	ePA	39	10.19	10.454
2480	1.0	GFSK	ePA	78	10.35	10.844
2402	2.0	$\pi/4$ -DQPSK	ePA	0	9.04	8.014
2441	2.0	$\pi/4$ -DQPSK	ePA	39	8.58	7.203
2480	2.0	$\pi/4$ -DQPSK	ePA	78	8.51	7.089
2402	3.0	8DPSK	ePA	0	9.14	8.195
2441	3.0	8DPSK	ePA	39	8.38	6.887
2480	3.0	8DPSK	ePA	78	8.47	7.029

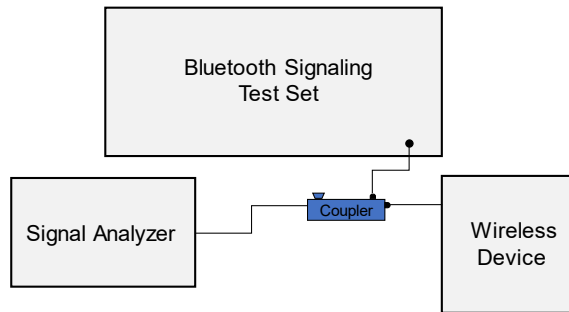
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**Figure 9-5
Bluetooth Transmission Plot**



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

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.88ms}{3.74ms} * 100\% = 77.0\%$$



**Figure 9-6
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
01/06/2022	750 Head	21.9	690	0.862	44.009	0.888	42.305	-0.68%	4.02%
			695	0.867	43.995	0.889	42.227	-0.22%	-4.09%
			700	0.869	43.980	0.889	42.201	0.00%	-4.12%
			710	0.862	43.908	0.880	42.149	0.22%	-4.17%
			725	0.868	43.863	0.891	42.071	0.79%	-4.26%
			750	0.867	43.791	0.884	41.942	1.45%	-4.41%
			770	0.913	43.720	0.895	41.838	2.01%	-4.52%
			785	0.919	43.689	0.896	41.760	2.46%	-4.62%
			800	0.924	43.661	0.897	41.682	3.01%	-4.72%
			815	0.930	43.617	0.898	41.594	3.69%	-4.85%
01/06/2022	835 Head	21.9	820	0.930	43.606	0.899	41.578	3.67%	-4.88%
			835	0.939	43.572	0.900	41.500	4.22%	-4.99%
			850	0.944	43.528	0.905	41.500	3.06%	-4.88%
			1710	1.354	41.888	1.348	40.142	0.46%	-4.35%
			1720	1.360	41.879	1.354	40.128	0.44%	-4.36%
01/04/2022	1750 Head	21.4	1745	1.376	41.828	1.358	40.087	0.58%	-4.36%
			1750	1.379	41.827	1.371	40.079	0.58%	-4.36%
			1770	1.392	41.789	1.383	40.047	0.65%	-4.35%
			1790	1.404	41.754	1.394	40.016	0.72%	-4.34%
			1710	1.358	40.288	1.348	40.142	0.52%	-0.36%
01/12/2022	1750 Head	21.9	1720	1.361	40.269	1.354	40.128	0.62%	-0.36%
			1745	1.378	40.221	1.368	40.087	0.68%	0.33%
			1750	1.379	40.212	1.371	40.079	0.68%	0.33%
			1770	1.391	40.176	1.383	40.047	0.69%	0.31%
			1790	1.403	40.138	1.394	40.016	0.68%	0.30%
01/09/2022	1900 Head	22.1	1850	1.397	40.247	1.400	40.000	-0.21%	0.62%
			1860	1.407	40.201	1.400	40.000	0.66%	0.60%
			1880	1.425	40.155	1.400	40.000	2.07%	0.27%
			1900	1.450	40.010	1.400	40.000	3.57%	0.05%
			1905	1.458	39.996	1.400	40.000	3.37%	-0.02%
			1910	1.460	39.971	1.400	40.000	4.29%	-0.07%
			2300	1.880	39.364	1.870	39.500	0.78%	-0.34%
			2310	1.895	39.325	1.879	39.480	0.65%	-0.39%
			2320	1.910	39.287	1.887	39.460	1.19%	-0.44%
			2400	1.788	38.969	1.758	39.289	2.39%	-0.82%
01/12/2022	2450 Head	24.5	2450	1.855	38.795	1.800	39.200	3.04%	-1.11%
			2460	1.866	38.646	1.833	39.162	3.11%	-1.25%
			2500	1.913	38.569	1.855	39.136	3.13%	-1.45%
			2510	1.926	38.530	1.866	39.123	3.16%	-1.51%
			2535	1.954	38.434	1.889	39.092	3.22%	-1.68%
			2550	1.974	38.371	1.904	39.073	3.29%	-1.82%
			2560	1.986	38.331	1.920	39.060	3.44%	-1.87%
			2600	2.033	38.175	1.964	39.009	3.51%	-2.12%
			2650	2.094	37.965	2.018	38.945	3.71%	-2.54%
			2680	2.129	37.845	2.051	38.907	3.82%	-2.72%
01/28/2022	2450 Head	19.2	2700	2.150	37.763	2.073	38.882	3.71%	-2.88%
			2300	1.744	39.364	1.670	39.500	4.43%	-0.34%
			2310	1.751	39.346	1.679	39.480	4.29%	-0.34%
			2320	1.758	39.327	1.687	39.460	4.21%	-0.34%
			2400	1.825	39.217	1.756	39.289	3.92%	-0.18%
			2450	1.867	39.112	1.800	39.200	3.72%	-0.22%
			2480	1.892	39.069	1.833	39.162	3.52%	-0.24%
			2500	1.909	39.032	1.855	39.136	2.88%	-0.27%
			2510	1.916	39.012	1.866	39.123	2.68%	-0.28%
			2535	1.937	38.929	1.893	39.092	2.92%	-0.32%
01/25/2022	5000-8000 Head	21.3	2560	1.956	38.907	1.909	39.073	2.19%	-0.37%
			2560	1.959	38.913	1.920	39.060	2.02%	-0.38%
			2600	1.991	38.840	1.964	39.009	1.97%	-0.42%
			2650	2.033	38.734	2.018	38.945	0.74%	-0.54%
			2680	2.050	38.699	2.051	38.907	0.24%	-0.54%
			2700	2.071	38.657	2.073	38.882	-0.10%	-0.58%
			5180	5.475	34.760	4.635	38.009	-3.49%	-3.47%
			5190	4.480	34.746	4.645	35.998	-3.49%	-3.48%
			5200	4.493	34.719	4.655	35.988	-3.49%	-3.52%
			5210	4.504	34.688	4.666	35.978	-3.47%	-3.56%
5220	4.518	34.667	4.676	35.963	-3.38%	-3.63%			
5240	4.542	34.620	4.696	35.940	-3.38%	-3.67%			
5260	4.561	34.589	4.708	35.929	-3.17%	-3.68%			
5280	4.585	34.565	4.717	35.917	-3.14%	-3.68%			
5270	4.586	34.566	4.727	35.906	-3.11%	-3.67%			
5280	4.587	34.562	4.737	35.894	-3.17%	-3.66%			
5290	4.596	34.574	4.748	35.883	-3.22%	-3.65%			
5300	4.603	34.587	4.758	35.871	-3.26%	-3.64%			
5310	4.613	34.551	4.768	35.860	-3.25%	-3.65%			
5320	4.624	34.520	4.778	35.849	-3.22%	-3.71%			
5000	4.822	34.192	4.983	35.643	-2.84%	-0.07%			
5510	4.830	34.178	4.973	35.632	-2.82%	-0.08%			
5520	4.844	34.168	4.983	35.620	-2.79%	-0.08%			
5530	4.856	34.151	4.994	35.609	-2.76%	-0.09%			
5540	4.868	34.137	5.004	35.597	-2.72%	-0.10%			
5550	4.879	34.116	5.014	35.586	-2.69%	-0.12%			
5560	4.892	34.090	5.024	35.574	-2.65%	-0.16%			
5580	4.915	34.052	5.045	35.551	-2.58%	-0.22%			
5600	4.939	34.016	5.065	35.529	-2.49%	-0.28%			
5610	4.952	33.998	5.076	35.518	-2.46%	-0.28%			
5620	4.965	33.989	5.086	35.506	-2.42%	-0.28%			
5640	4.980	33.995	5.106	35.483	-2.43%	-0.28%			
5660	5.002	33.953	5.127	35.460	-2.44%	-0.31%			
5670	5.015	33.915	5.137	35.449	-2.41%	-0.32%			
5680	5.024	33.903	5.147	35.437	-2.39%	-0.33%			
5690	5.036	33.889	5.158	35.426	-2.37%	-0.34%			
5700	5.048	33.889	5.168	35.414	-2.38%	-0.36%			
5710	5.060	33.857	5.178	35.403	-2.22%	-0.38%			
5720	5.076	33.836	5.188	35.391	-2.16%	-0.40%			
5745	5.105	33.801	5.214	35.363	-2.09%	-0.42%			
5760	5.108	33.796	5.219	35.357	-2.13%	-0.41%			
5755	5.112	33.797	5.224	35.351	-2.14%	-0.41%			
5765	5.119	33.779	5.234	35.340	-2.22%	-0.42%			
5775	5.126	33.759	5.245	35.329	-2.23%	-0.46%			
5785	5.138	33.723	5.265	35.317	-2.23%	-0.47%			
5795	5.150	33.721	5.285	35.305	-2.18%	-0.49%			
5800	5.154	33.714	5.270	35.300	-2.20%	-0.49%			
5800	5.154	33.714	5.270	35.300	-2.20%	-0.49%			
5805	5.160	33.709	5.275	35.294	-2.18%	-0.50%			
5825	5.186	33.689	5.298	35.271	-2.08%	-0.54%			
5845	5.199	33.689	5.308	35.230	-2.00%	-0.46%			
5845	5.212	33.656	5.315	35.210	-1.94%	-0.41%			
5855	5.222	33.650	5.325	35.197	-1.93%	-0.39%			
5865	5.232	33.640	5.336	35.190	-1.95%	-0.40%			
5865	5.232	33.640	5.336	35.190	-1.95%	-0.40%			
5865	5.232	33.640	5.336	35.190	-1.95%	-0.40%			
5875	5.246	33.618	5.347	35.183	-2.00%	-0.45%			
5885	5.248	33.595	5.357	35.177	-2.02%	-0.50%			
5905	5.266	33.547	5.379	35.163	-2.10%	-0.60%			




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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 F.

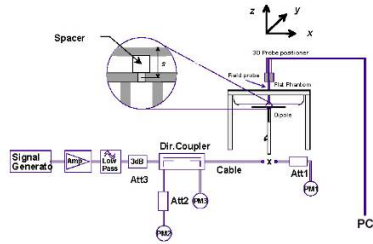
**Table 10-3
System Verification Results – 1g**

System Verification TARGET & MEASURED												
SAR System	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp. (C)	Liquid Temp. (C)	Input Power (W)	Source SN	Probe SN	Measured SAR1g (W/kg)	1W Target SAR1g (W/kg)	1W Normalized SAR 1g (W/kg)	Deviation1g (%)
A	750	HEAD	01/06/2022	22.9	21.9	0.20	1003	7406	1.640	8.78	8.200	-6.61%
A	835	HEAD	01/06/2022	22.9	21.9	0.20	4d132	7406	2.000	9.66	10.000	3.52%
A	1750	HEAD	01/04/2022	23.3	21.4	0.10	1148	7406	3.890	35.90	38.900	8.36%
P	1750	HEAD	01/12/2022	22.7	20.7	0.10	1008	7410	3.790	37.40	37.900	1.34%
B	1900	HEAD	01/09/2022	21.5	21.8	0.10	5d080	7660	4.010	40.50	40.100	-0.99%
E	2450	HEAD	01/12/2022	24.3	22.5	0.10	797	7538	5.440	52.40	54.400	3.82%
S	2600	HEAD	01/28/2022	19.5	19.2	0.10	1064	7552	5.840	58.10	58.400	0.52%
J	5250	HEAD	01/25/2022	20.1	19.6	0.05	1191	7668	3.650	79.60	73.000	-8.29%
J	5600	HEAD	01/25/2022	20.1	19.6	0.05	1191	7668	3.990	82.10	79.800	-2.80%
J	5750	HEAD	01/25/2022	20.1	19.6	0.05	1191	7668	3.670	78.20	73.400	-6.14%
I	750	BODY	01/10/2022	20.3	20.3	0.20	1161	7661	1.830	8.79	9.150	4.10%
E	835	BODY	01/05/2022	24.4	21.8	0.20	4d132	7538	2.130	9.81	10.650	8.56%
E	835	BODY	01/07/2022	22.2	21.9	0.20	4d047	7538	1.910	9.47	9.550	0.84%
E	835	BODY	01/10/2022	21.1	19.9	0.20	4d133	7538	1.990	9.69	9.950	2.68%
L	1750	BODY	01/10/2022	23.5	21.2	0.10	1008	7670	3.820	37.80	38.200	1.06%
L	1750	BODY	01/13/2022	21.5	19.5	0.10	1008	7670	3.730	37.80	37.300	-1.32%
P	1900	BODY	01/03/2022	20.3	20.8	0.10	5d080	7410	3.990	40.70	39.900	-1.97%
P	1900	BODY	01/05/2022	20.4	20.5	0.10	5d080	7410	4.200	40.70	42.000	3.19%
K	2450	BODY	01/04/2022	22.4	22.1	0.10	981	3914	4.870	50.30	48.700	-3.18%
K	2450	BODY	01/09/2022	21.9	21.9	0.10	981	3914	5.090	50.30	50.900	1.19%
H	2600	BODY	01/28/2022	22.0	21.0	0.10	1004	7409	5.540	55.40	55.400	0.00%
G	5250	BODY	01/25/2022	23.4	22.0	0.05	1191	7357	3.740	74.10	74.800	0.94%
G	5600	BODY	01/25/2022	23.4	22.0	0.05	1191	7357	3.850	76.90	77.000	0.13%
G	5750	BODY	01/25/2022	23.4	22.0	0.05	1191	7357	3.680	74.40	73.600	-1.08%

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**Table 10-4
System Verification Results – 10g**



System Verification TARGET & MEASURED												
SAR System	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp. (C)	Liquid Temp. (C)	Input Power (W)	Source SN	Probe SN	Measured SAR10g (W/kg)	1W Target SAR10g (W/kg)	1W Normalized SAR10g (W/kg)	Deviation10g (%)
L	1750	BODY	01/10/2022	23.5	21.2	0.10	1008	7670	2.030	19.90	20.300	2.01%
L	1750	BODY	01/13/2022	21.5	19.5	0.10	1008	7670	1.980	19.90	19.800	-0.50%
P	1900	BODY	01/05/2022	20.4	20.5	0.10	5d080	7410	2.150	21.40	21.500	0.47%
H	2450	BODY	01/28/2022	22.0	21.0	0.10	719	7409	2.300	24.70	23.000	-6.88%
H	2600	BODY	01/28/2022	22.0	21.0	0.10	1004	7409	2.440	24.80	24.400	-1.61%
G	5250	BODY	01/25/2022	23.4	22.0	0.05	1191	7357	1.060	20.80	21.200	1.92%
G	5600	BODY	01/25/2022	23.4	22.0	0.05	1191	7357	1.080	21.30	21.600	1.41%
G	5750	BODY	01/25/2022	23.4	22.0	0.05	1191	7357	1.030	20.70	20.600	-0.48%



**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**



MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.											(W/kg)		(W/kg)		
848.80	251	GSM 850	GSM	34.5	33.61	0.01	Right	Cheek	A	17304	1:8.3	0.176	1.227	0.216	A1	
848.80	251	GSM 850	GSM	34.5	33.61	-0.10	Right	Tilt	A	17304	1:8.3	0.088	1.227	0.108		
848.80	251	GSM 850	GSM	34.5	33.61	0.07	Left	Cheek	A	17304	1:8.3	0.156	1.227	0.191		
848.80	251	GSM 850	GSM	34.5	33.61	-0.14	Left	Tilt	A	17304	1:8.3	0.078	1.227	0.096		
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram									

**Table 11-2
GSM 1900 Head SAR**

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.											(W/kg)		(W/kg)		
1850.20	512	GSM 1900	GSM	31.0	29.83	0.02	Right	Cheek	B	18120	1:8.3	0.078	1.309	0.102		
1850.20	512	GSM 1900	GSM	31.0	29.83	-0.05	Right	Tilt	B	18120	1:8.3	0.057	1.309	0.075		
1850.20	512	GSM 1900	GSM	31.0	29.83	-0.04	Left	Cheek	B	18120	1:8.3	0.086	1.309	0.113	A2	
1850.20	512	GSM 1900	GSM	31.0	29.83	0.01	Left	Tilt	B	18120	1:8.3	0.074	1.309	0.097		
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram									

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

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.											(W/kg)		(W/kg)		
846.60	4233	UMTS 850	RMC	25.3	24.40	-0.03	Right	Cheek	A	17304	1:1	0.244	1.230	0.300	A3	
846.60	4233	UMTS 850	RMC	25.3	24.40	-0.02	Right	Tilt	A	17304	1:1	0.117	1.230	0.144		
846.60	4233	UMTS 850	RMC	25.3	24.40	0.11	Left	Cheek	A	17304	1:1	0.200	1.230	0.246		
846.60	4233	UMTS 850	RMC	25.3	24.40	0.04	Left	Tilt	A	17304	1:1	0.108	1.230	0.133		
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
UMTS 1750 Head SAR**

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.											(W/kg)		(W/kg)		
1752.60	1513	UMTS 1750	RMC	24.5	23.55	-0.17	Right	Cheek	B	17288	1:1	0.166	1.245	0.207		
1752.60	1513	UMTS 1750	RMC	24.5	23.55	0.03	Right	Tilt	B	17288	1:1	0.154	1.245	0.192		
1752.60	1513	UMTS 1750	RMC	24.5	23.55	0.01	Left	Cheek	B	17288	1:1	0.180	1.245	0.224	A4	
1752.60	1513	UMTS 1750	RMC	24.5	23.55	-0.09	Left	Tilt	B	17288	1:1	0.171	1.245	0.213		
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: UMTS 1750 Head SAR was tested at Maximum power level which is more conservative measurement than Reduced power level.



**Table 11-5
UMTS 1900 Head SAR**

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.											(W/kg)		(W/kg)		
1907.60	9538	UMTS 1900	RMC	24.5	23.14	0.06	Right	Cheek	B	18120	1:1	0.160	1.368	0.219		
1907.60	9538	UMTS 1900	RMC	24.5	23.14	0.02	Right	Tilt	B	18120	1:1	0.091	1.368	0.124		
1907.60	9538	UMTS 1900	RMC	24.5	23.14	0.07	Left	Cheek	B	18120	1:1	0.188	1.368	0.257	A5	
1907.60	9538	UMTS 1900	RMC	24.5	23.14	0.01	Left	Tilt	B	18120	1:1	0.120	1.368	0.164		
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: UMTS 1900 Head SAR was tested at Maximum power level which is more conservative measurement than Reduced power level.

**Table 11-6
LTE Band 12 Head SAR**

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Antenna Config.	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
707.50	23095	Mid	LTE Band 12	10	25.0	23.80	-0.03	0	Right	Cheek	A	QPSK	1	25	17304	1:1	0.130	1.318	0.171	A6
707.50	23095	Mid	LTE Band 12	10	24.0	23.00	0.02	1	Right	Cheek	A	QPSK	25	0	17304	1:1	0.087	1.259	0.110	
707.50	23095	Mid	LTE Band 12	10	25.0	23.80	-0.02	0	Right	Tilt	A	QPSK	1	25	17304	1:1	0.064	1.318	0.084	
707.50	23095	Mid	LTE Band 12	10	24.0	23.00	0.04	1	Right	Tilt	A	QPSK	25	0	17304	1:1	0.050	1.259	0.063	
707.50	23095	Mid	LTE Band 12	10	25.0	23.80	0.08	0	Left	Cheek	A	QPSK	1	25	17304	1:1	0.101	1.318	0.133	
707.50	23095	Mid	LTE Band 12	10	24.0	23.00	0.01	1	Left	Cheek	A	QPSK	25	0	17304	1:1	0.075	1.259	0.094	
707.50	23095	Mid	LTE Band 12	10	25.0	23.80	0.01	0	Left	Tilt	A	QPSK	1	25	17304	1:1	0.049	1.318	0.065	
707.50	23095	Mid	LTE Band 12	10	24.0	23.00	0.01	1	Left	Tilt	A	QPSK	25	0	17304	1:1	0.035	1.259	0.044	
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 26 (Cell) Head SAR**



MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Antenna Config.	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.80	0.02	0	Right	Cheek	A	QPSK	1	36	17304	1:1	0.173	1.175	0.203	A7
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	22.96	-0.01	1	Right	Cheek	A	QPSK	36	18	17304	1:1	0.139	1.132	0.157	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.80	0.02	0	Right	Tilt	A	QPSK	1	36	17304	1:1	0.099	1.175	0.116	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	22.96	-0.04	1	Right	Tilt	A	QPSK	36	18	17304	1:1	0.081	1.132	0.092	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.80	0.01	0	Left	Cheek	A	QPSK	1	36	17304	1:1	0.150	1.175	0.176	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	22.96	-0.07	1	Left	Cheek	A	QPSK	36	18	17304	1:1	0.117	1.132	0.132	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.80	0.02	0	Left	Tilt	A	QPSK	1	36	17304	1:1	0.086	1.175	0.101	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	22.96	0.02	1	Left	Tilt	A	QPSK	36	18	17304	1:1	0.069	1.132	0.078	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram										

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

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Antenna Config.	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.3	24.14	0.02	0	Right	Cheek	A	QPSK	1	0	17304	1:1	0.190	1.306	0.248	A8
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.3	23.42	-0.04	1	Right	Cheek	A	QPSK	25	0	17304	1:1	0.157	1.225	0.192	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.3	24.14	0.00	0	Right	Tilt	A	QPSK	1	0	17304	1:1	0.106	1.306	0.138	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.3	23.42	0.01	1	Right	Tilt	A	QPSK	25	0	17304	1:1	0.086	1.225	0.105	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.3	24.14	-0.01	0	Left	Cheek	A	QPSK	1	0	17304	1:1	0.180	1.306	0.235	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.3	23.42	0.02	1	Left	Cheek	A	QPSK	25	0	17304	1:1	0.145	1.225	0.178	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.3	24.14	0.03	0	Left	Tilt	A	QPSK	1	0	17304	1:1	0.098	1.306	0.128	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.3	23.42	0.00	1	Left	Tilt	A	QPSK	25	0	17304	1:1	0.084	1.225	0.103	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram										

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

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Antenna Config.	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.5	23.70	0.01	0	Right	Cheek	B	QPSK	1	50	17288	1:1	0.142	1.202	0.171	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.5	22.85	-0.02	1	Right	Cheek	B	QPSK	50	25	17288	1:1	0.127	1.161	0.147	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.5	23.70	-0.12	0	Right	Tilt	B	QPSK	1	50	17288	1:1	0.168	1.202	0.202	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.5	22.85	-0.04	1	Right	Tilt	B	QPSK	50	25	17288	1:1	0.148	1.161	0.172	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.5	23.70	-0.03	0	Left	Cheek	B	QPSK	1	50	17288	1:1	0.178	1.202	0.214	A9
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.5	22.85	0.04	1	Left	Cheek	B	QPSK	50	25	17288	1:1	0.151	1.161	0.175	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.5	23.70	0.19	0	Left	Tilt	B	QPSK	1	50	17288	1:1	0.155	1.202	0.186	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.5	22.85	-0.05	1	Left	Tilt	B	QPSK	50	25	17288	1:1	0.130	1.161	0.151	
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
LTE Band 2 (PCS) Head SAR**



MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Antenna Config.	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.5	24.04	-0.03	0	Right	Cheek	B	QPSK	1	50	18210	1:1	0.150	1.112	0.167	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	22.71	0.01	1	Right	Cheek	B	QPSK	50	25	18210	1:1	0.134	1.199	0.161	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.5	24.04	-0.04	0	Right	Tilt	B	QPSK	1	50	18210	1:1	0.108	1.112	0.120	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	22.71	-0.01	1	Right	Tilt	B	QPSK	50	25	18210	1:1	0.089	1.199	0.107	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.5	24.04	0.04	0	Left	Cheek	B	QPSK	1	50	18210	1:1	0.159	1.112	0.177	A10
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	22.71	0.02	1	Left	Cheek	B	QPSK	50	25	18210	1:1	0.140	1.199	0.168	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.5	24.04	-0.09	0	Left	Tilt	B	QPSK	1	50	18210	1:1	0.126	1.112	0.140	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	22.71	0.11	1	Left	Tilt	B	QPSK	50	25	18210	1:1	0.105	1.199	0.126	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram										

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

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Antenna Config.	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
2680.00	41490	High	LTE Band 41	20	24.5	23.96	0.02	0	Right	Cheek	B	QPSK	1	0	17825	1:1.58	0.242	1.132	0.274	
2680.00	41490	High	LTE Band 41	20	23.5	23.37	-0.14	1	Right	Cheek	B	QPSK	50	0	17825	1:1.58	0.188	1.030	0.194	
2680.00	41490	High	LTE Band 41	20	24.5	23.96	-0.14	0	Right	Tilt	B	QPSK	1	0	17825	1:1.58	0.240	1.132	0.272	
2680.00	41490	High	LTE Band 41	20	23.5	23.37	0.08	1	Right	Tilt	B	QPSK	50	0	17825	1:1.58	0.192	1.030	0.198	
2680.00	41490	High	LTE Band 41	20	24.5	23.96	0.07	0	Left	Cheek	B	QPSK	1	0	17825	1:1.58	0.326	1.132	0.369	A11
2680.00	41490	High	LTE Band 41	20	23.5	23.37	0.02	1	Left	Cheek	B	QPSK	50	0	17825	1:1.58	0.248	1.030	0.255	
2680.00	41490	High	LTE Band 41	20	24.5	23.96	0.14	0	Left	Tilt	B	QPSK	1	0	17825	1:1.58	0.155	1.132	0.175	
2680.00	41490	High	LTE Band 41	20	23.5	23.37	0.17	1	Left	Tilt	B	QPSK	50	0	17825	1:1.58	0.115	1.030	0.118	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram										

**Table 11-12
NR Band n5 (Cell) Head SAR**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Antenna Config.	Power Drift [dB]	MPR [dB]	Side	Test Position	Waveform	Modulation	RB Size	RB Offset	Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.																(W/kg)		(W/kg)		
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.91	A	0.08	0	Right	Cheek	DFT-S-OFDM	QPSK	1	53	17304	1:1	0.228	1.285	0.293	A12
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.85	A	-0.02	0	Right	Cheek	DFT-S-OFDM	QPSK	50	28	17304	1:1	0.218	1.303	0.284	
836.50	167300	Mid	NR Band n5 (Cell)	20	23.5	22.23	A	-0.05	1.5	Right	Cheek	CP-OFDM	QPSK	1	1	17304	1:1	0.133	1.340	0.178	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.91	A	0.00	0	Right	Tilt	DFT-S-OFDM	QPSK	1	53	17304	1:1	0.096	1.285	0.123	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.85	A	0.09	0	Right	Tilt	DFT-S-OFDM	QPSK	50	28	17304	1:1	0.103	1.303	0.134	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.91	A	0.06	0	Left	Cheek	DFT-S-OFDM	QPSK	1	53	17304	1:1	0.149	1.285	0.191	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.85	A	0.04	0	Left	Cheek	DFT-S-OFDM	QPSK	50	28	17304	1:1	0.153	1.303	0.199	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.91	A	0.02	0	Left	Tilt	DFT-S-OFDM	QPSK	1	53	17304	1:1	0.092	1.285	0.118	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.85	A	0.01	0	Left	Tilt	DFT-S-OFDM	QPSK	50	28	17304	1:1	0.095	1.303	0.124	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram											

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**Table 11-13
NR Band n66 (AWS) Head SAR**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Antenna Config	Power Drift [dB]	MPR [dB]	Side	Test Position	Waveform	Modulation	RB Size	RB Offset	Serial Number	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Reported SAR (1g) (W/kg)	Plot #	
MHz	Ch.																				
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.46	B	-0.05	0	Right	Cheek	DFT-S-OFDM	QPSK	1	53	16884	1:1	0.182	1.132	0.206	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.38	B	0.00	0	Right	Cheek	DFT-S-OFDM	QPSK	50	28	16884	1:1	0.167	1.153	0.193	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.46	B	-0.05	0	Right	Tilt	DFT-S-OFDM	QPSK	1	53	16884	1:1	0.156	1.132	0.177	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.38	B	0.02	0	Right	Tilt	DFT-S-OFDM	QPSK	50	28	16884	1:1	0.149	1.153	0.172	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.46	B	-0.18	0	Left	Cheek	DFT-S-OFDM	QPSK	1	53	16884	1:1	0.189	1.132	0.214	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.38	B	0.02	0	Left	Cheek	DFT-S-OFDM	QPSK	50	28	16884	1:1	0.193	1.153	0.223	A13
1745.00	349000	Mid	NR Band n66 (AWS)	20	22.5	21.67	B	-0.06	1.5	Left	Cheek	CP-OFDM	QPSK	1	1	16884	1:1	0.118	1.211	0.143	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.46	B	0.09	0	Left	Tilt	DFT-S-OFDM	QPSK	1	53	16884	1:1	0.179	1.132	0.203	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.38	B	0.04	0	Left	Tilt	DFT-S-OFDM	QPSK	50	28	16884	1:1	0.178	1.153	0.205	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Head 1.6 W/kg (mW/g) averaged over 1 gram									



**Table 11-14
DTS Head SAR**

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan (W/kg)	SAR (1g) (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g) (W/kg)	Plot #
MHz	Ch.																	
2412	1	802.11b	DSSS	22	14.0	13.74	-0.09	Right	Cheek	16579	1	99.2	0.221	0.157	1.062	1.008	0.168	A14
2412	1	802.11b	DSSS	22	14.0	13.74	0.01	Right	Tilt	16579	1	99.2	0.199	-	1.062	1.008	-	
2412	1	802.11b	DSSS	22	14.0	13.74	0.00	Left	Cheek	16579	1	99.2	0.113	-	1.062	1.008	-	
2412	1	802.11b	DSSS	22	14.0	13.74	0.02	Left	Tilt	16579	1	99.2	0.121	-	1.062	1.008	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Head 1.6 W/kg (mW/g) averaged over 1 gram						

**Table 11-15
NII Head SAR**

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan (W/kg)	SAR (1g) (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g) (W/kg)	Plot #
MHz	Ch.																	
5270	54	802.11n	OFDM	40	11.0	10.52	0.01	Right	Cheek	15878	13.5	92.7	0.284	-	1.117	1.079	-	
5270	54	802.11n	OFDM	40	11.0	10.52	0.04	Right	Tilt	15878	13.5	92.7	0.370	0.283	1.117	1.079	0.341	A15
5270	54	802.11n	OFDM	40	11.0	10.52	0.00	Left	Cheek	15878	13.5	92.7	0.273	-	1.117	1.079	-	
5270	54	802.11n	OFDM	40	11.0	10.52	0.10	Left	Tilt	15878	13.5	92.7	0.326	-	1.117	1.079	-	
5690	138	802.11ac	OFDM	80	11.0	10.72	0.01	Right	Cheek	15878	29.3	88.0	0.114	-	1.067	1.136	-	
5690	138	802.11ac	OFDM	80	11.0	10.72	-0.02	Right	Tilt	15878	29.3	88.0	0.156	-	1.067	1.136	-	
5690	138	802.11ac	OFDM	80	11.0	10.72	0.00	Left	Cheek	15878	29.3	88.0	0.121	-	1.067	1.136	-	
5690	138	802.11ac	OFDM	80	11.0	10.72	0.00	Left	Tilt	15878	29.3	88.0	0.178	0.119	1.067	1.136	0.144	
5775	155	802.11ac	OFDM	80	11.0	10.60	0.10	Right	Cheek	15878	29.3	88.0	0.128	-	1.096	1.136	-	
5775	155	802.11ac	OFDM	80	11.0	10.60	0.00	Right	Tilt	15878	29.3	88.0	0.144	-	1.096	1.136	-	
5775	155	802.11ac	OFDM	80	11.0	10.60	0.00	Left	Cheek	15878	29.3	88.0	0.159	-	1.096	1.136	-	
5775	155	802.11ac	OFDM	80	11.0	10.60	0.02	Left	Tilt	15878	29.3	88.0	0.214	0.143	1.096	1.136	0.178	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Head 1.6 W/kg (mW/g) averaged over 1 gram						

**Table 11-16
DSS Head SAR**

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MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2402.00	0	Bluetooth	FHSS	11.5	11.47	0.07	Right	Cheek	16579	1	77.00	0.053	1.007	1.299	0.069	A16
2402.00	0	Bluetooth	FHSS	11.5	11.47	0.01	Right	Tilt	16579	1	77.00	0.051	1.007	1.299	0.067	
2402.00	0	Bluetooth	FHSS	11.5	11.47	0.02	Left	Cheek	16579	1	77.00	0.026	1.007	1.299	0.034	
2402.00	0	Bluetooth	FHSS	11.5	11.47	0.10	Left	Tilt	16579	1	77.00	0.031	1.007	1.299	0.041	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram									



11.2 Standalone Body-Worn SAR Data

Table 11-17
GSM/UMTS Body-Worn SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
848.80	251	GSM 850	GSM	34.5	33.61	-0.03	15 mm	A	17775	1:8.3	back	0.324	1.227	0.398	A17
1850.20	512	GSM 1900	GSM	31.0	29.83	-0.03	15 mm	B	18120	1:8.3	back	0.120	1.309	0.157	A19
846.60	4233	UMTS 850	RMC	25.3	24.40	0.01	15 mm	A	17775	1:1	back	0.335	1.230	0.412	A21
1752.60	1513	UMTS 1750	RMC	24.5	23.55	0.02	15 mm	B	18120	1:1	back	0.319	1.245	0.397	A23
1907.60	9538	UMTS 1900	RMC	24.5	23.14	-0.02	15 mm	B	18120	1:1	back	0.224	1.368	0.306	A25
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-18
LTE Body-Worn SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
707.50	23095	Mid	LTE Band 12	10	25.0	23.80	0.01	0	A	15944	QPSK	1	25	15 mm	back	1:1	0.267	1.318	0.352	A27
707.50	23095	Mid	LTE Band 12	10	24.0	23.00	0.01	1	A	15944	QPSK	25	0	15 mm	back	1:1	0.218	1.259	0.274	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.80	0.01	0	A	17775	QPSK	1	36	15 mm	back	1:1	0.246	1.175	0.289	A29
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	22.96	-0.01	1	A	17775	QPSK	36	18	15 mm	back	1:1	0.208	1.132	0.235	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.3	24.14	0.00	0	A	17775	QPSK	1	0	15 mm	back	1:1	0.286	1.306	0.374	A31
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.3	23.42	-0.10	1	A	17775	QPSK	25	0	15 mm	back	1:1	0.238	1.225	0.292	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.5	23.70	-0.12	0	B	18120	QPSK	1	50	15 mm	back	1:1	0.316	1.202	0.380	A33
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.5	22.85	-0.02	1	B	18120	QPSK	50	25	15 mm	back	1:1	0.259	1.161	0.301	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.5	24.04	0.01	0	B	18120	QPSK	1	50	15 mm	back	1:1	0.218	1.112	0.242	A35
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	22.71	-0.01	1	B	18120	QPSK	50	25	15 mm	back	1:1	0.190	1.199	0.228	
2680.00	41490	High	LTE Band 41	20	24.5	23.96	0.07	0	B	17825	QPSK	1	0	15 mm	back	1:1.58	0.222	1.132	0.251	A37
2680.00	41490	High	LTE Band 41	20	23.5	23.37	0.04	1	B	17825	QPSK	50	0	15 mm	back	1:1.58	0.195	1.030	0.201	
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 11-19
NR Body-Worn SAR**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Antenna Config	Power Drift [dB]	MPR [dB]	Serial Number	Waveform	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	167300	Md	NR Band n5 (Cell)	20	25.0	23.91	A	0.00	0	17775	DFT-S-OFDM	QPSK	1	53	15 mm	back	1:1	0.303	1.285	0.389	A39
836.50	167300	Md	NR Band n5 (Cell)	20	25.0	23.85	A	0.00	0	17775	DFT-S-OFDM	QPSK	50	28	15 mm	back	1:1	0.297	1.303	0.387	
836.50	167300	Md	NR Band n5 (Cell)	20	23.5	22.23	A	0.00	1.5	17775	CP-OFDM	QPSK	1	1	15 mm	back	1:1	0.174	1.340	0.233	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.46	B	-0.03	0	17775	DFT-S-OFDM	QPSK	1	53	15 mm	back	1:1	0.297	1.132	0.336	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.38	B	0.04	0	17775	DFT-S-OFDM	QPSK	50	28	15 mm	back	1:1	0.307	1.153	0.354	A41
1745.00	349000	Md	NR Band n66 (AWS)	20	22.5	21.67	B	-0.01	1.5	17775	CP-OFDM	QPSK	1	1	15 mm	back	1:1	0.208	1.211	0.252	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram											

**Table 11-20
DTS Body-Worn SAR**



MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	18.0	17.97	0.10	15 mm	15878	1	back	99.2	0.110	0.086	1.007	1.008	0.087	A43
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram								

**Table 11-21
NII Body-Worn SAR**

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)	(W/kg)			(W/kg)	
5230	46	802.11n	OFDM	40	12.0	11.61	0.00	15 mm	16694	13.5	back	92.7	0.171	0.129	1.094	1.079	0.152	
5270	54	802.11n	OFDM	40	11.0	10.52	0.00	15 mm	16694	13.5	back	92.7	0.186	0.135	1.117	1.079	0.163	A45
5630	126	802.11n	OFDM	40	15.0	14.91	0.10	15 mm	16694	13.5	back	92.7	0.129	0.086	1.021	1.079	0.095	
5795	159	802.11n	OFDM	40	15.0	14.54	-0.03	15 mm	16694	13.5	back	92.7	0.117	0.049	1.112	1.079	0.059	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram								

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




MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #		
MHz	Ch.											(W/kg)			(W/kg)			
2402	0	Bluetooth	FHSS	11.5	11.47	-0.13	15 mm	15944	1	back	77	0.012	1.007	1.299	0.016	A47		
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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11.3 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	Antenna Config.	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	31.3	30.39	-0.05	10 mm	A	17775	3	1:2.76	back	0.668	1.233	0.824	
836.60	190	GSM 850	GPRS	31.3	30.06	-0.07	10 mm	A	17775	3	1:2.76	back	0.751	1.330	0.999	A18
848.80	251	GSM 850	GPRS	31.3	30.04	-0.04	10 mm	A	17775	3	1:2.76	back	0.702	1.337	0.939	
824.20	128	GSM 850	GPRS	31.3	30.39	-0.11	10 mm	A	17775	3	1:2.76	front	0.197	1.233	0.243	
824.20	128	GSM 850	GPRS	31.3	30.39	0.00	10 mm	A	17775	3	1:2.76	bottom	0.310	1.233	0.382	
824.20	128	GSM 850	GPRS	31.3	30.39	-0.16	10 mm	A	17775	3	1:2.76	right	0.360	1.233	0.444	
824.20	128	GSM 850	GPRS	31.3	30.39	-0.11	10 mm	A	17775	3	1:2.76	left	0.184	1.233	0.227	
1850.20	512	GSM 1900	GPRS	25.5	24.13	-0.09	10 mm	B	18120	3	1:2.76	back	0.141	1.371	0.193	
1850.20	512	GSM 1900	GPRS	25.5	24.13	-0.09	10 mm	B	18120	3	1:2.76	front	0.116	1.371	0.159	
1850.20	512	GSM 1900	GPRS	25.5	24.13	-0.02	10 mm	B	18120	3	1:2.76	bottom	0.179	1.371	0.245	A20
1850.20	512	GSM 1900	GPRS	25.5	24.13	-0.01	10 mm	B	18120	3	1:2.76	left	0.082	1.371	0.112	
826.40	4132	UMTS 850	RMC	25.3	24.01	-0.01	10 mm	A	17775	N/A	1:1	back	0.623	1.346	0.839	
836.60	4183	UMTS 850	RMC	25.3	24.21	-0.01	10 mm	A	17775	N/A	1:1	back	0.669	1.285	0.860	
846.60	4233	UMTS 850	RMC	25.3	24.40	-0.01	10 mm	A	17775	N/A	1:1	back	0.723	1.230	0.889	A22
846.60	4233	UMTS 850	RMC	25.3	24.40	0.02	10 mm	A	17775	N/A	1:1	front	0.163	1.230	0.200	
846.60	4233	UMTS 850	RMC	25.3	24.40	-0.01	10 mm	A	17775	N/A	1:1	bottom	0.299	1.230	0.368	
846.60	4233	UMTS 850	RMC	25.3	24.40	0.00	10 mm	A	17775	N/A	1:1	right	0.248	1.230	0.305	
846.60	4233	UMTS 850	RMC	25.3	24.40	0.05	10 mm	A	17775	N/A	1:1	left	0.113	1.230	0.139	
1752.60	1513	UMTS 1750	RMC	22.0	21.52	-0.08	10 mm	B	18120	N/A	1:1	back	0.340	1.117	0.380	
1752.60	1513	UMTS 1750	RMC	22.0	21.52	0.00	10 mm	B	18120	N/A	1:1	front	0.317	1.117	0.354	
1752.60	1513	UMTS 1750	RMC	22.0	21.52	0.09	10 mm	B	18120	N/A	1:1	bottom	0.386	1.117	0.431	A24
1752.60	1513	UMTS 1750	RMC	22.0	21.52	-0.03	10 mm	B	18120	N/A	1:1	left	0.242	1.117	0.270	
1880.00	9400	UMTS 1900	RMC	22.0	21.26	-0.02	10 mm	B	18120	N/A	1:1	back	0.338	1.186	0.401	
1880.00	9400	UMTS 1900	RMC	22.0	21.26	-0.04	10 mm	B	18120	N/A	1:1	front	0.243	1.186	0.288	
1880.00	9400	UMTS 1900	RMC	22.0	21.26	0.01	10 mm	B	18120	N/A	1:1	bottom	0.372	1.186	0.441	A26
1880.00	9400	UMTS 1900	RMC	22.0	21.26	-0.03	10 mm	B	18120	N/A	1:1	left	0.171	1.186	0.203	
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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**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]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
707.50	23095	Mid	LTE Band 12	10	25.0	23.80	-0.01	0	A	15944	QPSK	1	25	10 mm	back	1:1	0.348	1.318	0.459	A28
707.50	23095	Mid	LTE Band 12	10	24.0	23.00	0.01	1	A	15944	QPSK	25	0	10 mm	back	1:1	0.294	1.259	0.370	
707.50	23095	Mid	LTE Band 12	10	25.0	23.80	0.01	0	A	15944	QPSK	1	25	10 mm	front	1:1	0.139	1.318	0.183	
707.50	23095	Mid	LTE Band 12	10	24.0	23.00	0.00	1	A	15944	QPSK	25	0	10 mm	front	1:1	0.116	1.259	0.146	
707.50	23095	Mid	LTE Band 12	10	25.0	23.80	0.01	0	A	15944	QPSK	1	25	10 mm	bottom	1:1	0.132	1.318	0.174	
707.50	23095	Mid	LTE Band 12	10	24.0	23.00	-0.02	1	A	15944	QPSK	25	0	10 mm	bottom	1:1	0.108	1.259	0.136	
707.50	23095	Mid	LTE Band 12	10	25.0	23.80	0.00	0	A	15944	QPSK	1	25	10 mm	right	1:1	0.243	1.318	0.320	
707.50	23095	Mid	LTE Band 12	10	24.0	23.00	0.00	1	A	15944	QPSK	25	0	10 mm	right	1:1	0.208	1.259	0.262	
707.50	23095	Mid	LTE Band 12	10	25.0	23.80	0.02	0	A	15944	QPSK	1	25	10 mm	left	1:1	0.145	1.318	0.191	
707.50	23095	Mid	LTE Band 12	10	24.0	23.00	-0.02	1	A	15944	QPSK	25	0	10 mm	left	1:1	0.121	1.259	0.152	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram											

**Table 11-25
LTE Band 26 (Cell) Hotspot SAR**

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.80	-0.01	0	A	17775	QPSK	1	36	10 mm	back	1:1	0.544	1.175	0.639	A30
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	22.96	-0.03	1	A	17775	QPSK	36	18	10 mm	back	1:1	0.461	1.132	0.522	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.80	0.01	0	A	17775	QPSK	1	36	10 mm	front	1:1	0.174	1.175	0.204	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	22.96	0.02	1	A	17775	QPSK	36	18	10 mm	front	1:1	0.146	1.132	0.165	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.80	0.03	0	A	17775	QPSK	1	36	10 mm	bottom	1:1	0.257	1.175	0.302	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	22.96	0.00	1	A	17775	QPSK	36	18	10 mm	bottom	1:1	0.221	1.132	0.250	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.80	0.02	0	A	17775	QPSK	1	36	10 mm	right	1:1	0.247	1.175	0.290	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	22.96	0.01	1	A	17775	QPSK	36	18	10 mm	right	1:1	0.208	1.132	0.235	
831.50	26865	Mid	LTE Band 26 (Cell)	15	24.5	23.80	-0.03	0	A	17775	QPSK	1	36	10 mm	left	1:1	0.126	1.175	0.148	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	22.96	-0.01	1	A	17775	QPSK	36	18	10 mm	left	1:1	0.105	1.132	0.119	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram											

FCC ID: A3LSMM336B	 PCTEST Proud to be part of element	SAR EVALUATION REPORT		Approved by: Quality Manager
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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]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.3	24.14	0.00	0	A	17775	QPSK	1	0	10 mm	back	1:1	0.659	1.306	0.861	A32
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.3	23.42	0.00	1	A	17775	QPSK	25	0	10 mm	back	1:1	0.552	1.225	0.676	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.3	23.41	0.00	1	A	17775	QPSK	50	0	10 mm	back	1:1	0.558	1.227	0.685	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.3	24.14	0.01	0	A	17775	QPSK	1	0	10 mm	front	1:1	0.175	1.306	0.229	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.3	23.42	0.01	1	A	17775	QPSK	25	0	10 mm	front	1:1	0.141	1.225	0.173	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.3	24.14	0.00	0	A	17775	QPSK	1	0	10 mm	bottom	1:1	0.272	1.306	0.355	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.3	23.42	0.00	1	A	17775	QPSK	25	0	10 mm	bottom	1:1	0.221	1.225	0.271	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.3	24.14	0.10	0	A	17775	QPSK	1	0	10 mm	right	1:1	0.239	1.306	0.312	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.3	23.42	0.00	1	A	17775	QPSK	25	0	10 mm	right	1:1	0.196	1.225	0.240	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.3	24.14	-0.11	0	A	17775	QPSK	1	0	10 mm	left	1:1	0.126	1.306	0.165	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.3	23.42	0.02	1	A	17775	QPSK	25	0	10 mm	left	1:1	0.102	1.225	0.125	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram										

**Table 11-27
LTE Band 66 (AWS) Hotspot SAR**

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.58	0.05	0	B	18120	QPSK	1	50	10 mm	back	1:1	0.256	1.102	0.282	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.80	-0.03	0	B	18120	QPSK	50	25	10 mm	back	1:1	0.286	1.047	0.299	A34
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.58	-0.02	0	B	18120	QPSK	1	50	10 mm	front	1:1	0.238	1.102	0.262	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.80	-0.05	0	B	18120	QPSK	50	25	10 mm	front	1:1	0.265	1.047	0.277	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.58	-0.03	0	B	18120	QPSK	1	50	10 mm	bottom	1:1	0.247	1.102	0.272	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.80	-0.02	0	B	18120	QPSK	50	25	10 mm	bottom	1:1	0.284	1.047	0.297	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.58	0.02	0	B	18120	QPSK	1	50	10 mm	left	1:1	0.170	1.102	0.187	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.80	0.10	0	B	18120	QPSK	50	25	10 mm	left	1:1	0.172	1.047	0.180	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram										

**Table 11-28
LTE Band 2 (PCS) Hotspot SAR**

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	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)		
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.40	-0.01	0	B	18120	QPSK	1	0	10 mm	back	1:1	0.209	1.148	0.240	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.60	-0.01	0	B	18120	QPSK	50	50	10 mm	back	1:1	0.222	1.096	0.243	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.40	-0.01	0	B	18120	QPSK	1	0	10 mm	front	1:1	0.160	1.148	0.184	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.60	-0.02	0	B	18120	QPSK	50	50	10 mm	front	1:1	0.169	1.096	0.185	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.40	0.11	0	B	18120	QPSK	1	0	10 mm	bottom	1:1	0.279	1.148	0.320	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.60	-0.01	0	B	18120	QPSK	50	50	10 mm	bottom	1:1	0.287	1.096	0.315	A36
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.40	-0.04	0	B	18120	QPSK	1	0	10 mm	left	1:1	0.131	1.148	0.150	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.60	-0.01	0	B	18120	QPSK	50	50	10 mm	left	1:1	0.134	1.096	0.147	
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
LTE Band 41 Hotspot SAR**



MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	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)		
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.35	0.03	0	B	17825	QPSK	1	0	10 mm	back	1:1.58	0.255	1.161	0.296	
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.45	-0.04	0	B	17825	QPSK	50	25	10 mm	back	1:1.58	0.285	1.135	0.323	A38
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.35	0.02	0	B	17825	QPSK	1	0	10 mm	front	1:1.58	0.171	1.161	0.199	
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.45	0.02	0	B	17825	QPSK	50	25	10 mm	front	1:1.58	0.190	1.135	0.216	
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.35	0.10	0	B	17825	QPSK	1	0	10 mm	bottom	1:1.58	0.173	1.161	0.201	
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.45	-0.04	0	B	17825	QPSK	50	25	10 mm	bottom	1:1.58	0.191	1.135	0.217	
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.35	-0.04	0	B	17825	QPSK	1	0	10 mm	left	1:1.58	0.198	1.161	0.230	
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.45	-0.01	0	B	17825	QPSK	50	25	10 mm	left	1:1.58	0.222	1.135	0.252	
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
NR Band 5 (Cell) Hotspot SAR**

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Antenna Config.	Power Drift [dB]	MPR [dB]	Serial Number	Waveform	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	167300	Mid	NR Band n5 (Cell)	20	25.0	23.91	0.02	0	17775	DFT-S-OFDM	QPSK	1	53	10 mm	back	1:1	0.676	1.285	0.869	A40
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.85	0.02	0	17775	DFT-S-OFDM	QPSK	50	28	10 mm	back	1:1	0.658	1.303	0.857	
836.50	167300	Mid	NR Band n5 (Cell)	20	24.0	22.87	0.02	1	17775	DFT-S-OFDM	QPSK	100	0	10 mm	back	1:1	0.507	1.297	0.658	
836.50	167300	Mid	NR Band n5 (Cell)	20	23.5	22.23	-0.01	1.5	17775	CP-OFDM	QPSK	1	1	10 mm	back	1:1	0.402	1.340	0.539	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.91	0.01	0	17775	DFT-S-OFDM	QPSK	1	53	10 mm	front	1:1	0.165	1.285	0.212	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.85	0.01	0	17775	DFT-S-OFDM	QPSK	50	28	10 mm	front	1:1	0.160	1.303	0.208	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.91	0.03	0	17775	DFT-S-OFDM	QPSK	1	53	10 mm	bottom	1:1	0.289	1.285	0.346	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.85	0.01	0	17775	DFT-S-OFDM	QPSK	50	28	10 mm	bottom	1:1	0.262	1.303	0.341	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.91	0.01	0	17775	DFT-S-OFDM	QPSK	1	53	10 mm	right	1:1	0.236	1.285	0.303	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.85	0.00	0	17775	DFT-S-OFDM	QPSK	50	28	10 mm	right	1:1	0.230	1.303	0.300	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.91	0.02	0	17775	DFT-S-OFDM	QPSK	1	53	10 mm	left	1:1	0.117	1.285	0.150	
836.50	167300	Mid	NR Band n5 (Cell)	20	25.0	23.85	-0.01	0	17775	DFT-S-OFDM	QPSK	50	28	10 mm	left	1:1	0.115	1.303	0.150	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram										

**Table 11-31
NR Band 66 (AWS) Hotspot SAR**

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Antenna Config.	Power Drift [dB]	MPR [dB]	Serial Number	Waveform	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.20	-0.01	0	17775	DFT-S-OFDM	QPSK	1	53	10 mm	back	1:1	0.223	1.202	0.268	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.18	0.02	0	17775	DFT-S-OFDM	QPSK	50	28	10 mm	back	1:1	0.222	1.208	0.268	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.20	0.02	0	17775	DFT-S-OFDM	QPSK	1	53	10 mm	front	1:1	0.216	1.202	0.260	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.18	-0.03	0	17775	DFT-S-OFDM	QPSK	50	28	10 mm	front	1:1	0.213	1.208	0.257	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.20	0.01	0	17775	DFT-S-OFDM	QPSK	1	53	10 mm	bottom	1:1	0.240	1.202	0.288	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.18	-0.02	0	17775	DFT-S-OFDM	QPSK	50	28	10 mm	bottom	1:1	0.244	1.208	0.295	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.04	-0.01	0	17775	CP-OFDM	QPSK	1	1	10 mm	bottom	1:1	0.270	1.247	0.337	A42
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.20	0.05	0	17775	DFT-S-OFDM	QPSK	1	53	10 mm	left	1:1	0.121	1.202	0.145	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.18	0.00	0	17775	DFT-S-OFDM	QPSK	50	28	10 mm	left	1:1	0.124	1.208	0.150	
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
WLAN Hotspot SAR**

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	18.0	17.97	-0.07	10 mm	15878	1	back	99.2	0.246	0.195	1.007	1.008	0.198	A44
2412	1	802.11b	DSSS	22	18.0	17.97	-0.03	10 mm	15878	1	front	99.2	0.091	-	1.007	1.008	-	
2412	1	802.11b	DSSS	22	18.0	17.97	0.10	10 mm	15878	1	top	99.2	0.167	-	1.007	1.008	-	
2412	1	802.11b	DSSS	22	18.0	17.97	0.09	10 mm	15878	1	left	99.2	0.043	-	1.007	1.008	-	
5795	159	802.11n	OFDM	40	15.0	14.54	-0.09	10 mm	16694	13.5	back	92.7	0.111	-	1.112	1.079	-	
5795	159	802.11n	OFDM	40	15.0	14.54	-0.08	10 mm	16694	13.5	front	92.7	0.034	-	1.112	1.079	-	
5795	159	802.11n	OFDM	40	15.0	14.54	0.11	10 mm	16694	13.5	top	92.7	0.155	0.103	1.112	1.079	0.124	A46
5795	159	802.11n	OFDM	40	15.0	14.54	0.01	10 mm	16694	13.5	left	92.7	0.050	-	1.112	1.079	-	
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 11-33
DSS Hotspot SAR**




MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #	
MHz	Ch.											(W/kg)			(W/kg)		
2402	0	Bluetooth	FHSS	11.5	11.47	0.01	10 mm	15944	1	back	77.00	0.029	1.007	1.299	0.038	A48	
2402	0	Bluetooth	FHSS	11.5	11.47	0.02	10 mm	15944	1	front	77.00	0.011	1.007	1.299	0.014		
2402	0	Bluetooth	FHSS	11.5	11.47	0.04	10 mm	15944	1	top	77.00	0.015	1.007	1.299	0.020		
2402	0	Bluetooth	FHSS	11.5	11.47	-0.01	10 mm	15944	1	left	77.00	0.004	1.007	1.299	0.005		
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 11-34
GPRS Phablet SAR Data**

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	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	27.5	26.07	-0.01	11 mm	B	18120	3	1:2.76	back	0.108	1.390	0.150	
1850.20	512	GSM 1900	GPRS	27.5	26.07	-0.13	0 mm	B	18120	3	1:2.76	front	0.687	1.390	0.955	
1850.20	512	GSM 1900	GPRS	27.5	26.07	-0.19	5 mm	B	18120	3	1:2.76	bottom	0.334	1.390	0.464	
1850.20	512	GSM 1900	GPRS	27.5	26.07	-0.11	6 mm	B	18120	3	1:2.76	left	0.142	1.390	0.197	
1850.20	512	GSM 1900	GPRS	25.5	24.13	0.04	0 mm	B	18120	3	1:2.76	back	0.787	1.371	1.079	
1880.00	661	GSM 1900	GPRS	25.5	23.77	0.00	0 mm	B	18120	3	1:2.76	back	1.120	1.489	1.668	
1909.80	810	GSM 1900	GPRS	25.5	23.76	0.02	0 mm	B	18120	3	1:2.76	back	1.170	1.493	1.747	A49
1850.20	512	GSM 1900	GPRS	25.5	24.13	0.01	0 mm	B	18120	3	1:2.76	bottom	0.457	1.371	0.627	
1850.20	512	GSM 1900	GPRS	25.5	24.13	0.02	0 mm	B	18120	3	1:2.76	left	0.359	1.371	0.492	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Phablet 4.0 W/kg (mW/g) averaged over 10 grams									

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**Table 11-35
UMTS Phablet SAR Data**

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Duty Cycle	Side	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #	
MHz	Ch.											(W/kg)		(W/kg)		
1752.60	1513	UMTS 1750	RMC	24.5	23.55	0.07	11 mm	B	18120	1:1	back	0.323	1.245	0.402		
1712.40	1312	UMTS 1750	RMC	24.5	23.25	-0.04	0 mm	B	18120	1:1	front	1.930	1.334	2.575		
1732.40	1412	UMTS 1750	RMC	24.5	23.40	-0.04	0 mm	B	18120	1:1	front	1.920	1.288	2.473		
1752.60	1513	UMTS 1750	RMC	24.5	23.55	-0.01	0 mm	B	18120	1:1	front	2.320	1.245	2.888	A50	
1752.60	1513	UMTS 1750	RMC	24.5	23.55	0.01	5 mm	B	18120	1:1	bottom	0.703	1.245	0.875		
1752.60	1513	UMTS 1750	RMC	24.5	23.55	-0.04	6 mm	B	18120	1:1	left	0.302	1.245	0.376		
1712.40	1312	UMTS 1750	RMC	22.0	21.13	0.04	0 mm	B	18120	1:1	back	1.840	1.222	2.248		
1732.40	1412	UMTS 1750	RMC	22.0	21.26	0.01	0 mm	B	18120	1:1	back	1.920	1.186	2.277		
1752.60	1513	UMTS 1750	RMC	22.0	21.52	-0.02	0 mm	B	18120	1:1	back	2.140	1.117	2.390		
1752.60	1513	UMTS 1750	RMC	22.0	21.52	-0.01	0 mm	B	18120	1:1	bottom	1.040	1.117	1.162		
1752.60	1513	UMTS 1750	RMC	22.0	21.52	0.07	0 mm	B	18120	1:1	left	0.812	1.117	0.907		
1752.60	1513	UMTS 1750	RMC	24.5	23.55	0.02	0 mm	B	18120	1:1	front	2.320	1.245	2.888		
1907.60	9538	UMTS 1900	RMC	24.5	23.14	0.00	11 mm	B	18120	1:1	back	0.264	1.368	0.361		
1907.60	9538	UMTS 1900	RMC	24.5	23.14	-0.04	0 mm	B	18120	1:1	front	1.430	1.368	1.956		
1907.60	9538	UMTS 1900	RMC	24.5	23.14	0.03	5 mm	B	18120	1:1	bottom	0.652	1.368	0.892		
1907.60	9538	UMTS 1900	RMC	24.5	23.14	-0.06	6 mm	B	18120	1:1	left	0.260	1.368	0.356		
1852.40	9262	UMTS 1900	RMC	22.0	21.20	0.00	0 mm	B	18120	1:1	back	2.260	1.202	2.717		
1880.00	9400	UMTS 1900	RMC	22.0	21.26	-0.03	0 mm	B	18120	1:1	back	2.270	1.186	2.692		
1907.60	9538	UMTS 1900	RMC	22.0	21.25	0.00	0 mm	B	18120	1:1	back	2.300	1.189	2.735	A51	
1880.00	9400	UMTS 1900	RMC	22.0	21.26	0.03	0 mm	B	18120	1:1	bottom	1.040	1.186	1.233		
1880.00	9400	UMTS 1900	RMC	22.0	21.26	0.00	0 mm	B	18120	1:1	left	0.802	1.186	0.951		
1907.60	9538	UMTS 1900	RMC	22.0	21.25	0.01	0 mm	B	18120	1:1	back	2.300	1.189	2.735		
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Phablet									
Spatial Peak							4.0 W/kg (mW/g)									
Uncontrolled Exposure/General Population							averaged over 10 grams									

Note: Blue entries represent variability measurement





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Table 11-36
LTE Band 66 (AWS) Phablet SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.5	23.70	0.02	0	B	17288	QPSK	1	50	11 mm	back	1:1	0.318	1.202	0.382	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.5	22.85	-0.02	1	B	17288	QPSK	50	25	11 mm	back	1:1	0.274	1.161	0.318	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.5	23.70	0.00	0	B	17288	QPSK	1	50	0 mm	front	1:1	1.780	1.202	2.140	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.5	23.38	0.00	0	B	17288	QPSK	1	50	0 mm	front	1:1	1.820	1.294	2.355	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.5	23.52	0.02	0	B	17288	QPSK	1	50	0 mm	front	1:1	2.050	1.253	2.569	A52
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.5	22.85	-0.04	1	B	17288	QPSK	50	25	0 mm	front	1:1	1.560	1.161	1.811	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.5	22.70	0.01	1	B	17288	QPSK	100	0	0 mm	front	1:1	1.640	1.202	1.971	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.5	23.70	0.05	0	B	17288	QPSK	1	50	5 mm	bottom	1:1	0.653	1.202	0.785	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.5	22.85	0.00	1	B	17288	QPSK	50	25	5 mm	bottom	1:1	0.548	1.161	0.636	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.5	23.70	0.07	0	B	17288	QPSK	1	50	6 mm	left	1:1	0.304	1.202	0.365	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.5	22.85	-0.02	1	B	17288	QPSK	50	25	6 mm	left	1:1	0.251	1.161	0.291	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.58	0.01	0	B	17288	QPSK	1	50	0 mm	back	1:1	1.630	1.102	1.796	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.80	0.03	0	B	17288	QPSK	50	25	0 mm	back	1:1	1.820	1.047	1.906	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.58	0.02	0	B	17288	QPSK	1	50	0 mm	bottom	1:1	0.696	1.102	0.767	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.80	0.01	0	B	17288	QPSK	50	25	0 mm	bottom	1:1	0.783	1.047	0.820	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.58	-0.02	0	B	17288	QPSK	1	50	0 mm	left	1:1	0.521	1.102	0.574	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.80	-0.02	0	B	17288	QPSK	50	25	0 mm	left	1:1	0.578	1.047	0.605	
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 11-37
LTE Band 2 (PCS) Phablet SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	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)		
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.5	24.04	0.00	0	B	18120	QPSK	1	50	11 mm	back	1:1	0.249	1.112	0.277	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	22.71	0.00	1	B	18120	QPSK	50	25	11 mm	back	1:1	0.215	1.199	0.258	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.5	24.04	-0.03	0	B	18120	QPSK	1	50	0 mm	front	1:1	1.330	1.112	1.479	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	22.71	-0.01	1	B	18120	QPSK	50	25	0 mm	front	1:1	1.140	1.199	1.367	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.5	24.04	0.04	0	B	18120	QPSK	1	50	5 mm	bottom	1:1	0.584	1.112	0.649	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	22.71	-0.04	1	B	18120	QPSK	50	25	5 mm	bottom	1:1	0.510	1.199	0.611	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.5	24.04	-0.02	0	B	18120	QPSK	1	50	6 mm	left	1:1	0.254	1.112	0.282	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	22.71	-0.03	1	B	18120	QPSK	50	25	6 mm	left	1:1	0.215	1.199	0.258	
1860.00	18700	Low	LTE Band 2 (PCS)	20	21.0	20.03	-0.03	0	B	18120	QPSK	1	50	0 mm	back	1:1	1.690	1.250	2.113	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.40	-0.06	0	B	18120	QPSK	1	0	0 mm	back	1:1	1.320	1.148	1.515	
1900.00	19100	High	LTE Band 2 (PCS)	20	21.0	20.26	-0.02	0	B	18120	QPSK	1	0	0 mm	back	1:1	1.750	1.186	2.076	
1860.00	18700	Low	LTE Band 2 (PCS)	20	21.0	20.59	0.01	0	B	18120	QPSK	50	0	0 mm	back	1:1	1.840	1.099	2.022	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.60	-0.03	0	B	18120	QPSK	50	50	0 mm	back	1:1	1.860	1.096	2.039	A53
1900.00	19100	High	LTE Band 2 (PCS)	20	21.0	20.58	0.00	0	B	18120	QPSK	50	50	0 mm	back	1:1	1.860	1.102	2.050	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.39	-0.01	0	B	18120	QPSK	100	0	0 mm	back	1:1	1.820	1.151	2.095	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.40	0.02	0	B	18120	QPSK	1	0	0 mm	bottom	1:1	0.788	1.148	0.905	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.60	-0.03	0	B	18120	QPSK	50	50	0 mm	bottom	1:1	0.815	1.096	0.893	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.40	-0.01	0	B	18120	QPSK	1	0	0 mm	left	1:1	0.618	1.148	0.709	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	21.0	20.60	-0.06	0	B	18120	QPSK	50	50	0 mm	left	1:1	0.646	1.096	0.708	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial PeAK Uncontrolled Exposure/General Population										Phablet 4.0 W/kg (mW/g) averaged over 10 grams										

FCC ID: A3LSMM336B		SAR EVALUATION REPORT		Approved by: Quality Manager
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**Table 11-38
LTE Band 41 Phablet SAR**

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	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)		
2680.00	41490	High	LTE Band 41	20	24.5	23.96	0.01	0	B	17825	QPSK	1	0	11 mm	back	1:1.58	0.243	1.132	0.275	
2680.00	41490	High	LTE Band 41	20	23.5	23.37	0.12	1	B	17825	QPSK	50	0	11 mm	back	1:1.58	0.206	1.030	0.212	
2680.00	41490	High	LTE Band 41	20	24.5	23.96	-0.01	0	B	17825	QPSK	1	0	0 mm	front	1:1.58	1.270	1.132	1.438	
2680.00	41490	High	LTE Band 41	20	23.5	23.37	0.01	1	B	17825	QPSK	50	0	0 mm	front	1:1.58	1.090	1.030	1.123	
2680.00	41490	High	LTE Band 41	20	24.5	23.96	0.02	0	B	17825	QPSK	1	0	5 mm	bottom	1:1.58	0.389	1.132	0.440	
2680.00	41490	High	LTE Band 41	20	23.5	23.37	-0.03	1	B	17825	QPSK	50	0	5 mm	bottom	1:1.58	0.314	1.030	0.323	
2680.00	41490	High	LTE Band 41	20	24.5	23.96	0.10	0	B	17825	QPSK	1	0	6 mm	left	1:1.58	0.321	1.132	0.363	
2680.00	41490	High	LTE Band 41	20	23.5	23.37	0.02	1	B	17825	QPSK	50	0	6 mm	left	1:1.58	0.283	1.030	0.291	
2506.00	39750	Low	LTE Band 41	20	21.0	19.88	-0.01	0	B	17825	QPSK	1	99	0 mm	back	1:1.58	0.986	1.294	1.276	
2549.50	40185	Low-Mid	LTE Band 41	20	21.0	19.60	0.01	0	B	17825	QPSK	1	0	0 mm	back	1:1.58	1.070	1.380	1.477	
2593.00	40620	Mid	LTE Band 41	20	21.0	20.18	0.01	0	B	17825	QPSK	1	0	0 mm	back	1:1.58	1.360	1.208	1.643	
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.35	-0.02	0	B	17825	QPSK	1	0	0 mm	back	1:1.58	1.420	1.161	1.649	A54
2680.00	41490	High	LTE Band 41	20	21.0	20.07	0.03	0	B	17825	QPSK	1	0	0 mm	back	1:1.58	1.200	1.239	1.487	
2506.00	39750	Low	LTE Band 41	20	21.0	20.20	-0.02	0	B	17825	QPSK	50	25	0 mm	back	1:1.58	1.110	1.202	1.334	
2549.50	40185	Low-Mid	LTE Band 41	20	21.0	20.17	-0.01	0	B	17825	QPSK	50	50	0 mm	back	1:1.58	1.230	1.211	1.490	
2593.00	40620	Mid	LTE Band 41	20	21.0	20.35	-0.01	0	B	17825	QPSK	50	0	0 mm	back	1:1.58	1.370	1.161	1.591	
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.45	0.10	0	B	17825	QPSK	50	25	0 mm	back	1:1.58	1.400	1.135	1.589	
2680.00	41490	High	LTE Band 41	20	21.0	20.35	0.01	0	B	17825	QPSK	50	0	0 mm	back	1:1.58	1.280	1.161	1.486	
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.34	0.02	0	B	17825	QPSK	100	0	0 mm	back	1:1.58	1.400	1.164	1.630	
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.35	0.01	0	B	17825	QPSK	1	0	0 mm	bottom	1:1.58	0.469	1.161	0.545	
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.45	0.02	0	B	17825	QPSK	50	25	0 mm	bottom	1:1.58	0.439	1.135	0.498	
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.35	-0.01	0	B	17825	QPSK	1	0	0 mm	left	1:1.58	0.439	1.161	0.510	
2636.50	41055	Mid-High	LTE Band 41	20	21.0	20.45	-0.01	0	B	17825	QPSK	50	25	0 mm	left	1:1.58	0.428	1.135	0.486	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Phablet												
Spatial Peak								4.0 W/kg (mW/g)												
Uncontrolled Exposure/General Population								averaged over 10 grams												



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**Table 11-39
NR Band n66 (AWS) Phablet SAR**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Antenna Config	Power Drift [dB]	MPR [dB]	Serial Number	Waveform	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #	
MHz	Ch.																(W/kg)	(W/kg)	(W/kg)		
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.46	B	0.02	0	17775	DFT-S-OFDM	QPSK	1	53	11 mm	back	1:1	0.311	1.132	0.352	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.38	B	0.10	0	17775	DFT-S-OFDM	QPSK	50	28	11 mm	back	1:1	0.308	1.153	0.355	
1720.00	344000	Low	NR Band n66 (AWS)	20	24.0	23.27	B	0.01	0	17775	DFT-S-OFDM	QPSK	1	53	0 mm	front	1:1	2.110	1.183	2.496	
1745.00	349000	Mid	NR Band n66 (AWS)	20	24.0	23.40	B	0.07	0	17775	DFT-S-OFDM	QPSK	1	53	0 mm	front	1:1	1.910	1.148	2.193	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.46	B	-0.01	0	17775	DFT-S-OFDM	QPSK	1	53	0 mm	front	1:1	2.260	1.132	2.558	
1720.00	344000	Low	NR Band n66 (AWS)	20	24.0	23.25	B	0.04	0	17775	DFT-S-OFDM	QPSK	50	28	0 mm	front	1:1	2.130	1.189	2.533	
1745.00	349000	Mid	NR Band n66 (AWS)	20	24.0	23.35	B	0.01	0	17775	DFT-S-OFDM	QPSK	50	28	0 mm	front	1:1	1.860	1.161	2.159	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.38	B	0.02	0	17775	DFT-S-OFDM	QPSK	50	28	0 mm	front	1:1	2.290	1.153	2.640	A56
1745.00	349000	Mid	NR Band n66 (AWS)	20	23.0	22.29	B	0.06	1	17775	DFT-S-OFDM	QPSK	100	0	0 mm	front	1:1	1.450	1.178	1.708	
1745.00	349000	Mid	NR Band n66 (AWS)	20	22.5	21.67	B	0.03	1.5	17775	CP-OFDM	QPSK	1	1	0 mm	front	1:1	1.280	1.211	1.550	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.46	B	0.01	0	17775	DFT-S-OFDM	QPSK	1	53	5 mm	bottom	1:1	0.780	1.132	0.883	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.38	B	0.04	0	17775	DFT-S-OFDM	QPSK	50	28	5 mm	bottom	1:1	0.766	1.153	0.883	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.46	B	0.03	0	17775	DFT-S-OFDM	QPSK	1	53	6 mm	left	1:1	0.334	1.132	0.378	
1770.00	354000	High	NR Band n66 (AWS)	20	24.0	23.38	B	-0.01	0	17775	DFT-S-OFDM	QPSK	50	28	6 mm	left	1:1	0.340	1.153	0.392	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.20	B	-0.13	0	17775	DFT-S-OFDM	QPSK	1	53	0 mm	back	1:1	1.550	1.202	1.863	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.18	B	0.01	0	17775	DFT-S-OFDM	QPSK	50	28	0 mm	back	1:1	1.490	1.208	1.800	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.20	B	0.04	0	17775	DFT-S-OFDM	QPSK	1	53	0 mm	bottom	1:1	0.710	1.202	0.853	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.18	B	0.14	0	17775	DFT-S-OFDM	QPSK	50	28	0 mm	bottom	1:1	0.721	1.208	0.871	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.20	B	-0.01	0	17775	DFT-S-OFDM	QPSK	1	53	0 mm	left	1:1	0.595	1.202	0.715	
1745.00	349000	Mid	NR Band n66 (AWS)	20	21.0	20.18	B	0.03	0	17775	DFT-S-OFDM	QPSK	50	28	0 mm	left	1:1	0.587	1.208	0.709	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT										Phablet											
Spatial Peak										4.0 W/kg (mW/g)											
Uncontrolled Exposure/General Population										averaged over 10 grams											

**Table 11-40
WLAN Phablet SAR**

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.												(W/kg)	(W/kg)	(W/kg)	(W/kg)		
5230	46	802.11n	OFDM	40	12.0	11.61	-0.10	0 mm	16694	13.5	back	92.7	1.840	-	1.094	1.079	-	
5230	46	802.11n	OFDM	40	12.0	11.61	-0.03	0 mm	16694	13.5	front	92.7	0.341	-	1.094	1.079	-	
5230	46	802.11n	OFDM	40	12.0	11.61	-0.02	0 mm	16694	13.5	top	92.7	2.910	0.387	1.094	1.079	0.457	
5230	46	802.11n	OFDM	40	12.0	11.61	0.14	0 mm	16694	13.5	left	92.7	0.418	-	1.094	1.079	-	
5270	54	802.11n	OFDM	40	11.0	10.52	-0.03	0 mm	16694	13.5	back	92.7	3.460	-	1.117	1.079	-	
5270	54	802.11n	OFDM	40	11.0	10.52	0.03	0 mm	16694	13.5	front	92.7	0.542	-	1.117	1.079	-	
5270	54	802.11n	OFDM	40	11.0	10.52	-0.06	0 mm	16694	13.5	top	92.7	3.850	0.500	1.117	1.079	0.603	A56
5270	54	802.11n	OFDM	40	11.0	10.52	0.10	0 mm	16694	13.5	left	92.7	0.468	-	1.117	1.079	-	
5630	126	802.11n	OFDM	40	15.0	14.91	-0.02	0 mm	16694	13.5	back	92.7	1.860	-	1.021	1.079	-	
5630	126	802.11n	OFDM	40	15.0	14.91	-0.02	0 mm	16694	13.5	front	92.7	0.995	-	1.021	1.079	-	
5630	126	802.11n	OFDM	40	15.0	14.91	-0.03	0 mm	16694	13.5	top	92.7	2.130	0.348	1.021	1.079	0.383	
5630	126	802.11n	OFDM	40	15.0	14.91	-0.04	0 mm	16694	13.5	left	92.7	0.754	-	1.021	1.079	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT										Phablet								
Spatial Peak										4.0 W/kg (mW/g)								
Uncontrolled Exposure/General Population										averaged over 10 grams								

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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 IEEE 1528-2013, and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 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 12 for variability analysis.
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v02r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
10. Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is > 160 mm and < 200 mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg.
11. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information).
12. Unless otherwise noted, when 10g SAR measurement is considered, a factor of 2.5 is applied to the 1g thresholds for the equivalent test cases.

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 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 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 and MCC=001 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).
4. Per FCC KDB Publication 447498 D01v06, when the reported 1g SAR measured at the highest output power channel in a given a test configuration was > 0.6 W/kg for LTE B41.
5. 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.

NR Notes:

1. NR implementation supports SA and NSA mode. In EN-DC mode, NR operates with the LTE Bands shown in the NR FR1 checklist acting as anchor bands. Per FCC guidance, SAR tests for NR Bands and LTE Anchors Bands were performed separately due to limitations in SAR probe calibration factors.
2. Simultaneous transmission analysis for EN-DC operations is included in appendix D. This device additionally supports some EN-DC conditions where additional LTE carriers are added on the downlink only. Per FCC guidance, all unique uplink combinations were assessed.
3. Per FCC Guidance, NR modulations and RB Sizes/Offsets were selected for testing such that configurations with the highest output power were evaluated for SAR tests.

WLAN Notes:



1. For held-to-ear, and hotspot, and phablet operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg for 1g evaluations, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 8.6.5 for more information.
3. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg for 1g evaluations. See Section 8.6.6 for more information.

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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. 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 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 SAR MEASUREMENT VARIABILITY

12.1 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 12-1
Phablet SAR Measurement Variability Results

PHABLET VARIABILITY RESULTS													
Band	FREQUENCY		Mode	Service	Side	Spacing	Measured SAR (10g)	1st Repeated SAR (10g)	Ratio	2nd Repeated SAR (10g)	Ratio	3rd Repeated SAR (10g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1750	1752.60	1513	UMTS 1750	RMC	front	0 mm	2.320	2.320	1.00	N/A	N/A	N/A	N/A
1900	1907.60	9538	UMTS 1900	RMC	back	0 mm	2.300	2.300	1.00	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						

12.2 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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13 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	85046A	(R)Hz-20 Spectrum Analyzer	N/A	CBT	N/A	303440387
Agilent	85033E	3.5mm Standard Calibration Kit	7/7/2021	Annual	7/7/2022	MV53402352
Agilent	E4438C	ESG Vector Signal Generator	12/14/2020	Biennial	12/14/2022	MY42082385
Agilent	E4438C	ESG Vector Signal Generator	5/6/2021	Annual	5/6/2022	MY42082659
Agilent	MS182A	MMG Vector Signal Generator	6/15/2021	Annual	6/15/2022	MY47420602
Agilent	MS182A	MMG Vector Signal Generator	6/15/2021	Annual	6/15/2022	MY47420600
Agilent	87368S	S-Parameter Vector Network Analyzer	2/19/2021	Annual	2/19/2022	MY40001472
Agilent	ES515C	Wireless Communications Test Set	5/4/2021	Biennial	5/4/2023	GB44393563
Agilent	ES515C	Wireless Communications Test Set	5/18/2020	Biennial	5/18/2022	GB43193991
Agilent	ES515C	Wireless Communications Test Set	5/6/2021	Annual	5/6/2022	GB44400860
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46170464
Amplifier Research	155166	Amplifier	CBT	CBT	CBT	353617
Amplifier Research	155166	Amplifier	CBT	N/A	CBT	353468
Amplifier Research	155166	Amplifier	CBT	N/A	CBT	353469
Anritsu	ML2496A	Power Meter	3/3/2021	Annual	3/3/2022	1306009
Anritsu	ML2496A	Power Meter	4/21/2021	Annual	4/21/2022	1351001
Anritsu	MA2411B	Pulse Power Sensor	3/8/2021	Annual	3/8/2022	1359007
Anritsu	MA2411B	Pulse Power Sensor	3/9/2021	Annual	3/9/2022	1207470
Anritsu	MT8821C	Radio Communication Analyzer	4/16/2021	Annual	4/16/2022	620090190
Anritsu	MT8821C	Radio Communication Analyzer	3/23/2021	Annual	3/23/2022	620144418
Anritsu	MT8821C	Radio Communication Analyzer	4/14/2021	Annual	4/14/2022	6261895213
Anritsu	MT8821C	Radio Communication Analyzer	3/12/2021	Annual	3/12/2022	626204715
Anritsu	MT8821C	Radio Communication Analyzer	7/18/2021	Annual	7/18/2022	6262150047
Anritsu	MA24106A	USB Power Sensor	3/2/2021	Annual	3/2/2022	1244524
Anritsu	MA24106A	USB Power Sensor	3/3/2021	Annual	3/3/2022	1344556
Anritsu	MA24106A	USB Power Sensor	5/17/2021	Annual	5/17/2022	1349501
Anritsu	MA24106A	USB Power Sensor	3/2/2021	Annual	3/2/2022	1349509
Anritsu	MA24106A	USB Power Sensor	6/29/2021	Annual	6/29/2022	1349513
Anritsu	MA24106A	USB Power Sensor	5/3/2021	Annual	5/3/2022	1349514
Anritsu	MA24106A	USB Power Sensor	6/25/2021	Annual	6/25/2022	1520504
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46170464
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB44450273
COMTECH	AR8579-5	Solid State Amplifier	CBT	N/A	CBT	M155A00-009
COMTECH	AR8579-5/7598	Solid State Amplifier	CBT	CBT	CBT	M3V1A00-1002
Control Company	4353	Long Stem Thermometer	10/28/2020	Biennial	10/28/2022	200670653
Control Company	4352	Long Stem Thermometer	5/16/2020	Biennial	5/16/2022	200284436
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	2/17/2020	Biennial	2/17/2022	200113274
Control Company	4040	Therm / Clock/ Humidity Monitor	3/16/2020	Biennial	3/16/2022	200170289
Insize	1108-150	Digital Caliper	1/17/2020	Biennial	1/17/2022	409193536
Keyight	7720	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keyight Technologies	N6705B	DC Power Analyzer	5/5/2021	Triennial	5/5/2024	MY30040559
Keyight Technologies	N8008A	NMA Signal Analyzer	2/24/2021	Annual	2/24/2022	MY48010233
MCL	BW-16W6+	6dB Attenuator	CBT	CBT	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	SUP-2400+	Low Pass Filter	CBT	N/A	CBT	8897950903
MiniCircuits	BW-80W200	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
MiniCircuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
MiniCircuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
MiniCircuits	BW-420W5	Power Attenuator	CBT	N/A	CBT	1226
MiniCircuits	TYA-11-432	RF Power Amp	CBT	N/A	CBT	0A1303002
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	BW-53W2	Attenuator (dB)	CBT	N/A	CBT	120
Narda	4772-3	Attenuator (dB)	CBT	N/A	CBT	7676
Pasternack	PE209B-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	N/A
Pasternack	NC-100	Torque Wrench	8/4/2020	Biennial	8/4/2022	N/A
Pasternack	NC-100	Torque Wrench	8/4/2020	Biennial	8/4/2022	N/A
Pasternack	NC-100	Torque Wrench (Bin-Bin)	8/5/2020	Biennial	8/5/2022	47639-47
Rohde & Schwarz	CMW500	Radio Communication Tester	2/18/2021	Annual	2/18/2022	1001767
Rohde & Schwarz	CMW500	Radio Communication Tester	3/19/2021	Annual	3/19/2022	128853
Rohde & Schwarz	CMW500	Radio Communication Tester	5/11/2021	Annual	5/11/2022	128636
Rohde & Schwarz	CMW500	Radio Communication Tester	3/22/2021	Annual	3/22/2022	167283
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2/10/2021	Annual	2/10/2022	161562
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	3/12/2021	Annual	3/12/2022	161215
SPEAG	D750V3	750 MHz SAR Dipole	3/16/2020	Biennial	3/16/2022	1003
SPEAG	D750V3	750 MHz SAR Dipole	10/20/2021	Annual	10/20/2022	1161
SPEAG	D835V2	835 MHz SAR Dipole	1/21/2021	Annual	1/21/2022	44132
SPEAG	D835V2	835 MHz SAR Dipole	3/13/2020	Triennial	3/13/2022	46043
SPEAG	D835V2	835 MHz SAR Dipole	10/19/2021	Annual	10/19/2022	44133
SPEAG	D1750V2	1750 MHz SAR Dipole	5/12/2020	Biennial	5/12/2022	11748
SPEAG	D1765V2	1765 MHz SAR Dipole	5/14/2021	Annual	5/14/2022	10308
SPEAG	D1950V2	1950 MHz SAR Dipole	10/22/2020	Annual	10/22/2022	54900
SPEAG	D2450V2	2450 MHz SAR Dipole	9/9/2020	Biennial	9/9/2022	797
SPEAG	D2450V2	2450 MHz SAR Dipole	11/25/2021	Annual	11/25/2022	981
SPEAG	D2450V2	2450 MHz SAR Dipole	8/18/2021	Annual	8/18/2022	719
SPEAG	D2600V2	2600 MHz SAR Dipole	4/14/2021	Annual	4/14/2022	1004
SPEAG	D2600V2	2600 MHz SAR Dipole	6/14/2019	Triennial	6/14/2022	1064
SPEAG	DS6Hv2	5 GHz SAR Dipole	9/15/2021	Annual	9/15/2022	1191
SPEAG	EX3Dv4	SAR Probe	7/20/2021	Annual	7/20/2022	7406
SPEAG	EX3Dv4	SAR Probe	7/20/2021	Annual	7/20/2022	7410
SPEAG	EX3Dv4	SAR Probe	6/28/2021	Annual	6/28/2022	7660
SPEAG	EX3Dv4	SAR Probe	11/16/2021	Annual	11/16/2022	7538
SPEAG	EX3Dv4	SAR Probe	6/28/2021	Annual	6/28/2022	7661
SPEAG	EX3Dv4	SAR Probe	8/2/2021	Annual	8/2/2022	7670
SPEAG	EX3Dv4	SAR Probe	5/18/2021	Annual	5/18/2022	3914
SPEAG	EX3Dv4	SAR Probe	8/4/2021	Annual	8/4/2022	7668
SPEAG	EX3Dv4	SAR Probe	4/19/2021	Annual	4/19/2022	7357
SPEAG	EX3Dv4	SAR Probe	9/20/2021	Annual	9/20/2022	7552
SPEAG	EX3Dv4	SAR Probe	6/21/2021	Annual	6/21/2022	7409
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/23/2021	Annual	6/23/2022	1676
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/22/2021	Annual	6/22/2022	1677
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/13/2021	Annual	7/13/2022	1583
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/10/2021	Annual	11/10/2022	1523
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/7/2021	Annual	4/7/2022	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/2/2021	Annual	8/2/2022	1681
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/16/2021	Annual	8/16/2022	1450
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/11/2021	Annual	5/11/2022	728
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/18/2021	Annual	3/18/2022	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/4/2021	Annual	8/4/2022	1680
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/15/2021	Annual	6/15/2022	1334
SPEAG	DAK-3-5	Dielectric Assessment Kit	10/20/2021	Annual	10/20/2022	1091
SPEAG	DAK-3-5	Dielectric Parameter Probes	1/6/2022	Annual	1/6/2023	1278
SPEAG	MMA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	N/A

Note: all equipment was used solely within its respective calibration period.



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

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14 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	1.732	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	1.732	1	1	0.1	0.1	∞
Modulation Response	E.2.5	4.8	R	1.732	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	1.732	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.732	1	1	1.5	1.5	∞
RF Ambient Conditions - Noise	E.6.1	3	R	1.732	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	3	R	1.732	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.8	R	1.732	1	1	0.5	0.5	∞
Probe Positioning w/ respect to Phantom	E.6.3	6.7	R	1.732	1	1	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	4	R	1.732	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	1.732	1	1	2.9	2.9	∞
SAR Scaling	E.6.5	0	R	1.732	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	1.732	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Uncertainty	E.3.4	0.6	R	1.732	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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15 CONCLUSION

15.1 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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