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

SAR EVALUATION REPORT

Applicant Name:
Microsoft Corporation
One Microsoft Way
Redmond, WA 98052 USA

Date of Testing:
06/21/2021– 09/09/2021
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M2105060048-01.C3K (Rev 2)

FCC ID: **C3K1995**

APPLICANT: **MICROSOFT CORPORATION**

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model: 1995

Equipment Class	Band & Mode	Tx Frequency	SAR					
			1g Head (W/kg)	1g Body-Worn (W/kg)	1g Hotspot (W/kg)	10g Phablet (W/kg)	1g UMPC (W/kg)	1g Body (W/kg)
PCE	GSM/GPRS 850	824.20 - 848.80 MHz	0.48	0.91	0.91	2.74	0.60	0.52
PCE	GSM/GPRS 1900	1850.20 - 1909.80 MHz	0.26	1.03	1.03	2.05	0.79	0.55
PCE	UMTS 850	826.40 - 846.60 MHz	0.35	0.90	0.90	N/A	0.62	0.70
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.54	0.41	0.41	N/A	0.95	0.72
PCE	LTE Band 71	665.5 - 695.5 MHz	0.53	0.66	0.66	N/A	0.97	0.57
PCE	LTE Band 12	699.7 - 715.3 MHz	0.78	0.71	0.71	N/A	0.87	0.59
PCE	LTE Band 13	779.5 - 784.5 MHz	0.90	0.87	0.87	N/A	0.96	0.66
PCE	LTE Band 14	790.5 - 795.5 MHz	0.90	0.84	0.84	N/A	0.98	0.55
PCE	LTE Band 26 (Cell)	814.7 - 848.3 MHz	0.93	0.89	0.89	N/A	0.49	0.67
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.82	0.96	0.96	N/A	0.63	0.73
PCE	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.71	0.91	0.91	1.75	1.00	0.73
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A	N/A	N/A	N/A
PCE	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.73	0.90	0.90	2.00	0.80	0.76
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	N/A	N/A	N/A	N/A	N/A	N/A
PCE	LTE Band 30	2307.5 - 2312.5 MHz	0.41	0.62	0.62	N/A	0.65	0.65
PCE	LTE Band 7	2502.5 - 2567.5 MHz	0.58	0.80	0.80	2.68	0.86	0.72
CBE	LTE Band 48	3552.5 - 3697.5 MHz	0.16	0.47	0.62	N/A	0.59	0.61
PCE	LTE Band 41	2498.5 - 2687.5 MHz	0.80	0.71	0.77	2.59	0.90	0.71
PCE	NR Band n71	665.5 - 695.5 MHz	0.88	0.43	0.43	N/A	0.62	0.61
PCE	NR Band n5 (Cell)	826.5 - 846.5 MHz	0.54	0.60	0.60	N/A	0.64	0.64
PCE	NR Band n66 (AWS)	1712.5 - 1777.5 MHz	0.75	0.76	0.76	1.84	1.00	0.68
PCE	NR Band n25 (PCS)	1852.5 - 1912.5 MHz	0.69	0.91	0.91	1.79	0.91	0.67
PCE	NR Band n2 (PCS)	1852.5 - 1907.5 MHz	N/A	N/A	N/A	N/A	N/A	N/A
PCE	NR Band n41	2506.02 - 2679.99 MHz	0.69	0.99	1.15	2.43	0.89	0.67
DTS	2.4 GHz WLAN	2412 - 2472 MHz	0.33	0.21	0.10	N/A	0.30	0.30
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	0.24	N/A	N/A	N/A
NII	U-NII-2A	5260 - 5320 MHz	0.35	0.56	N/A	1.10	0.67	0.56
NII	U-NII-2C	5500 - 5720 MHz	0.31	1.01	N/A	2.11	1.15	1.02
NII	U-NII-3	5745 - 5825 MHz	0.24	0.48	0.34	N/A	0.81	0.90
DSS/DTS	Bluetooth	2402 - 2480 MHz	< 0.1	< 0.1	< 0.1	N/A	< 0.1	0.20
Simultaneous SAR per KDB 690783 D01v01r03:			1.44	1.56	1.59	3.93	1.55	1.59

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 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 71	Voice/Data	665.5 - 695.5 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 14	Voice/Data	790.5 - 795.5 MHz
LTE Band 26 (Cell)	Voice/Data	814.7 - 848.3 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 25 (PCS)	Voice/Data	1850.7 - 1914.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 30	Voice/Data	2307.5 - 2312.5 MHz
LTE Band 7	Voice/Data	2502.5 - 2567.5 MHz
LTE Band 48	Voice/Data	3552.5 - 3697.5 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
NR Band n71	Data	665.5 - 695.5 MHz
NR Band n5 (Cell)	Data	826.5 - 846.5 MHz
NR Band n66 (AWS)	Data	1712.5 - 1777.5 MHz
NR Band n25 (PCS)	Data	1852.5 - 1912.5 MHz
NR Band n2 (PCS)	Data	1852.5 - 1907.5 MHz
NR Band n41	Data	2506.02 - 2679.99 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
NR Band n260	Data	37000 - 40000 MHz
NR Band n261	Data	27500 - 28350 MHz
NFC	Data	13.56 MHz

1.2 Time-Averaging Algorithm for RF Exposure Compliance

This device is enabled with the Qualcomm® Smart Transmit feature. This feature performs time averaging algorithm in real time to control and manage transmitting power and ensure the time-averaged RF exposure is in compliance with FCC requirements all the time. Refer to Compliance Summary document for detailed description of Qualcomm® Smart Transmit feature (report SN can be found in Section 1.11 – Bibliography).

Note that WLAN operations are not enabled with Smart Transmit.

The Smart Transmit algorithm maintains the time-averaged transmit power, in turn, time-averaged RF exposure of *SAR_design_target* or *PD_design_target*, below the predefined time-averaged power limit (i.e., P_{limit} for sub-6 radio, and *input.power.limit* for 5G mmW NR), for each characterized technology and band (see RF Exposure Part 0 Test Report, report SN can be found in Section 1.11 - Bibliography).

Smart Transmit allows the device to transmit at higher power instantaneously, as high as P_{max}, when needed, but enforces power limiting to maintain time-averaged transmit power to P_{limit}. Below table shows P_{limit} EFS settings and maximum tune up output power P_{max} configured for this EUT for various transmit conditions (Device State Index DSI). Note that the device uncertainty for sub-6GHz WWAN is 1.0dB for this EUT.

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Exposure Senario		Free Space	Head	Flip/Closed Body	Read	Flat	Maximum Tune-Up Output Power*
Averaging Volume		1g, 10g	1g	1g, 10g	1g	1g	
Spacing		-	0 mm	10 mm	5 mm	0 mm	
Configuration		Flip/Closed/ Read/Flat	Flip/Flat	Flip/Closed	Read	Flat	
DSI		3	2	4	5	6	
Technology/Band	Antenna						Pmax
GSM 850	South	30.0	29.6	24.8	21.2	15.7	26.3
GSM 1900	South	30.0	29.8	20.6	15.8	10.9	23.3
UMTS 850	South	30.0	29.9	25.4	21.2	15.7	24.3
UMTS 1900	South	30.0	28.0	20.6	15.0	10.9	24.3
LTE Band 71	South	30.0	31.8	27.0	23.8	17.1	24.3
LTE Band 71	North	30.0	18.7	27.1	23.0	18.1	24.3
LTE Band 12	South	30.0	30.8	26.8	23.5	17.7	24.3
LTE Band 12	North	30.0	18.4	26.1	22.8	17.5	24.3
LTE Band 13	South	30.0	30.2	25.8	21.2	16.4	24.3
LTE Band 13	North	30.0	17.7	26.1	22.0	17.6	24.3
LTE Band 14	South	30.0	30.4	25.9	21.7	16.6	24.3
LTE Band 14	North	30.0	17.5	24.8	22.6	16.7	24.3
LTE Band 26 (Cell)	South	30.0	29.9	23.8	21.2	15.7	24.3
LTE Band 26 (Cell)	North	30.0	17.7	25.9	21.7	16.3	24.3
LTE Band 5 (Cell)	South	30.0	30.5	25.3	21.2	15.7	24.3
LTE Band 5 (Cell)	North	30.0	17.7	25.8	21.7	16.3	24.3
LTE Band 66/4 (AWS)	South	30.0	28.3	17.5	14.5	10.5	24.3
LTE Band 66/4 (AWS)	North	30.0	11.6	17.7	14.2	11.1	24.3
LTE Band 25/2 (PCS)	South	30.0	28.3	20.6	15.8	10.9	24.3
LTE Band 25/2 (PCS)	North	30.0	12.2	18.7	14.9	11.0	24.3
LTE Band 30	South	30.0	28.5	20.9	18.1	9.8	22.4
LTE Band 30	North	30.0	13.8	21.6	17.7	11.8	21.4
LTE Band 7	South	30.0	29.4	18.8	15.2	8.7	24.3
LTE Band 7	North	30.0	12.5	20.0	16.2	9.3	24.3
LTE Band 48	South	30.0	29.7	18.3	13.7	8.8	20.6
LTE Band 41	South	30.0	29.2	18.5	15.7	8.1	22.3
LTE Band 41 (PC2)	South	30.0	29.2	18.5	15.7	8.1	21.7
LTE Band 41	North	30.0	11.9	20.0	15.8	9.3	22.3
LTE Band 41 (PC2)	North	30.0	11.9	20.0	15.8	9.3	20.7
NR Band n71	South	30.0	31.3	27.0	25.6	17.1	22.5
NR Band n71	North	30.0	18.0	26.0	27.1	18.1	22.5
NR Band n5 (Cell)	South	30.0	30.0	24.8	21.2	15.7	22.5
NR Band n5 (Cell)	North	30.0	17.7	25.5	21.7	16.3	22.5
NR Band n66 (AWS)	South	30.0	28.1	17.5	14.5	10.5	22.5
NR Band n66 (AWS)	North	30.0	11.6	17.7	15.1	11.1	22.5
NR Band n25/2 (PCS)	South	30.0	28.8	20.6	15.8	10.9	22.5
NR Band n25/2 (PCS)	North	30.0	12.2	18.7	14.9	11.0	22.5
NR Band n41	South	30.0	27.3	18.5	15.1	8.1	22.5
NR Band n41	North	30.0	11.9	20.0	15.8	9.3	22.5

*Note all P_{limit} EFS and maximum tune up output power P_{max} levels entered in above Table correspond to average power levels after accounting for duty cycle in the case of TDD modulation schemes (for e.g., GSM & LTE TDD).
*Maximum tune up output power P_{max} is used to configure EUT during RF tune up procedure. The maximum allowed output power is equal to maximum Tune up output power + 1dB device design uncertainty.

The maximum time-averaged output power (dBm) for any 2G/3G/4G/5G Sub6 WWAN technology, band, and DSI = minimum of "P_{limit} EFS" and "Maximum tune up output power P_{max}" + 1dB device uncertainty. SAR values in this report were scaled to this maximum time-averaged output power to determine compliance per KDB Publication 447498 D01v06.

The purpose of this report (Part 1 test) is to demonstrate that the EUT meets FCC SAR limits when transmitting in static transmission scenario at maximum allowable time-averaged power levels.

Measurement Condition: All conducted power and SAR measurements in this report (Part 1 test) were performed by setting *Reserve_power_margin* (Smart Transmit EFS entry) to 0dB.

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1.3 Power Reduction for SAR

This device uses an independent fixed level power reduction mechanism for WLAN/BT operations in portable use conditions, during voice or VoIP held to ear scenarios, WLAN operations when WWAN is active, and based on the use condition of the device. 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.

1.4 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.

1.4.1 2G/3G/4G/5G Output Power

GSM/GPRS 850				
Power Level		Voice (in dBm)	Data - Burst Average GMSK (in dBm)	
		1 TX Slot	1 TX Slots	2 TX Slots
Pmax	Max Allowed Power	33.5	33.5	33.5
	Nominal	32.5	32.5	32.5
DSI = 2 (Head)	Max Allowed Power	33.5	33.5	33.5
	Nominal	32.5	32.5	32.5
DSI = 4 (Flip/Closed Body)	Max Allowed Power	33.5	33.5	32.0
	Nominal	32.5	32.5	31.0
DSI = 5 (Read)	Max Allowed Power	31.4	31.4	28.4
	Nominal	30.4	30.4	27.4
DSI = 6 (Flat)	Max Allowed Power	25.9	25.9	22.9
	Nominal	24.9	24.9	21.9
GSM/GPRS 1900				
Power Level		Voice (in dBm)	Data - Burst Average GMSK (in dBm)	
		1 TX Slot	1 TX Slots	2 TX Slots
Pmax	Max Allowed Power	30.5	30.5	30.5
	Nominal	29.5	29.5	29.5
DSI = 2 (Head)	Max Allowed Power	30.5	30.5	30.5
	Nominal	29.5	29.5	29.5
DSI = 4 (Flip/Closed Body)	Max Allowed Power	30.5	30.5	27.8
	Nominal	29.5	29.5	26.8
DSI = 5 (Read)	Max Allowed Power	26.0	26.0	23.0
	Nominal	25.0	25.0	22.0
DSI = 6 (Flat)	Max Allowed Power	21.1	21.1	18.1
	Nominal	20.1	20.1	17.1

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

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
Pmax	Max Allowed Power	25.3	25.3	25.3	25.3
	Nominal	24.3	24.3	24.3	24.3
DSI = 2 (Head)	Max Allowed Power	25.3	25.3	25.3	25.3
	Nominal	24.3	24.3	24.3	24.3
DSI = 4 (Flip/Closed Body)	Max Allowed Power	25.3	25.3	25.3	25.3
	Nominal	24.3	24.3	24.3	24.3
DSI = 5 (Read)	Max Allowed Power	22.2	22.2	22.2	22.2
	Nominal	21.2	21.2	21.2	21.2
DSI = 6 (Flat)	Max Allowed Power	16.7	16.7	16.7	16.7
	Nominal	15.7	15.7	15.7	15.7
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
Pmax	Max Allowed Power	25.3	25.3	25.3	25.3
	Nominal	24.3	24.3	24.3	24.3
DSI = 2 (Head)	Max Allowed Power	25.3	25.3	25.3	25.3
	Nominal	24.3	24.3	24.3	24.3
DSI = 4 (Flip/Closed Body)	Max Allowed Power	21.6	21.6	21.6	21.6
	Nominal	20.6	20.6	20.6	20.6
DSI = 5 (Read)	Max Allowed Power	16.0	16.0	16.0	16.0
	Nominal	15.0	15.0	15.0	15.0
DSI = 6 (Flat)	Max Allowed Power	11.9	11.9	11.9	11.9
	Nominal	10.9	10.9	10.9	10.9

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Mode / Band	Antenna		Modulated Average Output Power (in dBm)				
			Pmax	DSI =2 (Head)	DSI =4 (Flip/Closed Body)	DSI =5 (Read)	DSI =6 (Flat)
LTE Band 71	South	Max Allowed Power	25.3	25.3	25.3	24.8	18.1
		Nominal	24.3	24.3	24.3	23.8	17.1
LTE Band 71	North	Max Allowed Power	25.3	19.7	25.3	24.0	19.1
		Nominal	24.3	18.7	24.3	23.0	18.1
LTE Band 12	South	Max Allowed Power	25.3	25.3	25.3	24.5	18.7
		Nominal	24.3	24.3	24.3	23.5	17.7
LTE Band 12	North	Max Allowed Power	25.3	19.4	25.3	23.8	18.5
		Nominal	24.3	18.4	24.3	22.8	17.5
LTE Band 13	South	Max Allowed Power	25.3	25.3	25.3	22.2	17.4
		Nominal	24.3	24.3	24.3	21.2	16.4
LTE Band 13	North	Max Allowed Power	25.3	18.7	25.3	23.0	18.6
		Nominal	24.3	17.7	24.3	22.0	17.6
LTE Band 14	South	Max Allowed Power	25.3	25.3	25.3	22.7	17.6
		Nominal	24.3	24.3	24.3	21.7	16.6
LTE Band 14	North	Max Allowed Power	25.3	18.5	25.3	23.6	17.7
		Nominal	24.3	17.5	24.3	22.6	16.7
LTE Band 26 (Cell)	South	Max Allowed Power	25.3	25.3	24.8	22.2	16.7
		Nominal	24.3	24.3	23.8	21.2	15.7
LTE Band 26 (Cell)	North	Max Allowed Power	25.3	18.7	25.3	22.7	17.3
		Nominal	24.3	17.7	24.3	21.7	16.3
LTE Band 5 (Cell)	South	Max Allowed Power	25.3	25.3	25.3	22.2	16.7
		Nominal	24.3	24.3	24.3	21.2	15.7
LTE Band 5 (Cell)	North	Max Allowed Power	25.3	18.7	25.3	22.7	17.3
		Nominal	24.3	17.7	24.3	21.7	16.3
LTE Band 66 (AWS)	South	Max Allowed Power	25.3	25.3	18.5	15.5	11.5
		Nominal	24.3	24.3	17.5	14.5	10.5
LTE Band 66 (AWS)	North	Max Allowed Power	25.3	12.6	18.7	15.2	12.1
		Nominal	24.3	11.6	17.7	14.2	11.1
LTE Band 4 (AWS)	South	Max Allowed Power	25.3	25.3	18.5	15.5	11.5
		Nominal	24.3	24.3	17.5	14.5	10.5
LTE Band 4 (AWS)	North	Max Allowed Power	25.3	12.6	18.7	15.2	12.1
		Nominal	24.3	11.6	17.7	14.2	11.1
LTE Band 25 (PCS)	South	Max Allowed Power	25.3	25.3	21.6	16.8	11.9
		Nominal	24.3	24.3	20.6	15.8	10.9
LTE Band 25 (PCS)	North	Max Allowed Power	25.3	13.2	19.7	15.9	12.0
		Nominal	24.3	12.2	18.7	14.9	11.0
LTE Band 2 (PCS)	South	Max Allowed Power	25.3	25.3	21.6	16.8	11.9
		Nominal	24.3	24.3	20.6	15.8	10.9
LTE Band 2 (PCS)	North	Max Allowed Power	25.3	13.2	19.7	15.9	12.0
		Nominal	24.3	12.2	18.7	14.9	11.0
LTE Band 30	South	Max Allowed Power	23.4	23.4	21.9	19.1	10.8
		Nominal	22.4	22.4	20.9	18.1	9.8
LTE Band 30	North	Max Allowed Power	22.4	14.8	22.4	18.7	12.8
		Nominal	21.4	13.8	21.4	17.7	11.8
LTE Band 7	South	Max Allowed Power	25.3	25.3	19.8	16.2	9.7
		Nominal	24.3	24.3	18.8	15.2	8.7
LTE Band 7	North	Max Allowed Power	25.3	13.5	21.0	17.2	10.3
		Nominal	24.3	12.5	20.0	16.2	9.3
LTE Band 48 RB 1-7	South	Max Allowed Power	22.4	22.4	21.3	16.7	11.8
		Nominal	21.4	21.4	20.3	15.7	10.8
LTE Band 48 RB 8 and higher	South	Max Allowed Power	23.6	23.6	21.3	16.7	11.8
		Nominal	22.6	22.6	20.3	15.7	10.8
LTE Band 41	South	Max Allowed Power	25.3	25.3	21.5	18.7	11.1
		Nominal	24.3	24.3	20.5	17.7	10.1
LTE Band 41 (PC2)	South	Max Allowed Power	26.3	26.3	23.1	20.3	12.7
		Nominal	25.3	25.3	22.1	19.3	11.7
LTE Band 41	North	Max Allowed Power	25.3	14.9	23.0	18.8	12.3
		Nominal	24.3	13.9	22.0	17.8	11.3
LTE Band 41 (PC2)	North	Max Allowed Power	25.3	16.5	24.6	20.4	13.9
		Nominal	24.3	15.5	23.6	19.4	12.9

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Mode / Band	Antenna		Modulated Average Output Power (in dBm)				
			Pmax	DSI =2 (Head)	DSI =4 (Flip/Closed Body)	DSI =5 (Read)	DSI =6 (Flat)
NR Band n71	South	Max Allowed Power	23.5	23.5	23.5	23.5	18.1
		Nominal	22.5	22.5	22.5	22.5	17.1
NR Band n71	North	Max Allowed Power	23.5	19.0	23.5	23.5	19.1
		Nominal	22.5	18.0	22.5	22.5	18.1
NR Band n5 (Cell)	South	Max Allowed Power	23.5	23.5	23.5	22.2	16.7
		Nominal	22.5	22.5	22.5	21.2	15.7
NR Band n5 (Cell)	North	Max Allowed Power	23.5	18.7	23.5	22.7	17.3
		Nominal	22.5	17.7	22.5	21.7	16.3
NR Band n66 (AWS)	South	Max Allowed Power	23.5	23.5	18.5	15.5	11.5
		Nominal	22.5	22.5	17.5	14.5	10.5
NR Band n66 (AWS)	North	Max Allowed Power	23.5	12.6	18.7	16.1	12.1
		Nominal	22.5	11.6	17.7	15.1	11.1
NR Band n25 (PCS)	South	Max Allowed Power	23.5	23.5	21.6	16.8	11.9
		Nominal	22.5	22.5	20.6	15.8	10.9
NR Band n25 (PCS)	North	Max Allowed Power	23.5	13.2	19.7	15.9	12.0
		Nominal	22.5	12.2	18.7	14.9	11.0
NR Band n2 (PCS)	South	Max Allowed Power	23.5	23.5	21.6	16.8	11.9
		Nominal	22.5	22.5	20.6	15.8	10.9
NR Band n2 (PCS)	North	Max Allowed Power	23.5	13.2	19.7	15.9	12.0
		Nominal	22.5	12.2	18.7	14.9	11.0
NR Band n41	South	Max Allowed Power	23.5	23.5	19.5	16.1	9.1
		Nominal	22.5	22.5	18.5	15.1	8.1
NR Band n41	North	Max Allowed Power	23.5	12.9	21.0	16.8	10.3
		Nominal	22.5	11.9	20.0	15.8	9.3

For LTE TDD and NR TDD, the above powers listed are TDD burst average values.

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1.4.2 2.4 GHz Maximum Bluetooth and SISO/MIMO WLAN Output Power

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

Mode	Band	IEEE 802.11 (in dBm)															
		SISO Antenna 1 & Antenna 2								MIMO							
		b		g		n		ax (SU)		b (CDD + STBC)		g (CDD + STBC)		n (CDD + STBC, SDM)		ax (SU) (CDD + STBC, SDM)	
		Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
2.45 GHz WIFI	20 MHz	15.0 Ch. 12: 12.0 Ch. 13: 8.0	16.5 Ch. 12: 13.5 Ch. 13: 9.5	16.5 Ch.1 15.0 Ch. 11: 16.0 Ch. 12: 12.0 Ch. 13: 8.0	18.0 Ch.1 16.5 Ch. 11: 17.5 Ch. 12: 13.5 Ch. 13: 9.5	16.5 Ch.1 15.0 Ch. 11: 16.0 Ch. 12: 12.0 Ch. 13: 8.0	18.0 Ch.1 16.5 Ch. 11: 17.5 Ch. 12: 13.5 Ch. 13: 9.5	16.5 Ch.1 15.0 Ch. 11: 16.0 Ch. 12: 12.0 Ch. 13: 8.0	18.0 Ch.1 16.5 Ch. 11: 17.5 Ch. 12: 13.5 Ch. 13: 9.5	18.0 Ch. 12: 15.0 Ch. 13: 11.0	19.5 Ch. 12: 16.5 Ch. 13: 12.5	19.5 Ch.1 18.0 Ch. 11: 19.0 Ch. 12: 15.0 Ch. 13: 11.0	21.0 Ch.1 19.5 Ch. 11: 20.5 Ch. 12: 16.5 Ch. 13: 12.5	19.5 Ch.1 18.0 Ch. 11: 18.0 Ch. 12: 15.0 Ch. 13: 11.0	21.0 Ch.1 19.5 Ch. 11: 19.5 Ch. 12: 16.5 Ch. 13: 12.5	19.5 Ch.1 18.0 Ch. 11: 18.0 Ch. 12: 15.0 Ch. 13: 11.0	21.0 Ch.1 19.5 Ch. 11: 19.5 Ch. 12: 16.5 Ch. 13: 12.5
2.45 GHz WIFI	40 MHz					14.5 Ch. 3 13.0 Ch. 9 14.0 Ch. 10 12.5 Ch. 11 7.5	16.0 Ch. 3 14.5 Ch. 9 15.5 Ch. 10 14.0 Ch. 11 9.0	14.5 Ch. 3 13.0 Ch. 9 14.0 Ch. 10 12.5 Ch. 11 7.5	16.0 Ch. 3 14.5 Ch. 9 15.5 Ch. 10 14.0 Ch. 11 9.0					17.5 Ch. 3 16.0 Ch. 9 17.0 Ch. 10 15.5 Ch. 11 11.0	19.0 Ch. 3 17.5 Ch. 9 18.5 Ch. 10 17.0 Ch. 11 12.5	17.5 Ch. 3 16.0 Ch. 9 17.0 Ch. 10 15.5 Ch. 11 11.0	19.0 Ch. 3 17.5 Ch. 9 18.5 Ch. 10 17.0 Ch. 11 12.5

Mode	Single Antenna			
	South Antenna		North Antenna	
	Nominal	Maximum	Nominal	Maximum
Bluetooth (in dBm)	6.5	8.5	5.0	7.0
Bluetooth EDR (in dBm)	5.0	7.0	3.5	5.5
Bluetooth LE 2Mbps (in dBm)	6.0	8.5	4.5	7.0
Bluetooth LE 1Mbps, 125/500 kbps (in dBm)	6.0	8.5	4.5	7.0

1.4.3 2.4 GHz Reduced SISO/MIMO WLAN Output Power

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

The below table is applicable in the following conditions:

- Flip/Closed Hotspot at 10 mm
- Read Body at 5 mm

Mode	Band	IEEE 802.11 (in dBm)								IEEE 802.11 (in dBm)							
		SISO Antenna 1 & Antenna 2								MIMO							
		b		g		n		ax (SU)		b (CDD + STBC)		g (CDD + STBC)		n (CDD + STBC, SDM)		ax (SU) (CDD + STBC, SDM)	
		Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
2.45 GHz WIFI	20 MHz	11.5 Ch. 13: 8.0	13.0 Ch. 13: 9.5	11.5 Ch. 13: 8.0	13.0 Ch. 13: 9.5	11.5 Ch. 13: 8.0	13.0 Ch. 13: 9.5	11.5 Ch. 13: 8.0	13.0 Ch. 13: 9.5	14.5 Ch. 13: 11.0	16.0 Ch. 13: 12.5	14.5 Ch. 13: 11.0	16.0 Ch. 13: 12.5	14.5 Ch. 13: 11.0	16.0 Ch. 13: 12.5	14.5 Ch. 13: 11.0	16.0 Ch. 13: 12.5
2.45 GHz WIFI	40 MHz					11.5 Ch. 11 7.5	13.0 Ch. 11 9.0	11.5 Ch. 11 7.5	13.0 Ch. 11 9.0					14.5 Ch. 11 11.0	16.0 Ch. 11 12.5	14.5 Ch. 11 11.0	16.0 Ch. 11 12.5

The below table is applicable in the following conditions:

- Read Body at 5 mm during simultaneous conditions with WWAN
- Flat at 0 mm

Mode	Band	IEEE 802.11 (in dBm)															
		SISO Antenna 1 & Antenna 2								MIMO							
		b		g		n		ax (SU)		b (CDD + STBC)		g (CDD + STBC)		n (CDD + STBC, SDM)		ax (SU) (CDD + STBC, SDM)	
		Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
2.45 GHz WIFI	20 MHz	5.5	7.0	5.5	7.0	5.5	7.0	5.5	7.0	8.5	10.0	8.5	10.0	8.5	10.0	8.5	10.0
2.45 GHz WIFI	40 MHz					5.5	7.0	5.5	7.0					8.5	10.0	8.5	10.0

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The below table is applicable in the following conditions:

- Flat at 0 mm during simultaneous conditions with WWAN

Mode	Band	IEEE 802.11 (in dBm)															
		SISO Antenna 1 & Antenna 2								MIMO							
		b		g		n		ax (SU)		b (CDD + STBC)		g (CDD + STBC)		n (CDD + STBC, SDM)		ax (SU) (CDD + STBC, SDM)	
		Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
2.45 GHz WIFI	20 MHz	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	6.5	8.0	6.5	8.0	6.5	8.0	6.5	8.0
2.45 GHz WIFI	40 MHz					3.5	5.0	3.5	5.0					6.5	8.0	6.5	8.0

The below table is applicable in the following conditions:

- RCV Active

Mode	Band	IEEE 802.11 (in dBm)															
		SISO Antenna 1								SISO Antenna 2							
		b		g		n		ax (SU)		b		g		n		ax (SU)	
		Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
2.45 GHz WIFI	20 MHz	15.0 Ch. 12: 12.0 Ch. 13: 8.0	16.5 Ch. 12: 13.5 Ch. 13: 9.5	16.5 Ch.1 15.0 Ch. 11: 16.0 Ch. 12: 12.0 Ch. 13: 8.0	18.0 Ch.1 16.5 Ch. 11: 17.5 Ch. 12: 13.5 Ch. 13: 9.5	16.5 Ch.1 15.0 Ch. 11: 16.0 Ch. 12: 12.0 Ch. 13: 8.0	18.0 Ch.1 16.5 Ch. 11: 17.5 Ch. 12: 13.5 Ch. 13: 9.5	16.5 Ch.1 15.0 Ch. 11: 16.0 Ch. 12: 12.0 Ch. 13: 8.0	18.0 Ch.1 16.5 Ch. 11: 17.5 Ch. 12: 13.5 Ch. 13: 9.5	10.5 Ch. 13: 8.0	12.0 Ch. 13: 9.5	10.5 Ch. 13: 8.0	12.0 Ch. 13: 9.5	10.5 Ch. 13: 8.0	12.0 Ch. 13: 9.5	10.5 Ch. 13: 8.0	12.0 Ch. 13: 9.5
2.45 GHz WIFI	40 MHz					14.5 Ch. 3 13.0 Ch. 9 14.0 Ch. 10 12.5 Ch. 11 7.5	16.0 Ch. 3 14.5 Ch. 9 15.5 Ch. 10 14.0 Ch. 11 9.0	14.5 Ch. 3 13.0 Ch. 9 14.0 Ch. 10 12.5 Ch. 11 7.5	16.0 Ch. 3 14.5 Ch. 9 15.5 Ch. 10 14.0 Ch. 11 9.0					10.5 Ch. 11 7.5	12.0 Ch. 11 9.0	10.5 Ch. 11 7.5	12.0 Ch. 11 9.0

Mode	Band	IEEE 802.11 (in dBm)															
		MIMO Antenna 1								MIMO Antenna 2							
		b		g		n		ax (SU)		b		g		n		ax (SU)	
		Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
2.45 GHz WIFI	20 MHz	15.0 Ch. 12: 12.0 Ch. 13: 8.0	16.5 Ch. 12: 13.5 Ch. 13: 9.5	16.5 Ch.1 15.0 Ch. 11: 16.0 Ch. 12: 12.0 Ch. 13: 8.0	18.0 Ch.1 16.5 Ch. 11: 17.5 Ch. 12: 13.5 Ch. 13: 9.5	16.5 Ch.1 15.0 Ch. 11: 15.0 Ch. 12: 12.0 Ch. 13: 8.0	18.0 Ch.1 16.5 Ch. 11: 16.5 Ch. 12: 13.5 Ch. 13: 9.5	16.5 Ch.1 15.0 Ch. 11: 15.0 Ch. 12: 12.0 Ch. 13: 8.0	18.0 Ch.1 16.5 Ch. 11: 16.5 Ch. 12: 13.5 Ch. 13: 9.5	10.5 Ch. 13: 8.0	12.0 Ch. 13: 9.5	10.5 Ch. 13: 8.0	12.0 Ch. 13: 9.5	10.5 Ch. 13: 8.0	12.0 Ch. 13: 9.5	10.5 Ch. 13: 8.0	12.0 Ch. 13: 9.5
2.45 GHz WIFI	40 MHz					14.5 Ch. 3 13.0 Ch. 9 14.0 Ch. 10 12.5 Ch. 11 7.5	16.0 Ch. 3 14.5 Ch. 9 15.5 Ch. 10 14.0 Ch. 11 9.0	14.5 Ch. 3 13.0 Ch. 9 14.0 Ch. 10 12.5 Ch. 11 7.5	16.0 Ch. 3 14.5 Ch. 9 15.5 Ch. 10 14.0 Ch. 11 9.0					10.5 Ch. 11 7.5	12.0 Ch. 11 9.0	10.5 Ch. 11 7.5	12.0 Ch. 11 9.0

Note: In MIMO operations, each antenna transmits at the maximum allowed powers indicated above.

1.4.4 5 GHz Maximum SISO/MIMO WLAN Output Power

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

Mode	Band	IEEE 802.11 (in dBm)															
		SISO Antenna 1 & Antenna 2								MIMO							
		a		n		ac		ax (SU)		a (CDD + STBC)		n (CDD + STBC, SDM)		ac (CDD + STBC, SDM)		ax (SU) (CDD + STBC, SDM)	
		Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
5 GHz WIFI (20MHz BW)	5200 MHz	12.0	13.5	12.0	13.5	12.0	13.5	12.0	13.5	12.5	14.0	12.5	14.0	12.5	14.0	12.5	14.0
	5300 MHz	16.5 Ch 52 16.0	18.0 Ch 52 17.5	16.0	17.5	16.0	17.5	16.0	17.5	19.5 Ch 52 19.0	21.0 Ch 52 20.5	19.0	20.5	19.0	20.5	19.0	20.5
	5500 MHz	16.5	18.0	16.0	17.5	16.0	17.5	16.0	17.5	19.5	21.0	19.0	20.5	19.0	20.5	19.0	20.5
	5800 MHz	16.5	18.0	16.0	17.5	16.0	17.5	16.0	17.5	19.5	21.0	19.0	20.5	19.0	20.5	19.0	20.5
5 GHz WIFI (40MHz BW)	5200 MHz			14.0	15.5	14.0	15.5	14.0	15.5			15.0	16.5	15.0	16.5	15.0	16.5
	5300 MHz			16.0 ch. 62 13.5	17.5 ch. 62 15.0	16.0 ch. 62 13.5	17.5 ch. 62 15.0	16.0 ch. 62 13.5	17.5 ch. 62 15.0			19.0 ch. 62 16.5	20.5 ch. 62 18.0	19.0 ch. 62 16.5	20.5 ch. 62 18.0	19.0 ch. 62 16.5	20.5 ch. 62 18.0
	5500 MHz			16.0 ch. 102 15.5	17.5 ch. 102 17.0	16.0 ch. 102 15.5	17.5 ch. 102 17.0	16.0 ch. 102 15.5	17.5 ch. 102 17.0			19.0 ch. 102 18.5	20.5 ch. 102 20.0	19.0 ch. 102 18.5	20.5 ch. 102 20.0	19.0 ch. 102 18.5	20.5 ch. 102 20.0
	5800 MHz			15.0	16.5	15.0	16.5	15.0	16.5			18.0	19.5	18.0	19.5	18.0	19.5
5 GHz WIFI (80MHz BW)	5200 MHz					14.0	15.5	14.0	15.5					15.0	16.5	15.0	16.5
	5300 MHz					12.0	13.5	12.0	13.5					15.0	16.5	15.0	16.5
	5500 MHz					15.0 ch. 106 13.5	16.5 ch. 106 15.0	15.0 ch. 106 13.5	16.5 ch. 106 15.0					18.0 ch. 106 16.5	19.5 ch. 106 18.0	18.0 ch. 106 16.5	19.5 ch. 106 18.0
	5800 MHz					15.0	16.5	15.0	16.5					18.0	19.5	18.0	19.5
5 GHz WIFI (160MHz BW)	5250 MHz					12.0	13.5	12.0	13.5					15.0	16.5	15.0	16.5
	5570 MHz					12.5	14.0	12.5	14.0					15.5	17.0	15.5	17.0

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1.4.5 5 GHz Reduced WLAN Output Power

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

The below table is applicable in the following conditions:

- Flip/Closed Hotspot at 10 mm
- Read Body at 5 mm

Mode	Band	IEEE 802.11 (in dBm)															
		SISO Antenna 1 & Antenna 2								MIMO							
		a		n		ac		ax (SU)		a (CDD + STBC)		n (CDD + STBC, SDM)		ac (CDD + STBC, SDM)		ax (SU) (CDD + STBC, SDM)	
		Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
5 GHz WIFI (20MHz BW)	5200 MHz	11.5	13.0	11.5	13.0	11.5	13.0	11.5	13.0	12.5	14.0	12.5	14.0	12.5	14.0	12.5	14.0
	5300 MHz	11.5	13.0	11.5	13.0	11.5	13.0	11.5	13.0	14.5	16.0	14.5	16.0	14.5	16.0	14.5	16.0
	5500 MHz	11.5	13.0	11.5	13.0	11.5	13.0	11.5	13.0	14.5	16.0	14.5	16.0	14.5	16.0	14.5	16.0
	5800 MHz	11.5	13.0	11.5	13.0	11.5	13.0	11.5	13.0	14.5	16.0	14.5	16.0	14.5	16.0	14.5	16.0
5 GHz WIFI (40MHz BW)	5200 MHz			11.5	13.0	11.5	13.0	11.5	13.0			14.5	16.0	14.5	16.0	14.5	16.0
	5300 MHz			11.5	13.0	11.5	13.0	11.5	13.0			14.5	16.0	14.5	16.0	14.5	16.0
	5500 MHz			11.5	13.0	11.5	13.0	11.5	13.0			14.5	16.0	14.5	16.0	14.5	16.0
	5800 MHz			11.5	13.0	11.5	13.0	11.5	13.0			14.5	16.0	14.5	16.0	14.5	16.0
5 GHz WIFI (80MHz BW)	5200 MHz					11.5	13.0	11.5	13.0					14.5	16.0	14.5	16.0
	5300 MHz					11.5	13.0	11.5	13.0					14.5	16.0	14.5	16.0
	5500 MHz					11.5	13.0	11.5	13.0					14.5	16.0	14.5	16.0
	5800 MHz					11.5	13.0	11.5	13.0					14.5	16.0	14.5	16.0
5 GHz WIFI (160MHz BW)	5250 MHz					11.5	13.0	11.5	13.0					14.5	16.0	14.5	16.0
	5570 MHz					11.5	13.0	11.5	13.0					14.5	16.0	14.5	16.0

The below table is applicable in the following conditions:

- Read Body at 5 mm during simultaneous conditions with WWAN
- Flat at 0 mm

Mode	Band	IEEE 802.11 (in dBm)															
		SISO Antenna 1 & Antenna 2								MIMO							
		a		n		ac		ax (SU)		a (CDD + STBC)		n (CDD + STBC, SDM)		ac (CDD + STBC, SDM)		ax (SU) (CDD + STBC, SDM)	
		Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
5 GHz WIFI (20MHz BW)	5200 MHz	5.5	7.0	5.5	7.0	5.5	7.0	5.5	7.0	8.5	10.0	8.5	10.0	8.5	10.0	8.5	10.0
	5300 MHz	5.5	7.0	5.5	7.0	5.5	7.0	5.5	7.0	8.5	10.0	8.5	10.0	8.5	10.0	8.5	10.0
	5500 MHz	5.5	7.0	5.5	7.0	5.5	7.0	5.5	7.0	8.5	10.0	8.5	10.0	8.5	10.0	8.5	10.0
	5800 MHz	5.5	7.0	5.5	7.0	5.5	7.0	5.5	7.0	8.5	10.0	8.5	10.0	8.5	10.0	8.5	10.0
5 GHz WIFI (40MHz BW)	5200 MHz			5.5	7.0	5.5	7.0	5.5	7.0			8.5	10.0	8.5	10.0	8.5	10.0
	5300 MHz			5.5	7.0	5.5	7.0	5.5	7.0			8.5	10.0	8.5	10.0	8.5	10.0
	5500 MHz			5.5	7.0	5.5	7.0	5.5	7.0			8.5	10.0	8.5	10.0	8.5	10.0
	5800 MHz			5.5	7.0	5.5	7.0	5.5	7.0			8.5	10.0	8.5	10.0	8.5	10.0
5 GHz WIFI (80MHz BW)	5200 MHz					5.5	7.0	5.5	7.0					8.5	10.0	8.5	10.0
	5300 MHz					5.5	7.0	5.5	7.0					8.5	10.0	8.5	10.0
	5500 MHz					5.5	7.0	5.5	7.0					8.5	10.0	8.5	10.0
	5800 MHz					5.5	7.0	5.5	7.0					8.5	10.0	8.5	10.0
5 GHz WIFI (160MHz BW)	5250 MHz					5.5	7.0	5.5	7.0					8.5	10.0	8.5	10.0
	5570 MHz					5.5	7.0	5.5	7.0					8.5	10.0	8.5	10.0

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The below table is applicable in the following conditions:

- Flat at 0 mm during simultaneous conditions with WWAN

Mode	Band	IEEE 802.11 (in dBm)															
		SISO Antenna 1 & Antenna 2								MIMO							
		a		n		ac		ax (SU)		a		n		ac		ax (SU)	
		Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
5 GHz WIFI (20MHz BW)	5200 MHz	1.0	2.5	1.0	2.5	1.0	2.5	1.0	2.5	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
	5300 MHz	1.0	2.5	1.0	2.5	1.0	2.5	1.0	2.5	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
	5500 MHz	1.0	2.5	1.0	2.5	1.0	2.5	1.0	2.5	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
	5800 MHz	1.0	2.5	1.0	2.5	1.0	2.5	1.0	2.5	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5
5 GHz WIFI (40MHz BW)	5200 MHz			1.0	2.5	1.0	2.5	1.0	2.5			4.0	5.5	4.0	5.5	4.0	5.5
	5300 MHz			1.0	2.5	1.0	2.5	1.0	2.5			4.0	5.5	4.0	5.5	4.0	5.5
	5500 MHz			1.0	2.5	1.0	2.5	1.0	2.5			4.0	5.5	4.0	5.5	4.0	5.5
	5800 MHz			1.0	2.5	1.0	2.5	1.0	2.5			4.0	5.5	4.0	5.5	4.0	5.5
5 GHz WIFI (80MHz BW)	5200 MHz					1.0	2.5	1.0	2.5					4.0	5.5	4.0	5.5
	5300 MHz					1.0	2.5	1.0	2.5					4.0	5.5	4.0	5.5
	5500 MHz					1.0	2.5	1.0	2.5					4.0	5.5	4.0	5.5
	5800 MHz					1.0	2.5	1.0	2.5					4.0	5.5	4.0	5.5
5 GHz WIFI (160MHz BW)	5250 MHz					1.0	2.5	1.0	2.5					4.0	5.5	4.0	5.5
	5570 MHz					1.0	2.5	1.0	2.5					4.0	5.5	4.0	5.5

The below table is applicable in the following conditions:

- RCV Active

Mode	Band	IEEE 802.11 (in dBm)															
		SISO Antenna 1								SISO Antenna 2							
		a		n		ac		ax (SU)		a		n		ac		ax (SU)	
		Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
5 GHz WIFI (20MHz BW)	5200 MHz	12.0	13.5	12.0	13.5	12.0	13.5	12.0	13.5	10.5	12.0	10.5	12.0	10.5	12.0	10.5	12.0
	5300 MHz	16.5 Ch 52 16.0	18.0 Ch 52 17.5	16.0	17.5	16.0	17.5	16.0	17.5	10.5	12.0	10.5	12.0	10.5	12.0	10.5	12.0
	5500 MHz	16.5	18.0	16.0	17.5	16.0	17.5	16.0	17.5	10.5	12.0	10.5	12.0	10.5	12.0	10.5	12.0
	5800 MHz	16.5	18.0	16.0	17.5	16.0	17.5	16.0	17.5	10.5	12.0	10.5	12.0	10.5	12.0	10.5	12.0
5 GHz WIFI (40MHz BW)	5200 MHz			14.0	15.5	14.0	15.5	14.0	15.5			10.5	12.0	10.5	12.0	10.5	12.0
	5300 MHz			16.0 ch. 62 13.5	17.5 ch. 62 15.0	16.0 ch. 62 13.5	17.5 ch. 62 15.0	16.0 ch. 62 13.5	17.5 ch. 62 15.0			10.5	12.0	10.5	12.0	10.5	12.0
	5500 MHz			16.0 ch. 102 15.5	17.5 ch. 102 17.0	16.0 ch. 102 15.5	17.5 ch. 102 17.0	16.0 ch. 102 15.5	17.5 ch. 102 17.0			10.5	12.0	10.5	12.0	10.5	12.0
	5800 MHz			15.0	16.5	15.0	16.5	15.0	16.5			10.5	12.0	10.5	12.0	10.5	12.0
5 GHz WIFI (80MHz BW)	5200 MHz					14.0	15.5	14.0	15.5					10.5	12.0	10.5	12.0
	5300 MHz					12.0	13.5	12.0	13.5					10.5	12.0	10.5	12.0
	5500 MHz					15.0 ch. 106 13.5	16.5 ch. 106 15.0	15.0 ch. 106 13.5	16.5 ch. 106 15.0					10.5	12.0	10.5	12.0
	5800 MHz					15.0	16.5	15.0	16.5					10.5	12.0	10.5	12.0
5 GHz WIFI (160MHz BW)	5250 MHz					12.0	13.5	12.0	13.5					10.5	12.0	10.5	12.0
	5570 MHz					12.5	14.0	12.5	14.0					10.5	12.0	10.5	12.0

Mode	Band	IEEE 802.11 (in dBm)															
		MIMO Antenna 1								MIMO Antenna 2							
		a		n		ac		ax (SU)		a		n		ac		ax (SU)	
		Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal	Maximum
5 GHz WIFI (20MHz BW)	5200 MHz	9.5	11.0	9.5	11.0	9.5	11.0	9.5	11.0	9.5	11.0	9.5	11.0	9.5	11.0	9.5	11.0
	5300 MHz	16.5 Ch 52 16.0	18.0 Ch 52 17.5	16.0	17.5	16.0	17.5	16.0	17.5	10.5	12.0	10.5	12.0	10.5	12.0	10.5	12.0
	5500 MHz	16.5	18.0	16.0	17.5	16.0	17.5	16.0	17.5	10.5	12.0	10.5	12.0	10.5	12.0	10.5	12.0
	5800 MHz	16.5	18.0	16.0	17.5	16.0	17.5	16.0	17.5	10.5	12.0	10.5	12.0	10.5	12.0	10.5	12.0
5 GHz WIFI (40MHz BW)	5200 MHz			12.0	13.5	12.0	13.5	12.0	13.5			10.5	12.0	10.5	12.0	10.5	12.0
	5300 MHz			16.0 ch. 62 13.5	17.5 ch. 62 15.0	16.0 ch. 62 13.5	17.5 ch. 62 15.0	16.0 ch. 62 13.5	17.5 ch. 62 15.0			10.5	12.0	10.5	12.0	10.5	12.0
	5500 MHz			16.0 ch. 102 15.5	17.5 ch. 102 17.0	16.0 ch. 102 15.5	17.5 ch. 102 17.0	16.0 ch. 102 15.5	17.5 ch. 102 17.0			10.5	12.0	10.5	12.0	10.5	12.0
	5800 MHz			15.0	16.5	15.0	16.5	15.0	16.5			10.5	12.0	10.5	12.0	10.5	12.0
5 GHz WIFI (80MHz BW)	5200 MHz					12.0	13.5	12.0	13.5					10.5	12.0	10.5	12.0
	5300 MHz					12.0	13.5	12.0	13.5					10.5	12.0	10.5	12.0
	5500 MHz					15.0 ch. 106 13.5	16.5 ch. 106 15.0	15.0 ch. 106 13.5	16.5 ch. 106 15.0					10.5	12.0	10.5	12.0
	5800 MHz					15.0	16.5	15.0	16.5					10.5	12.0	10.5	12.0
5 GHz WIFI (160MHz BW)	5250 MHz					12.0	13.5	12.0	13.5					10.5	12.0	10.5	12.0
	5570 MHz					12.5	14.0	12.5	14.0					10.5	12.0	10.5	12.0

Note: In MIMO operations, each antenna transmits at the maximum allowed powers indicated above.

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1.5 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 F. This device is considered a "phablet" when it is in Flip configuration, a handset when it is closed configuration, a tablet in Flat configuration and a "UMPC mini-tablet" when it is in read configuration. Exact antenna dimensions and separation distances are shown in the Technical Descriptions in the FCC filing

Table 1-1
Device Edges/Sides for Flip/Closed Configuration SAR Testing

Device Sides/Edges for SAR Testing						
Mode	Back	Front	Top	Bottom	Right	Left
GSM 850 South	Yes	Yes	No	Yes	Yes	No
GSM 1900 South	Yes	Yes	No	Yes	Yes	No
UMTS 850 South	Yes	Yes	No	Yes	Yes	No
UMTS 1900 South	Yes	Yes	No	Yes	Yes	No
LTE Band 71 South	Yes	Yes	No	Yes	Yes	No
LTE Band 12 South	Yes	Yes	No	Yes	Yes	No
LTE Band 13 South	Yes	Yes	No	Yes	Yes	No
LTE Band 14 South	Yes	Yes	No	Yes	Yes	No
LTE Band 26 (Cell) South	Yes	Yes	No	Yes	Yes	No
LTE Band 5 (Cell) South	Yes	Yes	No	Yes	Yes	No
LTE Band 66 (AWS) South	Yes	Yes	No	Yes	Yes	No
LTE Band 25 (PCS) South	Yes	Yes	No	Yes	Yes	No
LTE Band 30 South	Yes	Yes	No	Yes	Yes	No
LTE Band 7 South	Yes	Yes	No	Yes	Yes	No
LTE Band 48 South	Yes	Yes	No	Yes	Yes	No
LTE Band 41 South	Yes	Yes	No	Yes	Yes	No
LTE Band 71 North	Yes	Yes	Yes	No	Yes	No
LTE Band 12 North	Yes	Yes	Yes	No	Yes	No
LTE Band 13 North	Yes	Yes	Yes	No	Yes	No
LTE Band 14 North	Yes	Yes	Yes	No	Yes	No
LTE Band 26 (Cell) North	Yes	Yes	Yes	No	Yes	No
LTE Band 5 (Cell) North	Yes	Yes	Yes	No	Yes	No
LTE Band 66 (AWS) North	Yes	Yes	Yes	No	Yes	No
LTE Band 25 (PCS) North	Yes	Yes	Yes	No	Yes	No
LTE Band 30 North	Yes	Yes	Yes	No	Yes	No
LTE Band 7 North	Yes	Yes	Yes	No	Yes	No
LTE Band 41 North	Yes	Yes	Yes	No	Yes	No
NR Band n71 South	Yes	Yes	No	Yes	Yes	No
NR Band n5 (Cell) South	Yes	Yes	No	Yes	Yes	No
NR Band n66 (AWS) South	Yes	Yes	No	Yes	Yes	No
NR Band n25 (PCS) South	Yes	Yes	No	Yes	Yes	No
NR Band n41 South	Yes	Yes	No	Yes	Yes	No
NR Band n71 North	Yes	Yes	Yes	No	Yes	No
NR Band n5 (Cell) North	Yes	Yes	Yes	No	Yes	No
NR Band n66 (AWS) North	Yes	Yes	Yes	No	Yes	No
NR Band n25 (PCS) North	Yes	Yes	Yes	No	Yes	No
NR Band n41 North	Yes	Yes	Yes	No	Yes	No
2.4 GHz WLAN Ant 1	Yes	Yes	No	Yes	No	No
2.4 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 1	Yes	Yes	No	Yes	No	No
5 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
Bluetooth Ant 1	Yes	Yes	No	Yes	No	No
Bluetooth Ant 2	Yes	Yes	Yes	No	No	Yes

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Table 1-2
Device Edges/Sides for Read Configuration SAR Testing

Device Sides/Edges for SAR Testing						
Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850 South	Yes	No	No	Yes	Yes	No
GPRS 1900 South	Yes	No	No	Yes	Yes	No
UMTS 850 South	Yes	No	No	Yes	Yes	No
UMTS 1900 South	Yes	No	No	Yes	Yes	No
LTE Band 71 South	Yes	No	No	Yes	Yes	No
LTE Band 12 South	Yes	No	No	Yes	Yes	No
LTE Band 13 South	Yes	No	No	Yes	Yes	No
LTE Band 14 South	Yes	No	No	Yes	Yes	No
LTE Band 26 (Cell) South	Yes	No	No	Yes	Yes	No
LTE Band 5 (Cell) South	Yes	No	No	Yes	Yes	No
LTE Band 66 (AWS) South	Yes	No	No	Yes	Yes	No
LTE Band 25 (PCS) South	Yes	No	No	Yes	Yes	No
LTE Band 30 South	Yes	No	No	Yes	Yes	No
LTE Band 7 South	Yes	No	No	Yes	Yes	No
LTE Band 48 South	Yes	No	No	Yes	Yes	No
LTE Band 41 South	Yes	No	No	Yes	Yes	No
LTE Band 71 North	Yes	No	Yes	No	Yes	No
LTE Band 12 North	Yes	No	Yes	No	Yes	No
LTE Band 13 North	Yes	No	Yes	No	Yes	No
LTE Band 14 North	Yes	No	Yes	No	Yes	No
LTE Band 26 (Cell) North	Yes	No	Yes	No	Yes	No
LTE Band 5 (Cell) North	Yes	No	Yes	No	Yes	No
LTE Band 66 (AWS) North	Yes	No	Yes	No	Yes	No
LTE Band 25 (PCS) North	Yes	No	Yes	No	Yes	No
LTE Band 30 North	Yes	No	Yes	No	Yes	No
LTE Band 7 North	Yes	No	Yes	No	Yes	No
LTE Band 48 North	Yes	No	Yes	No	Yes	No
LTE Band 41 North	Yes	No	Yes	No	Yes	No
NR Band n71 South	Yes	No	No	Yes	Yes	No
NR Band n5 (Cell) South	Yes	No	No	Yes	Yes	No
NR Band n66 (AWS) South	Yes	No	No	Yes	Yes	No
NR Band n25 (PCS) South	Yes	No	No	Yes	Yes	No
NR Band n41 South	Yes	No	No	Yes	Yes	No
NR Band n71 North	Yes	No	Yes	No	Yes	No
NR Band n5 (Cell) North	Yes	No	Yes	No	Yes	No
NR Band n66 (AWS) North	Yes	No	Yes	No	Yes	No
NR Band n25 (PCS) North	Yes	No	Yes	No	Yes	No
NR Band n41 North	Yes	No	Yes	No	Yes	No
2.4 GHz WLAN Ant 1	Yes	No	No	Yes	No	No
2.4 GHz WLAN Ant 2	Yes	No	Yes	No	No	No
5 GHz WLAN Ant 1	Yes	No	No	Yes	No	No
5 GHz WLAN Ant 2	Yes	No	Yes	No	No	No
Bluetooth Ant 1	Yes	No	No	Yes	No	No
Bluetooth Ant 2	Yes	No	Yes	No	No	No

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Table 1-3
Device Edges/Sides for Flat Configuration SAR Testing

Device Sides/Edges for SAR Testing						
Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850 South	Yes	No	No	Yes	Yes	No
GPRS 1900 South	Yes	No	No	Yes	Yes	No
UMTS 850 South	Yes	No	No	Yes	Yes	No
UMTS 1900 South	Yes	No	No	Yes	Yes	No
LTE Band 71 South	Yes	No	No	Yes	Yes	No
LTE Band 12 South	Yes	No	No	Yes	Yes	No
LTE Band 13 South	Yes	No	No	Yes	Yes	No
LTE Band 14 South	Yes	No	No	Yes	Yes	No
LTE Band 26 (Cell) South	Yes	No	No	Yes	Yes	No
LTE Band 5 (Cell) South	Yes	No	No	Yes	Yes	No
LTE Band 66 (AWS) South	Yes	No	No	Yes	Yes	No
LTE Band 25 (PCS) South	Yes	No	No	Yes	Yes	No
LTE Band 30 South	Yes	No	No	Yes	Yes	No
LTE Band 7 South	Yes	No	No	Yes	Yes	No
LTE Band 48 South	Yes	No	No	Yes	Yes	No
LTE Band 41 South	Yes	No	No	Yes	Yes	No
LTE Band 71 North	Yes	No	Yes	No	Yes	No
LTE Band 12 North	Yes	No	Yes	No	Yes	No
LTE Band 13 North	Yes	No	Yes	No	Yes	No
LTE Band 14 North	Yes	No	Yes	No	Yes	No
LTE Band 26 (Cell) North	Yes	No	Yes	No	Yes	No
LTE Band 5 (Cell) North	Yes	No	Yes	No	Yes	No
LTE Band 66 (AWS) North	Yes	No	Yes	No	Yes	No
LTE Band 25 (PCS) North	Yes	No	Yes	No	Yes	No
LTE Band 30 North	Yes	No	Yes	No	Yes	No
LTE Band 7 North	Yes	No	Yes	No	Yes	No
LTE Band 48 North	Yes	No	Yes	No	Yes	No
LTE Band 41 North	Yes	No	Yes	No	Yes	No
NR Band n71 South	Yes	No	No	Yes	Yes	No
NR Band n5 (Cell) South	Yes	No	No	Yes	Yes	No
NR Band n66 (AWS) South	Yes	No	No	Yes	Yes	No
NR Band n25 (PCS) South	Yes	No	No	Yes	Yes	No
NR Band n41 South	Yes	No	No	Yes	Yes	No
NR Band n71 North	Yes	No	Yes	No	Yes	No
NR Band n5 (Cell) North	Yes	No	Yes	No	Yes	No
NR Band n66 (AWS) North	Yes	No	Yes	No	Yes	No
NR Band n25 (PCS) North	Yes	No	Yes	No	Yes	No
NR Band n41 North	Yes	No	Yes	No	Yes	No
2.4 GHz WLAN Ant 1	Yes	No	No	Yes	No	No
2.4 GHz WLAN Ant 2	Yes	No	Yes	No	No	No
5 GHz WLAN Ant 1	Yes	No	No	Yes	No	No
5 GHz WLAN Ant 2	Yes	No	Yes	No	No	No
Bluetooth Ant 1	Yes	No	No	Yes	No	No
Bluetooth Ant 2	Yes	No	Yes	No	No	No

Some additional edges were evaluated per manufacturer's request

Note: Particular DUT edges were not required to be evaluated for wireless router SAR, phablet SAR or UMPC mini-tablet SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v02r01 Section III, FCC KDB Publication 941225 D07v01r02 and FCC KDB Publication 648474 D04v01r03. Per FCC KDB Publication 616217 D04v01r01, particular edges were not required to be evaluated for SAR in flat configuration based on the SAR exclusion threshold in KDB 447498 D01V06. The distances between the transmit antennas and the edges of the device are included in the filing. When wireless router mode is enabled, U-NII-2A, U-NII-2C operations are disabled. UMPC mini-tablet Front Side is excluded per KDB inquiry

1.6 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 F.

1.7 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.

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Table 1-4
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Phablet	Flat (Body)	Read (UMPC Body)	Notes
1	GSM voice + 2.4 GHz WLAN	Yes	Yes	N/A	Yes	Yes	Yes	
2	GSM voice + 5 GHz WLAN	Yes	Yes	N/A	Yes	Yes	Yes	
3	GSM voice + 2.4 GHz Bluetooth	Yes^	Yes	N/A	Yes	Yes	Yes	^ Bluetooth Tethering is considered
4	GSM voice + 2.4 GHz WLAN Ant 1 + 2.4 GHz WLAN Ant 2	Yes	Yes	N/A	Yes	Yes	Yes	
5	GSM voice + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	N/A	Yes	Yes	Yes	
6	GSM voice + 2.4 GHz WLAN Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	N/A	Yes	Yes	Yes	
7	GSM voice + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	N/A	Yes	Yes	Yes	
8	GSM voice + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	N/A	Yes	Yes	Yes	^ Bluetooth Tethering is considered
9	GSM voice + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	N/A	Yes	Yes	Yes	^ Bluetooth Tethering is considered
10	GSM voice + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	N/A	Yes	Yes	Yes	^ Bluetooth Tethering is considered
11	GSM voice + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	N/A	Yes	Yes	Yes	^ Bluetooth Tethering is considered
12	GSM voice + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	N/A	Yes	Yes	Yes	^ Bluetooth Tethering is considered
13	GSM voice + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	N/A	Yes	Yes	Yes	^ Bluetooth Tethering is considered
14	UMTS + 2.4 GHz WLAN	Yes	Yes	Yes	Yes	Yes	Yes	
15	UMTS + 5 GHz WLAN	Yes	Yes	Yes	Yes	Yes	Yes	
16	UMTS + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
17	UMTS + 2.4 GHz WLAN Ant 1 + 2.4 GHz WLAN Ant 2	Yes	Yes	Yes	Yes	Yes	Yes	
18	UMTS + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	Yes	Yes	Yes	Yes	
19	UMTS + 2.4 GHz WLAN Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	Yes	Yes	Yes	Yes	
20	UMTS + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	Yes	Yes	Yes	Yes	
21	UMTS + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
22	UMTS + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
23	UMTS + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
24	UMTS + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
25	UMTS + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
26	UMTS + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
27	LTE + 2.4 GHz WLAN	Yes	Yes	Yes	Yes	Yes	Yes	
28	LTE + 5 GHz WLAN	Yes	Yes	Yes	Yes	Yes	Yes	
29	LTE + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
30	LTE + 2.4 GHz WLAN Ant 1 + 2.4 GHz WLAN Ant 2	Yes	Yes	Yes	Yes	Yes	Yes	
31	LTE + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	Yes	Yes	Yes	Yes	
32	LTE + 2.4 GHz WLAN Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	Yes	Yes	Yes	Yes	
33	LTE + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	Yes	Yes	Yes	Yes	
34	LTE + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
35	LTE + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
36	LTE + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
37	LTE + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
38	LTE + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
39	LTE + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
40	LTE + NR	Yes	Yes	N/A	Yes	Yes	Yes	
41	LTE + NR + 2.4 GHz WLAN	Yes	Yes	Yes	Yes	Yes	Yes	
42	LTE + NR + 5 GHz WLAN	Yes	Yes	Yes	Yes	Yes	Yes	
43	LTE + NR + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
44	LTE + NR + 2.4 GHz WLAN Ant 1 + 2.4 GHz WLAN Ant 2	Yes	Yes	Yes	Yes	Yes	Yes	
45	LTE + NR + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	Yes	Yes	Yes	Yes	
46	LTE + NR + 2.4 GHz WLAN Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	Yes	Yes	Yes	Yes	
47	LTE + NR + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	Yes	Yes	Yes	Yes	
48	LTE + NR + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
49	LTE + NR + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
50	LTE + NR + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
51	LTE + NR + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
52	LTE + NR + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
53	LTE + NR + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	Yes^	Yes	Yes	Yes	^ Bluetooth Tethering is considered
54	GPRS + 2.4 GHz WLAN	Yes*	Yes*	Yes	Yes	Yes	Yes	* Pre-installed VOIP applications are considered.
55	GPRS + 5 GHz WLAN	Yes*	Yes*	Yes	Yes	Yes	Yes	* Pre-installed VOIP applications are considered.
56	GPRS + 2.4 GHz Bluetooth	Yes*^	Yes*	Yes^	Yes	Yes	Yes	* Pre-installed VOIP applications are considered. ^ Bluetooth Tethering is considered
57	GPRS + 2.4 GHz WLAN Ant 1 + 2.4 GHz WLAN Ant 2	Yes*	Yes*	Yes	Yes	Yes	Yes	* Pre-installed VOIP applications are considered.
58	GPRS + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes*	Yes*	Yes	Yes	Yes	Yes	* Pre-installed VOIP applications are considered.
59	GPRS + 2.4 GHz WLAN Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes*	Yes*	Yes	Yes	Yes	Yes	* Pre-installed VOIP applications are considered.
60	GPRS + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes*	Yes*	Yes	Yes	Yes	Yes	* Pre-installed VOIP applications are considered.
61	GPRS + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 2.4 GHz Bluetooth Ant 2	Yes*^	Yes*	Yes^	Yes	Yes	Yes	* Pre-installed VOIP applications are considered. ^ Bluetooth Tethering is considered
62	GPRS + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes*^	Yes*	Yes^	Yes	Yes	Yes	* Pre-installed VOIP applications are considered. ^ Bluetooth Tethering is considered
63	GPRS + 2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes*^	Yes*	Yes^	Yes	Yes	Yes	* Pre-installed VOIP applications are considered. ^ Bluetooth Tethering is considered
64	GPRS + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 2	Yes*^	Yes*	Yes^	Yes	Yes	Yes	* Pre-installed VOIP applications are considered. ^ Bluetooth Tethering is considered
65	GPRS + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes*^	Yes*	Yes^	Yes	Yes	Yes	* Pre-installed VOIP applications are considered. ^ Bluetooth Tethering is considered
66	GPRS + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 2	Yes*^	Yes*	Yes^	Yes	Yes	Yes	* Pre-installed VOIP applications are considered. ^ Bluetooth Tethering is considered
67	2.4 GHz WLAN Ant 1 + 2.4 GHz WLAN Ant 2	Yes	Yes	N/A	Yes	Yes	Yes	
68	5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	N/A	Yes	Yes	Yes	
69	2.4 GHz WLAN Ant 1 + 2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	N/A	Yes	Yes	Yes	
70	2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2	Yes	Yes	N/A	Yes	Yes	Yes	
71	2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	N/A	Yes	Yes	Yes	^ Bluetooth Tethering is considered
72	2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	N/A	Yes	Yes	Yes	^ Bluetooth Tethering is considered
73	2.4 GHz WLAN Ant 1 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	N/A	Yes	Yes	Yes	^ Bluetooth Tethering is considered
74	2.4 GHz WLAN Ant 2 + 5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	N/A	Yes	Yes	Yes	^ Bluetooth Tethering is considered
75	5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 1	Yes^	Yes	N/A	Yes	Yes	Yes	^ Bluetooth Tethering is considered
76	5 GHz WLAN Ant 1 + 5 GHz WLAN Ant 2 + 2.4 GHz Bluetooth Ant 2	Yes^	Yes	N/A	Yes	Yes	Yes	^ Bluetooth Tethering is considered

1. 2.4 GHz WLAN ant 1, and 2.4 GHz Bluetooth ant 1 share the same antenna path and cannot transmit simultaneously.
2. 2.4 GHz WLAN ant 2, and 2.4 GHz Bluetooth ant 2 share the same antenna path and cannot transmit simultaneously.
3. 2.4 GHz Bluetooth ant 1, and 2.4 GHz Bluetooth ant 2 cannot transmit simultaneously
4. All licensed modes share the same antenna path and cannot transmit simultaneously.

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5. 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.
6. Per the manufacturer, WIFI Direct is expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Therefore, there are no simultaneous transmission scenarios involving WIFI direct beyond that listed in the above table.
7. 5 GHz Wireless Router is only supported for U-NII-1 and U-NII-3 by S/W, therefore U-NII-2A, and U-NII-2C were not evaluated for wireless router conditions.
8. This device supports 2x2 MIMO Tx for WLAN 802.11a/b/g/n/ac/ax. 802.11a/b/g/n/ac/ax supports CDD and STBC and 802.11n/ac/ax additionally supports SDM.
9. This device supports VOLTE.
10. This device supports VOWIFI.
11. This device supports Bluetooth Tethering.
12. LTE + 5G NR FR1 Scenarios are limited to EN-DC combinations with anchor bands as shown in the NR FR1 checklist.
13. 5G NR FR2 n260 and n261 cannot transmit simultaneously.
14. LTE + 5G NR FR2 Scenarios are limited to EN-DC combinations with anchor bands as shown in the NR FR2 checklist.

1.8 Miscellaneous SAR Test Considerations

(A) WIFI/BT

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

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

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

This device supports IEEE 802.11ax with the following features:

a) Up to 160 MHz Bandwidth only for 5 GHz
b) Up to 40 MHz Bandwidth only for 2.4 GHz
c) 2 Tx antenna output
d) Up to 1024 QAM is supported
e) TDWR and Band gap channels are supported for 5 GHz
f) MU-MIMO UL Operations are not supported

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

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

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(B) Licensed Transmitter(s)

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

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

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

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

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

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

This device supports LTE/NR FR1 capabilities with overlapping transmission frequency ranges. When the supported frequency range of an LTE/NR Band falls completely within an LTE/NR band with a larger transmission frequency range, both LTE/NR bands have the same target power (or the band with the larger transmission frequency range has a higher target power), and both LTE/NR bands share the same transmission path and signal characteristics, SAR was only assessed for the band with the larger transmission frequency range.

This device supports both Power Class 2 (PC2) and Power Class 3 (PC3) for LTE Band 41. Per May 2017 TCB Workshop Notes, SAR tests were performed with Power Class 3 (given the specific UL/DL limitations for Power Class 2). Additionally, SAR testing for the power class 2 condition was evaluated for the highest configuration in Power Class 3 for each test configuration to confirm the results were scalable linearly (See Section 4 of Appendix A1 and Appendix A2).

This device supports LTE Carrier Aggregation (CA) for LTE Band 5, LTE Band 66, LTE Band 7, LTE Band 41, and LTE Band 48 with two component carriers in the uplink. SAR Measurements and conducted powers were evaluated per 2017 Fall TCB Workshop Notes.

This device supports 64QAM on the uplink and 256QAM on the downlink for LTE Operations.
Conducted powers for 64QAM uplink configurations were measured per Section 5.1 of FCC KDB Publication 941225D05v02r05. SAR was not required for 64QAM since the highest maximum output power for 64QAM is ≤ ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45W/kg, per Section 5.2.4 of FCC KDB Publication 941225 D05v02r05.

This device supports 5G NR for Bands n260, and n261. RF Exposure assessment and simultaneous transmission analysis for these bands can be found in the Near Field PD Report (report SN can be found in Section 1.11 – Bibliography).

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NR implementation supports 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.

1.9 DUT Configuration Information

Note the DUT can operate in 4 distinct configurations:

- **Flip (Handset)**: Device is folded in half with both displays facing out and used like a typical phablet. Only the right display turns on and acts as the default phablet display for voice calling as it contains the only earpiece speaker. Hotspot mode can be enabled.
- **Closed (Handset)**: Device is folded in half with both displays facing inward and disabled. Calls can be taken using a headset only. Hotspot mode can be enabled.
- **Read (UMPC):** The displays are at a nominal angle of 150 degrees relative to each other in portrait and landscape mode respectively. Calls are intended to be made over headset or speaker only, although the earpiece is not disabled. Hotspot mode can be enabled. Note that for testing purpose the device was open with both displays facing out, side by side.
- **Flat (Body):** Device is open with both displays facing out, side by side. Calls are intended to be made over headset or speaker only, although the earpiece is not disabled. Hotspot mode can be enabled.

1.10 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 (Tablet, Proximity Sensor)
- October 2013 TCB Workshop Notes (GPRS Testing Considerations)
- May 2017 TCB Workshop Notes (LTE 4x4 Downlink MIMO, LTE Band 41 Power Class 2/3)
- April 2018 TCB Workshop Notes (LTE Carrier Aggregation)
- April 2019 TCB Workshop Notes (IEEE 802.11ax, Dynamic Antenna Tuning)
- FCC KDB Publication 941225 D07v01r02 (UMPC Mini-Tablet Devices)

1.11 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.

1.12 Bibliography

Report Type	Report Serial Number
PD Exposure Part 0 Test Report	
Near Field PD Report (Part 1)	1M2105060048-20.C3K
RF Exposure Part 0 Test Report	1M2105060048-24.C3K
RF Exposure Part 2 Test Report	1M2105060048-21.C3K
RF Exposure Compliance Summary Report	1M2105060048-22.C3K

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2 LTE AND NR INFORMATION

LTE Information					
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 71 (665.5 - 695.5 MHz)				
	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 13 (779.5 - 784.5 MHz)				
	LTE Band 14 (790.5 - 795.5 MHz)				
	LTE Band 26 (Cell) (814.7 - 848.3 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 66 (AWS) (1710.7 - 1779.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)				
	LTE Band 25 (PCS) (1850.7 - 1914.3 MHz)				
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)				
	LTE Band 30 (2307.5 - 2312.5 MHz)				
	LTE Band 7 (2502.5 - 2567.5 MHz)				
	LTE Band 48 (3552.5 - 3697.5 MHz)				
	LTE Band 41 (2498.5 - 2687.5 MHz)				
Channel Bandwidths	LTE Band 71: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 13: 5 MHz, 10 MHz				
	LTE Band 14: 5 MHz, 10 MHz				
	LTE Band 26 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 25 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 30: 5 MHz, 10 MHz				
	LTE Band 7: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 48: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 71: 5 MHz	665.5 (133147)		680.5 (133297)	695.5 (133447)	
LTE Band 71: 10 MHz	668 (133172)		680.5 (133297)	693 (133422)	
LTE Band 71: 15 MHz	670.5 (133197)		680.5 (133297)	690.5 (133397)	
LTE Band 71: 20 MHz	673 (133222)		680.5 (133297)	688 (133372)	
LTE Band 12: 1.4 MHz	699.7 (23017)		707.5 (23095)	715.3 (23173)	
LTE Band 12: 3 MHz	700.5 (23025)		707.5 (23095)	714.5 (23165)	
LTE Band 12: 5 MHz	701.5 (23035)		707.5 (23095)	713.5 (23155)	
LTE Band 12: 10 MHz	704 (23060)		707.5 (23095)	711 (23130)	
LTE Band 13: 5 MHz	779.5 (23205)		782 (23230)	784.5 (23255)	
LTE Band 13: 10 MHz	N/A		782 (23230)	N/A	
LTE Band 14: 5 MHz	790.5 (23305)		793 (23330)	795.5 (23355)	
LTE Band 14: 10 MHz	N/A		793 (23330)	N/A	
LTE Band 26 (Cell): 1.4 MHz	814.7 (26697)		831.5 (26865)	848.3 (27033)	
LTE Band 26 (Cell): 3 MHz	815.5 (26705)		831.5 (26865)	847.5 (27025)	
LTE Band 26 (Cell): 5 MHz	816.5 (26715)		831.5 (26865)	846.5 (27015)	
LTE Band 26 (Cell): 10 MHz	819 (26740)		831.5 (26865)	844 (26990)	
LTE Band 26 (Cell): 15 MHz	821.5 (26765)		831.5 (26865)	841.5 (26965)	
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)		836.5 (20525)	848.3 (20643)	
LTE Band 5 (Cell): 3 MHz	825.5 (20415)		836.5 (20525)	847.5 (20635)	
LTE Band 5 (Cell): 5 MHz	826.5 (20425)		836.5 (20525)	846.5 (20625)	
LTE Band 5 (Cell): 10 MHz	829 (20450)		836.5 (20525)	844 (20600)	
LTE Band 66 (AWS): 1.4 MHz	1710.7 (131979)		1745 (132322)	1779.3 (132665)	
LTE Band 66 (AWS): 3 MHz	1711.5 (131987)		1745 (132322)	1778.5 (132657)	
LTE Band 66 (AWS): 5 MHz	1712.5 (131997)		1745 (132322)	1777.5 (132647)	
LTE Band 66 (AWS): 10 MHz	1715 (132022)		1745 (132322)	1775 (132622)	
LTE Band 66 (AWS): 15 MHz	1717.5 (132047)		1745 (132322)	1772.5 (132597)	
LTE Band 66 (AWS): 20 MHz	1720 (132072)		1745 (132322)	1770 (132572)	
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)		1732.5 (20175)	1754.3 (20393)	
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)		1732.5 (20175)	1753.5 (20385)	
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)		1732.5 (20175)	1752.5 (20375)	
LTE Band 4 (AWS): 10 MHz	1715 (20000)		1732.5 (20175)	1750 (20350)	
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)		1732.5 (20175)	1747.5 (20325)	
LTE Band 4 (AWS): 20 MHz	1720 (20050)		1732.5 (20175)	1745 (20300)	
LTE Band 25 (PCS): 1.4 MHz	1850.7 (26047)		1882.5 (26365)	1914.3 (26683)	
LTE Band 25 (PCS): 3 MHz	1851.5 (26055)		1882.5 (26365)	1913.5 (26675)	
LTE Band 25 (PCS): 5 MHz	1852.5 (26065)		1882.5 (26365)	1912.5 (26665)	
LTE Band 25 (PCS): 10 MHz	1855 (26090)		1882.5 (26365)	1910 (26640)	
LTE Band 25 (PCS): 15 MHz	1857.5 (26115)		1882.5 (26365)	1907.5 (26615)	
LTE Band 25 (PCS): 20 MHz	1860 (26140)		1882.5 (26365)	1905 (26590)	
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)		1880 (18900)	1909.3 (19193)	
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)		1880 (18900)	1908.5 (19185)	
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)		1880 (18900)	1907.5 (19175)	
LTE Band 2 (PCS): 10 MHz	1855 (18650)		1880 (18900)	1905 (19150)	
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)		1880 (18900)	1902.5 (19125)	
LTE Band 2 (PCS): 20 MHz	1860 (18700)		1880 (18900)	1900 (19100)	
LTE Band 30: 5 MHz	2307.5 (27685)		2310 (27710)	2312.5 (27735)	
LTE Band 30: 10 MHz	N/A		2310 (27710)	N/A	
LTE Band 7: 5 MHz	2502.5 (20775)		2535 (21100)	2567.5 (21425)	
LTE Band 7: 10 MHz	2505 (20800)		2535 (21100)	2565 (21400)	
LTE Band 7: 15 MHz	2507.5 (20825)		2535 (21100)	2562.5 (21375)	
LTE Band 7: 20 MHz	2510 (20850)		2535 (21100)	2560 (21350)	
LTE Band 48: 5 MHz	3552.5 (55265)	3600.8 (55748)	N/A	3649.2 (56232)	3697.5 (56715)
LTE Band 48: 10 MHz	3555 (55290)	3601.7 (55757)	N/A	3648.3 (56223)	3695 (56690)
LTE Band 48: 15 MHz	3557.5 (55315)	3602.5 (55765)	N/A	3647.5 (56215)	3692.5 (56665)
LTE Band 48: 20 MHz	3560 (55340)	3603.3 (55773)	N/A	3646.7 (56207)	3690 (56640)
LTE Band 41: 5 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 10 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 15 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
UE Category	DL UE Cat 20, UL UE Cat 13				
Modulations Supported in UL	QPSK, 16QAM, 64QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	YES				
A-MPR (Additional MPR) disabled for SAR Testing?	YES				
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations				
LTE Additional Information	This device does not support full CA features on 3GPP Release 14. It supports carrier aggregation, downlink MIMO, LAA features as shown in Appendix H and Section 1 of Appendix A1 and A2. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 14 Features are not supported: Relay, HetNet, Enhanced MIMO, eICIC, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

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NR Information					
Form Factor	Portable Handset				
Frequency Range of each NR transmission band	NR Band n71 (665.5 - 695.5 MHz)				
	NR Band n5 (Cell) (826.5 - 846.5 MHz)				
	NR Band n66 (AWS) (1712.5 - 1777.5 MHz)				
	NR Band n25 (PCS) (1852.5 - 1912.5 MHz)				
	NR Band n2 (PCS) (1852.5 - 1907.5 MHz)				
	NR Band n41 (2506.02 - 2679.99 MHz)				
Channel Bandwidths	NR Band n71: 5 MHz, 10 MHz, 15 MHz, 20 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, 30 MHz, 40 MHz				
	NR Band n25 (PCS): 5 MHz, 10 MHz, 15 MHz, 20 MHz, 25 MHz, 30 MHz, 40 MHz				
	NR Band n2 (PCS): 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	NR Band n41: 20 MHz, 30 MHz, 40 MHz, 50 MHz, 60 MHz, 80 MHz, 90 MHz, 100 MHz				
Channel Numbers and Frequencies (MHz)					
NR Band n71: 5 MHz	665.5 (133147)		680.5 (136100)	695.5 (133447)	
NR Band n71: 10 MHz	668 (133600)		680.5 (136100)	693 (138600)	
NR Band n71: 15 MHz	670.5 (134100)		680.5 (136100)	690.5 (138100)	
NR Band n71: 20 MHz	673 (134600)		680.5 (136100)	688 (137600)	
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)	
NR Band n66 (AWS): 30 MHz	1725 (345000)		1745 (349000)	1765 (353000)	
NR Band n66 (AWS): 40 MHz	1730 (346000)		1745 (349000)	1760 (352000)	
NR Band n25 (PCS): 5 MHz	1852.5 (370500)		1882.5 (376500)	1912.5 (382500)	
NR Band n25 (PCS): 10 MHz	1855 (371000)		1882.5 (376500)	1910 (382000)	
NR Band n25 (PCS): 15 MHz	1857.5 (371500)		1882.5 (376500)	1907.5 (381500)	
NR Band n25 (PCS): 20 MHz	1860 (372000)		1882.5 (376500)	1905 (381000)	
NR Band n25 (PCS): 25 MHz	1862.5 (372500)		1882.5 (376500)	1902.5 (380500)	
NR Band n25 (PCS): 30 MHz	1865 (373000)		1882.5 (376500)	1900 (380000)	
NR Band n25 (PCS): 40 MHz	1870 (374000)		1882.5 (376500)	1895 (379000)	
NR Band n2 (PCS): 5 MHz	1852.5 (370500)		1880 (376000)	1907.5 (381500)	
NR Band n2 (PCS): 10 MHz	1855 (371000)		1880 (376000)	1905 (381000)	
NR Band n2 (PCS): 15 MHz	1857.5 (371500)		1880 (376000)	1902.5 (380500)	
NR Band n2 (PCS): 20 MHz	1860 (372000)		1880 (376000)	1900 (380000)	
NR Band n41: 20 MHz	2506.02 (501204)	2549.49 (509898)	2592.99 (518598)	2636.49 (527298)	2679.99 (535998)
NR Band n41: 30 MHz	2511 (502200)	2552.01 (510402)	2592.99 (518598)	2634 (526800)	2674.98 (534996)
NR Band n41: 40 MHz	2516.01 (503202)	2567.34 (513468)	N/A	2618.67 (523734)	2670 (534000)
NR Band n41: 50 MHz	2521.02 (504204)		2592.99 (518598)	2664.99 (532998)	
NR Band n41: 60 MHz	2526 (505200)		2592.99 (518598)	2659.98 (531996)	
NR Band n41: 80 MHz	2536.02 (507204)		N/A	2649.99 (529998)	
NR Band n41: 90 MHz	2541 (508200)		N/A	2644.98 (528996)	
NR Band n41: 100 MHz	2546.01 (509202)		2592.99 (518598)	2640 (528000)	
SCS for NR Band n71/n5/n66/n25/n2	15 kHz				
SCS for NR Band n41	30 kHz				
Modulations Supported in UL	DFT-s-OFDM: π/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 n71	LTE Band 66/2				
LTE Anchor Bands for NR Band n5 (Cell)	LTE Band 66/2/30/7				
LTE Anchor Bands for NR Band n66 (AWS)	LTE Band 12/13/14/5/2/30				
LTE Anchor Bands for NR Band n25 (PCS)	LTE Band 12/66				
LTE Anchor Bands for NR Band n2 (PCS)	LTE Band 12/13/14/5/66/30				
LTE Anchor Bands for NR Band n41	LTE Band 12/66/2				

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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/m^3)
E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

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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:

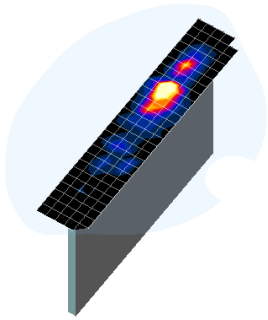

Figure 4-1 Sample SAR Area Scan

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):

   a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).

   b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.

   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

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

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

*Also compliant to IEEE 1528-2013 Table 6

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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].

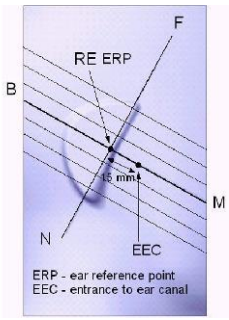

Figure 5-1
Close-Up Side view of ERP

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 than located at the same level as the center of the ear reference point. The test device was positioned so that the "vertical centerline" was bisecting the front surface of the handset at its top and bottom edges, positioning the "ear reference point" on the outer surface of the both the left and right head phantoms on the ear reference point.

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

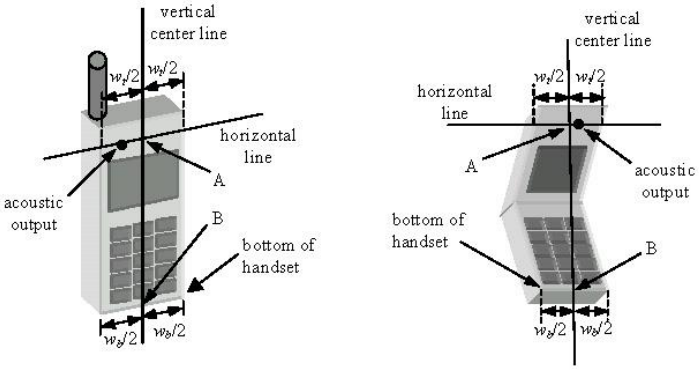

Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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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 ε = 3 and loss tangent δ = 0.02.

6.2 Positioning for Cheek

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

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

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the pinna.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the reference plane.
4. The phone was then rotated around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the device contact with the ear, the device was rotated about the NF line until any point on the handset made contact with a phantom point below the ear (cheek) (See Figure 6-2).

6.3 Positioning for Ear / 15º Tilt

With the test device aligned in the “Cheek Position”:

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15degrees.
2. The phone was then rotated around the horizontal line by 15 degrees.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the handset touched the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. In this situation, the tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 6-2).

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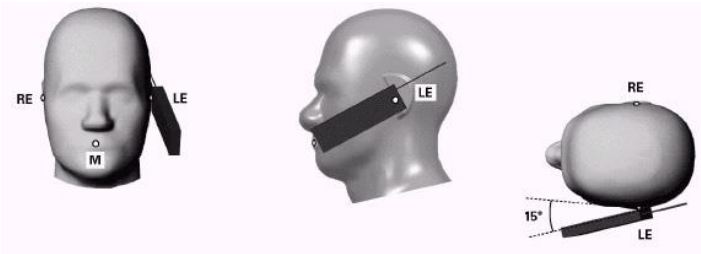

Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

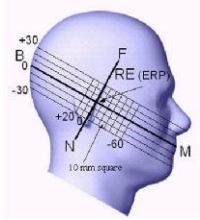

Figure 6-3
Side view w/ relevant markings

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

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

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

6.5 Body-Worn Accessory Configurations

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

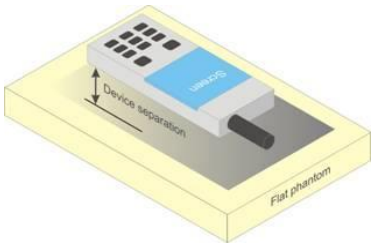

Figure 6-4
Sample Body-Worn Diagram

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

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

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

6.6 Extremity Exposure Configurations

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

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

6.7 Wireless Router Configurations

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

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

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

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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 UMPC Mini-Tablet Configurations

Small hand-held tablets (and devices of similar form factors that are designed primarily for interactive hand-held use next to or near the body of users) require body SAR and extremity SAR evaluation. These types of mini-tablets are normally optimized for mobile web access and multimedia use. UMPC test procedures are applicable for devices with displays and overall diagonal dimension ≤ 20 cm. Devices are to be set up according to KDB publication 941225 D07v01r02 requirements and are configured with maximum output power during SAR assessment for a worst case SAR evaluation.

Per KDB Publication 941225 D07v01r02, UMPC mini-tablet devices must be tested for all surfaces and edges ≤ 25 mm from a transmitting antenna. A test separation distance of 5 mm may be considered for 1g SAR. UMPC mini-tablet Front Side is excluded per FCC Guidance.

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

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

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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 ½ dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is <1.45 W/kg.

8.5.5 TDD

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

8.5.6 Downlink Only Carrier Aggregation

Conducted power measurements with LTE Carrier Aggregation (CA) (downlink only) active are made in accordance to KDB Publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier(s) (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to specifications when downlink

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carrier aggregation is inactive on the PCC. Additional conducted output powers are measured with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band. Per FCC KDB Publication 941225 D05Av01r02, no SAR measurements are required for downlink only carrier aggregation configurations when the average output power with downlink only carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink only carrier aggregation inactive.

8.6 SAR Testing with 802.11 Transmitters

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

8.6.1 General Device Setup

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

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

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

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

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

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

8.6.4 Initial Test Position Procedure

For exposure conditions with multiple test positions, such as handset operating next to the ear, devices with hotspot mode or UMPC mini-tablet, procedures for initial test position can be applied. Using the transmission

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mode determined by the DSSS procedure or initial test configuration, area scans are measured for all positions in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.5 2.4 GHz SAR Test Requirements

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

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

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

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

8.6.6 OFDM Transmission Mode and SAR Test Channel Selection

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

8.6.7 Initial Test Configuration Procedure

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

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

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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.

8.6.9 MIMO SAR considerations

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

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9 RF CONDUCTED POWERS

Conducted Powers not shared between Appendix A1 and Appendix A2 can be found in Section 1 of both appendices, respectively.

9.1 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 I.

9.1.1 NR Band n71

Table 9-1
NR Band n71 South Antenna Measured P_{max} for DSI =2 (Head), DSI = 4 (Flip/Closed Body/Extremity), and DSI = 5 (UMPC Body) - 20 MHz Bandwidth

NR Band n71 20 MHz Bandwidth					
			Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
Modulation	RB Size	RB Offset	136100 (680.5 MHz) Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	22.90	0	0.0
	1	53	22.68		0.0
	1	104	22.65		0.0
	50	0	22.78	0-0.5	0.5
	50	28	22.74	0	0.0
	50	56	22.60	0-0.5	0.5
	100	0	22.71		0.5
DFT-s-OFDM QPSK	1	1	**22.93**	0	0.0
	1	53	22.77		0.0
	1	104	22.57		0.0
	50	0	22.15	0-1	1.0
	50	28	**22.75**	0	0.0
	50	56	21.98	0-1	1.0
	100	0	22.19		1.0
DFT-s-OFDM 16QAM	1	1	22.42	0-1	1.0
CP-OFDM QPSK	1	1	21.47	0-1.5	1.5

Note: NR Band n71 at 20 MHz bandwidth does not support non-overlapping channels. Per FCC Guidance, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

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Table 9-2
NR Band n71 North Antenna Measured P_{max} for DSI = 4 (Flip/Closed Body/Extremity), and DSI = 5 (UMPC Body) - 20 MHz Bandwidth

NR Band n71 20 MHz Bandwidth					
			Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
Modulation	RB Size	RB Offset	136100 (680.5 MHz) Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	22.74	0	0.0
	1	53	22.55		0.0
	1	104	22.49		0.0
	50	0	22.52	0-0.5	0.5
	50	28	22.55	0	0.0
	50	56	22.41	0-0.5	0.5
	100	0	22.57		0.5
DFT-s-OFDM QPSK	1	1	**22.75**	0	0.0
	1	53	22.54		0.0
	1	104	22.48		0.0
	50	0	22.09	0-1	1.0
	50	28	**22.61**	0	0.0
	50	56	21.92	0-1	1.0
	100	0	22.08		1.0
DFT-s-OFDM 16QAM	1	1	22.44	0-1	1.0
CP-OFDM QPSK	1	1	21.49	0-1.5	1.5

Note: NR Band n71 at 20 MHz bandwidth does not support non-overlapping channels. Per FCC Guidance, 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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9.2 WLAN Conducted Powers

Table 9-3
2.4 GHz WLAN Reduced Average RF Power for Body/Extremity Conditions with WWAN Active – Ant 1

2.4GHz (20 MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11b
		Average
2412	1	12.84
2437	6	12.94
2462	11	12.99

2.4GHz (40 MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ax
		Average	Average
2412	1	12.73	12.31
2422	3	12.76	12.26
2437	6	12.90	12.35
2462	11	12.82	12.37

Table 9-4
2.4 GHz WLAN Reduced Average RF Power for Body/Extremity Conditions with WWAN Active – Ant 2

2.4GHz (20 MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11b
		Average
2412	1	12.95
2437	6	12.91
2462	11	12.67

2.4GHz (40 MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ax
		Average	Average
2412	1	12.88	12.64
2422	3	12.70	12.92
2437	6	12.79	13.06
2462	11	12.83	12.59

Table 9-5
5 GHz WLAN Reduced Average RF Power for Body/Extremity Conditions with WWAN Active – Ant 1

5GHz (80MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11ac	802.11ax
		Average	Average
5210	42	12.99	12.69
5290	58	12.99	12.56
5530	106	12.96	12.99
5610	122	12.81	12.91
5690	138	12.80	12.95
5775	155	12.95	12.95

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Table 9-6
5 GHz WLAN Reduced Average RF Power for Body/Extremity Conditions with WWAN Active – Ant 2

5GHz (80MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11ac	802.11ax
		Average	Average
5210	42	12.58	12.56
5290	58	12.89	12.91
5530	106	12.71	12.75
5610	122	12.62	12.59
5690	138	12.89	12.90
5775	155	12.59	12.63

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.

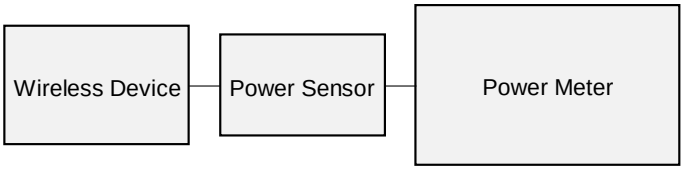

Figure 9-1
Power Measurement Setup

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9.3 Bluetooth Conducted Powers

Table 9-7
Bluetooth Maximum Average RF Power - Ant 1

Frequency [MHz]	Data Rate [Mbps]	Mod.	Channel No.	Peak Conducted Power		Avg Conducted Power	
				[dBm]	[mW]	[dBm]	[mW]
2402	1.0	GFSK	0	7.28	5.346	7.03	5.045
2441	1.0	GFSK	39	7.13	5.162	6.83	4.816
2480	1.0	GFSK	78	6.34	4.301	6.08	4.057
2402	2.0	π/4-DQPSK	0	6.78	4.760	4.51	2.823
2441	2.0	π/4-DQPSK	39	7.67	5.849	5.52	3.561
2480	2.0	π/4-DQPSK	78	6.03	4.007	3.95	2.484
2402	3.0	8DPSK	0	7.07	5.097	4.56	2.856
2441	3.0	8DPSK	39	7.91	6.173	5.57	3.606
2480	3.0	8DPSK	78	6.23	4.194	4.00	2.510

Table 9-8
Bluetooth Maximum Average RF Power - Ant 2

Frequency [MHz]	Data Rate [Mbps]	Mod.	Channel No.	Peak Conducted Power		Avg Conducted Power	
				[dBm]	[mW]	[dBm]	[mW]
2402	1.0	GFSK	0	5.47	3.526	5.16	3.280
2441	1.0	GFSK	39	5.59	3.624	5.28	3.370
2480	1.0	GFSK	78	3.90	2.454	3.62	2.302
2402	2.0	π/4-DQPSK	0	4.99	3.157	2.79	1.900
2441	2.0	π/4-DQPSK	39	6.04	4.018	4.00	2.514
2480	2.0	π/4-DQPSK	78	3.60	2.292	1.68	1.474
2402	3.0	8DPSK	0	5.23	3.330	2.84	1.923
2441	3.0	8DPSK	39	6.29	4.255	4.03	2.532
2480	3.0	8DPSK	78	3.77	2.380	1.73	1.488

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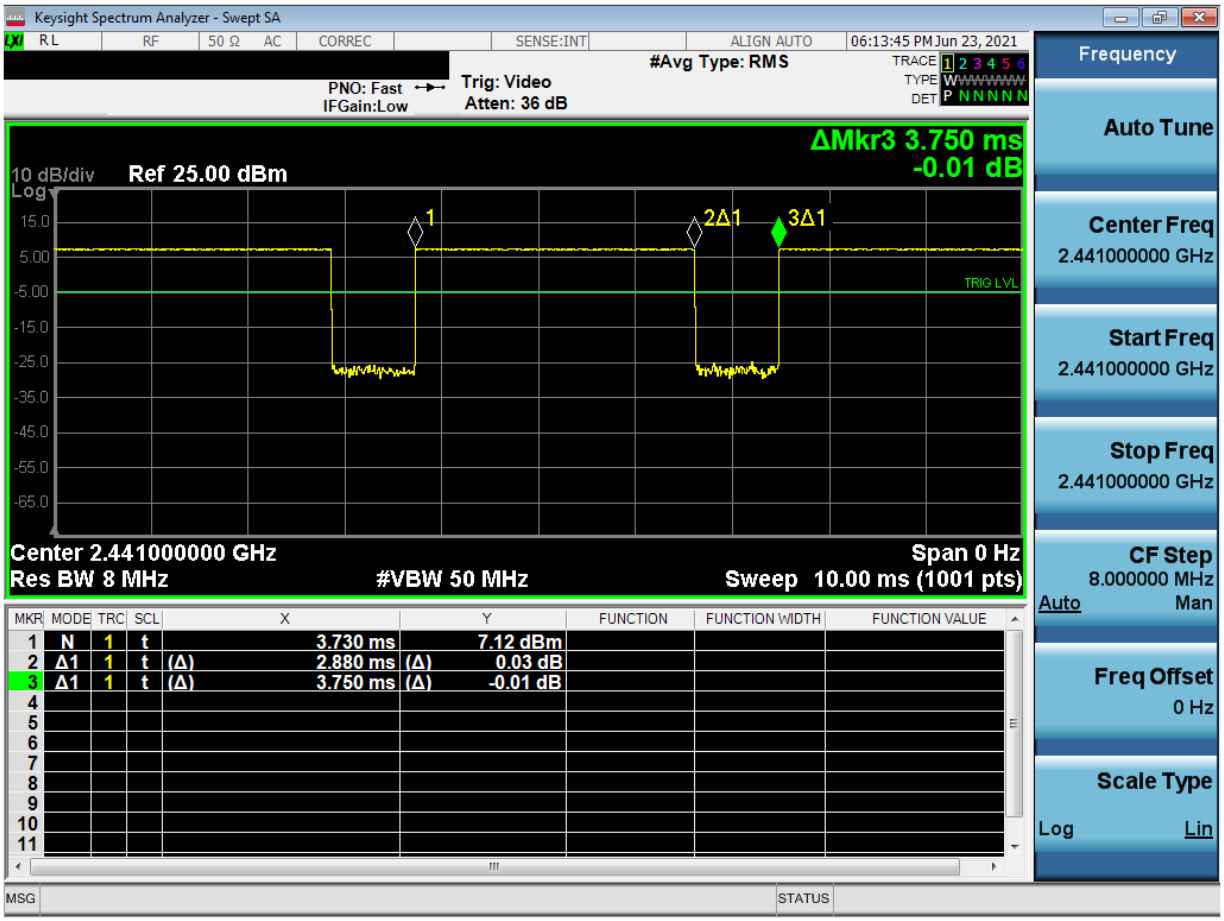
Figure 9-2
Bluetooth Transmission Plot Ant 1



Equation 9-1
Bluetooth Duty Cycle Calculation Ant 1

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

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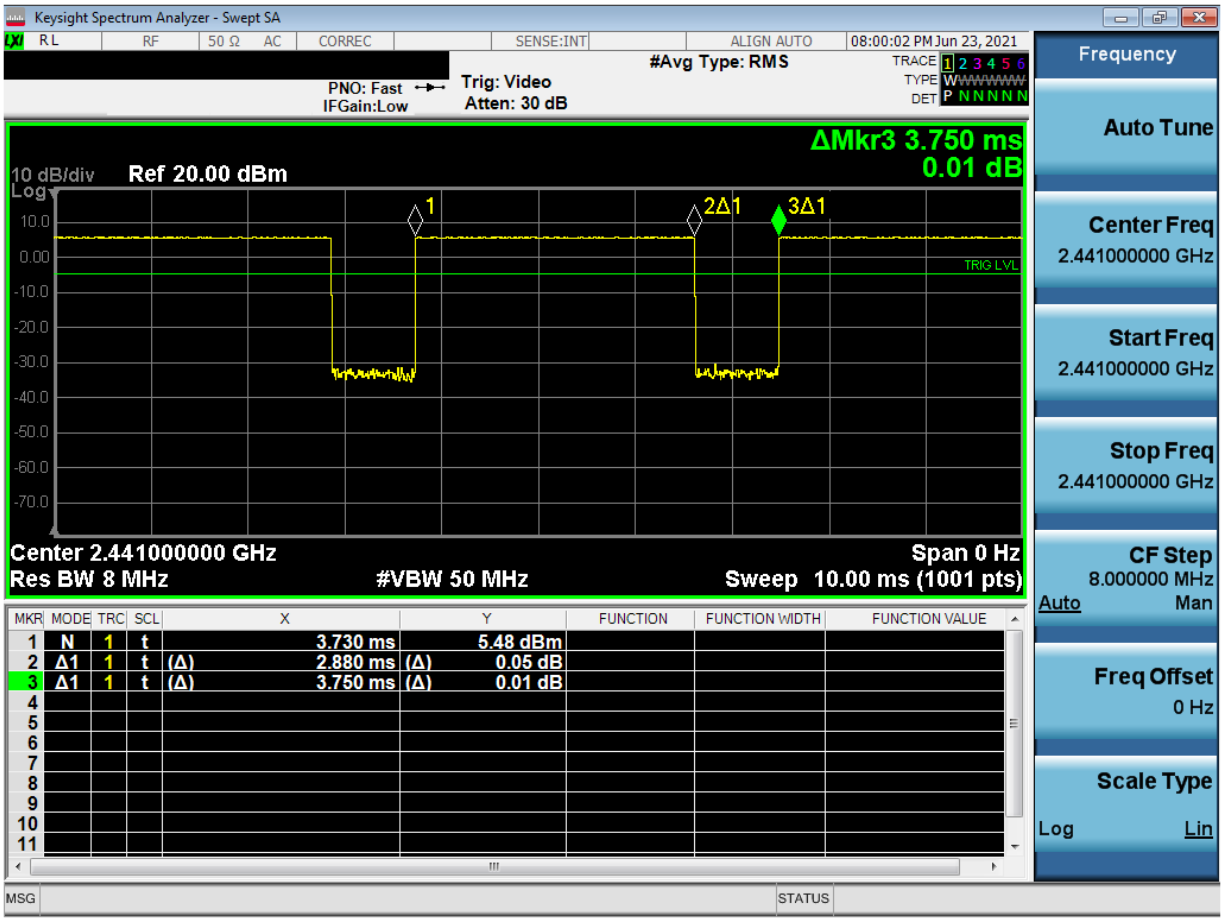
Figure 9-3
Bluetooth Transmission Plot Ant 2



Equation 9-2
Bluetooth Duty Cycle Calculation Ant 2

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

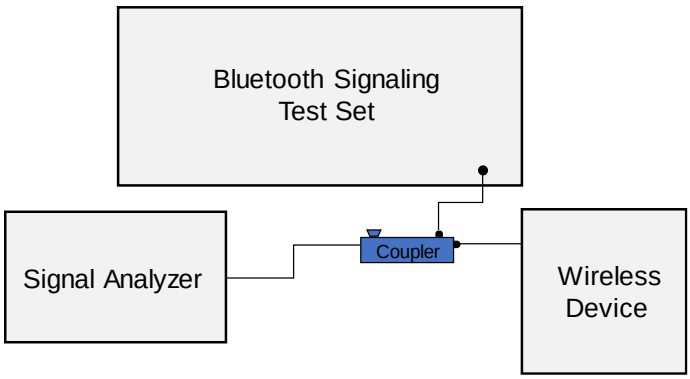


Figure 9-4
Power Measurement Setup

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10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Head Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (˚C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
07/27/2021	750 Head	22.0	680	0.884	41.715	0.888	42.305	-0.45%	-1.39%
			695	0.889	41.660	0.889	42.227	0.00%	-1.34%
			700	0.891	41.643	0.889	42.201	0.22%	-1.32%
			710	0.895	41.610	0.890	42.149	0.56%	-1.28%
			725	0.900	41.570	0.891	42.071	1.01%	-1.19%
			750	0.909	41.515	0.894	41.942	1.68%	-1.02%
			770	0.916	41.464	0.895	41.838	2.35%	-0.89%
			785	0.921	41.410	0.896	41.760	2.79%	-0.84%
			800	0.927	41.353	0.897	41.682	3.34%	-0.79%
07/29/2021	750 Head	21.4	680	0.880	41.544	0.888	42.305	-0.90%	-1.80%
			695	0.885	41.498	0.889	42.227	-0.45%	-1.73%
			700	0.887	41.481	0.889	42.201	-0.22%	-1.71%
			710	0.891	41.447	0.890	42.149	0.11%	-1.67%
			725	0.896	41.399	0.891	42.071	0.56%	-1.60%
			750	0.904	41.323	0.894	41.942	1.12%	-1.48%
			770	0.911	41.263	0.895	41.838	1.79%	-1.37%
			785	0.916	41.217	0.896	41.760	2.23%	-1.30%
			800	0.922	41.175	0.897	41.682	2.79%	-1.22%
08/23/2021	750 Head	22.6	680	0.879	41.180	0.888	42.305	-1.01%	-2.66%
			695	0.884	41.128	0.889	42.227	-0.56%	-2.60%
			700	0.886	41.110	0.889	42.201	-0.34%	-2.59%
			710	0.890	41.075	0.890	42.149	0.00%	-2.55%
			725	0.896	41.027	0.891	42.071	0.56%	-2.48%
			750	0.905	40.950	0.894	41.942	1.23%	-2.37%
			770	0.912	40.883	0.895	41.838	1.90%	-2.28%
			785	0.917	40.834	0.896	41.760	2.34%	-2.22%
			800	0.923	40.791	0.897	41.682	2.90%	-2.14%
08/29/2021	750 Head	21.2	680	0.881	40.653	0.888	42.305	-0.79%	-3.90%
			695	0.886	40.602	0.889	42.227	-0.34%	-3.85%
			700	0.888	40.585	0.889	42.201	-0.11%	-3.83%
			710	0.891	40.552	0.890	42.149	0.11%	-3.79%
			725	0.897	40.507	0.891	42.071	0.67%	-3.72%
			750	0.906	40.433	0.894	41.942	1.34%	-3.60%
			770	0.913	40.370	0.895	41.838	2.01%	-3.51%
			785	0.919	40.318	0.896	41.760	2.57%	-3.45%
			800	0.924	40.266	0.897	41.682	3.01%	-3.40%
07/21/2021	835 Head	22.3	820	0.893	43.023	0.899	41.578	-0.67%	3.48%
			835	0.909	42.837	0.900	41.500	1.00%	3.22%
			850	0.924	42.644	0.916	41.500	0.87%	2.76%
07/22/2021	835 Head	21.6	815	0.920	41.559	0.898	41.594	2.45%	-0.08%
			820	0.922	41.545	0.899	41.578	2.56%	-0.08%
			835	0.928	41.504	0.900	41.500	3.11%	0.01%
			850	0.933	41.462	0.916	41.500	1.86%	-0.09%
07/28/2021	835 Head	21.5	815	0.932	40.610	0.898	41.594	3.79%	-2.37%
			820	0.934	40.598	0.899	41.578	3.89%	-2.36%
			835	0.939	40.563	0.900	41.500	4.33%	-2.26%
			850	0.945	40.528	0.916	41.500	3.17%	-2.34%
08/17/2021	835 Head	20.3	815	0.923	41.172	0.898	41.594	2.78%	-1.01%
			820	0.925	41.160	0.899	41.578	2.89%	-1.01%
			835	0.930	41.121	0.900	41.500	3.33%	-0.91%
			850	0.936	41.082	0.916	41.500	2.18%	-1.01%
08/29/2021	835 Head	21.2	815	0.930	40.216	0.898	41.594	3.56%	-3.31%
			820	0.932	40.200	0.899	41.578	3.67%	-3.31%
			835	0.938	40.159	0.900	41.500	4.22%	-3.23%
			850	0.943	40.122	0.916	41.500	2.95%	-3.32%
07/06/2021	1750 Head	19.6	1710	1.370	39.245	1.348	40.142	1.63%	-2.23%
			1720	1.380	39.201	1.354	40.126	1.92%	-2.31%
			1745	1.405	39.078	1.368	40.087	2.70%	-2.52%
			1750	1.410	39.053	1.371	40.079	2.84%	-2.56%
			1770	1.431	38.956	1.383	40.047	3.47%	-2.72%
			1790	1.453	38.861	1.394	40.016	4.23%	-2.89%
07/20/2021	1750 Head	20.8	1710	1.353	39.975	1.348	40.142	0.37%	-0.42%
			1720	1.358	39.953	1.354	40.126	0.30%	-0.43%
			1745	1.374	39.899	1.368	40.087	0.44%	-0.47%
			1750	1.378	39.893	1.371	40.079	0.51%	-0.46%
			1770	1.392	39.872	1.383	40.047	0.65%	-0.44%
			1790	1.404	39.849	1.394	40.016	0.72%	-0.42%

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Table 10-2
Measured Head Tissue Properties Continued

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (˚C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
07/31/2021	1900 Head	21.4	1850	1.411	39.739	1.400	40.000	0.79%	-0.65%
			1860	1.417	39.728	1.400	40.000	1.21%	-0.68%
			1880	1.429	39.707	1.400	40.000	2.07%	-0.73%
			1900	1.442	39.684	1.400	40.000	3.00%	-0.79%
			1905	1.445	39.677	1.400	40.000	3.21%	-0.81%
			1910	1.448	39.669	1.400	40.000	3.43%	-0.83%
08/20/2021	1900 Head	22.3	1850	1.433	39.127	1.400	40.000	2.36%	-2.18%
			1860	1.439	39.109	1.400	40.000	2.79%	-2.23%
			1880	1.451	39.081	1.400	40.000	3.64%	-2.30%
			1900	1.463	39.056	1.400	40.000	4.50%	-2.36%
			1905	1.466	39.049	1.400	40.000	4.71%	-2.38%
			1910	1.469	39.040	1.400	40.000	4.93%	-2.40%
08/22/2021	1900 Head	22.1	1850	1.393	39.500	1.400	40.000	-0.50%	-1.25%
			1860	1.404	39.453	1.400	40.000	0.29%	-1.37%
			1880	1.425	39.367	1.400	40.000	1.79%	-1.58%
			1900	1.446	39.284	1.400	40.000	3.29%	-1.79%
			1905	1.452	39.263	1.400	40.000	3.71%	-1.84%
			1910	1.457	39.240	1.400	40.000	4.07%	-1.90%
07/16/2021	2450 Head	22.2	2400	1.808	38.416	1.756	39.289	2.96%	-2.22%
			2450	1.847	38.317	1.800	39.200	2.61%	-2.25%
			2480	1.873	38.301	1.833	39.162	2.18%	-2.20%
			2500	1.887	38.282	1.855	39.136	1.73%	-2.18%
			2510	1.894	38.262	1.866	39.123	1.50%	-2.20%
07/31/2021	2450 Head	22.9	2300	1.681	39.004	1.670	39.500	0.66%	-1.26%
			2310	1.692	38.970	1.679	39.480	0.77%	-1.29%
			2320	1.703	38.934	1.687	39.460	0.95%	-1.33%
			2400	1.789	38.668	1.756	39.289	1.88%	-1.58%
			2450	1.844	38.502	1.800	39.200	2.44%	-1.78%
			2480	1.876	38.410	1.833	39.162	2.35%	-1.92%
			2500	1.898	38.340	1.855	39.136	2.32%	-2.03%
			2510	1.909	38.303	1.866	39.123	2.30%	-2.10%
			2535	1.939	38.211	1.893	39.092	2.43%	-2.25%
			2550	1.957	38.159	1.909	39.073	2.51%	-2.34%
			2560	1.968	38.127	1.920	39.060	2.50%	-2.39%
			2600	2.012	37.995	1.964	39.009	2.44%	-2.60%
			2650	2.067	37.803	2.018	38.945	2.43%	-2.93%
			2680	2.101	37.697	2.051	38.907	2.44%	-3.11%
			2700	2.123	37.629	2.073	38.882	2.41%	-3.22%
08/09/2021	2450 Head	23.5	2400	1.791	39.480	1.756	39.289	1.99%	0.49%
			2450	1.846	39.302	1.800	39.200	2.56%	0.26%
			2480	1.877	39.199	1.833	39.162	2.40%	0.09%
			2500	1.899	39.125	1.855	39.136	2.37%	-0.03%
			2510	1.909	39.086	1.866	39.123	2.30%	-0.09%
			2535	1.937	38.989	1.893	39.092	2.32%	-0.26%
			2550	1.955	38.936	1.909	39.073	2.41%	-0.35%
			2560	1.966	38.904	1.920	39.060	2.40%	-0.40%
			2600	2.008	38.775	1.964	39.009	2.24%	-0.60%
			2650	2.062	38.586	2.018	38.945	2.18%	-0.92%
			2680	2.095	38.482	2.051	38.907	2.15%	-1.09%
			2700	2.116	38.416	2.073	38.882	2.07%	-1.20%
08/31/2021	2450 Head	22.4	2400	1.795	38.358	1.756	39.289	2.22%	-2.37%
			2450	1.832	38.289	1.800	39.200	1.78%	-2.32%
			2480	1.855	38.259	1.833	39.162	1.20%	-2.31%
			2500	1.869	38.227	1.855	39.136	0.75%	-2.32%
			2510	1.877	38.210	1.866	39.123	0.59%	-2.33%
			2535	1.898	38.165	1.893	39.092	0.26%	-2.37%
			2550	1.911	38.142	1.909	39.073	0.10%	-2.38%
			2560	1.919	38.131	1.920	39.060	-0.05%	-2.38%
			2600	1.950	38.080	1.964	39.009	-0.71%	-2.38%
			2650	1.988	37.986	2.018	38.945	-1.49%	-2.46%
			2680	2.012	37.946	2.051	38.907	-1.90%	-2.47%
			2700	2.027	37.918	2.073	38.882	-2.22%	-2.48%
08/22/2021	3600 Head	21.1	3300	2.611	38.115	2.708	38.157	-3.58%	-0.11%
			3350	2.654	38.013	2.759	38.100	-3.81%	-0.23%
			3450	2.741	37.833	2.861	37.986	-4.19%	-0.40%
			3500	2.788	37.729	2.913	37.929	-4.29%	-0.53%
			3550	2.837	37.649	2.964	37.871	-4.28%	-0.59%
			3560	2.843	37.638	2.974	37.860	-4.40%	-0.59%
			3600	2.875	37.550	3.015	37.814	-4.64%	-0.70%
			3650	2.928	37.489	3.066	37.757	-4.50%	-0.71%
			3690	2.958	37.432	3.107	37.711	-4.80%	-0.74%
			3700	2.966	37.407	3.117	37.700	-4.84%	-0.78%
			3750	3.027	37.323	3.169	37.643	-4.48%	-0.85%

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Table 10-3
Measured Head Tissue Properties Continued

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (˚C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
07/12/2021	5200-5800 Head	22.2	5180	4.474	34.834	4.635	36.009	-3.47%	-3.26%
			5190	4.484	34.825	4.645	35.998	-3.47%	-3.26%
			5200	4.494	34.804	4.655	35.986	-3.46%	-3.28%
			5210	4.505	34.781	4.666	35.975	-3.45%	-3.32%
			5220	4.518	34.758	4.676	35.963	-3.38%	-3.35%
			5240	4.540	34.730	4.696	35.940	-3.32%	-3.37%
			5250	4.552	34.708	4.706	35.929	-3.27%	-3.40%
			5260	4.564	34.688	4.717	35.917	-3.24%	-3.42%
			5270	4.574	34.671	4.727	35.906	-3.24%	-3.44%
			5280	4.585	34.656	4.737	35.894	-3.21%	-3.45%
			5290	4.593	34.645	4.748	35.883	-3.26%	-3.45%
			5300	4.605	34.635	4.758	35.871	-3.22%	-3.45%
			5310	4.617	34.618	4.768	35.860	-3.17%	-3.46%
			5320	4.627	34.594	4.778	35.849	-3.16%	-3.50%
			5500	4.822	34.279	4.963	35.643	-2.84%	-3.83%
			5510	4.834	34.266	4.973	35.632	-2.80%	-3.83%
			5520	4.847	34.252	4.983	35.620	-2.73%	-3.84%
			5530	4.860	34.237	4.994	35.609	-2.68%	-3.85%
			5540	4.873	34.217	5.004	35.597	-2.62%	-3.88%
			5550	4.886	34.197	5.014	35.586	-2.55%	-3.90%
			5560	4.898	34.184	5.024	35.574	-2.51%	-3.91%
			5580	4.920	34.164	5.045	35.551	-2.48%	-3.90%
			5600	4.939	34.118	5.065	35.529	-2.49%	-3.97%
			5610	4.950	34.100	5.076	35.518	-2.48%	-3.99%
			5620	4.962	34.083	5.086	35.506	-2.44%	-4.01%
			5640	4.984	34.046	5.106	35.483	-2.39%	-4.05%
			5660	5.010	34.016	5.127	35.460	-2.28%	-4.07%
			5670	5.021	34.009	5.137	35.449	-2.26%	-4.06%
			5680	5.031	34.000	5.147	35.437	-2.25%	-4.06%
			5690	5.040	33.994	5.158	35.426	-2.29%	-4.04%
			5700	5.051	33.973	5.168	35.414	-2.26%	-4.07%
			5710	5.064	33.954	5.178	35.403	-2.20%	-4.09%
			5720	5.075	33.937	5.188	35.391	-2.18%	-4.11%
			5745	5.099	33.889	5.214	35.363	-2.21%	-4.17%
			5750	5.106	33.877	5.219	35.357	-2.17%	-4.19%
			5755	5.112	33.868	5.224	35.351	-2.14%	-4.20%
			5765	5.124	33.854	5.234	35.340	-2.10%	-4.20%
			5775	5.134	33.839	5.245	35.329	-2.12%	-4.22%
			5785	5.143	33.829	5.255	35.317	-2.13%	-4.21%
			5795	5.153	33.818	5.265	35.305	-2.13%	-4.21%
			5805	5.165	33.806	5.275	35.294	-2.09%	-4.22%
			5825	5.186	33.770	5.296	35.271	-2.08%	-4.26%

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Table 10-4
Measured Body Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (˚C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
06/21/2021	750 Body	21.1	680	0.926	55.421	0.958	55.804	-3.34%	-0.69%
			695	0.932	55.392	0.959	55.745	-2.82%	-0.63%
			700	0.934	55.382	0.959	55.726	-2.61%	-0.62%
			710	0.938	55.360	0.960	55.687	-2.29%	-0.59%
			725	0.944	55.326	0.961	55.629	-1.77%	-0.54%
			750	0.953	55.251	0.964	55.531	-1.14%	-0.50%
			770	0.960	55.191	0.965	55.453	-0.52%	-0.47%
			785	0.965	55.159	0.966	55.395	-0.10%	-0.43%
			800	0.971	55.134	0.967	55.336	0.41%	-0.37%
06/23/2021	750 Body	22.5	680	0.940	55.376	0.958	55.804	-1.88%	-0.77%
			695	0.945	55.342	0.959	55.745	-1.46%	-0.72%
			700	0.947	55.331	0.959	55.726	-1.25%	-0.71%
			710	0.951	55.307	0.960	55.687	-0.94%	-0.68%
			725	0.956	55.273	0.961	55.629	-0.52%	-0.64%
			750	0.965	55.206	0.964	55.531	0.10%	-0.59%
			770	0.972	55.151	0.965	55.453	0.73%	-0.54%
			785	0.977	55.111	0.966	55.395	1.14%	-0.51%
			800	0.983	55.081	0.967	55.336	1.65%	-0.46%
07/22/2021	750 Body	21.4	680	0.938	54.817	0.958	55.804	-2.09%	-1.77%
			695	0.944	54.772	0.959	55.745	-1.56%	-1.75%
			700	0.945	54.758	0.959	55.726	-1.46%	-1.74%
			710	0.949	54.732	0.960	55.687	-1.15%	-1.71%
			725	0.954	54.703	0.961	55.629	-0.73%	-1.66%
			750	0.963	54.658	0.964	55.531	-0.10%	-1.57%
			770	0.971	54.609	0.965	55.453	0.62%	-1.52%
			785	0.976	54.566	0.966	55.395	1.04%	-1.50%
			800	0.982	54.523	0.967	55.336	1.55%	-1.47%
07/23/2021	750 Body	21.5	680	0.937	54.482	0.958	55.804	-2.19%	-2.37%
			695	0.943	54.450	0.959	55.745	-1.67%	-2.32%
			700	0.945	54.440	0.959	55.726	-1.46%	-2.31%
			710	0.949	54.416	0.960	55.687	-1.15%	-2.28%
			725	0.954	54.381	0.961	55.629	-0.73%	-2.24%
			750	0.963	54.322	0.964	55.531	-0.10%	-2.18%
			770	0.970	54.272	0.965	55.453	0.52%	-2.13%
			785	0.975	54.228	0.966	55.395	0.93%	-2.11%
			800	0.981	54.191	0.967	55.336	1.45%	-2.07%
07/25/2021	750 Body	20.7	680	0.930	55.166	0.958	55.804	-2.92%	-1.14%
			695	0.935	55.133	0.959	55.745	-2.50%	-1.10%
			700	0.937	55.123	0.959	55.726	-2.29%	-1.08%
			710	0.941	55.092	0.960	55.687	-1.98%	-1.07%
			725	0.947	55.049	0.961	55.629	-1.46%	-1.04%
			750	0.956	54.996	0.964	55.531	-0.83%	-0.96%
			770	0.964	54.954	0.965	55.453	-0.10%	-0.90%
			785	0.969	54.919	0.966	55.395	0.31%	-0.86%
			800	0.975	54.885	0.967	55.336	0.83%	-0.82%
07/27/2021	750 Body	22.5	680	0.953	54.276	0.958	55.804	-0.52%	-2.74%
			695	0.959	54.236	0.959	55.745	0.00%	-2.71%
			700	0.961	54.222	0.959	55.726	0.21%	-2.70%
			710	0.964	54.195	0.960	55.687	0.42%	-2.68%
			725	0.970	54.162	0.961	55.629	0.94%	-2.64%
			750	0.979	54.111	0.964	55.531	1.56%	-2.56%
			770	0.986	54.062	0.965	55.453	2.18%	-2.51%
			785	0.992	54.019	0.966	55.395	2.69%	-2.48%
			800	0.998	53.974	0.967	55.336	3.21%	-2.46%
07/29/2021	750 Body	21.5	680	0.961	53.843	0.958	55.804	0.31%	-3.51%
			695	0.967	53.805	0.959	55.745	0.83%	-3.48%
			700	0.969	53.790	0.959	55.726	1.04%	-3.47%
			710	0.972	53.763	0.960	55.687	1.25%	-3.46%
			725	0.978	53.726	0.961	55.629	1.77%	-3.42%
			750	0.987	53.664	0.964	55.531	2.39%	-3.36%
			770	0.993	53.613	0.965	55.453	2.90%	-3.32%
			785	0.999	53.574	0.966	55.395	3.42%	-3.29%
			800	1.005	53.541	0.967	55.336	3.93%	-3.24%
08/04/2021	750 Body	21.9	680	0.957	54.425	0.958	55.804	-0.10%	-2.47%
			695	0.963	54.388	0.959	55.745	0.42%	-2.43%
			700	0.965	54.374	0.959	55.726	0.63%	-2.43%
			710	0.968	54.353	0.960	55.687	0.83%	-2.40%
			725	0.974	54.322	0.961	55.629	1.35%	-2.35%
			750	0.983	54.266	0.964	55.531	1.97%	-2.28%
			770	0.990	54.208	0.965	55.453	2.59%	-2.25%
			785	0.996	54.163	0.966	55.395	3.11%	-2.22%
			800	1.001	54.130	0.967	55.336	3.52%	-2.18%

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Table 10-5
Measured Body Tissue Properties Continued

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
08/06/2021	750 Body	21.2	680	0.945	54.715	0.958	55.804	-1.36%	-1.95%
			695	0.951	54.671	0.959	55.745	-0.83%	-1.93%
			700	0.953	54.656	0.959	55.726	-0.63%	-1.92%
			710	0.957	54.624	0.960	55.687	-0.31%	-1.91%
			725	0.962	54.582	0.961	55.629	0.10%	-1.88%
			750	0.971	54.516	0.964	55.531	0.73%	-1.83%
			770	0.977	54.474	0.965	55.453	1.24%	-1.77%
			785	0.983	54.442	0.966	55.395	1.76%	-1.72%
			800	0.989	54.409	0.967	55.336	2.28%	-1.68%
08/16/2021	750 Body	21.4	680	0.936	54.273	0.958	55.804	-2.30%	-2.74%
			695	0.941	54.230	0.959	55.745	-1.88%	-2.72%
			700	0.944	54.218	0.959	55.726	-1.56%	-2.71%
			710	0.948	54.196	0.960	55.687	-1.25%	-2.68%
			725	0.954	54.170	0.961	55.629	-0.73%	-2.62%
			750	0.964	54.108	0.964	55.531	0.00%	-2.56%
			770	0.972	54.046	0.965	55.453	0.73%	-2.54%
			785	0.977	54.001	0.966	55.395	1.14%	-2.52%
			800	0.982	53.961	0.967	55.336	1.55%	-2.48%
08/20/2021	750 Body	21.7	680	0.953	53.187	0.958	55.804	-0.52%	-4.69%
			695	0.958	53.137	0.959	55.745	-0.10%	-4.68%
			700	0.960	53.124	0.959	55.726	0.10%	-4.67%
			710	0.963	53.100	0.960	55.687	0.31%	-4.65%
			725	0.968	53.071	0.961	55.629	0.73%	-4.60%
			750	0.978	53.026	0.964	55.531	1.45%	-4.51%
			770	0.985	52.980	0.965	55.453	2.07%	-4.46%
			785	0.991	52.935	0.966	55.395	2.59%	-4.44%
			800	0.996	52.894	0.967	55.336	3.00%	-4.41%
07/25/2021	835 Body	22.0	815	0.928	53.616	0.968	55.271	-4.13%	-2.99%
			820	0.933	53.568	0.969	55.258	-3.72%	-3.06%
			835	0.949	53.425	0.970	55.200	-2.16%	-3.22%
			850	0.965	53.284	0.988	55.154	-2.33%	-3.39%
07/27/2021	835 Body	23.5	815	0.930	54.714	0.968	55.271	-3.93%	-1.01%
			820	0.935	54.672	0.969	55.258	-3.51%	-1.06%
			835	0.950	54.548	0.970	55.200	-2.06%	-1.18%
			850	0.965	54.418	0.988	55.154	-2.33%	-1.33%
07/27/2021	835 Body	22.9	815	0.920	53.260	0.968	55.271	-4.96%	-3.64%
			820	0.925	53.212	0.969	55.258	-4.54%	-3.70%
			835	0.940	53.076	0.970	55.200	-3.09%	-3.85%
			850	0.956	52.943	0.988	55.154	-3.24%	-4.01%
07/29/2021	835 Body	21.8	815	0.920	53.140	0.968	55.271	-4.96%	-3.86%
			820	0.925	53.091	0.969	55.258	-4.54%	-3.92%
			835	0.941	52.945	0.970	55.200	-2.99%	-4.09%
			850	0.957	52.790	0.988	55.154	-3.14%	-4.29%
08/01/2021	835 Body	21.5	815	0.920	55.257	0.968	55.271	-4.96%	-0.03%
			820	0.925	55.212	0.969	55.258	-4.54%	-0.08%
			835	0.940	55.081	0.970	55.200	-3.09%	-0.22%
			850	0.955	54.953	0.988	55.154	-3.34%	-0.36%
08/05/2021	835 Body	22.3	815	0.921	53.800	0.968	55.271	-4.86%	-2.66%
			820	0.927	53.753	0.969	55.258	-4.33%	-2.72%
			835	0.943	53.612	0.970	55.200	-2.78%	-2.88%
			850	0.958	53.463	0.988	55.154	-3.04%	-3.07%
08/08/2021	835 Body	22.1	815	0.924	53.534	0.968	55.271	-4.55%	-3.14%
			820	0.929	53.485	0.969	55.258	-4.13%	-3.21%
			835	0.945	53.336	0.970	55.200	-2.58%	-3.38%
			850	0.960	53.187	0.988	55.154	-2.83%	-3.57%
08/10/2021	835 Body	23.3	815	0.920	52.855	0.968	55.271	-4.96%	-4.37%
			820	0.925	52.811	0.969	55.258	-4.54%	-4.43%
			835	0.941	52.680	0.970	55.200	-2.99%	-4.57%
			850	0.957	52.539	0.988	55.154	-3.14%	-4.74%
08/12/2021	835 Body	22.7	815	0.924	54.008	0.968	55.271	-4.55%	-2.29%
			820	0.929	53.963	0.969	55.258	-4.13%	-2.34%
			835	0.945	53.828	0.970	55.200	-2.58%	-2.49%
			850	0.960	53.687	0.988	55.154	-2.83%	-2.66%
06/23/2021	1750 Body	22.7	1710	1.458	51.558	1.463	53.537	-0.34%	-3.70%
			1720	1.467	51.519	1.469	53.511	-0.14%	-3.72%
			1745	1.493	51.419	1.485	53.445	0.54%	-3.79%
			1750	1.499	51.397	1.488	53.432	0.74%	-3.81%
			1770	1.521	51.323	1.501	53.379	1.33%	-3.85%
			1790	1.542	51.260	1.514	53.326	1.85%	-3.87%
07/21/2021	1750 Body	22.0	1710	1.492	52.097	1.463	53.537	1.98%	-2.69%
			1720	1.502	52.048	1.469	53.511	2.25%	-2.73%
			1745	1.532	51.968	1.485	53.445	3.16%	-2.76%
			1750	1.539	51.957	1.488	53.432	3.43%	-2.76%
			1770	1.562	51.913	1.501	53.379	4.06%	-2.75%
			1790	1.582	51.843	1.514	53.326	4.49%	-2.78%

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Table 10-6
Measured Body Tissue Properties Continued

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (˚C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
07/25/2021	1750 Body	22.1	1710	1.496	51.978	1.463	53.537	2.26%	-2.91%
			1720	1.506	51.944	1.469	53.511	2.52%	-2.93%
			1745	1.535	51.855	1.485	53.445	3.37%	-2.98%
			1750	1.540	51.837	1.488	53.432	3.49%	-2.99%
			1770	1.563	51.761	1.501	53.379	4.13%	-3.03%
			1790	1.586	51.684	1.514	53.326	4.76%	-3.08%
07/27/2021	1750 Body	23.3	1710	1.496	52.280	1.463	53.537	2.26%	-2.35%
			1720	1.506	52.241	1.469	53.511	2.52%	-2.37%
			1745	1.533	52.130	1.485	53.445	3.23%	-2.46%
			1750	1.539	52.107	1.488	53.432	3.43%	-2.48%
			1770	1.561	52.027	1.501	53.379	4.00%	-2.53%
			1790	1.583	51.958	1.514	53.326	4.56%	-2.57%
07/29/2021	1750 Body	23.1	1710	1.459	52.384	1.463	53.537	-0.27%	-2.15%
			1720	1.470	52.351	1.469	53.511	0.07%	-2.17%
			1745	1.497	52.267	1.485	53.445	0.81%	-2.20%
			1750	1.503	52.250	1.488	53.432	1.01%	-2.21%
			1770	1.525	52.184	1.501	53.379	1.60%	-2.24%
			1790	1.547	52.112	1.514	53.326	2.18%	-2.28%
06/24/2021	1900 Body	25.0	1850	1.479	52.279	1.520	53.300	-2.70%	-1.92%
			1860	1.489	52.240	1.520	53.300	-2.04%	-1.99%
			1880	1.511	52.165	1.520	53.300	-0.59%	-2.13%
			1900	1.532	52.096	1.520	53.300	0.79%	-2.26%
			1905	1.538	52.080	1.520	53.300	1.18%	-2.29%
			1910	1.543	52.063	1.520	53.300	1.51%	-2.32%
07/22/2021	1900 Body	23.6	1850	1.516	51.565	1.520	53.300	-0.26%	-3.26%
			1860	1.527	51.526	1.520	53.300	0.46%	-3.33%
			1880	1.549	51.456	1.520	53.300	1.91%	-3.46%
			1900	1.571	51.392	1.520	53.300	3.36%	-3.58%
			1905	1.577	51.375	1.520	53.300	3.75%	-3.61%
			1910	1.582	51.357	1.520	53.300	4.08%	-3.65%
07/25/2021	1900 Body	23.2	1850	1.527	51.212	1.520	53.300	0.46%	-3.92%
			1860	1.538	51.176	1.520	53.300	1.18%	-3.98%
			1880	1.560	51.111	1.520	53.300	2.63%	-4.11%
			1900	1.583	51.053	1.520	53.300	4.14%	-4.22%
			1905	1.588	51.037	1.520	53.300	4.47%	-4.25%
			1910	1.594	51.020	1.520	53.300	4.87%	-4.28%
07/27/2021	1900 Body	23.8	1850	1.528	51.072	1.520	53.300	0.53%	-4.18%
			1860	1.539	51.035	1.520	53.300	1.25%	-4.25%
			1880	1.561	50.968	1.520	53.300	2.70%	-4.38%
			1900	1.583	50.899	1.520	53.300	4.14%	-4.50%
			1905	1.589	50.882	1.520	53.300	4.54%	-4.54%
			1910	1.594	50.863	1.520	53.300	4.87%	-4.57%
08/01/2021	1900 Body	23.0	1850	1.504	51.433	1.520	53.300	-1.05%	-3.50%
			1860	1.515	51.392	1.520	53.300	-0.33%	-3.58%
			1880	1.537	51.318	1.520	53.300	1.12%	-3.72%
			1900	1.558	51.242	1.520	53.300	2.50%	-3.86%
			1905	1.564	51.222	1.520	53.300	2.89%	-3.90%
			1910	1.569	51.202	1.520	53.300	3.22%	-3.94%
08/10/2021	1900 Body	23.6	1850	1.507	52.891	1.520	53.300	-0.86%	-0.77%
			1860	1.518	52.860	1.520	53.300	-0.13%	-0.83%
			1880	1.541	52.795	1.520	53.300	1.38%	-0.95%
			1900	1.565	52.740	1.520	53.300	2.96%	-1.05%
			1905	1.571	52.730	1.520	53.300	3.36%	-1.07%
			1910	1.576	52.720	1.520	53.300	3.68%	-1.09%
08/12/2021	1900 Body	23.1	1850	1.516	52.990	1.520	53.300	-0.26%	-0.58%
			1860	1.528	52.958	1.520	53.300	0.53%	-0.64%
			1880	1.551	52.892	1.520	53.300	2.04%	-0.77%
			1900	1.574	52.815	1.520	53.300	3.55%	-0.91%
			1905	1.580	52.796	1.520	53.300	3.95%	-0.95%
			1910	1.586	52.779	1.520	53.300	4.34%	-0.98%
08/16/2021	1900 Body	23.4	1850	1.493	52.205	1.520	53.300	-1.78%	-2.05%
			1860	1.504	52.164	1.520	53.300	-1.05%	-2.13%
			1880	1.527	52.087	1.520	53.300	0.46%	-2.28%
			1900	1.551	52.022	1.520	53.300	2.04%	-2.40%
			1905	1.556	52.009	1.520	53.300	2.37%	-2.42%
			1910	1.562	51.995	1.520	53.300	2.76%	-2.45%
08/19/2021	1900 Body	23.4	1850	1.498	52.591	1.520	53.300	-1.45%	-1.33%
			1860	1.509	52.559	1.520	53.300	-0.72%	-1.39%
			1880	1.533	52.495	1.520	53.300	0.86%	-1.51%
			1900	1.556	52.436	1.520	53.300	2.37%	-1.62%
			1905	1.562	52.421	1.520	53.300	2.76%	-1.65%
			1910	1.567	52.407	1.520	53.300	3.09%	-1.68%
08/23/2021	1900 Body	23.1	1850	1.484	51.984	1.520	53.300	-2.37%	-2.47%
			1860	1.495	51.954	1.520	53.300	-1.64%	-2.53%
			1880	1.517	51.892	1.520	53.300	-0.20%	-2.64%
			1900	1.539	51.836	1.520	53.300	1.25%	-2.75%
			1905	1.544	51.825	1.520	53.300	1.58%	-2.77%
			1910	1.550	51.814	1.520	53.300	1.97%	-2.79%

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Table 10-7
Measured Body Tissue Properties Continued

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
09/05/2021	1900 Body	23.1	1850	1.512	52.818	1.520	53.300	-0.53%	-0.90%
			1860	1.522	52.782	1.520	53.300	0.13%	-0.97%
			1880	1.543	52.724	1.520	53.300	1.51%	-1.08%
			1900	1.565	52.679	1.520	53.300	2.96%	-1.17%
			1905	1.570	52.669	1.520	53.300	3.29%	-1.18%
			1910	1.575	52.660	1.520	53.300	3.62%	-1.20%
06/21/2021	2450 Body	23.8	2300	1.853	53.075	1.809	52.900	2.43%	0.33%
			2310	1.865	53.054	1.816	52.887	2.70%	0.32%
			2320	1.877	53.032	1.826	52.873	2.79%	0.30%
			2400	1.973	52.836	1.902	52.767	3.73%	0.13%
			2450	2.034	52.689	1.950	52.700	4.31%	-0.02%
			2480	2.069	52.606	1.993	52.662	3.81%	-0.11%
			2500	2.092	52.546	2.021	52.636	3.51%	-0.17%
			2510	2.104	52.515	2.035	52.623	3.39%	-0.21%
			2535	2.134	52.439	2.071	52.592	3.04%	-0.29%
			2550	2.152	52.398	2.092	52.573	2.87%	-0.33%
			2560	2.164	52.369	2.106	52.560	2.75%	-0.36%
			2600	2.211	52.251	2.163	52.509	2.22%	-0.49%
			2650	2.271	52.104	2.234	52.445	1.66%	-0.65%
			2680	2.306	52.020	2.277	52.407	1.27%	-0.74%
			2700	2.329	51.959	2.305	52.382	1.04%	-0.81%
06/23/2021	2450 Body	24.9	2400	1.961	51.549	1.902	52.767	3.10%	-2.31%
			2450	2.004	51.480	1.950	52.700	2.77%	-2.31%
			2480	2.028	51.432	1.993	52.662	1.76%	-2.34%
			2500	2.046	51.403	2.021	52.636	1.24%	-2.34%
06/27/2021	2450 Body	24.9	2400	1.973	51.944	1.902	52.767	3.73%	-1.56%
			2450	2.017	51.871	1.950	52.700	3.44%	-1.57%
			2480	2.041	51.835	1.993	52.662	2.41%	-1.57%
			2500	2.057	51.807	2.021	52.636	1.78%	-1.57%
06/29/2021	2450 Body	24.7	2400	1.976	51.697	1.902	52.767	3.89%	-2.03%
			2450	2.019	51.633	1.950	52.700	3.54%	-2.02%
			2480	2.044	51.597	1.993	52.662	2.56%	-2.02%
			2500	2.060	51.569	2.021	52.636	1.93%	-2.03%
07/16/2021	2450 Body	22.0	2300	1.894	52.496	1.809	52.900	4.70%	-0.76%
			2310	1.902	52.480	1.816	52.887	4.74%	-0.77%
			2320	1.910	52.468	1.826	52.873	4.60%	-0.77%
			2400	1.977	52.406	1.902	52.767	3.94%	-0.68%
			2450	2.022	52.335	1.950	52.700	3.69%	-0.69%
07/19/2021	2450 Body	24.2	2400	1.910	51.698	1.902	52.767	0.42%	-2.03%
			2450	1.967	51.593	1.950	52.700	0.87%	-2.10%
			2480	2.001	51.527	1.993	52.662	0.40%	-2.16%
			2500	2.023	51.473	2.021	52.636	0.10%	-2.21%
			2510	2.035	51.445	2.035	52.623	0.00%	-2.24%
			2535	2.066	51.376	2.071	52.592	-0.24%	-2.31%
			2550	2.084	51.340	2.092	52.573	-0.38%	-2.35%
			2560	2.095	51.316	2.106	52.560	-0.52%	-2.37%
			2600	2.143	51.210	2.163	52.509	-0.92%	-2.47%
			2650	2.201	51.060	2.234	52.445	-1.48%	-2.64%
			2680	2.236	50.975	2.277	52.407	-1.80%	-2.73%
			2700	2.259	50.920	2.305	52.382	-2.00%	-2.79%
07/22/2021	2450 Body	24.2	2400	1.874	51.152	1.902	52.767	-1.47%	-3.06%
			2450	1.928	51.041	1.950	52.700	-1.13%	-3.15%
			2480	1.960	50.974	1.993	52.662	-1.66%	-3.21%
			2500	1.982	50.924	2.021	52.636	-1.93%	-3.25%
			2510	1.993	50.898	2.035	52.623	-2.06%	-3.28%
			2535	2.022	50.829	2.071	52.592	-2.37%	-3.35%
			2550	2.039	50.790	2.092	52.573	-2.53%	-3.39%
			2560	2.051	50.765	2.106	52.560	-2.61%	-3.42%
			2600	2.094	50.666	2.163	52.509	-3.19%	-3.51%
			2650	2.149	50.519	2.234	52.445	-3.80%	-3.67%
			2680	2.182	50.434	2.277	52.407	-4.17%	-3.76%
			2700	2.204	50.380	2.305	52.382	-4.38%	-3.82%
07/25/2021	2450 Body	24.5	2400	1.981	52.065	1.902	52.767	4.15%	-1.33%
			2450	2.038	51.924	1.950	52.700	4.51%	-1.47%
			2480	2.073	51.850	1.993	52.662	4.01%	-1.54%
			2500	2.096	51.797	2.021	52.636	3.71%	-1.59%
			2510	2.108	51.769	2.035	52.623	3.59%	-1.62%
			2535	2.138	51.700	2.071	52.592	3.24%	-1.70%
			2550	2.156	51.660	2.092	52.573	3.06%	-1.74%
			2560	2.169	51.636	2.106	52.560	2.99%	-1.76%
			2600	2.217	51.533	2.163	52.509	2.50%	-1.86%
			2650	2.277	51.385	2.234	52.445	1.92%	-2.02%
			2680	2.314	51.300	2.277	52.407	1.62%	-2.11%
			2700	2.339	51.242	2.305	52.382	1.48%	-2.18%

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Table 10-8
Measured Body Tissue Properties Continued

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (˚C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
07/28/2021	2450 Body	23.8	2400	1.981	51.204	1.902	52.767	4.15%	-2.96%
			2450	2.040	51.061	1.950	52.700	4.62%	-3.11%
			2480	2.071	50.944	1.993	52.662	3.91%	-3.26%
			2500	2.093	50.837	2.021	52.636	3.56%	-3.42%
			2510	2.104	50.778	2.035	52.623	3.39%	-3.51%
			2535	2.133	50.616	2.071	52.592	2.99%	-3.76%
			2550	2.150	50.512	2.092	52.573	2.77%	-3.92%
			2560	2.160	50.441	2.106	52.560	2.56%	-4.03%
			2600	2.196	50.169	2.163	52.509	1.53%	-4.46%
			2650	2.252	49.914	2.234	52.445	0.81%	-4.83%
			2680	2.289	49.833	2.277	52.407	0.53%	-4.91%
			2700	2.312	49.781	2.305	52.382	0.30%	-4.97%
08/02/2021	2450 Body	23.5	2400	1.988	50.879	1.902	52.767	4.52%	-3.58%
			2450	2.043	50.774	1.950	52.700	4.77%	-3.65%
			2480	2.075	50.702	1.993	52.662	4.11%	-3.72%
			2500	2.098	50.649	2.021	52.636	3.81%	-3.77%
			2510	2.111	50.622	2.035	52.623	3.73%	-3.80%
			2535	2.142	50.553	2.071	52.592	3.43%	-3.88%
			2550	2.159	50.516	2.092	52.573	3.20%	-3.91%
			2560	2.171	50.494	2.106	52.560	3.09%	-3.93%
			2600	2.213	50.379	2.163	52.509	2.31%	-4.06%
			2650	2.273	50.195	2.234	52.445	1.75%	-4.29%
			2680	2.308	50.096	2.277	52.407	1.36%	-4.41%
			2700	2.330	50.017	2.305	52.382	1.08%	-4.51%
08/09/2021	2450 Body	23.4	2300	1.849	52.576	1.809	52.900	2.21%	-0.61%
			2310	1.861	52.553	1.816	52.887	2.48%	-0.63%
			2320	1.873	52.532	1.826	52.873	2.57%	-0.64%
			2400	1.967	52.337	1.902	52.767	3.42%	-0.81%
08/11/2021	2450 Body	21.8	2300	1.894	52.800	1.809	52.900	4.70%	-0.19%
			2310	1.904	52.785	1.816	52.887	4.85%	-0.19%
			2320	1.914	52.772	1.826	52.873	4.82%	-0.19%
			2400	1.991	52.653	1.902	52.767	4.68%	-0.22%
08/12/2021	2450 Body	24.2	2400	1.992	51.461	1.902	52.767	4.73%	-2.48%
			2450	2.046	51.252	1.950	52.700	4.92%	-2.75%
			2480	2.081	51.139	1.993	52.662	4.42%	-2.89%
			2500	2.103	51.074	2.021	52.636	4.06%	-2.97%
			2510	2.114	51.041	2.035	52.623	3.88%	-3.01%
			2535	2.142	50.940	2.071	52.592	3.43%	-3.14%
			2550	2.158	50.875	2.092	52.573	3.15%	-3.23%
			2560	2.169	50.829	2.106	52.560	2.99%	-3.29%
			2600	2.217	50.666	2.163	52.509	2.50%	-3.51%
			2650	2.275	50.493	2.234	52.445	1.84%	-3.72%
			2680	2.311	50.359	2.277	52.407	1.49%	-3.91%
			2700	2.335	50.270	2.305	52.382	1.30%	-4.03%
08/15/2021	2450 Body	24.4	2300	1.840	52.151	1.809	52.900	1.71%	-1.42%
			2310	1.851	52.126	1.816	52.887	1.93%	-1.44%
			2320	1.863	52.101	1.826	52.873	2.03%	-1.46%
			2400	1.958	51.889	1.902	52.767	2.94%	-1.66%
			2450	2.016	51.744	1.950	52.700	3.38%	-1.81%
08/17/2021	2450 Body	23.7	2400	1.981	51.226	1.902	52.767	4.15%	-2.92%
			2450	2.038	51.087	1.950	52.700	4.51%	-3.06%
			2480	2.073	51.012	1.993	52.662	4.01%	-3.13%
			2500	2.096	50.960	2.021	52.636	3.71%	-3.18%
			2510	2.108	50.931	2.035	52.623	3.59%	-3.22%
			2535	2.137	50.855	2.071	52.592	3.19%	-3.30%
			2550	2.155	50.811	2.092	52.573	3.01%	-3.35%
			2560	2.167	50.785	2.106	52.560	2.90%	-3.38%
			2600	2.212	50.681	2.163	52.509	2.27%	-3.48%
			2650	2.270	50.528	2.234	52.445	1.61%	-3.66%
			2680	2.305	50.433	2.277	52.407	1.23%	-3.77%
			2700	2.328	50.371	2.305	52.382	1.00%	-3.84%
08/19/2021	2450 Body	24.4	2400	1.974	50.903	1.902	52.767	3.79%	-3.53%
			2450	2.031	50.775	1.950	52.700	4.15%	-3.65%
			2480	2.065	50.699	1.993	52.662	3.61%	-3.73%
			2500	2.089	50.646	2.021	52.636	3.36%	-3.78%
			2510	2.101	50.617	2.035	52.623	3.24%	-3.81%
			2535	2.131	50.542	2.071	52.592	2.90%	-3.90%
			2550	2.150	50.501	2.092	52.573	2.77%	-3.94%
			2560	2.161	50.473	2.106	52.560	2.61%	-3.97%
			2600	2.208	50.358	2.163	52.509	2.08%	-4.10%
			2650	2.267	50.201	2.234	52.445	1.48%	-4.28%
			2680	2.302	50.112	2.277	52.407	1.10%	-4.38%
			2700	2.325	50.050	2.305	52.382	0.87%	-4.45%
08/23/2021	2450 Body	21.8	2400	1.920	51.959	1.902	52.767	0.95%	-1.53%
			2450	1.989	51.779	1.950	52.700	2.00%	-1.75%
			2480	2.030	51.675	1.993	52.662	1.86%	-1.87%
			2500	2.058	51.600	2.021	52.636	1.83%	-1.97%
			2510	2.072	51.561	2.035	52.623	1.82%	-2.02%
			2535	2.109	51.461	2.071	52.592	1.83%	-2.15%
			2550	2.131	51.404	2.092	52.573	1.86%	-2.22%
			2560	2.146	51.370	2.106	52.560	1.90%	-2.26%
			2600	2.202	51.224	2.163	52.509	1.80%	-2.45%
			2650	2.273	51.025	2.234	52.445	1.75%	-2.71%
			2680	2.316	50.915	2.277	52.407	1.71%	-2.85%
			2700	2.344	50.838	2.305	52.382	1.69%	-2.95%

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Table 10-9
Measured Body Tissue Properties Continued

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
08/29/2021	2450 Body	24.0	2400	1.940	52.133	1.902	52.767	2.00%	-1.20%
			2450	2.009	51.978	1.950	52.700	3.03%	-1.37%
			2480	2.051	51.885	1.993	52.662	2.91%	-1.48%
			2500	2.079	51.816	2.021	52.636	2.87%	-1.56%
			2510	2.094	51.779	2.035	52.623	2.90%	-1.60%
			2535	2.131	51.684	2.071	52.592	2.90%	-1.73%
			2550	2.153	51.630	2.092	52.573	2.92%	-1.79%
			2560	2.167	51.594	2.106	52.560	2.90%	-1.84%
			2600	2.223	51.445	2.163	52.509	2.77%	-2.03%
			2650	2.293	51.240	2.234	52.445	2.64%	-2.30%
			2680	2.335	51.115	2.277	52.407	2.55%	-2.47%
			2700	2.362	51.033	2.305	52.382	2.47%	-2.58%
08/06/2021	3600 Body	22.6	3500	3.412	49.384	3.314	51.321	2.96%	-3.77%
			3550	3.466	49.301	3.372	51.254	2.79%	-3.81%
			3560	3.479	49.287	3.384	51.240	2.81%	-3.81%
			3600	3.520	49.246	3.431	51.186	2.59%	-3.79%
			3650	3.569	49.160	3.489	51.118	2.29%	-3.83%
			3690	3.610	49.108	3.536	51.063	2.09%	-3.83%
			3700	3.621	49.092	3.548	51.050	2.06%	-3.84%
08/09/2021	3600 Body	21.8	3500	3.425	49.400	3.314	51.321	3.35%	-3.74%
			3550	3.478	49.312	3.372	51.254	3.14%	-3.79%
			3560	3.490	49.297	3.384	51.240	3.13%	-3.79%
			3600	3.532	49.253	3.431	51.186	2.94%	-3.78%
			3650	3.580	49.174	3.489	51.118	2.61%	-3.80%
			3690	3.624	49.121	3.536	51.063	2.49%	-3.80%
			3700	3.635	49.103	3.548	51.050	2.45%	-3.81%
08/23/2021	3600 Body	22.0	3500	3.423	49.320	3.314	51.321	3.29%	-3.90%
			3550	3.478	49.227	3.372	51.254	3.14%	-3.95%
			3560	3.490	49.215	3.384	51.240	3.13%	-3.95%
			3600	3.531	49.172	3.431	51.186	2.91%	-3.93%
			3650	3.581	49.094	3.489	51.118	2.64%	-3.96%
			3690	3.624	49.039	3.536	51.063	2.49%	-3.96%
			3700	3.635	49.022	3.548	51.050	2.45%	-3.97%
06/21/2021	5200-5800 Body	21.9	5180	5.171	50.164	5.276	49.041	-1.99%	2.29%
			5190	5.184	50.160	5.288	49.028	-1.97%	2.31%
			5200	5.199	50.141	5.299	49.014	-1.89%	2.30%
			5210	5.213	50.117	5.311	49.001	-1.85%	2.28%
			5220	5.225	50.098	5.323	48.987	-1.84%	2.27%
			5240	5.254	50.054	5.346	48.960	-1.72%	2.23%
			5250	5.271	50.023	5.358	48.947	-1.62%	2.20%
			5260	5.286	50.009	5.369	48.933	-1.55%	2.20%
			5270	5.299	50.000	5.381	48.919	-1.52%	2.21%
			5280	5.316	49.995	5.393	48.906	-1.43%	2.23%
			5290	5.331	49.989	5.404	48.892	-1.35%	2.24%
			5300	5.347	49.986	5.416	48.879	-1.27%	2.26%
			5310	5.362	49.985	5.428	48.865	-1.22%	2.29%
			5320	5.378	49.970	5.439	48.851	-1.12%	2.29%
			5500	5.644	49.726	5.650	48.607	-0.11%	2.30%
			5510	5.660	49.713	5.661	48.594	-0.02%	2.30%
			5520	5.679	49.702	5.673	48.580	0.11%	2.31%
			5530	5.697	49.691	5.685	48.566	0.21%	2.32%
			5540	5.712	49.680	5.696	48.553	0.28%	2.32%
			5550	5.728	49.672	5.708	48.539	0.35%	2.33%
			5560	5.741	49.666	5.720	48.526	0.37%	2.35%
			5580	5.767	49.626	5.743	48.499	0.42%	2.32%
			5600	5.792	49.575	5.766	48.471	0.45%	2.28%
			5610	5.807	49.559	5.778	48.458	0.50%	2.27%
			5620	5.823	49.545	5.790	48.444	0.57%	2.27%
			5640	5.856	49.519	5.813	48.417	0.74%	2.28%
			5660	5.886	49.504	5.837	48.390	0.84%	2.30%
			5670	5.898	49.497	5.848	48.376	0.85%	2.32%
			5680	5.910	49.474	5.860	48.363	0.85%	2.30%
			5690	5.922	49.443	5.872	48.349	0.85%	2.26%
			5700	5.936	49.410	5.883	48.336	0.90%	2.22%
			5710	5.950	49.388	5.895	48.322	0.93%	2.21%
			5720	5.965	49.374	5.907	48.309	0.98%	2.20%
			5745	6.003	49.319	5.936	48.275	1.13%	2.16%
			5750	6.011	49.313	5.942	48.268	1.16%	2.16%
			5755	6.019	49.311	5.947	48.261	1.21%	2.18%
			5765	6.032	49.305	5.959	48.248	1.23%	2.19%
			5775	6.045	49.294	5.971	48.234	1.24%	2.20%
			5785	6.056	49.272	5.982	48.220	1.24%	2.18%
			5795	6.068	49.249	5.994	48.207	1.23%	2.16%
			5800	6.074	49.239	6.000	48.200	1.23%	2.16%
			5805	6.082	49.228	6.006	48.193	1.27%	2.15%
			5825	6.109	49.169	6.029	48.166	1.33%	2.08%

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Table 10-10
Measured Body Tissue Properties Continued

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
			5180	5.282	48.243	5.276	49.041	0.11%	-1.63%
			5190	5.293	48.231	5.288	49.028	0.09%	-1.63%
			5200	5.305	48.207	5.299	49.014	0.11%	-1.65%
			5210	5.319	48.182	5.311	49.001	0.15%	-1.67%
			5220	5.330	48.166	5.323	48.987	0.13%	-1.68%
			5240	5.353	48.149	5.346	48.960	0.13%	-1.66%
			5250	5.365	48.130	5.358	48.947	0.13%	-1.67%
			5260	5.377	48.103	5.369	48.933	0.15%	-1.70%
			5270	5.390	48.063	5.381	48.919	0.17%	-1.75%
			5280	5.402	48.011	5.393	48.906	0.17%	-1.83%
			5290	5.413	47.967	5.404	48.892	0.17%	-1.89%
			5300	5.425	47.928	5.416	48.879	0.17%	-1.95%
			5310	5.437	47.909	5.428	48.865	0.17%	-1.96%
			5320	5.452	47.893	5.439	48.851	0.24%	-1.96%
			5500	5.682	47.430	5.650	48.607	0.57%	-2.42%
			5510	5.696	47.395	5.661	48.594	0.62%	-2.47%
			5520	5.711	47.360	5.673	48.580	0.67%	-2.51%
			5530	5.727	47.328	5.685	48.566	0.74%	-2.55%
			5540	5.743	47.302	5.696	48.553	0.83%	-2.58%
			5550	5.763	47.283	5.708	48.539	0.96%	-2.59%
			5560	5.783	47.268	5.720	48.526	1.10%	-2.59%
06/27/2021	5200-5800 Body	24.0	5580	5.813	47.235	5.743	48.499	1.22%	-2.61%
			5600	5.839	47.199	5.766	48.471	1.27%	-2.62%
			5610	5.854	47.176	5.778	48.458	1.32%	-2.65%
			5620	5.868	47.148	5.790	48.444	1.35%	-2.68%
			5640	5.895	47.103	5.813	48.417	1.41%	-2.71%
			5660	5.934	47.067	5.837	48.390	1.66%	-2.73%
			5670	5.952	47.057	5.848	48.376	1.78%	-2.73%
			5680	5.968	47.056	5.860	48.363	1.84%	-2.70%
			5690	5.983	47.054	5.872	48.349	1.89%	-2.68%
			5700	6.000	47.047	5.883	48.336	1.99%	-2.67%
			5710	6.016	47.036	5.895	48.322	2.05%	-2.66%
			5720	6.029	47.022	5.907	48.309	2.07%	-2.66%
			5745	6.063	46.973	5.936	48.275	2.14%	-2.70%
			5750	6.071	46.963	5.942	48.268	2.17%	-2.70%
			5755	6.079	46.953	5.947	48.261	2.22%	-2.71%
			5765	6.093	46.940	5.959	48.248	2.25%	-2.71%
			5775	6.109	46.933	5.971	48.234	2.31%	-2.70%
			5785	6.127	46.934	5.982	48.220	2.42%	-2.67%
			5795	6.145	46.932	5.994	48.207	2.52%	-2.64%
			5800	6.153	46.929	6.000	48.200	2.55%	-2.64%
			5805	6.162	46.926	6.006	48.193	2.60%	-2.63%
			5825	6.191	46.915	6.029	48.166	2.69%	-2.60%
			5180	5.271	47.995	5.276	49.041	-0.09%	-2.13%
			5190	5.284	47.985	5.288	49.028	-0.08%	-2.13%
			5200	5.297	47.962	5.299	49.014	-0.04%	-2.15%
			5210	5.307	47.928	5.311	49.001	-0.08%	-2.19%
			5220	5.322	47.891	5.323	48.987	-0.02%	-2.24%
			5240	5.357	47.846	5.346	48.960	0.21%	-2.28%
			5250	5.372	47.831	5.358	48.947	0.26%	-2.28%
			5260	5.382	47.812	5.369	48.933	0.24%	-2.29%
			5270	5.397	47.797	5.381	48.919	0.30%	-2.29%
			5280	5.414	47.786	5.393	48.906	0.39%	-2.29%
			5290	5.429	47.788	5.404	48.892	0.46%	-2.26%
			5300	5.444	47.787	5.416	48.879	0.52%	-2.23%
			5310	5.461	47.781	5.428	48.865	0.61%	-2.22%
			5320	5.476	47.769	5.439	48.851	0.68%	-2.21%
			5500	5.738	47.472	5.650	48.607	1.56%	-2.34%
			5510	5.756	47.465	5.661	48.594	1.68%	-2.32%
			5520	5.775	47.458	5.673	48.580	1.80%	-2.31%
			5530	5.790	47.448	5.685	48.566	1.85%	-2.30%
			5540	5.804	47.434	5.696	48.553	1.90%	-2.30%
			5550	5.816	47.420	5.708	48.539	1.89%	-2.31%
			5560	5.828	47.408	5.720	48.526	1.89%	-2.30%
08/14/2021	5200-5800 Body	24.5	5580	5.855	47.363	5.743	48.499	1.95%	-2.34%
			5600	5.883	47.315	5.766	48.471	2.03%	-2.38%
			5610	5.898	47.300	5.778	48.458	2.08%	-2.39%
			5620	5.915	47.283	5.790	48.444	2.16%	-2.40%
			5640	5.945	47.253	5.813	48.417	2.27%	-2.40%
			5660	5.970	47.233	5.837	48.390	2.28%	-2.39%
			5670	5.980	47.224	5.848	48.376	2.26%	-2.38%
			5680	5.991	47.203	5.860	48.363	2.24%	-2.40%
			5690	6.004	47.175	5.872	48.349	2.25%	-2.43%
			5700	6.015	47.143	5.883	48.336	2.24%	-2.47%
			5710	6.029	47.117	5.895	48.322	2.27%	-2.49%
			5720	6.044	47.095	5.907	48.309	2.32%	-2.51%
			5745	6.082	47.033	5.936	48.275	2.46%	-2.57%
			5750	6.089	47.025	5.942	48.268	2.47%	-2.58%
			5755	6.096	47.019	5.947	48.261	2.51%	-2.57%
			5765	6.110	47.010	5.959	48.248	2.53%	-2.57%
			5775	6.120	47.000	5.971	48.234	2.50%	-2.56%
			5785	6.129	46.989	5.982	48.220	2.46%	-2.55%
			5795	6.139	46.970	5.994	48.207	2.42%	-2.57%
			5800	6.144	46.957	6.000	48.200	2.40%	-2.58%
			5805	6.149	46.945	6.006	48.193	2.38%	-2.59%
			5825	6.170	46.857	6.029	48.166	2.34%	-2.72%

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Table 10-11
Measured Body Tissue Properties Continued

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
			5180	5.372	48.160	5.276	49.041	1.82%	-1.80%
			5190	5.381	48.142	5.288	49.028	1.76%	-1.81%
			5200	5.395	48.129	5.299	49.014	1.81%	-1.81%
			5210	5.412	48.110	5.311	49.001	1.90%	-1.82%
			5220	5.426	48.087	5.323	48.987	1.93%	-1.84%
			5240	5.456	48.053	5.346	48.960	2.06%	-1.85%
			5250	5.472	48.030	5.358	48.947	2.13%	-1.87%
			5260	5.487	48.009	5.369	48.933	2.20%	-1.89%
			5270	5.502	47.981	5.381	48.919	2.25%	-1.92%
			5280	5.518	47.959	5.393	48.906	2.32%	-1.94%
			5290	5.533	47.944	5.404	48.892	2.39%	-1.94%
			5300	5.548	47.934	5.416	48.879	2.44%	-1.93%
			5310	5.564	47.928	5.428	48.865	2.51%	-1.92%
			5320	5.579	47.910	5.439	48.851	2.57%	-1.93%
			5500	5.840	47.595	5.650	48.607	3.36%	-2.08%
			5510	5.855	47.578	5.661	48.594	3.43%	-2.09%
			5520	5.873	47.566	5.673	48.580	3.53%	-2.09%
			5530	5.892	47.551	5.685	48.566	3.64%	-2.09%
			5540	5.907	47.532	5.696	48.553	3.70%	-2.10%
			5550	5.923	47.515	5.708	48.539	3.77%	-2.11%
			5560	5.938	47.498	5.720	48.526	3.81%	-2.12%
09/09/2021	5200-5800 Body	21.5	5580	5.966	47.462	5.743	48.499	3.88%	-2.14%
			5600	5.993	47.415	5.766	48.471	3.94%	-2.18%
			5610	6.008	47.394	5.778	48.458	3.98%	-2.20%
			5620	6.024	47.381	5.790	48.444	4.04%	-2.19%
			5640	6.051	47.349	5.813	48.417	4.09%	-2.21%
			5660	6.082	47.301	5.837	48.390	4.20%	-2.25%
			5670	6.098	47.288	5.848	48.376	4.27%	-2.25%
			5680	6.111	47.278	5.860	48.363	4.28%	-2.24%
			5690	6.123	47.261	5.872	48.349	4.27%	-2.25%
			5700	6.139	47.235	5.883	48.336	4.35%	-2.28%
			5710	6.153	47.212	5.895	48.322	4.38%	-2.30%
			5720	6.166	47.192	5.907	48.309	4.38%	-2.31%
			5745	6.202	47.136	5.936	48.275	4.48%	-2.36%
			5750	6.211	47.131	5.942	48.268	4.53%	-2.36%
			5755	6.218	47.127	5.947	48.261	4.56%	-2.35%
			5765	6.230	47.121	5.959	48.248	4.55%	-2.34%
			5775	6.244	47.103	5.971	48.234	4.57%	-2.34%
			5785	6.257	47.080	5.982	48.220	4.60%	-2.36%
			5795	6.271	47.062	5.994	48.207	4.62%	-2.38%
			5800	6.279	47.050	6.000	48.200	4.65%	-2.39%
			5805	6.286	47.036	6.006	48.193	4.66%	-2.40%
			5825	6.314	46.978	6.029	48.166	4.73%	-2.47%

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

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10.2 Test System Verification

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

Table 10-12
System Verification Results – Head 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 (%)
D	750	HEAD	07/27/2021	23.7	22.5	0.20	1161	3589	1.65	8.03	8.250	2.74%
D	750	HEAD	07/29/2021	23.6	22.3	0.20	1161	3589	1.65	8.03	8.250	2.74%
A	750	HEAD	08/23/2021	22.9	22.6	0.20	1161	7406	1.66	8.03	8.300	3.36%
A	750	HEAD	08/29/2021	23.5	21.2	0.20	1161	7406	1.69	8.03	8.450	5.23%
D	835	HEAD	07/21/2021	23.9	22.3	0.20	4d132	3589	1.96	9.66	9.800	1.45%
J	835	HEAD	07/22/2021	21.3	21.6	0.20	4d133	7526	2.01	9.43	10.050	6.57%
J	835	HEAD	07/28/2021	21.7	21.5	0.20	4d132	7526	1.99	9.66	9.950	3.00%
A	835	HEAD	08/17/2021	22.9	20.3	0.20	4d133	7406	1.97	9.43	9.850	4.45%
A	835	HEAD	08/29/2021	23.5	21.2	0.20	4d132	7406	1.81	9.66	9.050	-6.31%
P	1750	HEAD	07/06/2021	21.5	20.2	0.10	1148	7308	3.31	35.90	33.100	-7.80%
J	1750	HEAD	07/20/2021	20.2	20.4	0.10	1150	7526	3.86	36.50	38.600	5.75%
J	1900	HEAD	07/31/2021	21.7	21.4	0.10	5d149	7526	4.15	39.30	41.500	5.60%
B	1900	HEAD	08/20/2021	24.2	22.3	0.10	5d148	7660	3.93	39.10	39.300	0.51%
B	1900	HEAD	08/22/2021	24.3	22.1	0.10	5d080	7660	4.11	39.80	41.100	3.27%
E	2300	HEAD	07/31/2021	24.2	22.9	0.10	1073	7571	5.10	49.20	51.000	3.66%
E	2450	HEAD	07/16/2021	24.7	23.7	0.10	719	7571	5.49	51.40	54.900	6.81%
E	2450	HEAD	08/09/2021	23.5	24.5	0.10	719	7571	5.42	51.40	54.200	5.45%
B	2450	HEAD	08/31/2021	23.8	22.4	0.10	797	7660	4.88	52.40	48.800	-6.87%
E	2600	HEAD	08/09/2021	23.5	24.5	0.10	1064	7571	6.17	58.10	61.700	6.20%
B	2600	HEAD	08/31/2021	23.8	22.4	0.10	1004	7660	5.62	57.80	56.200	-2.77%
L	3500	HEAD	08/22/2021	22.3	20.2	0.10	1097	7539	6.74	66.40	67.400	1.51%
L	3700	HEAD	08/22/2021	22.3	20.2	0.10	1067	7539	7.04	67.20	70.400	4.76%
K	5250	HEAD	07/12/2021	23.4	22.2	0.05	1191	7538	3.83	79.80	76.600	-4.01%
K	5600	HEAD	07/12/2021	23.4	22.2	0.05	1191	7538	4.34	81.80	86.800	6.11%
K	5750	HEAD	07/12/2021	23.4	22.2	0.05	1191	7538	3.93	79.30	78.600	-0.88%

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Table 10-13
System Verification Results – Body 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 (%)
G	750	BODY	06/21/2021	22.4	21.1	0.20	1003	7357	1.76	8.61	8.800	2.21%
G	750	BODY	06/23/2021	23.4	22.5	0.20	1003	7357	1.79	8.61	8.950	3.95%
G	750	BODY	07/22/2021	22.2	21.4	0.20	1003	7357	1.81	8.61	9.050	5.11%
G	750	BODY	07/23/2021	22.2	21.5	0.20	1003	7357	1.81	8.61	9.050	5.11%
G	750	BODY	07/25/2021	21.0	20.7	0.20	1003	7357	1.78	8.61	8.900	3.37%
G	750	BODY	07/27/2021	22.5	22.0	0.20	1003	7357	1.83	8.61	9.150	6.27%
G	750	BODY	07/29/2021	22.6	21.5	0.20	1003	7357	1.69	8.61	8.450	-1.86%
G	750	BODY	08/04/2021	22.4	21.9	0.20	1003	7357	1.79	8.61	8.950	3.95%
G	750	BODY	08/06/2021	23.0	21.2	0.20	1003	7357	1.81	8.61	9.050	5.11%
G	750	BODY	08/16/2021	21.9	21.4	0.20	1003	7357	1.83	8.61	9.150	6.27%
G	750	BODY	08/20/2021	23.4	21.7	0.20	1003	7357	1.80	8.61	9.000	4.53%
H	835	BODY	07/25/2021	22.4	22.5	0.20	4d132	7409	2.10	9.81	10.500	7.03%
E	835	BODY	07/27/2021	24.5	23.5	0.20	4d132	7571	2.10	9.81	10.500	7.03%
H	835	BODY	07/27/2021	23.1	23.2	0.20	4d133	7409	2.08	9.75	10.400	6.67%
H	835	BODY	07/29/2021	23.0	22.7	0.20	4d133	7409	2.02	9.75	10.100	3.59%
H	835	BODY	08/01/2021	21.5	22.2	0.20	4d132	7409	2.01	9.81	10.050	2.45%
H	835	BODY	08/05/2021	22.0	22.3	0.20	4d133	7409	2.04	9.75	10.200	4.62%
H	835	BODY	08/08/2021	21.9	22.2	0.20	4d133	7409	2.07	9.75	10.350	6.15%
H	835	BODY	08/10/2021	23.4	23.2	0.20	4d133	7409	2.02	9.75	10.100	3.59%
H	835	BODY	08/12/2021	23.4	22.6	0.20	4d133	7409	2.02	9.75	10.100	3.59%
P	1750	BODY	06/23/2021	22.2	23.2	0.10	1148	7308	3.70	36.30	37.000	1.93%
P	1750	BODY	07/21/2021	21.5	20.3	0.10	1148	7308	3.85	36.30	38.500	6.06%
P	1750	BODY	07/25/2021	21.5	22.1	0.10	1150	7308	3.71	36.60	37.100	1.37%
P	1750	BODY	07/27/2021	21.6	22.7	0.10	1148	7308	3.80	36.30	38.000	4.68%
P	1750	BODY	07/29/2021	21.6	22.1	0.10	1148	7308	3.74	36.30	37.400	3.03%
H	1900	BODY	06/24/2021	22.6	24.0	0.10	5d149	7410	4.26	39.40	42.600	8.12%
I	1900	BODY	07/22/2021	22.7	22.6	0.10	5d080	7551	4.19	39.20	41.900	6.89%
I	1900	BODY	07/25/2021	22.0	21.6	0.10	5d149	7551	4.25	39.40	42.500	7.87%
I	1900	BODY	07/27/2021	23.5	22.5	0.10	5d149	7551	4.31	39.40	43.100	9.39%
I	1900	BODY	08/01/2021	21.6	21.0	0.10	5d149	7551	4.09	39.40	40.900	3.81%
P	1900	BODY	08/10/2021	23.6	22.6	0.10	5d148	7410	3.87	39.10	38.700	-1.02%
P	1900	BODY	08/16/2021	22.0	21.4	0.10	5d148	7410	4.07	39.10	40.700	4.09%
O	1900	BODY	08/19/2021	21.6	21.6	0.10	5d149	7659	4.07	39.40	40.700	3.30%
O	1900	BODY	08/23/2021	22.5	21.7	0.10	5d148	7659	3.97	39.10	39.700	1.53%
P	1900	BODY	09/05/2021	22.1	23.2	0.10	5d148	7410	3.96	39.10	39.600	1.28%

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Table 10-14
System Verification Results – Body 1g continued

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 (%)
K	2300	BODY	06/21/2021	23.4	22.1	0.10	1073	7538	5.14	47.70	51.400	7.76%
L	2300	BODY	07/16/2021	21.0	21.0	0.10	1116	7539	4.81	49.20	48.100	-2.24%
K	2300	BODY	08/09/2021	21.9	21.9	0.10	1073	7538	5.10	47.70	51.000	6.92%
J	2300	BODY	08/11/2021	22.5	21.8	0.10	1116	7526	4.73	49.20	47.300	-3.86%
K	2300	BODY	08/15/2021	21.5	23.0	0.10	1116	7538	4.97	49.20	49.700	1.02%
K	2450	BODY	06/21/2021	23.4	22.1	0.10	719	7538	5.28	50.70	52.800	4.14%
L	2450	BODY	06/23/2021	22.5	24.2	0.10	981	7539	4.97	50.10	49.700	-0.80%
L	2450	BODY	06/27/2021	21.3	24.9	0.10	981	7539	5.08	50.10	50.800	1.40%
L	2450	BODY	06/29/2021	21.7	23.7	0.10	981	7539	5.03	50.10	50.300	0.40%
K	2450	BODY	07/19/2021	22.2	22.5	0.10	719	7538	5.11	50.70	51.100	0.79%
K	2450	BODY	07/22/2021	23.0	22.5	0.10	719	7538	5.19	50.70	51.900	2.37%
K	2450	BODY	07/25/2021	23.8	24.5	0.10	719	7538	5.28	50.70	52.800	4.14%
K	2450	BODY	07/28/2021	23.8	23.8	0.10	719	7538	5.10	50.70	51.000	0.59%
K	2450	BODY	08/02/2021	22.5	23.5	0.10	719	7538	5.19	50.70	51.900	2.37%
K	2450	BODY	08/12/2021	23.5	24.2	0.10	797	7538	5.02	49.40	50.200	1.62%
K	2450	BODY	08/19/2021	23.2	22.6	0.10	981	7538	4.98	50.10	49.800	-0.60%
J	2450	BODY	08/29/2021	21.1	22.0	0.10	797	7526	4.75	49.40	47.500	-3.85%
K	2600	BODY	06/21/2021	23.4	22.1	0.10	1064	7538	5.54	55.60	55.400	-0.36%
K	2600	BODY	07/19/2021	22.2	22.5	0.10	1064	7538	5.66	55.60	56.600	1.80%
K	2600	BODY	07/22/2021	23.0	22.5	0.10	1064	7538	5.47	55.60	54.700	-1.62%
K	2600	BODY	07/25/2021	23.8	24.5	0.10	1064	7538	5.76	55.60	57.600	3.60%
K	2600	BODY	07/28/2021	23.8	23.8	0.10	1064	7538	5.65	55.60	56.500	1.62%
K	2600	BODY	08/02/2021	22.5	23.5	0.10	1064	7538	5.33	55.60	53.300	-4.14%
K	2600	BODY	08/12/2021	23.5	24.2	0.10	1064	7538	5.61	55.60	56.100	0.90%
K	2600	BODY	08/19/2021	23.2	22.6	0.10	1004	7538	5.67	55.40	56.700	2.35%
J	2600	BODY	08/29/2021	21.1	22.0	0.10	1064	7526	5.30	55.60	53.000	-4.68%
I	3500	BODY	08/06/2021	22.0	22.0	0.10	1059	7551	6.37	63.00	63.700	1.11%
I	3500	BODY	08/09/2021	22.0	22.5	0.10	1059	7551	6.63	63.00	66.300	5.24%
I	3500	BODY	08/23/2021	22.6	22.0	0.10	1059	7551	6.80	63.00	68.000	7.94%
I	3700	BODY	08/06/2021	22.0	22.0	0.10	1018	7551	6.63	63.50	66.300	4.41%
I	3700	BODY	08/09/2021	22.0	22.5	0.10	1018	7551	6.60	63.50	66.000	3.94%
I	3700	BODY	08/23/2021	22.6	22.0	0.10	1018	7551	6.15	63.50	61.500	-3.15%
J	5250	BODY	06/21/2021	22.3	21.9	0.05	1191	7526	3.59	74.60	71.800	-3.75%
J	5250	BODY	06/27/2021	20.9	22.0	0.05	1191	7526	3.74	74.60	74.800	0.27%
J	5250	BODY	08/14/2021	21.1	22.5	0.05	1191	7526	3.45	74.60	69.000	-7.51%
J	5250	BODY	09/09/2021	21.5	21.5	0.05	1057	7526	3.54	74.30	70.800	-4.71%
J	5600	BODY	06/21/2021	22.3	21.9	0.05	1191	7526	3.79	78.10	75.800	-2.94%
J	5600	BODY	06/27/2021	20.9	22.0	0.05	1191	7526	4.06	78.10	81.200	3.97%
J	5600	BODY	08/14/2021	21.1	22.5	0.05	1191	7526	3.76	78.10	75.200	-3.71%
J	5600	BODY	09/09/2021	21.5	21.5	0.05	1057	7526	3.84	77.40	76.800	-0.78%
J	5750	BODY	06/21/2021	22.3	21.9	0.05	1191	7526	3.45	74.90	69.000	-7.88%
J	5750	BODY	06/27/2021	20.9	22.0	0.05	1191	7526	3.88	74.90	77.600	3.60%
J	5750	BODY	08/14/2021	21.1	22.5	0.05	1191	7526	3.48	74.90	69.600	-7.08%
J	5750	BODY	09/09/2021	21.5	21.5	0.05	1057	7526	3.57	72.80	71.400	-1.92%

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Table 10-15
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 (%)
H	835	BODY	08/10/2021	23.4	23.2	0.20	4d133	7409	1.330	6.40	6.650	3.91%
P	1750	BODY	07/27/2021	21.6	22.7	0.10	1148	7308	1.990	19.30	19.900	3.11%
P	1900	BODY	08/10/2021	23.6	22.6	0.10	5d148	7410	1.990	20.50	19.900	-2.93%
P	1900	BODY	08/12/2021	23.3	23.1	0.10	5d148	7410	2.140	20.50	21.400	4.39%
P	1900	BODY	08/16/2021	22.0	21.4	0.10	5d148	7410	2.090	20.50	20.900	1.95%
K	2450	BODY	07/22/2021	23.0	22.5	0.10	719	7538	2.370	23.90	23.700	-0.84%
K	2450	BODY	08/17/2021	22.6	22.0	0.10	797	7538	2.290	23.40	22.900	-2.14%
J	2450	BODY	08/23/2021	21.5	21.8	0.10	981	7526	2.280	23.70	22.800	-3.80%
K	2600	BODY	07/22/2021	23.0	22.5	0.10	1064	7538	2.400	25.00	24.000	-4.00%
K	2600	BODY	08/17/2021	22.6	22.0	0.10	1064	7538	2.540	25.00	25.400	1.60%
J	2600	BODY	08/23/2021	21.5	21.8	0.10	1004	7526	2.390	24.80	23.900	-3.63%
J	5250	BODY	08/14/2021	21.1	22.5	0.05	1191	7526	0.986	21.00	19.720	-6.10%
J	5250	BODY	09/09/2021	21.5	21.5	0.05	1057	7526	0.988	20.70	19.760	-4.54%
J	5600	BODY	08/14/2021	21.1	22.5	0.05	1191	7526	1.060	21.70	21.200	-2.30%
J	5600	BODY	09/09/2021	21.5	21.5	0.05	1057	7526	1.060	21.40	21.200	-0.93%
J	5750	BODY	08/14/2021	21.1	22.5	0.05	1191	7526	0.992	20.80	19.840	-4.62%
J	5750	BODY	09/09/2021	21.5	21.5	0.05	1057	7526	0.995	20.00	19.900	-0.50%

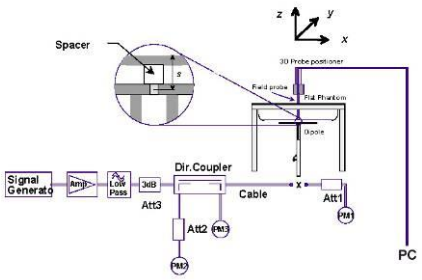

Figure 10-1
System Verification Setup Diagram

Figure 10-2
System Verification Setup Photo

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11 SAR TEST NOTES

11.1 SAR Test Notes

SAR Test Data can be found in Appendix A1 and Appendix A2

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01r03, body-worn SAR was evaluated without a headset connected to the device. Since the standalone reported body-worn SAR was ≤ 1.2 W/kg, no additional body-worn SAR evaluations using a headset cable were required.
8. Per FCC KDB 865664 D01v01r04, variability SAR tests were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 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" when it is in closed configuration since the diagonal dimension is > 160 mm and < 200 mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information)
11. Unless otherwise noted, when 10g SAR measurement is considered, a factor of 2.5 is applied to the equivalent thresholds.
12. Per FCC KDB Publication 941225 D07v01r02, this device is considered a "UMPC mini-tablet" when it is in read configuration. UMPC body 1g SAR tests are required on all surfaces and edges ≤ 25 mm from a transmitting antenna except for Front side per KDB inquiry.
13. This device uses Qualcomm Smart Transmit for 2G/3G/4G/5G operations to control and manage transmitting power in real time to ensure RF Exposure compliance. Per FCC Guidance, compliance for was assessed at the minimum of the time averaged power and the maximum output power for each band/mode/exposure condition (DSI).
14. For head modes, for the highest SAR configuration for each channel in each band per test position found to exceed 0.6 W/kg in Flip configuration testing, SAR was additionally evaluated in the Flat configuration.

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 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.

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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).
4. GPRS was additionally evaluated for head and body-worn exposure conditions to address possible VoIP scenarios.

UMTS Notes:

1. UMTS mode was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03r01. AMR and HSPA SAR was not required per the 3G Test Reduction Procedure in KDB Publication 941225 D01v03r01.
2. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the 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 LTE Band 41 or LTE Band 48 SAR measured at the highest output power channel in a given a test configuration was > 0.6 W/kg for 1g evaluations, testing at the other channels was required for such test configurations.
5. TDD LTE was tested per the guidance provided in FCC KDB Publication 941225 D05v02r04. Testing was performed using UL-DL configuration 0 with 6 UL subframes and 2 S subframes using extended cyclic prefix only and special subframe configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Section 4, the duty factor for special subframe configuration 6 using extended cyclic prefix is 0.633.
6. Per KDB Publication 941225 D05Av01r02, SAR for downlink only LTE CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.
7. This device supports Power Class 2 and Power Class 3 operations for LTE Band 41. The highest available duty cycle for Power Class 2 operations is 43.3 % using UL-DL configuration 1. Per FCC Guidance, all SAR tests were performed using Power Class 3. SAR with power class 2 at the available duty factor was additionally performed for the power class 3 configuration with the highest SAR configuration for each exposure conditions. Please see Section 4 of Appendix A1 and Appendix A2 for linearity results.
8. For LTE Band 5, LTE Band 66, LTE Band 7, LTE Band 48, and LTE Band 41, per FCC guidance, SAR was first measured with only a single carrier active in the uplink (carrier aggregation not active). For each exposure condition, the uplink CA scenario with two component carriers was additionally tested for the configuration with the highest SAR when carrier aggregation was not active. The SCC was configured with the closest available contiguous channel. The two component carriers were configured so the resource blocks are physically allocated side by side to achieve the maximum output power.

NR Notes:

1. NR implementation supports 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. Due to test setup limitations, SAR testing for NR was performed using test mode software to establish the connection.

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3. Simultaneous transmission analysis for EN-DC operations is addressed in the Part 2 Test Report (Serial Number can be found in the bibliography).
4. This device additionally supports some EN-DC conditions where additional LTE carriers are added on the downlink only.
5. 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.
6. For final implementation, NR Band n41 slot configuration is synchronized using maximum duty cycle of 100%. SAR testing was performed using FTM mode with a 100% duty cycle applied to match final duty cycle.

WLAN Notes:

1. For held-to-ear, hotspot, phablet, and UMPC mini-tablet operations, the initial test position procedures were applied. 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/ax) 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 single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg for 1g evaluations. See Section 8.6.6 for more information.
4. Per KDB Publication 248227 D01v02r02, SAR for MIMO was evaluated by following the simultaneous SAR provisions from KDB Publication 447498 D01v06 by either evaluating the sum of the 1g SAR values of each antenna transmitting independently or making a SAR measurement with both antennas transmitting simultaneously. Please see Section 3 of Appendix A1 and Appendix A2 for complete analysis.
5. 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.
6. 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.
7. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

Bluetooth Notes

1. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation and Tx Tests test mode type. Per October 2016 TCB Workshop Notes, the reported SAR was scaled to the 100% transmission duty factor to determine compliance. See Section 9.7 for the time domain plot and calculation for the duty factor of the device.
2. Head and Hotspot Bluetooth SAR were evaluated for BT BR tethering applications.

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12 FCC MULTI-TX AND ANTENNA SAR NOTES

12.1 Introduction

Simultaneous transmission data can be found in Appendix A1 and Appendix A2

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

12.2 Simultaneous Transmission Procedures

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

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

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

For each position, the highest SAR value across all modes for the applicable cellular band antenna was considered for summation to determine simultaneous SAR test exclusion.

Qualcomm Smart Transmit algorithm in WWAN adds directly the time-averaged RF exposure from 4G and time averaged RF exposure from 5G NR. Smart Transmit algorithm controls the total RF exposure from both 4G and 5G NR to not exceed FCC limit. Therefore, simultaneous transmission compliance between 4G+5G operations is demonstrated in the Part 2 Report during algorithm validation.

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13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

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

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

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

Table 13-1
1g Head SAR Measurement Variability Results

HEAD VARIABILITY RESULTS																
Band	FREQUENCY		Mode	Service	Side	Test Position	Antenna Config	DUT Configuration	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.							(W/kg)	(W/kg)		(W/kg)		(W/kg)	
750	782.00	23230	LTE Band 13, 10 MHz Bandwidth	QPSK, 50 RB, 0 RB Offset	Left	Cheek	North	Flat	0.853	0.851	1.00	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 13-2
1g Body/UMPC SAR Measurement Variability Results

BODY VARIABILITY RESULTS																	
Band	Component Carrier	FREQUENCY		Mode	Bandwidth [MHz]	Service	Side	Spacing	Antenna Config	DUT Configuraiton	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
		MHz	Ch.								(W/kg)	(W/kg)		(W/kg)		(W/kg)	
835	PCC	836.50	20525	ULCA LTE Band 5 (Cell)	10	QPSK, 1 RB, 49 RB Offset	front	10 mm	South	Flip	0.882	0.822	1.07	N/A	N/A	N/A	N/A
	SCC	843.7	20597		5	QPSK, 1 RB, 0 RB Offset											
1750	PCC	1745.00	132322	ULCA LTE Band 66 (AWS)	20	QPSK, 1 RB, 99 RB Offset	back	5 mm	North	UMPC Body	0.999	0.962	1.04	N/A	N/A	N/A	N/A
	SCC	1764.80	132520			QPSK, 1 RB, 0 RB Offset											
1900	N/A	1880.00	9400	UMTS 1900	N/A	RMC	back	5 mm	South	UMPC Body	0.897	0.833	1.08	N/A	N/A	N/A	N/A
2600	N/A	2592.99	Mid	NR Band n41	100.00	DFT-S-OFDM, QPSK, 1 RB, 137 RB Offset	top	10 mm	North	Flip	0.867	0.756	1.15	N/A	N/A	N/A	N/A
5600	N/A	5610.00	122	802.11ac	80	OFDM	bottom	5 mm	ANT 1	UMPC Body	1.090	1.030	1.06	N/A	N/A	N/A	N/A
5750	N/A	5690.00	138	802.11ac	80	OFDM	bottom	0 mm	ANT 1	Flat	0.915	0.933	1.020	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram										

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Table 13-3
10g SAR Measurement Variability Results

PHABLET VARIABILITY RESULTS																	
Band	Component Carrier	FREQUENCY		Mode	Service	# of Time Slots	Side	Spacing	Antenna Config	DUT Configuraiton	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)	
835	N/A	848.80	251	GSM 850	GPRS	2	front	0 mm	South	Flip	2.450	2.430	1.01	N/A	N/A	N/A	N/A
2450	N/A	2510.00	20850	LTE Band 7, 20 MHz Bandwidth	QPSK, 50 RB, 25 RB Offset	N/A	front	0 mm	North	Flip	2.020	1.790	1.13	N/A	N/A	N/A	N/A
2600	PCC	2636.50	41055	ULCA LTE Band 41, 20 MHz Bandwidth	QPSK, 1 RB, 0 RB Offset	N/A	front	0 mm	North	Flip	2.560	2.550	1.00	N/A	N/A	N/A	N/A
	SCC	2616.70	40857		QPSK, 1 RB, 99 RB Offset												
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Phablet 4.0 W/kg (mW/g) averaged over 10 grams										

13.2 Measurement Uncertainty

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

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14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	CBT	N/A	CBT	3051A00187
Agilent	85033E	3.5mm Standard Calibration Kit	7/7/2021	Annual	7/7/2022	MY53402352
Agilent	E4438C	ESG Vector Signal Generator	12/14/2020	Biennial	12/14/2022	MY42082385
Agilent	E4438C	ESG Vector Signal Generator	9/18/2020	Annual	9/18/2021	MY45091346
Agilent	E4432B	ESG-D Series Signal Generator	2/24/2021	Annual	2/24/2022	US40053896
Agilent	N5182A	MXG Vector Signal Generator	6/21/2021	Annual	6/21/2022	MY47420603
Agilent	N5182A	MXG Vector Signal Generator	6/15/2021	Annual	6/15/2022	MY47420800
Agilent	8753ES	S-Parameter Vector Network Analyzer	9/16/2020	Annual	9/16/2021	MY40200670
Agilent	8753ES	S-Parameter Vector Network Analyzer	2/2/2021	Annual	2/2/2022	US39170122
Agilent	E5515C	Wireless Communications Test Set	2/4/2021	Annual	2/4/2022	GB43193563
Agilent	E5515C	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	15S1G6	Amplifier	CBT	N/A	CBT	353317
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	353468
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433976
Anritsu	MN8110B	I/O Adaptor	CBT	N/A	CBT	6261747881
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	12/18/2020	Annual	12/18/2021	1126066
Anritsu	MA2411B	Pulse Power Sensor	9/22/2020	Annual	9/22/2021	1339008
Anritsu	MT8820C	Radio Communication Analyzer	9/17/2020	Annual	9/17/2021	6201300731
Anritsu	MT8821C	Radio Communication Analyzer	9/11/2020	Annual	9/11/2021	6201524637
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	9/15/2020	Annual	9/15/2021	1520505
Anritsu	MT8862A	Wireless Connectivity Test Set	10/29/2020	Annual	10/29/2021	6261782395
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M35SA00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Control Company	4352	Long Stem Thermometer	1/24/2020	Biennial	1/24/2022	200043588
Control Company	4352	Long Stem Thermometer	1/24/2020	Biennial	1/24/2022	200043655
Control Company	4352	Long Stem Thermometer	5/16/2020	Biennial	5/16/2022	200294604
Control Company	4040	Therm./ Clock/ Humidity Monitor	2/17/2020	Biennial	2/17/2022	200113269
Control Company	4040	Therm./ Clock/ Humidity Monitor	3/6/2020	Biennial	3/6/2022	200170289
Control Company	4040	Therm./ Clock/ Humidity Monitor	3/6/2020	Biennial	3/6/2022	200170313
Insize	1108-150	Digital Caliper	1/17/2020	Biennial	1/17/2022	409193536
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	N6705B	DC Power Analyzer	5/5/2021	Triennial	5/5/2024	MY53004059
Keysight Technologies	N9020A	MXA Signal Analyzer	2/24/2021	Annual	2/24/2022	MY48010233
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	NC-100	Torque Wrench	8/4/2020	Biennial	8/4/2022	1445
Pasternack	NC-100	Torque Wrench	8/4/2020	Biennial	8/4/2022	N/A
Rohde & Schwarz	CMW500	Radio Communication Tester	2/18/2021	Annual	2/18/2022	101767
Rohde & Schwarz	CMW500	Radio Communication Tester	3/19/2021	Annual	3/19/2022	128633
Rohde & Schwarz	CMW500	Radio Communication Tester	3/22/2021	Annual	3/22/2022	167283
Rohde & Schwarz	ZNL6	Vector Network Analyzer	9/29/2020	Annual	9/29/2021	101307
SPEAG	D750V3	750 MHz SAR Dipole	3/16/2020	Biennial	3/16/2022	1003
SPEAG	D750V3	750 MHz SAR Dipole	10/19/2018	Triennial	10/19/2021	1161
SPEAG	D835V2	835 MHz SAR Dipole	1/21/2021	Annual	1/21/2022	4d132
SPEAG	D835V2	835 MHz SAR Dipole	10/19/2018	Triennial	10/19/2021	4d133
SPEAG	D1750V2	1750 MHz SAR Dipole	5/12/2020	Biennial	5/12/2022	1148
SPEAG	D1750V2	1750 MHz SAR Dipole	10/22/2018	Triennial	10/22/2021	1150
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Triennial	10/23/2021	5d080
SPEAG	D1900V2	1900 MHz SAR Dipole	2/21/2019	Triennial	2/21/2022	5d148
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Triennial	10/23/2021	5d149
SPEAG	D2300V2	2300 MHz SAR Dipole	8/13/2018	Triennial	8/13/2021	1073
SPEAG	D2300V2	2300 MHz SAR Dipole	6/3/2021	Annual	6/3/2022	1116
SPEAG	D2450V2	2450 MHz SAR Dipole	8/14/2020	Annual	8/14/2021	719
SPEAG	D2450V2	2450 MHz SAR Dipole	9/9/2020	Annual	9/9/2021	797
SPEAG	D2450V2	2450 MHz SAR Dipole	1/19/2021	Annual	1/19/2022	981
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	D3500V2	3500 MHz SAR Dipole	1/19/2021	Annual	1/19/2022	1059
SPEAG	D3500V2	3500 MHz SAR Dipole	1/21/2020	Biennial	1/21/2022	1097
SPEAG	D3700V2	3700 MHz SAR Dipole	1/19/2021	Annual	1/19/2022	1018
SPEAG	D3700V2	3700 MHz SAR Dipole	1/21/2020	Biennial	1/21/2022	1067
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/20/2021	Annual	1/20/2022	1057
SPEAG	D5GHzV2	5 GHz SAR Dipole	9/10/2020	Annual	9/10/2021	1191
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/18/2021	Annual	3/18/2022	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/15/2020	Annual	7/15/2021	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/16/2020	Annual	10/16/2021	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/15/2021	Annual	6/15/2022	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/7/2021	Annual	4/7/2022	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/10/2021	Annual	3/10/2022	1415
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/10/2020	Annual	9/10/2021	1449
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/11/2020	Annual	8/11/2021	1450
SPEAG	DAE4	Dasy Data Acquisition Electronics	12/7/2020	Annual	12/7/2021	1533
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/13/2021	Annual	1/13/2022	1558
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/13/2021	Annual	7/13/2022	1583
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/21/2021	Annual	6/21/2022	1676
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/22/2021	Annual	6/22/2022	1677
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/21/2021	Annual	6/21/2022	1678
SPEAG	EX3DV4	SAR Probe	1/20/2021	Annual	1/20/2022	3589
SPEAG	EX3DV4	SAR Probe	7/31/2020	Annual	7/31/2021	7308
SPEAG	EX3DV4	SAR Probe	4/19/2021	Annual	4/19/2022	7357
SPEAG	EX3DV4	SAR Probe	7/20/2021	Annual	7/20/2022	7406
SPEAG	EX3DV4	SAR Probe	6/21/2021	Annual	6/21/2022	7409
SPEAG	EX3DV4	SAR Probe	7/20/2020	Annual	7/20/2021	7410
SPEAG	EX3DV4	SAR Probe	7/20/2021	Annual	7/20/2022	7410
SPEAG	EX3DV4	SAR Probe	3/16/2021	Annual	3/16/2022	7526
SPEAG	EX3DV4	SAR Probe	11/23/2020	Annual	11/23/2021	7538
SPEAG	EX3DV4	SAR Probe	10/20/2020	Annual	10/20/2021	7539
SPEAG	EX3DV4	SAR Probe	10/20/2020	Annual	10/20/2021	7551
SPEAG	EX3DV4	SAR Probe	12/11/2020	Annual	12/11/2021	7571
SPEAG	EX3DV4	SAR Probe	6/29/2021	Annual	6/29/2022	7659
SPEAG	EX3DV4	SAR Probe	6/28/2021	Annual	6/28/2022	7660
SPEAG	DAK-3.5	Dielectric Assessment Kit	10/14/2020	Annual	10/14/2021	1091
SPEAG	MAIA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	N/A

Note: 1. Each equipment item was used solely within its respective calibration period.
2. 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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15 MEASUREMENT UNCERTAINTIES

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	Div.	c_i 1gm	c_i 10 gms	1gm u_i (± %)	10gms u_i (± %)	v_i
Measurement System									
Probe Calibration	E.2.1	7	N	1	1	1	7.0	7.0	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	E.2.3	2	R	1.73	1	1	1.2	1.2	∞
Linearity	E.2.4	0.3	N	1	1	1	0.3	0.3	∞
System Detection Limits	E.2.4	0.25	R	1.73	1	1	0.1	0.1	∞
Modulation Response	E.2.5	4.8	R	1.73	1	1	2.8	2.8	∞
Readout Electronics	E.2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1	1	1.5	1.5	∞
RF Ambient Conditions - Noise	E.6.1	3	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	3	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.8	R	1.73	1	1	0.5	0.5	∞
Probe Positioning w/ respect to Phantom	E.6.3	6.7	R	1.73	1	1	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	4	R	1.73	1	1	2.3	2.3	∞
Test Sample Related									
Test Sample Positioning	E.4.2	3.12	N	1	1	1	3.1	3.1	35
Device Holder Uncertainty	E.4.1	1.67	N	1	1	1	1.7	1.7	5
Output Power Variation - SAR drift measurement	E.2.9	5	R	1.73	1	1	2.9	2.9	∞
SAR Scaling	E.6.5	0	R	1.73	1	1	0.0	0.0	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	E.3.3	4.3	N	1	0.78	0.71	3.3	3.0	76
Liquid Permittivity - measurement uncertainty	E.3.3	4.2	N	1	0.23	0.26	1.0	1.1	75
Liquid Conductivity - Temperature Uncertainty	E.3.4	3.4	R	1.73	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Unceritainty	E.3.4	0.6	R	1.73	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)			RSS				12.2	12.0	191
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				24.4	24.0	

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16 CONCLUSION

16.1 Measurement Conclusion

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

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

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17 REFERENCES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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