FCC SAR TEST REPORT

FCC ID	:	**A5M-QCNFA725**
Equipment	:	**WiFi 6E BT 5.2 M.2 1418 Module**
Brand Name	:	**Qualcomm**
Model Name	:	**QCNFA725**
Applicant	:	**Qualcomm Technologies, Inc. 5775 Morehouse Drive, San Diego, CA 92121-1714**
Manufacturer	:	**Lenovo PC HK Limited. 23/F, Lincoln House, Taikoo Place, 979 King's Road, Quarry Bay, Hong Kong, China**
Standard	:	**FCC 47 CFR Part 2 (2.1093)**

Equipment: Qualcomm QCNFA725 tested inside of Lenovo Notebook Computer.

The product was received on Feb. 08, 2022 and testing was started from Mar. 02, 2022 and completed on Mar. 03, 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. Laboratory, the test report shall not be reproduced except in full.

Approved by: Cona Huang / Deputy Manager

Sporton International Inc. EMC & Wireless Communications Laboratory

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History of this test report

Report No.	Version	Description	Issued Date
FA211805-02	01	Initial issue of report	Apr. 07, 2022

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Qualcomm Technologies, Inc., WiFi 6E BT 5.2 M.2 1418 Module, QCNFA725, are as follows.

Equipment Class	Frequency Band		Highest SAR Summary Body (Separation 0mm) 1g SAR (W/kg)	Highest Simultaneous Transmission 1g SAR (W/kg)
DTS	WLAN	2.4GHz WLAN	0.54	0.87
NII		5GHz WLAN	1.20	1.22
6CD		6GHz WLAN	0.73	1.22
DSS	2.4GHz Band	Bluetooth	0.02	1.22

Equipment Class	Frequency Band		Reported SAR Body 1g SAR (W/kg)	Measured APD Body (W/m^2)	Reported PD Body (W/m^2)
6CD	WLAN	6GHz WLAN	0.73	5.00	5.88
Date of Testing:			2022/3/2 ~ 2022/3/3		

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) specified in FCC 47 CFR part 2 (2.1093), Human Exposure to RF Radiation Limits (1.0 mW/cm^2=10 W/m^2) specified in FCC 47 CFR part 1.1310 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: Carlie Tsai

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
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02
- IEC/IEEE 62209-1528:2020
- SPEAG DASY6 System Handbook
- SPEAG DASY6 Application Note (Interim Procedure for Device Operation at 6GHz-10GHz)

3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	WiFi 6E BT 5.2 M.2 1418 Module
Brand Name	Qualcomm
Model Name	QCNFA725
FCC ID	A5M-QCNFA725
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 WLAN 6E: 5925 MHz ~ 6425 MHz, 6425 MHz ~ 6525 MHz, 6525 MHz ~ 6875 MHz, 6875 MHz ~ 7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Mode	WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE
Remark: 1. The device support DBS (Dual Band Simultaneous) function, when the device 2.4GHz and 5/6GHz transmit at the same time the module will reduce output power 3dB for simultaneous transmission compliance. For RF exposure is spot check each band worst case from non-DBS mode to ensure Sim-Tx SAR compliance when the DBS mode active.	

Host Information	
Equipment Name	Notebook Computer
Brand Name	Lenovo
Model Name	TP00132B
Integrate NFC Module	Brand Name: Foxconn Model Name: T77H747
Wireless Technology and Frequency Range	NFC: 13.56 MHz
Mode	NFC: ASK
EUT Stage	Production Unit
Remark: 1. This device has NFC operations, the NFC antenna is integrated into the device for this model, therefore, all SAR test were performed with the device which already incorporates the NFC antenna. A diagram showing the location of the antenna can be found in the operational description. 2. 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.	

Antenna Information					
Antenna 1	Manufacturer	AVX/Ethertronics			
	Antenna Type	PIFA Antenna		PIFA Antenna	
	Part number	025.901TE.0001		025.901TE.0001	
	Peak gain (dbi)	Main Antenna :		Aux Antenna :	
		2400-2500MHz	1.88 dBi	2400-2500MHz/BT	1.89 dBi
		5150-5250MHz	1.59 dBi	5150-5250MHz	1.89 dBi
		5250-5350MHz	1.62 dBi	5250-5350MHz	1.89 dBi
		5470-5725MHz	1.91 dBi	5470-5725MHz	1.87 dBi
		5725-5850MHz	1.91 dBi	5725-5850MHz	1.87 dBi
		5925-6425MHz	1.96 dBi	5925-6425MHz	1.88 dBi
		6425-6525MHz	1.64 dBi	6425-6525MHz	1.42 dBi
		6525-6875MHz	1.7 dBi	6525-6875MHz	1.77 dBi
		6875-7125MHz	1.7 dBi	6875-7125MHz	1.77 dBi
Antenna 2	Manufacturer	Speed			
	Antenna Type	PIFA Antenna		PIFA Antenna	
	Part number	025.901TJ.0001		025.901TJ.0001	
	Peak gain (dbi)	Main Antenna :		Aux Antenna :	
		2400-2500MHz	2.63 dBi	2400-2500MHz/BT	2.5 dBi
		5150-5250MHz	2.33 dBi	5150-5250MHz	2.52 dBi
		5250-5350MHz	1.97 dBi	5250-5350MHz	2.9 dBi
		5470-5725MHz	3.46 dBi	5470-5725MHz	2.67 dBi
		5725-5850MHz	3.87 dBi	5725-5850MHz	2.67 dBi
		5925-6425MHz	3.71 dBi	5925-6425MHz	1.56 dBi
		6425-6525MHz	3.88 dBi	6425-6525MHz	0.28 dBi
		6525-6875MHz	3.95 dBi	6525-6875MHz	2.06 dBi
		6875-7125MHz	1.34 dBi	6875-7125MHz	2.47 dBi

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.

4.3 RF Exposure limit for above 6GHz

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Peak Spatially Averaged Power Density was evaluated over a circular area of 4cm^2 per interim FCC Guidance for near-field power density evaluations per October 2018 TCB Workshop notes

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

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:

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

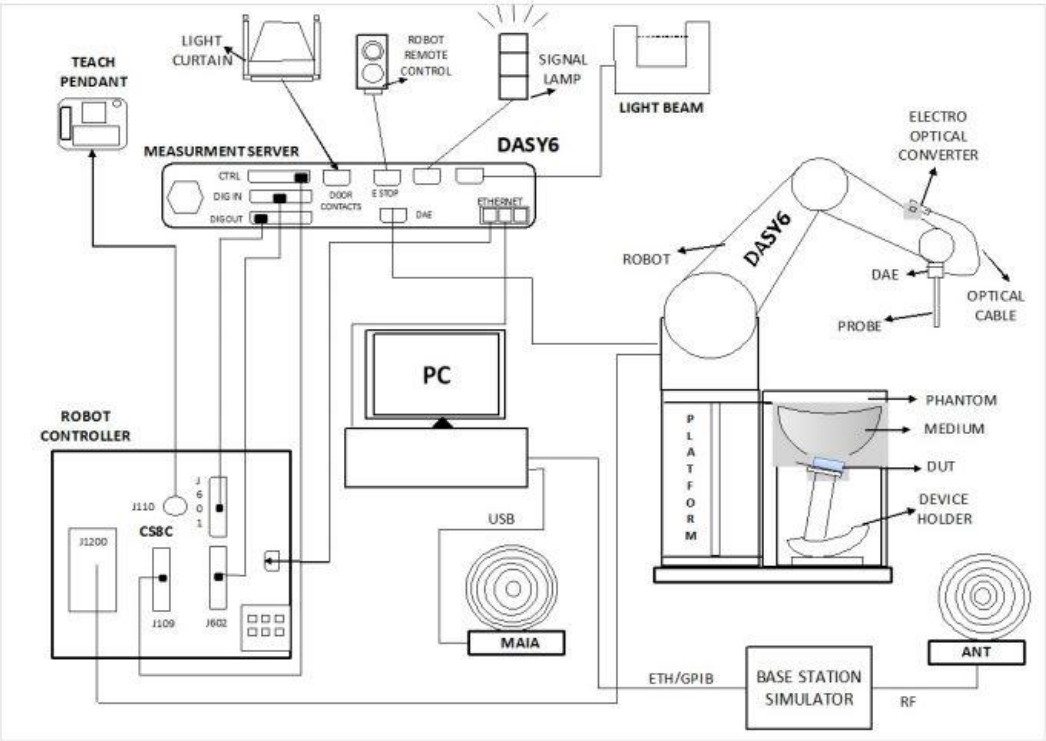
SAR is expressed in units of Watts per kilogram (W/kg)

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

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 µW/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 µW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 µW/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)

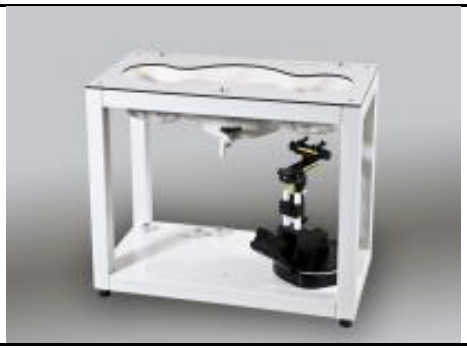
The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an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

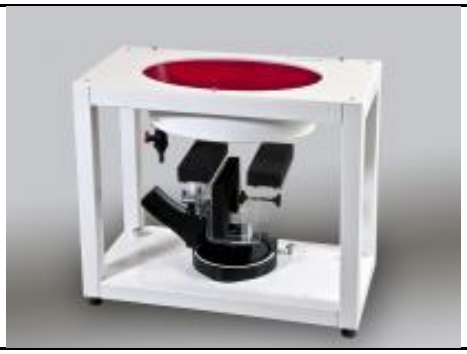
6.4 Phantom

<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 form 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	½·δ·ln(2) ± 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: Δx_{Area}, Δy_{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: Δx_{Zoom}, Δy_{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 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: 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 *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

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	5GHz System Validation Kit	D5GHzV2	1006	Sep. 15, 2021	Sep. 14, 2022
SPEAG	6500MHz System Validation Kit	D6.5GHzV2	1003	Sep. 24, 2021	Sep. 23, 2022
SPEAG	5G Verification Source	10 GHz	1020	Jan. 18, 2022	Jan. 17, 2023
SPEAG	EUmmWV Probe Tip Protection	EUmmWV4	9461	Oct. 22, 2021	Oct. 21, 2022
SPEAG	Data Acquisition Electronics	DAE4	376	Nov. 22, 2021	Nov. 21, 2022
SPEAG	Data Acquisition Electronics	DAE4	854	Aug. 19, 2021	Aug. 18, 2022
SPEAG	Dosimetric E-Field Probe	EX3DV4	3642	Apr. 26, 2021	Apr. 25, 2022
SPEAG	Dosimetric E-Field Probe	EX3DV4	7625	Jan. 27, 2022	Jan. 26, 2023
RCPTWN	Thermometer	HTC-1	TM685-1	Oct. 28, 2021	Oct. 27, 2022
RCPTWN	Thermometer	HTC-1	TM560-2	Oct. 28, 2021	Oct. 27, 2022
R&S	BT Base Station	CBT32	101136	Oct. 17, 2021	Oct. 16, 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	N9010A	MY53470118	Jan. 12, 2022	Jan. 11, 2023
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℃ to 25℃, 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℃ to 25℃ and within ± 2℃ 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. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
2450	22.7	1.799	39.126	1.80	39.20	-0.06	-0.19	±5	2022/3/3
5250	22.7	4.623	36.933	4.71	35.95	-1.85	2.73	±5	2022/3/2
5600	22.7	4.969	36.492	5.07	35.50	-1.99	2.79	±5	2022/3/2
5750	22.7	5.131	36.290	5.22	35.35	-1.70	2.66	±5	2022/3/2
6500	22.5	6.150	35.700	6.07	34.50	1.32	3.48	±5	2022/3/3

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	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
SAR05	2022/3/3	2450	50	D2450V2-736	EX3DV4 - SN7625	DAE4 Sn376	2.46	54.20	49.2	-9.23
SAR05	2022/3/2	5250	50	D5GHzV2-1006-5250	EX3DV4 - SN7625	DAE4 Sn376	3.83	81.70	76.6	-6.24
SAR05	2022/3/2	5600	50	D5GHzV2-1006-5600	EX3DV4 - SN7625	DAE4 Sn376	3.95	85.10	79	-7.17
SAR05	2022/3/2	5750	50	D5GHzV2-1006-5750	EX3DV4 - SN7625	DAE4 Sn376	3.69	81.40	73.8	-9.34
SAR01	2022/3/3	6500	100	D6.5GHzV2-1003	EX3DV4 - SN3642	DAE4 Sn854	27.30	292.00	273	-6.51

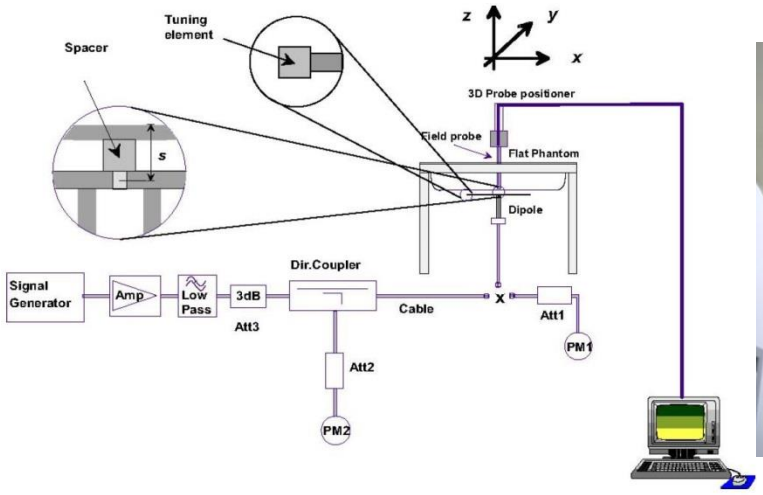


Fig 8.3.1 System Performance Check Setup

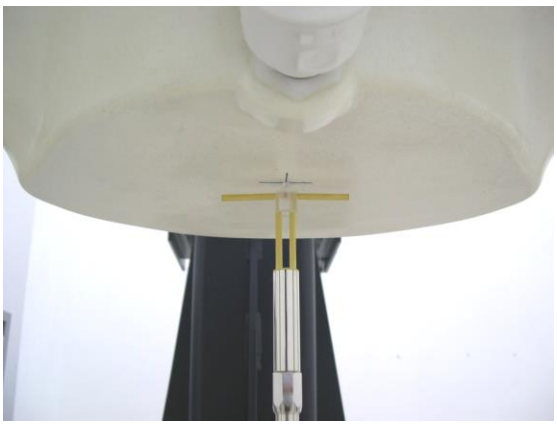


Fig 8.3.2 Setup Photo

9.3 PD System Performance Check Results

The system was verified to be within ±0.66 dB of the power density targets on the calibration certificate according to the test system specification in the user's manual and calibration facility recommendation. The 0.66 dB deviation threshold represents the expanded uncertainty for system performance checks using SPEAG's mmWave verification sources. The same spatial resolution and measurement region used in the source calibration was applied during the system check. The measured power density distribution of verification source was also confirmed through visual inspection to have no noticeable differences, both spatially (shape) and numerically (level) from the distribution provided by the manufacturer, per November 2017 TCBC Workshop Notes.

Test Location	Frequency (GHz)	5G Verification Source	Probe S/N	DAE S/N	Distance (mm)	Measured 4 cm^2 (W/m^2)	Targeted 4 cm^2 (W/m^2)	Deviation (dB)	Date
SAR06	10G	10GHz_1020	EUmmWV4 - SN9461	DAE4 Sn854	10mm	43.8	42.2	0.16	2022/03/03

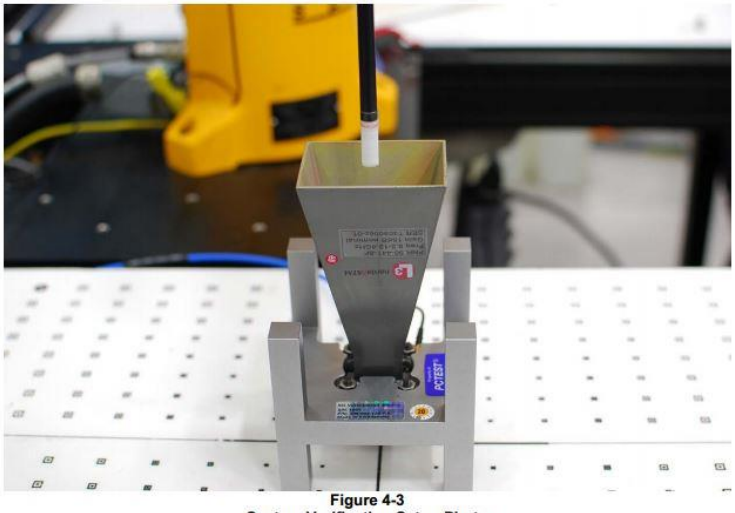


Figure 4-3
System Verification Setup Photo

System Performance Check Setup

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

General Note:

1. The device supports SP mode for UNII 5 and 7, and supports LPI mode for UNII 5, 6, 7 and 8, for RF exposure is selected SP mode for UNII 5 and 7 due to it is higher power than LPI mode; selected LPI mode for UNII 6 and 8 to be tested.
2. All of the wireless technology of this device only supports MIMO mode operation.
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 ≤ 0.4 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 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.
   c. 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.
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-DBS>

2.4GHz WLAN

2.4GHz WLAN				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	18.20	18.50	18.10	18.50	21.16	21.50	98.10
		6	2437	19.10	19.50	19.20	19.50	22.16	22.50	
		11	2462	18.60	19.00	18.70	19.00	21.66	22.00	
		12	2467	16.40	16.50	16.40	16.50	19.41	19.50	
		13	2472	12.90	13.00	12.50	13.00	15.71	16.00	
	802.11g 6Mbps	1	2412	Not required	16.00	Not required	16.00	Not required	19.00	Not required
		6	2437		19.50		19.50		22.50	
		11	2462		16.50		16.50		19.50	
		12	2467		15.00		15.00		18.00	
		13	2472		3.00		3.00		6.00	
	802.11n-HT20 MCS0	1	2412		15.00		15.00		18.00	
		6	2437		19.50		19.50		22.50	
		11	2462		15.50		15.50		18.50	
		12	2467		15.00		15.00		18.00	
		13	2472		2.00		2.00		5.00	
	802.11n-HT40 MCS0	3	2422		15.50		15.50		18.50	
		6	2437		17.00		17.00		20.00	
		9	2452		14.50		14.50		17.50	
		10	2457		14.00		14.00		17.00	
		11	2462		2.50		2.50		5.50	
	802.11ac-VHT20 MCS0	1	2412		15.00		15.00		18.00	
		6	2437		19.50		19.50		22.50	
		11	2462		15.50		15.50		18.50	
		12	2467		15.00		15.00		18.00	
		13	2472		2.00		2.00		5.00	
	802.11ac-VHT40 MCS0	3	2422		15.50		15.50		18.50	
		6	2437		17.00		17.00		20.00	
		9	2452		14.50		14.50		17.50	
		10	2457		14.00		14.00		17.00	
		11	2462		2.50		2.50		5.50	
	802.11ax-HE20 MCS0	1	2412		15.00		15.00		18.00	
		6	2437		19.50		19.50		22.50	
		11	2462		15.50		15.50		18.50	
		12	2467		15.00		15.00		18.00	
		13	2472		2.00		2.00		5.00	
	802.11ax-HE40 MCS0	3	2422		15.50		15.50		18.50	
		6	2437		17.00		17.00		20.00	
		9	2452		14.50		14.50		17.50	
		10	2457		14.00		14.00		17.00	
		11	2462		2.50		2.50		5.50	

5GHz WLAN

5.2GHz WLAN				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	Not required	13.50	Not required	13.50	Not required	16.50	Not required
		40	5200		13.50		13.50		16.50	
		44	5220		13.50		13.50		16.50	
		48	5240		13.50		13.50		16.50	
	802.11n-HT20 MCS0	36	5180		14.00		14.00		17.00	
		40	5200		14.00		14.00		17.00	
		44	5220		14.00		14.00		17.00	
		48	5240		14.00		14.00		17.00	
	802.11n-HT40 MCS0	38	5190		15.00		15.00		18.00	
		46	5230		15.00		15.00		18.00	
	802.11ac-VHT20 MCS0	36	5180		14.00		14.00		17.00	
		40	5200		14.00		14.00		17.00	
		44	5220		14.00		14.00		17.00	
		48	5240		14.00		14.00		17.00	
	802.11ac-VHT40 MCS0	38	5190		15.00		15.00		18.00	
		46	5230		15.00		15.00		18.00	
	802.11ac-VHT80 MCS0	42	5210		14.00		14.00		17.00	
	802.11ax-HE20 MCS0	36	5180		14.00		14.00		17.00	
		40	5200		14.00		14.00		17.00	
		44	5220		14.00		14.00		17.00	
		48	5240		14.00		14.00		17.00	
	802.11ax-HE40 MCS0	38	5190		15.00		15.00		18.00	
		46	5230		15.00		15.00		18.00	
	802.11ax-HE80 MCS0	42	5210		14.00		14.00		17.00	

5.3GHz WLAN				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	18.90	19.00	18.50	19.00	21.71	22.00	99.10
		56	5280	18.90	19.00	18.30	19.00	21.62	22.00	
		60	5300	18.90	19.00	18.10	19.00	21.53	22.00	
		64	5320	18.40	18.50	17.40	18.50	20.94	21.50	
	802.11n-HT20 MCS0	52	5260	Not required	17.50	Not required	17.50	Not required	20.50	Not required
		56	5280		17.50		17.50		20.50	
		60	5300		17.50		17.50		20.50	
		64	5320		17.50		17.50		20.50	
	802.11n-HT40 MCS0	54	5270		17.00		17.00		20.00	
		62	5310		16.50		16.50		19.50	
	802.11ac-VHT20 MCS0	52	5260		17.50		17.50		20.50	
		56	5280		17.50		17.50		20.50	
		60	5300		17.50		17.50		20.50	
		64	5320		17.50		17.50		20.50	
	802.11ac-VHT40 MCS0	54	5270		17.00		17.00		20.00	
		62	5310		16.50		16.50		19.50	
	802.11ac-VHT80 MCS0	58	5290		16.00		16.00		19.00	
	802.11ac-VHT160 MCS0	50	5250		14.00		14.00		17.00	
	802.11ax-HE20 MCS0	52	5260		17.50		17.50		20.50	
		56	5280		17.50		17.50		20.50	
		60	5300		17.50		17.50		20.50	
		64	5320		17.50		17.50		20.50	
	802.11ax-HE40 MCS0	54	5270		17.00		17.00		20.00	
		62	5310		16.50		16.50		19.50	
	802.11ax-HE80 MCS0	58	5290		16.00		16.00		19.00	
	802.11ax-HE160 MCS0	50	5250		14.00		14.00		17.00	

5.5GHz WLAN				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	17.90	18.00	17.10	18.00	20.53	21.00	99.10
		116	5580	18.60	19.00	17.60	19.00	21.14	22.00	
		124	5620	18.90	19.00	17.70	19.00	21.35	22.00	
		132	5660	18.90	19.00	18.50	19.00	21.71	22.00	
		144	5720	18.80	19.00	17.80	19.00	21.34	22.00	
	802.11n-HT20 MCS0	100	5500	Not required	16.50	Not required	16.50	Not required	19.50	Not required
		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	
	802.11n-HT40 MCS0	102	5510		16.00		16.00		19.00	
		110	5550		17.00		17.00		20.00	
		126	5630		17.00		17.00		20.00	
		134	5670		17.00		17.00		20.00	
		142	5710		17.00		17.00		20.00	
	802.11ac-VHT20 MCS0	100	5500		16.50		16.50		19.50	
		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	
	802.11ac-VHT40 MCS0	102	5510		16.00		16.00		19.00	
		110	5550		17.00		17.00		20.00	
		126	5630		17.00		17.00		20.00	
		134	5670		17.00		17.00		20.00	
		142	5710		17.00		17.00		20.00	
	802.11ac-VHT80 MCS0	106	5530		15.50		15.50		18.50	
		122	5610		16.50		16.50		19.50	
		138	5690		16.50		16.50		19.50	
	802.11ac-VHT160 MCS0	114	5570		15.00		15.00		18.00	
	802.11ax-HE20 MCS0	100	5500		16.50		16.50		19.50	
		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		16.00		16.00		19.00	
		110	5550		17.00		17.00		20.00	
		126	5630		17.00		17.00		20.00	
		134	5670		17.00		17.00		20.00	
		142	5710		17.00		17.00		20.00	
	802.11ax-HE80 MCS0	106	5530		15.50		15.50		18.50	
		122	5610		16.50		16.50		19.50	
		138	5690		16.50		16.50		19.50	
	802.11ax-HE160 MCS0	114	5570		15.00		15.00		18.00	

5.8GHz WLAN				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	17.50	18.00	16.80	18.00	20.22	21.00	99.10
		157	5785	17.50	18.00	16.70	18.00	20.18	21.00	
		165	5825	17.40	18.00	17.00	18.00	20.21	21.00	
	802.11n-HT20 MCS0	149	5745	Not required	17.50	Not required	17.50	Not required	20.50	Not required
		157	5785		17.50		17.50		20.50	
		165	5825		17.50		17.50		20.50	
	802.11n-HT40 MCS0	151	5755		17.00		17.00		20.00	
		159	5795		17.00		17.00		20.00	
	802.11ac-VHT20 MCS0	149	5745		17.50		17.50		20.50	
		157	5785		17.50		17.50		20.50	
		165	5825		17.50		17.50		20.50	
	802.11ac-VHT40 MCS0	151	5755		17.00		17.00		20.00	
		159	5795		17.00		17.00		20.00	
	802.11ac-VHT80 MCS0	155	5775		16.50		16.50		19.50	
	802.11ax-HE20 MCS0	149	5745		17.50		17.50		20.50	
		157	5785		17.50		17.50		20.50	
		165	5825		17.50		17.50		20.50	
	802.11ax-HE40 MCS0	151	5755		17.00		17.00		20.00	
		159	5795		17.00		17.00		20.00	
	802.11ax-HE80 MCS0	155	5775		16.50		16.50		19.50	

6GHz WLAN (SP Mode)

WiFi 6E				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit (dBm)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit (dBm)	Duty Cycle %
WiFi 6E	802.11a 6Mbps	1	5955	15.80	16.00	14.90	16.00	18.38	19.00	98.20
		57	6235	16.00	16.00	14.60	16.00	18.37	19.00	
		173	6815	15.90	16.00	14.20	16.00	18.14	19.00	
	802.11ax-HE20 MCS0	1	5955	Not required	16.00	Not required	16.00	Not required	19.00	Not required
		57	6235		16.00		16.00		19.00	
		173	6815	Not required	16.00	Not required	16.00	Not required	19.00	
	802.11ax-HE40 MCS0	3	5965	Not required	15.50	Not required	15.50	Not required	18.50	
		59	6245		15.50		15.50		18.50	
		171	6805	Not required	15.50	Not required	15.50	Not required	18.50	
	802.11ax-HE80 MCS0	7	5985	Not required	15.00	Not required	15.00	Not required	18.00	
		71	6305		15.00		15.00		18.00	
		167	6785	Not required	15.00	Not required	15.00	Not required	18.00	
	802.11ax-HE160 MCS0	15	6025	Not required	14.50	Not required	14.50	Not required	17.50	
		47	6185		14.50		14.50		17.50	
		175	6825	Not required	14.50	Not required	14.50	Not required	17.50	

6GHz WLAN (LPI Mode)

WiFi 6E				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit (dBm)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit (dBm)	Duty Cycle %
WiFi 6E	802.11a 6Mbps	1	5955	Not required	1.00	Not required	1.00	Not required	4.00	Not required
		57	6235		1.00		1.00		4.00	
		113	6515		1.00		1.00		4.00	
		173	6815		1.00		1.00		4.00	
		233	7115		1.00		1.00		4.00	
	802.11ax-HE20 MCS0	1	5955		1.00		1.00		4.00	
		57	6235		1.00		1.00		4.00	
		113	6515		1.00		1.00		4.00	
		173	6815		1.00		1.00		4.00	
		233	7115		1.00		1.00		4.00	
	802.11ax-HE40 MCS0	3	5965		5.50		5.50		8.50	
		59	6245		5.50		5.50		8.50	
		107	6485		5.50		5.50		8.50	
		171	6805		5.50		5.50		8.50	
		227	7085		5.50		5.50		8.50	
	802.11ax-HE80 MCS0	7	5985		8.50		8.50		11.50	
		71	6305		8.50		8.50		11.50	
		119	6545		8.50		8.50		11.50	
		167	6785		8.50		8.50		11.50	
		215	7025		8.50		8.50		11.50	
	802.11ax-HE160 MCS0	15	6025		11.50		11.50		14.50	
		47	6185		11.50		11.50		14.50	
		111	6505	11.20	11.50	9.50	11.50	13.44	14.50	98.60
		175	6825	Not required	11.50	Not required	11.50	Not required	14.50	
		207	6985	11.50	11.50	10.50	11.50	14.04	14.50	

<DBS>

2.4GHz WLAN

2.4GHz WLAN				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	15.40	15.50	15.30	15.50	18.36	18.50	98.10
		6	2437	16.40	16.50	16.40	16.50	19.41	19.50	
		11	2462	15.70	16.00	15.60	16.00	18.66	19.00	
		12	2467	13.30	13.50	13.50	13.50	16.41	16.50	
		13	2472	9.40	10.00	9.70	10.00	12.56	13.00	
	802.11g 6Mbps	1	2412	Not required	13.00	Not required	13.00	Not required	16.00	Not required
		6	2437		16.50		16.50		19.50	
		11	2462		13.50		13.50		16.50	
		12	2467		12.00		12.00		15.00	
		13	2472		0.00		0.00		3.00	
	802.11n-HT20 MCS0	1	2412		12.00		12.00		15.00	
		6	2437		16.50		16.50		19.50	
		11	2462		12.50		12.50		15.50	
		12	2467		12.00		12.00		15.00	
		13	2472		-1.00		-1.00		2.00	
	802.11n-HT40 MCS0	3	2422		12.50		12.50		15.50	
		6	2437		14.00		14.00		17.00	
		9	2452		11.50		11.50		14.50	
		10	2457		11.00		11.00		14.00	
		11	2462		-0.50		-0.50		2.50	
	802.11ac-VHT20 MCS0	1	2412		12.00		12.00		15.00	
		6	2437		16.50		16.50		19.50	
		11	2462		12.50		12.50		15.50	
		12	2467		12.00		12.00		15.00	
		13	2472		-1.00		-1.00		2.00	
	802.11ac-VHT40 MCS0	3	2422		12.50		12.50		15.50	
		6	2437		14.00		14.00		17.00	
		9	2452		11.50		11.50		14.50	
		10	2457		11.00		11.00		14.00	
		11	2462		-0.50		-0.50		2.50	
	802.11ax-HE20 MCS0	1	2412		12.00		12.00		15.00	
		6	2437		16.50		16.50		19.50	
		11	2462		12.50		12.50		15.50	
		12	2467		12.00		12.00		15.00	
		13	2472		-1.00		-1.00		2.00	
	802.11ax-HE40 MCS0	3	2422		12.50		12.50		15.50	
		6	2437		14.00		14.00		17.00	
		9	2452		11.50		11.50		14.50	
		10	2457		11.00		11.00		14.00	
		11	2462		-0.50		-0.50		2.50	

5GHz WLAN

5.2GHz WLAN				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	Not required	10.50	Not required	10.50	Not required	13.50	Not required
		40	5200		10.50		10.50		13.50	
		44	5220		10.50		10.50		13.50	
		48	5240		10.50		10.50		13.50	
	802.11n-HT20 MCS0	36	5180		11.00		11.00		14.00	
		40	5200		11.00		11.00		14.00	
		44	5220		11.00		11.00		14.00	
		48	5240		11.00		11.00		14.00	
	802.11n-HT40 MCS0	38	5190		12.00		12.00		15.00	
		46	5230		12.00		12.00		15.00	
	802.11ac-VHT20 MCS0	36	5180		11.00		11.00		14.00	
		40	5200		11.00		11.00		14.00	
		44	5220		11.00		11.00		14.00	
		48	5240		11.00		11.00		14.00	
	802.11ac-VHT40 MCS0	38	5190		12.00		12.00		15.00	
		46	5230		12.00		12.00		15.00	
	802.11ac-VHT80 MCS0	42	5210		11.00		11.00		14.00	
	802.11ax-HE20 MCS0	36	5180		11.00		11.00		14.00	
		40	5200		11.00		11.00		14.00	
		44	5220		11.00		11.00		14.00	
		48	5240		11.00		11.00		14.00	
	802.11ax-HE40 MCS0	38	5190		12.00		12.00		15.00	
		46	5230		12.00		12.00		15.00	
	802.11ax-HE80 MCS0	42	5210		11.00		11.00		14.00	

5.3GHz WLAN				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	15.80	16.00	15.20	16.00	18.52	19.00	99.10
		56	5280	15.90	16.00	15.30	16.00	18.62	19.00	
		60	5300	15.90	16.00	15.30	16.00	18.62	19.00	
		64	5320	15.40	15.50	14.50	15.50	17.98	18.50	
	802.11n-HT20 MCS0	52	5260	Not required	14.50	Not required	14.50	Not required	17.50	Not required
		56	5280		14.50		14.50		17.50	
		60	5300		14.50		14.50		17.50	
		64	5320		14.50		14.50		17.50	
	802.11n-HT40 MCS0	54	5270		14.00		14.00		17.00	
		62	5310		13.50		13.50		16.50	
	802.11ac-VHT20 MCS0	52	5260		14.50		14.50		17.50	
		56	5280		14.50		14.50		17.50	
		60	5300		14.50		14.50		17.50	
		64	5320		14.50		14.50		17.50	
	802.11ac-VHT40 MCS0	54	5270		14.00		14.00		17.00	
		62	5310		13.50		13.50		16.50	
	802.11ac-VHT80 MCS0	58	5290		13.00		13.00		16.00	
	802.11ac-VHT160 MCS0	50	5250		11.00		11.00		14.00	
	802.11ax-HE20 MCS0	52	5260		14.50		14.50		17.50	
		56	5280		14.50		14.50		17.50	
		60	5300		14.50		14.50		17.50	
		64	5320		14.50		14.50		17.50	
	802.11ax-HE40 MCS0	54	5270		14.00		14.00		17.00	
		62	5310		13.50		13.50		16.50	
	802.11ax-HE80 MCS0	58	5290		13.00		13.00		16.00	
	802.11ax-HE160 MCS0	50	5250		11.00		11.00		14.00	

5.5GHz WLAN				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	14.80	15.00	13.80	15.00	17.34	18.00	99.10
		116	5580	15.80	16.00	14.60	16.00	18.25	19.00	
		124	5620	15.80	16.00	14.60	16.00	18.25	19.00	
		132	5660	15.70	16.00	14.70	16.00	18.24	19.00	
		144	5720	15.90	16.00	14.70	16.00	18.35	19.00	
	802.11n-HT20 MCS0	100	5500	Not required	13.50	Not required	13.50	Not required	16.50	Not required
		116	5580		14.50		14.50		17.50	
		124	5620		14.50		14.50		17.50	
		132	5660		14.50		14.50		17.50	
		144	5720		14.50		14.50		17.50	
	802.11n-HT40 MCS0	102	5510		13.00		13.00		16.00	
		110	5550		14.00		14.00		17.00	
		126	5630		14.00		14.00		17.00	
		134	5670		14.00		14.00		17.00	
		142	5710		14.00		14.00		17.00	
	802.11ac-VHT20 MCS0	100	5500		13.50		13.50		16.50	
		116	5580		14.50		14.50		17.50	
		124	5620		14.50		14.50		17.50	
		132	5660		14.50		14.50		17.50	
		144	5720		14.50		14.50		17.50	
	802.11ac-VHT40 MCS0	102	5510		13.00		13.00		16.00	
		110	5550		14.00		14.00		17.00	
		126	5630		14.00		14.00		17.00	
		134	5670		14.00		14.00		17.00	
		142	5710		14.00		14.00		17.00	
	802.11ac-VHT80 MCS0	106	5530		12.50		12.50		15.50	
		122	5610		13.50		13.50		16.50	
		138	5690		13.50		13.50		16.50	
	802.11ac-VHT160 MCS0	114	5570		12.00		12.00		15.00	
	802.11ax-HE20 MCS0	100	5500		13.50		13.50		16.50	
		116	5580		14.50		14.50		17.50	
		124	5620		14.50		14.50		17.50	
		132	5660		14.50		14.50		17.50	
		144	5720		14.50		14.50		17.50	
	802.11ax-HE40 MCS0	102	5510		13.00		13.00		16.00	
		110	5550		14.00		14.00		17.00	
		126	5630		14.00		14.00		17.00	
		134	5670		14.00		14.00		17.00	
		142	5710		14.00		14.00		17.00	
	802.11ax-HE80 MCS0	106	5530		12.50		12.50		15.50	
		122	5610		13.50		13.50		16.50	
		138	5690		13.50		13.50		16.50	
	802.11ax-HE160 MCS0	114	5570		12.00		12.00		15.00	

5.8GHz WLAN				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	14.60	15.00	13.30	15.00	17.11	18.00	99.10
		157	5785	14.60	15.00	13.30	15.00	17.10	18.00	
		165	5825	14.80	15.00	14.00	15.00	17.50	18.00	
	802.11n-HT20 MCS0	149	5745	Not required	14.50	Not required	14.50	Not required	17.50	Not required
		157	5785		14.50		14.50		17.50	
		165	5825		14.50		14.50		17.50	
	802.11n-HT40 MCS0	151	5755		14.00		14.00		17.00	
		159	5795		14.00		14.00		17.00	
	802.11ac-VHT20 MCS0	149	5745		14.50		14.50		17.50	
		157	5785		14.50		14.50		17.50	
		165	5825		14.50		14.50		17.50	
	802.11ac-VHT40 MCS0	151	5755		14.00		14.00		17.00	
		159	5795		14.00		14.00		17.00	
	802.11ac-VHT80 MCS0	155	5775		13.50		13.50		16.50	
	802.11ax-HE20 MCS0	149	5745		14.50		14.50		17.50	
		157	5785		14.50		14.50		17.50	
		165	5825		14.50		14.50		17.50	
	802.11ax-HE40 MCS0	151	5755		14.00		14.00		17.00	
		159	5795		14.00		14.00		17.00	
	802.11ax-HE80 MCS0	155	5775		13.50		13.50		16.50	

6GHz WLAN (SP Mode)

WiFi 6E				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit (dBm)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit (dBm)	Duty Cycle %
WiFi 6E	802.11a 6Mbps	1	5955	12.70	13.00	11.90	13.00	15.33	16.00	98.20
		57	6235	13.00	13.00	11.50	13.00	15.32	16.00	
		173	6815	13.00	13.00	11.10	13.00	15.16	16.00	
	802.11ax-HE20 MCS0	1	5955	Not required	13.00	Not required	13.00	Not required	16.00	Not required
		57	6235		13.00		13.00		16.00	
		173	6815		13.00		13.00		16.00	
	802.11ax-HE40 MCS0	3	5965		12.50		12.50		15.50	
		59	6245		12.50		12.50		15.50	
		171	6805		12.50		12.50		15.50	
	802.11ax-HE80 MCS0	7	5985		12.00		12.00		15.00	
		71	6305		12.00		12.00		15.00	
		167	6785		12.00		12.00		15.00	
	802.11ax-HE160 MCS0	15	6025		11.50		11.50		14.50	
		47	6185		11.50		11.50		14.50	
		175	6825		11.50		11.50		14.50	

6GHz WLAN (LPI Mode)

WiFi 6E				Main		Aux		Main + Aux		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit (dBm)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit (dBm)	Duty Cycle %
WiFi 6E	802.11a 6Mbps	1	5955	Not required	-2.00	Not required	-2.00	Not required	1.00	Not required
		57	6235		-2.00		-2.00		1.00	
		113	6515		-2.00		-2.00		1.00	
		173	6815		-2.00		-2.00		1.00	
		233	7115		-2.00		-2.00		1.00	
	802.11ax-HE20 MCS0	1	5955		-2.00		-2.00		1.00	
		57	6235		-2.00		-2.00		1.00	
		113	6515		-2.00		-2.00		1.00	
		173	6815		-2.00		-2.00		1.00	
		233	7115		-2.00		-2.00		1.00	
	802.11ax-HE40 MCS0	3	5965		2.50		2.50		5.50	
		59	6245		2.50		2.50		5.50	
		107	6485		2.50		2.50		5.50	
		171	6805		2.50		2.50		5.50	
		227	7085		2.50		2.50		5.50	
	802.11ax-HE80 MCS0	7	5985		5.50		5.50		8.50	
		71	6305		5.50		5.50		8.50	
		119	6545		5.50		5.50		8.50	
		167	6785		5.50		5.50		8.50	
		215	7025		5.50		5.50		8.50	
	802.11ax-HE160 MCS0	15	6025		8.50		8.50		11.50	
		47	6185		8.50		8.50		11.50	
		111	6505	8.50	8.50	7.20	8.50	10.91	11.50	98.60
		175	6825	8.40	8.50	7.10	8.50	10.81	11.50	
		207	6985	8.40	8.50	7.10	8.50	10.81	11.50	

<2.4GHz Bluetooth>

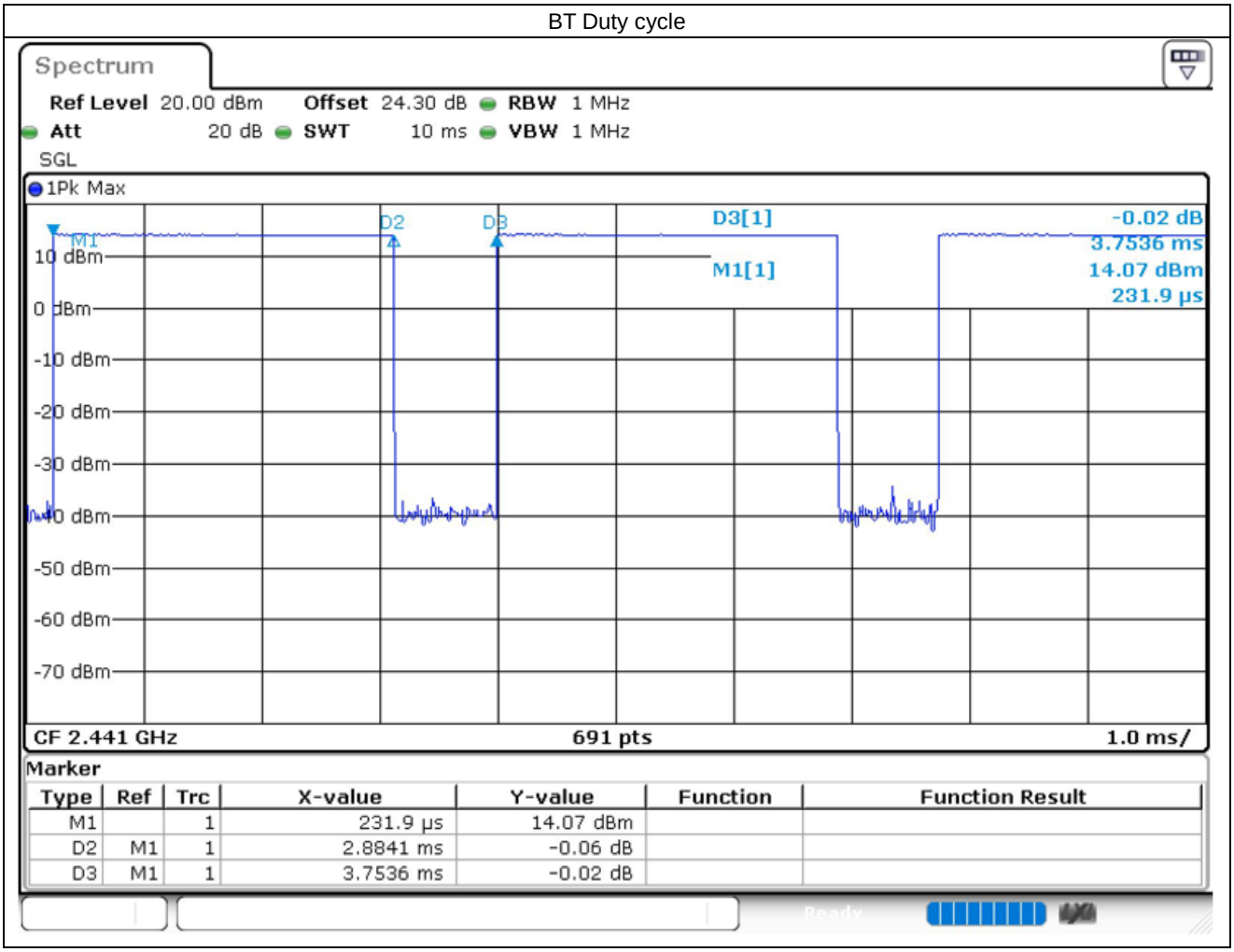
Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	14.90	11.40	11.40
	CH 39	2441	15.10	11.60	11.60
	CH 78	2480	15.50	12.00	12.00
Tune-up Limit			16	12	12

Mode	Channel	Frequency (MHz)	Average power (dBm)	
			1Mbps	2Mbps
LE	CH 00	2402	not required	not required
	CH 19	2440		
	CH 39	2480		
Tune-up Limit			7	7

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps due to its highest average power and duty cycle is 76.83% considered in SAR testing, and the duty cycle would be scaled to theoretical 83.3% in reported SAR calculation.

BT Duty cycle



11. 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/Bluetooth: 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 ≥0.8W/kg.

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.

WLAN PD Note:

1. The WiFi 6E PD was separate measured each transmit antenna, and spot check MIMO transmit antenna to ensure the result is compliance.
2. The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
3. Absorbed power density (APD) using a 4cm2 averaging area is reported based on SAR measurements.
4. Power density was calculated by repeated E-field measurements on two measurement planes separated by λ/4.
5. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools.
6. Per FCC guidance and equipment manufacturer guidance, power density results were scaled according to IEC 62479:2010 for the portion of the measurement uncertainty > 30%. Total expanded uncertainty of 2.68 dB (85.4%) was used to determine the psPD measurement scaling factor.
7. The measurement procedure consists of measuring the PDinc at two different distances: 2 mm (compliance distance) and λ/5. The grid extents should be large enough to fully capture the transmitted energy. The grid step should be fine enough to demonstrate that the integrated Power Density iPDn fulfill the criterion described below. Since iPD ratio between the two distances is ≥ -1dB, the grid step (0.0625) was sufficient for determining compliance at d=2mm.

$$10 \cdot log_{10} \frac{iPD_n(2mm)}{iPD_n(\lambda/5)} \geq -1$$

11.1 Body SAR

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Antenna Vendor	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)
01	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0mm	Main	Non-DBS	6	2437	AVX	19.1	19.5	1.096	98.10	1.019	-0.06	0.479	0.535
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	6	2437	AVX	19.2	19.5	1.072	98.10	1.019		0.141	0.154
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0mm	Main	Non-DBS	1	2412	AVX	18.2	18.5	1.072	98.10	1.019	0.05	0.381	0.416
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	1	2412	AVX	18.1	18.5	1.096	98.10	1.019		0.103	0.115
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0mm	Main	Non-DBS	11	2462	AVX	18.6	19	1.096	98.10	1.019	-0.01	0.401	0.448
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	11	2462	AVX	18.7	19	1.072	98.10	1.019		0.131	0.143
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0mm	Main	Non-DBS	6	2437	Speed	19.1	19.5	1.096	98.10	1.019	-0.04	0.179	0.200
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	6	2437	Speed	19.2	19.5	1.072	98.10	1.019		0.340	0.371
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0mm	Main	DBS	6	2437	AVX	16.4	16.5	1.023	98.10	1.019	0.01	0.257	0.268
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0mm	Aux	DBS	6	2437	AVX	16.4	16.5	1.023	98.10	1.019		0.066	0.069

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Antenna Vendor	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)
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	52	5260	AVX	18.9	19	1.023	99.10	1.009	-0.16	0.860	0.888
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	52	5260	AVX	18.5	19	1.122	99.10	1.009		0.439	0.497
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	56	5280	AVX	18.9	19	1.023	99.10	1.009	0.12	0.862	0.890
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	56	5280	AVX	18.3	19	1.175	99.10	1.009		0.425	0.504
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	60	5300	AVX	18.9	19	1.023	99.10	1.009	0.1	0.897	0.926
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	60	5300	AVX	18.1	19	1.230	99.10	1.009		0.420	0.521
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	64	5320	AVX	18.4	18.5	1.023	99.10	1.009	-0.01	0.758	0.783
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	64	5320	AVX	17.4	18.5	1.288	99.10	1.009		0.398	0.517
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	60	5300	Speed	18.9	19	1.023	99.10	1.009	0.18	1.020	1.053
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	60	5300	Speed	18.1	19	1.230	99.10	1.009		0.667	0.828
02	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	52	5260	Speed	18.9	19	1.023	99.10	1.009	-0.02	1.160	1.198
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	52	5260	Speed	18.5	19	1.122	99.10	1.009		0.792	0.897
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	56	5280	Speed	18.9	19	1.023	99.10	1.009	0.05	1.040	1.074
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	56	5280	Speed	18.3	19	1.175	99.10	1.009		0.669	0.793
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	64	5320	Speed	18.4	18.5	1.023	99.10	1.009	-0.15	0.830	0.857
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	64	5320	Speed	17.4	18.5	1.288	99.10	1.009		0.555	0.721
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	DBS	52	5260	Speed	15.8	16	1.047	99.10	1.009	0.18	0.535	0.565
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	DBS	52	5260	Speed	15.2	16	1.202	99.10	1.009		0.338	0.410

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Antenna Vendor	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)
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	132	5660	AVX	18.9	19	1.023	99.10	1.009	0.08	0.903	0.932
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	132	5660	AVX	18.5	19	1.122	99.10	1.009		0.668	0.756
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	100	5500	AVX	17.9	18	1.023	99.10	1.009	-0.01	0.557	0.575
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	100	5500	AVX	17.1	18	1.230	99.10	1.009		0.430	0.534
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	116	5580	AVX	18.6	19	1.096	99.10	1.009	-0.12	0.680	0.752
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	116	5580	AVX	17.6	19	1.380	99.10	1.009		0.582	0.811
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	124	5620	AVX	18.9	19	1.023	99.10	1.009	-0.02	0.856	0.884
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	124	5620	AVX	17.7	19	1.349	99.10	1.009		0.661	0.900
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	144	5720	AVX	18.8	19	1.047	99.10	1.009	-0.15	0.908	0.959
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	144	5720	AVX	17.8	19	1.318	99.10	1.009		0.766	1.019
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	144	5720	Speed	18.8	19	1.047	99.10	1.009	0.01	0.925	0.977
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	144	5720	Speed	17.8	19	1.318	99.10	1.009		0.632	0.841
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	132	5660	Speed	18.9	19	1.023	99.10	1.009	-0.13	0.962	0.993
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	132	5660	Speed	18.5	19	1.122	99.10	1.009		0.810	0.917
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	100	5500	Speed	17.9	18	1.023	99.10	1.009	-0.12	0.623	0.643
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	100	5500	Speed	17.1	18	1.230	99.10	1.009		0.361	0.448
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	116	5580	Speed	18.6	19	1.096	99.10	1.009	-0.01	0.704	0.779
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	116	5580	Speed	17.6	19	1.380	99.10	1.009		0.494	0.688
03	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	124	5620	Speed	18.9	19	1.023	99.10	1.009	-0.16	0.908	0.938
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	124	5620	Speed	17.7	19	1.349	99.10	1.009		0.756	1.029
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	DBS	124	5620	Speed	15.8	16	1.047	99.10	1.009	-0.15	0.384	0.406
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	DBS	124	5620	Speed	14.6	16	1.380	99.10	1.009		0.324	0.451
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	165	5825	AVX	17.4	18	1.148	99.10	1.009	0.05	0.843	0.977
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	165	5825	AVX	17	18	1.259	99.10	1.009		0.693	0.880
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	149	5745	AVX	17.5	18	1.122	99.10	1.009	-0.02	0.709	0.803
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	149	5745	AVX	16.8	18	1.318	99.10	1.009		0.617	0.821
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	157	5785	AVX	17.5	18	1.122	99.10	1.009	-0.15	0.761	0.862
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	157	5785	AVX	16.7	18	1.349	99.10	1.009		0.641	0.872
04	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	165	5825	Speed	17.4	18	1.148	99.10	1.009	-0.17	1.020	1.182
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	165	5825	Speed	17	18	1.259	99.10	1.009		0.583	0.741
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	149	5745	Speed	17.5	18	1.122	99.10	1.009	0.15	0.744	0.842
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	149	5745	Speed	16.8	18	1.318	99.10	1.009		0.507	0.674
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	157	5785	Speed	17.5	18	1.122	99.10	1.009	0.03	0.801	0.907
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	157	5785	Speed	16.7	18	1.349	99.10	1.009		0.489	0.666
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	DBS	165	5825	Speed	14.8	15	1.047	99.10	1.009	-0.06	0.543	0.574
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	DBS	165	5825	Speed	14	15	1.259	99.10	1.009		0.474	0.602

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Antenna Vendor	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)
05	Bluetooth	1Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	78	2480	AVX	15.5	16	1.122	76.83	1.084	-0.16	0.017	0.021
	Bluetooth	1Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	0	2402	AVX	14.9	16	1.288	76.83	1.084	0.03	0.014	0.020
	Bluetooth	1Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	39	2441	AVX	15.1	16	1.230	76.83	1.084	-0.07	0.013	0.017
	Bluetooth	1Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	78	2480	Speed	15.5	16	1.122	76.83	1.084	0.04	0.012	0.015

11.2 6GHz WLAN SAR Test Result

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Output Power Mode	Ch.	Freq. (MHz)	Antenna Vendor	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)	APD (W/m^2)
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	SP	1	5955	AVX	15.8	16	1.047	98.20	1.018	0.02	0.422	0.450	2.84
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	SP	1	5955	AVX	14.9	16	1.288	98.20	1.018		0.408	0.535	2.35
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	SP	57	6235	AVX	16	16	1.000	98.20	1.018	0.04	0.497	0.506	3.51
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	SP	57	6235	AVX	14.6	16	1.380	98.20	1.018		0.295	0.415	1.59
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom of Laptop	0mm	Main	Non-DBS	LPI	111	6505	AVX	11.2	11.5	1.072	98.60	1.014	-0.01	0.233	0.253	1.54
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom of Laptop	0mm	Aux	Non-DBS	LPI	111	6505	AVX	9.5	11.5	1.585	98.60	1.014		0.148	0.238	0.70
06	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	SP	173	6815	AVX	15.9	16	1.023	98.20	1.018	-0.13	0.697	0.726	5.00
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	SP	173	6815	AVX	14.2	16	1.514	98.20	1.018		0.264	0.407	2.23
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom of Laptop	0mm	Main	Non-DBS	LPI	207	6985	AVX	11.5	11.5	1.000	98.60	1.014	0.11	0.436	0.442	3.08
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom of Laptop	0mm	Aux	Non-DBS	LPI	207	6985	AVX	10.5	11.5	1.259	98.60	1.014		0.180	0.230	1.06
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	SP	173	6815	Speed	15.9	16	1.023	98.20	1.018	0.15	0.464	0.483	3.19
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	SP	173	6815	Speed	14.2	16	1.514	98.20	1.018		0.372	0.573	2.32
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	DBS	SP	173	6815	AVX	13	13	1.000	98.20	1.018	-0.07	0.394	0.401	2.58
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	DBS	SP	173	6815	AVX	11.1	13	1.549	98.20	1.018		0.123	0.194	0.86

11.3 6GHz PD Test Result

Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Grid Step (λ)	iPDn	iPD ratio (≥ -1)	Normal psPD (W/m^2)	Total psPD (W/m^2)
WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	2mm	Main	1	5955	15.8	0.0625	2.32	-0.99894867	2.42	3.15
WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	10mm	Main	1	5955	15.8	0.25	2.92		1.18	1.53
WLAN6GHz	802.11ax-HE160 MCS0	Bottom of Laptop	2mm	Main	207	6985	11.5	0.0625	3.32	-0.07778617	1.7	1.87
WLAN6GHz	802.11ax-HE160 MCS0	Bottom of Laptop	8.59mm	Main	207	6985	11.5	0.25	3.38		1	1.05

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Grid Step (λ)	Scaling Factor for Measurement Uncertainty	Power Drift (dB)	Normal psPD (W/m^2)	Scaled Normal psPD (W/m^2)	Total psPD (W/m^2)	Scaled Total psPD (W/m^2)
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	2mm	Main	1	5955	15.8	16	1.047	98.20	1.018	0.0625	1.5535	0.13	2.42	4.01	2.88	4.77
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	2mm	Main	57	6235	16	16	1.000	98.20	1.018	0.0625	1.5535	0.12	2.14	3.38	2.51	3.97
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom of Laptop	2mm	Main	111	6505	11.2	11.5	1.072	98.60	1.014	0.0625	1.5535	-0.02	0.837	1.41	0.945	1.60
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	2mm	Main	173	6815	15.9	16	1.023	98.20	1.018	0.0625	1.5535	-0.15	2.72	4.40	3.15	5.10
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom of Laptop	2mm	Main	207	6985	11.5	11.5	1.000	98.60	1.014	0.0625	1.5535	-0.17	1.7	2.68	1.87	2.95
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	2mm	Aux	1	5955	14.9	16	1.288	98.20	1.018	0.0625	1.5535	-0.04	1.18	2.40	1.38	2.81
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	2mm	Aux	57	6235	14.6	16	1.380	98.20	1.018	0.0625	1.5535	0.09	1.13	2.47	1.29	2.82
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom of Laptop	2mm	Aux	111	6505	9.5	11.5	1.585	98.60	1.014	0.0625	1.5535	-0.07	0.94	2.35	1	2.50
	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	2mm	Aux	173	6815	14.2	16	1.514	98.20	1.018	0.0625	1.5535	0.12	1.84	4.40	1.87	4.48
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom of Laptop	2mm	Aux	207	6985	10.5	11.5	1.259	98.60	1.014	0.0625	1.5535	-0.04	1.35	2.68	1.55	3.07
01	WLAN6GHz	802.11a 6Mbps	Bottom of Laptop	2mm	Main+Aux	173	6815	18.14	19.00	1.219	98.20	1.018	0.0625	1.5535	0.08	2.92	5.63	3.05	5.88

11.4 Repeated SAR Measurement

No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Antenna Vendor	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	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	52	5260	Speed	18.9	19	1.023	99.10	1.009	-0.02	1.160	-	1.198
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	52	5260	Speed	18.5	19	1.122	99.10	1.009		0.792		0.897
2nd	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	52	5260	Speed	18.9	19	1.023	99.10	1.009	-0.13	1.120	1.04	1.156
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	52	5260	Speed	18.5	19	1.122	99.10	1.009		0.754		0.854
1st	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	132	5660	Speed	18.9	19	1.023	99.10	1.009	-0.13	0.962	-	0.993
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	132	5660	Speed	18.5	19	1.122	99.10	1.009		0.810		0.917
2nd	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	132	5660	Speed	18.9	19	1.023	99.10	1.009	-0.08	0.942	1.02	0.973
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	132	5660	Speed	18.5	19	1.122	99.10	1.009		0.799		0.905
1st	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	165	5825	Speed	17.4	18	1.148	99.10	1.009	-0.17	1.020	-	1.182
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	165	5825	Speed	17	18	1.259	99.10	1.009		0.583		0.741
2nd	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Main	Non-DBS	165	5825	Speed	17.4	18	1.148	99.10	1.009	0.02	0.997	1.02	1.155
	WLAN5GHz	802.11a 6Mbps	Bottom of Laptop	0mm	Aux	Non-DBS	165	5825	Speed	17	18	1.259	99.10	1.009		0.564		0.716

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥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. The ratio is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

12. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
Non-DBS		
1.	WLAN 2.4GHz Ant Main + Aux	Yes
2.	WLAN 5/6GHz Ant Main + Aux + BT Ant Aux	Yes
DBS		
3.	WLAN 2.4GHz Ant Main + Aux + WLAN 5/6GHz Ant Main + Aux	Yes

General Note:

1. The Scaled SAR summation is calculated based on the same configuration and test position.
2. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (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 ≤ 0.04, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

12.1 Body Exposure Conditions

<Non-DBS>

Exposure Position	1	2	3	2+3 Summed 1g SAR (W/kg)
	WLAN2.4GHz Main+Aux	WLAN5/6GHz Main+Aux	Bluetooth Aux	
	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	
Bottom of Laptop at 0mm	0.535	1.198	0.021	**1.219**

<DBS>

Exposure Position	1	2	1+2 Summed 1g SAR (W/kg)
	WLAN2.4GHz Main+Aux	WLAN5/6GHz Main+Aux	
	1g SAR (W/kg)	1g SAR (W/kg)	
Bottom of Laptop at 0mm	0.268	0.602	**0.870**

Test Engineer： Bevis Chang, Jacky Chen and Dennis Hsieh

13. Uncertainty Assessment

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.

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type An evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in table below.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor[a]	1/k[b]	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) κ is the coverage factor

Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

The judgment of conformity in the report is based on the measurement results excluding the measurement uncertainty.

Applicable for SAR Measurements:

Uncertainty Budget (4 MHz - 10 GHz range)							
Error Description	**Uncertainty Value (±%)**	**Probability**	**Divisor**	**(Ci) 1g**	**(Ci) 10g**	**Standard Uncertainty (1g) (±%)**	**Standard Uncertainty (10g) (±%)**
Measurement System							
Probe Calibration	18.60	N	2	1	1	9.3	9.3
Axial Isotropy	4.70	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.60	R	1.732	0.7	0.7	3.9	3.9
Linearity	4.70	R	1.732	1	1	2.7	2.7
Modulation Response	4.68	R	1.732	1	1	2.7	2.7
System Detection Limits	1.00	R	1.732	1	1	0.6	0.6
Boundary Effects	2.00	R	1.732	1	1	1.2	1.2
Readout Electronics	0.30	N	1	1	1	0.3	0.3
Response Time	0.00	R	1.732	1	1	0.0	0.0
Integration Time	2.60	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.00	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.00	R	1.732	1	1	1.7	1.7
Probe Positioner	0.40	R	1.732	1	1	0.2	0.2
Probe Positioning	6.70	R	1.732	1	1	3.9	3.9
Post-processing	4.00	R	1.732	1	1	2.3	2.3
Test Sample Related							
Device Holder	3.60	N	1	1	1	3.6	3.6
Test sample Positioning	3.03	N	1	1	1	3.0	3.0
Power Scaling	0.00	R	1.732	1	1	0.0	0.0
Power Drift	5.00	R	1.732	1	1	2.9	2.9
Phantom and Setup							
Phantom Uncertainty	7.60	R	1.732	1	1	4.4	4.4
SAR correction	0.00	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.03	N	1	0.78	0.77	0.0	0.0
Liquid Conductivity (target)	5.00	R	1.732	0.78	0.77	2.3	2.2
Liquid Conductivity (mea.)	2.50	R	1.732	0.78	0.77	1.1	1.1
Temp. unc. - Conductivity	3.68	R	1.732	0.78	0.77	1.7	1.6
Liquid Permittivity Repeatability	0.02	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.00	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.50	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.84	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						14.5%	14.2%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						29.0%	28.4%

Applicable for Power Density Measurements:

Error Description	Uncertainty Value (±dB)	Probability	Divisor	(Ci)	Standard Uncertainty (±dB)
Probe Calibration	0.49	N	1	1	0.49
Probe correction	0.00	R	1.732	1	0.00
Frequency response (BW ≤ 1 GHz)	0.20	R	1.732	1	0.12
Sensor cross coupling	0.00	R	1.732	1	0.00
Isotropy	0.50	R	1.732	1	0.29
Linearity	0.20	R	1.732	1	0.12
Probe scattering	0.00	R	1.732	1	0.00
Probe positioning offset	0.30	R	1.732	1	0.17
Probe positioning repeatability	0.04	R	1.732	1	0.02
Sensor mechanical offset	0.00	R	1.732	1	0.00
Probe spatial resolution	0.00	R	1.732	1	0.00
Field impedance dependance	0.00	R	1.732	1	0.00
Amplitude and phase drift	0.00	R	1.732	1	0.00
Amplitude and phase noise	0.04	R	1.732	1	0.02
Measurement area truncation	0.00	R	1.732	1	0.00
Data acquisition	0.03	N	1	1	0.03
Sampling	0.00	R	1.732	1	0.00
Field reconstruction	2.00	R	1.732	1	1.15
Forward transformation	0.00	R	1.732	1	0.00
Power density scaling	0.00	R	1.732	1	0.00
Spatial averaging	0.10	R	1.732	1	0.06
System detection limit	0.04	R	1.732	1	0.02
Uncertainty terms dep endent on the DUT and environmental factors					
Probe coupling with DUT	0.00	R	1.732	1	0.0
Modulation response	0.40	R	1.732	1	0.2
Integration time	0.00	R	1.732	1	0.0
Response time	0.00	R	1.732	1	0.0
Device holder influence	0.10	R	1.732	1	0.1
DUT alignment	0.00	R	1.732	1	0.0
RF ambient conditions	0.04	R	1.732	1	0.0
Ambient reflections	0.04	R	1.732	1	0.0
Immunity / secondary reception	0.00	R	1.732	1	0.0
Drift of the DUT		R	1.732	1	
Combined Std. Uncertainty					1.34
Expanded STD Uncertainty (95%)					**2.68**

14. 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 616217 D04 v01r02, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, Oct 2015

[8] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[9] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.

[10] 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

[11] SPEAG DASY6 System Handbook

[12] SPEAG DASY6 Application Note (Interim Procedure for Device Operation at 6GHz-10GHz)