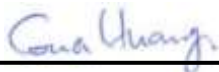


FCC SAR TEST REPORT

FCC ID : UZ7TC5301
Equipment : Touch Computer
Brand Name : Zebra
Model Name : TC5301
Applicant : Zebra Technologies Corporation
1 Zebra Plaza, Holtsville, NY 11742
Manufacturer : Zebra Technologies Corporation
1 Zebra Plaza, Holtsville, NY 11742
Standard : FCC 47 CFR Part 2 (2.1093)

The product was received on Dec. 08, 2021 and testing was started from Jan. 15, 2022 and completed on Feb. 07, 2022. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Cona Huang / Deputy Manager



Sporton International Inc. EMC & Wireless Communications Laboratory

No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan



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1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Zebra Technologies Corporation, Touch Computer, TC5301, are as follows.

Table with columns: Equipment Class, Frequency Band, Highest SAR Summary (Head, Body-worn, Hotspot, Extremity), Highest Simultaneous Transmission 1g SAR (W/kg), Highest Simultaneous Transmission 10g SAR (W/kg). Rows include DTS (2.4GHz WLAN) and NII (5GHz WLAN) with SAR values.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test. This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR, 4.0 W/kg for Extremity 10g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

Reviewed by: Jason Wang
Report Producer: Paula Chen

2. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards, the below KDB standard may not including in the TAF code without accreditation.

- FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2013
FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
FCC KDB 865664 D02 SAR Reporting v01r02
FCC KDB 447498 D01 General RF Exposure Guidance v06
FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
IEC/IEEE 62209-1528:2020



3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	Touch Computer
Brand Name	Zebra
Model Name	TC5301
FCC ID	UZ7TC5301
S / N	213365225E0159
	213335225E0017
	213365225E0174
Wireless Technology and Frequency Range	WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3 GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6 GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz RFID : 13.56 MHz
Mode	WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE RFID: ASK
HW Version	EV2
SW Version	11-05-19.00-RG-U00-PRD-ATH-04 99 test-keys
FW Version	FUSION_QA_4_1.0.0.007_R
MFD	03DEC21
EUT Stage	Identical Prototype
Remark:	
<ol style="list-style-type: none"> There are three kinds of samples as below. First RF exposure selects sample 2 to test all exposure position and sample 1 and 3 spot check worst case found sample 2. The device support DBS (Dual Band Simultaneous) function, when the device 2.4GHz and 5GHz transmit at the same time the module will reduce output power for simultaneous transmission compliance. For RF exposure is spot check worst case from non-DBS mode to ensure Sim-Tx SAR compliance when the DBS mode active. The device 2.4GHz support hotspot operation via 5GHz receive signal, when the device 2.4GHz operate hotspot function that the Bluetooth cannot transmit with 2.4GHz WLAN This device has RFID operations, the RFID antenna is integrated into the device for this model, therefore, all SAR test were performed with the device which already incorporates the RFID antenna. A diagram showing the location of the antenna can be found in the operational description. According to FCC KDB publication 447498 D01v06, transmitters are consider to be operating simultaneously when there is overlapping transmission, with the exception of transmission during network hand-offs with maximum hand-off duration less than 30 seconds. 	

Sample list	
Sample1	Lowell + Premium config
Sample2	SE4720 + Base config
Sample3	Lowell + Base config

Specification of Accessories				
Adapter	Brand Name	Zebra	Model	SAWA-65-20005A
			Part Number	PWR-WUA5V12W0US
Battery 1X	Brand Name	Zebra	Model	BT-000442
			Part Number	BT-000442-0020
USB TYPE A to TYPE C cable	Brand Name	Zebra	Part Number	CBL-TC5X-USBC2A-01
USB TYPE C to 3.5mm audio connector	Brand Name	Zebra	Part Number	ADP-USBC-35MM1-01
3.5mm Earphone	Brand Name	Zebra	Part Number	HDST-35MM-PTVP-01
Headset Jumper	Brand Name	Zebra	Part Number	CBL-TC51-HDST35-01
Trigger Handle	Brand Name	Zebra	Part Number	TRG-NGTC5-ELEC-01
Soft Holster	Brand Name	Zebra	Part Number	SG-NGTC5TC7-HLSTR-01
TC53/TC58 RUGGED BOOT	Brand Name	Zebra	Part Number	SG-NGTC5EXO1-01



4. RF Exposure Limits

4.1 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.

4.2 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. The 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.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

1. Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.



5. Specific Absorption Rate (SAR)

5.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

5.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

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

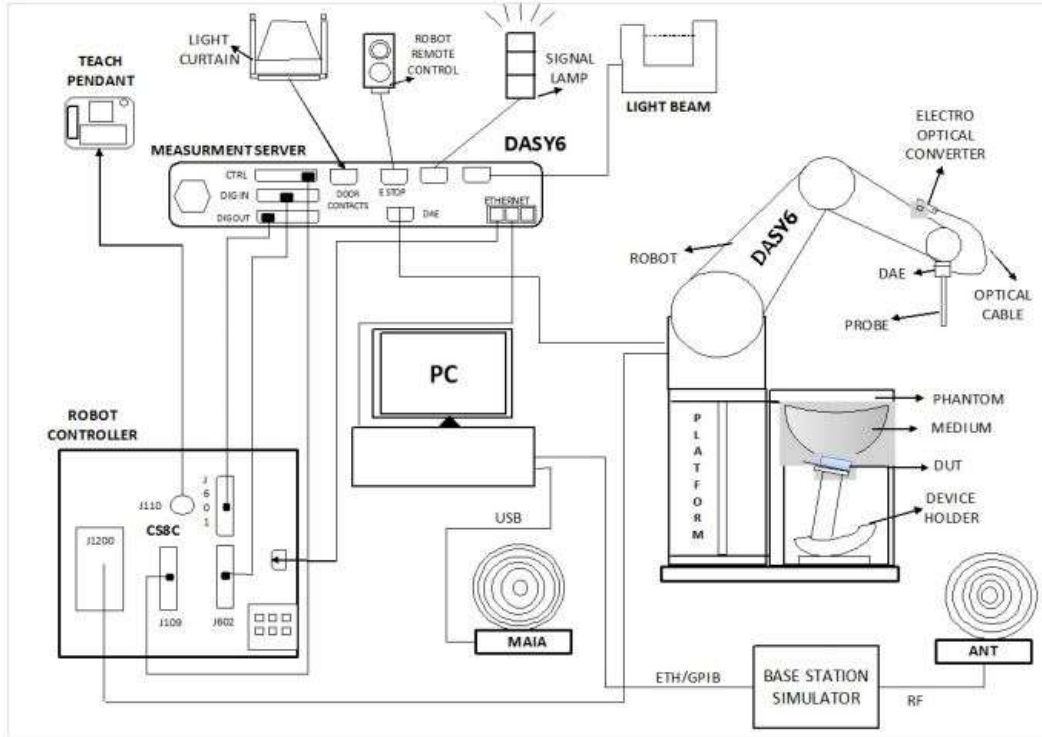
SAR is expressed in units of Watts per kilogram (W/kg)

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

6. System Description and Setup

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



- The DASY system in DASY6/DASY5 V5.2 SAR Configuration is shown above
- 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 windows software and the DASY5/DASY6 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.

6.1 Test Site Location


The SAR measurement facilities used to collect data are within both Sporton Lab list below test site location are accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190 and 3786) and the FCC designation No. TW1190 and TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Test Site	EMC & Wireless Communications Laboratory		Wensan Laboratory		
Test Site Location	TW1190 No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan		TW3786 No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan		
Test Site No.	SAR01-HY	SAR03-HY	SAR08-HY	SAR09-HY	SAR15-HY
	SAR04-HY	SAR05-HY	SAR11-HY	SAR12-HY	
	SAR06-HY	SAR10-HY	SAR13-HY	SAR14-HY	


6.2 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG).The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

<ES3DV3 Probe>

Construction	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – 4 GHz; Linearity: ± 0.2 dB (30 MHz – 4 GHz)	
Directivity	± 0.2 dB in TSL (rotation around probe axis) ± 0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	5 μ W/g – >100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 3.9 mm (body: 12 mm) Distance from probe tip to dipole centers: 3.0 mm	

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – >6 GHz Linearity: ± 0.2 dB (30 MHz – 6 GHz)	
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 μ W/g – >100 mW/g Linearity: ± 0.2 dB (noise: typically <1 μ W/g)	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

6.3 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.


The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



Fig 5.1 Photo of DAE


6.4 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Hand, Right Hand, Flat Phantom	

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

<ELI Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)	
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm	

The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

6.5 Device Holder

<Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.



Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

<Mounting Device for Laptops and other Body-Worn Transmitters>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.



Mounting Device for Laptops

7. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

- (a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- (b) Read the WWAN RF power level from the base station simulator.
- (c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
- (d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

- (a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
- (b) Place the EUT in the positions as Appendix D demonstrates.
- (c) Set scan area, grid size and other setting on the DASY software.
- (d) Measure SAR results for the highest power channel on each testing position.
- (e) Find out the largest SAR result on these testing positions of each band
- (f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- (a) Power reference measurement
- (b) Area scan
- (c) Zoom scan
- (d) Power drift measurement

7.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g



7.2 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. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

7.3 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 found in the scanned area, within a range of the global maximum. The range (in dB0) 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 FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 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° ± 1°	20° ± 1°
Maximum area scan spatial resolution: $\Delta x_{Area}, \Delta y_{Area}$	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 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 ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

7.4 Zoom Scan

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes 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 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 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 st 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	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
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: δ 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 <i>area scan based 1-g SAR estimation</i> 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.				

7.5 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

7.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASy measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.



8. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	2450MHz System Validation Kit	D2450V2	736	Aug. 17, 2021	Aug. 17, 2022
SPEAG	2450MHz System Validation Kit ⁽²⁾	D2450V2	929	Nov. 21, 2019	Nov. 18, 2022
SPEAG	5GHz System Validation Kit	D5GHzV2	1006	Sep. 15, 2021	Sep. 14, 2022
SPEAG	Data Acquisition Electronics	DAE4	778	May. 21, 2021	May. 20, 2022
SPEAG	Data Acquisition Electronics	DAE4	1311	Aug. 20, 2021	Aug. 19, 2022
SPEAG	Dosimetric E-Field Probe	EX3DV4	7350	Dec. 20, 2021	Dec. 19, 2022
SPEAG	Dosimetric E-Field Probe	EX3DV4	7439	Feb. 23, 2021	Feb. 22, 2022
RCPTWN	Thermometer	HTC-1	TM685-1	Oct. 28, 2021	Oct. 27, 2022
RCPTWN	Thermometer	HTC-1	TM560-2	Oct. 28, 2021	Oct. 27, 2022
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Oct. 24, 2021	Oct. 23, 2022
Keysight	ENA Network Analyzer	E5071C	MY46104758	Sep. 19, 2021	Sep. 18, 2022
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 24, 2021	Sep. 23, 2022
LINE SEIKI	Digital Thermometer	DTM3000-spezial	2942	Oct. 26, 2021	Oct. 25, 2022
Anritsu	Power Meter	ML2495A	1419002	Aug. 18, 2021	Aug. 17, 2022
Anritsu	Power Sensor	MA2411B	1911176	Aug. 18, 2021	Aug. 17, 2022
Anritsu	Power Meter	ML2495A	1804003	Oct. 09, 2021	Oct. 08, 2022
Anritsu	Power Sensor	MA2411B	1726150	Oct. 09, 2021	Oct. 08, 2022
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jul. 16, 2021	Jul. 15, 2022
Agilent	Spectrum Analyzer	E4408B	MY44211028	Aug. 19, 2021	Aug. 18, 2022
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 12, 2021	Oct. 11, 2022
Mini-Circuits	Power Amplifier	ZVE-8G+	479102029	Sep. 06, 2021	Sep. 05, 2022
Custom Microwave	Standard Horn antenna	M15RH	V91113-A	NCR	NCR
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Warison	Directional Coupler	WCOU-10-50S-10	WR889BMC4B1	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005-3	N/A	Note 1	

General Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.
2. The dipole calibration interval can be extended to 3 years with justification according to KDB 865664 D01. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.



9. System Verification

9.1 Tissue Verification

The tissue dielectric parameters of tissue-equivalent media used for SAR measurements must be characterized within a temperature range of 18°C to 25°C, measured with calibrated instruments and apparatuses, such as network analyzers and temperature probes. The temperature of the tissue-equivalent medium during SAR measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized. The tissue dielectric measurement system must be calibrated before use. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements.

The liquid tissue depth was at least 15cm in the phantom for all SAR testing.

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ε _r)	Conductivity Target (σ)	Permittivity Target (ε _r)	Delta (σ) (%)	Delta (ε _r) (%)	Limit (%)	Date
2450	22.5	1.784	38.976	1.80	39.20	-0.89	-0.57	±5	2022/2/1
2450	22.6	1.783	40.473	1.80	39.20	-0.94	3.25	±5	2022/2/5
5250	22.5	4.822	36.529	4.71	35.95	2.38	1.61	±5	2022/2/2
5250	22.6	4.660	36.379	4.71	35.95	-1.06	1.19	±5	2022/2/7
5600	22.5	5.093	35.661	5.07	35.50	0.45	0.45	±5	2022/2/3
5750	22.5	5.360	35.764	5.22	35.35	2.68	1.17	±5	2022/2/2

9.2 System Performance Check Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Test Site	Date	Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Power Drift (dB)	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
SAR06	2022/2/1	2450	50	D2450V2-929	EX3DV4 - SN7350	DAE4 Sn1311	-0.11	2.600	53.10	52	-2.07
SAR05	2022/2/5	2450	50	D2450V2-736	EX3DV4 - SN7439	DAE4 Sn778	-0.05	2.560	54.20	51.2	-5.54
SAR06	2022/2/2	5250	100	D5GHzV2-1006-5250	EX3DV4 - SN7350	DAE4 Sn1311	0.01	8.480	81.70	84.8	3.79
SAR05	2022/2/7	5250	50	D5GHzV2-1006-5250	EX3DV4 - SN7439	DAE4 Sn778	-0.1	4.110	81.70	82.2	0.61
SAR06	2022/2/3	5600	50	D5GHzV2-1006-5600	EX3DV4 - SN7350	DAE4 Sn1311	0.16	3.980	85.10	79.6	-6.46
SAR06	2022/2/2	5750	100	D5GHzV2-1006-5750	EX3DV4 - SN7350	DAE4 Sn1311	0.03	8.330	81.40	83.3	2.33

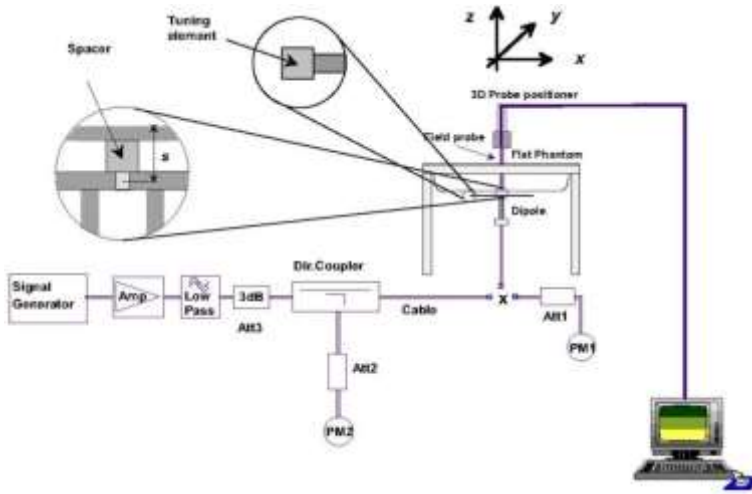


Fig 8.3.1 System Performance Check Setup



Fig 8.3.2 Setup Photo

10. RF Exposure Positions

10.1 Ear and handset reference point

Figure 9.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M,” the left ear reference point (ERP) is marked “LE,” and the right ERP is marked “RE.” Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Figure 9.1.2 The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Figure 9.1.3). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Figure 9.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.



Fig 9.1.1 Front, back, and side views of SAM twin phantom

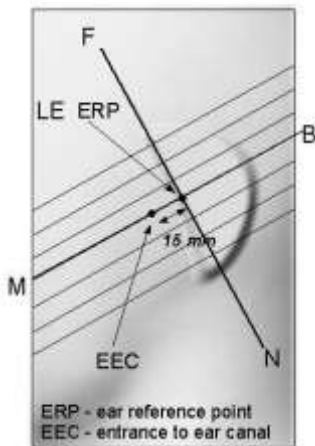


Fig 9.1.2 Close-up side view of phantom showing the ear region.

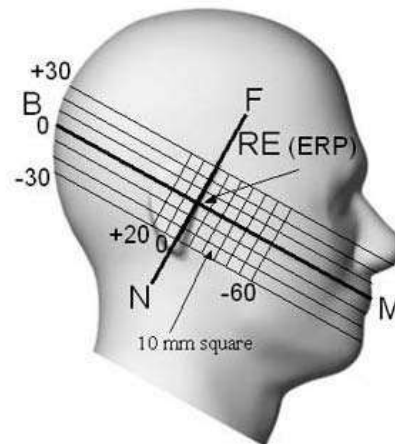


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

10.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width w_t of the handset at the level of the acoustic output (point A in Figure 9.2.1 and Figure 9.2.2), and the midpoint of the width w_b of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 9.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 9.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 9.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 9.2.3. The actual rotation angles should be documented in the test report.

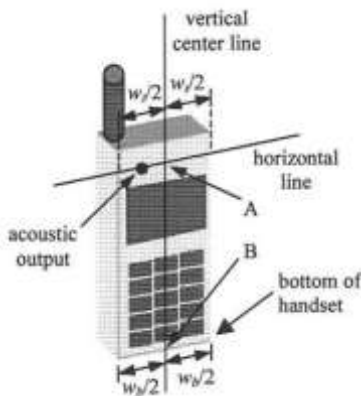


Fig 9.2.1 Handset vertical and horizontal reference lines—“fixed case”

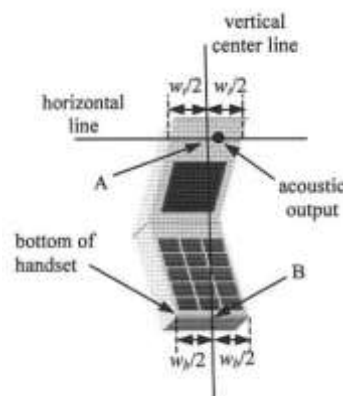


Fig 9.2.2 Handset vertical and horizontal reference lines—“clam-shell case”

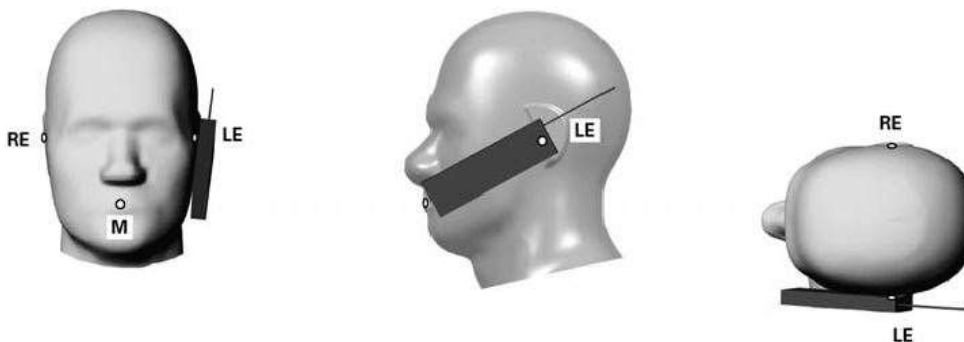


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

10.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 9.3.1. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

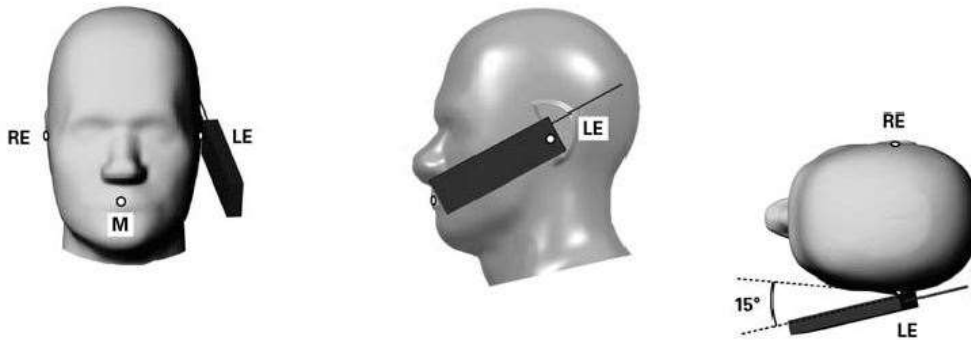


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

10.4 Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 9.4). Per KDB648474 D04v01r03, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is $> 1.2 \text{ W/kg}$, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

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

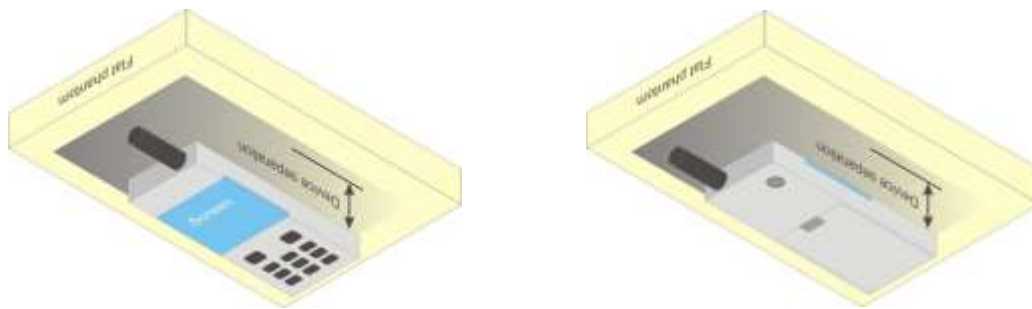


Fig 9.4 Body Worn Position



11. WiFi/Bluetooth Output Power (Unit: dBm)

General Note:

1. For each antenna, transmit power in SISO operation is larger than (or equal to) the power in MIMO operation, RF exposure compliance of MIMO mode can be deduced from the compliance simultaneous transmission of antennas operating in SISO mode.
2. Per KDB 248227 D01v02r02, the simultaneous SAR provisions in KDB publication 447498 should be applied to determine simultaneous transmission SAR test exclusion for WiFi MIMO. If the sum of 1g single transmission chain SAR measurements is $< 1.6\text{W/kg}$ and SAR peak to location ratio ≤ 0.04 , no additional SAR measurements for MIMO.
3. The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, additional output power measurements were not necessary.
4. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
5. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
6. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
7. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures. 18 The initial test position procedure is described in the following:
 - a. When the reported SAR of the initial test position is $\leq 0.4\text{ W/kg}$, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
 - b. When the reported SAR of the test position is $> 0.4\text{ W/kg}$, SAR is repeated for the 802.11 transmission mode 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 report SAR is $\leq 0.8\text{ W/kg}$ or all required test position are tested.
 - c. For all positions/configurations, when the reported SAR is $> 0.8\text{ W/kg}$, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is $\leq 1.2\text{ W/kg}$ or all required channels are tested.
8. Per 201904 TCBC workshops, General principles of FCC KDB Publication 248227 D01 can be applied to determine the SAR Initial Test Configurations and test reduction for 802.11ax SAR testing. For the table below the 802.11ax maximum power is SU (non-OFDMA), and the SU maximum power also higher than RU (OFDMA)
9. In applying the test guidance, the IEEE 802.11 mode with the maximum output power (out of all modes) should be considered for testing
10. For modes with the same maximum output power, the guidance from section 5.3.2 a) of FCC KDB Publication 248227 D01 should be applied, with 802.11ax being considered as the highest 802.11 mode for the appropriate frequency bands
11. When SAR testing for 802.11ax is required
 - a. If the maximum output power is highest for OFDMA scenarios, choose the tone size with the maximum number of tones and the highest maximum output power
 - b. Otherwise, consider the fully allocated channel for SAR testing
 - c. When SAR testing is required on RU sizes less than the fully allocated channel, use the RU number closest to the middle of the channel, choosing the higher RU number when two RUs are equidistant to the middle of the channel



<Non-Beamforming>
Non-DBS

2.4GHz WLAN				Ant 1			Ant 2			Ant 1+2(1)		Ant 1+2(2)		Ant 1+2		
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %	
802.11b 1Mbps	1	2412	Not Required	20.00	Not Required	19.80	20.00	99.90	19.50	20.00	19.90	20.00	22.71	23.00	99.90	
	6	2437		20.00		19.90	20.00		19.70	20.00	19.80	20.00	22.76	23.00		
	11	2462		20.00		19.90	20.00		19.70	20.00	19.90	20.00	22.81	23.00		
802.11g 6Mbps	1	2412	Not Required	20.00	Not Required	Not Required	20.00	Not Required	Not Required	20.00	Not Required	20.00	Not Required	23.00	Not Required	
	6	2437		20.00			20.00			20.00		20.00		23.00		
	11	2462		19.50			19.50			19.50		19.50		22.50		
802.11n-HT20 MCS0	1	2412	Not Required	20.00	Not Required	Not Required	20.00	Not Required	Not Required	20.00	Not Required	20.00	Not Required	23.00	Not Required	
	6	2437		20.00			20.00			20.00		20.00		23.00		
	11	2462		19.00			19.00			19.00		19.00		22.00		
802.11n-HT40 MCS0	3	2422	Not Required	20.00	Not Required	Not Required	20.00	Not Required	Not Required	20.00	Not Required	20.00	Not Required	23.00	Not Required	
	6	2437		20.00			20.00			20.00		20.00		23.00		
	9	2452		19.50			19.50			19.50		19.50		22.50		
802.11ac-VHT20 MCS0	1	2412	Not Required	20.00	Not Required	Not Required	20.00	Not Required	Not Required	20.00	Not Required	20.00	Not Required	23.00	Not Required	
	6	2437		20.00			20.00			20.00		20.00		23.00		
	11	2462		19.00			19.00			19.00		19.00		22.00		
802.11ac-VHT40 MCS0	3	2422	Not Required	20.00	Not Required	Not Required	20.00	Not Required	Not Required	20.00	Not Required	20.00	Not Required	23.00	Not Required	
	6	2437		20.00			20.00			20.00		20.00		23.00		
	9	2452		19.50			19.50			19.50		19.50		22.50		
802.11ax-HE20 MCS0	1	2412	Not Required	20.00	Not Required	Not Required	20.00	Not Required	Not Required	20.00	Not Required	20.00	Not Required	23.00	Not Required	
	6	2437		20.00			20.00			20.00		20.00		23.00		
	11	2462		19.00			19.00			19.00		19.00		22.00		
802.11ax-HE40 MCS0	3	2422	Not Required	20.00	Not Required	Not Required	20.00	Not Required	Not Required	20.00	Not Required	20.00	Not Required	23.00	Not Required	
	6	2437		20.00			20.00			20.00		20.00		23.00		
	9	2452		19.50			19.50			19.50		19.50		22.50		



5.2GHz WLAN				Ant 1			Ant 2			Ant 1+2(1)		Ant 1+2(2)		Ant 1+2		
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %	
802.11a 6Mbps	36	5180	Not Required	16.00	Not Required	Not Required	16.00	Not Required	Not Required	16.00	Not Required	16.00	Not Required	19.00	Not Required	
	40	5200		18.50			18.50			18.50		21.50				
	44	5220		18.50			18.50			18.50		21.50				
	48	5240		18.50			18.50			18.50		21.50				
802.11n-HT20 MCS0	36	5180	Not Required	17.50	Not Required	Not Required	17.50	Not Required	Not Required	17.50	Not Required	17.50	Not Required	20.50	Not Required	
	40	5200		18.50			18.50			18.50		21.50				
	44	5220		18.00			18.00			18.00		21.00				
	48	5240		18.50			18.50			18.50		21.50				
802.11n-HT40 MCS0	38	5190	Not Required	14.00	Not Required	Not Required	14.00	Not Required	Not Required	14.00	Not Required	14.00	Not Required	17.00	Not Required	
	46	5230		16.00			16.00			16.00		19.00				
802.11ac-VHT20 MCS0	36	5180	Not Required	17.50	Not Required	Not Required	17.50	Not Required	Not Required	17.50	Not Required	17.50	Not Required	20.50	Not Required	
	40	5200		18.50			18.50			18.50		21.50				
	44	5220		18.00			18.00			18.00		21.00				
	48	5240		18.50			18.50			18.50		21.50				
802.11ac-VHT40 MCS0	38	5190	Not Required	14.00	Not Required	Not Required	14.00	Not Required	Not Required	14.00	Not Required	14.00	Not Required	17.00	Not Required	
	46	5230		16.00			16.00			16.00		19.00				
802.11ac-VHT80 MCS0	42	5210	Not Required	13.50	Not Required	Not Required	13.50	Not Required	Not Required	13.50	Not Required	13.50	Not Required	16.50	Not Required	
	36	5180		17.50			17.50			17.50		21.50				
802.11ax-HE20 MCS0	40	5200	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	21.50	Not Required	
	44	5220		18.00			18.00			18.00		21.00				
	48	5240		18.50			18.50			18.50		21.50				
	38	5190		14.00			14.00			14.00		17.00				
802.11ax-HE40 MCS0	46	5230	Not Required	16.00	Not Required	Not Required	16.00	Not Required	Not Required	16.00	Not Required	16.00	Not Required	19.00	Not Required	
	42	5210		13.50			13.50			13.50		16.50				
802.11ax-HE80 MCS0	36	5180	Not Required	17.50	Not Required	Not Required	17.50	Not Required	Not Required	17.50	Not Required	17.50	Not Required	20.50	Not Required	
	40	5200		18.50			18.50			18.50		21.50				
	44	5220		18.00			18.00			18.00		21.00				
	48	5240		18.50			18.50			18.50		21.50				
802.11ax-HE40 MCS0	38	5190	Not Required	14.00	Not Required	Not Required	14.00	Not Required	Not Required	14.00	Not Required	14.00	Not Required	17.00	Not Required	
	46	5230		16.00			16.00			16.00		19.00				
802.11ax-HE80 MCS0	42	5210	Not Required	13.50	Not Required	Not Required	13.50	Not Required	Not Required	13.50	Not Required	13.50	Not Required	16.50	Not Required	



5.3GHz WLAN				Ant 1			Ant 2			Ant 1+2(1)		Ant 1+2(2)		Ant 1+2		
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %	
802.11a 6Mbps	52	5260	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.00	18.50	17.90	18.50	20.96	21.50	99.25	
	56	5280		18.50			18.50		18.20	18.50	17.90	18.50	21.06	21.50		
	60	5300		16.50			16.50		15.70	16.50	16.10	16.50	18.91	19.50		
	64	5320		16.50			16.50		15.80	16.50	15.90	16.50	18.86	19.50		
802.11n-HT20 MCS0	52	5260	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	21.50	Not Required	
	56	5280		18.50			18.50			18.50		18.50		21.50		
	60	5300		17.50			17.50			17.50		17.50		20.50		
	64	5320		16.00			16.00			16.00		16.00		19.00		
802.11n-HT40 MCS0	54	5270	Not Required	16.50	Not Required	Not Required	16.50	Not Required	Not Required	16.50	Not Required	16.50	Not Required	19.50	Not Required	
	62	5310		14.00			14.00			14.00		14.00		17.00		
802.11ac-VHT20 MCS0	52	5260	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	21.50	Not Required	
	56	5280		18.50			18.50			18.50		18.50		21.50		
	60	5300		16.00			16.00			16.00		16.00		19.00		
	64	5320		13.50			13.50			13.50		13.50		16.50		
802.11ac-VHT40 MCS0	54	5270	Not Required	16.00	Not Required	Not Required	16.00	Not Required	Not Required	16.00	Not Required	16.00	Not Required	19.00	Not Required	
	62	5310		14.00			14.00			14.00		14.00		17.00		
802.11ac-VHT80 MCS0	58	5290	Not Required	13.00	Not Required	Not Required	13.00	Not Required	Not Required	13.00	Not Required	13.00	Not Required	16.00	Not Required	
802.11ac-VHT160 MCS0	50	5250		13.00			13.00			13.00		13.00		16.00		
802.11ax-HE20 MCS0	52	5260	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	21.50	Not Required	
	56	5280		18.50			18.50			18.50		18.50		21.50		
	60	5300		17.50			17.50			17.50		17.50		20.50		
	64	5320		16.00			16.00			16.00		16.00		19.00		
802.11ax-HE40 MCS0	54	5270	Not Required	16.00	Not Required	Not Required	16.00	Not Required	Not Required	16.00	Not Required	16.00	Not Required	19.00	Not Required	
	62	5310		14.00			14.00			14.00		14.00		17.00		
802.11ax-HE80 MCS0	58	5290	Not Required	13.00	Not Required	Not Required	13.00	Not Required	Not Required	13.00	Not Required	13.00	Not Required	16.00	Not Required	
802.11ax-HE160 MCS0	50	5250		11.00			11.00			11.00		11.00		14.00		



5.5GHz WLAN			Ant 1			Ant 2			Ant 1+2(1)		Ant 1+2(2)		Ant 1+2		
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
802.11a 6Mbps	100	5500		17.50			17.50		17.10	17.50	17.50	17.50	20.31	20.50	99.25
	116	5580		18.00			18.00		17.60	18.00	20.81	21.00			
	124	5620		18.00			18.00		17.50	18.00	20.77	21.00			
	132	5660		18.00			18.00		17.50	18.00	20.71	21.00			
	144	5720		18.00			18.00		18.00	18.00	20.96	21.00			
802.11n-HT20 MCS0	100	5500		14.00			14.00			14.00		14.00		17.00	
	116	5580		18.00			18.00			18.00		18.00		21.00	
	124	5620		18.00			18.00			18.00		18.00		21.00	
	132	5660		18.00			18.00			18.00		18.00		21.00	
	144	5720		18.00			18.00			18.00		18.00		21.00	
802.11n-HT40 MCS0	102	5510		15.00			15.00			15.00		15.00		18.00	
	110	5550		17.90			17.90			17.90		17.90		20.90	
	126	5630		17.50			17.50			17.50		17.50		20.50	
	134	5670		14.50			14.50			14.50		14.50		17.50	
	142	5710		17.50			17.50			17.50		17.50		20.50	
802.11ac-VHT20 MCS0	100	5500		14.00			14.00			14.00		14.00		17.00	
	116	5580		18.00			18.00			18.00		18.00		21.00	
	124	5620		18.00			18.00			18.00		18.00		21.00	
	132	5660		18.00			18.00			18.00		18.00		21.00	
	144	5720		18.00			18.00			18.00		18.00		21.00	
802.11ac-VHT40 MCS0	102	5510	Not Required	15.00	Not Required	Not Required	15.00	Not Required		15.00		15.00		18.00	
	110	5550		17.90			17.90			17.90		17.90		20.90	
	126	5630		17.50			17.50			17.50		17.50		20.50	
	134	5670		14.50			14.50			14.50		14.50		17.50	
	142	5710		17.50			17.50			17.50		17.50		20.50	
802.11ac-VHT80 MCS0	106	5530		13.50			13.50			13.50		13.50		16.50	
	122	5610		13.50			13.50			13.50		13.50		16.50	
	138	5690		16.00			16.00			16.00		16.00		19.00	
	114	5570		11.00			11.00			11.00		11.00		14.00	
	100	5500		14.00			14.00			14.00		14.00		17.00	
802.11ac-VHT160 MCS0	116	5580		18.00			18.00			18.00		18.00		21.00	
	124	5620		18.00			18.00			18.00		18.00		21.00	
	132	5660		18.00			18.00			18.00		18.00		21.00	
	144	5720		18.00			18.00			18.00		18.00		21.00	
	102	5510		15.00			15.00			15.00		15.00		18.00	
802.11ax-HE20 MCS0	110	5550		17.90			17.90			17.90		17.90		20.90	
	126	5630		17.50			17.50			17.50		17.50		20.50	
	134	5670		14.50			14.50			14.50		14.50		17.50	
	142	5710		17.50			17.50			17.50		17.50		20.50	
	106	5530		13.50			13.50			13.50		13.50		16.50	
802.11ax-HE40 MCS0	122	5610		13.50			13.50			13.50		13.50		16.50	
	138	5690		16.00			16.00			16.00		16.00		19.00	
	114	5570		11.00			11.00			11.00		11.00		14.00	
	100	5500		14.00			14.00			14.00		14.00		17.00	
	116	5580		18.00			18.00			18.00		18.00		21.00	
802.11ax-HE80 MCS0	124	5620		18.00			18.00			18.00		18.00		21.00	
	132	5660		18.00			18.00			18.00		18.00		21.00	
	144	5720		18.00			18.00			18.00		18.00		21.00	
	102	5510		15.00			15.00			15.00		15.00		18.00	
	110	5550		17.90			17.90			17.90		17.90		20.90	
802.11ax-HE160 MCS0	126	5630		17.50			17.50			17.50		17.50		20.50	
	134	5670		14.50			14.50			14.50		14.50		17.50	
	142	5710		17.50			17.50			17.50		17.50		20.50	
	106	5530		13.50			13.50			13.50		13.50		16.50	
	122	5610		13.50			13.50			13.50		13.50		16.50	
802.11ax-HE160 MCS0	138	5690		16.00			16.00			16.00		16.00		19.00	
	114	5570		14.50			14.50			14.50		14.50		17.50	



5.8GHz WLAN				Ant 1			Ant 2			Ant 1+2(1)		Ant 1+2(2)		Ant 1+2		
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %	
802.11a 6Mbps	149	5745	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	18.50	18.40	18.50	21.46	21.50	99.25	
	157	5785		18.50					18.50	18.10	18.50	21.16	21.50			
	165	5825		18.50					18.50	18.50	18.50	21.46	21.50			
802.11n-HT20 MCS0	149	5745	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	21.50	Not Required	
	157	5785		18.50						18.50		18.50		21.50		
	165	5825		18.50						18.50		18.50		21.50		
802.11n-HT40 MCS0	151	5755	Not Required	17.50	Not Required	Not Required	18.50	Not Required	Not Required	17.50	Not Required	17.50	Not Required	20.50	Not Required	
	159	5795		18.00						18.00		18.00		21.00		
802.11ac-VHT20 MCS0	149	5745	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	21.50	Not Required	
	157	5785		18.50						18.50		18.50		21.50		
	165	5825		18.50						18.50		18.50		21.50		
802.11ac-VHT40 MCS0	151	5755	Not Required	18.00	Not Required	Not Required	18.50	Not Required	Not Required	18.00	Not Required	18.00	Not Required	21.00	Not Required	
	159	5795		18.00						18.00		18.00		21.00		
802.11ac-VHT80 MCS0	155	5775	Not Required	18.00	Not Required	Not Required	18.50	Not Required	Not Required	18.00	Not Required	18.00	Not Required	21.00	Not Required	
802.11ax-HE20 MCS0	149	5745		18.50						18.50		18.50		21.50		
	157	5785	18.50	18.50	18.50	21.50										
	165	5825	18.50	18.50	18.50	21.50										
802.11ax-HE40 MCS0	151	5755	Not Required	18.00	Not Required	Not Required	18.50	Not Required	Not Required	18.00	Not Required	18.00	Not Required	21.00	Not Required	
	159	5795		18.00						18.00		18.00		21.00		
802.11ax-HE80 MCS0	155	5775	Not Required	18.00	Not Required	Not Required	18.50	Not Required	Not Required	18.00	Not Required	18.00	Not Required	21.00	Not Required	



DBS

2.4GHz WLAN				Ant 1			Ant 2			Ant 1+2(1)		Ant 1+2(2)		Ant 1+2				
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %	
802.11b 1Mbps	1	2412	Not Required	18.50	Not Required	18.4	18.50	99.90	18.2	18.50	18.4	18.50	21.31	21.50	99.90			
	6	2437		18.50		18.4	18.50		18.2	18.50	18.3	18.50	21.26	21.50				
	11	2462		18.50		18.4	18.50		18.3	18.50	18.5	18.50	21.41	21.50				
802.11g 6Mbps	1	2412	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	18.50	Not Required	Not Required	Not Required	
	6	2437		18.50			18.50			18.50		18.50		18.50				18.50
	11	2462		18.50			18.50			18.50		18.50		18.50				18.50
802.11n-HT20 MCS0	1	2412	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	18.50	Not Required	Not Required	Not Required	
	6	2437		18.50			18.50			18.50		18.50		18.50				18.50
	11	2462		18.50			18.50			18.50		18.50		18.50				18.50
802.11n-HT40 MCS0	3	2422	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	18.50	Not Required	Not Required	Not Required	
	6	2437		18.50			18.50			18.50		18.50		18.50				18.50
	9	2452		18.50			18.50			18.50		18.50		18.50				18.50
802.11ac-VHT20 MCS0	1	2412	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	18.50	Not Required	Not Required	Not Required	
	6	2437		18.50			18.50			18.50		18.50		18.50				18.50
	11	2462		18.50			18.50			18.50		18.50		18.50				18.50
802.11ac-VHT40 MCS0	3	2422	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	18.50	Not Required	Not Required	Not Required	
	6	2437		18.50			18.50			18.50		18.50		18.50				18.50
	9	2452		18.50			18.50			18.50		18.50		18.50				18.50
802.11ax-HE20 MCS0	1	2412	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	18.50	Not Required	Not Required	Not Required	
	6	2437		18.50			18.50			18.50		18.50		18.50				18.50
	11	2462		18.50			18.50			18.50		18.50		18.50				18.50
802.11ax-HE40 MCS0	3	2422	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	18.50	Not Required	Not Required	Not Required	
	6	2437		18.50			18.50			18.50		18.50		18.50				18.50
	9	2452		18.50			18.50			18.50		18.50		18.50				18.50



5.2GHz WLAN				Ant 1			Ant 2			Ant 1+2(1)		Ant 1+2(2)		Ant 1+2		
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %	
802.11a 6Mbps	36	5180	Not Required	16.00	Not Required	Not Required	16.00	Not Required	Not Required	16.00	Not Required	16.00	Not Required	19.00	Not Required	
	40	5200		18.50			18.50			18.50		21.50				
	44	5220		18.50			18.50			18.50		21.50				
	48	5240		18.50			18.50			18.50		21.50				
802.11n-HT20 MCS0	36	5180	Not Required	17.50	Not Required	Not Required	17.50	Not Required	Not Required	17.50	Not Required	17.50	Not Required	20.50	Not Required	
	40	5200		18.50			18.50			18.50		21.50				
	44	5220		18.00			18.00			18.00		21.00				
	48	5240		18.50			18.50			18.50		21.50				
802.11n-HT40 MCS0	38	5190	Not Required	14.00	Not Required	Not Required	14.00	Not Required	Not Required	14.00	Not Required	14.00	Not Required	17.00	Not Required	
	46	5230		16.00			16.00			16.00		19.00				
802.11ac-VHT20 MCS0	36	5180	Not Required	17.50	Not Required	Not Required	17.50	Not Required	Not Required	17.50	Not Required	17.50	Not Required	20.50	Not Required	
	40	5200		18.50			18.50			18.50		21.50				
	44	5220		18.00			18.00			18.00		21.00				
	48	5240		18.50			18.50			18.50		21.50				
802.11ac-VHT40 MCS0	38	5190	Not Required	14.00	Not Required	Not Required	14.00	Not Required	Not Required	14.00	Not Required	14.00	Not Required	17.00	Not Required	
	46	5230		16.00			16.00			16.00		19.00				
802.11ac-VHT80 MCS0	42	5210	Not Required	13.50	Not Required	Not Required	13.50	Not Required	Not Required	13.50	Not Required	13.50	Not Required	16.50	Not Required	
802.11ax-HE20 MCS0	36	5180		17.50			17.50			17.50		21.50				
	40	5200	18.50	18.50	18.50	21.50										
	44	5220	18.00	18.00	18.00	21.00										
	48	5240	18.50	18.50	18.50	21.50										
802.11ax-HE40 MCS0	38	5190	Not Required	14.00	Not Required	Not Required	14.00	Not Required	Not Required	14.00	Not Required	14.00	Not Required	17.00	Not Required	
	46	5230		16.00			16.00			16.00		19.00				
802.11ax-HE80 MCS0	42	5210	Not Required	13.50	Not Required	Not Required	13.50	Not Required	Not Required	13.50	Not Required	13.50	Not Required	16.50	Not Required	



5.3GHz WLAN				Ant 1			Ant 2			Ant 1+2(1)		Ant 1+2(2)		Ant 1+2		
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %	
802.11a 6Mbps	52	5260	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.00	18.50	17.90	18.50	20.96	21.50	99.25	
	56	5280		18.50			18.50		18.20	18.50	17.90	18.50	21.06	21.50		
	60	5300		16.50			16.50		15.70	16.50	16.10	16.50	18.91	19.50		
	64	5320		16.50			16.50		15.80	16.50	15.90	16.50	18.86	19.50		
802.11n-HT20 MCS0	52	5260	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	21.50	Not Required	
	56	5280		18.50			18.50			18.50		18.50		21.50		
	60	5300		17.50			17.50			17.50		17.50		20.50		
	64	5320		16.00			16.00			16.00		16.00		19.00		
802.11n-HT40 MCS0	54	5270	Not Required	16.50	Not Required	Not Required	16.50	Not Required	Not Required	16.50	Not Required	16.50	Not Required	19.50	Not Required	
	62	5310		14.00			14.00			14.00		14.00		17.00		
802.11ac-VHT20 MCS0	52	5260	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	21.50	Not Required	
	56	5280		18.50			18.50			18.50		18.50		21.50		
	60	5300		16.00			16.00			16.00		16.00		19.00		
	64	5320		13.50			13.50			13.50		13.50		16.50		
802.11ac-VHT40 MCS0	54	5270	Not Required	16.00	Not Required	Not Required	16.00	Not Required	Not Required	16.00	Not Required	16.00	Not Required	19.00	Not Required	
	62	5310		14.00			14.00			14.00		14.00		17.00		
802.11ac-VHT80 MCS0	58	5290	Not Required	13.00	Not Required	Not Required	13.00	Not Required	Not Required	13.00	Not Required	13.00	Not Required	16.00	Not Required	
802.11ac-VHT160 MCS0	50	5250		13.00			13.00			13.00		13.00		16.00		
802.11ax-HE20 MCS0	52	5260	Not Required	18.50	Not Required	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	Not Required	21.50	Not Required	
	56	5280		18.50			18.50			18.50		18.50		21.50		
	60	5300		17.50			17.50			17.50		17.50		20.50		
	64	5320		16.00			16.00			16.00		16.00		19.00		
802.11ax-HE40 MCS0	54	5270	Not Required	16.00	Not Required	Not Required	16.00	Not Required	Not Required	16.00	Not Required	16.00	Not Required	19.00	Not Required	
	62	5310		14.00			14.00			14.00		14.00		17.00		
802.11ax-HE80 MCS0	58	5290	Not Required	13.00	Not Required	Not Required	13.00	Not Required	Not Required	13.00	Not Required	13.00	Not Required	16.00	Not Required	
802.11ax-HE160 MCS0	50	5250		11			11			11		11		14		



5.5GHz WLAN				Ant 1			Ant 2			Ant 1+2(1)		Ant 1+2(2)		Ant 1+2		Duty Cycle %
Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %	
802.11a 6Mbps	100	5500		17.50			17.50		17.20	17.50	17.00	17.50	20.11	20.50	99.20	
	116	5580		17.50			17.50		16.80	17.50	20.01	20.50				
	124	5620		17.50			17.50		16.80	17.50	20.01	20.50				
	132	5660		17.50			17.50		16.70	17.50	19.97	20.50				
	140	5700		16.50			16.50		17.30	16.50	20.36	19.50				
	144	5720		17.50			17.50		17.20	17.50	20.26	20.50				
802.11n-HT20 MCS0	100	5500		14.00			14.00			14.00		14.00		17.00		
	116	5580		17.50			17.50			17.50		17.50		20.50		
	124	5620		17.50			17.50			17.50		17.50		20.50		
	132	5660		17.50			17.50			17.50		17.50		20.50		
	140	5700		12.50			12.50			12.50		12.50		15.50		
	144	5720		17.50			17.50			17.50		17.50		20.50		
802.11n-HT40 MCS0	102	5510		15.00			15.00			15.00		15.00		18.00		
	110	5550		17.00			17.00			17.00		17.00		20.00		
	126	5630		15.50			15.50			15.50		15.50		18.50		
	134	5670		14.50			14.50			14.50		14.50		17.50		
	142	5710		15.50			15.50			15.50		15.50		18.50		
802.11ac-VHT20 MCS0	100	5500		14.00			14.00			14.00		14.00		17.00		
	116	5580		17.50			17.50			17.50		17.50		20.50		
	124	5620		17.50			17.50			17.50		17.50		20.50		
	132	5660		17.50			17.50			17.50		17.50		20.50		
	140	5700		12.50			12.50			12.50		12.50		15.50		
	144	5720		17.50			17.50			17.50		17.50		20.50		
802.11ac-VHT40 MCS0	102	5510	Not Required	15.00	Not Required	Not Required	15.00	Not Required		15.00		15.00		18.00		
	110	5550		17.00			17.00			17.00		17.00		20.00		
	126	5630		15.50			15.50			15.50		15.50		18.50		
	134	5670		14.50			14.50			14.50		14.50		17.50		
	142	5710		15.50			15.50			15.50		15.50		18.50		
802.11ac-VHT80 MCS0	106	5530		13.50			13.50			13.50		13.50		16.50		
	122	5610		13.50			13.50			13.50		13.50		16.50		
	138	5690		16.00			16.00			16.00		16.00		19.00		
	102	5510		15.00			15.00			15.00		15.00		18.00		
	110	5550		17.00			17.00			17.00		17.00		20.00		
802.11ac-VHT160 MCS0	106	5530		13.50			13.50			13.50		13.50		16.50		
	122	5610		13.50			13.50			13.50		13.50		16.50		
	138	5690		16.00			16.00			16.00		16.00		19.00		
	102	5510		15.00			15.00			15.00		15.00		18.00		
	110	5550		17.00			17.00			17.00		17.00		20.00		
802.11ax-HE20 MCS0	102	5510		15.00			15.00			15.00		15.00		18.00		
	110	5550		17.00			17.00			17.00		17.00		20.00		
	126	5630		15.50			15.50			15.50		15.50		18.50		
	134	5670		14.50			14.50			14.50		14.50		17.50		
	142	5710		15.50			15.50			15.50		15.50		18.50		
802.11ax-HE40 MCS0	102	5510		15.00			15.00			15.00		15.00		18.00		
	110	5550		17.00			17.00			17.00		17.00		20.00		
	126	5630		15.50			15.50			15.50		15.50		18.50		
	134	5670		14.50			14.50			14.50		14.50		17.50		
	142	5710		15.50			15.50			15.50		15.50		18.50		
802.11ax-HE80 MCS0	106	5530		13.50			13.50			13.50		13.50		16.50		
	122	5610		13.50			13.50			13.50		13.50		16.50		
	138	5690		16.00			16.00			16.00		16.00		19.00		
802.11ax-HE160 MCS0	114	5570		14.50			14.50			14.50		14.50		17.50		



5.8GHz WLAN				Ant 1+2(1)			Ant 1+2(2)			Ant 1+2						
5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
		802.11a 6Mbps	149	5745	Not Required	18.50	Not Required	Not Required	18.50	Not Required	18.50	18.50	18.40	18.50	21.46	21.50
157			5785	18.20							18.50	18.10	18.50	21.16	21.50	
165			5825	18.50							18.50	18.50	18.50	21.46	21.50	
802.11n-HT20 MCS0		149	5745	18.50							18.50	21.50	Not Required			
		157	5785	18.50							18.50	21.50				
		165	5825	18.50							18.50	21.50				
802.11n-HT40 MCS0		151	5755	17.50							17.50	20.50				
		159	5795	18.00							18.00	21.00				
802.11ac-VHT20 MCS0		149	5745	18.50							18.50	21.50				
		157	5785	18.50							18.50	21.50				
		165	5825	18.50							18.50	21.50				
802.11ac-VHT40 MCS0		151	5755	18.00							18.00	21.00				
		159	5795	18.00							18.00	21.00				
802.11ac-VHT80 MCS0		155	5775	17.00							17.00	20.00				
802.11ax-HE20 MCS0		149	5745	18.50							18.50	21.50				
		157	5785	18.50							18.50	21.50				
		165	5825	18.50							18.50	21.50				
802.11ax-HE40 MCS0		151	5755	18.00							18.00	21.00				
		159	5795	18.00							18.00	21.00				
802.11ax-HE80 MCS0		155	5775	17.50							17.50	20.50				



<Beamforming>
Non-DBS

	Mode	Channel	Frequency (MHz)	Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
				Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
2.4GHz WLAN	802.11ax-HE20 MCS0	1	2412	18.00	18.00	21.00
		6	2437	20.00	20.00	23.00
		11	2462	17.00	17.00	20.00
	802.11ax-HE40 MCS0	3	2422	17.00	17.00	20.00
		6	2437	17.00	17.00	20.00
		9	2452	15.00	15.00	18.00

	Mode	Channel	Frequency (MHz)	Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
				Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
5.2GHz WLAN	802.11ax-HE20 MCS0	36	5180	14.00	14.00	17.00
		40	5200	18.50	18.50	21.50
		44	5220	17.00	17.00	21.00
		48	5240	18.50	18.50	21.50
	802.11ax-HE40 MCS0	38	5190	14.00	14.00	17.00
		46	5230	16.00	16.00	19.00
	802.11ax-HE80 MCS0	42	5210	13.50	13.50	16.50

	Mode	Channel	Frequency (MHz)	Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
				Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
5.3GHz WLAN	802.11ax-HE20 MCS0	52	5260	18.50	18.50	21.50
		56	5280	18.50	18.50	21.50
		60	5300	16.50	16.50	19.50
		64	5320	13.50	13.50	16.50
	802.11ax-HE40 MCS0	54	5270	16.00	16.00	19.00
		62	5310	14.00	14.00	17.00
	802.11ax-HE80 MCS0	58	5290	14.00	14.00	17.00
	802.11ax-HE160 MCS0	50	5250	10	10.00	13.00



	Mode	Channel	Frequency (MHz)	Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
				Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
5.5GHz WLAN	802.11ax-HE20 MCS0	100	5500	14.00	14.00	17.00
		116	5580	18.00	18.00	21.00
		124	5620	18.00	18.00	21.00
		132	5660	18.00	18.00	21.00
		144	5720	18.00	18.00	21.00
	802.11ax-HE40 MCS0	102	5510	12.00	12.00	15.00
		110	5550	15.50	15.50	18.50
		126	5630	17.50	17.50	20.50
		134	5670	14.50	14.50	17.50
	802.11ax-HE80 MCS0	142	5710	17.50	17.50	20.50
		106	5530	13.50	13.50	16.50
		122	5610	13.50	13.50	16.50
	802.11ax-HE160 MCS0	138	5690	16.00	16.00	19.00
			114	5570	11.00	11.00

	Mode	Channel	Frequency (MHz)	Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
				Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
5.8GHz WLAN	802.11ax-HE20 MCS0	149	5745	18.00	18.00	21.00
		157	5785	18.00	18.00	21.00
		165	5825	18.00	18.00	21.00
	802.11ax-HE40 MCS0	151	5755	18.00	18.00	21.00
		159	5795	18.00	18.00	21.00
	802.11ax-HE80 MCS0	155	5775	18.00	18.00	21.00



DBS

2.4GHz WLAN	Mode	Channel	Frequency (MHz)	Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
				Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
802.11ax-HE20 MCS0		1	2412	18.00	18.00	21.00
		6	2437	18.50	18.50	21.50
		11	2462	17.00	17.00	20.00
802.11ax-HE40 MCS0		3	2422	17.00	17.00	20.00
		6	2437	17.00	17.00	20.00
		9	2452	15.00	15.00	18.00

5.2GHz WLAN	Mode	Channel	Frequency (MHz)	Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
				Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
802.11ax-HE20 MCS0		36	5180	14.00	14.00	17.00
		40	5200	18.50	18.50	21.50
		44	5220	17.00	17.00	20.00
		48	5240	18.50	18.50	21.50
802.11ax-HE40 MCS0		38	5190	13.00	13.00	16.00
		46	5230	16.00	16.00	19.00
802.11ax-HE80 MCS0		42	5210	13.00	13.00	16.00

5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
				Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
802.11ax-HE20 MCS0		52	5260	18.50	18.50	21.50
		56	5280	18.50	18.50	21.50
		60	5300	16.50	16.50	19.50
		64	5320	13.50	13.50	16.50
802.11ax-HE40 MCS0		54	5270	16.00	16.00	19.00
		62	5310	14.00	14.00	17.00
802.11ax-HE80 MCS0		58	5290	14.00	14.00	17.00
802.11ax-HE160 MCS0		50	5250	10	10.00	13.00



				Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
5.5GHz WLAN	Mode	Channel	Frequency (MHz)	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
	802.11ax-HE20 MCS0	100	5500	14.00	14.00	17.00
		116	5580	17.50	17.50	20.50
		124	5620	17.50	17.50	20.50
		132	5660	17.50	17.50	20.50
		144	5720	17.50	17.50	20.50
	802.11ax-HE40 MCS0	102	5510	13.00	13.00	16.00
		110	5550	15.50	15.50	18.50
		126	5630	17.50	17.50	20.50
		134	5670	14.50	14.50	17.50
142		5710	17.50	17.50	20.50	
802.11ax-HE80 MCS0	106	5530	13.50	13.50	16.50	
	122	5610	13.50	13.50	16.50	
	138	5690	16.00	16.00	19.00	
802.11ax-HE160 MCS0	114	5570	11.00	11.00	14.00	

				Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Tune-Up Limit	Tune-Up Limit	Tune-Up Limit
	802.11ax-HE20 MCS0	149	5745	18.00	18.00	21.00
		157	5785	18.00	18.00	21.00
		165	5825	18.00	18.00	21.00
	802.11ax-HE40 MCS0	151	5755	18.00	18.00	21.00
		159	5795	18.00	18.00	21.00
	802.11ax-HE80 MCS0	155	5775	18.00	18.00	20.50



12. Bluetooth Exclusions Applied

Mode Band	Max Average power(dBm)	
	BR/EDR	LE
2.4GHz Bluetooth	3	3

Note:

- Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

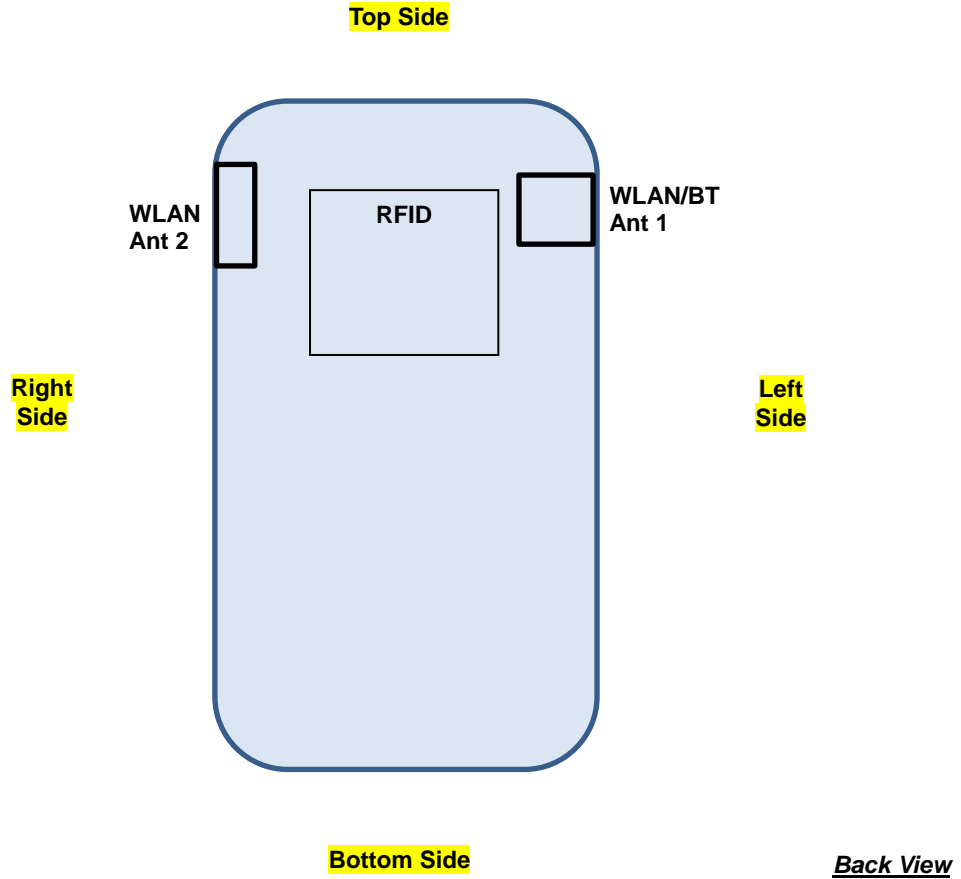
$$[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] \cdot [\sqrt{f(GHz)}] \leq 3.0$$
for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
 - f(GHz) is the RF channel transmit frequency in GHz
 - Power and distance are rounded to the nearest mW and mm before calculation
 - The result is rounded to one decimal place for comparison

Bluetooth Max Power (dBm)	Separation Distance (mm)	Frequency (GHz)	exclusion thresholds
3	< 5	2.48	0.630
3	10	2.48	0.315
3	15	2.48	0.210

Note:

Per KDB 447498 D01v06, when the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion. The test exclusion threshold is 0.63 which is ≤ 3, SAR testing is not required.

13. Antenna Location





14. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
 - c. For WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
 - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
 - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
5. Per KDB648474 D04v01r03, for smart phones with a display diagonal dimension > 15 cm or an overall diagonal dimension > 16 cm, when hotspot mode applies, 10-g product specific SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg
6. For 5GHz WLAN product specific SAR is necessary, due to an overall diagonal dimension is > 16 cm
7. Additional 2.4GHz ant2 SAR just for Sim-Tx with 5GHz and Bluetooth

WLAN Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per KDB 248227 D01v02r02, WLAN5.2GHz SAR testing is not required when the WLAN5.3GHz band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for WLAN5.2GHz band.
3. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode 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 report SAR is ≤ 0.8 W/kg or all required test position are tested.
4. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
5. For determination of the scaling factor for report SAR of MIMO mode, if the hot spots are separated the scaling factors are individually determined from each transmit chain. If the hot spots are not spatially separated, the scaling factor is determined from the worst number of each transmit chain.
6. During SAR testing the WLAN transmission was verified using a spectrum analyzer.



14.1 Head SAR

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Ant 1+2(1)	Non DBS	11	2462	Sample 2	19.70	20.00	1.072	99.9	1.001	0.11	0.649	0.696
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	0mm	Ant 1+2(1)	Non DBS	11	2462	Sample 2	19.70	20.00	1.072	99.9	1.001	0.16	0.622	0.667
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	11	2462	Sample 2	19.70	20.00	1.072	99.9	1.001	0.11	0.894	0.959
01	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	1	2412	Sample 2	19.50	20.00	1.122	99.9	1.001	-0.19	0.993	1.115
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1+2(1)	DBS	1	2412	Sample 2	18.20	18.50	1.072	99.9	1.001	-0.05	0.748	0.802
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	6	2437	Sample 2	19.70	20.00	1.072	99.9	1.001	0.01	0.984	1.055
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	Ant 1+2(1)	Non DBS	11	2462	Sample 2	19.70	20.00	1.072	99.9	1.001	-0.19	0.744	0.798
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	1	2412	Sample 1	19.50	20.00	1.122	99.9	1.001	0.08	0.986	1.107
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	6	2437	Sample 1	19.70	20.00	1.072	99.9	1.001	-0.16	0.879	0.943
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	11	2462	Sample 1	19.70	20.00	1.072	99.9	1.001	0.11	0.926	0.993
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	1	2412	Sample 3	19.50	20.00	1.122	99.9	1.001	0.09	0.966	1.085
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	6	2437	Sample 3	19.70	20.00	1.072	99.9	1.001	0	0.947	1.016
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	11	2462	Sample 3	19.70	20.00	1.072	99.9	1.001	0.12	0.917	0.984
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Ant 2	Non DBS	11	2462	Sample 2	19.90	20.00	1.023	99.9	1.001	-0.12	0.288	0.295
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	0mm	Ant 2	Non DBS	11	2462	Sample 2	19.90	20.00	1.023	99.9	1.001	0.14	0.216	0.221
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 2	Non DBS	11	2462	Sample 2	19.90	20.00	1.023	99.9	1.001	0.15	0.632	0.647
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 2	Non DBS	6	2437	Sample 2	19.90	20.00	1.023	99.9	1.001	0.06	0.622	0.637
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 2	Non DBS	1	2412	Sample 2	19.80	20.00	1.047	99.9	1.001	-0.1	0.651	0.682
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 2	DBS	1	2412	Sample 2	18.40	18.50	1.023	99.9	1.001	-0.01	0.370	0.379
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	Ant 2	Non DBS	11	2462	Sample 2	19.90	20.00	1.023	99.9	1.001	0.18	0.288	0.295
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 2	Non DBS	1	2412	Sample 1	19.80	20.00	1.047	99.9	1.001	0.13	0.611	0.640
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 2	Non DBS	1	2412	Sample 3	19.80	20.00	1.047	99.9	1.001	0.14	0.606	0.635
	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm	Ant 1+2(2)	Non DBS	56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	-0.06	0.311	0.360
	WLAN5GHz	802.11a 6Mbps	Right Tilted	0mm	Ant 1+2(2)	Non DBS	56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	-0.14	0.259	0.300
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(2)	Non DBS	56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	0.06	0.352	0.407
02	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(2)	Non DBS	52	5260	Sample 2	17.90	18.50	1.148	99.25	1.008	0.09	0.495	0.573
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	60	5300	Sample 2	15.70	16.50	1.202	99.25	1.008	-0.13	0.326	0.395
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	64	5320	Sample 2	15.80	16.50	1.175	99.25	1.008	-0.18	0.264	0.313
	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm	Ant 1+2(2)	Non DBS	56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	0	0.274	0.317
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(2)	Non DBS	52	5260	Sample 1	17.90	18.50	1.148	99.25	1.008	-0.16	0.487	0.564
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(2)	Non DBS	52	5260	Sample 3	17.90	18.50	1.148	99.25	1.008	-0.17	0.423	0.490
	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm	Ant 1+2(2)	Non DBS	116	5580	Sample 2	17.60	18.00	1.096	99.25	1.008	0.1	0.226	0.250
	WLAN5GHz	802.11a 6Mbps	Right Tilted	0mm	Ant 1+2(2)	Non DBS	116	5580	Sample 2	17.60	18.00	1.096	99.25	1.008	-0.18	0.201	0.222
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(2)	Non DBS	116	5580	Sample 2	17.60	18.00	1.096	99.25	1.008	0.09	0.588	0.650
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	100	5500	Sample 2	17.10	17.50	1.096	99.25	1.008	0.15	0.574	0.634
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(2)	Non DBS	124	5620	Sample 2	17.50	18.00	1.122	99.25	1.008	-0.14	0.568	0.642
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(2)	Non DBS	132	5660	Sample 2	17.50	18.00	1.122	99.25	1.008	-0.17	0.559	0.632
03	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	144	5720	Sample 2	17.90	18.00	1.023	99.25	1.008	-0.04	0.632	0.652
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(2)	DBS	144	5720	Sample 2	17.20	17.50	1.072	99.20	1.008	-0.05	0.467	0.504
	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm	Ant 1+2(2)	Non DBS	116	5580	Sample 2	17.60	18.00	1.096	99.25	1.008	0.19	0.244	0.270
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	144	5720	Sample 1	17.90	18.00	1.023	99.25	1.008	0.14	0.622	0.642
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	144	5720	Sample 3	17.90	18.00	1.023	99.25	1.008	0.16	0.618	0.637
	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm	Ant 1+2(2)	Non DBS	149	5745	Sample 2	18.40	18.50	1.023	99.25	1.008	0.02	0.244	0.252
	WLAN5GHz	802.11a 6Mbps	Right Tilted	0mm	Ant 1+2(2)	Non DBS	149	5745	Sample 2	18.40	18.50	1.023	99.25	1.008	0.13	0.189	0.195
04	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(2)	Non DBS	149	5745	Sample 2	18.40	18.50	1.023	99.25	1.008	-0.07	0.629	0.649
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(2)	Non DBS	157	5785	Sample 2	18.10	18.50	1.096	99.25	1.008	0.06	0.549	0.607
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(2)	Non DBS	165	5825	Sample 2	18.50	18.50	1.000	99.25	1.008	-0.11	0.611	0.616
	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm	Ant 1+2(2)	Non DBS	149	5745	Sample 2	18.40	18.50	1.023	99.25	1.008	0.13	0.226	0.233
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(2)	Non DBS	149	5745	Sample 1	18.40	18.50	1.023	99.25	1.008	0.14	0.623	0.643
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	Ant 1+2(2)	Non DBS	149	5745	Sample 3	18.40	18.50	1.023	99.25	1.008	-0.09	0.619	0.638



14.2 Hotspot SAR

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	Ant 1+2(1)	Non DBS	11	2462	Sample 2	19.70	20.00	1.072	99.9	1.001	0.11	0.374	0.401
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1+2(1)	Non DBS	11	2462	Sample 2	19.70	20.00	1.072	99.9	1.001	0.14	0.516	0.553
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1+2(1)	Non DBS	1	2412	Sample 2	19.50	20.00	1.122	99.9	1.001	0.02	0.874	0.982
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1+2(1)	Non DBS	6	2437	Sample 2	19.70	20.00	1.072	99.9	1.001	0.09	0.901	0.966
	WLAN2.4GHz	802.11b 1Mbps	Left Side	10mm	Ant 1+2(1)	Non DBS	11	2462	Sample 2	19.70	20.00	1.072	99.9	1.001	-0.1	0.411	0.441
	WLAN2.4GHz	802.11b 1Mbps	Right Side	10mm	Ant 1+2(1)	Non DBS	11	2462	Sample 2	19.70	20.00	1.072	99.9	1.001	-0.04	0.490	0.526
	WLAN2.4GHz	802.11b 1Mbps	Top Side	10mm	Ant 1+2(1)	Non DBS	11	2462	Sample 2	19.70	20.00	1.072	99.9	1.001	-0.02	0.410	0.440
05	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1+2(1)	Non DBS	11	2462	Sample 1	19.70	20.00	1.072	99.9	1.001	-0.02	0.929	0.996
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1+2(1)	Non DBS	1	2412	Sample 1	19.50	20.00	1.122	99.9	1.001	0.18	0.884	0.993
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1+2(1)	Non DBS	6	2437	Sample 1	19.70	20.00	1.072	99.9	1.001	-0.16	0.913	0.979
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1+2(1)	Non DBS	11	2462	Sample 3	19.70	20.00	1.072	99.9	1.001	-0.08	0.900	0.965
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1+2(1)	Non DBS	1	2412	Sample 3	19.50	20.00	1.122	99.9	1.001	-0.06	0.867	0.974
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 1+2(1)	Non DBS	6	2437	Sample 3	19.70	20.00	1.072	99.9	1.001	0.07	0.907	0.973



14.3 Body Worn Accessory SAR

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Holster	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
06	WLAN2.4GHz	802.11b 1Mbps	Front	15mm	Ant 1+2(1)	Non DBS		11	2462	Sample 2	19.70	20.00	1.072	99.9	1.001	0.01	0.254	0.272
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 1+2(1)	Non DBS		11	2462	Sample 2	19.70	20.00	1.072	99.9	1.001	0.1	0.465	0.499
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 1+2(1)	DBS		11	2462	Sample 2	18.30	18.50	1.047	99.9	1.001	0.08	0.298	0.312
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Ant 1+2(1)	Non DBS	Soft Holster	11	2462	Sample 2	19.70	20.00	1.072	99.9	1.001	0.19	0.268	0.287
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 1+2(1)	Non DBS		1	2412	Sample 2	19.50	20.00	1.122	99.9	1.001	0.16	0.434	0.487
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 1+2(1)	Non DBS		6	2437	Sample 2	19.70	20.00	1.072	99.9	1.001	-0.06	0.419	0.449
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 1+2(1)	Non DBS		11	2462	Sample 1	19.70	20.00	1.072	99.9	1.001	0.15	0.404	0.433
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 1+2(1)	Non DBS		11	2462	Sample 3	19.70	20.00	1.072	99.9	1.001	0.09	0.422	0.453
	WLAN2.4GHz	802.11b 1Mbps	Front	15mm	Ant 2	Non DBS		11	2462	Sample 2	19.90	20.00	1.023	99.9	1.001	-0.12	0.116	0.119
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 2	Non DBS		11	2462	Sample 2	19.90	20.00	1.023	99.9	1.001	0.14	0.199	0.204
07	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Ant 2	Non DBS	Soft Holster	11	2462	Sample 2	19.90	20.00	1.023	99.9	1.001	0.15	0.197	0.202
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 2	Non DBS		6	2437	Sample 2	19.90	20.00	1.023	99.9	1.001	-0.16	0.212	0.217
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 2	DBS		6	2437	Sample 2	18.40	18.50	1.023	99.9	1.001	-0.03	0.151	0.155
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 2	Non DBS		1	2412	Sample 2	19.80	20.00	1.047	99.9	1.001	0.06	0.188	0.197
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 2	Non DBS		6	2437	Sample 1	19.90	20.00	1.023	99.9	1.001	0.08	0.106	0.109
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 2	Non DBS		6	2437	Sample 3	19.90	20.00	1.023	99.9	1.001	-0.13	0.125	0.128
	WLAN5GHz	802.11a 6Mbps	Front	15mm	Ant 1+2(2)	Non DBS		56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	-0.08	0.115	0.133
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	0.12	0.715	0.827
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1+2(2)	Non DBS	Soft Holster	56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	-0.15	0.500	0.579
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		52	5260	Sample 2	17.90	18.50	1.148	99.25	1.008	-0.03	0.654	0.757
08	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(1)	Non DBS		60	5300	Sample 2	15.70	16.50	1.202	99.25	1.008	0.05	0.411	0.498
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(1)	Non DBS		64	5320	Sample 2	15.80	16.50	1.175	99.25	1.008	0.01	0.288	0.341
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		56	5280	Sample 1	17.90	18.50	1.148	99.25	1.008	-0.1	0.612	0.708
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		56	5280	Sample 3	17.90	18.50	1.148	99.25	1.008	0.12	0.677	0.784
	WLAN5GHz	802.11a 6Mbps	Front	15mm	Ant 1+2(2)	Non DBS		116	5580	Sample 2	17.60	18.00	1.096	99.25	1.008	-0.05	0.121	0.134
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		116	5580	Sample 2	17.60	18.00	1.096	99.25	1.008	-0.01	0.667	0.737
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	DBS		116	5580	Sample 2	16.80	17.50	1.175	99.2	1.008	-0.1	0.510	0.604
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1+2(2)	Non DBS	Soft Holster	116	5580	Sample 2	17.60	18.00	1.096	99.25	1.008	0.08	0.462	0.511
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(1)	Non DBS		100	5500	Sample 2	17.10	17.50	1.096	99.25	1.008	0.08	0.411	0.454
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		124	5620	Sample 2	17.50	18.00	1.122	99.25	1.008	0	0.499	0.564
09	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		132	5660	Sample 2	17.50	18.00	1.122	99.25	1.008	0.15	0.442	0.500
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(1)	Non DBS		144	5720	Sample 2	17.90	18.00	1.023	99.25	1.008	0.12	0.494	0.510
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		116	5580	Sample 1	17.60	18.00	1.096	99.25	1.008	-0.1	0.564	0.623
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		116	5580	Sample 3	17.60	18.00	1.096	99.25	1.008	-0.03	0.615	0.680
	WLAN5GHz	802.11a 6Mbps	Front	15mm	Ant 1+2(2)	Non DBS		149	5745	Sample 2	18.40	18.50	1.023	99.25	1.008	-0.08	0.135	0.139
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		149	5745	Sample 2	18.40	18.50	1.023	99.25	1.008	-0.1	0.428	0.441
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1+2(2)	Non DBS	Soft Holster	149	5745	Sample 2	18.40	18.50	1.023	99.25	1.008	-0.05	0.301	0.310
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		157	5785	Sample 2	18.10	18.50	1.096	99.25	1.008	0.04	0.365	0.403
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		165	5825	Sample 2	18.50	18.50	1.000	99.25	1.008	0.02	0.330	0.333
	WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		149	5745	Sample 1	18.40	18.50	1.023	99.25	1.008	0.19	0.312	0.322
WLAN5GHz	802.11a 6Mbps	Back	15mm	Ant 1+2(2)	Non DBS		149	5745	Sample 3	18.40	18.50	1.023	99.25	1.008	0.09	0.345	0.356	



14.4 Extremity SAR

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WLAN5GHz	802.11a 6Mbps	Front	0mm	Ant 1+2(2)	Non DBS	56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	0.01	0.104	0.120
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1+2(2)	Non DBS	56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	-0.18	0.711	0.823
	WLAN5GHz	802.11a 6Mbps	Left Side	0mm	Ant 1+2(2)	Non DBS	56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	0.08	1.210	1.400
10	WLAN5GHz	802.11a 6Mbps	Right side	0mm	Ant 1+2(2)	Non DBS	56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	-0.05	2.000	2.315
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	52	5260	Sample 2	17.90	18.50	1.148	99.25	1.008	0.16	1.810	2.095
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(1)	Non DBS	60	5300	Sample 2	15.70	16.50	1.202	99.25	1.008	0.02	1.240	1.503
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(1)	Non DBS	64	5320	Sample 2	15.80	16.50	1.175	99.25	1.008	0.02	0.796	0.943
	WLAN5GHz	802.11a 6Mbps	Top Side	0mm	Ant 1+2(2)	Non DBS	56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	0.01	0.211	0.244
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	56	5280	Sample 1	17.90	18.50	1.148	99.25	1.008	0.13	1.420	1.643
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	56	5280	Sample 3	17.90	18.50	1.148	99.25	1.008	-0.02	1.880	2.176
	WLAN5GHz	802.11a 6Mbps	Front	0mm	Ant 1+2(2)	Non DBS	116	5580	Sample 2	17.60	18.00	1.096	99.25	1.008	-0.01	0.144	0.159
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1+2(2)	Non DBS	116	5580	Sample 2	17.60	18.00	1.096	99.25	1.008	-0.14	0.832	0.920
	WLAN5GHz	802.11a 6Mbps	Left Side	0mm	Ant 1+2(2)	Non DBS	116	5580	Sample 2	17.60	18.00	1.096	99.25	1.008	-0.14	1.330	1.470
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	116	5580	Sample 2	17.60	18.00	1.096	99.25	1.008	-0.07	1.620	1.791
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(1)	Non DBS	100	5500	Sample 2	17.10	17.50	1.096	99.25	1.008	0.16	1.400	1.547
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	124	5620	Sample 2	17.50	18.00	1.122	99.25	1.008	0	1.880	2.126
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	132	5660	Sample 2	17.50	18.00	1.122	99.25	1.008	-0.13	2.320	2.624
11	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(1)	Non DBS	144	5720	Sample 2	17.90	18.00	1.023	99.25	1.008	-0.07	2.880	2.971
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	DBS	144	5720	Sample 2	17.20	17.50	1.072	99.2	1.008	-0.05	2.450	2.646
	WLAN5GHz	802.11a 6Mbps	Top Side	0mm	Ant 1+2(2)	Non DBS	116	5580	Sample 2	17.60	18.00	1.096	99.25	1.008	0.01	0.240	0.265
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(1)	Non DBS	144	5720	Sample 1	17.90	18.00	1.023	99.25	1.008	0.14	2.300	2.372
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(1)	Non DBS	100	5500	Sample 1	17.10	17.50	1.096	99.25	1.008	0.01	1.880	2.078
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	116	5580	Sample 1	17.60	18.00	1.096	99.25	1.008	-0.05	2.000	2.211
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	124	5620	Sample 1	17.50	18.00	1.122	99.25	1.008	0.12	1.710	1.934
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	132	5660	Sample 1	17.50	18.00	1.122	99.25	1.008	0.03	1.800	2.036
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(1)	Non DBS	144	5720	Sample 3	17.90	18.00	1.023	99.25	1.008	-0.16	2.510	2.589
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(1)	Non DBS	100	5500	Sample 3	17.10	17.50	1.096	99.25	1.008	0.12	1.690	1.868
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	116	5580	Sample 3	17.60	18.00	1.096	99.25	1.008	0.07	2.230	2.465
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	124	5620	Sample 3	17.50	18.00	1.122	99.25	1.008	0.09	2.120	2.398
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	132	5660	Sample 3	17.50	18.00	1.122	99.25	1.008	-0.08	2.030	2.296
	WLAN5GHz	802.11a 6Mbps	Front	0mm	Ant 1+2(2)	Non DBS	149	5745	Sample 2	18.40	18.50	1.023	99.25	1.008	-0.19	0.156	0.161
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Ant 1+2(2)	Non DBS	149	5745	Sample 2	18.40	18.50	1.023	99.25	1.008	0.16	0.831	0.857
	WLAN5GHz	802.11a 6Mbps	Left Side	0mm	Ant 1+2(2)	Non DBS	149	5745	Sample 2	18.40	18.50	1.023	99.25	1.008	0.01	1.320	1.362
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	149	5745	Sample 2	18.40	18.50	1.023	99.25	1.008	-0.13	2.100	2.166
12	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	157	5785	Sample 2	18.10	18.50	1.096	99.25	1.008	-0.13	2.520	2.785
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	165	5825	Sample 2	18.50	18.50	1.000	99.25	1.008	0.12	2.000	2.016
	WLAN5GHz	802.11a 6Mbps	Top Side	0mm	Ant 1+2(2)	Non DBS	149	5745	Sample 2	18.40	18.50	1.023	99.25	1.008	0.14	0.210	0.217
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	157	5785	Sample 1	18.10	18.50	1.096	99.25	1.008	-0.04	2.120	2.343
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	149	5745	Sample 1	18.40	18.50	1.023	99.25	1.008	0.11	1.890	1.949
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	165	5825	Sample 1	18.50	18.50	1.000	99.25	1.008	0.03	2.010	2.026
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	157	5785	Sample 3	18.10	18.50	1.096	99.25	1.008	0.02	2.330	2.575
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	149	5745	Sample 3	18.40	18.50	1.023	99.25	1.008	0.05	1.660	1.712
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	165	5825	Sample 3	18.50	18.50	1.000	99.25	1.008	-0.18	1.790	1.804



14.5 Repeated SAR Measurement

No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	1	2412	Sample 2	19.50	20.00	1.122	99.9	1.001	-0.19	0.993	-	1.115
2nd	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 1+2(1)	Non DBS	1	2412	Sample 2	19.50	20.00	1.122	99.9	1.001	0.1	0.956	1.039	1.074

No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Ratio	Reported 10g SAR (W/kg)
1st	WLAN5GHz	802.11a 6Mbps	Right side	0mm	Ant 1+2(2)	Non DBS	56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	-0.05	2.000	-	2.315
2nd	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	56	5280	Sample 2	17.90	18.50	1.148	99.25	1.008	0.05	1.910	1.05	2.211
1st	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(1)	Non DBS	144	5720	Sample 2	17.90	18.00	1.023	99.25	1.008	-0.07	2.880	-	2.971
2nd	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	144	5720	Sample 2	18.00	18.00	1.000	99.25	1.008	0.01	2.790	1.03	2.812
1st	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	157	5785	Sample 2	18.10	18.50	1.096	99.25	1.008	-0.13	2.520	-	2.785
2nd	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(2)	Non DBS	157	5785	Sample 2	18.10	18.50	1.096	99.25	1.008	0.05	2.480	1.02	2.741

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8W/kg$.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR $< 1.45W/kg$, only one repeated measurement is required.
3. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The ratio is the difference in percentage between original and repeated *measured* SAR.
5. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

15. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Head	Body-worn	Hotspot	Extremity
Non-DBS					
1.	2.4GHz WLAN Ant 1+2 (5GHz WLAN Rx)			Yes	
2.	2.4GHz WLAN Ant 2 + Bluetooth Ant 1	Yes	Yes		Yes
3.	5GHz WLAN Ant 1+2 + Bluetooth Ant 1	Yes	Yes		Yes
DBS					
4.	2.4GHz WLAN Ant 1+2 + 5GHz WLAN Ant 1+2	Yes	Yes		Yes
5.	2.4GHz WLAN Ant 2+ 5GHz WLAN Ant 1+2+ Bluetooth Ant 1	Yes	Yes		Yes

General Note:

1. The device 2.4GHz support hotspot operation via 5GHz receive signal, when the device 2.4GHz operate hotspot function that the Bluetooth cannot transmit with 2.4GHz WLAN
2. The Scaled SAR summation is calculated based on the same configuration and test position.
3. Only 2.4GHz WLAN support Hotspot mode.
4. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - i) Scalar SAR summation < 1.6W/kg.
 - ii) $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - iii) If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
5. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v06 based on the formula below.
 - i) $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})} / x] \text{ W/kg}$ for test separation distances $\leq 50 \text{ mm}$; where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
 - ii) When the minimum separation distance is < 5mm, the distance is used 5mm to determine SAR test exclusion.
 - iii) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Bluetooth Max Power	Exposure Position	Head 1g SAR (W/kg)	Body-worn 1g SAR (W/kg)	Extremity 10g SAR (W/kg)
	Test separation	5 mm	15 mm	5 mm
3.0 dBm	Estimated SAR (W/kg)	0.084 W/kg	0.028 W/kg	0.21 W/kg



15.1 Head Exposure Conditions

Non DBS/ DBS	Exposure Position	1	2	3	4	2+3 Summed 1g SAR (W/kg)	1+3+4 Summed 1g SAR (W/kg)	3+4 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
		WLAN2.4GHz Ant 2 1g SAR (W/kg)	WLAN2.4GHz Ant 1+2 1g SAR (W/kg)	WLAN5GHz Ant 1+2 1g SAR (W/kg)	Bluetooth Ant 1 Estimated 1g SAR (W/kg)				
Non DBS	Right Cheek	0.295	0.696	0.360	0.084			0.444	0.379
	Right Tilted	0.221	0.667	0.300	0.084			0.384	0.305
	Left Cheek	0.682	1.115	0.652	0.084			0.736	0.766
	Left Tilted	0.295	0.798	0.317	0.084			0.401	0.379
DBS	Left Cheek	0.379	0.802	0.649	0.084	1.451	1.112		

15.2 Hotspot Exposure Conditions

Non DBS/ DBS	Exposure Position	1	2	3	4	2+3 Summed 1g SAR (W/kg)	1+3+4 Summed 1g SAR (W/kg)	3+4 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
		WLAN2.4GHz Ant 2 1g SAR (W/kg)	WLAN2.4GHz Ant 1+2 1g SAR (W/kg)	WLAN5GHz Ant 1+2 1g SAR (W/kg)	Bluetooth Ant 1 Estimated 1g SAR (W/kg)				
Non DBS	Front		0.401					0.000	0.000
	Back		0.996					0.000	0.000
	Left side		0.441					0.000	0.000
	Right side		0.526					0.000	0.000
	Top side		0.440				0.440	0.000	

15.3 Body-Worn Accessory Exposure Conditions

Non DBS/ DBS	Exposure Position	1	2	3	4	2+3 Summed 1g SAR (W/kg)	1+3+4 Summed 1g SAR (W/kg)	3+4 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
		WLAN2.4GHz Ant 2 1g SAR (W/kg)	WLAN2.4GHz Ant 1+2 1g SAR (W/kg)	WLAN5GHz Ant 1+2 1g SAR (W/kg)	Bluetooth Ant 1 Estimated 1g SAR (W/kg)				
Non DBS	Front	0.119	0.272	0.139	0.028			0.167	0.147
	Back	0.217	0.499	0.827	0.028			0.855	0.245
	Back at 0mm Soft Holster	0.202	0.287	0.579	0.084			0.663	0.286
DBS	Back	0.155	0.312	0.827	0.028	1.139	1.010		

15.4 Extremity Exposure Conditions

Non DBS/ DBS	Exposure Position	1	2	3	4	2+3 Summed 10g SAR (W/kg)	1+3+4 Summed 10g SAR (W/kg)	3+4 Summed 10g SAR (W/kg)
		WLAN2.4GHz Ant 2 10g SAR (W/kg)	WLAN2.4GHz Ant 1+2 10g SAR (W/kg)	WLAN5GHz Ant 1+2 10g SAR (W/kg)	Bluetooth Ant 1 Estimated 10g SAR (W/kg)			
Non DBS	Front			0.161	0.210			0.371
	Back			0.920	0.210			1.130
	Left side			1.470	0.210			1.680
	Right side			2.971	0.210			3.181
	Top side			0.265	0.210			0.475
DBS	Right side			2.785	0.210	2.785	2.995	

Test Engineer : Bevis Chang and Ken Li



16. Uncertainty Assessment

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be $\leq 30\%$, for a confidence interval of $k = 2$. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg. Therefore, the measurement uncertainty table is not required in this report.

Declaration of Conformity:

The test results with all measurement uncertainty excluded is presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

17. References

- [1] FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"
- [2] ANSI/IEEE Std. C95.1-1992, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", September 1992
- [3] IEEE Std. 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", Sep 2013
- [4] SPEAG DASY System Handbook
- [5] FCC KDB 248227 D01 v02r02, "SAR Guidance for IEEE 802.11 (WiFi) Transmitters", Oct 2015.
- [6] FCC KDB 447498 D01 v06, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", Oct 2015
- [7] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [8] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.
- [9] IEC/IEEE 62209-1528:2020, "Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Part 1528: Human models, instrumentation, and procedures (Frequency range of 4 MHz to 10 GHz)", Oct. 2020
- [10] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [11] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.