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SAR EVALUATION REPORT

Applicant Name:
Apple Inc.
One Apple Park Way
Cupertino, CA 95014 USA

Date of Testing:
09/06/2022 – 10/03/2022
Test Site/Location:
Element Washington DC LLC,
Morgan Hill, CA, USA
Document Serial No.:
1C2205090029-25.BCG (Rev 1)

FCC ID: **BCGA2437**

APPLICANT: **APPLE, INC.**

DUT Type:	Tablet Device
Application Type:	Certification
FCC Rule Part(s):	CFR §2.1093
Model:	A2437, A2766
Reference FCC ID:	BCGA2764

Equipment Class	Band & Mode	Tx Frequency	SAR	APD	PD
			1g Body (W/kg)	Body - Tablet (W/m²)	pePD (W/m²)
PCB	UMTS 850	826.40 - 846.60 MHz	0.88	N/A	N/A
PCB	UMTS 1750	1712.4 - 1752.6 MHz	0.98	N/A	N/A
PCB	UMTS 1900	1852.4 - 1907.6 MHz	1.50	N/A	N/A
PCB	LTE Band 71	663.5 - 695.5 MHz	0.91	N/A	N/A
PCB	LTE Band 12	699.7 - 715.3 MHz	0.90	N/A	N/A
PCB	LTE Band 17	706.5 - 713.5 MHz	N/A	N/A	N/A
PCB	LTE Band 13	779.5 - 784.5 MHz	0.55	N/A	N/A
PCB	LTE Band 14	790.5 - 795.5 MHz	0.92	N/A	N/A
PCB	LTE Band 26 (Cell)	814.7 - 848.3 MHz	0.99	N/A	N/A
PCB	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.91	N/A	N/A
PCB	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.97	N/A	N/A
PCB	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A
PCB	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.98	N/A	N/A
PCB	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	N/A	N/A	N/A
PCB	LTE Band 30	2307.5 - 2312.5 MHz	0.97	N/A	N/A
PCB	LTE Band 7	2502.5 - 2567.5 MHz	0.99	N/A	N/A
PCB	LTE Band 41	2498.5 - 2687.5 MHz	1.50	N/A	N/A
CBE	LTE Band 48	3550.5 - 3697.5 MHz	0.99	N/A	N/A
PCB	NR Band n71	663.5 - 695.5 MHz	0.90	N/A	N/A
PCB	NR Band n12	701.5 - 713.5 MHz	0.95	N/A	N/A
PCB	NR Band n14	790.5 - 795.5 MHz	0.94	N/A	N/A
PCB	NR Band n26 (Cell)	816.5 - 846.5 MHz	0.75	N/A	N/A
PCB	NR Band n5 (Cell)	826.5 - 846.5 MHz	0.91	N/A	N/A
PCB	NR Band n70	1697.5-1707.5 MHz	0.98	N/A	N/A
PCB	NR Band n66 (AWS)	1712.5 - 1777.5 MHz	0.92	N/A	N/A
PCB	NR Band n25 (PCS)	1852.5 - 1912.5 MHz	0.93	N/A	N/A
PCB	NR Band n2 (PCS)	1852.5 - 1907.5 MHz	N/A	N/A	N/A
PCB	NR Band n30	2307.5 - 2312.5 MHz	1.50	N/A	N/A
PCB	NR Band n7	2502.5 - 2567.5 MHz	1.00	N/A	N/A
PCB	NR Band n41	2506.02 - 2679.99 MHz	1.50	N/A	N/A
PCB	NR Band n77 DoD PCF	3455.01 - 3544.98 MHz	1.50	N/A	N/A
PCB	NR Band n77 C PCF	3700 - 3915 MHz	1.50	N/A	N/A
DTS	2.4 GHz WLAN	2412 - 2472 MHz	1.03	N/A	N/A
NII	U-NII-1	5180 - 5240 MHz	1.10	N/A	N/A
NII	U-NII-2A	5260 - 5320 MHz	1.17	N/A	N/A
NII	U-NII-2C	5500 - 5720 MHz	1.08	N/A	N/A
NII	U-NII-3	5745 - 5825 MHz	1.15	N/A	N/A
RSS/DTS	Bluetooth	2402 - 2480 MHz	1.19	N/A	N/A
NII	NII UNII-1	5150 - 5250 MHz	1.16	N/A	N/A
NII	NII UNII-3	5725 - 5850 MHz	1.01	N/A	N/A
6GO	Wi-Fi 6 GHz	5955 - 7115 MHz	1.39	6.13	8.69
Simultaneous SAR per KDB 690783 D01v01r03:			1.50	N/A	N/A

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.

Note: This table above includes test data from RF exposure technical report S/N: 1C2205090028-26.BCG (Rev 1) and 1C2205090028-33.BCG (Rev 1) per FCC TCB workshop for data referencing of closely related product FCC ID BCGA2764

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.

RJ Ortanez
Executive Vice 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.

T A B L E O F C O N T E N T S

1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
UMTS 850	Data	826.40 - 846.60 MHz
UMTS 1750	Data	1712.4 - 1752.6 MHz
UMTS 1900	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 17	Voice/Data	706.5 - 713.5 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 41	Voice/Data	2498.5 - 2687.5 MHz
LTE Band 48	Voice/Data	3552.5 - 3697.5 MHz
NR Band n71	Data	665.5 - 695.5 MHz
NR Band n12	Data	701.5 - 713.5 MHz
NR Band n14	Data	790.5 - 795.5 MHz
NR Band n5 (Cell)	Data	826.5 - 846.5 MHz
NR Band n26 (Cell)	Data	816.5 - 846.5 MHz
NR Band n70	Data	1697.5 - 1707.5 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 n30	Data	2307.5 - 2312.5 MHz
NR Band n7	Data	2502.5 - 2567.5 MHz
NR Band n41	Data	2506.02 - 2679.99 MHz
NR Band n77 DoD	Data	3455.01 - 3544.98 MHz
NR Band n77 C	Data	3705.0 - 3975.0 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
U-NII-5	Voice/Data	5955 - 6415 MHz
U-NII-6	Voice/Data	6435 - 6515 MHz
U-NII-7	Voice/Data	6535 - 6875 MHz
U-NII-8	Voice/Data	6895 - 7115 MHz
Bluetooth	Data	2402 - 2480 MHz
NB UNII-1	Data	5162 - 5245 MHz
NB UNII-3	Data	5733 - 5844 MHz

1.2 Data Referencing

Band & Mode	Reference Model - BCGA2764	Variant Model - BCGA2437
UMTS 850	Fully Evaluated	Referenced
UMTS 1750	Fully Evaluated	Referenced
UMTS 1900	Fully Evaluated	Referenced
LTE Band 71	Fully Evaluated	Referenced
LTE Band 12	Fully Evaluated	Referenced
LTE Band 13	Fully Evaluated	Referenced
LTE Band 14	Fully Evaluated	Referenced
LTE Band 26 (Cell)	Fully Evaluated	Referenced
LTE Band 5 (Cell)	Fully Evaluated	Referenced
LTE Band 66 (AWS)	Fully Evaluated	Referenced
LTE Band 4 (AWS)	Fully Evaluated	Referenced
LTE Band 25 (PCS)	Fully Evaluated	Referenced
LTE Band 2 (PCS)	Fully Evaluated	Referenced
LTE Band 30	Fully Evaluated	Referenced
LTE Band 7	Fully Evaluated	Referenced
LTE Band 41	Fully Evaluated	Referenced
LTE Band 48	Fully Evaluated	Referenced
NR Band n71	Fully Evaluated	Referenced
NR Band n12	Fully Evaluated	Referenced
NR Band n14	Fully Evaluated	Referenced
NR Band n5 (Cell)	Fully Evaluated	Referenced
NR Band n26 (Cell)	Fully Evaluated	Referenced
NR Band n70	Fully Evaluated	Referenced
NR Band n66 (AWS)	Fully Evaluated	Referenced
NR Band n25 (PCS)	Fully Evaluated	Referenced
NR Band n2 (PCS)	Fully Evaluated	Referenced
NR Band n30	Fully Evaluated	Referenced
NR Band n7	Fully Evaluated	Referenced
NR Band n41	Fully Evaluated	Referenced
NR Band n77 DoD	Fully Evaluated	Referenced
NR Band n77 C	Fully Evaluated	Referenced
2.4 GHz WLAN	Fully Evaluated	Referenced
U-NII-1	Fully Evaluated	Referenced
U-NII-2A	Fully Evaluated	Referenced
U-NII-2C	Fully Evaluated	Referenced
U-NII-3	Fully Evaluated	Referenced
U-NII-5	Fully Evaluated	Referenced
U-NII-6	Fully Evaluated	Referenced
U-NII-7	Fully Evaluated	Referenced
U-NII-8	Fully Evaluated	Referenced
Bluetooth	Fully Evaluated	Referenced
NB UNII-1	Fully Evaluated	Referenced
NB UNII-3	Fully Evaluated	Referenced

Per manufacturer declaration, there are two tablet devices FCC ID: BCGA2764 and FCC ID: BCGA2437, with high degree of similarity, reference model FCC ID: BCGA2764 and variant model FCC ID: BCGA2437. Both models share the same material, form factor, circuit design, and components, including antennas and their locations. The reference and variant models use the same material, form factor, circuit design, and components, including antennas and their locations. The reference and variant models use the same power tables and have same tune-up tolerances.

Per FCC Approved Data Referencing Test Plan, testing was done fully on the reference model FCC ID: BCGA2764, while spot-check verification has been performed on variant model FCC ID: BCGA2437. The reference and variant model comparison data summary is included in section 9. Please see RF exposure technical report S/N 1C2205090028-26.BCG (Rev 1) and 1C2205090028-33.BCG (Rev 1) for complete compliance evaluation for the reference model.

1.3 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 could be found in Section 1.10 – 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, below the predefined time-averaged power limit (i.e., Plimit for sub-6 radio), for each characterized technology and band (see reference model RF Exposure Part 0 Test Report, report SN could be found in Section 1.10 - Bibliography).

Exposure Scenario:	Ant 1 Body	Ant 1 Maximum Tune-up Output Power*	Ant 2a/2b Body	Ant 2a/2b Maximum Tune-up Output Power*	Ant 3 Body	Ant 3 Maximum Tune-up Output Power*	Ant 4b Body	Ant 4b Maximum Tune-up Output Power*	Manufacturer's Smart Transmit Uncertainty (dB)	Low, Mid, High Band Pmax target Tolerance (dB)	Plimit target and UHB Pmax target Tolerance (dB)
Averaging Volume:	1g		1g		1g		1g				
Spacing:	0 mm		0 mm		0 mm		0 mm				
DSI:	1		1		1		1				
Technology/Band	**Plimit corresponding to 0.8 W/kg**	Pmax	**Plimit corresponding to 0.8 W/kg**	Pmax	**Plimit corresponding to 0.8 W/kg**	Pmax	**Plimit corresponding to 0.8 W/kg**	Pmax			
UMTS 850	17.70	23.20	N/A	N/A	18.40	25.00	N/A	N/A	+/- 1.0	+0.7 /- 1.0	+/- 1.0
UMTS 1750	16.10	22.00	14.30	22.00	16.00	24.50	13.30	25.00			
UMTS 1900	16.40	22.00	13.70	22.00	15.90	24.50	12.20	25.00			
LTE Band 71	20.30	23.20	N/A	N/A	20.50	25.00	N/A	N/A			
LTE Band 12	20.10	23.20	N/A	N/A	19.50	25.00	N/A	N/A			
LTE Band 17	20.10	23.20	N/A	N/A	19.50	25.00	N/A	N/A			
LTE Band 13	19.60	23.20	N/A	N/A	19.90	25.00	N/A	N/A			
LTE Band 14	19.60	23.20	N/A	N/A	19.90	25.00	N/A	N/A			
LTE Band 26 (Cell)	17.70	23.20	N/A	N/A	18.40	25.00	N/A	N/A			
LTE Band 5 (Cell)	17.70	23.20	N/A	N/A	18.40	25.00	N/A	N/A			
LTE Band 5 ULCA (Cell)	17.70	23.20	N/A	N/A	18.40	25.00	N/A	N/A			
LTE Band 66 (AWS)	16.10	25.00	14.30	24.50	16.00	23.50	13.30	24.00			
LTE Band 4 (AWS)	16.10	25.00	14.30	24.50	16.00	24.50	13.30	25.00			
LTE Band 25 (PCS)	16.40	22.00	13.70	22.00	15.90	24.50	12.20	25.00			
LTE Band 2 (PCS)	16.40	22.00	13.70	22.00	15.90	24.50	12.20	25.00			
LTE Band 30	13.60	21.50	13.60	21.50	14.90	24.50	12.10	21.80			
LTE Band 7	13.50	21.50	13.90	21.50	15.50	24.50	12.20	25.00			
LTE Band 7 ULCA	13.50	21.50	13.90	21.50	15.50	24.50	12.20	25.00			
LTE Band 41 PC3	12.7	23.0	14.0	23.0	13.1	23.0	11.8	23.0			
LTE Band 41 ULCA PC3	12.7	23.0	14.0	23.0	13.1	23.0	11.8	23.0			
LTE Band 41 PC2	12.7	24.4	14.0	23.9	13.1	22.9	11.8	23.4			
LTE Band 41 ULCA PC2	12.7	24.4	14.0	23.9	13.1	22.9	11.8	23.4			
LTE Band 48	11.2	17.6	11.4	18.0	11.8	16.7	10.9	19.0			
LTE Band 48 ULCA	11.2	17.6	11.4	18.0	11.8	16.7	10.9	19.0			
NR Band n71	20.30	23.20	N/A	N/A	20.50	25.00	N/A	N/A			
NR Band n12	20.10	23.20	N/A	N/A	19.50	25.00	N/A	N/A			
NR Band n14	19.60	23.20	N/A	N/A	19.90	25.00	N/A	N/A			
NR Band n26 (Cell)	17.70	23.20	N/A	N/A	18.40	25.00	N/A	N/A			
NR Band n5 (Cell)	17.70	23.20	N/A	N/A	18.40	25.00	N/A	N/A			
NR Band n70	16.10	25.00	14.30	24.50	16.00	24.50	13.30	25.00			
NR Band n66 (AWS)	16.10	25.00	14.30	24.50	16.00	23.50	13.30	24.00			
NR Band n25 (PCS)	16.40	22.00	13.70	22.00	15.90	24.50	12.20	25.00			
NR Band n2 (PCS)	16.40	22.00	13.70	22.00	15.90	24.50	12.20	25.00			
NR Band n30	13.60	21.50	13.60	21.50	14.90	24.50	12.10	21.80			
NR Band n7	13.50	21.50	13.90	21.50	15.50	24.50	12.20	25.00			
NR Band n41 PC3	12.70	25.00	14.00	25.00	13.10	25.00	11.80	25.00			
NR Band n41 PC2	12.70	28.00	14.00	27.50	13.10	26.50	11.80	27.00			
NR Band n77 PC3	11.20	22.50	11.00	22.50	11.20	24.70	10.80	24.70			
NR Band n77 PC2	11.20	22.50	11.00	22.50	11.20	26.50	10.80	26.50			

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 +1.0/-1.0 dB for this EUT.

*Maximum tune up output power Pmax is used to configure EUT during RF tune up procedure. The maximum allowed output power is equal to maximum Tune up output power +0.7/-1.0 dB tolerance and for UHB +/-1.0 dB tolerance

*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., LTE TDD).

1.4 Power Reduction for SAR

This device additionally utilizes a power reduction mechanism for Bluetooth and WLAN operations. When WLAN/Bluetooth is operating simultaneously with certain combinations of 3G/4G and 5 GHz WLAN antennas, the output power of is permanently reduced. SAR evaluations were additionally performed at the maximum allowed output power for these scenarios to evaluate simultaneous transmission compliance.

Additionally, this device uses an independent mechanism that limits WIFI powers to a time-averaged output power. For the purposes of this test report, all SAR measurements were performed with the algorithm disabled at the maximum time-averaged output power level. Appendix J of the reference model report includes verification data for this time-averaged SAR
mechanism.

1.5 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.

1.5.1 3G/4G/5G Output Power for Portable Use Conditions

Table 1-1
UMTS B5 (850 MHz)

Mode/Band	Antenna		Modulated Average Output Power (in dBm)			
			3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6	3GPP DC-HSDPA Rel 8
UMTS Band 5 (850 MHz)	Ant 1	Max allowed power	**18.70**	**18.70**	**18.70**	**18.70**
		Nominal	**17.70**	**17.70**	**17.70**	**17.70**
	Ant 3	Max allowed power	**19.40**	**19.40**	**19.40**	**19.40**
		Nominal	**18.40**	**18.40**	**18.40**	**18.40**

Table 1-2
UMTS B4 (1750 MHz)

Mode/Band	Antenna		Modulated Average Output Power (in dBm)			
			3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6	3GPP DC-HSDPA Rel 8
UMTS Band 2 (1900 MHz)	Ant 1	Max allowed power	**17.10**	**17.10**	**17.10**	**17.10**
		Nominal	**16.10**	**16.10**	**16.10**	**16.10**
	Ant 2b	Max allowed power	**15.30**	**15.30**	**15.30**	**15.30**
		Nominal	**14.30**	**14.30**	**14.30**	**14.30**
	Ant 3	Max allowed power	**17.00**	**17.00**	**17.00**	**17.00**
		Nominal	**16.00**	**16.00**	**16.00**	**16.00**
	Ant 4b	Max allowed power	**14.30**	**14.30**	**14.30**	**14.30**
		Nominal	**13.30**	**13.30**	**13.30**	**13.30**

Table 1-3
UMTS B2 (1900 MHz)

Mode/Band	Antenna		Modulated Average Output Power (in dBm)			
			3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6	3GPP DC-HSDPA Rel 8
UMTS Band 2 (1900 MHz)	Ant 1	Max allowed power	**17.40**	**17.40**	**17.40**	**17.40**
		Nominal	**16.40**	**16.40**	**16.40**	**16.40**
	Ant 2b	Max allowed power	**14.70**	**14.70**	**14.70**	**14.70**
		Nominal	**13.70**	**13.70**	**13.70**	**13.70**
	Ant 3	Max allowed power	**16.90**	**16.90**	**16.90**	**16.90**
		Nominal	**15.90**	**15.90**	**15.90**	**15.90**
	Ant 4b	Max allowed power	**13.20**	**13.20**	**13.20**	**13.20**
		Nominal	**12.20**	**12.20**	**12.20**	**12.20**

Table 1-4
LTE Bands

Mode / Band		Modulated Average Output Power (in dBm)				
		Ant 1	Ant 2a	Ant 2b	Ant 3	Ant 4b
LTE FDD Band 71	Max allowed power	21.30			21.50	
	Nominal	20.30			20.50	
LTE FDD Band 12	Max allowed power	21.10			20.50	
	Nominal	20.10			19.50	
LTE FDD Band 17	Max allowed power	21.10			20.50	
	Nominal	20.10			19.50	
LTE FDD Band 13	Max allowed power	20.60			20.90	
	Nominal	19.60			19.90	
LTE FDD Band 14	Max allowed power	20.60			20.90	
	Nominal	19.60			19.90	
LTE FDD Band 26	Max allowed power	18.70			19.40	
	Nominal	17.70			18.40	
LTE FDD Band 5	Max allowed power	18.70			19.40	
	Nominal	17.70			18.40	
LTE FDD Band 5 Intra-Band ULCA	Max allowed power	18.70			19.40	
	Nominal	17.70			18.40	
LTE FDD Band 4	Max allowed power	17.10		15.30	17.00	14.30
	Nominal	16.10		14.30	16.00	13.30
LTE FDD Band 66	Max allowed power	17.10		15.30	17.00	14.30
	Nominal	16.10		14.30	16.00	13.30
LTE FDD Band 2	Max allowed power	17.40		14.70	16.90	13.20
	Nominal	16.40		13.70	15.90	12.20
LTE FDD Band 25	Max allowed power	17.40		14.70	16.90	13.20
	Nominal	16.40		13.70	15.90	12.20
LTE FDD Band 30	Max allowed power	14.60		14.60	15.90	13.10
	Nominal	13.60		13.60	14.90	12.10
LTE FDD Band 7	Max allowed power	14.50		14.90	16.50	13.20
	Nominal	13.50		13.90	15.50	12.20
LTE FDD Band 7 Intra-Band ULCA	Max allowed power	14.50		14.90	16.50	13.20
	Nominal	13.50		13.90	15.50	12.20
LTE TDD Band 41 (PC3)	Max allowed power	15.70		17.00	16.10	14.80
	Nominal	14.70		16.00	15.10	13.80
LTE TDD Band 41 (PC3) Intra-band ULCA	Max allowed power	15.70		17.00	16.10	14.80
	Nominal	14.70		16.00	15.10	13.80
LTE TDD Band 41 (PC2)	Max allowed power	17.30		18.60	17.70	16.40
	Nominal	16.30		17.60	16.70	15.40
LTE TDD Band 41 (PC2) Intra-band ULCA	Max allowed power	17.30		18.60	17.70	16.40
	Nominal	16.30		17.60	16.70	15.40
LTE TDD Band 48	Max allowed power	14.20	14.40		14.80	13.90
	Nominal	13.20	13.40		13.80	12.90
LTE TDD Band 48 Intra-band ULCA	Max allowed power	14.20	14.40		14.80	13.90
	Nominal	13.20	13.40		13.80	12.90

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

Table 1-5
NR Bands

Mode / Band		Modulated Average Output Power (in dBm)				
		Ant 1	Ant 2a	Ant 2b	Ant 3	Ant 4b
NR FDD Band n71	Max allowed power	**21.30**			**21.50**	
	Nominal	**20.30**			**20.50**	
NR FDD Band n12	Max allowed power	**21.10**			**20.50**	
	Nominal	**20.10**			**19.50**	
NR FDD Band n14	Max allowed power	**20.60**			**20.90**	
	Nominal	**19.60**			**19.90**	
NR FDD Band n26	Max allowed power	**18.70**			**19.40**	
	Nominal	**17.70**			**18.40**	
NR FDD Band n5	Max allowed power	**18.70**			**19.40**	
	Nominal	**17.70**			**18.40**	
NR FDD Band n70	Max allowed power	**17.10**		**15.30**	**17.00**	**14.30**
	Nominal	**16.10**		**14.30**	**16.00**	**13.30**
NR FDD Band n66	Max allowed power	**17.10**		**15.30**	**17.00**	**14.30**
	Nominal	**16.10**		**14.30**	**16.00**	**13.30**
NR FDD Band n25	Max allowed power	**17.40**		**14.70**	**16.90**	**13.20**
	Nominal	**16.40**		**13.70**	**15.90**	**12.20**
NR FDD Band n2	Max allowed power	**17.40**		**14.70**	**16.90**	**13.20**
	Nominal	**16.40**		**13.70**	**15.90**	**12.20**
NR FDD Band n30	Max allowed power	**14.60**		**14.60**	**15.90**	**13.10**
	Nominal	**13.60**		**13.60**	**14.90**	**12.10**
NR FDD Band n7	Max allowed power	**14.50**		**14.90**	**16.50**	**13.20**
	Nominal	**13.50**		**13.90**	**15.50**	**12.20**
NR TDD Band n41 (PC3)	Max allowed power	**13.70**		**15.00**	**14.10**	**12.80**
	Nominal	**12.70**		**14.00**	**13.10**	**11.80**
NR TDD Band n41 (PC2)	Max allowed power	**13.70**		**15.00**	**14.10**	**12.80**
	Nominal	**12.70**		**14.00**	**13.10**	**11.80**
NR TDD Band n77 (PC3)	Max allowed power	**12.20**	**12.00**		**12.20**	**11.80**
	Nominal	**11.20**	**11.00**		**11.20**	**10.80**
NR TDD Band n77 (PC2)	Max allowed power	**12.20**	**12.00**		**12.20**	**11.80**
	Nominal	**11.20**	**11.00**		**11.20**	**10.80**

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

1.5.1 Maximum WLAN Time-Averaged Output Power

Note: Targets for 802.11ax RU operations can be found in Appendix H of the reference model report.

Mode	IEEE 802.11 (Maximum in dBm) - Ant 2a Tolerance (+0/-3.00 dB)							
	Channel	SISO				MIMO		
		b	g	n	ax SU	g	n	ax SU
2.4 GHz WIFI 20 MHz Bandwidth	1	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	2	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	3	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	4	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	5	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	6	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	7	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	8	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	9	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	10	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	11	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	12	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	13	13.50	10.50	11.00	NS	10.50	10.50	NS

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

Mode	IEEE 802.11 (Maximum in dBm) - Ant 4a Tolerance (+0/-3.00 dB)							
	Channel	SISO				MIMO		
		b	g	n	ax SU	g	n	ax SU
2.4 GHz WIFI 20 MHz Bandwidth	1	14.00	14.00	14.00	14.00	13.50	13.50	13.50
	2	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	3	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	4	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	5	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	6	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	7	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	8	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	9	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	10	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	11	14.00	14.00	14.00	14.00	14.00	14.00	14.00
	12	14.00	14.00	14.00	14.00	14.00	14.00	13.50
	13	14.00	10.50	11.00	NS	10.50	10.50	NS

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

Mode	IEEE 802.11 (Maximum in dBm) - Ant 4a Tolerance (+0/-3.00 dB)							
	Channel	SISO			MIMO CDD		MIMO SDM	
		a	n/ac	ax SU	a/n/ac	ax SU	n/ac	ax SU
5 GHz WIFI 20 MHz Bandwidth	36	10.25	10.25	10.25	10.25	10.25	10.25	10.25
	40	10.25	10.25	10.25	10.25	10.25	10.25	10.25
	44	10.25	10.25	10.25	10.25	10.25	10.25	10.25
	48	10.25	10.25	10.25	10.25	10.25	10.25	10.25
	52	10.25	10.25	10.25	10.25	10.25	10.25	10.25
	56	10.25	10.25	10.25	10.25	10.25	10.25	10.25
	60	10.25	10.25	10.25	10.25	10.25	10.25	10.25
	64	10.25	10.25	10.25	10.25	10.25	10.25	10.25
	100	9.00	9.00	9.00	9.00	9.00	9.00	9.00
	104	9.00	9.00	9.00	9.00	9.00	9.00	9.00
	108	9.00	9.00	9.00	9.00	9.00	9.00	9.00
	112	9.00	9.00	9.00	9.00	9.00	9.00	9.00
	116	9.00	9.00	9.00	9.00	9.00	9.00	9.00
	120	9.00	9.00	9.00	9.00	9.00	9.00	9.00
	124	9.00	9.00	9.00	9.00	9.00	9.00	9.00
	128	9.00	9.00	9.00	9.00	9.00	9.00	9.00
	132	9.00	9.00	9.00	9.00	9.00	9.00	9.00
	136	9.00	9.00	9.00	9.00	9.00	9.00	9.00
	140	9.00	9.00	9.00	9.00	9.00	9.00	9.00
	144	9.00	9.00	9.00	9.00	9.00	9.00	9.00
	149	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	153	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	157	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	161	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	165	10.50	10.50	10.50	10.50	10.50	10.50	10.50
5 GHz WIFI 40 MHz Bandwidth	38	[redacted]	10.25	10.25	10.25	10.25	10.25	10.25
	46		10.25	10.25	10.25	10.25	10.25	10.25
	54		10.25	10.25	10.25	10.25	10.25	10.25
	62		10.25	10.25	10.25	10.25	10.25	10.25
	102		9.00	9.00	9.00	9.00	9.00	9.00
	110		9.00	9.00	9.00	9.00	9.00	9.00
	118		9.00	9.00	9.00	9.00	9.00	9.00
	126		9.00	9.00	9.00	9.00	9.00	9.00
	134		9.00	9.00	9.00	9.00	9.00	9.00
	142		9.00	9.00	9.00	9.00	9.00	9.00
	151		10.50	10.50	10.50	10.50	10.50	10.50
	159		10.50	10.50	10.50	10.50	10.50	10.50
5 GHz WIFI 80 MHz Bandwidth	42		10.25	10.25	10.25	10.25	10.25	10.25
	58		10.25	10.25	10.25	10.25	10.25	10.25
	106		9.00	9.00	9.00	9.00	9.00	9.00
	122		9.00	9.00	9.00	9.00	9.00	9.00
	138		9.00	9.00	9.00	9.00	9.00	9.00
	155		10.50	10.50	10.50	10.50	10.50	10.50
5GHz WIFI 160 Mhz Bandwidth	50		9.00	9.00	8.50	8.50	8.50	8.50
	114		9.00	9.00	9.00	9.00	9.00	9.00

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above.
Note: 802.11a supports up to 20MHz, 802.11n supports up to 40MHz, 802.11ac/ax supports up to 160MHz

Mode	IEEE 802.11 (Maximum in dBm) - Ant 5b Tolerance (+0/-3.00 dB)							
	Channel	SISO			MIMO CDD		MIMO SDM	
		a	n/ac	ax SU	a/n/ac	ax SU	n/ac	ax SU
5 GHz WIFI 20 MHz Bandwidth	36	17.50	17.50	16.50	17.00	16.25	17.00	16.25
	40	17.50	17.50	17.50	17.00	17.00	17.00	17.00
	44	17.50	17.50	17.50	17.00	17.00	17.00	17.00
	48	17.50	17.50	17.50	17.00	17.00	17.00	17.00
	52	16.50	16.50	16.50	16.50	16.50	16.50	16.50
	56	16.50	16.50	16.50	16.50	16.50	16.50	16.50
	60	16.50	16.50	16.50	16.50	16.50	16.50	16.50
	64	16.50	16.50	16.50	16.50	16.50	16.50	16.50
	100	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	104	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	108	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	112	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	116	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	120	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	124	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	128	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	132	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	136	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	140	16.00	16.00	14.50	16.00	14.50	16.00	14.50
	144	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	149	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	153	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	157	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	161	16.00	16.00	16.00	16.00	16.00	16.00	16.00
	165	16.00	16.00	16.00	16.00	16.00	16.00	16.00
5 GHz WIFI 40 MHz Bandwidth	38	[redacted]	14.50	14.00	14.50	13.75	14.50	13.75
	46		17.50	17.50	17.50	17.50	17.50	17.50
	54		16.50	16.50	16.50	16.50	16.50	16.50
	62		16.50	16.00	16.50	15.50	16.50	15.50
	102		15.00	15.50	14.50	14.50	14.50	14.50
	110		16.00	16.00	16.00	16.00	16.00	16.00
	118		16.00	16.00	16.00	16.00	16.00	16.00
	126		16.00	16.00	16.00	16.00	16.00	16.00
	134		16.00	16.00	16.00	16.00	16.00	16.00
	142		16.00	16.00	16.00	16.00	16.00	16.00
	151		16.00	16.00	16.00	16.00	16.00	16.00
	159		16.00	16.00	16.00	16.00	16.00	16.00
5 GHz WIFI 80 MHz Bandwidth	42		12.50	12.00	12.50	11.75	12.50	11.75
	58		15.25	14.50	15.00	14.50	15.00	14.50
	106		14.00	14.00	14.00	14.00	14.00	14.00
	122		16.00	16.00	16.00	16.00	16.00	16.00
	138		16.00	16.00	16.00	16.00	16.00	16.00
	155		16.00	16.00	16.00	16.00	16.00	16.00
5GHz WIFI 160 Mhz Bandwidth	50		9.00	9.00	8.50	8.50	8.50	8.50
	114		11.00	10.00	10.50	10.00	10.50	10.00

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above.
Note: 802.11a supports up to 20MHz, 802.11n supports up to 40MHz, 802.11ac/ax supports up to 160MHz

Mode	Channel	IEEE 802.11 (Maximum in dBm) - Ant 4a (Tolerance +0/-3.00dB)			
		SISO		MIMO	
		a	ax (SU)	ax (SU) CDD	ax (SU) SDM
6 GHz WIFI (20MHz BW)	1	3.50	3.50	-1.50	1.50
	5	3.50	3.50	-1.50	1.50
	9-29	3.50	3.50	-1.50	1.50
	33-61	3.25	3.25	-1.50	1.50
	65-85	2.75	2.75	-1.75	1.00
	89	2.75	2.75	-1.75	1.00
	93	2.75	2.75	-1.75	1.00
	97-113	3.00	3.00	-1.75	1.25
	117-181	3.25	3.25	-1.50	1.50
	185	3.25	3.25	-1.50	1.50
	189-225	5.00	5.00	1.00	3.75
	229	5.00	5.00	1.00	3.75
	233	4.50	4.50	1.00	3.75
6 GHz WIFI (40MHz BW)	3	[redacted]	6.50	1.50	4.50
	11		6.50	1.50	4.50
	19-27		6.50	1.50	4.50
	35-59		6.25	1.50	4.50
	67-75		5.75	1.25	4.00
	83		5.75	1.25	4.00
	91		5.75	1.25	4.00
	99-107		6.00	1.25	4.25
	115		6.00	1.25	4.25
	123-179		6.25	1.50	4.50
	187		6.25	1.50	4.50
	195-219		8.00	4.00	6.75
	227		8.00	4.00	6.75
6 GHz WIFI (80MHz BW)	7		9.00	4.50	7.50
	23		9.00	4.50	7.50
	39-55		8.25	4.25	7.00
	71		8.25	4.25	7.00
	87		8.75	4.25	7.00
	103		9.00	4.25	7.25
	119		9.00	4.25	7.25
	135-167		9.25	4.50	7.50
	183		9.25	4.50	7.50
	199		10.50	7.00	9.75
	215		10.50	7.00	9.75
6 GHz WIFI (160MHz BW)	15		9.00	7.50	9.00
	47		8.25	7.50	8.25
	79		10.25	8.25	10.25
	111		9.75	8.25	9.75
	143		9.75	8.00	9.75
	175		9.75	8.50	9.75
	207		10.50	10.50	10.50

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

Mode	Channel	IEEE 802.11 (Maximum in dBm) - Ant 5b (Tolerance +0/-3.00dB)			
		SISO		MIMO	
		a	ax (SU)	ax (SU) CDD	ax (SU) SDM
6 GHz WIFI (20MHz BW)	1	3.50	3.50	-1.50	1.50
	5	3.50	3.50	-1.50	1.50
	9-29	3.50	3.50	-1.50	1.50
	33-61	3.25	3.25	-1.50	1.50
	65-85	2.75	2.75	-1.75	1.00
	89	2.75	2.75	-1.75	1.00
	93	2.75	2.75	-1.75	1.00
	97-113	3.00	3.00	-1.75	1.25
	117-181	3.25	3.25	-1.50	1.50
	185	3.25	3.25	-1.50	1.50
	189-225	5.00	5.00	1.00	3.75
	229	5.00	5.00	1.00	3.75
	233	4.50	4.50	1.00	3.75
6 GHz WIFI (40MHz BW)	3	[redacted]	6.50	1.50	4.50
	11		6.50	1.50	4.50
	19-27		6.50	1.50	4.50
	35-59		6.25	1.50	4.50
	67-75		5.75	1.25	4.00
	83		5.75	1.25	4.00
	91		5.75	1.25	4.00
	99-107		6.00	1.25	4.25
	115		6.00	1.25	4.25
	123-179		6.25	1.50	4.50
	187		6.25	1.50	4.50
	195-219		8.00	4.00	6.75
	227		8.00	4.00	6.75
6 GHz WIFI (80MHz BW)	7		9.50	4.50	7.50
	23		9.50	4.50	7.50
	39-55		9.25	4.50	7.50
	71		8.75	4.25	7.00
	87		8.75	4.25	7.00
	103		9.00	4.25	7.25
	119		9.00	4.25	7.25
	135-167		9.25	4.50	7.50
	183		9.25	4.50	7.50
	199		11.00	7.00	9.75
	215		11.00	7.00	9.75
6 GHz WIFI (160MHz BW)	15		12.50	7.50	10.50
	47		12.25	7.50	10.50
	79		12.75	8.25	11.00
	111		13.00	8.25	11.25
	143		12.75	8.00	11.00
	175		13.25	8.50	11.50
	207		13.25	10.50	13.25

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

1.5.2 Reduced WLAN Time-Averaged Output Power

Note: Targets for 802.11ax RU operations can be found in Appendix H of the reference model report.

The table below is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 2a/2b active
-Simultaneous conditions with Inter-band ULCA active

Mode	IEEE 802.11 (Maximum in dBm) - Ant 2a Tolerance (+0/-3.00 dB)							
	Channel	SISO				MIMO		
		b	g	n	ax SU	g	n	ax SU
2.4 GHz WIFI 20 MHz Bandwidth	1	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	2	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	3	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	4	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	5	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	6	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	7	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	8	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	9	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	10	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	11	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	12	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	13	10.00	10.00	10.00	NS	10.00	10.00	NS

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

The table below is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 4b active
-Simultaneous conditions with Inter-band ULCA active

Mode	IEEE 802.11 (Maximum in dBm) - Ant 4a Tolerance (+0/-3.00 dB)							
	Channel	SISO				MIMO		
		b	g	n	ax SU	g	n	ax SU
2.4 GHz WIFI 20 MHz Bandwidth	1	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	2	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	3	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	4	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	5	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	6	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	7	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	8	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	9	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	10	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	11	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	12	10.50	10.50	10.50	10.50	10.50	10.50	10.50
	13	10.50	10.50	10.50	NS	10.50	10.50	NS

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

The table below is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 4b active
-Simultaneous conditions with Inter-band ULCA active

Mode	IEEE 802.11 (Maximum in dBm) - Ant 4a Tolerance (+0/-3.00 dB)							
	Channel	SISO			MIMO CDD		MIMO SDM	
		a	n/ac	ax SU	a/n/ac	ax SU	n/ac	ax SU
5 GHz WIFI 20 MHz Bandwidth	36	4.75	4.75	4.75	4.75	4.75	4.75	4.75
	40	4.75	4.75	4.75	4.75	4.75	4.75	4.75
	44	4.75	4.75	4.75	4.75	4.75	4.75	4.75
	48	4.75	4.75	4.75	4.75	4.75	4.75	4.75
	52	4.75	4.75	4.75	4.75	4.75	4.75	4.75
	56	4.75	4.75	4.75	4.75	4.75	4.75	4.75
	60	4.75	4.75	4.75	4.75	4.75	4.75	4.75
	64	4.75	4.75	4.75	4.75	4.75	4.75	4.75
	100	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	104	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	108	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	112	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	116	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	120	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	124	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	128	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	132	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	136	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	140	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	144	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	149	5.00	5.00	5.00	5.00	5.00	5.00	5.00
	153	5.00	5.00	5.00	5.00	5.00	5.00	5.00
	157	5.00	5.00	5.00	5.00	5.00	5.00	5.00
	161	5.00	5.00	5.00	5.00	5.00	5.00	5.00
	165	5.00	5.00	5.00	5.00	5.00	5.00	5.00
5 GHz WIFI 40 MHz Bandwidth	38	[redacted]	4.75	4.75	4.75	4.75	4.75	4.75
	46		4.75	4.75	4.75	4.75	4.75	4.75
	54		4.75	4.75	4.75	4.75	4.75	4.75
	62		4.75	4.75	4.75	4.75	4.75	4.75
	102		5.50	5.50	5.50	5.50	5.50	5.50
	110		5.50	5.50	5.50	5.50	5.50	5.50
	118		5.50	5.50	5.50	5.50	5.50	5.50
	126		5.50	5.50	5.50	5.50	5.50	5.50
	134		5.50	5.50	5.50	5.50	5.50	5.50
	142		5.50	5.50	5.50	5.50	5.50	5.50
	151		5.00	5.00	5.00	5.00	5.00	5.00
	159		5.00	5.00	5.00	5.00	5.00	5.00
5 GHz WIFI 80 MHz Bandwidth	42		4.75	4.75	4.75	4.75	4.75	4.75
	58		4.75	4.75	4.75	4.75	4.75	4.75
	106		5.50	5.50	5.50	5.50	5.50	5.50
	122		5.50	5.50	5.50	5.50	5.50	5.50
	138		5.50	5.50	5.50	5.50	5.50	5.50
	155		5.00	5.00	5.00	5.00	5.00	5.00
5GHz WIFI 160 Mhz Bandwidth	50		4.75	4.75	4.75	4.75	4.75	4.75
	114		5.50	5.50	5.50	5.50	5.50	5.50

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above.
Note: 802.11a supports up to 20MHz, 802.11n supports up to 40MHz, 802.11ac/ax supports up to 160MHz

The table below is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 2a/2b active
-Simultaneous conditions with Inter-band ULCA active

Mode	IEEE 802.11 (Maximum in dBm) - Ant 5b Tolerance (+0/-3.00 dB)							
	Channel	SISO			MIMO CDD		MIMO SDM	
		a	n/ac	ax SU	a/n/ac	ax SU	n/ac	ax SU
5 GHz WIFI 20 MHz Bandwidth	36	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	40	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	44	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	48	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	52	12.50	12.50	12.50	12.50	12.50	12.50	12.50
	56	12.50	12.50	12.50	12.50	12.50	12.50	12.50
	60	12.50	12.50	12.50	12.50	12.50	12.50	12.50
	64	12.50	12.50	12.50	12.50	12.50	12.50	12.50
	100	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	104	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	108	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	112	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	116	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	120	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	124	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	128	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	132	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	136	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	140	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	144	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	149	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	153	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	157	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	161	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	165	12.00	12.00	12.00	12.00	12.00	12.00	12.00
5 GHz WIFI 40 MHz Bandwidth	38	[redacted]	13.50	13.50	13.50	13.50	13.50	13.50
	46		13.50	13.50	13.50	13.50	13.50	13.50
	54		12.50	12.50	12.50	12.50	12.50	12.50
	62		12.50	12.50	12.50	12.50	12.50	12.50
	102		12.00	12.00	12.00	12.00	12.00	12.00
	110		12.00	12.00	12.00	12.00	12.00	12.00
	118		12.00	12.00	12.00	12.00	12.00	12.00
	126		12.00	12.00	12.00	12.00	12.00	12.00
	134		12.00	12.00	12.00	12.00	12.00	12.00
	142		12.00	12.00	12.00	12.00	12.00	12.00
	151		12.00	12.00	12.00	12.00	12.00	12.00
	159		12.00	12.00	12.00	12.00	12.00	12.00
5 GHz WIFI 80 MHz Bandwidth	42		12.50	12.00	12.50	11.75	12.50	11.75
	58		12.50	12.50	12.50	12.50	12.50	12.50
	106		12.00	12.00	12.00	12.00	12.00	12.00
	122		12.00	12.00	12.00	12.00	12.00	12.00
	138		12.00	12.00	12.00	12.00	12.00	12.00
	155		12.00	12.00	12.00	12.00	12.00	12.00
5GHz WIFI 160 Mhz Bandwidth	50		9.00	9.00	8.50	8.50	8.50	8.50
	114		11.00	10.00	10.50	10.00	10.50	10.00

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above.
Note: 802.11a supports up to 20MHz, 802.11n supports up to 40MHz, 802.11ac/ax supports up to 160MHz

The table below is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 4b active
-Simultaneous conditions with Inter-band ULCA active

Mode	Channel	IEEE 802.11 (Maximum in dBm) - Ant 4a (Tolerance +0/-3.00dB)			
		SISO		MIMO	
		a	ax (SU)	ax (SU) CDD	ax (SU) SDM
6 GHz WIFI (20MHz BW)	1	3.50	3.50	-1.50	1.50
	5	3.50	3.50	-1.50	1.50
	9-29	3.50	3.50	-1.50	1.50
	33-61	3.25	3.25	-1.50	1.50
	65-85	2.75	2.75	-1.75	1.00
	89	2.75	2.75	-1.75	1.00
	93	2.75	2.75	-1.75	1.00
	97-113	3.00	3.00	-1.75	1.25
	117-181	3.25	3.25	-1.50	1.50
	185	3.25	3.25	-1.50	1.50
	189-225	5.00	5.00	1.00	3.75
	229	5.00	5.00	1.00	3.75
	233	4.50	4.50	1.00	3.75
6 GHz WIFI (40MHz BW)	3	[redacted]	4.75	1.50	4.50
	11		4.75	1.50	4.50
	19-27		4.75	1.50	4.50
	35-59		4.75	1.50	4.50
	67-75		4.75	1.25	4.00
	83		4.75	1.25	4.00
	91		4.75	1.25	4.00
	99-107		4.25	1.25	4.25
	115		4.25	1.25	4.25
	123-179		4.25	1.50	4.25
	187		5.00	1.50	4.50
	195-219		5.00	4.00	5.00
	227		5.00	4.00	5.00
6 GHz WIFI (80MHz BW)	7		4.75	4.50	4.75
	23		4.75	4.50	4.75
	39-55		4.75	4.25	4.75
	71		4.75	4.25	4.75
	87		4.75	4.25	4.75
	103		4.25	4.25	4.25
	119		4.25	4.25	4.25
	135-167		4.25	4.25	4.25
	183		4.25	4.25	4.25
	199		5.00	5.00	5.00
	215		5.00	5.00	5.00
6 GHz WIFI (160MHz BW)	15		4.75	4.75	4.75
	47		4.75	4.75	4.75
	79		4.75	4.75	4.75
	111		4.25	4.25	4.25
	143		4.25	4.25	4.25
	175		4.25	4.25	4.25
	207		5.00	5.00	5.00

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

The table below is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 2a/2b active
-Simultaneous conditions with Inter-band ULCA active

Mode	Channel	IEEE 802.11 (Maximum in dBm) - Ant 5b (Tolerance +0/-3.00dB)			
		SISO		MIMO	
		a	ax (SU)	ax (SU) CDD	ax (SU) SDM
6 GHz WIFI (20MHz BW)	1	3.50	3.50	-1.50	1.50
	5	3.50	3.50	-1.50	1.50
	9-29	3.50	3.50	-1.50	1.50
	33-61	3.25	3.25	-1.50	1.50
	65-85	2.75	2.75	-1.75	1.00
	89	2.75	2.75	-1.75	1.00
	93	2.75	2.75	-1.75	1.00
	97-113	3.00	3.00	-1.75	1.25
	117-181	3.25	3.25	-1.50	1.50
	185	3.25	3.25	-1.50	1.50
	189-225	5.00	5.00	1.00	3.75
	229	5.00	5.00	1.00	3.75
	233	4.50	4.50	1.00	3.75
6 GHz WIFI (40MHz BW)	3	[redacted]	6.50	1.50	4.50
	11		6.50	1.50	4.50
	19-27		6.50	1.50	4.50
	35-59		6.25	1.50	4.50
	67-75		5.75	1.25	4.00
	83		5.75	1.25	4.00
	91		5.75	1.25	4.00
	99-107		6.00	1.25	4.25
	115		6.00	1.25	4.25
	123-179		6.25	1.50	4.50
	187		6.25	1.50	4.50
	195-219		8.00	4.00	6.75
	227		8.00	4.00	6.75
6 GHz WIFI (80MHz BW)	7		9.50	4.50	7.50
	23		9.50	4.50	7.50
	39-55		9.25	4.50	7.50
	71		8.75	4.25	7.00
	87		8.75	4.25	7.00
	103		9.00	4.25	7.25
	119		9.00	4.25	7.25
	135-167		9.25	4.50	7.50
	183		9.25	4.50	7.50
	199		9.25	7.00	9.25
	215		9.25	7.00	9.25
6 GHz WIFI (160MHz BW)	15		10.50	10.50	10.50
	47		9.75	9.75	9.75
	79		9.75	9.75	9.75
	111		11.25	11.25	11.25
	143		11.00	11.00	11.00
	175		11.25	11.25	11.25
	207		9.25	9.25	9.25

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

1.5.3 Bluetooth Maximum and Reduced Output Power

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 2a	Modulated Average (iPA) - Single Tx Chain (dBm) - Antenna 2a
Bluetooth BDR/LE	Maximum	**14.00**	**10.00**
	Nominal	**12.50**	**8.50**
Bluetooth EDR	Maximum	**13.00**	**5.50**
	Nominal	**11.50**	**4.00**
Bluetooth HDR	Maximum	**10.00**	**3.00**
	Nominal	**8.50**	**1.50**

Mode / Band		Modulated Average (ePA) - TxBF (dBm) - Antenna 2a	Modulated Average (iPA) - TxBF (dBm) - Antenna 2a
Bluetooth BDR/LE	Maximum	**10.50**	**10.00**
	Nominal	**9.00**	**8.50**
Bluetooth EDR	Maximum	**10.50**	**5.50**
	Nominal	**9.00**	**4.00**
Bluetooth HDR	Maximum	**10.00**	**3.00**
	Nominal	**8.50**	**1.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 4a	Modulated Average (iPA) - Single Tx Chain (dBm) - Antenna 4a
Bluetooth BDR/LE	Maximum	**14.50**	**10.50**
	Nominal	**13.00**	**9.00**
Bluetooth EDR	Maximum	**13.50**	**7.50**
	Nominal	**12.00**	**6.00**
Bluetooth HDR	Maximum	**10.00**	**5.00**
	Nominal	**8.50**	**3.50**

Mode / Band		Modulated Average (ePA) - TxBF (dBm) - Antenna 4a	Modulated Average (iPA) - TxBF (dBm) - Antenna 4a
Bluetooth BDR/LE	Maximum	**11.00**	**10.50**
	Nominal	**9.50**	**9.00**
Bluetooth EDR	Maximum	**11.00**	**7.50**
	Nominal	**9.50**	**6.00**
Bluetooth HDR	Maximum	**10.00**	**5.00**
	Nominal	**8.50**	**3.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 1/2a/2b active
-Simultaneous conditions with Licensed Bands Antenna 3/4b and 5/6 GHz WLAN active
-Simultaneous conditions with 5/6 GHz WLAN active

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 2a	Modulated Average (iPA) - Single Tx Chain (dBm) - Antenna 2a
Bluetooth BDR/LE Reduced	Maximum	**10.00**	**10.00**
	Nominal	**8.50**	**8.50**
Bluetooth EDR Reduced	Maximum	**10.00**	**5.50**
	Nominal	**8.50**	**4.00**
Bluetooth HDR Reduced	Maximum	**10.00**	**3.00**
	Nominal	**8.50**	**1.50**

Mode / Band		Modulated Average (ePA) - TxBF (dBm) - Antenna 2a	Modulated Average (iPA) - TxBF (dBm) - Antenna 2a
Bluetooth BDR/LE Reduced	Maximum	**6.50**	**6.50**
	Nominal	**5.00**	**5.00**
Bluetooth EDR Reduced	Maximum	**6.50**	**5.50**
	Nominal	**5.00**	**4.00**
Bluetooth HDR Reduced	Maximum	**6.50**	**3.00**
	Nominal	**5.00**	**1.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 2a/2b and 5/6 GHz WLAN active
-Simultaneous conditions with Inter-band ULCA active

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 2a	Modulated Average (iPA) - Single Tx Chain (dBm) - Antenna 2a
Bluetooth BDR/LE Reduced	Maximum	**7.00**	**7.00**
	Nominal	**5.50**	**5.50**
Bluetooth EDR Reduced	Maximum	**7.00**	**5.50**
	Nominal	**5.50**	**4.00**
Bluetooth HDR Reduced	Maximum	**7.00**	**3.00**
	Nominal	**5.50**	**1.50**

Mode / Band		Modulated Average (ePA) - TxBF (dBm) - Antenna 2a	Modulated Average (iPA) - TxBF (dBm) - Antenna 2a
Bluetooth BDR/LE Reduced	Maximum	**3.50**	**3.50**
	Nominal	**2.00**	**2.00**
Bluetooth EDR Reduced	Maximum	**3.50**	**3.50**
	Nominal	**2.00**	**2.00**
Bluetooth HDR Reduced	Maximum	**3.50**	**3.00**
	Nominal	**2.00**	**1.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 3/4b active

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 4a	Modulated Average (iPA) - Single Tx Chain (dBm) - Antenna 4a
Bluetooth BDR/LE Reduced	Maximum	**11.50**	**10.50**
	Nominal	**10.00**	**9.00**
Bluetooth EDR Reduced	Maximum	**11.50**	**7.50**
	Nominal	**10.00**	**6.00**
Bluetooth HDR Reduced	Maximum	**10.00**	**5.00**
	Nominal	**8.50**	**3.50**

Mode / Band		Modulated Average (ePA) - TxBF (dBm) - Antenna 4a	Modulated Average (iPA) - TxBF (dBm) - Antenna 4a
Bluetooth BDR/LE Reduced	Maximum	**8.00**	**8.00**
	Nominal	**6.50**	**6.50**
Bluetooth EDR Reduced	Maximum	**8.00**	**7.50**
	Nominal	**6.50**	**6.00**
Bluetooth HDR Reduced	Maximum	**8.00**	**5.00**
	Nominal	**6.50**	**3.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 1/2a/2b and 5/6 GHz WLAN active
-Simultaneous conditions with 5/6 GHz WLAN active

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 4a	Modulated Average (iPA) - Single Tx Chain (dBm) - Antenna 4a
Bluetooth BDR/LE Reduced	Maximum	**9.50**	**9.50**
	Nominal	**8.00**	**8.00**
Bluetooth EDR Reduced	Maximum	**9.50**	**7.50**
	Nominal	**8.00**	**6.00**
Bluetooth HDR Reduced	Maximum	**9.50**	**5.00**
	Nominal	**8.00**	**3.50**

Mode / Band		Modulated Average (ePA) - TxBF (dBm) - Antenna 4a	Modulated Average (iPA) - TxBF (dBm) - Antenna 4a
Bluetooth BDR/LE Reduced	Maximum	**6.00**	**6.00**
	Nominal	**4.50**	**4.50**
Bluetooth EDR Reduced	Maximum	**6.00**	**6.00**
	Nominal	**4.50**	**4.50**
Bluetooth HDR Reduced	Maximum	**6.00**	**5.00**
	Nominal	**4.50**	**3.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 3/4b and 5/6 GHz WLAN active
-Simultaneous conditions with Inter-band ULCA active

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 4a	Modulated Average (iPA) - Single Tx Chain (dBm) - Antenna 4a
Bluetooth BDR/LE Reduced	Maximum	**7.50**	**7.50**
	Nominal	**6.00**	**6.00**
Bluetooth EDR Reduced	Maximum	**7.50**	**7.50**
	Nominal	**6.00**	**6.00**
Bluetooth HDR Reduced	Maximum	**7.50**	**5.00**
	Nominal	**6.00**	**3.50**

Mode / Band		Modulated Average (ePA) - TxBF (dBm) - Antenna 4a	Modulated Average (iPA) - TxBF (dBm) - Antenna 4a
Bluetooth BDR/LE Reduced	Maximum	**4.00**	**4.00**
	Nominal	**2.50**	**2.50**
Bluetooth EDR Reduced	Maximum	**4.00**	**4.00**
	Nominal	**2.50**	**2.50**
Bluetooth HDR Reduced	Maximum	**4.00**	**4.00**
	Nominal	**2.50**	**2.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

1.5.4 NB UNII Maximum and Reduced Output Power

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 4a	Modulated Average (ePA) - TxBF (dBm) - Antenna 4a
NB UNII-1 BDR	Maximum	**10.00**	**7.00**
	Nominal	**8.50**	**5.50**
NB UNII-1 HDR	Maximum	**10.50**	**9.00**
	Nominal	**9.00**	**7.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 5b	Modulated Average (ePA) - TxBF (dBm) - Antenna 5b
NB UNII-1 BDR	Maximum	**10.00**	**7.00**
	Nominal	**8.50**	**5.50**
NB UNII-1 HDR	Maximum	**11.50**	**9.00**
	Nominal	**10.00**	**7.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 4a	Modulated Average (ePA) - TxBF (dBm) - Antenna 4a
NB UNII-3 BDR	Maximum	**11.00**	**11.00**
	Nominal	**9.50**	**9.50**
NB UNII-3 HDR	Maximum	**11.00**	**11.00**
	Nominal	**9.50**	**9.50**

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 5b	Modulated Average (ePA) - TxBF (dBm) - Antenna 5b
NB UNII-3 BDR	Maximum	**18.00**	**18.00**
	Nominal	**16.50**	**16.50**
NB UNII-3 HDR	Maximum	**14.00**	**14.00**
	Nominal	**12.50**	**12.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 3/4b active

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 4a	Modulated Average (ePA) - TxBF (dBm) - Antenna 4a
NB UNII-1 BDR Reduced	Maximum	**7.50**	**7.00**
	Nominal	**6.00**	**5.50**
NB UNII-1 HDR Reduced	Maximum	**7.50**	**7.50**
	Nominal	**6.00**	**6.00**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 4a	Modulated Average (ePA) - TxBF (dBm) - Antenna 4a
NB UNII-3 BDR Reduced	Maximum	**8.00**	**8.00**
	Nominal	**6.50**	**6.50**
NB UNII-3 HDR Reduced	Maximum	**8.00**	**8.00**
	Nominal	**6.50**	**6.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 1/2a/2b and 2.4 GHz WLAN active
-Simultaneous conditions with 2.4 GHz WLAN active

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 4a	Modulated Average (ePA) - TxBF (dBm) - Antenna 4a
NB UNII-1 BDR Reduced	Maximum	**5.50**	**5.50**
	Nominal	**4.00**	**4.00**
NB UNII-1 EDR Reduced	Maximum	**5.50**	**5.50**
	Nominal	**4.00**	**4.00**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 4a	Modulated Average (ePA) - TxBF (dBm) - Antenna 4a
NB UNII-3 BDR Reduced	Maximum	**6.00**	**6.00**
	Nominal	**4.50**	**4.50**
NB UNII-3 EDR Reduced	Maximum	**6.00**	**6.00**
	Nominal	**4.50**	**4.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 3/4b and 2.4 GHz WLAN active

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 4a	Modulated Average (ePA) - TxBF (dBm) - Antenna 4a
NB UNII-1 BDR Reduced	Maximum	**3.50**	**3.50**
	Nominal	**2.00**	**2.00**
NB UNII-1 HDR Reduced	Maximum	**3.50**	**3.50**
	Nominal	**2.00**	**2.00**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 4a	Modulated Average (ePA) - TxBF (dBm) - Antenna 4a
NB UNII-3 BDR Reduced	Maximum	**4.00**	**4.00**
	Nominal	**2.50**	**2.50**
NB UNII-3 HDR Reduced	Maximum	**4.00**	**4.00**
	Nominal	**2.50**	**2.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 1/2a/2b active or 2.4 GHz WLAN active

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 5b	Modulated Average (ePA) - TxBF (dBm) - Antenna 5b
NB UNII-1 BDR Reduced	Maximum	**7.50**	**7.00**
	Nominal	**6.00**	**5.50**
NB UNII-1 HDR Reduced	Maximum	**7.50**	**7.50**
	Nominal	**6.00**	**6.00**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 5b	Modulated Average (ePA) - TxBF (dBm) - Antenna 5b
NB UNII-3 BDR Reduced	Maximum	**14.00**	**14.00**
	Nominal	**12.50**	**12.50**
NB UNII-3 HDR Reduced	Maximum	**14.00**	**14.00**
	Nominal	**12.50**	**12.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Below table is applicable in the following conditions:
-Simultaneous conditions with Licensed Bands Antenna 2a/2b and 2.4 GHz WLAN active

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 5b	Modulated Average (ePA) - TxBF (dBm) - Antenna 5b
NB UNII-1 BDR Reduced	Maximum	**4.50**	**4.50**
	Nominal	**3.00**	**3.00**
NB UNII-1 HDR Reduced	Maximum	**4.50**	**4.50**
	Nominal	**3.00**	**3.00**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Mode / Band		Modulated Average (ePA) - Single Tx Chain (dBm) - Antenna 5b	Modulated Average (ePA) - TxBF (dBm) - Antenna 5b
NB UNII-3 Bluetooth BDR Reduced	Maximum	**11.00**	**11.00**
	Nominal	**9.50**	**9.50**
NB UNII-3 Bluetooth HDR Reduced	Maximum	**11.00**	**11.00**
	Nominal	**9.50**	**9.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

1.6 DUT Antenna Locations

The overall diagonal dimension of the device is > 200 mm. A diagram showing the location of the device antennas can be found in Appendix B. Exact antenna dimensions and separation distances are shown in the Technical Descriptions in the FCC filings.

Table 1-6
Device Edges/Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
UMTS 850 Antenna 1	Yes	No	No	Yes	No	Yes
UMTS 1750 Antenna 1	Yes	No	No	Yes	No	Yes
UMTS 1900 Antenna 1	Yes	No	No	Yes	No	Yes
LTE Band 71 Antenna 1	Yes	No	No	Yes	No	Yes
LTE Band 12 Antenna 1	Yes	No	No	Yes	No	Yes
LTE Band 13 Antenna 1	Yes	No	No	Yes	No	Yes
LTE Ban 14 Antenna 1	Yes	No	No	Yes	No	Yes
LTE Band 26 (Cell) Antenna 1	Yes	No	No	Yes	No	Yes
LTE Band 5 (Cell) Antenna 1	Yes	No	No	Yes	No	Yes
LTE Band 66 (AWS) Antenna 1	Yes	No	No	Yes	No	Yes
LTE Band 25 (PCS) Antenna 1	Yes	No	No	Yes	No	Yes
LTE Band 30 Antenna 1	Yes	No	No	Yes	No	Yes
LTE Band 7 Antenna 1	Yes	No	No	Yes	No	Yes
LTE Band 41 Antenna 1	Yes	No	No	Yes	No	Yes
LTE Band 48 Antenna 1	Yes	No	No	Yes	No	Yes
NR Band n71 Antenna 1	Yes	No	No	Yes	No	Yes
NR Band n12 Antenna 1	Yes	No	No	Yes	No	Yes
NR Band n14 Antenna 1	Yes	No	No	Yes	No	Yes
NR Band n5 (Cell) Antenna 1	Yes	No	No	Yes	No	Yes
NR Band n26 (Cell) Antenna 1	Yes	No	No	Yes	No	Yes
NR Band n70 Antenna 1	Yes	No	No	Yes	No	Yes
NR Band n66 (AWS) Antenna 1	Yes	No	No	Yes	No	Yes
NR Band n25 (PCS) Antenna 1	Yes	No	No	Yes	No	Yes
NR Band n30 Antenna 1	Yes	No	No	Yes	No	Yes
NR Band n7 Antenna 1	Yes	No	No	Yes	No	Yes
NR Band n41 Antenna 1	Yes	No	No	Yes	No	Yes
NR Band n77 Antenna 1	Yes	No	No	Yes	No	Yes
LTE Band 48 Antenna 2a	Yes	No	No	Yes	Yes	No
NR Band n77 Antenna 2a	Yes	No	No	Yes	Yes	No
UMTS 1750 Antenna 2b	Yes	No	No	Yes	No	No
UMTS 1900 Antenna 2b	Yes	No	No	Yes	No	No
LTE Band 66 (AWS) Antenna 2b	Yes	No	No	Yes	No	No
LTE Band 25 (PCS) Antenna 2b	Yes	No	No	Yes	No	No
LTE Band 30 Antenna 2b	Yes	No	No	Yes	No	No
LTE Band 7 Antenna 2b	Yes	No	No	Yes	No	No
LTE Band 41 Antenna 2b	Yes	No	No	Yes	No	No
NR Band n70 Antenna 2b	Yes	No	No	Yes	No	No
NR Band n66 (AWS) Antenna 2b	Yes	No	No	Yes	No	No
NR Band n25 (PCS) Antenna 2b	Yes	No	No	Yes	No	No
NR Band n30 Antenna 2b	Yes	No	No	Yes	No	No
NR Band n7 Antenna 2b	Yes	No	No	Yes	No	No
NR Band n41 Antenna 2b	Yes	No	No	Yes	No	No

Table 1-7
Device Edges/Sides for SAR Testing Cont'd

Mode	Back	Front	Top	Bottom	Right	Left
UMTS 850 Antenna 3	Yes	No	Yes	No	Yes	No
UMTS 1750 Antenna 3	Yes	No	Yes	No	Yes	No
UMTS 1900 Antenna 3	Yes	No	Yes	No	Yes	No
LTE Band 71 Antenna 3	Yes	No	Yes	No	Yes	No
LTE Band 12 Antenna 3	Yes	No	Yes	No	Yes	No
LTE Band 13 Antenna 3	Yes	No	Yes	No	Yes	No
LTE Ban 14 Antenna 3	Yes	No	Yes	No	Yes	No
LTE Band 26 (Cell) Antenna 3	Yes	No	Yes	No	Yes	No
LTE Band 5 (Cell) Antenna 3	Yes	No	Yes	No	Yes	No
LTE Band 66 (AWS) Antenna 3	Yes	No	Yes	No	Yes	No
LTE Band 25 (PCS) Antenna 3	Yes	No	Yes	No	Yes	No
LTE Band 30 Antenna 3	Yes	No	Yes	No	Yes	No
LTE Band 7 Antenna 3	Yes	No	Yes	No	Yes	No
LTE Band 41 Antenna 3	Yes	No	Yes	No	Yes	No
LTE Band 48 Antenna 3	Yes	No	Yes	No	Yes	No
NR Band n71 Antenna 3	Yes	No	Yes	No	Yes	No
NR Band n12 Antenna 3	Yes	No	Yes	No	Yes	No
NR Band n14 Antenna 3	Yes	No	Yes	No	Yes	No
NR Band n5 (Cell) Antenna 3	Yes	No	Yes	No	Yes	No
NR Band n26 (Cell) Antenna 3	Yes	No	Yes	No	Yes	No
NR Band n70 Antenna 3	Yes	No	Yes	No	Yes	No
NR Band n66 (AWS) Antenna 3	Yes	No	Yes	No	Yes	No
NR Band n25 (PCS) Antenna 3	Yes	No	Yes	No	Yes	No
NR Band n30 Antenna 3	Yes	No	Yes	No	Yes	No
NR Band n7 Antenna 3	Yes	No	Yes	No	Yes	No
NR Band n41 Antenna 3	Yes	No	Yes	No	Yes	No
NR Band n77 Antenna 3	Yes	No	Yes	No	Yes	No
UMTS 1750 Antenna 4b	Yes	No	Yes	No	No	No
UMTS 1900 Antenna 4b	Yes	No	Yes	No	No	No
LTE Band 66 (AWS) Antenna 4b	Yes	No	Yes	No	No	No
LTE Band 25 (PCS) Antenna 4b	Yes	No	Yes	No	No	No
LTE Band 30 Antenna 4b	Yes	No	Yes	No	No	No
LTE Band 7 Antenna 4b	Yes	No	Yes	No	No	No
LTE Band 41 Antenna 4b	Yes	No	Yes	No	No	No
LTE Band 48 Antenna 4b	Yes	No	Yes	No	No	No
NR Band n70 Antenna 4b	Yes	No	Yes	No	No	No
NR Band n66 (AWS) Antenna 4b	Yes	No	Yes	No	No	No
NR Band n25 (PCS) Antenna 4b	Yes	No	Yes	No	No	No
NR Band n30 Antenna 4b	Yes	No	Yes	No	No	No
NR Band n7 Antenna 4b	Yes	No	Yes	No	No	No
NR Band n41 Antenna 4b	Yes	No	Yes	No	No	No
NR Band n77 Antenna 4b	Yes	No	Yes	No	No	No
2.4GHz WLAN Antenna 2a	Yes	No	No	Yes	Yes	No
2.4GHz WLAN Antenna 4a	Yes	No	Yes	No	No	Yes
5 GHz WLAN Antenna 5b	Yes	No	No	No	Yes	No
5 GHz WLAN Antenna 4a	Yes	No	Yes	No	No	Yes
Bluetooth Antenna 2a	Yes	No	No	Yes	Yes	No
Bluetooth Antenna 4a	Yes	No	Yes	No	No	Yes
NB UNII-1 Antenna 5b	Yes	No	No	No	Yes	No
NB UNII-1 Antenna 4a	Yes	No	Yes	No	No	Yes
NB UNII-3 Antenna 5b	Yes	No	No	No	Yes	No
NB UNII-3 Antenna 4a	Yes	No	Yes	No	No	Yes

Note: Per FCC KDB Publication 616217 D04v01r01, particular edges were not required to be evaluated for SAR based on the SAR exclusion threshold in KDB 447498 D01V06. Additional edges may have been evaluated for simultaneous transmission analysis.

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.

Table 1-8
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Body
1	Cellular Band + 2.4 GHz WIFI	Yes
2	Cellular Band + 5/6 GHz WIFI	Yes
3	Cellular Band + 2.4 GHz Bluetooth	Yes
4	Cellular Band+ 2.4 GHz WIFI MIMO	Yes
5	Cellular Band+ 5/6 GHz WIFI MIMO	Yes
6	Cellular Band + 2.4 GHz Bluetooth + 5/6 GHz WIFI	Yes
7	Cellular Band + 2.4 GHz Bluetooth + 5/6 GHz WIFI MIMO	Yes
8	2.4 GHz Bluetooth + 5/6 GHz WIFI	Yes
9	2.4 GHz Bluetooth + 5/6 GHz WIFI MIMO	Yes
10	Cellular Band + 2.4 GHz Bluetooth(TXBF) + 5/6 GHz WIFI	Yes
11	Cellular Band + 2.4 GHz Bluetooth(TXBF) + 5/6 GHz WIFI MIMO	Yes
12	2.4 GHz Bluetooth(TXBF) + 5/6 GHz WIFI	Yes
13	2.4 GHz Bluetooth (TXBF) + 5/6 GHZ WIFI MIMO	Yes
14	Cellular Band + NB UNII	Yes
15	Cellular + NB UNII + 2.4 GHz WIFI	Yes
16	Cellular + NB UNII + 2.4 GHz WIFI MIMO	Yes
17	NB UNII + 2.4 GHz WIFI	Yes
18	NB UNII + 2.4 GHz WIFI MIMO	Yes
19	Cellular Band + NB UNII(TXBF) + 2.4 GHz WIFI	Yes
20	Cellular Band + NB UNII(TXBF) + 2.4 GHz WIFI MIMO	Yes
21	Cellular Band + NB UNII(TXBF)	Yes
22	Cellular Band + 2.4 GHz Bluetooth(TXBF)	Yes
23	Cellular Band + 2.4 GHz WLAN + 2.4 GHz Bluetooth	Yes
24	2.4 GHz WLAN + 2.4 GHz Bluetooth	Yes
25	NB UNII(TXBF) + 2.4 GHz WIFI	Yes
26	NB UNII(TXBF) + 2.4 GHz WIFI MIMO	Yes

Table 1-9
Simultaneous Transmission Scenarios of Inter-Band ULCA

No.	Capable Transmit Configuration	Body	Notes
1	Cellular Ant 1 LB + Cellular Ant 3 MB/HB	Yes	LTE Bands transmitting from Ant 1 LB: LTE B5/12/13/14 LTE Bands transmitting from Ant 3 MB/HB: LTE B2/4/7/66/30
2	Cellular Ant 1 LB + Cellular Ant 2b MB/HB	Yes	LTE Bands transmitting from Ant 1 LB: LTE B5/12/13/14 LTE Bands transmitting from Ant 2b MB/HB: LTE B2/4/7/66/30
3	Cellular Ant 1 LB + Cellular Ant 4b MB/HB	Yes	LTE Bands transmitting from Ant 1 LB: LTE B5/12/13/14 LTE Bands transmitting from Ant 4b MB/HB: LTE B2/4/7/66/30
4	Cellular Ant 3 LB + Cellular Ant 1 MB/HB	Yes	LTE Bands transmitting from Ant 3 LB: LTE B5/12/13/14 LTE Bands transmitting from Ant 1 MB/HB: LTE B2/4/7/66/30
5	Cellular Ant 3 LB + Cellular Ant 2b MB/HB	Yes	LTE Bands transmitting from Ant 3 LB: LTE B5/12/13/14 LTE Bands transmitting from Ant 2b MB/HB: LTE B2/4/7/66/30
6	Cellular Ant 3 LB + Cellular Ant 4b MB/HB	Yes	LTE Bands transmitting from Ant 3 LB: LTE B5/12/13/14 LTE Bands transmitting from Ant 4b MB/HB: LTE B2/4/7/66/30

Note: The technical description includes all the possible Inter-band ULCA combinations.

Table 1-10
Simultaneous Transmission Scenarios with Inter-Band ULCA Active

No.	Capable Transmit Configuration	Body
1	LTE Inter-Band ULCA + 2.4 GHz WI-FI	Yes
2	LTE Inter-Band ULCA + 5/6 GHz WI-FI	Yes
3	LTE Inter-Band ULCA + 2.4 GHz Bluetooth	Yes
4	LTE Inter-Band ULCA + 2.4 GHz WI-FI MIMO	Yes
5	LTE Inter-Band ULCA + 5/6 GHz WI-FI MIMO	Yes
6	LTE Inter-Band ULCA + 2.4 GHz Bluetooth + 5/6 GHz WI-FI	Yes
7	LTE Inter-Band ULCA + 2.4 GHz Bluetooth + 5/6 GHz WI-FI MIMO	Yes
8	LTE Inter-Band ULCA + 2.4 GHz Bluetooth(TXBF) + 5/6 GHz WI-FI	Yes
9	LTE Inter-Band ULCA + 2.4 GHz Bluetooth(TXBF) + 5/6 GHz WI-FI MIMO	Yes
10	LTE Inter-Band ULCA + NB UNII	Yes
11	LTE Inter-Band ULCA + UNII NB + 2.4 GHz WI-FI	Yes
12	LTE Inter-Band ULCA + UNII NB + 2.4 GHz WI-FI MIMO	Yes
13	LTE Inter-Band ULCA + UNII NB(TXBF) + 2.4 GHz WI-FI	Yes
14	LTE Inter-Band ULCA + UNII NB(TXBF) + 2.4 GHz WI-FI MIMO	Yes
15	LTE Inter-Band ULCA + UNII NB(TXBF)	Yes
16	LTE Inter-Band ULCA + 2.4 GHz Bluetooth(TXBF)	Yes
17	LTE Inter-Band ULCA + 2.4 GHz WI-FI + 2.4 GHz Bluetooth	Yes

Note: LTE inter-band ULCA can operate in any of the combinations in Table 1-9

1. There are no limitations in the above listed simultaneous transmission scenarios between cellular antennas and BT/WI-FI antennas.
2. Wi-Fi 2.4GHz and Bluetooth 2.4 GHz can transmit simultaneously on separate antennas. 2.4 GHz WLAN Antenna 4a can only transmit simultaneously with 2.4GHz Bluetooth Antenna 2a. In this scenario Wi-Fi max power will not exceed minimum of (13.5dBm, SAR max cap, Reg max cap) power. Additionally, in disconnected mode, BT will be using iPA only.
3. This device supports 2x2 MIMO Tx for WLAN 802.11a/g/n/ac/ax. 802.11a/g/n/ac/ax supports CDD and STBC and 802.11n/ac/ax additionally supports SDM. Each WLAN antenna can transmit independently or together when operating with MIMO.
4. EN-DC operation is supported with LTE + 5G NR FR1 scenarios. The LTE anchor bands are shown in the NR FR1 checklist.
5. This device supports VoWIFI.
6. This device supports VoLTE.

1.8 Miscellaneous SAR Test Considerations

(A) WIFI/BT

Based on the maximum allowed power for the respective antennas, U-NII-1 was evaluated for Antenna 5b and U-NII-2A was evaluated for Antenna 4a. Additional testing for U-NII-2A Antenna 5b and for UNII- 1 Antenna 4a SAR was not required since all reported SAR was less than 1.2 W/kg per FCC KDB Publication 248227 D01v02r02.

The WLAN/Bluetooth chipset in this device is produced by two different suppliers. The electrically identical modules are manufactured with the identical mechanical structure to meet the same specifications and functions. Two device variants are referenced as Variant 1 and Variant 2 in this report. WLAN/Bluetooth SAR worst case configuration was tested on Variant 1 and Variant 2.

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, channels 1, 6, and 11 were considered for SAR testing per FCC KDB 248227 D01V02r02.

This device supports IEEE 802.11ac with the following features:

a) Up to 160 MHz Bandwidth only for 5/6 GHz
b) 3 Tx antenna output
c) 256 QAM is supported
d) TDWR and Band gap channels are supported

This device supports IEEE 802.11ax with the following features:

a) Up to 160 MHz Bandwidth only for 5/6 GHz
b) Up to 20 MHz Bandwidth only for 2.4 GHz
c) 3 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 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.

(B) Licensed Transmitter(s)

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.

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

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.

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 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 and NR Band n41/77. 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 13).

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

This device supports inter-band LTE Carrier Aggregation (CA) for LTE Bands 2/4/5/7/12/13/14/66 with two component carriers in the uplink

1.9 Guidance Applied

- FCC KDB Publication 941225 D01v03r01, D05v02r04, D05Av01r02 (3G/4G)
- 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 616217 D04v01r02 (Tablet)
- 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)
- October 2018 TCB Workshop Notes (Inter-band Uplink Carrier Aggregation)

1.10 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 9.

1.11 Bibliography

Report Type	Report Serial Number
BCGA2764 FCC Part 1 SAR Report	1C2205090028-26.BCG (Rev 1)
BCGA2764 FCC Part 0 SAR Report	1C2205090028-25.BCG (Rev 1)
BCGA2764 FCC SAR WIFI 6 GHz Test Report	1C2205090028-33.BCG (Rev 1)
BCGA2437 FCC RF Exposure Part 2 Test Report	1C2205090029-26.BCG (Rev 1)
BCGA2437 FCC Compliance Summary	1C2205090029-28.BCG

2 LTE INFORMATION

LTE Information					
Form Factor	Tablet Device				
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 17 (706.5 - 713.5 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 41 (2498.5 - 2687.5 MHz)				
	LTE Band 48 (3552.5 - 3697.5 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 17: 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				
	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 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 48: 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 17: 5 MHz	706.5 (23755)		710 (23790)	713.5 (23825)	
LTE Band 17: 10 MHz	709 (23780)		710 (23790)	711 (23800)	
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 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 41: 5 MHz	2506 (39750)	2549.5 (40185)	2549.5 (40185)	2593 (40620)	2636.5 (41055)
LTE Band 41: 10 MHz	2506 (39750)	2549.5 (40185)	2549.5 (40185)	2593 (40620)	2636.5 (41055)
LTE Band 41: 15 MHz	2506 (39750)	2549.5 (40185)	2549.5 (40185)	2593 (40620)	2636.5 (41055)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2549.5 (40185)	2593 (40620)	2636.5 (41055)
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)
UE Category	DL UE Cat 20 (QPSK, 16QAM, 64QAM, 256 QAM) , UL UE Cat 18 (QPSK, 16QAM, 64QAM, 256QAM)				
Modulations Supported in UL	QPSK, 16QAM, 64QAM, 256QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	YES				
A-MPR (Additional MPR) disabled for SAR Testing?	YES				
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations				
LTE Additional Information	This device does not support full CA features on 3GPP Release 15. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 15 Features are not supported: Relay, HetNet, Enhanced MIMO, eICIC, WIFI Offloading, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

NR Information						
Form Factor	Tablet					
Frequency Range of each NR transmission band	NR Band n71 (665.5 - 695.5 MHz)					
	NR Band n12 (701.5 - 713.5 MHz)					
	NR Band n14 (790.5 - 795.5 MHz)					
	NR Band n26 (Cell) (816.5 - 846.5 MHz)					
	NR Band n5 (Cell) (826.5 - 846.5 MHz)					
	NR Band n70 (1697.5-1707.5 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 n30 (2307.5 - 2312.5 MHz)					
	NR Band n7 (2502.5 - 2567.5 MHz)					
	NR Band n41 (2506.02 - 2679.99 MHz)					
	NR Band n77 DoD (3455.01 - 3544.98 MHz)					
	NR Band n77 C (3705 - 3975 MHz)					
Channel Bandwidths	NR Band n71: 5 MHz, 10 MHz, 15 MHz, 20 MHz					
	NR Band n12: 5 MHz, 10 MHz, 15 MHz					
	NR Band n14: 5 MHz, 10 MHz					
	NR Band n26 (Cell): 5 MHz, 10 MHz					
	NR Band n5 (Cell): 5 MHz, 10 MHz, 15 MHz, 20 MHz					
	NR Band n70: 5 MHz, 10 MHz, 15 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 n30: 5 MHz, 10 MHz					
	NR Band n7: 5 MHz, 10 MHz, 15 MHz, 20 MHz, 25 MHz, 30 MHz, 40 MHz					
	NR Band n41: 20 MHz, 30 MHz, 40 MHz, 50 MHz, 60 MHz, 70 MHz, 80 MHz, 90 MHz, 100 MHz					
	NR Band n77 DoD: 10 MHz, 15 MHz, 20 MHz, 30 MHz, 40 MHz, 50 MHz, 60 MHz, 70 MHz, 80 MHz, 90 MHz, 100 MHz					
	NR Band n77 C: 10 MHz, 15 MHz, 20 MHz, 30 MHz, 40 MHz, 50 MHz, 60 MHz, 70 MHz, 80 MHz, 90 MHz, 100 MHz					
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid		Mid-High	High
NR Band n71: 5 MHz	665.5 (133100)		680.5 (136100)		695.5 (139100)	
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 n12: 5 MHz	701.5 (140300)		707.5 (141500)		713.5 (142700)	
NR Band n12: 10 MHz	704 (140800)		707.5 (141500)		711 (142200)	
NR Band n12: 15 MHz	706.5 (141300)		707.5 (141500)		708.5 (141700)	
NR Band n14: 5 MHz	790.5 (158100)		793 (158600)		795.5 (159100)	
NR Band n14: 10 MHz	N/A		793 (158600)		N/A	
NR Band n26 (Cell): 5 MHz	816.5 (163300)		831.5 (166300)		846.5 (169300)	
NR Band n26 (Cell): 10 MHz	819 (163800)		831.5 (166300)		844 (168800)	
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 n70: 5 MHz	1697.5 (339500)		1702.5 (340500)		1707.5 (341500)	
NR Band n70: 10 MHz	1700 (340000)		1702.5 (340500)		1705 (341000)	
NR Band n70: 15 MHz	N/A		1702.5 (340500)		N/A	
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 n30: 5 MHz	2307.5 (461500)		2310 (462000)		2312.5 (462500)	
NR Band n30: 10 MHz	N/A		2310 (462000)		N/A	
NR Band n7: 5 MHz	2502.5 (500500)		2535 (507000)		2567.5 (513500)	
NR Band n7: 10 MHz	2505 (501000)		2535 (507000)		2565 (513000)	
NR Band n7: 15 MHz	2507.5 (501500)		2535 (507000)		2562.5 (512500)	
NR Band n7: 20 MHz	2510 (502000)		2535 (507000)		2560 (512000)	
NR Band n7: 25 MHz	2512.5 (502500)		2535 (507000)		2557.5 (511500)	
NR Band n7: 30 MHz	2515 (503000)		2535 (507000)		2555 (511000)	
NR Band n7: 40 MHz	2520 (504000)		2535 (507000)		2550 (510000)	
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: 70 MHz	2531.01 (506202)		N/A		2655 (531000)	
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)	
NR Band n77 DoD: 10 MHz	3455.01 (630334)		3500.01 (633334)		3544.98 (636332)	
NR Band n77 DoD: 15 MHz	3457.5 (630500)		3500.01 (633334)		3542.49 (636166)	
NR Band n77 DoD: 20 MHz	3460.02 (630668)		3500.01 (633334)		3540 (636000)	
NR Band n77 DoD: 30 MHz	3465 (631000)		3500.01 (633334)		3534.99 (635666)	
NR Band n77 DoD: 40 MHz	3470.01 (631334)		N/A		3529.98 (635332)	
NR Band n77 DoD: 50 MHz	3475.02 (631668)		N/A		3525 (635000)	
NR Band n77 DoD: 60 MHz	N/A		3500.01(633334)		N/A	
NR Band n77 DoD: 70 MHz	N/A		3500.01(633334)		N/A	
NR Band n77 DoD: 80 MHz	N/A		3500.01(633334)		N/A	
NR Band n77 DoD: 90 MHz	N/A		3500.01(633334)		N/A	
NR Band n77 DoD: 100 MHz	N/A		3500.01(633334)		N/A	
NR Band n77 C: 10 MHz	3705 (647000)	3759 (650600)	3813 (654200)	3867 (657800)	3921 (661400)	3975 (665000)
NR Band n77 C: 15 MHz	3707.52 (647168)	3760.5 (650700)	3813.51 (654234)	3866.49 (657766)	3919.5 (661300)	3972.48 (664832)
NR Band n77 C: 20 MHz	3710.01 (647334)	3762 (650800)	3813.99 (654266)	3866.01 (657734)	3918 (661200)	3969.99 (664666)
NR Band n77 C: 30 MHz	3715.02 (647668)	3765 (651000)	3815.01 (654334)	3864.99 (657666)	3915 (661000)	3964.98 (664332)
NR Band n77 C: 40 MHz	3720 (648000)	3768 (651200)	3816 (654400)	3864 (657600)	3912 (660800)	3960 (664000)
NR Band n77 C: 50 MHz	3725.01 (648334)	3782.49 (652166)	3840 (656000)		3897.51 (659834)	3954.99 (663666)
NR Band n77 C: 60 MHz	3730.02 (648668)	3803.34 (653556)	N/A	N/A	3876.66 (658444)	3949.98 (663332)
NR Band n77 C: 70 MHz	3735 (649000)	3804.99 (653666)	N/A		3875.01 (658334)	3945 (663000)
NR Band n77 C: 80 MHz	3740.01 (649334)	N/A	3840 (656000)		N/A	3939.99 (662666)
NR Band n77 C: 90 MHz	3745.02 (649668)	N/A	3840 (656000)		N/A	3934.98 (662332)
NR Band n77 C: 100 MHz	3750 (650000)	N/A	N/A	N/A	N/A	3930 (662000)
SCS for NR Band n71/n12/n14/n26/n5/n70/n66/n25/n2/n30/n7	15 kHz					
SCS for NR Band n41/n77 DoD/n77 C	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 66/2/7/48					
LTE Anchor Bands for NR Band n12	LTE Band 66/2/30/48					
LTE Anchor Bands for NR Band n14	LTE Band 66/2/30					
LTE Anchor Bands for NR Band n26 (Cell)	N/A					
LTE Anchor Bands for NR Band n5 (Cell)	LTE Band 66/2/30/7/48					
LTE Anchor Bands for NR Band n70	N/A					
LTE Anchor Bands for NR Band n66 (AWS)	LTE Band 71/12/13/14/5/2/30/7/48					
LTE Anchor Bands for NR Band n25 (PCS)	LTE Band 12/66/48					
LTE Anchor Bands for NR Band n2 (PCS)	LTE Band 12/13/14/5/66					
LTE Anchor Bands for NR Band n30	LTE Band 12/14/5/66					
LTE Anchor Bands for NR Band n7	LTE Band 12/5/66					
LTE Anchor Bands for NR Band n41	LTE Band 26/4/66/2/25					
LTE Anchor Bands for NR Band n77 DoD	LTE Band 71/12/13/14/5/66/2/30/7/41					
LTE Anchor Bands for NR Band n77 C	LTE Band 71/12/13/14/5/66/2/30/7/41					

3 INTRODUCTION

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

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

3.1 SAR Definition

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

Equation 3-1
SAR Mathematical Equation

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

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

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

where:

σ = conductivity of the tissue-simulating material (S/m)
ρ = mass density of the tissue-simulating material (kg/m^3)
E = Total RMS electric field strength (V/m)

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

4 DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

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

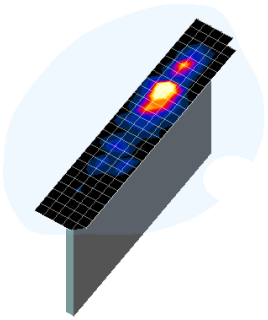

Figure 4-1
Sample SAR Area Scan

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

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

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

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

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

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

*Also compliant to IEEE 1528-2013 Table 6

5 TEST CONFIGURATION POSITIONS

5.1 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.

5.2 SAR Testing for Tablet per KDB Publication 616217 D04v01r02

Per FCC KDB Publication 616217 D04v01r02, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. The SAR Exclusion Threshold in KDB 447498 D01v06 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

6 RF EXPOSURE LIMITS

6.1 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.

6.2 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 6-1
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.

7 FCC MEASUREMENT PROCEDURES

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

7.1 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.

7.2 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.

7.3 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.

7.4 SAR Measurement Conditions for UMTS

7.4.1 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.

7.4.2 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.

7.4.3 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.

7.4.4 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.

7.4.5 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.

7.5 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).

7.5.1 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.

7.5.2 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.

7.5.3 A-MPR

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

7.5.4 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.

7.5.5 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.

7.5.6 Downlink Only Carrier Aggregation

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

7.6 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.

7.6.1 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.

7.6.2 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.

7.6.3 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.

7.6.4 2.4 GHz SAR Test Requirements

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

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

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

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

7.6.5 OFDM Transmission Mode and SAR Test Channel Selection

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

7.6.6 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 7.6.5).

7.6.7 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.

7.6.8 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.

8 SYSTEM VERIFICATION

8.1 Tissue Verification

Table 8-1
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
09/06/2022	2450 Head	22.8	2300	1.715	37.962	1.670	39.500	2.69%	-3.89%
			2310	1.722	37.954	1.679	39.480	2.56%	-3.87%
			2320	1.730	37.946	1.687	39.460	2.55%	-3.84%
			2400	1.789	37.835	1.756	39.289	1.88%	-3.70%
			2450	1.827	37.754	1.800	39.200	1.50%	-3.69%
			2480	1.849	37.690	1.833	39.162	0.87%	-3.76%
			2500	1.865	37.663	1.855	39.136	0.54%	-3.76%
			2510	1.873	37.654	1.866	39.123	0.38%	-3.75%
			2535	1.893	37.620	1.893	39.092	0.00%	-3.77%
			2550	1.904	37.594	1.909	39.073	-0.26%	-3.79%
			2560	1.911	37.569	1.920	39.060	-0.47%	-3.82%
			2600	1.942	37.477	1.964	39.009	-1.12%	-3.93%
			2650	1.981	37.416	2.018	38.945	-1.83%	-3.93%
			2680	2.003	37.352	2.051	38.907	-2.34%	-4.00%
			2700	2.019	37.305	2.073	38.882	-2.60%	-4.06%
09/06/2022	2450 Head	21.0	2300	1.730	39.015	1.670	39.500	3.59%	-1.23%
			2310	1.737	38.999	1.679	39.480	3.45%	-1.22%
			2320	1.744	38.985	1.687	39.460	3.38%	-1.20%
			2400	1.807	38.846	1.756	39.289	2.90%	-1.13%
			2450	1.846	38.768	1.800	39.200	2.56%	-1.10%
			2480	1.868	38.697	1.833	39.162	1.91%	-1.19%
			2500	1.884	38.665	1.855	39.136	1.56%	-1.20%
			2510	1.892	38.656	1.866	39.123	1.39%	-1.19%
			2535	1.913	38.634	1.893	39.092	1.06%	-1.17%
			2550	1.924	38.611	1.909	39.073	0.79%	-1.18%
			2560	1.932	38.593	1.920	39.060	0.63%	-1.20%
			2600	1.965	38.504	1.964	39.009	0.05%	-1.29%
			2650	2.006	38.438	2.018	38.945	-0.59%	-1.30%
			2680	2.028	38.372	2.051	38.907	-1.12%	-1.38%
			2700	2.046	38.330	2.073	38.882	-1.30%	-1.42%
10/03/2022	2450 Head	22.4	2300	1.714	38.986	1.670	39.500	2.63%	-1.30%
			2310	1.721	38.974	1.679	39.480	2.50%	-1.28%
			2320	1.728	38.959	1.687	39.460	2.43%	-1.27%
			2400	1.786	38.874	1.756	39.289	1.71%	-1.06%
			2450	1.824	38.798	1.800	39.200	1.33%	-1.03%
			2480	1.847	38.746	1.833	39.162	0.76%	-1.06%
			2500	1.863	38.723	1.855	39.136	0.43%	-1.06%
			2510	1.870	38.710	1.866	39.123	0.21%	-1.06%
			2535	1.888	38.670	1.893	39.092	-0.26%	-1.08%
			2550	1.899	38.638	1.909	39.073	-0.52%	-1.11%
			2560	1.907	38.617	1.920	39.060	-0.68%	-1.13%
			2600	1.942	38.560	1.964	39.009	-1.12%	-1.15%
			2650	1.979	38.465	2.018	38.945	-1.93%	-1.23%
			2680	2.003	38.415	2.051	38.907	-2.34%	-1.26%
			2700	2.019	38.386	2.073	38.882	-2.60%	-1.28%
09/07/2022	3600 Head	22.0	3350	2.885	36.672	2.759	38.100	4.57%	-3.75%
			3450	2.959	36.533	2.861	37.986	3.43%	-3.83%
			3500	2.999	36.448	2.913	37.929	2.95%	-3.90%
			3550	3.032	36.390	2.964	37.871	2.29%	-3.91%
			3560	3.042	36.363	2.974	37.860	2.29%	-3.95%
			3600	3.075	36.310	3.015	37.814	1.99%	-3.98%
			3650	3.114	36.260	3.066	37.757	1.57%	-3.96%
			3690	3.146	36.185	3.107	37.711	1.26%	-4.05%
			3700	3.153	36.170	3.117	37.700	1.15%	-4.06%
			3750	3.199	36.117	3.169	37.643	0.95%	-4.05%
			3900	3.320	35.916	3.323	37.471	-0.09%	-4.15%
			3930	3.343	35.877	3.353	37.437	-0.30%	-4.17%
			4100	3.492	35.665	3.528	37.243	-1.02%	-4.24%
			4150	3.538	35.616	3.579	37.186	-1.15%	-4.22%

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
09/29/2022	5200-5800 Head	21.6	5180	4.458	35.074	4.635	36.009	-3.82%	-2.60%
			5190	4.470	35.056	4.645	35.998	-3.77%	-2.62%
			5200	4.482	35.051	4.655	35.986	-3.72%	-2.60%
			5210	4.493	35.023	4.666	35.975	-3.71%	-2.65%
			5220	4.505	34.992	4.676	35.963	-3.66%	-2.70%
			5240	4.531	34.975	4.696	35.940	-3.51%	-2.69%
			5250	4.541	34.973	4.706	35.929	-3.51%	-2.66%
			5260	4.547	34.943	4.717	35.917	-3.60%	-2.71%
			5270	4.558	34.907	4.727	35.906	-3.58%	-2.78%
			5280	4.569	34.894	4.737	35.894	-3.55%	-2.79%
			5290	4.581	34.877	4.748	35.883	-3.52%	-2.80%
			5300	4.594	34.860	4.758	35.871	-3.45%	-2.82%
			5310	4.604	34.841	4.768	35.860	-3.44%	-2.84%
			5320	4.616	34.820	4.778	35.849	-3.39%	-2.87%
			5500	4.806	34.521	4.963	35.643	-3.16%	-3.15%
			5510	4.818	34.493	4.973	35.632	-3.12%	-3.20%
			5520	4.833	34.472	4.983	35.620	-3.01%	-3.22%
			5530	4.845	34.466	4.994	35.609	-2.98%	-3.21%
			5540	4.854	34.453	5.004	35.597	-3.00%	-3.21%
			5550	4.863	34.428	5.014	35.586	-3.01%	-3.25%
			5560	4.875	34.400	5.024	35.574	-2.97%	-3.30%
			5580	4.898	34.373	5.045	35.551	-2.91%	-3.31%
			5600	4.918	34.332	5.065	35.529	-2.90%	-3.37%
			5610	4.933	34.308	5.076	35.518	-2.82%	-3.41%
			5620	4.949	34.291	5.086	35.506	-2.69%	-3.42%
			5640	4.971	34.266	5.106	35.483	-2.64%	-3.43%
			5660	4.993	34.231	5.127	35.460	-2.61%	-3.47%
			5670	5.003	34.215	5.137	35.449	-2.61%	-3.48%
			5680	5.013	34.202	5.147	35.437	-2.60%	-3.49%
			5690	5.023	34.180	5.158	35.426	-2.62%	-3.52%
			5700	5.034	34.159	5.168	35.414	-2.59%	-3.54%
			5710	5.045	34.137	5.178	35.403	-2.57%	-3.58%
			5720	5.057	34.120	5.188	35.391	-2.53%	-3.59%
			5745	5.090	34.088	5.214	35.363	-2.38%	-3.61%
			5750	5.096	34.082	5.219	35.357	-2.36%	-3.61%
			5755	5.102	34.077	5.224	35.351	-2.34%	-3.60%
			5765	5.114	34.062	5.234	35.340	-2.29%	-3.62%
			5775	5.125	34.045	5.245	35.329	-2.29%	-3.63%
			5785	5.134	34.024	5.255	35.317	-2.30%	-3.66%
			5795	5.143	34.004	5.265	35.305	-2.32%	-3.69%
			5800	5.147	33.994	5.270	35.300	-2.33%	-3.70%
			5800	5.147	33.994	5.270	35.300	-2.33%	-3.70%
			5805	5.152	33.983	5.275	35.294	-2.33%	-3.71%
			5825	5.177	33.946	5.296	35.271	-2.25%	-3.76%
			5835	5.188	33.933	5.305	35.230	-2.21%	-3.68%
			5845	5.198	33.925	5.315	35.210	-2.20%	-3.65%
			5855	5.210	33.916	5.325	35.197	-2.16%	-3.64%
			5865	5.223	33.902	5.336	35.190	-2.12%	-3.66%
			5865	5.223	33.902	5.336	35.190	-2.12%	-3.66%
			5865	5.223	33.902	5.336	35.190	-2.12%	-3.66%
			5865	5.223	33.902	5.336	35.190	-2.12%	-3.66%
			5875	5.236	33.878	5.347	35.183	-2.08%	-3.71%
			5885	5.246	33.851	5.357	35.177	-2.07%	-3.77%
			5905	5.265	33.812	5.379	35.163	-2.12%	-3.84%
09/26/2022	6000 Head	21.1	5935	5.495	34.492	5.411	35.143	1.55%	-1.85%
			5985	5.539	34.465	5.464	35.110	1.37%	-1.84%
			6000	5.549	34.410	5.480	35.100	1.26%	-1.97%
			6025	5.594	34.311	5.510	35.070	1.52%	-2.16%
			6065	5.650	34.293	5.557	35.022	1.67%	-2.08%
			6075	5.654	34.292	5.569	35.010	1.53%	-2.05%
			6085	5.661	34.273	5.580	34.998	1.45%	-2.07%
			6275	5.907	33.900	5.805	34.770	1.76%	-2.50%
			6305	5.917	33.843	5.840	34.734	1.32%	-2.57%
			6345	6.002	33.736	5.887	34.686	1.95%	-2.74%
			6475	6.140	33.548	6.041	34.530	1.64%	-2.84%
			6500	6.142	33.469	6.070	34.500	1.19%	-2.99%
			6505	6.149	33.449	6.076	34.494	1.20%	-3.03%
			6545	6.254	33.397	6.122	34.446	2.16%	-3.05%
			6675	6.398	33.255	6.273	34.290	1.99%	-3.02%
			6715	6.400	33.069	6.319	34.242	1.28%	-3.43%
			6785	6.514	33.066	6.400	34.158	1.78%	-3.20%
			6825	6.537	32.848	6.447	34.110	1.40%	-3.70%
			6985	6.758	32.780	6.633	33.918	1.88%	-3.36%
			7025	6.763	32.533	6.680	33.870	1.24%	-3.95%

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 IEC/IEEE 62209-1528:2020). The tissue parameters listed in the SAR test plots may slightly differ from the table above due to significant digit rounding in the software.

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.

Table 8-2
System Verification Results – 1g

System Verification TARGET & MEASURED												
SAR System	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp. (C)	Liquid Temp. (C)	Input Power (W)	Source SN	Probe SN	Measured SAR1g (W/kg)	1W Target SAR1g (W/kg)	1W Normalized SAR 1g (W/kg)	Deviation1g (%)
AM10	2450	HEAD	09/06/2022	21.6	20.2	0.10	750	7308	5.250	52.60	52.500	-0.19%
AM4	2450	HEAD	09/06/2022	24.6	22.1	0.10	921	3837	5.230	54.20	52.300	-3.51%
AM10	2600	HEAD	10/03/2022	22.2	21.8	0.10	1042	7308	5.360	55.80	53.600	-3.94%
AM1	3700	HEAD	09/07/2022	22.4	21.0	0.10	1002	7639	6.460	68.80	64.600	-6.10%
AM9	5250	HEAD	09/29/2022	23.2	22.9	0.05	1123	7638	3.710	80.50	74.200	-7.83%
AM2	6500	HEAD	09/26/2022	21.9	20.2	0.03	1019	7421	7.560	285.00	302.400	6.11%

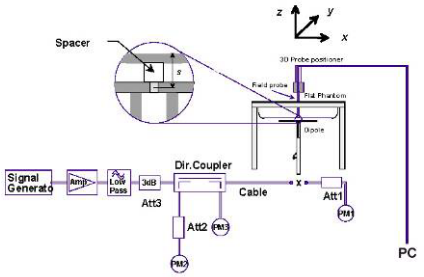

Figure 8-1
System Verification Setup Diagram

Figure 8-2
System Verification Setup Photo

8.2 Power Density Test System Verification

The system was verified to be within ±0.66 dB of the power density targets on the calibration certificate according to the test system specification in the user's manual and calibration facility recommendation. The 0.66 dB deviation threshold represents the expanded uncertainty for system performance checks using SPEAG's mmWave verification sources. The same spatial resolution and measurement region used in the source calibration was applied during the system check.

The measured power density distribution of verification source was also confirmed through visual inspection to have no noticeable differences, both spatially (shape) and numerically (level) from the distribution provided by the manufacturer, per November 2017 TCBC Workshop Notes.

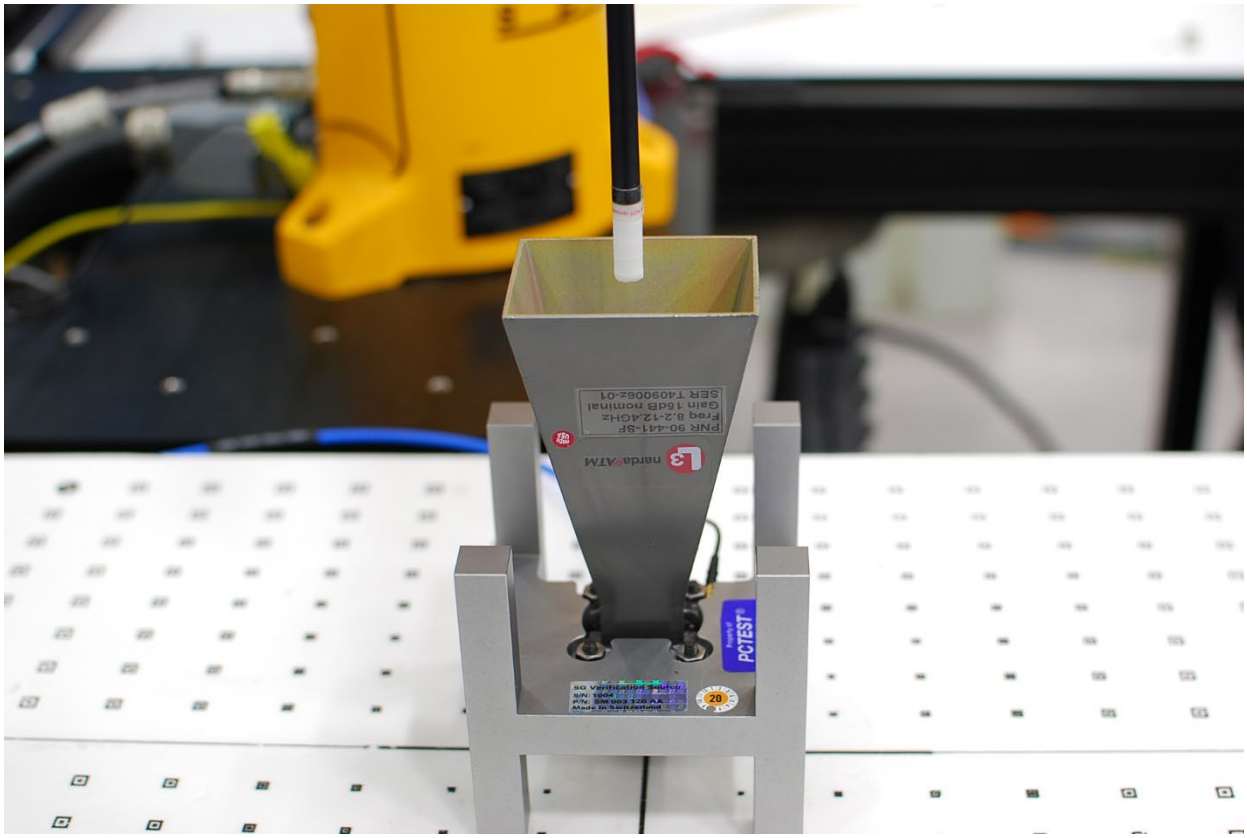

Figure 8-3
System Verification Setup Photo

Table 8-3
10 GHz Verifications

System Verification											
System	Frequency (GHz)	Date	Source S/N	Probe S/N	Prad (mW)	Normal psPD (W/m² over 4 cm²)		Deviation (dB)	Total psPD (W/m² over 4 cm²)		Deviation (dB)
						Measured	Target		Measured	Target	
AM5	10	09/27/2022	1006	9364	86.1	50.60	50.80	-0.02	50.90	50.80	0.01

Note: A **10 mm distance spacing** was used from the reference horn antenna aperture to the probe element.

9 SAR DATA SUMMARY

9.1 Standalone Body SAR Data

Table 9-1
PCB Spot-check Verification for Data Referencing

MEASUREMENT RESULTS																							
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Reported SAR for Refence Model (1g)
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	(W/kg)
2636.50	41055	Mid-High	LTE Band 41	20	15.70	14.50	-0.07	0	Ant 1	V49T9PH3JW	QPSK	1	0	0 mm	back	1:1.58	0.636	1.318	0.838	0.218	0.287	0.999
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram														

Table 9-2
CBE Spot-check Verification for Data Referencing

MEASUREMENT RESULTS																						
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Reported SAR for Refence Model (1g)
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	(W/kg)
3690.00	56640	High	LTE Band 48	20	14.20	13.48	-0.06	0	Ant 1	P2CCP9KW6V	QPSK	50	50	0 mm	back	1:1	0.682	1.180	0.805	0.221	0.261	0.988
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram														

Table 9-3
DSS/DTS Spot-check Verification for Data Referencing

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Variant	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Reported SAR for Refence Model (1g)
MHz	Ch.														(W/kg)			(W/kg)	(W/kg)	(W/kg)	(W/kg)
2412	1	802.11b	DSSS	22	13.50	12.33	0.01	0 mm	Ant 2a	V1	P2CCP9KW6V	1	back	99.1	0.755	1.309	1.009	0.997	0.312	0.412	1.027
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram													

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Variant	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Reported SAR for Refence Model (1g)
MHz	Ch.													(W/kg)			(W/kg)	(W/kg)	(W/kg)	(W/kg)
2480	78	Bluetooth	FHSS	14.50	13.84	-0.01	0 mm	Ant 4a	V2	X4YCQP6RVX	1	back	76.9	0.859	1.164	1.008	1.008	0.312	0.366	1.157
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram													

Note: The reported BT SAR was scaled to the 77.5% transmission duty factor to determine compliance since the duty factor of the device is permanently limited to 77.5% per the manufacturer.

Table 9-4
NII Spot-check Verification for Data Referencing

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Variant	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Reported SAR for Refence Model (1g)
MHz	Ch.														(W/kg)			(W/kg)	(W/kg)	(W/kg)	(W/kg)
5230	46	802.11n	OFDM	40	17.50	16.58	-0.13	0 mm	Ant 5b	V2	X4YCQP6RVX	13.5	right	97.9	0.915	1.236	1.021	1.155	0.283	0.357	1.186
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram													

Table 9-5
6XD Spot-check Verification for Data Referencing

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing (mm)	Antenna Config.	Variant	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Reported SAR (10g)	Reported SAR for Refence Model (1g)
MHz	Ch.														(W/kg)	(W/kg)			(W/kg)	(W/kg)	(W/kg)
6185.00	47	802.11ax	OFDM	160	8.25	7.92	0.00	0	4A	V1	KYXYR43WW7	68.1	Back	97.95	1.050	0.214	1.079	1.021	1.157	0.236	1.189
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram									

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing (mm)	Antenna Config.	Variant	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Measured APD W/m² (4cm²)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported APD W/m² (4cm²)	Reported APD for Reference Model
MHz	Ch.																		
6025.00	15	802.11ax	OFDM	160	9.00	7.92	0.01	0	4A	V1	KYXYR43WW7	68.1	Back	97.95	4.000	1.282	1.021	5.236	6.131

MEASUREMENT RESULTS																							
Frequency		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift (dB)	Spacing (mm)	Antenna Config.	Variant	DUT Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Grid Step (λ)	iPD (W/m²)	Scaling Factor for Measurement Uncertainty per IEC 62479	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Normal psPD (W/m²)	Scaled Normal psPD (W/m²)	Total psPD (W/m²)	Scaled Total psPD (W/m²)	Reported psPD for Reference Model
MHz	Ch.																							
6985.00	207	802.11ax	OFDM	160	13.25	12.96	-0.1	2	5b	V2	X4YCQP6RVX	68.1	Right	97.95	0.25	-	1.554	1.069	1.021	2.460	4.172	2.910	4.936	6.680
47 CFR §1.1310 - SAFETY LIMIT Spatial Average Uncontrolled Exposure/General Population													Power Density 10 W/m² averaged over 4 cm²										

SAR and Absorbed Power Density General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication 616217 D04v01r02 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. FCC KDB Publication 616217 D04v01r02 Section 4.3, SAR tests are required for the back surface and edges of the tablet with the tablet touching the phantom. The SAR Exclusion Threshold in FCC KDB 447498 D01v06 was applied to determine SAR test exclusion for adjacent edge configurations.
7. This device is the depopulated version of the fully populated reference model FCC ID: BCGA2764. The worst-case configurations of reference model for each equipment class and antenna was selected for spot-check verification with the variant model. The spot-check verification results showed negligible impact of RF exposure from the depopulation therefore, the RF exposure data was referenced based on the reference model test results

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 7.5.4.
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 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.
8. For LTE Band 5, LTE Band 7, LTE Band 41, and LTE Band 48, 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. ULCA is only supported in Power Class 3.
9. 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 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.

WLAN Notes:

1. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 7.6.4 for more information.
2. 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 7.6.5 for more information.
3. 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.
4. 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.
5. The time-averaged mechanism for WLAN operations was disabled for the above SAR measurements. The SAR was scaled to the maximum time-averaged output power.

Bluetooth Notes

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 77.5% transmission duty factor to determine compliance.

Power Density General Notes

1. The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
2. Batteries are fully charged at the beginning of the measurements. The DUT was connected to a wall charger for some measurements due to the test duration. It was confirmed that the charger plugged into this DUT did not impact the near-field PD test results.

3. Power density was calculated by repeated E-field measurements on two measurement planes separated by λ/4.
4. 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.
5. Per FCC guidance and equipment manufacturer guidance, power density results were scaled according to IEC 62479:2010 for the portion of the measurement uncertainty > 30%. Total expanded uncertainty of 2.68 dB (85.4%) was used to determine the psPD measurement scaling factor.
6. Per equipment manufacturer guidance, power density was measured at d=2mm and d=λ/5mm using the same grid size and grid step size for some frequencies and surfaces. The integrated Power Density (iPD) was calculated based on these measurements. Since iPD ratio between the two distances is ≥ -1dB, the grid step was sufficient for determining compliance at d=2mm.
7. PD results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01.
8. PTP-PR algorithm was used during psPD measurement and calculations.

10 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

10.1 Introduction

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

10.2 Simultaneous Transmission Procedures

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

Please see complete compliance evaluation of reference FCC ID BCGA2764 in RF Exposure Technical Report S/N: 1C2205090028-26.BCG (Rev 1) for standalone reported SAR for models and bands not evaluated for variant models.

10.3 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013 Section 6.3.4.1.2.

11 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Vector Network Analyzer	2/11/2022	Annual	2/11/2023	MY40003841
Agilent	E4438C	ESG Vector Signal Generator	3/22/2022	Annual	3/22/2023	US41460739
Agilent	E5515C	Wireless Communications Test Set	5/4/2021	Biennial	5/4/2023	GB41450275
Agilent	N5182A	MXG Vector Signal Generator	11/17/2021	Annual	11/17/2022	US46240505
Agilent	N5182A	MXG Vector Signal Generator	1/12/2021	Annual	1/12/2023	MY47420837
Agilent	SMF100A	Signal Generator	3/28/2022	Biennial	3/28/2024	101590
Agilent	N9020A	MXA Signal Analyzer	5/6/2022	Annual	5/6/2023	MY51240479
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343971
Anritsu	MS2038C	20 GHz Vector Network Analyzer	2/18/2022	Annual	2/18/2023	1214109
Anritsu	MA24106A	USB Power Sensor	8/12/2022	Annual	8/12/2023	1349513
Anritsu	MA24106A	USB Power Sensor	3/28/2022	Annual	3/28/2023	1520501
Anritsu	MA2411B	Pulse Power Sensor	4/29/2022	Annual	4/29/2023	1207470
Anritsu	MA2411B	Pulse Power Sensor	3/2/2022	Annual	3/2/2023	1126066
Anritsu	MT8821C	Radio Communication Analyzer	5/2/2022	Annual	5/2/2023	6200901190
Anritsu	MT8821C	Radio Communication Analyzer	5/24/2022	Annual	5/24/2023	6201144418
Control Company	4040	Therm./Clock/Humidity Monitor	1/21/2022	Annual	1/21/2023	160574418
Control Company	4040	Therm./Clock/Humidity Monitor	3/12/2021	Biennial	3/12/2023	210202100
Control Company	4353	Long Stem Thermometer	10/28/2020	Biennial	10/28/2022	C01065
Control Company	4353	Long Stem Thermometer	10/28/2020	Biennial	10/28/2022	C01064
Emco	3115	Horn Antenna (1-18GHz)	N/A	N/A	N/A	9704-5182
Insize	1108-150	Digital Caliper	4/5/2022	Biennial	4/5/2023	409193536
Keysight Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	8/18/2022	Annual	8/18/2023	MY49430494
MCL	BW-N10W5+	10dB Attenuator	CBT	N/A	CBT	1611
MCL	BW-N3W5+	3dB Attenuator	CBT	N/A	CBT	1812
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1311
Mini-Circuits	NLP-1000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	ZHDC-16-63-S+	50-6000MHz Bidirectional Coupler	CBT	N/A	CBT	N/A
MiniCircuits	ZUDC10-83-S+	Directional Coupler	CBT	N/A	CBT	2050
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	NRX	Power Meter	11/22/2021	Annual	11/22/2022	102583
Rohde & Schwarz	CMW500	Radio Communication Tester	12/22/2021	Annual	12/22/2022	167284
Rohde & Schwarz	CMW500	Radio Communication Tester	1/11/2022	Annual	1/11/2023	167285
Rohde & Schwarz	CMW500	Radio Communication Tester	4/14/2022	Annual	4/14/2023	101699
Rohde & Schwarz	CMW500	Radio Communication Tester	4/14/2022	Annual	4/14/2023	106578
Rohde & Schwarz	CMW500	Radio Communication Tester	9/29/2021	Annual	9/29/2022	145663
Rohde& Schwarz	CMW500	Wideband Radio Communication Tester	9/29/2021	Annual	9/29/2022	151849
Huber + Suhner	74Z-0-0-21	Torque Wrench	4/6/2022	Biennial	4/6/2024	83881
SPEAG	DAKS-3.5	Portable DAK	10/7/2021	Annual	10/7/2022	1045
SPEAG	D2450V2	2450 MHz SAR Dipole	5/11/2022	Annual	5/11/2023	750
SPEAG	D2450V2	2450 MHz SAR Dipole	11/9/2021	Annual	11/9/2022	921
SPEAG	D2600V2	2600 MHz SAR Dipole	5/11/2022	Annual	5/11/2023	1042
SPEAG	D3700V2	3700 MHz SAR Dipole	10/17/2019	Triennial	10/17/2022	1002
SPEAG	D5GHzV2	5 GHz SAR Dipole	3/22/2022	Annual	3/22/2023	1123
SPEAG	D6.5GHzV2	6.5GHz SAR Dipole	1/14/2022	Annual	1/14/2023	1019
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/13/2022	Annual	1/13/2023	793
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/21/2022	Annual	3/21/2023	1408
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/11/2021	Annual	11/11/2022	1646
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/22/2022	Annual	3/22/2023	604
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/24/2022	Annual	2/24/2023	467
SPEAG	EX3DV4	SAR Probe	1/19/2022	Annual	1/19/2023	3837
SPEAG	EX3DV4	SAR Probe	2/21/2022	Annual	2/21/2023	7308
SPEAG	EX3DV4	SAR Probe	3/22/2022	Annual	3/22/2023	7421
SPEAG	EX3DV4	SAR Probe	11/16/2021	Annual	11/16/2022	7639
SPEAG	EX3DV4	SAR Probe	3/22/2022	Annual	3/22/2023	7638
SPEAG	MAIA	Modulation and Audio Interference Analyzer	CBT	N/A	CBT	1237
SPEAG	MAIA	Modulation and Audio Interference Analyzer	CBT	N/A	CBT	1324
SPEAG	MAIA	Modulation and Audio Interference Analyzer	CBT	N/A	CBT	1260
SPEAG	EUmmWV3	EUmmWV3 Probe	6/16/2022	Annual	6/16/2023	9364
SPEAG	SM 003 100 AA	10 GHz System Verification Antenna	10/27/2021	Annual	10/27/2022	1006
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	N/A	N/A	N/A	A051107

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

12 MEASUREMENT UNCERTAINTIES

Applicable for SAR measurements:

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	Div.	c_i 1gm	c_i 10 gms	1gm u_i (± %)	10gms u_i (± %)	v_i
Measurement System									
Probe Calibration	E.2.1	7	N	1	1	1	7.0	7.0	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	E.2.3	2	R	1.732	1	1	1.2	1.2	∞
Linearity	E.2.4	0.3	N	1	1	1	0.3	0.3	∞
System Detection Limits	E.2.4	0.25	R	1.732	1	1	0.1	0.1	∞
Modulation Response	E.2.5	4.8	R	1.732	1	1	2.8	2.8	∞
Readout Electronics	E.2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	R	1.732	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.732	1	1	1.5	1.5	∞
RF Ambient Conditions - Noise	E.6.1	3	R	1.732	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	3	R	1.732	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.8	R	1.732	1	1	0.5	0.5	∞
Probe Positioning w/ respect to Phantom	E.6.3	6.7	R	1.732	1	1	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	4	R	1.732	1	1	2.3	2.3	∞
Test Sample Related									
Test Sample Positioning	E.4.2	3.12	N	1	1	1	3.1	3.1	35
Device Holder Uncertainty	E.4.1	1.67	N	1	1	1	1.7	1.7	5
Output Power Variation - SAR drift measurement	E.2.9	5	R	1.732	1	1	2.9	2.9	∞
SAR Scaling	E.6.5	0	R	1.732	1	1	0.0	0.0	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	E.3.3	4.3	N	1	0.78	0.71	3.3	3.0	76
Liquid Permittivity - measurement uncertainty	E.3.3	4.2	N	1	0.23	0.26	1.0	1.1	75
Liquid Conductivity - Temperature Uncertainty	E.3.4	3.4	R	1.732	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Unceritainty	E.3.4	0.6	R	1.732	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)			RSS				12.2	12.0	191
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				24.4	24.0	

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

Applicable for Power Density Measurements:

a	b	c	d	e	f = c x f/e	g
Uncertainty Component	Unc. (± dB)	Prob. Dist.	Div.	c_i	u_i (± dB)	v_i
Measurement System						
Calibration	0.49	N	1	1	0.49	∞
Probe Correction	0.00	R	1.73	1	0.00	∞
Frequency Response	0.20	R	1.73	1	0.12	∞
Sensor Cross Coupling	0.00	R	1.73	1	0.00	∞
Isotropy	0.50	R	1.73	1	0.29	∞
Linearity	0.20	R	1.73	1	0.12	∞
Probe Scattering	0.00	R	1.73	1	0.00	∞
Probe Positioning offset	0.30	R	1.73	1	0.17	∞
Probe Positioning Repeatability	0.04	R	1.73	1	0.02	∞
Sensor Mechanical Offset	0.00	R	1.73	1	0.00	∞
Probe Spatial Resolution	0.00	R	1.73	1	0.00	∞
Field Impedence Dependance	0.00	R	1.73	1	0.00	∞
Amplitude and Phase Drift	0.00	R	1.73	1	0.00	∞
Amplitude and Phase Noise	0.04	R	1.73	1	0.02	∞
Measurement Area Truncation	0.00	R	1.73	1	0.00	∞
Data Acquisition	0.03	N	1	1	0.03	∞
Sampling	0.00	R	1.73	1	0.00	∞
Field Reconstruction	2.00	R	1.73	1	1.15	∞
Forward Transformation	0.00	R	1.73	1	0.00	∞
Power Density Scaling	0.00	R	1.73	1	0.00	∞
Spatial Averaging	0.10	R	1.73	1	0.06	∞
System Detection Limit	0.04	R	1.73	1	0.02	∞
Test Sample Related						
Probe Coupling with DUT	0.00	R	1.73	1	0.00	∞
Modulation Response	0.40	R	1.73	1	0.23	∞
Integration Time	0.00	R	1.73	1	0.00	∞
Response Time	0.00	R	1.73	1	0.00	∞
Device Holder Influence	0.10	R	1.73	1	0.06	∞
DUT alignment	0.00	R	1.73	1	0.00	∞
RF Ambient Conditions	0.04	R	1.73	1	0.02	∞
Ambient Reflections	0.04	R	1.73	1	0.02	∞
Immunity/Secondary Reception	0.00	R	1.73	1	0.00	∞
Drift of DUT	0.21	R	1.73	1	0.12	∞
Combined Standard Uncertainty (k=1)		RSS			1.34	∞
Expanded Uncertainty (95% CONFIDENCE LEVEL)		k=2			2.68	

13 CONCLUSION

13.1 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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