



**SAR EVALUATION REPORT**

**FCC 47 CFR § 2.1093  
IEEE Std 1528-2013**

*For*  
**Tablet Device**

**FCC ID: BCGA1538  
Model Name: A1538**

**Report Number: 14U19186-S1A  
Issue Date: 5/5/2015**

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NVLAP LAB CODE 200065-0

**Revision History**

Rev.	Date	Revisions	Revised By
--	4/16/2015	Initial Issue	--
A	5/5/2015	Report revised base on reviewer comments: Updated Sec.2, Sec 6.2, Appendix A, Appendix F	Yu Chen



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# 1. Attestation of Test Results

Applicant Name	APPLE INC.			
FCC ID	BCGA1538			
Model Name	A1538			
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013			
<b>SAR Limits (W/Kg)</b>				
Exposure Category	Peak spatial-average(1g of tissue)			
General population / Uncontrolled exposure	1.6			
<b>The Highest Reported SAR (W/kg)</b>				
<b>RF Exposure Conditions</b>	<b>Equipment Class</b>			
	<b>Licensed</b>	<b>DTS</b>	<b>U-NII</b>	<b>DSS (BT)</b>
Standalone	N/A	1.152	1.183	0.392
Simultaneous TX	N/A	0.117	1.572	1.572
Date Tested	3/12/2015 to 4/14/2015			
Test Results	Pass			
<p>UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p> <p><b>Note:</b> The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.</p>				
Approved & Released By:		Prepared By:		
				
Bobby Bayani Senior Engineer UL Verification Services Inc.		Yu Chen Laboratory Technician UL Verification Services Inc.		

## 2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE STD 1528-2013, the following FCC Published RF exposure [KDB](#) procedures:

- 248227 D01 802.11 Wi-Fi SAR v02
- 447498 D01 General RF Exposure Guidance v05r02
- 447498 D03 Supplement C Cross-Reference v01
- 616217 D04 SAR for laptop and tablets v01r01
- 690783 D01 SAR Listings on Grants v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03
- 865664 D02 RF Exposure Reporting v01r01

## 3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at

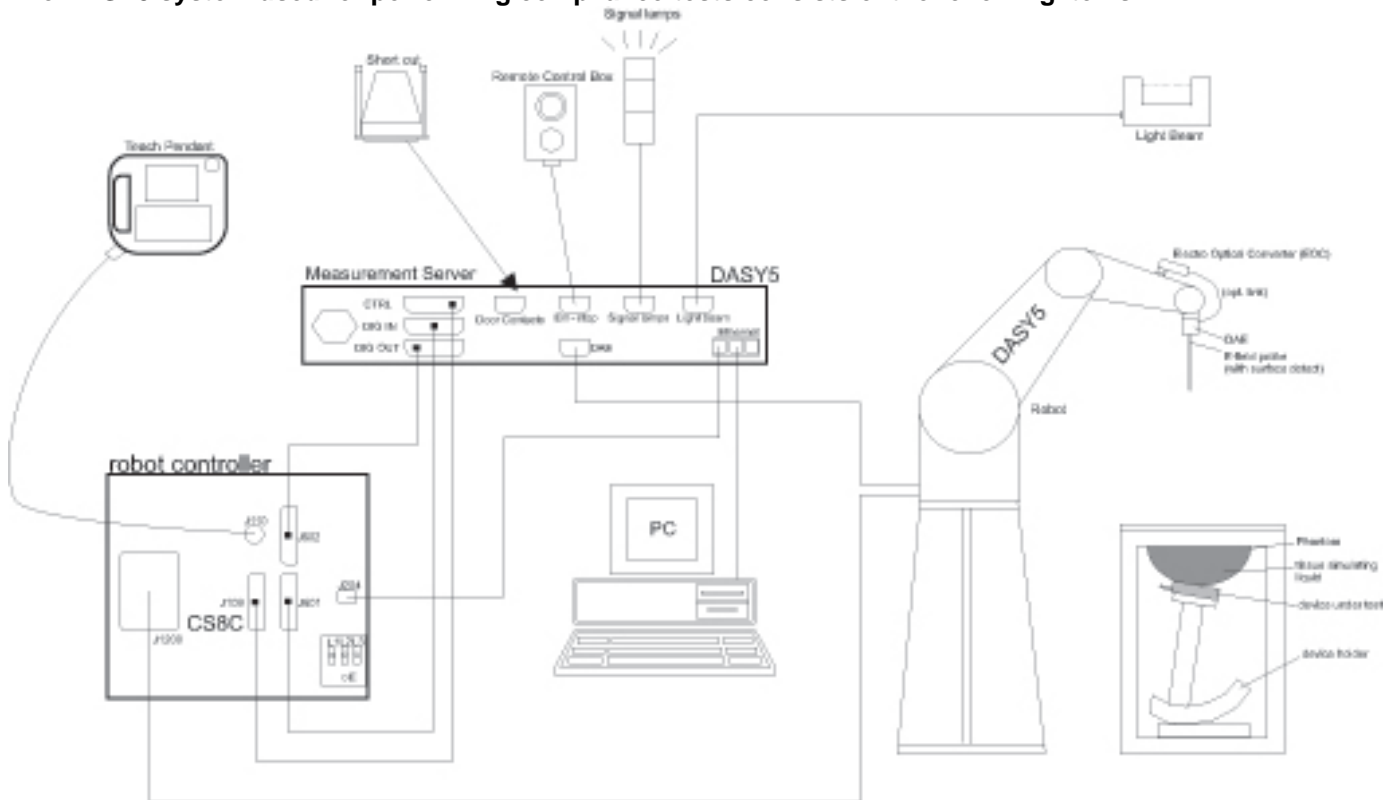
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	
SAR Lab G	
SAR Lab H	

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

## 4. SAR Measurement System & Test Equipment

### 4.1. SAR Measurement System

The DASY5 system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

## 4.2. SAR Scan Procedures

### Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

### Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

	$\leq 3$ GHz	$> 3$ GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	$5 \pm 1$ mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{Area}$ , $\Delta y_{Area}$	$\leq 2$ GHz: $\leq 15$ mm $2 - 3$ GHz: $\leq 12$ mm	$3 - 4$ GHz: $\leq 12$ mm $4 - 6$ GHz: $\leq 10$ mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	



**Step 3: Zoom Scan**

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

		≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{Zoom}, \Delta y_{Zoom}$		≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface	≤ 4 mm  3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$ : between subsequent points	≤ 1.5 · $\Delta z_{Zoom}(n-1)$
Minimum zoom scan volume	x, y, z	≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details. * When zoom scan is required and the <i>reported</i> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.			

**Step 4: Power drift measurement**

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

**Step 5: Z-Scan (FCC only)**

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not be larger than the step size in Z-direction.

### 4.3. Test Equipment

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards.

#### Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	8753ES	MY40001647	7/17/2015
Dielectronic Probe kit	SPEAG	DAK-3.5	1087	11/11/2015
Dielectronic Probe kit	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Traceable Calibration Control Co.	4242	122529162	10/8/2015
Network Analyzer	Agilent	E753ES	MY40000980	4/7/2015
Dielectronic Probe kit	SPEAG	DAK-3.5	1082	9/16/2015
Dielectronic Probe kit	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Control Company	Traceable	122529163	10/8/2015

#### System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	HP	8665B	3744A01084	5/20/2015
Power Meter	Agilent	N1912A	MY53040016	5/5/2015
Power Sensor	Agilent	E9323A	MY53070005	5/1/2015
Power Sensor	Agilent	E9323A	MY53070009	5/28/2015
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Directional coupler	Werlatone	C8060-102	2149	N/A
DC Power Supply	AMETEK	XT 15-4	1319A02778	N/A
Synthesized Signal Generator	Agilent	8665B	3438A00633	7/10/2015
Power Meter	HP	437B	3125U11347	8/27/2015
Power Meter	HP	437B	3125U16345	6/16/2015
Power Sensor	HP	8481A	2702A60780	6/16/2015
Power Sensor	HP	8481A	1926A16917	10/10/2015
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1808938	N/A
Bi-directional coupler	Werlatone, Inc.	C8060-102	2710	N/A
DC Power Supply	HP	6296A	2841A-05955	N/A
E-Field Probe (SAR Lab A)	SPEAG	EX3DV4	3901	1/27/2016
E-Field Probe (SAR Lab B)	SPEAG	EX3DV4	3751	11/14/2015
E-Field Probe (SAR Lab C)	SPEAG	EX3DV4	3885	9/15/2015
E-Field Probe (SAR Lab E)	SPEAG	EX3DV4	3772	2/23/2016
E-Field Probe (SAR Lab F)	SPEAG	EX3DV4	3936	7/24/2015
E-Field Probe (SAR Lab H)	SPEAG	EX3DV4	3871	8/26/2015
Data Acquisition Electronics (SAR Lab A)	SPEAG	DAE4	1357	2/20/2016
Data Acquisition Electronics (SAR Lab B)	SPEAG	DAE3	500	5/15/2015
Data Acquisition Electronics (SAR Lab C)	SPEAG	DAE3	427	1/14/2016
Data Acquisition Electronics (SAR Lab E)	SPEAG	DAE4	1257	9/29/2015
Data Acquisition Electronics (SAR Lab F)	SPEAG	DAE4	1239	4/15/2015
Data Acquisition Electronics (SAR Lab H)	SPEAG	DAE4	1258	5/15/2015
System Validation Dipole	SPEAG	D2450V2	706	5/20/2015
System Validation Dipole	SPEAG	D5GHzV2	1138	9/18/2015

#### Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Sensor	Agilent	N1921A	MY52270022	12/12/2015
Power Meter	Agilent	N1912A	MY53040015	2/27/2016
Power Sensor	Agilent	N1921A	MY53260001	10/11/2015

## 5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

## 6. Device Under Test (DUT) Information

### 6.1. DUT Description

Model A1538 is a tablet with multimedia functions (music, application support, and video), IEEE 802.11a/b/g/n/ac radio (MIMO 2x2), Bluetooth radio and NFC

There are two vendors of the Wi-Fi/Bluetooth radio modules to support the production volumes of the device. The two variants are referenced in this report as:

Module 1 = Wi-Fi/BT module vendor 1

Module 2 = Wi-Fi/BT module vendor 2

The Wi-Fi/Bluetooth radio modules have the same mechanical outline (e.g., the same package dimension and pin-out layout), use the same on-board antenna matching circuit, have an identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances.

Complete SAR evaluation is performed on the device with one Wi-Fi/Bluetooth radio module and then, the test is repeated on the device with the other Wi-Fi/Bluetooth module at the highest SAR value.

Device dimension	Overall (Length x Width): 203 mm x 135 mm Overall Diagonal: 235.8 mm Display Diagonal: 201 mm
AirPlay	AirPlay mode enabled devices transfer data directly between each other <input checked="" type="checkbox"/> AirPlay (Wi-Fi 2.4 GHz) <input checked="" type="checkbox"/> AirPlay (Wi-Fi 5 GHz)
RF Exposure Condition(s)	Body Exposure with all surfaces and edges

### 6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode	Duty Cycle used for SAR testing
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)	100%
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)	100%
Bluetooth	2.4 GHz	Version 4.1 LE	77.5% (DH5)

### 6.3. Nominal and Maximum Output Power

#### Maximum Output Power for Bluetooth

Mode	Maximum Output Power (dBm)
	Antenna B
Bluetooth	12.0

#### Maximum Output Power for Wi-Fi 2.4 GHz

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)	
					Antenna A	Antenna B
2.4	802.11b	1 Tx	1	2412	15.0	
			6	2437	15.0	
			11	2462	15.0	
			12	2467	15.0	
			13	2472	13.0	
			1	2412		16.0
			6	2437		16.0
			11	2462		16.0
			12	2467		16.0
			13	2472		13.0
	802.11g	1 Tx	1	2412	15.0	
			2	2417	15.0	
			6	2437	15.0	
			10	2457	15.0	
			11	2462	13.5	
			12	2467	10.5	
			13	2472	4.0	
		1	2412		15.0	
		2	2417		16.0	
		6	2437		16.0	
		10	2457		16.0	
		11	2462		13.5	
		12	2467		10.5	
		13	2472		4.0	
		2 Tx CDD	1	2412	14.0	14.0
			2	2417	15.0	16.0
			6	2437	15.0	16.0
10	2457		15.0	16.0		
11	2462		13.0	13.0		
12	2467		10.0	10.0		
13	2472		3.0	3.0		

**Maximum Output Power for Wi-Fi 2.4 GHz continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)	
					Antenna A	Antenna B
2.4	802.11n	1 Tx	1	2412	15.0	
			2	2417	15.0	
			6	2437	15.0	
			10	2457	15.0	
			11	2462	13.5	
			12	2467	10.5	
			13	2472	4.0	
			1	2412		15.0
			2	2417		16.0
			6	2437		16.0
			10	2457		16.0
			11	2462		13.5
			12	2467		10.5
			13	2472		4.0
		2 Tx HT20 CDD	1	2412	14.0	14.0
			2	2417	15.0	16.0
			6	2437	15.0	16.0
			10	2457	15.0	16.0
			11	2462	13.0	13.0
			12	2467	10.0	10.0
			13	2472	3.0	3.0
		2 Tx HT20 STBC	1	2412	14.0	14.0
			2	2417	15.0	16.0
			6	2437	15.0	16.0
			10	2457	15.0	16.0
			11	2462	13.0	13.0
			12	2467	10.0	10.0
			13	2472	3.0	3.0
2 Tx HT20 SDM	1	2412	14.0	14.0		
	2	2417	15.0	16.0		
	6	2437	15.0	16.0		
	10	2457	15.0	16.0		
	11	2462	13.0	13.0		
	12	2467	10.0	10.0		
	13	2472	3.0	3.0		

**Maximum Output Power for Wi-Fi 5.2 GHz**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)		
					Antenna A	Antenna B	
5.2	802.11a	1 Tx	36	5180	16.0		
			40	5200	17.0		
			44	5220	17.0		
			48	5240	17.0		
			36	5180		16.0	
			40	5200		16.5	
			44	5220		16.5	
			48	5240		16.5	
		2 Tx CDD	36	5180	15.5	15.5	
			40	5200	16.0	16.0	
			44	5220	16.0	16.0	
			48	5240	16.0	16.0	
		802.11n	1 Tx HT20	36	5180	16.0	
				40	5200	17.0	
				44	5220	17.0	
				48	5240	17.0	
	36			5180		16.0	
	40			5200		16.5	
	44			5220		16.5	
	48			5240		16.5	
	1 Tx HT40			38	5180	13.5	
				46	5230	17.0	
				38	5180		13.5
				46	5230		16.5
	2 Tx HT20 CDD			36	5180	15.5	15.5
				40	5200	16.0	16.0
				44	5220	16.0	16.0
				48	5240	16.0	16.0
	2 Tx HT20 STBC		36	5180	15.5	15.5	
			40	5200	17.0	16.5	
			44	5220	17.0	16.5	
			48	5240	17.0	16.5	
2 Tx HT20 SDM	36		5180	15.5	15.5		
	40		5200	17.0	16.5		
	44		5220	17.0	16.5		
	48		5240	17.0	16.5		
2 Tx HT40 CDD	38		5190	12.5	12.5		
	46		5230	16.0	16.0		
2 Tx HT40 STBC	38		5190	12.5	12.5		
	46		5230	17.0	16.5		
2 Tx HT40 SDM	38		5190	12.5	12.5		
	46		5230	17.0	16.5		

**Maximum Output Power for Wi-Fi 5.2 GHz continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)	
					Antenna A	Antenna B
5.2	802.11ac	1 Tx VHT20	36	5180	16.0	
			40	5200	17.0	
			44	5220	17.0	
			48	5240	17.0	
			36	5180		16.0
			40	5200		16.5
			44	5220		16.5
			48	5240		16.5
		1 Tx VHT40	38	5180	13.5	
			46	5230	17.0	
			38	5180		13.5
			46	5230		16.5
		1 Tx VHT80	42	5210	13.0	
			42	5210		13.0
		2 Tx VHT20 CDD	36	5180	15.5	15.5
			40	5200	16.0	16.0
			44	5220	16.0	16.0
			48	5240	16.0	16.0
		2 Tx VHT20 STBC	36	5180	15.5	15.5
			40	5200	17.0	16.5
			44	5220	17.0	16.5
			48	5240	17.0	16.5
		2 Tx VHT20 SDM	36	5180	15.5	15.5
			40	5200	17.0	16.5
			44	5220	17.0	16.5
			48	5240	17.0	16.5
		2 Tx VHT40 CDD	38	5190	12.5	12.5
			46	5230	16.0	16.0
		2 Tx VHT40 STBC	38	5190	12.5	12.5
			46	5230	17.0	16.5
		2 Tx VHT40 SDM	38	5190	12.5	12.5
			46	5230	17.0	16.5
2 Tx VHT80 CDD	38	5190	12.0	12.0		
2 Tx VHT80 STBC	38	5190	12.0	12.0		
2 Tx VHT80 SDM	38	5190	12.0	12.0		



**Maximum Output Power for Wi-Fi 5.3 GHz**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)	
					Antenna A	Antenna B
5.3	802.11a	1 Tx	52	5260	16.0	
			56	5280	16.0	
			60	5300	16.0	
			64	5320	16.0	
			52	5260		15.5
			56	5280		15.5
			60	5300		15.5
			64	5320		15.5
		2 Tx CDD	52	5260	15.5	15.5
			56	5280	15.5	15.5
			60	5300	15.5	15.5
			64	5320	15.0	15.0
	802.11n	1 Tx HT20	52	5260	16.0	
			56	5280	16.0	
			60	5300	16.0	
			64	5320	16.0	
			52	5260		15.5
			56	5280		15.5
			60	5300		15.5
			64	5320		15.5
		1 Tx HT40	54	5270	16.0	
			62	5310	15.0	
			54	5270		15.5
			62	5310		15.0
		2 Tx HT20 CDD	52	5260	15.5	15.5
			56	5280	15.5	15.5
			60	5300	15.5	15.5
			64	5320	15.0	15.0
		2 Tx HT20 STBC	52	5260	16.0	15.5
			56	5280	16.0	15.5
			60	5300	16.0	15.5
			64	5320	15.0	15.0
2 Tx HT20 SDM		52	5260	16.0	15.5	
		56	5280	16.0	15.5	
		60	5300	16.0	15.5	
		64	5320	15.0	15.0	
2 Tx HT40 CDD		54	5270	15.5	15.5	
		62	5310	14.0	14.0	
2 Tx HT40 STBC		54	5270	16.0	15.5	
		62	5310	14.0	14.0	
2 Tx HT40 SDM		54	5270	16.0	15.5	
		62	5310	14.0	14.0	

**Maximum Output Power for Wi-Fi 5.3 GHz continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)	
					Antenna A	Antenna B
5.3	802.11ac	1 Tx VHT20	52	5260	16.0	
			56	5280	16.0	
			60	5300	16.0	
			64	5320	16.0	
			52	5260		15.5
			56	5280		15.5
			60	5300		15.5
			64	5320		15.5
		1 Tx VHT40	54	5270	16.0	
			62	5310	15.0	
			54	5270		15.5
			62	5310		15.0
		1 Tx VHT80	58	5290	14.0	
			58	5290		14.0
		2 Tx VHT20 CDD	52	5260	15.5	15.5
			56	5280	15.5	15.5
			60	5300	15.5	15.5
			64	5320	15.0	15.0
		2 Tx VHT20 STBC	52	5260	16.0	15.5
			56	5280	16.0	15.5
			60	5300	16.0	15.5
			64	5320	15.0	15.0
		2 Tx VHT20 SDM	52	5260	16.0	15.5
			56	5280	16.0	15.5
			60	5300	16.0	15.5
			64	5320	15.0	15.0
		2 Tx VHT40 CDD	54	5270	15.5	15.5
			62	5310	14.0	14.0
		2 Tx VHT40 STBC	54	5270	16.0	15.5
			62	5310	14.0	14.0
		2 Tx VHT40 SDM	54	5270	16.0	15.5
			62	5310	14.0	14.0
2 Tx VHT80 CDD	54	5270	13.0	13.0		
2 Tx VHT80 STBC	54	5270	13.0	13.0		
2 Tx VHT80 SDM	54	5270	13.0	13.0		

**Maximum Output Power for Wi-Fi 5.5 GHz**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)			
					Antenna A	Antenna B		
5.5	802.11a	1 Tx	100	5500	15.0			
			104	5520	15.0			
			108	5540	15.0			
			112	5560	15.0			
			116	5580	15.0			
			120	5600	15.0			
			124	5620	15.0			
			128	5640	15.0			
				2 Tx CDD	100	5500		15.0
					104	5520		15.0
					108	5540		15.0
					112	5560		15.0
					116	5580		15.0
					120	5600		15.0
					124	5620		15.0
					128	5640		15.0

**Maximum Output Power for Wi-Fi 5.5 GHz continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)	
					Antenna A	Antenna B
5.5	802.11n	1 Tx HT20	100	5500	15.0	
			104	5520	15.0	
			108	5540	15.0	
			112	5560	15.0	
			116	5580	15.0	
			120	5600	15.0	
			124	5620	15.0	
			128	5640	15.0	
			100	5500		15.0
			104	5520		15.0
			108	5540		15.0
			112	5560		15.0
			116	5580		15.0
			120	5600		15.0
		124	5620		15.0	
		128	5640		15.0	
		1 Tx HT40	102	5510	14.0	
			110	5550	15.0	
			118	5590	15.0	
			126	5630	15.0	
			102	5510		14.0
			110	5550		15.0
			118	5590		15.0
			126	5630		15.0

**Maximum Output Power for Wi-Fi 5.5 GHz continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)	
					Antenna A	Antenna B
5.5	802.11n	2 Tx HT20 CDD	100	5500	15.0	15.0
			104	5520	15.0	15.0
			108	5540	15.0	15.0
			112	5560	15.0	15.0
			116	5580	15.0	15.0
			120	5600	15.0	15.0
			124	5620	15.0	15.0
			128	5640	15.0	15.0
		2 Tx HT20 STBC	100	5500	15.0	15.0
			104	5520	15.0	15.0
			108	5540	15.0	15.0
			112	5560	15.0	15.0
			116	5580	15.0	15.0
			120	5600	15.0	15.0
			124	5620	15.0	15.0
			128	5640	15.0	15.0
		2 Tx HT20 SDM	100	5500	15.0	15.0
			104	5520	15.0	15.0
			108	5540	15.0	15.0
			112	5560	15.0	15.0
			116	5580	15.0	15.0
			120	5600	15.0	15.0
			124	5620	15.0	15.0
			128	5640	15.0	15.0
		2 Tx HT40 CDD	102	5510	13.0	13.0
			110	5550	15.0	15.0
			118	5590	15.0	15.0
			126	5630	15.0	15.0
		2 Tx HT40 STBC	102	5510	13.0	13.0
			110	5550	15.0	15.0
			118	5590	15.0	15.0
			126	5630	15.0	15.0
		2 Tx HT40 SDM	102	5510	13.0	13.0
			110	5550	15.0	15.0
			118	5590	15.0	15.0
			126	5630	15.0	15.0

**Maximum Output Power for Wi-Fi 5.5 GHz continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)	
					Antenna A	Antenna B
5.5	802.11ac	1 Tx VHT20	100	5500	15.0	
			104	5520	15.0	
			108	5540	15.0	
			112	5560	15.0	
			116	5580	15.0	
			120	5600	15.0	
			124	5620	15.0	
			128	5640	15.0	
			100	5500		15.0
			104	5520		15.0
			108	5540		15.0
			112	5560		15.0
			116	5580		15.0
			120	5600		15.0
			124	5620		15.0
			128	5640		15.0
		1 Tx VHT40	102	5510	14.0	
			110	5550	15.0	
			118	5590	15.0	
			126	5630	15.0	
			102	5510		14.0
			110	5550		15.0
			118	5590		15.0
			126	5630		15.0
1 Tx VHT80	106	5530	13.0			
	122	5610	15.0			
	106	5530		13.0		
	122	5610		15.0		

**Maximum Output Power for Wi-Fi 5.5 GHz continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)	
					Antenna A	Antenna B
5.5	802.11ac	2 Tx HT20 CDD	100	5500	15.0	15.0
			104	5520	15.0	15.0
			108	5540	15.0	15.0
			112	5560	15.0	15.0
			116	5580	15.0	15.0
			120	5600	15.0	15.0
			124	5620	15.0	15.0
			128	5640	15.0	15.0
		2 Tx HT20 STBC	100	5500	15.0	15.0
			104	5520	15.0	15.0
			108	5540	15.0	15.0
			112	5560	15.0	15.0
			116	5580	15.0	15.0
			120	5600	15.0	15.0
			124	5620	15.0	15.0
			128	5640	15.0	15.0
		2 Tx HT20 SDM	100	5500	15.0	15.0
			104	5520	15.0	15.0
			108	5540	15.0	15.0
			112	5560	15.0	15.0
			116	5580	15.0	15.0
			120	5600	15.0	15.0
			124	5620	15.0	15.0
			128	5640	15.0	15.0
		2 Tx HT40 CDD	102	5510	13.0	13.0
			110	5550	15.0	15.0
			118	5590	15.0	15.0
			126	5630	15.0	15.0
		2 Tx HT40 STBC	102	5510	13.0	13.0
			110	5550	15.0	15.0
			118	5590	15.0	15.0
			126	5630	15.0	15.0
		2 Tx HT40 SDM	102	5510	13.0	13.0
			110	5550	15.0	15.0
			118	5590	15.0	15.0
			126	5630	15.0	15.0
		2 Tx VHT80 CDD	106	5530	12.0	12.0
			122	5610	15.0	15.0
		2 Tx VHT80 STBC	106	5530	12.0	12.0
			122	5610	15.0	15.0
		2 Tx VHT80 SDM	106	5530	12.0	12.0
			122	5610	15.0	15.0

**Maximum Output Power for Wi-Fi 5.8 GHz**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)			
					Antenna A	Antenna B		
5.8	802.11a	1 Tx	132	5660	15.0			
			136	5680	15.0			
			140	5700	14.5			
			144	5720	15.0			
			149	5745	15.0			
			153	5765	17.5			
			157	5785	17.5			
			161	5805	17.5			
			165	5825	16.0			
			132	5660		15.0		
		136	5680		15.0			
		140	5700		14.5			
		144	5720		15.0			
		149	5745		15.0			
		153	5765		16.5			
		157	5785		16.5			
		161	5805		16.5			
		165	5825		16.0			
				2 Tx CDD	132	5660	15.0	15.0
					136	5680	15.0	15.0
		140	5700		14.0	14.0		
		144	5720		15.0	15.0		
		149	5745		14.0	14.0		
		153	5765		17.5	16.5		
		157	5785		17.5	16.5		
		161	5805		17.5	16.5		
		165	5825	15.0	15.0			



**Maximum Output Power for Wi-Fi 5.8 GHz continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)	
					Antenna A	Antenna B
5.8	802.11n	1 Tx HT20	132	5660	15.0	
			136	5680	15.0	
			140	5700	14.5	
			144	5720	15.0	
			149	5745	15.0	
			153	5765	17.5	
			157	5785	17.5	
			161	5805	17.5	
			165	5825	16.0	
			132	5660		15.0
			136	5680		15.0
			140	5700		14.5
			144	5720		15.0
			149	5745		15.0
		153	5765		16.5	
		157	5785		16.5	
		161	5805		16.5	
		165	5825		16.0	
		1 Tx HT40	134	5670	15.0	
			142	5710	14.5	
			151	5755	13.5	
			159	5795	16.0	
			134	5670		15.0
			142	5710		14.5
			151	5755		13.5
			159	5795		16.0

**Maximum Output Power for Wi-Fi 5.8 GHz continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)	
					Antenna A	Antenna B
5.8	802.11n	2 Tx HT20 CDD	132	5660	15.0	15.0
			136	5680	15.0	15.0
			140	5700	14.0	14.0
			144	5720	15.0	15.0
			149	5745	14.0	14.0
			153	5765	17.5	16.5
			157	5785	17.5	16.5
			161	5805	17.5	16.5
			165	5825	15.0	15.0
		2 Tx HT20 STBC	132	5660	15.0	15.0
			136	5680	15.0	15.0
			140	5700	14.0	14.0
			144	5720	15.0	15.0
			149	5745	14.0	14.0
			153	5765	17.5	16.5
			157	5785	17.5	16.5
			161	5805	17.5	16.5
			165	5825	15.0	15.0
		2 Tx HT20 SDM	132	5660	15.0	15.0
			136	5680	15.0	15.0
			140	5700	14.0	14.0
			144	5720	15.0	15.0
			149	5745	14.0	14.0
			153	5765	17.5	16.5
			157	5785	17.5	16.5
			161	5805	17.5	16.5
			165	5825	15.0	15.0
		2 Tx HT40 CDD	134	5670	14.0	14.0
			142	5710	14.0	14.0
			151	5755	13.0	13.0
			159	5795	15.0	15.0
		2 Tx HT40 STBC	134	5670	14.0	14.0
			142	5710	14.0	14.0
			151	5755	13.0	13.0
			159	5795	15.0	15.0
		2 Tx HT40 SDM	134	5670	14.0	14.0
			142	5710	14.0	14.0
			151	5755	13.0	13.0
			159	5795	15.0	15.0

**Maximum Output Power for Wi-Fi 5.8 GHz continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)	
					Antenna A	Antenna B
5.8	802.11ac	1 Tx VHT20	132	5660	15.0	
			136	5680	15.0	
			140	5700	14.5	
			144	5720	15.0	
			149	5745	15.0	
			153	5765	17.5	
			157	5785	17.5	
			161	5805	17.5	
			165	5825	16.0	
			132	5660		15.0
			136	5680		15.0
			140	5700		14.5
			144	5720		15.0
			149	5745		15.0
			153	5765		16.5
			157	5785		16.5
		161	5805		16.5	
		165	5825		16.0	
		1 Tx VHT40	134	5670	15.0	
			142	5710	14.5	
			151	5755	13.5	
			159	5795	16.0	
			134	5670		15.0
			142	5710		14.5
			151	5755		13.5
			159	5795		16.0
		1 Tx VHT80	138	5690	15.0	
			155	5775	13.5	
			138	5690		15.0
			155	5775		13.5
		2 Tx HT20 CDD	132	5660	15.0	15.0
			136	5680	15.0	15.0
140	5700		14.0	14.0		
144	5720		15.0	15.0		
149	5745		14.0	14.0		
153	5765		17.5	16.5		
157	5785		17.5	16.5		
161	5805		17.5	16.5		
165	5825	15.0	15.0			

**Maximum Output Power for Wi-Fi 5.8 GHz continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Maximum Target Power (dBm)	
					Antenna A	Antenna B
5.8	802.11ac	2 Tx HT20 STBC	132	5660	15.0	15.0
			136	5680	15.0	15.0
			140	5700	14.0	14.0
			144	5720	15.0	15.0
			149	5745	14.0	14.0
			153	5765	17.5	16.5
			157	5785	17.5	16.5
			161	5805	17.5	16.5
			165	5825	15.0	15.0
		2 Tx HT20 SDM	132	5660	15.0	15.0
			136	5680	15.0	15.0
			140	5700	14.0	14.0
			144	5720	15.0	15.0
			149	5745	14.0	14.0
			153	5765	17.5	16.5
			157	5785	17.5	16.5
			161	5805	17.5	16.5
			165	5825	15.0	15.0
		2 Tx HT40 CDD	134	5670	14.0	14.0
			142	5710	14.0	14.0
			151	5755	13.0	13.0
			159	5795	15.0	15.0
		2 Tx HT40 STBC	134	5670	14.0	14.0
			142	5710	14.0	14.0
			151	5755	13.0	13.0
			159	5795	15.0	15.0
		2 Tx HT40 SDM	134	5670	14.0	14.0
			142	5710	14.0	14.0
			151	5755	13.0	13.0
			159	5795	15.0	15.0
		2 Tx VHT80 CDD	138	5690	15.0	15.0
			155	5775	13.0	13.0
		2 Tx VHT80 STBC	138	5690	15.0	15.0
			155	5775	13.0	13.0
		2 Tx VHT80 SDM	138	5690	15.0	15.0
			155	5775	13.0	13.0

**6.4. Antenna Dimensions and Separation Distances**

Refer to separate filing document.

## 7. RF Exposure Conditions (Test Configurations)

### 7.1. Standalone SAR Test Exclusion Considerations

Since the *Dedicated Host Approach* is applied, the standalone SAR test exclusion procedure in KDB 447498 § 4.3.1 is applied in conjunction with KDB 616217 § 4.3 to determine the minimum test separation distance:

- When the separation distance from the antenna to an adjacent edge is  $\leq 5$  mm, a distance of 5 mm is applied to determine SAR test exclusion.
- When the separation distance from the antenna to an adjacent edge is  $> 5$  mm, the actual antenna-to-edge separation distance is applied to determine SAR test exclusion.

### 7.1.1. SAR Test Exclusion Calculations for Wi-Fi, SISO Transmit Conditions

#### Antennas < 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
<b>Antenna A</b>															
Wi-Fi 2.4 GHz	2462	15.00	32	5.1	191	95.4	3.1	7.9		10 -MEASURE-	> 50 mm	> 50 mm	10 -MEASURE-	6.3 -MEASURE-	
Wi-Fi 5.2 GHz	5240	17.00	50	5.1	191	95.4	3.1	7.9		22.9 -MEASURE-	> 50 mm	> 50 mm	22.9 -MEASURE-	14.3 -MEASURE-	
Wi-Fi 5.3 GHz	5320	16.00	40	5.1	191	95.4	3.1	7.9		8.5 -MEASURE-	> 50 mm	> 50 mm	8.5 -MEASURE-	115 -MEASURE-	
Wi-Fi 5.5 GHz	5700	15.00	32	5.1	191	95.4	3.1	7.9		15.3 -MEASURE-	> 50 mm	> 50 mm	15.3 -MEASURE-	9.5 -MEASURE-	
Wi-Fi 5.8 GHz	5825	17.50	56	5.1	191	95.4	3.1	7.9		27 -MEASURE-	> 50 mm	> 50 mm	27 -MEASURE-	16.9 -MEASURE-	
<b>Antenna B</b>															
Wi-Fi 2.4 GHz	2462	16.00	40	5.1	3.1	23	186.6	74.5		12.6 -MEASURE-	12.6 -MEASURE-	2.7 -EXEMPT-	> 50 mm	> 50 mm	
Wi-Fi 5.2 GHz	5240	16.50	45	5.1	3.1	23	186.6	74.5		20.6 -MEASURE-	20.6 -MEASURE-	4.5 -MEASURE-	> 50 mm	> 50 mm	
Wi-Fi 5.3 GHz	5320	15.50	35	5.1	3.1	23	186.6	74.5		16.1 -MEASURE-	16.1 -MEASURE-	3.5 -MEASURE-	> 50 mm	> 50 mm	
Wi-Fi 5.5 GHz	5700	15.00	32	5.1	3.1	23	186.6	74.5		15.3 -MEASURE-	15.3 -MEASURE-	3.3 -MEASURE-	> 50 mm	> 50 mm	
Wi-Fi 5.8 GHz	5825	16.50	45	5.1	3.1	23	186.6	74.5		21.7 -MEASURE-	21.7 -MEASURE-	4.7 -MEASURE-	> 50 mm	> 50 mm	
Bluetooth	2480	12.00	16	5.1	3.1	23	186.6	74.5		5 -MEASURE-	5 -MEASURE-	1.1 -EXEMPT-	> 50 mm	> 50 mm	

**Note(s):**

1. According to KDB 447498, if the calculated threshold value is >3 then SAR testing is required.

#### Antennas > 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
<b>Antenna A</b>															
Wi-Fi 2.4 GHz	2462	15.00	32	5.1	191	95.4	3.1	7.9		< 50 mm	1505.6 mW -EXEMPT-	549.6 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.2 GHz	5240	17.00	50	5.1	191	95.4	3.1	7.9		< 50 mm	1475.5 mW -EXEMPT-	519.5 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.3 GHz	5320	16.00	40	5.1	191	95.4	3.1	7.9		< 50 mm	1475 mW -EXEMPT-	519 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.5 GHz	5700	15.00	32	5.1	191	95.4	3.1	7.9		< 50 mm	1472.8 mW -EXEMPT-	516.8 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.8 GHz	5825	17.50	56	5.1	191	95.4	3.1	7.9		< 50 mm	1472.2 mW -EXEMPT-	516.2 mW -EXEMPT-	< 50 mm	< 50 mm	
<b>Antenna B</b>															
Wi-Fi 2.4 GHz	2462	16.00	40	5.1	3.1	23	186.6	74.5		< 50 mm	< 50 mm	< 50 mm	14616 mW -EXEMPT-	340.6 mW -EXEMPT-	
Wi-Fi 5.2 GHz	5240	16.50	45	5.1	3.1	23	186.6	74.5		< 50 mm	< 50 mm	< 50 mm	14315 mW -EXEMPT-	310.5 mW -EXEMPT-	
Wi-Fi 5.3 GHz	5320	15.50	35	5.1	3.1	23	186.6	74.5		< 50 mm	< 50 mm	< 50 mm	1431 mW -EXEMPT-	310 mW -EXEMPT-	
Wi-Fi 5.5 GHz	5700	15.00	32	5.1	3.1	23	186.6	74.5		< 50 mm	< 50 mm	< 50 mm	1428.8 mW -EXEMPT-	307.8 mW -EXEMPT-	
Wi-Fi 5.8 GHz	5825	16.50	45	5.1	3.1	23	186.6	74.5		< 50 mm	< 50 mm	< 50 mm	1428.2 mW -EXEMPT-	307.2 mW -EXEMPT-	
Bluetooth	2480	12.00	16	5.1	3.1	23	186.6	74.5		< 50 mm	< 50 mm	< 50 mm	14613 mW -EXEMPT-	340.3 mW -EXEMPT-	

**Note(s):**

1. According to KDB 447498, if the calculated Power threshold is less than the output power then SAR testing is required.

### 7.1.2. SAR Test Exclusion Calculations for Wi-Fi, MIMO Transmit Conditions

#### Antennas < 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
<b>Antenna A</b>															
Wi-Fi 2.4 GHz	2462	15.00	32	5.1	191	95.4	3.1	7.9		10 -MEASURE-	> 50 mm	> 50 mm	10 -MEASURE-	6.3 -MEASURE-	
Wi-Fi 5.2 GHz	5240	17.00	50	5.1	191	95.4	3.1	7.9		22.9 -MEASURE-	> 50 mm	> 50 mm	22.9 -MEASURE-	14.3 -MEASURE-	
Wi-Fi 5.3 GHz	5320	16.00	40	5.1	191	95.4	3.1	7.9		8.5 -MEASURE-	> 50 mm	> 50 mm	8.5 -MEASURE-	11.5 -MEASURE-	
Wi-Fi 5.5 GHz	5700	15.00	32	5.1	191	95.4	3.1	7.9		15.3 -MEASURE-	> 50 mm	> 50 mm	15.3 -MEASURE-	9.5 -MEASURE-	
Wi-Fi 5.8 GHz	5825	17.50	56	5.1	191	95.4	3.1	7.9		27 -MEASURE-	> 50 mm	> 50 mm	27 -MEASURE-	16.9 -MEASURE-	
<b>Antenna B</b>															
Wi-Fi 2.4 GHz	2462	16.00	40	5.1	3.1	23	186.6	74.5		12.6 -MEASURE-	12.6 -MEASURE-	2.7 -EXEMPT-	> 50 mm	> 50 mm	
Wi-Fi 5.2 GHz	5240	16.50	45	5.1	3.1	23	186.6	74.5		20.6 -MEASURE-	20.6 -MEASURE-	4.5 -MEASURE-	> 50 mm	> 50 mm	
Wi-Fi 5.3 GHz	5320	15.50	35	5.1	3.1	23	186.6	74.5		16.1 -MEASURE-	16.1 -MEASURE-	3.5 -MEASURE-	> 50 mm	> 50 mm	
Wi-Fi 5.5 GHz	5700	15.00	32	5.1	3.1	23	186.6	74.5		15.3 -MEASURE-	15.3 -MEASURE-	3.3 -MEASURE-	> 50 mm	> 50 mm	
Wi-Fi 5.8 GHz	5825	16.50	45	5.1	3.1	23	186.6	74.5		21.7 -MEASURE-	21.7 -MEASURE-	4.7 -MEASURE-	> 50 mm	> 50 mm	
Bluetooth	2480	12.00	16	5.1	3.1	23	186.6	74.5		5 -MEASURE-	5 -MEASURE-	1.1 -EXEMPT-	> 50 mm	> 50 mm	

**Note(s):**

- According to KDB 447498, if the calculated threshold value is >3 then SAR testing is required.

#### Antennas > 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
<b>Antenna A</b>															
Wi-Fi 2.4 GHz	2462	15.00	32	5.1	191	95.4	3.1	7.9		< 50 mm	1505.6 mW -EXEMPT-	549.6 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.2 GHz	5240	17.00	50	5.1	191	95.4	3.1	7.9		< 50 mm	1475.5 mW -EXEMPT-	519.5 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.3 GHz	5320	16.00	40	5.1	191	95.4	3.1	7.9		< 50 mm	1475 mW -EXEMPT-	519 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.5 GHz	5700	15.00	32	5.1	191	95.4	3.1	7.9		< 50 mm	1472.8 mW -EXEMPT-	516.8 mW -EXEMPT-	< 50 mm	< 50 mm	
Wi-Fi 5.8 GHz	5825	17.50	56	5.1	191	95.4	3.1	7.9		< 50 mm	1472.2 mW -EXEMPT-	516.2 mW -EXEMPT-	< 50 mm	< 50 mm	
<b>Antenna B</b>															
Wi-Fi 2.4 GHz	2462	16.00	40	5.1	3.1	23	186.6	74.5		< 50 mm	< 50 mm	< 50 mm	14616 mW -EXEMPT-	340.6 mW -EXEMPT-	
Wi-Fi 5.2 GHz	5240	16.50	45	5.1	3.1	23	186.6	74.5		< 50 mm	< 50 mm	< 50 mm	14315 mW -EXEMPT-	310.5 mW -EXEMPT-	
Wi-Fi 5.3 GHz	5320	15.50	35	5.1	3.1	23	186.6	74.5		< 50 mm	< 50 mm	< 50 mm	1431 mW -EXEMPT-	310 mW -EXEMPT-	
Wi-Fi 5.5 GHz	5700	15.00	32	5.1	3.1	23	186.6	74.5		< 50 mm	< 50 mm	< 50 mm	1428.8 mW -EXEMPT-	307.8 mW -EXEMPT-	
Wi-Fi 5.8 GHz	5825	16.50	45	5.1	3.1	23	186.6	74.5		< 50 mm	< 50 mm	< 50 mm	1428.2 mW -EXEMPT-	307.2 mW -EXEMPT-	
Bluetooth	2480	12.00	16	5.1	3.1	23	186.6	74.5		< 50 mm	< 50 mm	< 50 mm	14613 mW -EXEMPT-	340.3 mW -EXEMPT-	

**Note(s):**

- According to KDB 447498, if the calculated Power threshold is less than the output power then SAR testing is required.

## 7.2. Required Test Configurations

The table below identifies the standalone test configurations required for this device according to the findings in Section 7.1:

Test Configurations	Rear	Edge 1	Edge 2	Edge 3	Edge 4
		(Top Edge)	(Right Edge )	(Bottom Edge)	(Left Edge)
Wi-Fi 2.4 GHz SISO (Antenna A)	Yes	No	No	Yes	Yes
Wi-Fi 2.4 GHz SISO (Antenna B)	Yes	Yes	No	No	No
Wi-Fi 2.4 GHz MIMO	Yes	Yes	No	Yes	Yes
Wi-Fi 5 GHz SISO (Antenna A)	Yes	No	No	Yes	Yes
Wi-Fi 5 GHz SISO (Antenna B)	Yes	Yes	Yes	No	No
Wi-Fi 5 GHz MIMO	Yes	Yes	Yes	Yes	Yes
Bluetooth	Yes	Yes	No	No	No

### Note(s):

1. Yes = Testing is required.
2. No = Testing is not required.



## 8. Dielectric Property Measurements & System Check

### 8.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within  $\pm 2^\circ\text{C}$  of the temperature when the tissue parameters are characterized.

The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

#### Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Target Frequency (MHz)	Head		Body	
	$\epsilon_r$	$\sigma$ (S/m)	$\epsilon_r$	$\sigma$ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5000	36.2	4.45	49.3	5.07
5100	36.1	4.55	49.1	5.18
5200	36.0	4.66	49.0	5.30
5300	35.9	4.76	48.9	5.42
5400	35.8	4.86	48.7	5.53
5500	35.6	4.96	48.6	5.65
5600	35.5	5.07	48.5	5.77
5700	35.4	5.17	48.3	5.88
5800	35.3	5.27	48.2	6.00

#### IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

**Dielectric Property Measurements Results:****SAR Lab A**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit $\pm$ (%)	
3/12/2015	Body 2450	e'	51.4000	Relative Permittivity ( $\epsilon_r$ ):	51.40	52.70	-2.47	5
		e"	14.3900	Conductivity ( $\sigma$ ):	1.96	1.95	0.53	5
	Body 2410	e'	51.5100	Relative Permittivity ( $\epsilon_r$ ):	51.51	52.76	-2.37	5
		e"	14.2900	Conductivity ( $\sigma$ ):	1.91	1.91	0.39	5
	Body 2475	e'	51.3500	Relative Permittivity ( $\epsilon_r$ ):	51.35	52.67	-2.50	5
		e"	14.5600	Conductivity ( $\sigma$ ):	2.00	1.99	0.94	5
3/23/2015	Body 2450	e'	51.1800	Relative Permittivity ( $\epsilon_r$ ):	51.18	52.70	-2.88	5
		e"	14.3000	Conductivity ( $\sigma$ ):	1.95	1.95	-0.10	5
	Body 2410	e'	51.2600	Relative Permittivity ( $\epsilon_r$ ):	51.26	52.76	-2.84	5
		e"	14.4100	Conductivity ( $\sigma$ ):	1.93	1.91	1.23	5
	Body 2475	e'	51.1000	Relative Permittivity ( $\epsilon_r$ ):	51.10	52.67	-2.98	5
		e"	14.3100	Conductivity ( $\sigma$ ):	1.97	1.99	-0.80	5

**SAR Lab B**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit $\pm$ (%)	
4/14/2015	Head 2450	e'	39.4600	Relative Permittivity ( $\epsilon_r$ ):	39.46	39.20	0.66	5
		e"	13.8200	Conductivity ( $\sigma$ ):	1.88	1.80	4.59	5
	Head 2410	e'	39.5800	Relative Permittivity ( $\epsilon_r$ ):	39.58	39.28	0.77	5
		e"	13.7300	Conductivity ( $\sigma$ ):	1.84	1.76	4.51	5
	Head 2475	e'	39.3800	Relative Permittivity ( $\epsilon_r$ ):	39.38	39.17	0.54	5
		e"	13.8800	Conductivity ( $\sigma$ ):	1.91	1.83	4.55	5

**SAR Lab C**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)		
3/23/2015	Body 5180	e'	48.1300	Relative Permittivity ( $\epsilon_r$ ):	48.13	49.05	-1.87	5	
		e"	18.8000	Conductivity ( $\sigma$ ):	5.41	5.27	2.72	5	
	Body 5200	e'	48.1100	Relative Permittivity ( $\epsilon_r$ ):	48.11	49.02	-1.86	5	
		e"	18.8000	Conductivity ( $\sigma$ ):	5.44	5.29	2.66	5	
	Body 5600	e'	47.5800	Relative Permittivity ( $\epsilon_r$ ):	47.58	48.48	-1.85	5	
		e"	18.9100	Conductivity ( $\sigma$ ):	5.89	5.76	2.21	5	
	Body 5800	e'	47.4700	Relative Permittivity ( $\epsilon_r$ ):	47.47	48.20	-1.51	5	
		e"	19.0000	Conductivity ( $\sigma$ ):	6.13	6.00	2.12	5	
	Body 5825	e'	47.4700	Relative Permittivity ( $\epsilon_r$ ):	47.47	48.20	-1.51	5	
		e"	18.9900	Conductivity ( $\sigma$ ):	6.15	6.00	2.51	5	
	3/26/2015	Body 5180	e'	48.5200	Relative Permittivity ( $\epsilon_r$ ):	48.52	49.05	-1.07	5
			e"	18.2400	Conductivity ( $\sigma$ ):	5.25	5.27	-0.34	5
Body 5200		e'	48.5600	Relative Permittivity ( $\epsilon_r$ ):	48.56	49.02	-0.94	5	
		e"	18.2900	Conductivity ( $\sigma$ ):	5.29	5.29	-0.12	5	
Body 5600		e'	47.7200	Relative Permittivity ( $\epsilon_r$ ):	47.72	48.48	-1.56	5	
		e"	18.7700	Conductivity ( $\sigma$ ):	5.84	5.76	1.45	5	
Body 5800		e'	47.3800	Relative Permittivity ( $\epsilon_r$ ):	47.38	48.20	-1.70	5	
		e"	18.9600	Conductivity ( $\sigma$ ):	6.11	6.00	1.91	5	
Body 5825		e'	47.4200	Relative Permittivity ( $\epsilon_r$ ):	47.42	48.20	-1.62	5	
		e"	18.8700	Conductivity ( $\sigma$ ):	6.11	6.00	1.86	5	
3/30/2015		Body 5180	e'	49.0300	Relative Permittivity ( $\epsilon_r$ ):	49.03	49.05	-0.03	5
			e"	18.1300	Conductivity ( $\sigma$ ):	5.22	5.27	-0.94	5
	Body 5200	e'	49.0200	Relative Permittivity ( $\epsilon_r$ ):	49.02	49.02	0.00	5	
		e"	18.1700	Conductivity ( $\sigma$ ):	5.25	5.29	-0.78	5	
	Body 5600	e'	48.3400	Relative Permittivity ( $\epsilon_r$ ):	48.34	48.48	-0.28	5	
		e"	18.0800	Conductivity ( $\sigma$ ):	5.63	5.76	-2.28	5	
	Body 5800	e'	47.9600	Relative Permittivity ( $\epsilon_r$ ):	47.96	48.20	-0.50	5	
		e"	18.4500	Conductivity ( $\sigma$ ):	5.95	6.00	-0.83	5	
	Body 5825	e'	48.1000	Relative Permittivity ( $\epsilon_r$ ):	48.10	48.20	-0.21	5	
		e"	18.4200	Conductivity ( $\sigma$ ):	5.97	6.00	-0.57	5	
	4/2/2015	Body 5180	e'	48.7800	Relative Permittivity ( $\epsilon_r$ ):	48.78	49.05	-0.54	5
			e"	17.5800	Conductivity ( $\sigma$ ):	5.06	5.27	-3.94	5
Body 5200		e'	48.8000	Relative Permittivity ( $\epsilon_r$ ):	48.80	49.02	-0.45	5	
		e"	17.8600	Conductivity ( $\sigma$ ):	5.16	5.29	-2.47	5	
Body 5600		e'	48.6200	Relative Permittivity ( $\epsilon_r$ ):	48.62	48.48	0.29	5	
		e"	17.9900	Conductivity ( $\sigma$ ):	5.60	5.76	-2.77	5	
Body 5800		e'	48.0900	Relative Permittivity ( $\epsilon_r$ ):	48.09	48.20	-0.23	5	
		e"	18.1100	Conductivity ( $\sigma$ ):	5.84	6.00	-2.66	5	
Body 5825		e'	47.9900	Relative Permittivity ( $\epsilon_r$ ):	47.99	48.20	-0.44	5	
		e"	18.1400	Conductivity ( $\sigma$ ):	5.88	6.00	-2.08	5	

**SAR Lab E**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)		
3/23/2015	Body 5180	e'	48.0600	Relative Permittivity ( $\epsilon_r$ ):	48.06	49.05	-2.01	5	
		e"	18.5200	Conductivity ( $\sigma$ ):	5.33	5.27	1.19	5	
	Body 5200	e'	48.0900	Relative Permittivity ( $\epsilon_r$ ):	48.09	49.02	-1.90	5	
		e"	18.5200	Conductivity ( $\sigma$ ):	5.35	5.29	1.14	5	
	Body 5600	e'	47.5100	Relative Permittivity ( $\epsilon_r$ ):	47.51	48.48	-2.00	5	
		e"	18.7800	Conductivity ( $\sigma$ ):	5.85	5.76	1.50	5	
	Body 5800	e'	47.1000	Relative Permittivity ( $\epsilon_r$ ):	47.10	48.20	-2.28	5	
		e"	18.9900	Conductivity ( $\sigma$ ):	6.12	6.00	2.07	5	
	Body 5825	e'	47.1100	Relative Permittivity ( $\epsilon_r$ ):	47.11	48.20	-2.26	5	
		e"	19.0500	Conductivity ( $\sigma$ ):	6.17	6.00	2.83	5	
	3/26/2015	Body 5180	e'	48.4500	Relative Permittivity ( $\epsilon_r$ ):	48.45	49.05	-1.22	5
			e"	18.3900	Conductivity ( $\sigma$ ):	5.30	5.27	0.48	5
Body 5200		e'	48.9300	Relative Permittivity ( $\epsilon_r$ ):	48.93	49.02	-0.18	5	
		e"	18.4600	Conductivity ( $\sigma$ ):	5.34	5.29	0.81	5	
Body 5600		e'	47.9400	Relative Permittivity ( $\epsilon_r$ ):	47.94	48.48	-1.11	5	
		e"	18.9800	Conductivity ( $\sigma$ ):	5.91	5.76	2.59	5	
Body 5800		e'	47.4700	Relative Permittivity ( $\epsilon_r$ ):	47.47	48.20	-1.51	5	
		e"	19.1100	Conductivity ( $\sigma$ ):	6.16	6.00	2.72	5	
Body 5825		e'	47.6000	Relative Permittivity ( $\epsilon_r$ ):	47.60	48.20	-1.24	5	
		e"	19.1400	Conductivity ( $\sigma$ ):	6.20	6.00	3.32	5	
3/30/2015		Body 5180	e'	48.0100	Relative Permittivity ( $\epsilon_r$ ):	48.01	49.05	-2.11	5
			e"	18.1600	Conductivity ( $\sigma$ ):	5.23	5.27	-0.78	5
	Body 5200	e'	47.8500	Relative Permittivity ( $\epsilon_r$ ):	47.85	49.02	-2.39	5	
		e"	18.2500	Conductivity ( $\sigma$ ):	5.28	5.29	-0.34	5	
	Body 5600	e'	47.2100	Relative Permittivity ( $\epsilon_r$ ):	47.21	48.48	-2.62	5	
		e"	18.1200	Conductivity ( $\sigma$ ):	5.64	5.76	-2.06	5	
	Body 5800	e'	46.8300	Relative Permittivity ( $\epsilon_r$ ):	46.83	48.20	-2.84	5	
		e"	18.4500	Conductivity ( $\sigma$ ):	5.95	6.00	-0.83	5	
	Body 5825	e'	47.0600	Relative Permittivity ( $\epsilon_r$ ):	47.06	48.20	-2.37	5	
		e"	18.5400	Conductivity ( $\sigma$ ):	6.00	6.00	0.08	5	

**SAR Lab F**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)		
3/23/2015	Body 5180	e'	48.3600	Relative Permittivity ( $\epsilon_r$ ):	48.36	49.05	-1.40	5	
		e"	18.2800	Conductivity ( $\sigma$ ):	5.27	5.27	-0.12	5	
	Body 5200	e'	48.2900	Relative Permittivity ( $\epsilon_r$ ):	48.29	49.02	-1.49	5	
		e"	18.2800	Conductivity ( $\sigma$ ):	5.29	5.29	-0.18	5	
	Body 5600	e'	47.6600	Relative Permittivity ( $\epsilon_r$ ):	47.66	48.48	-1.69	5	
		e"	18.6600	Conductivity ( $\sigma$ ):	5.81	5.76	0.86	5	
	Body 5800	e'	47.3000	Relative Permittivity ( $\epsilon_r$ ):	47.30	48.20	-1.87	5	
		e"	18.8600	Conductivity ( $\sigma$ ):	6.08	6.00	1.37	5	
	Body 5825	e'	47.2900	Relative Permittivity ( $\epsilon_r$ ):	47.29	48.20	-1.89	5	
		e"	18.8900	Conductivity ( $\sigma$ ):	6.12	6.00	1.97	5	
	3/26/2015	Body 5180	e'	48.4100	Relative Permittivity ( $\epsilon_r$ ):	48.41	49.05	-1.30	5
			e"	18.2200	Conductivity ( $\sigma$ ):	5.25	5.27	-0.45	5
Body 5200		e'	48.7600	Relative Permittivity ( $\epsilon_r$ ):	48.76	49.02	-0.53	5	
		e"	18.5100	Conductivity ( $\sigma$ ):	5.35	5.29	1.08	5	
Body 5600		e'	47.8100	Relative Permittivity ( $\epsilon_r$ ):	47.81	48.48	-1.38	5	
		e"	18.7900	Conductivity ( $\sigma$ ):	5.85	5.76	1.56	5	
Body 5800		e'	47.3700	Relative Permittivity ( $\epsilon_r$ ):	47.37	48.20	-1.72	5	
		e"	18.9300	Conductivity ( $\sigma$ ):	6.10	6.00	1.75	5	
Body 5825		e'	47.4500	Relative Permittivity ( $\epsilon_r$ ):	47.45	48.20	-1.56	5	
		e"	18.8800	Conductivity ( $\sigma$ ):	6.12	6.00	1.92	5	

**SAR Lab H**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)		
3/23/2015	Body 5180	e'	48.9700	Relative Permittivity ( $\epsilon_r$ ):	48.97	49.05	-0.16	5	
		e"	18.3700	Conductivity ( $\sigma$ ):	5.29	5.27	0.37	5	
	Body 5200	e'	48.8600	Relative Permittivity ( $\epsilon_r$ ):	48.86	49.02	-0.33	5	
		e"	18.3500	Conductivity ( $\sigma$ ):	5.31	5.29	0.21	5	
	Body 5600	e'	48.3500	Relative Permittivity ( $\epsilon_r$ ):	48.35	48.48	-0.26	5	
		e"	18.6900	Conductivity ( $\sigma$ ):	5.82	5.76	1.02	5	
	Body 5800	e'	48.0200	Relative Permittivity ( $\epsilon_r$ ):	48.02	48.20	-0.37	5	
		e"	18.8600	Conductivity ( $\sigma$ ):	6.08	6.00	1.37	5	
	Body 5825	e'	47.9900	Relative Permittivity ( $\epsilon_r$ ):	47.99	48.20	-0.44	5	
		e"	18.9400	Conductivity ( $\sigma$ ):	6.13	6.00	2.24	5	
	3/26/2015	Body 5180	e'	48.5800	Relative Permittivity ( $\epsilon_r$ ):	48.58	49.05	-0.95	5
			e"	18.1900	Conductivity ( $\sigma$ ):	5.24	5.27	-0.61	5
Body 5200		e'	48.9900	Relative Permittivity ( $\epsilon_r$ ):	48.99	49.02	-0.06	5	
		e"	18.2700	Conductivity ( $\sigma$ ):	5.28	5.29	-0.23	5	
Body 5600		e'	47.8400	Relative Permittivity ( $\epsilon_r$ ):	47.84	48.48	-1.32	5	
		e"	18.7100	Conductivity ( $\sigma$ ):	5.83	5.76	1.13	5	
Body 5800		e'	47.3600	Relative Permittivity ( $\epsilon_r$ ):	47.36	48.20	-1.74	5	
		e"	18.8700	Conductivity ( $\sigma$ ):	6.09	6.00	1.43	5	
Body 5825		e'	47.5400	Relative Permittivity ( $\epsilon_r$ ):	47.54	48.20	-1.37	5	
		e"	18.8500	Conductivity ( $\sigma$ ):	6.11	6.00	1.75	5	
3/30/2015		Body 5180	e'	49.2400	Relative Permittivity ( $\epsilon_r$ ):	49.24	49.05	0.39	5
			e"	18.0900	Conductivity ( $\sigma$ ):	5.21	5.27	-1.16	5
	Body 5200	e'	49.1600	Relative Permittivity ( $\epsilon_r$ ):	49.16	49.02	0.29	5	
		e"	18.1700	Conductivity ( $\sigma$ ):	5.25	5.29	-0.78	5	
	Body 5600	e'	48.3700	Relative Permittivity ( $\epsilon_r$ ):	48.37	48.48	-0.22	5	
		e"	18.3700	Conductivity ( $\sigma$ ):	5.72	5.76	-0.71	5	
	Body 5800	e'	47.8800	Relative Permittivity ( $\epsilon_r$ ):	47.88	48.20	-0.66	5	
		e"	18.6700	Conductivity ( $\sigma$ ):	6.02	6.00	0.35	5	
	Body 5825	e'	48.2400	Relative Permittivity ( $\epsilon_r$ ):	48.24	48.20	0.08	5	
		e"	18.7200	Conductivity ( $\sigma$ ):	6.06	6.00	1.05	5	
	4/2/2015	Body 5180	e'	47.8400	Relative Permittivity ( $\epsilon_r$ ):	47.84	49.05	-2.46	5
			e"	18.4600	Conductivity ( $\sigma$ ):	5.32	5.27	0.86	5
Body 5200		e'	47.5600	Relative Permittivity ( $\epsilon_r$ ):	47.56	49.02	-2.98	5	
		e"	18.7100	Conductivity ( $\sigma$ ):	5.41	5.29	2.17	5	
Body 5600		e'	46.8200	Relative Permittivity ( $\epsilon_r$ ):	46.82	48.48	-3.42	5	
		e"	18.9900	Conductivity ( $\sigma$ ):	5.91	5.76	2.64	5	
Body 5800		e'	46.6500	Relative Permittivity ( $\epsilon_r$ ):	46.65	48.20	-3.22	5	
		e"	19.2000	Conductivity ( $\sigma$ ):	6.19	6.00	3.20	5	
Body 5825		e'	46.5600	Relative Permittivity ( $\epsilon_r$ ):	46.56	48.20	-3.40	5	
		e"	19.2200	Conductivity ( $\sigma$ ):	6.23	6.00	3.75	5	

## 8.2. System Check

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

### System Performance Check Measurement Conditions:

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0  $\pm$ 0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be  $\geq$  15.0 cm for SAR measurements  $\leq$  3 GHz and  $\geq$  10.0 cm for measurements  $>$  3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.  
For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm.  
For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

**Reference Target SAR Values**

The reference SAR values can be obtained from the calibration certificate of system validation dipoles

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	Target SAR Values (W/kg)		
				1g/10g	Head	Body
D2450V2	706	5/20/2014	2450	1g	53.0	50.2
				10g	24.5	23.4
D5GHzV2	1138	9/18/2014	5200	1g	81.4	75.4
				10g	23.3	21.0
			5600	1g	85.1	81.9
				10g	24.2	22.6
			5800	1g	80.6	75.2
				10g	23.0	20.8



**System Check Results**

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target.

**SAR Lab A**

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
3/12/2015	D2450V2	706	Body	1g	5.09	50.9	50.2	1.39	1,2
				10g	2.30	23.0	23.4	-1.71	
3/23/2015	D2450V2	706	Body	1g	5.01	50.1	50.2	-0.20	
				10g	2.29	22.9	23.4	-2.14	

**SAR Lab B**

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
4/14/2015	D2450V2	706	Body	1g	5.32	53.2	50.2	5.98	3,4
				10g	2.45	24.5	23.4	4.70	

**SAR Lab C**

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
3/23/2015	D5GHzV2 (5.2GHz)	1138	Body	1g	7.94	79.4	75.4	5.31	5,6
				10g	2.23	22.3	21.0	6.19	
3/26/2015	D5GHzV2 (5.2GHz)	1138	Body	1g	7.60	76.0	75.4	0.80	
				10g	2.14	21.4	21.0	1.90	
3/30/2015	D5GHzV2 (5.2GHz)	1138	Body	1g	7.50	75.0	75.4	-0.53	
				10g	2.10	21.0	21.0	0.00	
4/2/2015	D5GHzV2 (5.8GHz)	1138	Body	1g	7.16	71.6	75.2	-4.79	
				10g	1.99	19.9	20.8	-4.33	

**SAR Lab E**

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
3/23/2015	D5GHzV2 (5.6GHz)	1138	Body	1g	8.48	84.8	81.9	3.54	7,8
				10g	2.41	24.1	22.6	6.64	
3/26/2015	D5GHzV2 (5.6GHz)	1138	Body	1g	8.01	80.1	81.9	-2.20	
				10g	2.24	22.4	22.6	-0.88	
3/30/2015	D5GHzV2 (5.6GHz)	1138	Body	1g	8.17	81.7	81.9	-0.24	
				10g	2.29	22.9	22.6	1.33	

**SAR Lab F**

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
3/23/2015	D5GHzV2 (5.2GHz)	1138	Body	1g	7.64	76.4	75.4	1.33	
				10g	2.17	21.7	21.0	3.33	
3/26/2015	D5GHzV2 (5.2GHz)	1138	Body	1g	7.85	78.5	75.4	4.11	9,10
				10g	2.24	22.4	21.0	6.67	

**SAR Lab H**

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
3/23/2015	D5GHzV2 (5.8GHz)	1138	Body	1g	7.04	70.4	75.2	-6.38	11,12
				10g	1.96	19.6	20.8	-5.77	
3/26/2015	D5GHzV2 (5.8GHz)	1138	Body	1g	7.83	78.3	75.2	4.12	
				10g	2.17	21.7	20.8	4.33	
3/30/2015	D5GHzV2 (5.8GHz)	1138	Body	1g	7.37	73.7	75.2	-1.99	
				10g	2.04	20.4	20.8	-1.92	
4/2/2015	D5GHzV2 (5.2GHz)	1138	Body	1g	7.39	73.9	75.4	-1.99	
				10g	2.06	20.6	21.0	-1.90	

## 9. Conducted Output Power Measurements

### 9.1. Wi-Fi 2.4GHz (DTS Band)

#### Wi-Fi 2.4 GHz Measured Results

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)	
					Antenna A	Antenna B		
2.4	802.11b	1 Tx	1	2412	15.0		Yes	
			6	2437	15.0			
			11	2462	14.8			
			12	2467	14.9			
			13	2472	13.0			
			1	2412		16.0		
			6	2437		16.0		
			11	2462		16.0		
			12	2467		16.0		
	13	2472		13.0				
	802.11g	1 Tx	1	2412	15.0		No	
			2	2417	15.0			
			6	2437	15.0			
			10	2457	14.9			
			11	2462	13.5			
			12	2467	10.5			
		13	2472	4.0				
		2 Tx CDD	1	2412	14.0	14.0		Yes
			2	2417	15.0	16.0		
			6	2437	15.0	16.0		
			10	2457	15.0	16.0		
11			2462	13.0	13.0			
12	2467		10.0	10.0				
13	2472	3.0	3.0					

**Wi-Fi 2.4 GHz Measured Results Continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)	
					Antenna A	Antenna B		
2.4	802.11n	1 Tx HT20	1	2412	15.0		No	
			2	2417	15.0			
			6	2437	15.0			
			10	2457	15.0			
			11	2462	13.5			
			12	2467	10.5			
			13	2472	4.0			
			1	2412		15.0		
			2	2417		16.0		
			6	2437		16.0		
			10	2457		16.0		
			11	2462		13.5		
			12	2467		10.5		
		13	2472		4.0			
		2 Tx HT20 CDD (Antennas A & B)	1	2412	14.0	14.0	No	
			2	2417	14.9	16.0		
			6	2437	15.0	16.0		
			10	2457	15.0	16.0		
			11	2462	13.0	13.0		
			12	2467	10.0	10.0		
		2 Tx HT20 STBC (Antennas A & B)	1	2412	14.0	14.0	No	
			2	2417	15.0	16.0		
			6	2437	15.0	16.0		
			10	2457	15.0	16.0		
			11	2462	13.0	13.0		
			12	2467	10.0	10.0		
		2 Tx HT20 SDM (Antennas A & B)	1	2412	14.0	14.0	No	
			2	2417	15.0	15.9		
			6	2437	15.0	16.0		
			10	2457	15.0	16.0		
			11	2462	13.0	13.0		
			12	2467	10.0	10.0		
				13	2472	3.0	3.0	

### 9.2. Wi-Fi 5GHz (U-NII Bands)

#### Wi-Fi 5.2 GHz Measured Results

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)		
					Antenna A	Antenna B			
5.2	802.11a	1 Tx	36	5180	16.0		No		
			40	5200	17.0				
			44	5220	17.0				
			48	5240	17.0				
		2 Tx CDD	36	5180	15.5	15.5		No	
			40	5200	16.0	16.0			
			44	5220	16.0	16.0			
			48	5240	16.0	16.0			
	802.11n	1 Tx HT20	36	5180	16.0		No		
			40	5200	16.9				
			44	5220	17.0				
			48	5240	17.0				
			1 Tx HT40	36	5180	13.5		16.0	Yes
				46	5230	17.0			
				38	5180			13.5	
				46	5230			16.5	
		2 Tx HT20 CDD	36	5180	15.5	15.5	No		
			40	5200	16.0	16.0			
			44	5220	16.0	16.0			
			48	5240	16.0	16.0			
		2 Tx HT20 STBC	36	5180	15.5	15.5	No		
			40	5200	17.0	16.5			
			44	5220	17.0	16.5			
			48	5240	17.0	16.5			
		2 Tx HT20 SDM	36	5180	15.5	15.5	No		
			40	5200	17.0	16.4			
			44	5220	17.0	16.5			
			48	5240	17.0	16.5			
	2 Tx HT40 CDD	38	5190	12.5	12.5	No			
		46	5230	16.0	16.0				
	2 Tx HT40 STBC	38	5190	12.5	12.5	Yes			
		46	5230	17.0	16.5				
2 Tx HT40 SDM	38	5190	12.5	12.5	No				
	46	5230	17.0	16.5					

**Wi-Fi 5.2 GHz Measured Results continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)
					Antenna A	Antenna B	
5.2	802.11ac	1 Tx VHT20	36	5180	16.0		No
			40	5200	17.0		
			44	5220	17.0		
			48	5240	17.0		
			36	5180		16.0	
			40	5200		16.5	
			44	5220		16.5	
			48	5240		16.5	
		1 Tx VHT40	38	5180	13.5		No
			46	5230	17.0		
			38	5180		13.5	
			46	5230		16.5	
		1 Tx VHT80	42	5210	13.0		No
			42	5210		13.0	
		2 Tx VHT20 CDD	36	5180	15.5	15.5	No
			40	5200	16.0	16.0	
			44	5220	16.0	16.0	
			48	5240	16.0	16.0	
		2 Tx VHT20 STBC	36	5180	15.5	15.5	No
			40	5200	17.0	16.5	
			44	5220	17.0	16.5	
			48	5240	17.0	16.5	
		2 Tx VHT20 SDM	36	5180	15.5	15.5	No
			40	5200	16.9	16.5	
			44	5220	17.0	16.5	
			48	5240	17.0	16.5	
		2 Tx VHT40 CDD	38	5190	12.5	12.5	No
			46	5230	16.0	16.0	
2 Tx VHT40 STBC	38	5190	12.5	12.5	No		
	46	5230	17.0	16.5			
2 Tx VHT40 SDM	38	5190	12.5	12.5	No		
	46	5230	17.0	16.5			
2 Tx VHT80 CDD	38	5190	12.0	12.0	No		
2 Tx VHT80 STBC	38	5190	12.0	12.0	No		
2 Tx VHT80 SDM	38	5190	12.0	12.0	No		

**Wi-Fi 5.3 GHz Measured Results**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)	
					Antenna A	Antenna B		
5.3	802.11a	1 Tx	52	5260	15.8		No	
			56	5280	15.8			
			60	5300	15.8			
			64	5320	15.8			
		52	5260		15.5			
		56	5280		15.5			
		60	5300		15.5			
		64	5320		15.5			
	52	5260	15.5	15.5	No			
	56	5280	15.5	15.5				
	60	5300	15.5	15.5				
	64	5320	15.0	15.0				
	802.11n	1 Tx HT20	52	5260	16.0		No	
			56	5280	16.0			
			60	5300	16.0			
			64	5320	16.0			
			52	5260		15.5		
			56	5280		15.5		
			60	5300		15.5		
			64	5320		15.5		
		1 Tx HT40	54	5270	16.0		No	
			62	5310	15.0			
			54	5270		15.5		
			62	5310		15.0		
		2 Tx HT20 CDD	52	5260	15.5	15.5	No	
			56	5280	15.5	15.5		
			60	5300	15.5	15.5		
			64	5320	15.0	15.0		
		2 Tx HT20 STBC	52	5260	16.0	15.5	No	
			56	5280	16.0	15.5		
			60	5300	16.0	15.4		
			64	5320	15.0	15.0		
2 Tx HT20 SDM	52	5260	16.0	15.5	No			
	56	5280	16.0	15.5				
	60	5300	16.0	15.5				
	64	5320	15.0	15.0				
2 Tx HT40 CDD	54	5270	15.5	15.5	No			
	62	5310	14.0	14.0	No			
2 Tx HT40 STBC	54	5270	15.8	15.5	No			
	62	5310	14.0	14.0	No			
2 Tx HT40 SDM	54	5270	16.0	15.5	No			
	62	5310	14.0	14.0				

**Wi-Fi 5.3 GHz Measured Results continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)
					Antenna A	Antenna B	
5.3	802.11ac	1 Tx VHT20	52	5260	16.0		No
			56	5280	16.0		
			60	5300	16.0		
			64	5320	16.0		
			52	5260		15.5	
			56	5280		15.5	
			60	5300		15.5	
			64	5320		15.5	
		1 Tx VHT40	54	5270	16.0		No
			62	5310	15.0		
			54	5270		15.5	
			62	5310		15.0	
		1 Tx VHT80	58	5290	14.0		No
			58	5290		14.0	
		2 Tx VHT20 CDD	52	5260	15.5	15.5	No
			56	5280	15.5	15.5	
			60	5300	15.5	15.5	
			64	5320	15.0	15.0	
		2 Tx VHT20 STBC	52	5260	16.0	15.5	No
			56	5280	16.0	15.5	
			60	5300	15.9	15.5	
			64	5320	15.0	15.0	
		2 Tx VHT20 SDM	52	5260	16.0	15.5	No
			56	5280	16.0	15.5	
			60	5300	16.0	15.4	
			64	5320	15.0	15.0	
		2 Tx VHT40 CDD	54	5270	15.5	15.5	No
			62	5310	14.0	14.0	
		2 Tx VHT40 STBC	54	5270	16.0	15.5	No
			62	5310	14.0	14.0	
2 Tx VHT40 SDM	54	5270	16.0	15.5	No		
	62	5310	14.0	14.0			
2 Tx VHT80 CDD	54	5270	13.0	13.0	No		
2 Tx VHT80 STBC	54	5270	13.0	13.0	No		
2 Tx VHT80 SDM	54	5270	13.0	13.0	No		



**Wi-Fi 5.5 GHz Measured Results**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)
					Antenna A	Antenna B	
5.5	802.11a	1 Tx	100	5500	15.0		No
			104	5520	15.0		
			108	5540	15.0		
			112	5560	15.0		
			116	5580	15.0		
			120	5600	15.0		
			124	5620	15.0		
			128	5640	15.0		
		100	5500		15.0		
		104	5520		15.0		
		108	5540		15.0		
		112	5560		15.0		
		116	5580		15.0		
		120	5600		15.0		
		124	5620		14.9		
		128	5640		15.0		
	100	5500	15.0	15.0			
	104	5520	15.0	15.0			
	108	5540	15.0	15.0			
	112	5560	15.0	15.0			
	116	5580	15.0	15.0			
	120	5600	15.0	15.0			
	124	5620	15.0	15.0			
	128	5640	15.0	15.0			
	100	5500	15.0				
	104	5520	15.0				
	108	5540	15.0				
	112	5560	15.0				
	116	5580	15.0				
	120	5600	15.0				
	124	5620	15.0				
	128	5640	15.0				
102	5510	14.0					
110	5550	15.0					
118	5590	14.9					
126	5630	15.0					
102	5510		14.0				
110	5550		15.0				
118	5590		15.0				
126	5630		15.0				

**Wi-Fi 5.5 GHz Measured Results (continued)**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)
					Antenna A	Antenna B	
5.5	802.11n	2 Tx HT20 CDD	100	5500	15.0	15.0	No
			104	5520	15.0	15.0	
			108	5540	15.0	15.0	
			112	5560	15.0	15.0	
			116	5580	15.0	15.0	
			120	5600	15.0	15.0	
			124	5620	15.0	15.0	
			128	5640	15.0	15.0	
		2 Tx HT20 STBC	100	5500	15.0	15.0	No
			104	5520	15.0	15.0	
			108	5540	15.0	15.0	
			112	5560	15.0	15.0	
			116	5580	15.0	15.0	
			120	5600	15.0	15.0	
			128	5640	15.0	15.0	
		2 Tx HT20 SDM	100	5500	15.0	15.0	No
			104	5520	15.0	15.0	
			108	5540	15.0	15.0	
			112	5560	15.0	15.0	
			116	5580	15.0	15.0	
			120	5600	15.0	15.0	
			128	5640	15.0	15.0	
		2 Tx HT40 CDD	102	5510	13.0	13.0	No
			110	5550	15.0	15.0	
			118	5590	15.0	15.0	
			126	5630	15.0	15.0	
		2 Tx HT40 STBC	102	5510	13.0	13.0	No
			110	5550	15.0	15.0	
			118	5590	15.0	15.0	
			126	5630	15.0	15.0	
		2 Tx HT40 SDM	102	5510	13.0	13.0	No
			110	5550	15.0	15.0	
			118	5590	15.0	15.0	
			126	5630	15.0	15.0	

**Wi-Fi 5.5 GHz Measured Results (continued)**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)
					Antenna A	Antenna B	
5.5	802.11ac	1 Tx VHT20	100	5500	15.0		No
			104	5520	15.0		
			108	5540	15.0		
			112	5560	15.0		
			116	5580	15.0		
			120	5600	15.0		
			124	5620	15.0		
			128	5640	14.9		
			100	5500		15.0	
			104	5520		15.0	
			108	5540		15.0	
			112	5560		15.0	
			116	5580		15.0	
			120	5600		15.0	
		124	5620		15.0		
		128	5640		15.0		
		1 Tx VHT40	102	5510	14.0		No
			110	5550	15.0		
			118	5590	15.0		
			126	5630	15.0		
			102	5510		14.0	
			110	5550		15.0	
			118	5590		15.0	
		126	5630		15.0		
1 Tx VHT80	106	5530	13.0		Yes		
	122	5610	15.0				
	106	5530		13.0			
	122	5610		15.0			

**Wi-Fi 5.5 GHz Measured Results (continued)**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)
					Antenna A	Antenna B	
5.5	802.11ac	2 Tx HT20 CDD	100	5500	15.0	15.0	No
			104	5520	15.0	15.0	
			108	5540	15.0	15.0	
			112	5560	15.0	15.0	
			116	5580	15.0	15.0	
			120	5600	15.0	15.0	
			124	5620	15.0	15.0	
			128	5640	15.0	15.0	
		2 Tx HT20 STBC	100	5500	15.0	15.0	No
			104	5520	15.0	15.0	
			108	5540	15.0	15.0	
			112	5560	15.0	15.0	
			116	5580	15.0	15.0	
			120	5600	15.0	15.0	
			128	5640	15.0	14.9	
		2 Tx HT20 SDM	100	5500	15.0	15.0	No
			104	5520	15.0	15.0	
			108	5540	15.0	15.0	
			112	5560	15.0	15.0	
			116	5580	15.0	15.0	
			120	5600	15.0	15.0	
			128	5640	15.0	15.0	
		2 Tx HT40 CDD	102	5510	13.0	13.0	No
			110	5550	15.0	15.0	
			118	5590	15.0	15.0	
			126	5630	15.0	15.0	
		2 Tx HT40 STBC	102	5510	15.0	15.0	No
			110	5550	15.0	15.0	
			118	5590	13.0	13.0	
			126	5630	15.0	15.0	
2 Tx HT40 SDM	102	5510	13.0	13.0	No		
	110	5550	15.0	15.0			
	118	5590	15.0	15.0			
	126	5630	15.0	15.0			
2 Tx VHT80 CDD	106	5530	12.0	12.0	Yes		
	122	5610	15.0	14.9			
2 Tx VHT80 STBC	106	5530	15.0	15.0	No		
	122	5610	12.0	12.0			
2 Tx VHT80 SDM	106	5530	12.0	12.0	No		
	122	5610	15.0	15.0			

**Wi-Fi 5.8 GHz Measured Results**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)	
					Antenna A	Antenna B		
5.8	802.11a	1 Tx	132	5660	15.0		Yes	
			136	5680	15.0			
			140	5700	14.5			
			144	5720	15.0			
			149	5745	15.0			
			153	5765	17.5			
			157	5785	17.5			
			161	5805	17.3			
			165	5825	16.0			
			132	5660		14.9		
			136	5680		15.0		
			140	5700		14.5		
			144	5720		15.0		
			149	5745		15.0		
			153	5765		16.4		
			157	5785		16.5		
	161	5805		16.4				
	165	5825		16.0				
		2 Tx CDD		132	5660	15.0	15.0	Yes
				136	5680	15.0	15.0	
				140	5700	14.0	14.0	
				144	5720	15.0	15.0	
				149	5745	14.0	14.0	
				153	5765	17.5	16.5	
				157	5785	17.4	16.5	
				161	5805	17.5	16.5	
		165	5825	15.0	15.0			
		802.11n	1 Tx HT20	132	5660	15.0		No
				136	5680	15.0		
				140	5700	14.5		
				144	5720	15.0		
				149	5745	15.0		
	153			5765	17.5			
	157			5785	17.5			
	161			5805	17.5			
	165		5825	16.0				
				132	5660		15.0	
				136	5680		15.0	
				140	5700		14.5	
				144	5720		15.0	
				149	5745		15.0	
				153	5765		16.5	
				157	5785		16.5	
			161	5805		16.5		
			165	5825		16.0		
	1 Tx HT40		134	5670	15.0		No	
			142	5710	14.5			
			151	5755	13.5			
			159	5795	16.0			
			134	5670		15.0		
			142	5710		14.5		
			151	5755		13.5		
			159	5795		16.0		

**Wi-Fi 5.8 GHz Measured Results continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)
					Antenna A	Antenna B	
5.8	802.11n	2 Tx HT20 CDD	132	5660	15.0	15.0	No
			136	5680	15.0	15.0	
			140	5700	14.0	14.0	
			144	5720	15.0	15.0	
			149	5745	14.0	14.0	
			153	5765	17.5	16.5	
			157	5785	17.5	16.5	
			161	5805	17.5	16.5	
			165	5825	15.0	15.0	
		2 Tx HT20 STBC	132	5660	15.0	15.0	No
			136	5680	15.0	15.0	
			140	5700	14.0	14.0	
			144	5720	15.0	15.0	
			149	5745	14.0	14.0	
			153	5765	17.4	16.5	
			157	5785	17.5	16.5	
			161	5805	17.5	16.5	
		2 Tx HT20 SDM	132	5660	15.0	15.0	No
			136	5680	15.0	15.0	
			140	5700	14.0	14.0	
			144	5720	15.0	15.0	
			149	5745	14.0	14.0	
			153	5765	17.5	16.5	
			157	5785	17.5	16.5	
			161	5805	17.5	16.5	
		2 Tx HT40 CDD	134	5670	14.0	14.0	No
			142	5710	14.0	14.0	
			151	5755	13.0	13.0	
			159	5795	15.0	15.0	
		2 Tx HT40 STBC	134	5670	14.0	14.0	No
			142	5710	14.0	14.0	
			151	5755	13.0	13.0	
			159	5795	15.0	14.9	
		2 Tx HT40 SDM	134	5670	14.0	14.0	No
			142	5710	14.0	14.0	
			151	5755	13.0	13.0	
159	5795		15.0	15.0			

**Wi-Fi 5.8 GHz Measured Results continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)
					Antenna A	Antenna B	
5.8	802.11ac	1 Tx VHT20	132	5660	15.0		No
			136	5680	15.0		
			140	5700	14.5		
			144	5720	15.0		
			149	5745	15.0		
			153	5765	17.5		
			157	5785	17.5		
			161	5805	17.4		
			165	5825	16.0		
			132	5660		15.0	
			136	5680		15.0	
			140	5700		14.5	
			144	5720		15.0	
			149	5745		15.0	
			153	5765		16.5	
			157	5785		16.5	
		161	5805		16.5		
		165	5825		16.0		
		1 Tx VHT40	134	5670	15.0		No
			142	5710	14.5		
			151	5755	13.5		
			159	5795	16.0		
		1 Tx VHT80	134	5670		15.0	No
			142	5710		14.5	
			151	5755		13.5	
			159	5795		16.0	
		2 Tx HT20 CDD	138	5690	15.0		No
			155	5775	13.5		
			138	5690		15.0	
			155	5775		13.5	
		2 Tx HT20 CDD	132	5660	15.0	15.0	No
			136	5680	15.0	15.0	
140	5700		14.0	14.0			
144	5720		15.0	15.0			
149	5745		14.0	14.0			
153	5765		17.5	16.5			
157	5785		17.5	16.5			
161	5805		17.5	16.4			
165	5825	15.0	15.0				

**Wi-Fi 5.8 GHz Measured Results continued**

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Average Power (dBm)		SAR Test (Yes/No)
					Antenna A	Antenna B	
5.8	802.11ac	2 Tx HT20 STBC	132	5660	15.0	15.0	No
			136	5680	15.0	15.0	
			140	5700	14.0	14.0	
			144	5720	15.0	15.0	
			149	5745	14.0	14.0	
			153	5765	17.5	16.5	
			157	5785	17.5	16.5	
			161	5805	17.5	16.5	
			165	5825	15.0	15.0	
		2 Tx HT20 SDM	132	5660	15.0	15.0	No
			136	5680	15.0	15.0	
			140	5700	14.0	14.0	
			144	5720	15.0	15.0	
			149	5745	14.0	14.0	
			153	5765	17.4	16.5	
			157	5785	17.5	16.5	
			161	5805	17.5	16.5	
		2 Tx HT40 CDD	134	5670	14.0	14.0	No
			142	5710	14.0	14.0	
			151	5755	13.0	13.0	
			159	5795	15.0	15.0	
		2 Tx HT40 STBC	134	5670	14.0	14.0	No
			142	5710	14.0	14.0	
			151	5755	13.0	13.0	
			159	5795	15.0	14.9	
		2 Tx HT40 SDM	134	5670	14.0	14.0	No
			142	5710	14.0	14.0	
			151	5755	13.0	13.0	
			159	5795	15.0	15.0	
		2 Tx VHT80 CDD	138	5690	15.0	15.0	No
			155	5775	13.0	13.0	
		2 Tx VHT80 STBC	138	5690	15.0	15.0	No
			155	5775	13.0	13.0	
		2 Tx VHT80 SDM	138	5690	15.0	15.0	No
			155	5775	13.0	13.0	



### 9.3. Bluetooth

Band (GHz)	Mode	Ch #	Freq. (MHz)	Avg Pwr (dBm)
2.4	V3.0 + BDR, GFSK	0	2402	11.7
		39	2441	11.5
		78	2480	11.7
	V3.0 + EDR, 8-DPSK	0	2402	10.3
		39	2441	10.2
		78	2480	10.3
	V4.0 LE, GFSK	0	2402	6.9
		19	2440	6.8
		39	2480	7.0

## 10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

### KDB 248227 D01 SAR meas for 802.11 v02:

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the initial test position(s) by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The initial test position(s) is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the reported SAR for the initial test position is:

- $\leq 0.4$  W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- $> 0.4$  W/kg, SAR is repeated using the same wireless mode test configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the reported SAR is  $\leq 0.8$  W/kg or all required test positions are tested.
  - For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
  - When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is  $> 0.8$  W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is  $\leq 1.2$  W/kg or all required test channels are considered.
  - The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.
- When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is  $\leq 1.2$  W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.
- When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is  $\leq 1.2$  W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.

To determine the initial test position, Area Scans were performed to determine the position with the *Maximum Value of SAR (measured)*. The position that produced the highest *Maximum Value of SAR* is considered the worst case position; thus used as the initial test position.

### 10.1. Wi-Fi (DTS Band)

#### 2.4 GHz Module 1

Band	Mode	No. of Transmitters	Test Position	Ch #.	Freq. (MHz)	Power (dBm)				Area Scan Meas. Peak	SAR (W/kg)								Plot No.
						Ant. A		Ant. B			Ant. A				Ant. B				
						Tune-up Limit	Measured	Tune-up Limit	Measured		Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
2.4 GHz	802.11b	1 Tx	Rear	6	2437	15.0	15.0			0.120	0.088	0.039	0.088	0.039					
			Edge 3	1	2412	15.0	15.0			1.360	0.789	0.257	0.789	0.257					
				6	2437	15.0	15.0			1.640	0.987	0.328	0.987	0.328					
				11	2462	15.0	14.8			1.940	1.100	0.366	1.152	0.383					1
			Edge 4	6	2437	15.0	15.0			0.468	0.162	0.070	0.162	0.070					
			Rear	6	2437			16.0	16.0	0.110					0.097	0.040	0.097	0.040	
			Edge 1	1	2412			16.0	16.0	0.758					0.732	0.245	0.732	0.245	
				6	2437			16.0	16.0	0.992					0.953	0.319	0.953	0.319	
				11	2462			16.0	16.0	1.330				1.060	0.355	1.060	0.355		
			Edge 2	6	2437			16.0	16.0	0.202				0.117	0.052	0.117	0.052		
2.4 GHz	802.11g	2 Tx CDD	Rear	6	2437	15.0	15.0	16.0	16.0	0.142	0.103	0.046	0.103	0.046	0.092	0.038	0.092	0.038	
			Edge 3	2	2417	15.0	15.0	16.0	16.0	0.622	0.799	0.262	0.799	0.262					
				6	2437	15.0	15.0	16.0	16.0	1.090	0.992	0.327	0.992	0.327					
				10	2457	15.0	15.0	16.0	16.0	1.140	1.150	0.379	1.150	0.379					
			Edge 4	6	2437	15.0	15.0	16.0	16.0	0.192	0.185	0.079	0.185	0.079					
			Edge 1	2	2417	15.0	15.0	16.0	16.0	0.721					0.799	0.269	0.799	0.269	
				6	2437	15.0	15.0	16.0	16.0	0.918					0.967	0.325	0.967	0.325	
				10	2457	15.0	15.0	16.0	16.0	0.865					1.080	0.364	1.080	0.364	
			Edge 2	6	2437	15.0	15.0	16.0	16.0	0.270				0.101	0.042	0.101	0.042		

#### 2.4 GHz Module 2

Band	Mode	No. of Transmitters	Test Position	Ch #.	Freq. (MHz)	Power (dBm)				Area Scan Meas. Peak	SAR (W/kg)								Plot No.
						Ant. A		Ant. B			Ant. A				Ant. B				
						Tune-up Limit	Measured	Tune-up Limit	Measured		Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
2.4 GHz	802.11b	1 Tx	Edge 3	11	2462	15.0	15.0				1.070	0.358	1.070	0.358					

### 10.2. Wi-Fi (U-NII Band)

#### 5.2 GHz Module 1

Band	Mode	No. of Transmitters	Test Position	Ch #.	Freq. (MHz)	Power (dBm)				Area Scan Meas. Peak	SAR (W/kg)								Plot No.
						Ant. A		Ant. B			Ant. A				Ant. B				
						Tune-up Limit	Measured	Tune-up Limit	Measured		Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
5.2 GHz	802.11n HT40	1 Tx	Rear	46	5230	17.0	17.0			0.194	0.109	0.046	0.109	0.046					
			Edge 3	38	5180	13.5	13.5			0.747	0.495	0.154	0.495	0.154					
				46	5230	17.0	17.0			1.500	1.180	0.366	<b>1.180</b>	0.366					2
			Edge 4	46	5230	17.0	17.0			0.439	0.255	0.097	0.255	0.097					
		1 Tx	Rear	46	5230			16.5	16.5	0.287					0.159	0.071	0.159	0.071	
			Edge 1	38	5180			13.5	13.5	0.818					0.557	0.173	0.557	0.173	
				46	5230			16.5	16.5	1.570					1.110	0.035	1.110	0.035	
			Edge 2	46	5230			16.5	16.5	0.085					0.054	0.027	0.054	0.027	
	802.11n HT40 STBC	2 Tx	Rear	46	5230	17.0	17.0	16.5	16.5	0.232	0.146	0.062	0.146	0.062	0.145	0.064	0.145	0.064	
			Edge 3	38	5180	12.5	12.5	12.5	12.5	0.704	0.353	0.116	0.353	0.116					
				46	5230	17.0	17.0	16.5	16.5	2.450	1.160	0.368	1.160	0.368					
			Edge 4	46	5230	17.0	17.0	16.5	16.5	0.467	0.268	0.111	0.268	0.111					
Edge 1			38	5180	12.5	12.5	12.5	12.5	0.855					0.454	0.150	0.454	0.150		
			46	5230	17.0	17.0	16.5	16.5	1.990					1.100	0.358	1.100	0.358		
Edge 2	46	5230	17.0	17.0	16.5	16.5	0.086					0.054	0.028	0.054	0.028				

#### 5.2 GHz Module 2

Band	Mode	No. of Transmitters	Test Position	Ch #.	Freq. (MHz)	Power (dBm)				Area Scan Meas. Peak	SAR (W/kg)								Plot No.
						Ant. A		Ant. B			Ant. A				Ant. B				
						Tune-up Limit	Measured	Tune-up Limit	Measured		Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
5.2 GHz	802.11n HT40	1 Tx	Edge 3	46	5230	17.0	17.0				1.110	0.339	1.110	0.339					

**5.5 GHz Module 1**

Band	Mode	No. of Transmitters	Test Position	Ch #.	Freq. (MHz)	Power (dBm)				Area Scan Meas. Peak	SAR (W/kg)								Plot No.
						Ant. A		Ant. B			Ant. A				Ant. B				
						Tune-up Limit	Measured	Tune-up Limit	Measured		Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
5.5 GHz	802.11ac VHT 80	1 Tx	Rear	122	5610	15.0	15.0			0.189	0.117	0.041	0.117	0.041					
			Edge 3	106	5530	13.0	13.0			1.400	0.802	0.263	0.802	0.263					
			Edge 3	122	5610	15.0	15.0			2.040	0.999	0.338	0.999	0.338					
			Edge 4	122	5610	15.0	15.0			0.354	0.198	0.075	0.198	0.075					
	802.11ac VHT 80 CDD	2 Tx	Rear	122	5610			15.0	15.0	0.234					0.132	0.054	0.132	0.054	
			Edge 1	106	5530			13.0	13.0	1.300					0.705	0.244	0.705	0.244	
			Edge 1	122	5610			15.0	15.0	1.990					1.180	0.427	<b>1.180</b>	0.427	3
			Edge 2	122	5610			15.0	15.0	0.062					0.031	0.010	0.031	0.010	
	802.11ac VHT 80 CDD	2 Tx	Rear	122	5610	15.0	15.0	15.0	14.9	0.245	0.116	0.049	0.116	0.049	0.165	0.068	0.169	0.069	
			Edge 3	106	5530	12.0	12.0	12.0	12.0	1.100	0.603	0.198	0.603	0.198					
			Edge 3	122	5610	15.0	15.0	15.0	14.9	1.790	1.030	0.354	1.030	0.354					
			Edge 4	122	5610	15.0	15.0	15.0	14.9	0.323	0.181	0.066	0.181	0.066					
Edge 1			106	5530	12.0	12.0	12.0	12.0	1.040					0.564	0.195	0.564	0.195		
Edge 1			122	5610	15.0	15.0	15.0	14.9	2.100					1.150	0.412	1.177	0.422		
Edge 2	122	5610	15.0	15.0	15.0	14.9	0.066					0.034	0.012	0.035	0.012				

**5.5 GHz Module 2**

Band	Mode	No. of Transmitters	Test Position	Ch #.	Freq. (MHz)	Power (dBm)				Area Scan Meas. Peak	SAR (W/kg)								Plot No.
						Ant. A		Ant. B			Ant. A				Ant. B				
						Tune-up Limit	Measured	Tune-up Limit	Measured		Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
5.5 GHz	802.11ac VHT80	1 Tx	Edge 1	122	5610			15.0	15.0					1.150	0.418	1.150	0.418		

**5.8 GHz Module 1**

Band	Mode	No. of Transmitters	Test Position	Ch #.	Freq. (MHz)	Power (dBm)				Area Scan Meas. Peak	SAR (W/kg)								Plot No.	
						Ant. A		Ant. B			Ant. A				Ant. B					
						Tune-up Limit	Measured	Tune-up Limit	Measured		Measured		Scaled		Measured		Scaled			
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g		
5.8 GHz	802.11a	1 Tx	Rear	153	5765	17.5	17.5			0.177	0.110	0.035	0.110	0.035						
			Edge 3	153	5765	17.5	17.5			1.210	0.926	0.280	0.926	0.280						
				161	5805	17.5	17.3			1.820	1.130	0.343	<b>1.183</b>	0.359						4
			Edge 4	153	5765	17.5	17.5			0.293	0.182	0.069	0.182	0.069						
	1 Tx	Rear	153	5765			16.5	16.4	0.324						0.170	0.057	0.174	0.058		
		Edge 1	153	5765			16.5	16.4	2.160						1.150	0.400	1.177	0.409		
			161	5805			16.5	16.4	2.090						1.150	0.400	1.177	0.409		
	Edge 2	153	5765			16.5	16.4	0.075						0.051	0.015	0.052	0.015			
	802.11a CDD	2 Tx	Rear	153	5765	17.5	17.5	16.5	16.5	0.368	0.112	0.038	0.112	0.038	0.198	0.073	0.198	0.073		
			Edge 3	153	5765	17.5	17.5	16.5	16.5	1.490	0.923	0.266	0.923	0.266						
				161	5805	17.5	17.5	16.5	16.5	1.990	1.010	0.330	1.010	0.330						
			Edge 4	153	5765	17.5	17.5	16.5	16.5	0.332	0.181	0.064	0.181	0.064						
			Edge 1	153	5765	17.5	17.5	16.5	16.5	2.170						1.120	0.389	1.120	0.389	
				161	5805	17.5	17.5	16.5	16.5	2.110						1.130	0.396	1.130	0.396	
Edge 2	153	5765	17.5	17.5	16.5	16.5	0.081						0.046	0.014	0.046	0.014				

**5.8 GHz Module 2**

Band	Mode	No. of Transmitters	Test Position	Ch #.	Freq. (MHz)	Power (dBm)				Area Scan Meas. Peak	SAR (W/kg)								Plot No.
						Ant. A		Ant. B			Ant. A				Ant. B				
						Tune-up Limit	Measured	Tune-up Limit	Measured		Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
5.8 GHz	802.11a	1 Tx	Edge 3	161	5805	17.5	17.0				0.941	0.289	1.056	0.324					

## 10.3. Bluetooth

### Module 1

Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		Measured		Scaled		Plot No.
					Tune-up limit	Measured	1-g	10-g	1-g	10-g	
V3.0 + BDR GFSK	0	Rear	78	2480	12.0	11.7	0.027	0.010	0.029	0.011	
		Edge 1	78	2480	12.0	11.7	0.366	0.121	<b>0.392</b>	0.130	5
		Edge 2	78	2480	12.0	11.7	0.041	0.016	0.044	0.017	

### Module 2

Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		Measured		Scaled		Plot No.
					Tune-up limit	Meas.	1-g	10-g	1-g	10-g	
V3.0 + BDR GFSK	0	Edge 1	78	2480	12.0	11.5	0.288	0.094	0.323	0.106	

## 11. SAR Measurement Variability

In accordance with published RF Exposure KDB 865664 D01 SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

- 1) Repeated measurement is not required when the original highest measured SAR is  $< 0.80$  W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is  $\geq 0.80$  W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the **ratio of largest to smallest SAR** for the original and first repeated measurements is  $> 1.20$  or when the original or repeated measurement is  $\geq 1.45$  W/kg (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Repeated Measured SAR (W/kg)	Largest to Smallest SAR Ratio
2400	Wi-Fi 802.11b/g/n	Body	Edge 3	Yes	1.15	1.07	1.07
5200	Wi-Fi 802.11a/n/ac	Body	Edge 3	Yes	1.18	1.12	1.05
5500	Wi-Fi 802.11a/n/ac	Body	Edge 1	Yes	1.18	1.18	1.00
5800	Wi-Fi 802.11a/n/ac	Body	Edge 1	Yes	1.15	1.10	1.05

### Note(s):

Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not  $> 1.20$ .



## 12. Simultaneous Transmission SAR Analysis

KDB 447498 D01 General RF Exposure Guidance introduces a new formula for calculating the SAR to Peak Location Ratio (SPLSR) between pairs of simultaneously transmitting antennas:

$$SPLSR = (SAR_1 + SAR_2)^{1.5} / Ri$$

Where:

**SAR<sub>1</sub>** is the highest measured or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

**SAR<sub>2</sub>** is the highest measured or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

**Ri** is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of  $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$

In order for a pair of simultaneous transmitting antennas with the sum of 1-g SAR > 1.6 W/kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:

$$(SAR_1 + SAR_2)^{1.5} / Ri < 0.04$$

### Simultaneous Transmission Condition

RF Exposure Condition	Item		
Standalone	1	Antenna A Wi-Fi 2.4 GHz SISO	+ Antenna B Bluetooth
	2	Antenna A Wi-Fi 5 GHz SISO	+ Antenna B Bluetooth
	3	Antenna B Wi-Fi 5 GHz SISO	+ Antenna B Bluetooth
	4	Antenna A + B Wi-Fi 5 GHz MIMO	+ Antenna B Bluetooth
Notes:			
1. Wi-Fi 2.4GHz Radio on Antenna B cannot transmit simultaneously with Bluetooth Radio.			

### Estimated SAR for Simultaneous Transmission SAR Analysis

#### Considerations for SAR estimation

1. When standalone SAR test exclusion applies, standalone SAR must also be estimated to determine simultaneous transmission SAR test exclusion.
2. Dedicated Host Approach criteria for SAR test exclusion is likewise applied to SAR estimation, with certain distinctions between test exclusion and SAR estimation:
  - o When the separation distance from the antenna to an adjacent edge is  $\leq 5$  mm, a distance of 5 mm is applied for SAR estimation; this is the same between test exclusion and SAR estimation calculations.
  - o When the separation distance from the antenna to an adjacent edge is  $> 5$  mm but  $\leq 50$  mm, the actual antenna-to-edge separation distance is applied for SAR estimation.
  - o When the minimum test separation distance is  $> 50$  mm, the estimated SAR value is 0.4 W/kg
3. Please refer to Estimated SAR Tables to see which test positions are inherently compliant as they consist of only estimated SAR values for all applicable transmitters and consequently will always have sum of SAR values  $< 1.2$  W/kg. Simultaneous transmission SAR analysis was therefore not performed for these test positions.

#### Estimated SAR for WLAN

SISO														
Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)					Estimated 1-g SAR Value (W/kg)					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4
<b>Antenna A</b>														
Wi-Fi 2.4 GHz	2462	15.00	32	5.1	191	95.4	3.1	7.9		-MEASURE	0.400	0.400	-MEASURE	-MEASURE
Wi-Fi 5.2 GHz	5240	17.00	50	5.1	191	95.4	3.1	7.9		-MEASURE	0.400	0.400	-MEASURE	-MEASURE
Wi-Fi 5.3 GHz	5320	16.00	40	5.1	191	95.4	3.1	7.9		-MEASURE	0.400	0.400	-MEASURE	-MEASURE
Wi-Fi 5.5 GHz	5700	15.00	32	5.1	191	95.4	3.1	7.9		-MEASURE	0.400	0.400	-MEASURE	-MEASURE
Wi-Fi 5.8 GHz	5825	17.50	56	5.1	191	95.4	3.1	7.9		-MEASURE	0.400	0.400	-MEASURE	-MEASURE
<b>Antenna B</b>														
Wi-Fi 2.4 GHz	2462	16.00	40	5.1	3.1	23	186.6	74.5		-MEASURE	-MEASURE	0.364	0.400	0.400
Wi-Fi 5.2 GHz	5240	16.50	45	5.1	3.1	23	186.6	74.5		-MEASURE	-MEASURE	-MEASURE	0.400	0.400
Wi-Fi 5.3 GHz	5320	15.50	35	5.1	3.1	23	186.6	74.5		-MEASURE	-MEASURE	-MEASURE	0.400	0.400
Wi-Fi 5.5 GHz	5700	15.00	32	5.1	3.1	23	186.6	74.5		-MEASURE	-MEASURE	-MEASURE	0.400	0.400
Wi-Fi 5.8 GHz	5825	16.50	45	5.1	3.1	23	186.6	74.5		-MEASURE	-MEASURE	-MEASURE	0.400	0.400
Bluetooth	2480	12.00	16	5.1	3.1	23	186.6	74.5		-MEASURE	-MEASURE	0.146	0.400	0.400
<b>MIMO</b>														
Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)					Estimated 1-g SAR Value (W/kg)					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4
<b>Antenna A</b>														
Wi-Fi 2.4 GHz	2462	15.00	32	5.1	191	95.4	3.1	7.9		-MEASURE	0.400	0.400	-MEASURE	-MEASURE
Wi-Fi 5.2 GHz	5240	17.00	50	5.1	191	95.4	3.1	7.9		-MEASURE	0.400	0.400	-MEASURE	-MEASURE
Wi-Fi 5.3 GHz	5320	16.00	40	5.1	191	95.4	3.1	7.9		-MEASURE	0.400	0.400	-MEASURE	-MEASURE
Wi-Fi 5.5 GHz	5700	15.00	32	5.1	191	95.4	3.1	7.9		-MEASURE	0.400	0.400	-MEASURE	-MEASURE
Wi-Fi 5.8 GHz	5825	17.50	56	5.1	191	95.4	3.1	7.9		-MEASURE	0.400	0.400	-MEASURE	-MEASURE
<b>Antenna B</b>														
Wi-Fi 2.4 GHz	2462	15.00	32	5.1	3.1	23	186.6	74.5		-MEASURE	-MEASURE	0.291	0.400	0.400
Wi-Fi 5.2 GHz	5240	17.00	50	5.1	3.1	23	186.6	74.5		-MEASURE	-MEASURE	-MEASURE	0.400	0.400
Wi-Fi 5.3 GHz	5320	16.00	40	5.1	3.1	23	186.6	74.5		-MEASURE	-MEASURE	-MEASURE	0.400	0.400
Wi-Fi 5.5 GHz	5700	15.00	32	5.1	3.1	23	186.6	74.5		-MEASURE	-MEASURE	-MEASURE	0.400	0.400
Wi-Fi 5.8 GHz	5825	17.50	56	5.1	3.1	23	186.6	74.5		-MEASURE	-MEASURE	-MEASURE	0.400	0.400
Bluetooth	2480	12.00	16	5.1	3.1	23	186.6	74.5		-MEASURE	-MEASURE	0.146	0.400	0.400

### 12.1. Wi-Fi 2.4GHz (SISO) & BT

RF Exposure conditions	① Ant. A Wi-Fi 2.4GHz	② Ant. B BT	① + ② Ant. A +Ant. B	
			$\Sigma$ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.088	0.029	0.117	No
Edge 1	0.400	0.392	0.792	No
Edge 2	0.400	0.044	0.444	No
Edge 3	1.152	0.400	1.552	No
Edge 4	0.162	0.400	0.562	No

### 12.2. Wi-Fi 5GHz (SISO) & BT

RF Exposure conditions	① Ant. A Wi-Fi 5GHz	② Ant. B Wi-Fi 5GHz	③ Ant. B BT	① + ③ Ant. A +Ant. B (BT)		② + ③ Ant. B +Ant. B (BT)	
				$\Sigma$ 1-g SAR (mW/g)	SPLSR (Yes/ No)	$\Sigma$ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.117	0.174	0.029	0.146	No	0.203	No
Edge 1	0.400	1.180	0.392	0.792	No	1.572	No
Edge 2	0.400	0.054	0.044	0.444	No	0.098	No
Edge 3	1.183	0.400	0.400	1.583	No	0.800	No
Edge 4	0.255	0.400	0.400	0.655	No	0.800	No

### 12.3. Wi-Fi 5GHz (MIMO) & BT

RF Exposure conditions	① Ant. A +B Wi-Fi 5GHz	② Ant. B BT	① + ② Ant. A +B +Ant. B (BT)	
			$\Sigma$ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.198	0.029	0.227	No
Edge 1	1.177	0.392	1.569	No
Edge 2	0.054	0.044	0.098	No
Edge 3	1.160	0.400	1.560	No
Edge 4	0.268	0.400	0.668	No

#### Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the either sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

## **Appendixes**

**Refer to separated files for the following appendixes.**

**A\_14U19186v1 SAR Photos**

**B\_14U19186v0 SAR System Check Plots**

**C\_14U19186v0 SAR Highest Test Plots**

**D\_14U19186v0 SAR Tissue Ingredients**

**E\_14U19186v0 SAR Probe Cal. Certificates**

**F\_14U19186v1 SAR Dipole Cal. Certificates**

**END OF REPORT**