FCC SAR Test Report

Applicant	:	**Qualcomm Technologies, Inc.** **5775 Morehouse Drive, San Diego, CA 92121-1714**
Equipment	:	**Qualcomm WiFi 7/BT Combo module**
Brand Name	:	**Qualcomm**
Model Name	:	**QCNCM825**
FCC ID	:	**J9C-QCNCM825**
Standard	:	**FCC 47 CFR Part 2 (2.1093)**

The product was tested inside of Lenovo Notebook Computer.

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Si Zhang

Approved by: Si Zhang

ACCREDITED
Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

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History of this test report

Report No.	Version	Description	Issued Date
FA422127	01	Initial issue of report	Apr. 18, 2024

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Qualcomm Technologies, Inc., Qualcomm WiFi 7/BT Combo module, QCNCM825**, are as follows.

Equipment Class	Band	Reported SAR	Highest Simultaneous Transmission	Measured APD	Scaled PD
		Body (Separation 0mm) (1g SAR W/kg)	1g SAR (W/kg)	Body (W/m^2)	psPD (W/m^2)
DTS	2.4GHz WLAN	0.73	1.53		
NII	5GHz WLAN	1.00	1.50		
6CD	6GHz WLAN	**1.17**	1.58	7.80	7.89
DSS	Bluetooth	0.20	1.58		
Date of Testing:		2024/3/16 ~ 2024/3/22			

Declaration of Conformity:
The test results with all measurement uncertainty excluded are 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.

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) and Power density exposure limits (1 mW/cm^2 = 10 W/m^2) specified in FCC 47 CFR part 2 (2.1093), ANSI/IEEE C95.1-1992 and FCC 47 CFR Part1.1310, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

2. Administration Data

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory			
Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	SAR01-KS, SAR04-KS	CN1257	314309

3. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards.

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- IEC/IEEE 62209-1528:2020
- SPEAG DASY6 System Handbook
- SPEAG DASY6 Application Note (Interim Procedure for Device Operation at 6GHz-10GHz)
- IEC TR 63170:2018
- IEC 62479:2010
- 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

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Qualcomm WiFi 7/BT Combo module
Brand Name	Qualcomm
Model Name	QCNCM825
FCC ID	J9C-QCNCM825
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2472 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz WLAN 6GHz U-NII-5: 5925 MHz ~ 6425 MHz WLAN 6GHz U-NII-6: 6425 MHz ~ 6525 MHz WLAN 6GHz U-NII-7: 6525 MHz ~ 6875 MHz WLAN 6GHz U-NII-8: 6875 MHz ~ 7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Mode	WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ac VHT20/VHT40 WLAN 2.4GHz 802.11ax HE20/HE40 WLAN 2.4GHz 802.11be EHT20/EHT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80/VHT160 WLAN 5GHz 802.11ax HE20/HE40/HE80/HE160 WLAN 5GHz 802.11be EHT20/EHT40/EHT80/EHT160 WLAN 6GHz 802.11a WLAN 6GHz 802.11ax HE20/HE40/HE80/HE160 WLAN 6GHz 802.11be EHT20/EHT40/EHT80/EHT160/EHT320 Bluetooth BR/EDR/LE/QHS
Remark: 1. The EUT has no voice function. 2. The 2.4GHz/5GHz/6GHz WLAN can transmit in SISO and MIMO mode. 3. There are two samples under test, sample 1 with Luxshare-ict antenna and sample 2 with INPAQ antenna. According to the difference, sample 1/2 was all chosen to perform full SAR testing.	

Host Information	
Equipment Name	Notebook Computer
Brand Name	Lenovo
Model Name	Yoga Slim 7 14Q8X9, Yoga Slim 7 14Q8X9********(The"*"in model name can be 0 to 9,A to Z,a to z,"-", blank,or any symbol, for marketing use only, with no impact on RF compliance of the product)
EUT Stage	Identical Prototype

5. RF Exposure Limits

5.1 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.

5.2 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.

5.3 RF Exposure limit for below 6GHz

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.

5.4 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. The unit of power density evaluation is W/m2 or mW/cm2.

Peak Spatially Averaged Power Density was evaluated over a square 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

Note: 1.0 mW/cm^2 is 10 W/m^2

6. Specific Absorption Rate (SAR)

6.1 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.

6.2 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:

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

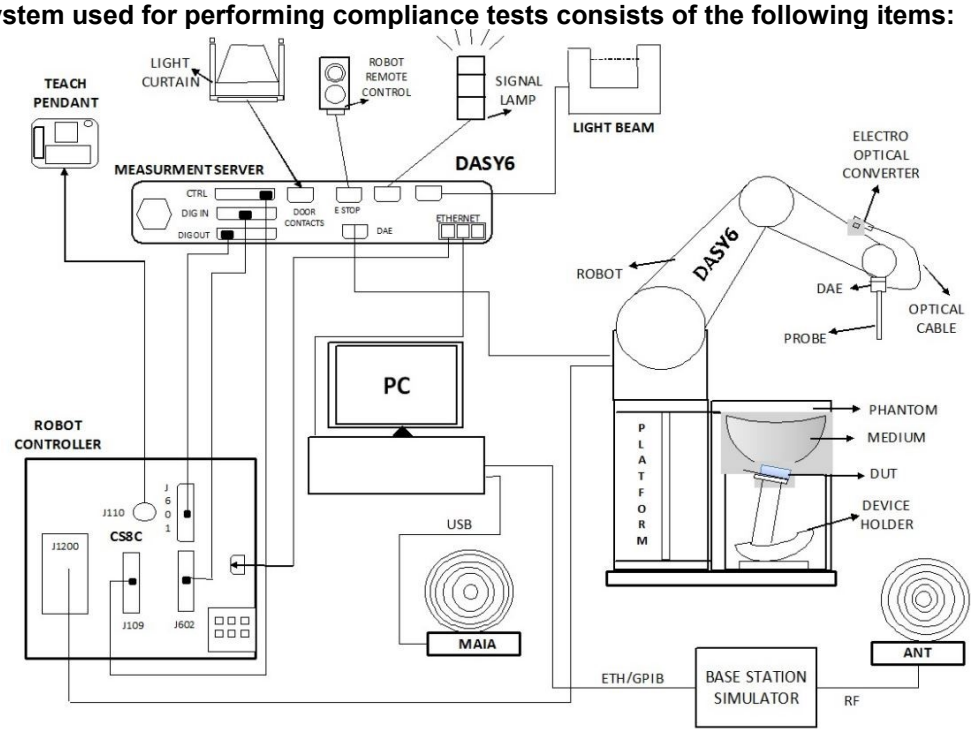
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. System Description and Setup

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win7 or Win10 and the DASY5 or DASY6[(1)] 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.

Note: 1. DASY6 software used: DASY6 mmWave V3.0.0.841 and older generations and used the developed Plane-to-Plane Phase Reconstruction (PTP-PR) Algorithm which was used in PD measurement.

7.1 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.

<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

7.2 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.

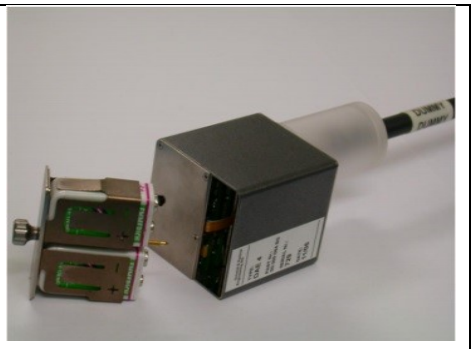
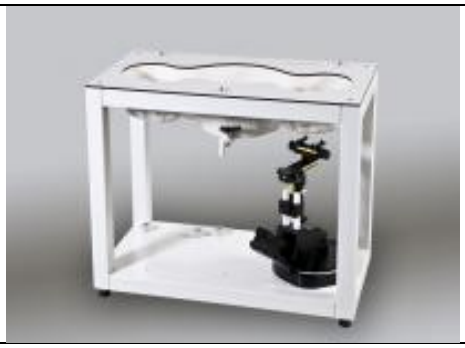


Photo of DAE

7.3 Phantom

<SAM Twin Phantom>

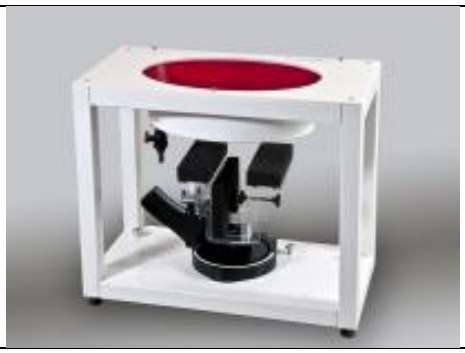
Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom



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



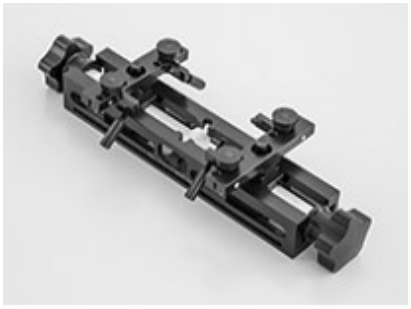
The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

7.4 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

8. 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

8.1 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

8.2 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.

8.3 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.	

8.4 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	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
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 *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.

8.5 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.

8.6 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.

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	2450MHz System Validation Kit	D2450V2	1040	2023/4/25	2024/4/24
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	2022/9/23	2025/9/22
SPEAG	6500MHz System Validation Kit	D6.5GHzV2	1031	2023/2/22	2026/2/21
SPEAG	5G Verification Source	10GHz	2005	2023/11/20	2024/11/19
SPEAG	Data Acquisition Electronics	DAE4	1650	2023/9/13	2024/9/12
SPEAG	Data Acquisition Electronics	DAE4	1649	2023/4/24	2024/4/23
SPEAG	Data Acquisition Electronics	DAE4	1303	2023/11/20	2024/11/19
SPEAG	Dosimetric E-Field Probe	EX3DV4	3857	2024/1/22	2025/1/21
SPEAG	Dosimetric E-Field Probe	EX3DV4	7764	2023/10/5	2024/10/4
SPEAG	EUmmWV Probe Tip Protection	EUmmWV4	9553	2023/10/18	2024/10/17
SPEAG	mmWave Phantom	mmWave	1065	NCR	NCR
SPEAG	ELI Phantom	ELI4	TP-1201	NCR	NCR
SPEAG	ELI Phantom	ELI4	TP-2134	NCR	NCR
Testo	Thermo-Hygrometer	608-H1	1241332126	2023/7/10	2024/7/9
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Rohde & Schwarz	Signal Generator	SMB100A	100455	2024/1/2	2025/1/1
Keysight	Preamplifier	83017A	MY57280111	2023/7/5	2024/7/4
Agilent	ENA Series Network Analyzer	E5071C	MY46111157	2023/7/5	2024/7/4
SPEAG	Dielectric Probe Kit	DAK-3.5	1144	2023/8/17	2024/8/16
Anritsu	Vector Signal Generator	MG3710A	6201682672	2024/1/2	2025/1/1
Rohde & Schwarz	Signal Generator	SMB100A	175779	2023/12/28	2024/12/27
Rohde & Schwarz	Power Meter	NRVD	102081	2023/7/5	2024/7/4
Rohde & Schwarz	Power Sensor	NRV-Z5	100538	2023/7/5	2024/7/4
Rohde & Schwarz	Power Sensor	NRV-Z5	100539	2023/7/5	2024/7/4
Rohde & Schwarz	Power Sensor	NRP50S	101385	2023/10/11	2024/10/10
Rohde & Schwarz	Power Sensor	NRP50S	101254	2023/4/6	2024/4/5
R&S	BLUETOOTH TESTER	CBT	101246	2023/5/15	2024/5/14
Rohde & Schwarz	Spectrum Analyzer	FSV7	101631	2023/10/11	2024/10/10
TES	DIGITAC THERMOMETER	1310	220305411	2023/7/8	2024/7/7
ARRA	Power Divider	A3200-2	N/A	Note 1	
MCL	Attenuation1	BW-S10W5+	N/A	Note 1	
MCL	Attenuation2	BW-S10W5+	N/A	Note 1	
MCL	Attenuation3	BW-S10W5+	N/A	Note 1	
BONN	POWER AMPLIFIER	BLMA 0830-3	087193A	Note 1	
BONN	POWER AMPLIFIER	BLMA 2060-2	087193B	Note 1	
mini-circuits	amplifier	ZVE-3W-83+	162601250	Note 1	
Agilent	Dual Directional Coupler	778D	20500	Note 1	
Agilent	Dual Directional Coupler	11691D	MY48151020	Note 1	
ET Industries	Dual Directional Coupler	C-058-10	N/A	Note 1	
ATM	Dual Directional Coupler	C122H-10	P610410z-02	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.

10. SAR System Verification

10.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.1.

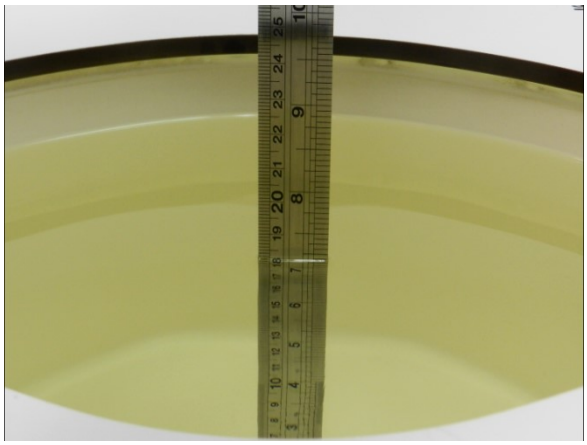


Fig 11.1 Photo of Liquid Height for Body SAR

10.2 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Head								
2450	55.0	0	0	0	0	45.0	1.80	39.2

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

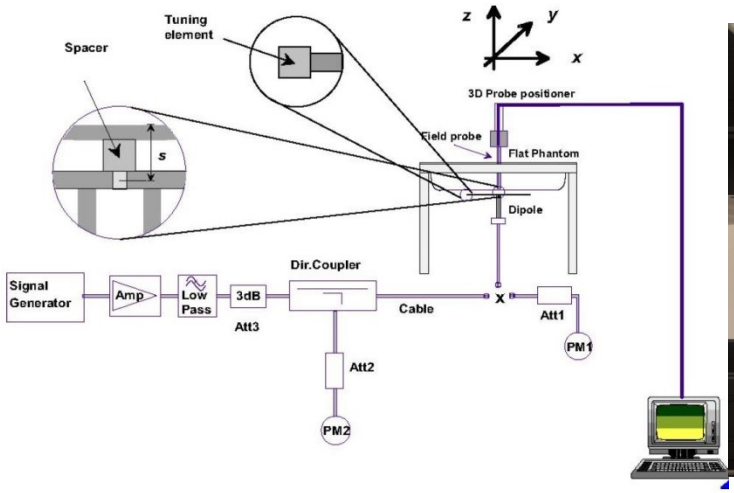
<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
2450	Head	22.7	1.744	39.268	1.80	39.20	-3.11	0.17	±5	2024/3/16
5250	Head	22.7	4.764	35.914	4.71	35.90	1.15	0.04	±5	2024/3/18
5600	Head	22.7	5.192	35.249	5.07	35.50	2.41	-0.71	±5	2024/3/20
5750	Head	22.7	5.362	34.958	5.22	35.40	2.72	-1.25	±5	2024/3/22
6500	Head	22.7	6.060	34.500	6.07	34.50	-0.16	0.00	±5	2024/3/17

10.3 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.

Date	Frequency (MHz)	Tissue Type	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 (%)
2024/3/16	2450	Head	50	1040	3857	1650	2.650	52.70	53	0.57
2024/3/18	5250	Head	50	1113	3857	1650	4.380	81.50	87.6	7.48
2024/3/20	5600	Head	50	1113	3857	1650	4.320	82.60	86.4	4.60
2024/3/22	5750	Head	50	1113	3857	1650	4.310	80.80	86.2	6.68
2024/3/17	6500	Head	50	1031	7764	1649	15.900	297.00	318	7.07



System Performance Check Setup

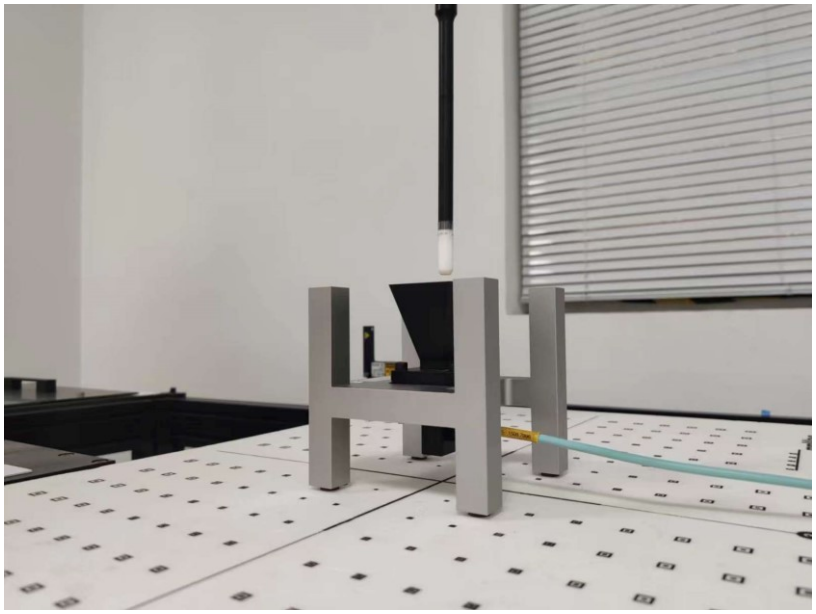
Setup Photo

10.4 PD System Verification 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.

Frequency (GHz)	5G Verification Source	Probe S/N	DAE S/N	Distance (mm)	Input Power (mW)	Measured 4 cm^2 (W/m^2)	Normalized[(1)] 4 cm^2 (W/m^2)	Targeted 4 cm^2 (W/m^2)	Deviation (dB)	Date
10	10GHz_2005	9553	1303	10	63	61.7	155.2	161	-0.16	2024/3/22

Note: 1. Measured PD after normalized to Pard power with DASY Calibration Certificate in appendix C.



System Verification Setup Photo

11. RF Exposure Positions

11.1 SAR testing for Notebook Computer

For laptop PC, according to KDB 616217 D04, SAR evaluation is required for the bottom surface of the keyboard. This EUT was tested in the base of EUT directly against the flat phantom. The required minimum test separation distance for incorporating transmitters and antennas into laptop computer display is determined with the display screen opened at an angle of 90° to the keyboard compartment.

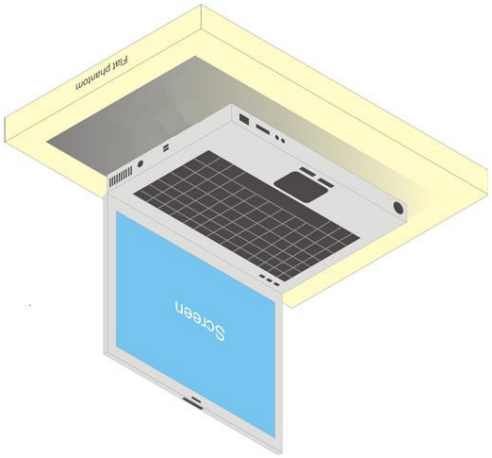


Illustration for Laptop Setup

<EUT Setup Photos>

Please refer to Appendix D for the test setup photos.

11.2 Miscellaneous Testing Considerations

- Evaluate SAR using 6-7 GHz parameters per IEC/IEEE 62209-1528:2020.
- Per procedures of KDB Pubs. 447498 and 248227
- Where supported by the test system, also report estimated absorbed (epithelial) power density (for reference purposes only, not specifically for compliance) and estimated incident PD, derived from measured SAR.
- In addition, for the highest SAR test configurations evaluate incident PD using the mmw near-field probe and total-field/power-density reconstruction method (2 mm closest meas. plane)
  - Adjust measured results per amount that measurement uncertainty exceeds 30 % (see e.g. IEC 62479:2010)

12. Conducted RF Output Power (Unit: dBm)

<WLAN Conducted Power>

General Note:

1. 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, for each frequency band or when MIMO mode was not performed, due to 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. Additional output power measurements were not necessary.
2. 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.
3. 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).
4. 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.
5. 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.
6. In applying the test guidance, the IEEE 802.11 mode with the maximum output power (out of all modes) should be considered for testing
7. 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
8. 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

9. SISO and MIMO all supported by WLAN2.4GHz/WLAN5GHz, for SISO mode power is less than per chain power of MIMO mode. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power, so only chose MIMO mode to perform SAR testing.

10. For the conducted power measurement is MIMO chains transmitting simultaneously and measured the separately conducted power for both chains and then based on the conducted power of two antennas respectively to calculate sum of the power for MIMO mode.

11. For testing the WLAN 6GHz of this DUT, the selection of test channels was based on FCC guidance, with five channels selected across the entire WLAN 6GHz Bands. For the U-NII-5/U-NII-7 band supporting Standard AP mode and indoor Client mode, the higher output mode was measured among the selected channels.

<For Non DBS>
<2.4GHz WLAN>

				Ant 1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	18.78	19.00	97.93
		6	2437	18.82	19.00	
		11	2462	18.56	19.00	
		12	2467	18.60	19.00	
		13	2472	12.72	13.00	
	802.11g 6Mbps	1	2412	Not Required	19.00	Not Required
		6	2437		19.00	
		11	2462		19.00	
		12	2467		19.00	
		13	2472		13.00	
	802.11n-HT20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11n-HT40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	
	802.11ac-VHT20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11ac-VHT40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	
	802.11ax-HE20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11ax-HE40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	
	802.11be-EHT20 MCS0	1	2412		19.00	
		6	2437		19.00	

		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11be-EHT40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	

				Ant 2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	18.78	19.00	98.35
		6	2437	18.97	19.00	
		11	2462	18.45	19.00	
		12	2467	18.42	19.00	
		13	2472	12.72	13.00	
	802.11g 6Mbps	1	2412	Not Required	19.00	Not Required
		6	2437		19.00	
		11	2462		19.00	
		12	2467		19.00	
		13	2472		13.00	
	802.11n-HT20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11n-HT40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	
	802.11ac-VHT20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11ac-VHT40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	
	802.11ax-HE20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11ax-HE40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	
	802.11be-EHT20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11be-EHT40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	

		10	2457		13.25	
		11	2462		8.00	

				Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	21.79	22.00	98.35
		6	2437	21.91	22.00	
		11	2462	21.52	22.00	
		12	2467	21.52	22.00	
		13	2472	15.73	16.00	
	802.11g 6Mbps	1	2412	Not Required	22.00	Not Required
		6	2437		22.00	
		11	2462		22.00	
		12	2467		22.00	
		13	2472		16.00	
	802.11n-HT20 MCS0	1	2412		22.00	
		6	2437		22.00	
		11	2462		19.50	
		12	2467		17.50	
		13	2472		13.50	
	802.11n-HT40 MCS0	3	2422		19.25	
		6	2437		20.50	
		9	2452		18.75	
		10	2457		16.25	
		11	2462		11.00	
	802.11ac-VHT20 MCS0	1	2412		22.00	
		6	2437		22.00	
		11	2462		19.50	
		12	2467		17.50	
		13	2472		13.50	
	802.11ac-VHT40 MCS0	3	2422		19.25	
		6	2437		20.50	
		9	2452		18.75	
		10	2457		16.25	
		11	2462		11.00	
	802.11ax-HE20 MCS0	1	2412		22.00	
		6	2437		22.00	
		11	2462		19.50	
		12	2467		17.50	
		13	2472		13.50	
	802.11ax-HE40 MCS0	3	2422		19.25	
		6	2437		20.50	
		9	2452		18.75	
		10	2457		16.25	
		11	2462		11.00	
	802.11be-EHT20 MCS0	1	2412		22.00	
		6	2437		22.00	
		11	2462		19.50	
		12	2467		17.50	
		13	2472		13.50	
	802.11be-EHT40 MCS0	3	2422		19.25	
		6	2437		20.50	
		9	2452		18.75	
		10	2457		16.25	
		11	2462		11.00	

<5GHz WLAN>

				Ant 1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	Not Required	17.00	Not Required
		40	5200		17.00	
		44	5220		17.00	
		48	5240		17.00	
	802.11n-HT20 MCS0	36	5180		17.00	
		40	5200		17.00	
		44	5220		17.00	
		48	5240		17.00	
	802.11n-HT40 MCS0	38	5190		17.00	
		46	5230		17.00	
	802.11ac-VHT20 MCS0	36	5180		17.00	
		40	5200		17.00	
		44	5220		17.00	
		48	5240		17.00	
	802.11ac-VHT40 MCS0	38	5190		17.00	
		46	5230		17.00	
	802.11ac-VHT80 MCS0	42	5210		15.75	
	802.11ax-HE20 MCS0	36	5180		17.00	
		40	5200		17.00	
		44	5220		17.00	
		48	5240		17.00	
	802.11ax-HE40 MCS0	38	5190		17.00	
		46	5230		17.00	
	802.11ax-HE80 MCS0	42	5210		15.75	
	802.11be-EHT20 MCS0	36	5180		17.00	
		40	5200		17.00	
		44	5220		17.00	
		48	5240		17.00	
	802.11be-EHT40 MCS0	38	5190		17.00	
		46	5230		17.00	
	802.11be-EHT80 MCS0	42	5210		15.75	

				Ant 2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	Not Required	18.50	Not Required
		40	5200		18.50	
		44	5220		18.50	
		48	5240		18.50	
	802.11n-HT20 MCS0	36	5180		18.50	
		40	5200		18.50	
		44	5220		18.50	
		48	5240		18.50	
	802.11n-HT40 MCS0	38	5190		18.50	
		46	5230		18.50	
	802.11ac-VHT20 MCS0	36	5180		18.50	
		40	5200		18.50	
		44	5220		18.50	
		48	5240		18.50	
	802.11ac-VHT40 MCS0	38	5190		18.50	
		46	5230		18.50	
	802.11ac-VHT80 MCS0	42	5210		15.75	
	802.11ax-HE20 MCS0	36	5180		18.50	
		40	5200		18.50	

		44	5220		18.50	
		48	5240		18.50	
	802.11ax-HE40 MCS0	38	5190		18.50	
		46	5230		18.50	
	802.11ax-HE80 MCS0	42	5210		15.75	
	802.11be-EHT20 MCS0	36	5180		18.50	
		40	5200		18.50	
		44	5220		18.50	
		48	5240		18.50	
	802.11be-EHT40 MCS0	38	5190		18.50	
		46	5230		18.50	
	802.11be-EHT80 MCS0	42	5210		15.75	

				Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	Not Required	21.00	Not Required
		40	5200		21.00	
		44	5220		21.00	
		48	5240		21.00	
	802.11n-HT20 MCS0	36	5180		21.00	
		40	5200		21.00	
		44	5220		21.00	
		48	5240		21.00	
	802.11n-HT40 MCS0	38	5190		21.00	
		46	5230		21.00	
	802.11ac-VHT20 MCS0	36	5180		21.00	
		40	5200		21.00	
		44	5220		21.00	
		48	5240		21.00	
	802.11ac-VHT40 MCS0	38	5190		21.00	
		46	5230		21.00	
	802.11ac-VHT80 MCS0	42	5210		18.75	
	802.11ax-HE20 MCS0	36	5180		21.00	
		40	5200		21.00	
		44	5220		21.00	
		48	5240		21.00	
	802.11ax-HE40 MCS0	38	5190		21.00	
		46	5230		21.00	
	802.11ax-HE80 MCS0	42	5210		18.75	
	802.11be-EHT20 MCS0	36	5180		21.00	
		40	5200		21.00	
		44	5220		21.00	
		48	5240		21.00	
	802.11be-EHT40 MCS0	38	5190		21.00	
		46	5230		21.00	
	802.11be-EHT80 MCS0	42	5210		18.75	

				Ant 1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	Not Required	17.00	Not Required
		56	5280		17.00	
		60	5300		17.00	
		64	5320		17.00	
	802.11n-HT20 MCS0	52	5260		17.00	
		56	5280		17.00	
		60	5300		17.00	
		64	5320		17.00	
	802.11n-HT40 MCS0	54	5270	15.13	17.00	100.00
		62	5310	15.33	17.00	
	802.11ac-VHT20 MCS0	52	5260	Not Required	17.00	Not Required
		56	5280		17.00	
		60	5300		17.00	
		64	5320		17.00	
	802.11ac-VHT40 MCS0	54	5270		17.00	
		62	5310		17.00	
	802.11ac-VHT80 MCS0	58	5290		15.75	
	802.11ac-VHT160 MCS0	50	5250		13.75	
	802.11ax-HE20 MCS0	52	5260		17.00	
		56	5280		17.00	
		60	5300		17.00	
		64	5320		17.00	
	802.11ax-HE40 MCS0	54	5270		17.00	
		62	5310		17.00	
	802.11ax-HE80 MCS0	58	5290		15.75	
	802.11ax-HE160 MCS0	50	5250		13.75	
	802.11be-EHT20 MCS0	52	5260		17.00	
		56	5280		17.00	
		60	5300		17.00	
		64	5320		17.00	
	802.11be-EHT40 MCS0	54	5270		17.00	
		62	5310		17.00	
	802.11be-EHT80 MCS0	58	5290		15.75	
	802.11be-EHT160 MCS0	50	5250		13.75	

				Ant 2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	Not Required	18.50	Not Required
		56	5280		18.50	
		60	5300		18.50	
		64	5320		18.50	
	802.11n-HT20 MCS0	52	5260		18.50	
		56	5280		18.50	
		60	5300		18.50	
		64	5320		18.50	
	802.11n-HT40 MCS0	54	5270	16.86	18.50	100.00
		62	5310	16.81	18.50	
	802.11ac-VHT20 MCS0	52	5260	Not Required	18.50	Not Required
		56	5280		18.50	
		60	5300		18.50	
		64	5320		18.50	
	802.11ac-VHT40 MCS0	54	5270		18.50	
		62	5310		18.50	

	802.11ac-VHT80 MCS0	58	5290		15.75	
	802.11ac-VHT160 MCS0	50	5250		13.75	
	802.11ax-HE20 MCS0	52	5260		18.50	
		56	5280		18.50	
		60	5300		18.50	
		64	5320		18.50	
	802.11ax-HE40 MCS0	54	5270		18.50	
		62	5310		18.50	
	802.11ax-HE80 MCS0	58	5290		15.75	
	802.11ax-HE160 MCS0	50	5250		13.75	
	802.11be-EHT20 MCS0	52	5260		18.50	
		56	5280		18.50	
		60	5300		18.50	
		64	5320		18.50	
	802.11be-EHT40 MCS0	54	5270		18.50	
		62	5310		18.50	
	802.11be-EHT80 MCS0	58	5290		15.75	
	802.11be-EHT160 MCS0	50	5250		13.75	

				Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	Not Required	21.00	Not Required
		56	5280		21.00	
		60	5300		21.00	
		64	5320		21.00	
	802.11n-HT20 MCS0	52	5260		21.00	
		56	5280		21.00	
		60	5300		21.00	
		64	5320		21.00	
	802.11n-HT40 MCS0	54	5270	19.10	21.00	100.00
		62	5310	19.14	21.00	
	802.11ac-VHT20 MCS0	52	5260	Not Required	21.00	Not Required
		56	5280		21.00	
		60	5300		21.00	
		64	5320		21.00	
	802.11ac-VHT40 MCS0	54	5270		21.00	
		62	5310		21.00	
	802.11ac-VHT80 MCS0	58	5290		18.75	
	802.11ac-VHT160 MCS0	50	5250		16.75	
	802.11ax-HE20 MCS0	52	5260		21.00	
		56	5280		21.00	
		60	5300		21.00	
		64	5320		21.00	
	802.11ax-HE40 MCS0	54	5270		21.00	
		62	5310		21.00	
	802.11ax-HE80 MCS0	58	5290		18.75	
	802.11ax-HE160 MCS0	50	5250		16.75	
	802.11be-EHT20 MCS0	52	5260		21.00	
		56	5280		21.00	
		60	5300		21.00	
		64	5320		21.00	
	802.11be-EHT40 MCS0	54	5270		21.00	
		62	5310		21.00	
	802.11be-EHT80 MCS0	58	5290		18.75	
	802.11be-EHT160 MCS0	50	5250		16.75	

				Ant 1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	Not Required	15.50	Not Required
		116	5580		15.50	
		124	5620		15.50	
		132	5660		15.50	
		140	5700		15.50	
		144	5720		15.50	
	802.11n-HT20 MCS0	100	5500		15.50	
		116	5580		15.50	
		124	5620		15.50	
		132	5660		15.50	
		140	5700		15.50	
		144	5720		15.50	
	802.11n-HT40 MCS0	102	5510		15.50	
		110	5550		15.50	
		126	5630		15.50	
		134	5670		15.50	
		142	5710		15.50	
	802.11ac-VHT20 MCS0	100	5500		15.50	
		116	5580		15.50	
		124	5620		15.50	
		132	5660		15.50	
		140	5700		15.50	
		144	5720		15.50	
	802.11ac-VHT40 MCS0	102	5510		15.50	
		110	5550		15.50	
		126	5630		15.50	
		134	5670		15.50	
		142	5710		15.50	
	802.11ac-VHT80 MCS0	106	5530	15.23	15.50	100.00
		122	5610	15.05	15.50	
		138	5690	14.90	15.50	
	802.11ac-VHT160 MCS0	114	5570	Not Required	14.25	Not Required
	802.11ax-HE20 MCS0	100	5500		15.50	
		116	5580		15.50	
		124	5620		15.50	
		132	5660		15.50	
		140	5700		15.50	
		144	5720		15.50	
	802.11ax-HE40 MCS0	102	5510		15.50	
		110	5550		15.50	
		126	5630		15.50	
		134	5670		15.50	
		142	5710		15.50	
	802.11ax-HE80 MCS0	106	5530		15.50	
		122	5610		15.50	
		138	5690		15.50	
	802.11ax-HE160 MCS0	114	5570		14.25	
	802.11be-EHT20 MCS0	100	5500		15.50	
		116	5580		15.50	
		124	5620		15.50	
		132	5660		15.50	
		140	5700		15.50	
		144	5720		15.50	
	802.11be-EHT40 MCS0	102	5510		15.50	
		110	5550		15.50	
		126	5630		15.50	

		134	5670		15.50	
		142	5710		15.50	
	802.11be-EHT80 MCS0	106	5530		15.50	
		122	5610		15.50	
		138	5690		15.50	
	802.11be-EHT160 MCS0	114	5570		14.25	

				Ant 2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	Not Required	16.50	Not Required
		116	5580		16.50	
		124	5620		16.50	
		132	5660		16.50	
		140	5700		16.50	
		144	5720		16.50	
	802.11n-HT20 MCS0	100	5500		16.50	
		116	5580		16.50	
		124	5620		16.50	
		132	5660		16.50	
		140	5700		16.50	
		144	5720		16.50	
	802.11n-HT40 MCS0	102	5510		16.50	
		110	5550		16.50	
		126	5630		16.50	
		134	5670		16.50	
		142	5710		16.50	
	802.11ac-VHT20 MCS0	100	5500		16.50	
		116	5580		16.50	
		124	5620		16.50	
		132	5660		16.50	
		140	5700		16.50	
		144	5720		16.50	
	802.11ac-VHT40 MCS0	102	5510		16.50	
		110	5550		16.50	
		126	5630		16.50	
		134	5670		16.50	
		142	5710		16.50	
	802.11ac-VHT80 MCS0	106	5530	16.44	16.50	100.00
		122	5610	16.47	16.50	
		138	5690	16.42	16.50	
	802.11ac-VHT160 MCS0	114	5570	Not Required	14.25	Not Required
	802.11ax-HE20 MCS0	100	5500		16.50	
		116	5580		16.50	
		124	5620		16.50	
		132	5660		16.50	
		140	5700		16.50	
		144	5720		16.50	
	802.11ax-HE40 MCS0	102	5510		16.50	
		110	5550		16.50	
		126	5630		16.50	
		134	5670		16.50	
		142	5710		16.50	
	802.11ax-HE80 MCS0	106	5530		16.50	
		122	5610		16.50	
		138	5690		16.50	
	802.11ax-HE160 MCS0	114	5570		14.25	
	802.11be-EHT20 MCS0	100	5500		16.50	
		116	5580		16.50	
		124	5620		16.50	

		132	5660		16.50	
		140	5700		16.50	
		144	5720		16.50	
	802.11be-EHT40 MCS0	102	5510		16.50	
		110	5550		16.50	
		126	5630		16.50	
		134	5670		16.50	
		142	5710		16.50	
	802.11be-EHT80 MCS0	106	5530		16.50	
		122	5610		16.50	
		138	5690		16.50	
	802.11be-EHT160 MCS0	114	5570		14.25	

				Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	Not Required	19.00	Not Required
		116	5580		19.00	
		124	5620		19.00	
		132	5660		19.00	
		140	5700		19.00	
		144	5720		19.00	
	802.11n-HT20 MCS0	100	5500		19.00	
		116	5580		19.00	
		124	5620		19.00	
		132	5660		19.00	
		140	5700		19.00	
		144	5720		19.00	
	802.11n-HT40 MCS0	102	5510		19.00	
		110	5550		19.00	
		126	5630		19.00	
		134	5670		19.00	
		142	5710		19.00	
	802.11ac-VHT20 MCS0	100	5500		19.00	
		116	5580		19.00	
		124	5620		19.00	
		132	5660		19.00	
		140	5700		19.00	
		144	5720		19.00	
	802.11ac-VHT40 MCS0	102	5510		19.00	
		110	5550		19.00	
		126	5630		19.00	
		134	5670		19.00	
		142	5710		19.00	
	802.11ac-VHT80 MCS0	106	5530	18.89	19.00	100.00
		122	5610	18.83	19.00	
		138	5690	18.74	19.00	
	802.11ac-VHT160 MCS0	114	5570	Not Required	17.25	Not Required
	802.11ax-HE20 MCS0	100	5500		19.00	
		116	5580		19.00	
		124	5620		19.00	
		132	5660		19.00	
		140	5700		19.00	
		144	5720		19.00	
	802.11ax-HE40 MCS0	102	5510		19.00	
		110	5550		19.00	
		126	5630		19.00	
		134	5670		19.00	
		142	5710		19.00	
	802.11ax-HE80 MCS0	106	5530		19.00	

		122	5610		19.00	
		138	5690		19.00	
	802.11ax-HE160 MCS0	114	5570		17.25	
	802.11be-EHT20 MCS0	100	5500		19.00	
		116	5580		19.00	
		124	5620		19.00	
		132	5660		19.00	
		140	5700		19.00	
		144	5720		19.00	
	802.11be-EHT40 MCS0	102	5510		19.00	
		110	5550		19.00	
		126	5630		19.00	
		134	5670		19.00	
		142	5710		19.00	
	802.11be-EHT80 MCS0	106	5530		19.00	
		122	5610		19.00	
		138	5690		19.00	
	802.11be-EHT160 MCS0	114	5570		17.25	

				Ant 1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	Not Required	15.50	Not Required
		157	5785		15.50	
		165	5825		15.50	
	802.11n-HT20 MCS0	149	5745		15.50	
		157	5785		15.50	
		165	5825		15.50	
	802.11n-HT40 MCS0	151	5755		15.50	
		159	5795		15.50	
	802.11ac-VHT20 MCS0	149	5745		15.50	
		157	5785		15.50	
		165	5825		15.50	
	802.11ac-VHT40 MCS0	151	5755		15.50	
		159	5795		15.50	
	802.11ac-VHT80 MCS0	155	5775	14.24	15.50	100.00
	802.11ax-HE20 MCS0	149	5745	Not Required	15.50	Not Required
		157	5785		15.50	
		165	5825		15.50	
	802.11ax-HE40 MCS0	151	5755		15.50	
		159	5795		15.50	
	802.11ax-HE80 MCS0	155	5775		15.50	
	802.11be-EHT20 MCS0	149	5745		15.50	
		157	5785		15.50	
		165	5825		15.50	
	802.11be-EHT40 MCS0	151	5755		15.50	
		159	5795		15.50	
	802.11be-EHT80 MCS0	155	5775		15.50	

				Ant 2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	Not Required	17.00	Not Required
		157	5785		17.00	
		165	5825		17.00	
	802.11n-HT20 MCS0	149	5745		17.00	
		157	5785		17.00	
		165	5825		17.00	

	802.11n-HT40 MCS0	151	5755		17.00	
		159	5795		17.00	
	802.11ac-VHT20 MCS0	149	5745		17.00	
		157	5785		17.00	
		165	5825		17.00	
	802.11ac-VHT40 MCS0	151	5755		17.00	
		159	5795		17.00	
	802.11ac-VHT80 MCS0	155	5775	15.83	17.00	100.00
	802.11ax-HE20 MCS0	149	5745	Not Required	17.00	Not Required
		157	5785		17.00	
		165	5825		17.00	
	802.11ax-HE40 MCS0	151	5755		17.00	
		159	5795		17.00	
	802.11ax-HE80 MCS0	155	5775		17.00	
	802.11be-EHT20 MCS0	149	5745		17.00	
		157	5785		17.00	
		165	5825		17.00	
	802.11be-EHT40 MCS0	151	5755		17.00	
		159	5795		17.00	
	802.11be-EHT80 MCS0	155	5775		17.00	

				Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	Not Required	19.50	Not Required
		157	5785		19.50	
		165	5825		19.50	
	802.11n-HT20 MCS0	149	5745		19.50	
		157	5785		19.50	
		165	5825		19.50	
	802.11n-HT40 MCS0	151	5755		19.50	
		159	5795		19.50	
	802.11ac-VHT20 MCS0	149	5745		19.50	
		157	5785		19.50	
		165	5825		19.50	
	802.11ac-VHT40 MCS0	151	5755		19.50	
		159	5795		19.50	
	802.11ac-VHT80 MCS0	155	5775	18.12	19.50	100.00
	802.11ax-HE20 MCS0	149	5745	Not Required	19.50	Not Required
		157	5785		19.50	
		165	5825		19.50	
	802.11ax-HE40 MCS0	151	5755		19.50	
		159	5795		19.50	
	802.11ax-HE80 MCS0	155	5775		19.50	
	802.11be-EHT20 MCS0	149	5745		19.50	
		157	5785		19.50	
		165	5825		19.50	
	802.11be-EHT40 MCS0	151	5755		19.50	
		159	5795		19.50	
	802.11be-EHT80 MCS0	155	5775		19.50	

<6GHz WLAN>

				Ant 1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
WiFi 6GHz	802.11a 6Mbps	1	5955	Not Required	-1.50	Not Required
		57	6235		-1.50	
		113	6515		0.00	
		173	6815		-0.25	
		233	7115		0.25	
	802.11ax-HE20 MCS0	1	5955		2.00	
		57	6235		2.00	
		113	6515		3.75	
		173	6815		3.50	
		233	7115		-7.75	
	802.11ax-HE40 MCS0	3	5965		6.00	
		59	6245		6.00	
		107	6485		6.25	
		171	6805		6.25	
		227	7085		6.50	
	802.11ax-HE80 MCS0	7	5985		9.00	
		71	6305		9.00	
		119	6545		9.00	
		167	6785		9.00	
		215	7025		9.25	
	802.11ax-HE160 MCS0	15	6025		13.50	
		47	6185		12.75	
		111	6505		13.25	
		143	6665		13.25	
		207	6985		13.00	
	802.11be-EHT20 MCS0	1	5955		2.00	
		57	6235		2.00	
		113	6515		3.75	
		173	6815		3.50	
		233	7115		-7.75	
	802.11be-EHT40 MCS0	3	5965		6.00	
		59	6245		6.00	
		107	6485		6.25	
		171	6805		6.25	
		227	7085		6.50	
	802.11be-EHT80 MCS0	7	5985		9.00	
		71	6305		9.00	
		119	6545		9.00	
		167	6785		9.00	
		215	7025		9.25	
	802.11be-EHT160 MCS0	15	6025		13.50	
		47	6185		12.75	
		111	6505		13.25	
		143	6665		13.25	
		207	6985		13.00	
	802.11be-EHT320 MCS0	31	6105	14.08	14.50	98.27
		95	6425	14.84	15.00	
		127	6585	14.77	15.00	
		159	6745	14.20	14.50	
		191	6905	14.75	15.00	

				Ant 2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
WiFi 6GHz	802.11a 6Mbps	1	5955	Not Required	-1.50	Not Required
		57	6235		-1.50	
		113	6515		0.00	
		173	6815		-0.25	
		233	7115		0.25	
	802.11ax-HE20 MCS0	1	5955		2.00	
		57	6235		2.00	
		113	6515		3.75	
		173	6815		3.50	
		233	7115		-7.75	
	802.11ax-HE40 MCS0	3	5965		6.00	
		59	6245		6.00	
		107	6485		6.25	
		171	6805		6.25	
		227	7085		6.50	
	802.11ax-HE80 MCS0	7	5985		9.00	
		71	6305		9.00	
		119	6545		9.00	
		167	6785		9.00	
		215	7025		9.25	
	802.11ax-HE160 MCS0	15	6025		13.50	
		47	6185		12.75	
		111	6505		13.25	
		143	6665		13.25	
		207	6985		13.00	
	802.11be-EHT20 MCS0	1	5955		2.00	
		57	6235		2.00	
		113	6515		3.75	
		173	6815		3.50	
		233	7115		-7.75	
	802.11be-EHT40 MCS0	3	5965		6.00	
		59	6245		6.00	
		107	6485		6.25	
		171	6805		6.25	
		227	7085		6.50	
	802.11be-EHT80 MCS0	7	5985		9.00	
		71	6305		9.00	
		119	6545		9.00	
		167	6785		9.00	
		215	7025		9.25	
	802.11be-EHT160 MCS0	15	6025		13.50	
		47	6185		12.75	
		111	6505		13.25	
		143	6665		13.25	
		207	6985		13.00	
	802.11be-EHT320 MCS0	31	6105	15.40	15.50	98.84
		95	6425	14.48	15.00	
		127	6585	14.50	15.00	
		159	6745	14.33	14.50	
		191	6905	14.04	14.50	

				Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
WiFi 6GHz	802.11a 6Mbps	1	5955	Not Required	1.50	Not Required
		57	6235		1.50	
		113	6515		3.00	
		173	6815		2.75	
		233	7115		3.25	
	802.11ax-HE20 MCS0	1	5955		5.00	
		57	6235		5.00	
		113	6515		6.75	
		173	6815		6.50	
		233	7115		-4.75	
	802.11ax-HE40 MCS0	3	5965		9.00	
		59	6245		9.00	
		107	6485		9.25	
		171	6805		9.25	
		227	7085		9.50	
	802.11ax-HE80 MCS0	7	5985		12.00	
		71	6305		12.00	
		119	6545		12.00	
		167	6785		12.00	
		215	7025		12.25	
	802.11ax-HE160 MCS0	15	6025		16.50	
		47	6185		15.75	
		111	6505		16.25	
		143	6665		16.25	
		207	6985		16.00	
	802.11be-EHT20 MCS0	1	5955		5.00	
		57	6235		5.00	
		113	6515		6.75	
		173	6815		6.50	
		233	7115		-4.75	
	802.11be-EHT40 MCS0	3	5965		9.00	
		59	6245		9.00	
		107	6485		9.25	
		171	6805		9.25	
		227	7085		9.50	
	802.11be-EHT80 MCS0	7	5985		12.00	
		71	6305		12.00	
		119	6545		12.00	
		167	6785		12.00	
		215	7025		12.25	
	802.11be-EHT160 MCS0	15	6025		16.50	
		47	6185		15.75	
		111	6505		16.25	
		143	6665		16.25	
		207	6985		16.00	
	802.11be-EHT320 MCS0	31	6105	17.81	18.00	98.84
		95	6425	17.67	18.00	
		127	6585	17.65	18.00	
		159	6745	17.27	17.50	
		191	6905	17.42	17.50	

<For DBS>
<2.4GHz WLAN>

				Ant 1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	18.78	19.00	97.93
		6	2437	18.82	19.00	
		11	2462	18.56	19.00	
		12	2467	18.60	19.00	
		13	2472	12.72	13.00	
	802.11g 6Mbps	1	2412	Not Required	19.00	Not Required
		6	2437		19.00	
		11	2462		19.00	
		12	2467		19.00	
		13	2472		13.00	
	802.11n-HT20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11n-HT40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	
	802.11ac-VHT20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11ac-VHT40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	
	802.11ax-HE20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11ax-HE40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	
	802.11be-EHT20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11be-EHT40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	

				Ant 2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	18.78	19.00	98.35
		6	2437	18.97	19.00	
		11	2462	18.45	19.00	
		12	2467	18.42	19.00	
		13	2472	12.72	13.00	
	802.11g 6Mbps	1	2412	Not Required	19.00	Not Required
		6	2437		19.00	
		11	2462		19.00	
		12	2467		19.00	
		13	2472		13.00	
	802.11n-HT20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11n-HT40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	
	802.11ac-VHT20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11ac-VHT40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	
	802.11ax-HE20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11ax-HE40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	
	802.11be-EHT20 MCS0	1	2412		19.00	
		6	2437		19.00	
		11	2462		16.50	
		12	2467		14.50	
		13	2472		10.50	
	802.11be-EHT40 MCS0	3	2422		16.25	
		6	2437		17.50	
		9	2452		15.75	
		10	2457		13.25	
		11	2462		8.00	

				Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	21.79	22.00	98.35
		6	2437	21.91	22.00	
		11	2462	21.52	22.00	
		12	2467	21.52	22.00	
		13	2472	15.73	16.00	
	802.11g 6Mbps	1	2412	Not Required	22.00	Not Required
		6	2437		22.00	
		11	2462		22.00	
		12	2467		22.00	
		13	2472		16.00	
	802.11n-HT20 MCS0	1	2412		22.00	
		6	2437		22.00	
		11	2462		19.50	
		12	2467		17.50	
		13	2472		13.50	
	802.11n-HT40 MCS0	3	2422		19.25	
		6	2437		20.50	
		9	2452		18.75	
		10	2457		16.25	
		11	2462		11.00	
	802.11ac-VHT20 MCS0	1	2412		22.00	
		6	2437		22.00	
		11	2462		19.50	
		12	2467		17.50	
		13	2472		13.50	
	802.11ac-VHT40 MCS0	3	2422		19.25	
		6	2437		20.50	
		9	2452		18.75	
		10	2457		16.25	
		11	2462		11.00	
	802.11ax-HE20 MCS0	1	2412		22.00	
		6	2437		22.00	
		11	2462		19.50	
		12	2467		17.50	
		13	2472		13.50	
	802.11ax-HE40 MCS0	3	2422		19.25	
		6	2437		20.50	
		9	2452		18.75	
		10	2457		16.25	
		11	2462		11.00	
	802.11be-EHT20 MCS0	1	2412		22.00	
		6	2437		22.00	
		11	2462		19.50	
		12	2467		17.50	
		13	2472		13.50	
	802.11be-EHT40 MCS0	3	2422		19.25	
		6	2437		20.50	
		9	2452		18.75	
		10	2457		16.25	
		11	2462		11.00	

<5GHz WLAN>

				Ant 1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	Not Required	16.00	Not Required
		40	5200		16.00	
		44	5220		16.00	
		48	5240		16.00	
	802.11n-HT20 MCS0	36	5180		16.00	
		40	5200		16.00	
		44	5220		16.00	
		48	5240		16.00	
	802.11n-HT40 MCS0	38	5190		16.00	
		46	5230		16.00	
	802.11ac-VHT20 MCS0	36	5180		16.00	
		40	5200		16.00	
		44	5220		16.00	
		48	5240		16.00	
	802.11ac-VHT40 MCS0	38	5190		16.00	
		46	5230		16.00	
	802.11ac-VHT80 MCS0	42	5210		15.75	
	802.11ax-HE20 MCS0	36	5180		16.00	
		40	5200		16.00	
		44	5220		16.00	
		48	5240		16.00	
	802.11ax-HE40 MCS0	38	5190		16.00	
		46	5230		16.00	
	802.11ax-HE80 MCS0	42	5210		15.75	
	802.11be-EHT20 MCS0	36	5180		16.00	
		40	5200		16.00	
		44	5220		16.00	
		48	5240		16.00	
	802.11be-EHT40 MCS0	38	5190		16.00	
		46	5230		16.00	
	802.11be-EHT80 MCS0	42	5210		15.75	

				Ant 2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	Not Required	17.50	Not Required
		40	5200		17.50	
		44	5220		17.50	
		48	5240		17.50	
	802.11n-HT20 MCS0	36	5180		17.50	
		40	5200		17.50	
		44	5220		17.50	
		48	5240		17.50	
	802.11n-HT40 MCS0	38	5190		17.50	
		46	5230		17.50	
	802.11ac-VHT20 MCS0	36	5180		17.50	
		40	5200		17.50	
		44	5220		17.50	
		48	5240		17.50	
	802.11ac-VHT40 MCS0	38	5190		17.50	
		46	5230		17.50	
	802.11ac-VHT80 MCS0	42	5210		15.75	
	802.11ax-HE20 MCS0	36	5180		17.50	
		40	5200		17.50	
		44	5220		17.50	
		48	5240		17.50	
	802.11ax-HE40 MCS0	38	5190		17.50	
		46	5230		17.50	
	802.11ax-HE80 MCS0	42	5210		15.75	
	802.11be-EHT20 MCS0	36	5180		17.50	
		40	5200		17.50	
		44	5220		17.50	
		48	5240		17.50	
	802.11be-EHT40 MCS0	38	5190		17.50	
		46	5230		17.50	
	802.11be-EHT80 MCS0	42	5210		15.75	

				Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	Not Required	20.00	Not Required
		40	5200		20.00	
		44	5220		20.00	
		48	5240		20.00	
	802.11n-HT20 MCS0	36	5180		20.00	
		40	5200		20.00	
		44	5220		20.00	
		48	5240		20.00	
	802.11n-HT40 MCS0	38	5190		20.00	
		46	5230		20.00	
	802.11ac-VHT20 MCS0	36	5180		20.00	
		40	5200		20.00	
		44	5220		20.00	
		48	5240		20.00	
	802.11ac-VHT40 MCS0	38	5190		20.00	
		46	5230		20.00	
	802.11ac-VHT80 MCS0	42	5210		18.75	
	802.11ax-HE20 MCS0	36	5180		20.00	
		40	5200		20.00	
		44	5220		20.00	
		48	5240		20.00	
	802.11ax-HE40 MCS0	38	5190		20.00	
		46	5230		20.00	
	802.11ax-HE80 MCS0	42	5210		18.75	
	802.11be-EHT20 MCS0	36	5180		20.00	
		40	5200		20.00	
		44	5220		20.00	
		48	5240		20.00	
	802.11be-EHT40 MCS0	38	5190		20.00	
		46	5230		20.00	
	802.11be-EHT80 MCS0	42	5210		18.75	

				Ant 1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	Not Required	16.00	Not Required
		56	5280		16.00	
		60	5300		16.00	
		64	5320		16.00	
	802.11n-HT20 MCS0	52	5260		16.00	
		56	5280		16.00	
		60	5300		16.00	
		64	5320		16.00	
	802.11n-HT40 MCS0	54	5270	14.45	16.00	100.00
		62	5310	14.51	16.00	
	802.11ac-VHT20 MCS0	52	5260	Not Required	16.00	Not Required
		56	5280		16.00	
		60	5300		16.00	
		64	5320		16.00	
	802.11ac-VHT40 MCS0	54	5270		16.00	
		62	5310		16.00	
	802.11ac-VHT80 MCS0	58	5290		15.75	
	802.11ac-VHT160 MCS0	50	5250		13.75	
	802.11ax-HE20 MCS0	52	5260		16.00	
		56	5280		16.00	
		60	5300		16.00	
		64	5320		16.00	
	802.11ax-HE40 MCS0	54	5270		16.00	
		62	5310		16.00	
	802.11ax-HE80 MCS0	58	5290		15.75	
	802.11ax-HE160 MCS0	50	5250		13.75	
	802.11be-EHT20 MCS0	52	5260		16.00	
		56	5280		16.00	
		60	5300		16.00	
		64	5320		16.00	
	802.11be-EHT40 MCS0	54	5270		16.00	
		62	5310		16.00	
	802.11be-EHT80 MCS0	58	5290		15.75	
	802.11be-EHT160 MCS0	50	5250		13.75	

				Ant 2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	Not Required	17.50	Not Required
		56	5280		17.50	
		60	5300		17.50	
		64	5320		17.50	
	802.11n-HT20 MCS0	52	5260		17.50	
		56	5280		17.50	
		60	5300		17.50	
		64	5320		17.50	
	802.11n-HT40 MCS0	54	5270	16.28	17.50	100.00
		62	5310	16.35	17.50	
	802.11ac-VHT20 MCS0	52	5260	Not Required	17.50	Not Required
		56	5280		17.50	
		60	5300		17.50	
		64	5320		17.50	
	802.11ac-VHT40 MCS0	54	5270		17.50	
		62	5310		17.50	
	802.11ac-VHT80 MCS0	58	5290		15.75	
	802.11ac-VHT160 MCS0	50	5250		13.75	
	802.11ax-HE20 MCS0	52	5260		17.50	
		56	5280		17.50	
		60	5300		17.50	
		64	5320		17.50	
	802.11ax-HE40 MCS0	54	5270		17.50	
		62	5310		17.50	
	802.11ax-HE80 MCS0	58	5290		15.75	
	802.11ax-HE160 MCS0	50	5250		13.75	
	802.11be-EHT20 MCS0	52	5260		17.50	
		56	5280		17.50	
		60	5300		17.50	
		64	5320		17.50	
	802.11be-EHT40 MCS0	54	5270		17.50	
		62	5310		17.50	
	802.11be-EHT80 MCS0	58	5290		15.75	
	802.11be-EHT160 MCS0	50	5250		13.75	

				Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	Not Required	20.00	Not Required
		56	5280		20.00	
		60	5300		20.00	
		64	5320		20.00	
	802.11n-HT20 MCS0	52	5260		20.00	
		56	5280		20.00	
		60	5300		20.00	
		64	5320		20.00	
	802.11n-HT40 MCS0	54	5270	18.47	20.00	100.00
		62	5310	18.54	20.00	
	802.11ac-VHT20 MCS0	52	5260	Not Required	20.00	Not Required
		56	5280		20.00	
		60	5300		20.00	
		64	5320		20.00	
	802.11ac-VHT40 MCS0	54	5270		20.00	
		62	5310		20.00	
	802.11ac-VHT80 MCS0	58	5290		18.75	
	802.11ac-VHT160 MCS0	50	5250		16.75	
	802.11ax-HE20 MCS0	52	5260		20.00	
		56	5280		20.00	
		60	5300		20.00	
		64	5320		20.00	
	802.11ax-HE40 MCS0	54	5270		20.00	
		62	5310		20.00	
	802.11ax-HE80 MCS0	58	5290		18.75	
	802.11ax-HE160 MCS0	50	5250		16.75	
	802.11be-EHT20 MCS0	52	5260		20.00	
		56	5280		20.00	
		60	5300		20.00	
		64	5320		20.00	
	802.11be-EHT40 MCS0	54	5270		20.00	
		62	5310		20.00	
	802.11be-EHT80 MCS0	58	5290		18.75	
	802.11be-EHT160 MCS0	50	5250		16.75	

				Ant 1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	Not Required	14.50	Not Required
		116	5580		14.50	
		124	5620		14.50	
		132	5660		14.50	
		140	5700		14.50	
		144	5720		14.50	
	802.11n-HT20 MCS0	100	5500		14.50	
		116	5580		14.50	
		124	5620		14.50	
		132	5660		14.50	
		140	5700		14.50	
		144	5720		14.50	
	802.11n-HT40 MCS0	102	5510		14.50	
		110	5550		14.50	
		126	5630		14.50	
		134	5670		14.50	
		142	5710		14.50	
	802.11ac-VHT20 MCS0	100	5500		14.50	
		116	5580		14.50	
		124	5620		14.50	
		132	5660		14.50	
		140	5700		14.50	
		144	5720		14.50	
	802.11ac-VHT40 MCS0	102	5510		14.50	
		110	5550		14.50	
		126	5630		14.50	
		134	5670		14.50	
		142	5710		14.50	
	802.11ac-VHT80 MCS0	106	5530	13.62	14.50	100.00
		122	5610	13.36	14.50	
		138	5690	13.40	14.50	
	802.11ac-VHT160 MCS0	114	5570	Not Required	14.25	Not Required
	802.11ax-HE20 MCS0	100	5500		14.50	
		116	5580		14.50	
		124	5620		14.50	
		132	5660		14.50	
		140	5700		14.50	
		144	5720		14.50	
	802.11ax-HE40 MCS0	102	5510		14.50	
		110	5550		14.50	
		126	5630		14.50	
		134	5670		14.50	
		142	5710		14.50	
	802.11ax-HE80 MCS0	106	5530		14.50	
		122	5610		14.50	
		138	5690		14.50	
	802.11ax-HE160 MCS0	114	5570		14.25	
	802.11be-EHT20 MCS0	100	5500		14.50	
		116	5580		14.50	
		124	5620		14.50	
		132	5660		14.50	
		140	5700		14.50	
		144	5720		14.50	
	802.11be-EHT40 MCS0	102	5510		14.50	
		110	5550		14.50	
		126	5630		14.50	

		134	5670		14.50	
		142	5710		14.50	
	802.11be-EHT80 MCS0	106	5530		14.50	
		122	5610		14.50	
		138	5690		14.50	
	802.11be-EHT160 MCS0	114	5570		14.25	

				Ant 2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	Not Required	15.50	Not Required
		116	5580		15.50	
		124	5620		15.50	
		132	5660		15.50	
		140	5700		15.50	
		144	5720		15.50	
	802.11n-HT20 MCS0	100	5500		15.50	
		116	5580		15.50	
		124	5620		15.50	
		132	5660		15.50	
		140	5700		15.50	
		144	5720		15.50	
	802.11n-HT40 MCS0	102	5510		15.50	
		110	5550		15.50	
		126	5630		15.50	
		134	5670		15.50	
		142	5710		15.50	
	802.11ac-VHT20 MCS0	100	5500		15.50	
		116	5580		15.50	
		124	5620		15.50	
		132	5660		15.50	
		140	5700		15.50	
		144	5720		15.50	
	802.11ac-VHT40 MCS0	102	5510		15.50	
		110	5550		15.50	
		126	5630		15.50	
		134	5670		15.50	
		142	5710		15.50	
	802.11ac-VHT80 MCS0	106	5530	15.05	15.50	100.00
		122	5610	14.93	15.50	
		138	5690	15.00	15.50	
	802.11ac-VHT160 MCS0	114	5570	Not Required	14.25	Not Required
	802.11ax-HE20 MCS0	100	5500		15.50	
		116	5580		15.50	
		124	5620		15.50	
		132	5660		15.50	
		140	5700		15.50	
		144	5720		15.50	
	802.11ax-HE40 MCS0	102	5510		15.50	
		110	5550		15.50	
		126	5630		15.50	
		134	5670		15.50	
		142	5710		15.50	
	802.11ax-HE80 MCS0	106	5530		15.50	
		122	5610		15.50	
		138	5690		15.50	
	802.11ax-HE160 MCS0	114	5570		14.25	
	802.11be-EHT20 MCS0	100	5500		15.50	
		116	5580		15.50	
		124	5620		15.50	

		132	5660		15.50	
		140	5700		15.50	
		144	5720		15.50	
	802.11be-EHT40 MCS0	102	5510		15.50	
		110	5550		15.50	
		126	5630		15.50	
		134	5670		15.50	
		142	5710		15.50	
	802.11be-EHT80 MCS0	106	5530		15.50	
		122	5610		15.50	
		138	5690		15.50	
	802.11be-EHT160 MCS0	114	5570		14.25	

				Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	Not Required	18.00	Not Required
		116	5580		18.00	
		124	5620		18.00	
		132	5660		18.00	
		140	5700		18.00	
		144	5720		18.00	
	802.11n-HT20 MCS0	100	5500		18.00	
		116	5580		18.00	
		124	5620		18.00	
		132	5660		18.00	
		140	5700		18.00	
		144	5720		18.00	
	802.11n-HT40 MCS0	102	5510		18.00	
		110	5550		18.00	
		126	5630		18.00	
		134	5670		18.00	
		142	5710		18.00	
	802.11ac-VHT20 MCS0	100	5500		18.00	
		116	5580		18.00	
		124	5620		18.00	
		132	5660		18.00	
		140	5700		18.00	
		144	5720		18.00	
	802.11ac-VHT40 MCS0	102	5510		18.00	
		110	5550		18.00	
		126	5630		18.00	
		134	5670		18.00	
		142	5710		18.00	
	802.11ac-VHT80 MCS0	106	5530	17.40	18.00	100.00
		122	5610	17.23	18.00	
		138	5690	17.28	18.00	
	802.11ac-VHT160 MCS0	114	5570	Not Required	17.25	Not Required
	802.11ax-HE20 MCS0	100	5500		18.00	
		116	5580		18.00	
		124	5620		18.00	
		132	5660		18.00	
		140	5700		18.00	
		144	5720		18.00	
	802.11ax-HE40 MCS0	102	5510		18.00	
		110	5550		18.00	
		126	5630		18.00	
		134	5670		18.00	
		142	5710		18.00	
	802.11ax-HE80 MCS0	106	5530		18.00	

		122	5610		18.00	
		138	5690		18.00	
	802.11ax-HE160 MCS0	114	5570		17.25	
	802.11be-EHT20 MCS0	100	5500		18.00	
		116	5580		18.00	
		124	5620		18.00	
		132	5660		18.00	
		140	5700		18.00	
		144	5720		18.00	
	802.11be-EHT40 MCS0	102	5510		18.00	
		110	5550		18.00	
		126	5630		18.00	
		134	5670		18.00	
		142	5710		18.00	
	802.11be-EHT80 MCS0	106	5530		18.00	
		122	5610		18.00	
		138	5690		18.00	
	802.11be-EHT160 MCS0	114	5570		17.25	

				Ant 1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	Not Required	14.50	Not Required
		157	5785		14.50	
		165	5825		14.50	
	802.11n-HT20 MCS0	149	5745		14.50	
		157	5785		14.50	
		165	5825		14.50	
	802.11n-HT40 MCS0	151	5755		14.50	
		159	5795		14.50	
	802.11ac-VHT20 MCS0	149	5745		14.50	
		157	5785		14.50	
		165	5825		14.50	
	802.11ac-VHT40 MCS0	151	5755		14.50	
		159	5795		14.50	
	802.11ac-VHT80 MCS0	155	5775	13.71	14.50	100.00
	802.11ax-HE20 MCS0	149	5745	Not Required	14.50	Not Required
		157	5785		14.50	
		165	5825		14.50	
	802.11ax-HE40 MCS0	151	5755		14.50	
		159	5795		14.50	
	802.11ax-HE80 MCS0	155	5775		14.50	
	802.11be-EHT20 MCS0	149	5745		14.50	
		157	5785		14.50	
		165	5825		14.50	
	802.11be-EHT40 MCS0	151	5755		14.50	
		159	5795		14.50	
	802.11be-EHT80 MCS0	155	5775		14.50	

				Ant 2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	Not Required	16.00	Not Required
		157	5785		16.00	
		165	5825		16.00	
	802.11n-HT20 MCS0	149	5745		16.00	
		157	5785		16.00	
		165	5825		16.00	

	802.11n-HT40 MCS0	151	5755		16.00	
		159	5795		16.00	
	802.11ac-VHT20 MCS0	149	5745		16.00	
		157	5785		16.00	
		165	5825		16.00	
	802.11ac-VHT40 MCS0	151	5755		16.00	
		159	5795		16.00	
	802.11ac-VHT80 MCS0	155	5775	15.23	16.00	100.00
	802.11ax-HE20 MCS0	149	5745	Not Required	16.00	Not Required
		157	5785		16.00	
		165	5825		16.00	
	802.11ax-HE40 MCS0	151	5755		16.00	
		159	5795		16.00	
	802.11ax-HE80 MCS0	155	5775		16.00	
	802.11be-EHT20 MCS0	149	5745		16.00	
		157	5785		16.00	
		165	5825		16.00	
	802.11be-EHT40 MCS0	151	5755		16.00	
		159	5795		16.00	
	802.11be-EHT80 MCS0	155	5775		16.00	

				Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	Not Required	18.50	Not Required
		157	5785		18.50	
		165	5825		18.50	
	802.11n-HT20 MCS0	149	5745		18.50	
		157	5785		18.50	
		165	5825		18.50	
	802.11n-HT40 MCS0	151	5755		18.50	
		159	5795		18.50	
	802.11ac-VHT20 MCS0	149	5745		18.50	
		157	5785		18.50	
		165	5825		18.50	
	802.11ac-VHT40 MCS0	151	5755		18.50	
		159	5795		18.50	
	802.11ac-VHT80 MCS0	155	5775	17.55	18.50	100.00
	802.11ax-HE20 MCS0	149	5745	Not Required	18.50	Not Required
		157	5785		18.50	
		165	5825		18.50	
	802.11ax-HE40 MCS0	151	5755		18.50	
		159	5795		18.50	
	802.11ax-HE80 MCS0	155	5775		18.50	
	802.11be-EHT20 MCS0	149	5745		18.50	
		157	5785		18.50	
		165	5825		18.50	
	802.11be-EHT40 MCS0	151	5755		18.50	
		159	5795		18.50	
	802.11be-EHT80 MCS0	155	5775		18.50	

<6GHz WLAN>

				Ant 1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
WiFi 6GHz	802.11a 6Mbps	1	5955	Not Required	-1.50	Not Required
		57	6235		-1.50	
		113	6515		0.00	
		173	6815		-0.25	
		233	7115		0.25	
	802.11ax-HE20 MCS0	1	5955		2.00	
		57	6235		2.00	
		113	6515		3.75	
		173	6815		3.50	
		233	7115		-7.75	
	802.11ax-HE40 MCS0	3	5965		6.00	
		59	6245		6.00	
		107	6485		6.25	
		171	6805		6.25	
		227	7085		6.50	
	802.11ax-HE80 MCS0	7	5985		9.00	
		71	6305		9.00	
		119	6545		9.00	
		167	6785		9.00	
		215	7025		9.25	
	802.11ax-HE160 MCS0	15	6025		13.50	
		47	6185		12.75	
		111	6505		13.25	
		143	6665		13.25	
		207	6985		13.00	
	802.11be-EHT20 MCS0	1	5955		2.00	
		57	6235		2.00	
		113	6515		3.75	
		173	6815		3.50	
		233	7115		-7.75	
	802.11be-EHT40 MCS0	3	5965		6.00	
		59	6245		6.00	
		107	6485		6.25	
		171	6805		6.25	
		227	7085		6.50	
	802.11be-EHT80 MCS0	7	5985		9.00	
		71	6305		9.00	
		119	6545		9.00	
		167	6785		9.00	
		215	7025		9.25	
	802.11be-EHT160 MCS0	15	6025		13.50	
		47	6185		12.75	
		111	6505		13.25	
		143	6665		13.25	
		207	6985		13.00	
	802.11be-EHT320 MCS0	31	6105	12.60	13.00	98.27
		95	6425	13.36	13.50	
		127	6585	13.36	13.50	
		159	6745	13.18	13.50	
		191	6905	13.39	13.50	

				Ant 2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
WiFi 6GHz	802.11a 6Mbps	1	5955	Not Required	-1.50	Not Required
		57	6235		-1.50	
		113	6515		0.00	
		173	6815		-0.25	
		233	7115		0.25	
	802.11ax-HE20 MCS0	1	5955		2.00	
		57	6235		2.00	
		113	6515		3.75	
		173	6815		3.50	
		233	7115		-7.75	
	802.11ax-HE40 MCS0	3	5965		6.00	
		59	6245		6.00	
		107	6485		6.25	
		171	6805		6.25	
		227	7085		6.50	
	802.11ax-HE80 MCS0	7	5985		9.00	
		71	6305		9.00	
		119	6545		9.00	
		167	6785		9.00	
		215	7025		9.25	
	802.11ax-HE160 MCS0	15	6025		13.50	
		47	6185		12.75	
		111	6505		13.25	
		143	6665		13.25	
		207	6985		13.00	
	802.11be-EHT20 MCS0	1	5955		2.00	
		57	6235		2.00	
		113	6515		3.75	
		173	6815		3.50	
		233	7115		-7.75	
	802.11be-EHT40 MCS0	3	5965		6.00	
		59	6245		6.00	
		107	6485		6.25	
		171	6805		6.25	
		227	7085		6.50	
	802.11be-EHT80 MCS0	7	5985		9.00	
		71	6305		9.00	
		119	6545		9.00	
		167	6785		9.00	
		215	7025		9.25	
	802.11be-EHT160 MCS0	15	6025		13.50	
		47	6185		12.75	
		111	6505		13.25	
		143	6665		13.25	
		207	6985		13.00	
	802.11be-EHT320 MCS0	31	6105	13.88	14.00	98.84
		95	6425	13.03	13.50	
		127	6585	13.08	13.50	
		159	6745	13.38	13.50	
		191	6905	13.21	13.50	

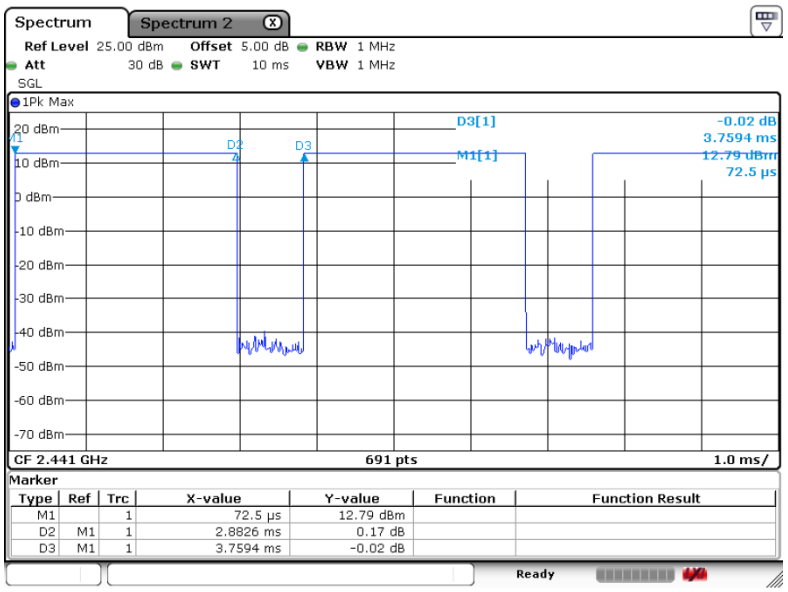
				Ant 1+2		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
WiFi 6GHz	802.11a 6Mbps	1	5955	Not Required	1.50	Not Required
		57	6235		1.50	
		113	6515		3.00	
		173	6815		2.75	
		233	7115		3.25	
	802.11ax-HE20 MCS0	1	5955		5.00	
		57	6235		5.00	
		113	6515		6.75	
		173	6815		6.50	
		233	7115		-4.75	
	802.11ax-HE40 MCS0	3	5965		9.00	
		59	6245		9.00	
		107	6485		9.25	
		171	6805		9.25	
		227	7085		9.50	
	802.11ax-HE80 MCS0	7	5985		12.00	
		71	6305		12.00	
		119	6545		12.00	
		167	6785		12.00	
		215	7025		12.25	
	802.11ax-HE160 MCS0	15	6025		16.50	
		47	6185		15.75	
		111	6505		16.25	
		143	6665		16.25	
		207	6985		16.00	
	802.11be-EHT20 MCS0	1	5955		5.00	
		57	6235		5.00	
		113	6515		6.75	
		173	6815		6.50	
		233	7115		-4.75	
	802.11be-EHT40 MCS0	3	5965		9.00	
		59	6245		9.00	
		107	6485		9.25	
		171	6805		9.25	
		227	7085		9.50	
	802.11be-EHT80 MCS0	7	5985		12.00	
		71	6305		12.00	
		119	6545		12.00	
		167	6785		12.00	
		215	7025		12.25	
	802.11be-EHT160 MCS0	15	6025		16.50	
		47	6185		15.75	
		111	6505		16.25	
		143	6665		16.25	
		207	6985		16.00	
	802.11be-EHT320 MCS0	31	6105	16.30	16.50	98.84
		95	6425	16.21	16.50	
		127	6585	16.23	16.50	
		159	6745	16.29	16.50	
		191	6905	16.31	16.50	

<2.4GHz Bluetooth>

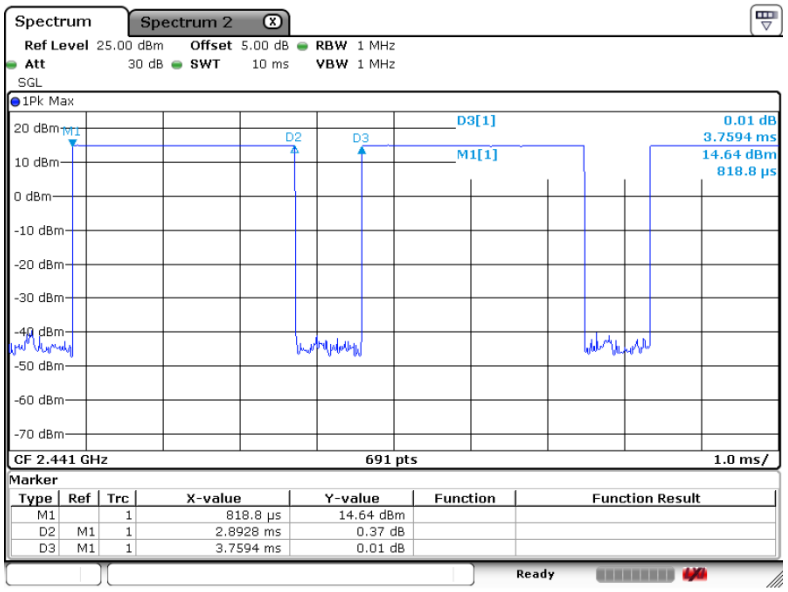
General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle is 76.68% for Ant1, 76.95% for Ant2 as following figure, Bluetooth SAR scaling need further consideration and the theoretical duty cycle is 83.3%, therefore the actual duty cycle will be scaled up to the theoretical value of Bluetooth reported SAR calculation.

Bluetooth time-domain plot for Ant1



Bluetooth time-domain plot for Ant2



<Ant1>

Mode	Channel	Frequency (MHz)	Average power (dBm)			Tune-up Limit
			1Mbps	2Mbps	3Mbps	
BR / EDR	CH 00	2402	14.20	Not Required	Not Required	16.00
	CH 39	2441	14.17			16.00
	CH 78	2480	12.97			14.50

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
LE_1M	CH 00	2402	Not Required
	CH 19	2440	
	CH 39	2480	
Tune-up Limit			14.50

Mode	Channel	Frequency (MHz)	Average power (dBm)
			2Mbps
LE_2M	CH 01	2404	Not Required
	CH 19	2440	
	CH 38	2478	
Tune-up Limit			14.50

QHS

Mode	Channel	Frequency (MHz)	Average power (dBm)
			6Mbps
LE	CH 01	2404	Not Required
	CH 18	2438	
	CH 38	2478	
Tune-up Limit			14.50

<Ant2>

Mode	Channel	Frequency (MHz)	Average power (dBm)			Tune-up Limit
			1Mbps	2Mbps	3Mbps	
BR / EDR	CH 00	2402	15.64	Not Required	Not Required	16.00
	CH 39	2441	15.50			16.00
	CH 78	2480	14.37			14.50

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
LE_1M	CH 00	2402	Not Required
	CH 19	2440	
	CH 39	2480	
Tune-up Limit			16.00

Mode	Channel	Frequency (MHz)	Average power (dBm)
			2Mbps
LE_2M	CH 01	2404	Not Required
	CH 19	2440	
	CH 38	2478	
Tune-up Limit			14.50

QHS

Mode	Channel	Frequency (MHz)	Average power (dBm)
			6Mbps
LE	CH 01	2404	Not Required
	CH 18	2438	
	CH 38	2478	
Tune-up Limit			14.50

13. Antenna Location

The detailed antenna location information can refer to SAR Test Setup Photos.

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/Bluetooth 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 SAR testing of Bluetooth signal with 83.3% theoretical duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle) *83.3%".
   d. 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.
4. For WLAN6GHz doesn't support wireless router capability.
5. Per FCC guidance, SAR was performed using 6.5 GHz SAR probe calibration factors.
6. Per October 2020 TCB Workshop Interim procedures, start instead with a minimum of 5 test channels across the full band, then adapt and apply conducted power and SAR test reduction procedures of KDB Pub. 248227 v02r02
7. For testing the WLAN 6GHz of this DUT, the selection of test channels was based on FCC guidance, with five channels selected across the entire WLAN 6GHz Bands. For the U-NII-5/U-NII-7 band supporting Standard AP mode and indoor Client mode, the higher output mode was measured among the selected channels.
8. Absorbed power density (APD) using a 4cm^2 averaging area is reported based on SAR measurements.

WLAN SAR 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, U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 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. SISO and MIMO all supported by WLAN2.4GHz/WLAN5GHz, for SISO mode power is less than per chain power of MIMO mode. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power, so only chose MIMO mode to perform SAR testing.
6. For the conducted power measurement is MIMO chains transmitting simultaneously and measured the separately conducted power for both chains and then based on the conducted power of SISO antenna respectively to calculate sum of the power for MIMO mode.
7. During SAR testing the WLAN transmission was verified using a spectrum analyzer.
8. 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.

14.1 Body SAR Test Result

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Antenna Type	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	Bottom Face	0mm	Ant 1+2	For Non DBS	6	2437	INPAQ Ant	21.91	22.00	1.021	98.35	1.017	0.08	0.281	0.292
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 1+2	For Non DBS	1	2412	INPAQ Ant	21.79	22.00	1.050	98.35	1.017	0.01	0.313	0.334
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 1+2	For Non DBS	13	2472	INPAQ Ant	15.73	16.00	1.064	98.35	1.017	0.03	0.077	0.083
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 1+2	For Non DBS	6	2437	Luxshare-ict Ant	21.91	22.00	1.021	98.35	1.017	-0.08	0.684	0.710
01	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 1+2	For Non DBS	1	2412	Luxshare-ict Ant	21.79	22.00	1.050	98.35	1.017	-0.08	0.684	**0.730**
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0mm	Ant 1+2	For Non DBS	13	2472	Luxshare-ict Ant	15.73	16.00	1.064	98.35	1.017	0.1	0.166	0.180
	Bluetooth	1Mbps	Bottom Face	0mm	Ant 1	For Non DBS	39	2441	INPAQ Ant	14.17	16.00	1.524	76.68	1.086	0.1	0.032	0.053
	Bluetooth	1Mbps	Bottom Face	0mm	Ant 1	For Non DBS	0	2402	INPAQ Ant	14.20	16.00	1.514	76.68	1.086	0.12	0.041	0.067
	Bluetooth	1Mbps	Bottom Face	0mm	Ant 1	For Non DBS	78	2480	INPAQ Ant	12.97	14.50	1.422	76.68	1.086	0.08	0.030	0.046
	Bluetooth	1Mbps	Bottom Face	0mm	Ant 1	For Non DBS	39	2441	Luxshare-ict Ant	14.17	16.00	1.524	76.68	1.086	-0.17	0.106	0.175
	Bluetooth	1Mbps	Bottom Face	0mm	Ant 1	For Non DBS	0	2402	Luxshare-ict Ant	14.20	16.00	1.514	76.68	1.086	-0.03	0.121	0.199
	Bluetooth	1Mbps	Bottom Face	0mm	Ant 1	For Non DBS	78	2480	Luxshare-ict Ant	12.97	14.50	1.422	76.68	1.086	0.14	0.111	0.171
	Bluetooth	1Mbps	Bottom Face	0mm	Ant 2	For Non DBS	39	2441	INPAQ Ant	15.50	16.00	1.122	76.95	1.083	-0.05	0.095	0.115
	Bluetooth	1Mbps	Bottom Face	0mm	Ant 2	For Non DBS	0	2402	INPAQ Ant	15.64	16.00	1.086	76.95	1.083	0.18	0.095	0.112
	Bluetooth	1Mbps	Bottom Face	0mm	Ant 2	For Non DBS	78	2480	INPAQ Ant	14.37	14.50	1.030	76.95	1.083	0.14	0.062	0.069
02	Bluetooth	1Mbps	Bottom Face	0mm	Ant 2	For Non DBS	39	2441	Luxshare-ict Ant	15.50	16.00	1.122	76.95	1.083	0.07	0.167	**0.203**
	Bluetooth	1Mbps	Bottom Face	0mm	Ant 2	For Non DBS	0	2402	Luxshare-ict Ant	15.64	16.00	1.086	76.95	1.083	0.17	0.111	0.131
	Bluetooth	1Mbps	Bottom Face	0mm	Ant 2	For Non DBS	78	2480	Luxshare-ict Ant	14.37	14.50	1.030	76.95	1.083	-0.05	0.104	0.116
	WLAN5.3GHz	802.11n-HT40 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	62	5310	INPAQ Ant	19.14	21.00	1.535	100	1.000	0.1	0.520	0.798
	WLAN5.3GHz	802.11n-HT40 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	54	5270	INPAQ Ant	19.10	21.00	1.549	100	1.000	-0.17	0.518	0.802
	WLAN5.3GHz	802.11n-HT40 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	62	5310	INPAQ Ant	18.54	20.00	1.401	100	1.000	0.04	0.451	0.632
03	WLAN5.3GHz	802.11n-HT40 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	62	5310	Luxshare-ict Ant	19.14	21.00	1.535	100	1.000	-0.02	0.611	**0.938**
	WLAN5.3GHz	802.11n-HT40 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	54	5270	Luxshare-ict Ant	19.10	21.00	1.549	100	1.000	-0.08	0.597	0.925
	WLAN5.3GHz	802.11n-HT40 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	62	5310	Luxshare-ict Ant	18.54	20.00	1.401	100	1.000	0.05	0.533	0.746
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	106	5530	INPAQ Ant	18.89	19.00	1.026	100	1.000	-0.09	0.583	0.598
04	WLAN5.5GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	122	5610	INPAQ Ant	18.83	19.00	1.040	100	1.000	-0.08	0.904	**0.940**
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	138	5690	INPAQ Ant	18.74	19.00	1.062	100	1.000	0.13	0.807	0.857
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	122	5610	INPAQ Ant	17.23	18.00	1.194	100	1.000	0.12	0.611	0.730
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	106	5530	Luxshare-ict Ant	18.89	19.00	1.026	100	1.000	0.03	0.726	0.745
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	122	5610	Luxshare-ict Ant	18.83	19.00	1.040	100	1.000	0.18	0.797	0.829
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	138	5690	Luxshare-ict Ant	18.74	19.00	1.062	100	1.000	0.16	0.796	0.845
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	138	5690	Luxshare-ict Ant	17.28	17.50	1.052	100	1.000	-0.1	0.533	0.561
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	155	5775	INPAQ Ant	18.12	19.50	1.374	100	1.000	0.18	0.589	0.809
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	155	5775	INPAQ Ant	17.55	18.50	1.245	100	1.000	-0.1	0.503	0.626
05	WLAN5.8GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	155	5775	Luxshare-ict Ant	18.12	19.50	1.374	100	1.000	0.01	0.724	**0.995**
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	155	5775	Luxshare-ict Ant	17.55	18.50	1.245	100	1.000	-0.15	0.621	0.773

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Antenna Type	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)	Measured APD (W/m^2)
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	31	6105	INPAQ Ant	17.81	18.00	1.045	98.84	1.012	0.06	0.818	0.865	6.03
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	95	6425	INPAQ Ant	17.67	18.00	1.079	98.84	1.012	0.04	0.983	1.073	7.17
06	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	127	6585	INPAQ Ant	17.65	18.00	1.084	98.84	1.012	0.09	1.070	**1.174**	**7.8**
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	159	6745	INPAQ Ant	17.27	17.50	1.054	98.84	1.012	-0.01	0.955	1.019	6.95
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	191	6905	INPAQ Ant	17.42	17.50	1.019	98.84	1.012	0.08	0.957	0.986	6.91
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	31	6105	INPAQ Ant	16.30	16.50	1.047	98.84	1.012	0.02	0.625	0.662	4.58
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	95	6425	INPAQ Ant	16.21	16.50	1.069	98.84	1.012	0.01	0.696	0.753	5.05
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	127	6585	INPAQ Ant	16.23	16.50	1.064	98.84	1.012	0.18	0.739	0.796	5.4
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	159	6745	INPAQ Ant	16.29	16.50	1.050	98.84	1.012	0.02	0.736	0.782	5.89
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	191	6905	INPAQ Ant	16.31	16.50	1.045	98.84	1.012	0.11	0.730	0.772	5.35
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	31	6105	Luxshare-ict Ant	17.81	18.00	1.045	98.84	1.012	0.08	0.649	0.686	4.75
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	95	6425	Luxshare-ict Ant	17.67	18.00	1.079	98.84	1.012	0.08	0.576	0.629	4.54
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	127	6585	Luxshare-ict Ant	17.65	18.00	1.084	98.84	1.012	0.07	0.675	0.740	5.36
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	159	6745	Luxshare-ict Ant	17.27	17.50	1.054	98.84	1.012	0.06	0.567	0.605	4.4
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For Non DBS	191	6905	Luxshare-ict Ant	17.42	17.50	1.019	98.84	1.012	0.05	0.574	0.592	3.87
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	31	6105	Luxshare-ict Ant	16.30	16.50	1.047	98.84	1.012	0.02	0.460	0.487	3.37
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	95	6425	Luxshare-ict Ant	16.21	16.50	1.069	98.84	1.012	0.02	0.367	0.397	2.85
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	127	6585	Luxshare-ict Ant	16.23	16.50	1.064	98.84	1.012	0.01	0.478	0.515	3.72
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	159	6745	Luxshare-ict Ant	16.29	16.50	1.050	98.84	1.012	0.02	0.459	0.488	3.53
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	0mm	Ant 1+2	For DBS	191	6905	Luxshare-ict Ant	16.31	16.50	1.045	98.84	1.012	0.19	0.433	0.458	3.19

14.2 PD Test Result

Power Density General Notes:

1. The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
2. Batteries are fully charged at the beginning of the measurements.
3. Absorbed power density (APD) using a 4cm^2 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 WiFi 6GHz PD was performed according 2020 TCB workshop RF Exposure 5G RFX Policies Interim Procedures.
8. First, evaluate SAR using 6-7 GHz parameters per IEC/EEE 62209-1528:2020 and using highest SAR test configurations evaluate incident PD using the mmw near-field probe and total-field/power-density reconstruction method (2 mm closest meas. plane)
9. Per October 2020 TCB Workshop, for distances smaller than λ/5, used the developed Plane-to-Plane Phase Reconstruction (PTP-PR) Algorithm which was used in PD measurement.
10. Per April 2021 TCB Workshop, For the highest SAR test configurations also measure incident PD (total) using power-density reconstruction method in 2 mm closest measurement plane.
11. 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.

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

<WLAN PD>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Antenna Type	Ch.	Freq. (MHz)	Average Power (dBm)	Grip Step (λ)	iPDn	iPD ratio (≥ -1)	Normal psPD (W/m^2)	Total psPD (W/m^2)
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom Face	2mm	Ant 1+2	INPAQ	31	6105	17.81	0.0625	2.49	0.72	3.600	4.260
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom Face	10mm	Ant 1+2	INPAQ	31	6105	17.81	0.15	2.11		2.35	2.86
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom Face	2mm	Ant 1+2	INPAQ	191	6905	17.42	0.0625	3.3	0.40	3.49	4.08
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom Face	8.59mm	Ant 1+2	INPAQ	191	6905	17.42	0.15	3.01		1.950	2.96

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Antenna Type	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Grip 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	802.11be-EHT320 MCS0	Bottom Face	2mm	Ant 1+2	INPAQ Ant	31	6105	17.81	18.00	1.045	98.84	1.012	0.0625	1.5535	0.02	3.600	5.91	4.260	7.00
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	2mm	Ant 1+2	INPAQ Ant	95	6425	17.67	18.00	1.079	98.84	1.012	0.0625	1.5535	-0.02	3.570	6.06	3.960	6.72
01	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	2mm	Ant 1+2	INPAQ Ant	127	6585	17.65	18.00	1.084	98.84	1.012	0.0625	1.5535	0.05	3.830	6.53	4.630	**7.89**
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	2mm	Ant 1+2	INPAQ Ant	159	6745	17.27	17.50	1.054	98.84	1.012	0.0625	1.5535	0.02	3.040	5.04	3.990	6.61
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	2mm	Ant 1+2	INPAQ Ant	191	6905	17.42	17.50	1.019	98.84	1.012	0.0625	1.5535	-0.02	3.490	5.59	4.080	6.53
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	2mm	Ant 1+2	Luxshare-ict Ant	31	6105	17.81	18.00	1.045	98.84	1.012	0.0625	1.5535	-0.08	2.570	4.22	2.870	4.71
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	2mm	Ant 1+2	Luxshare-ict Ant	95	6425	17.67	18.00	1.079	98.84	1.012	0.0625	1.5535	-0.12	3.080	5.22	3.750	6.36
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	2mm	Ant 1+2	Luxshare-ict Ant	127	6585	17.65	18.00	1.084	98.84	1.012	0.0625	1.5535	2.94	3.550	6.05	3.540	6.03
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	2mm	Ant 1+2	Luxshare-ict Ant	159	6745	17.27	17.50	1.054	98.84	1.012	0.0625	1.5535	0.03	3.270	5.42	4.260	7.06
	WLAN6GHz	802.11be-EHT320 MCS0	Bottom Face	2mm	Ant 1+2	Luxshare-ict Ant	191	6905	17.42	17.50	1.019	98.84	1.012	0.0625	1.5535	0.02	3.260	5.22	3.720	5.96

15. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Notebook Computer
		Body
1.	WLAN 2.4GHz + WLAN 5GHz	Yes
2.	WLAN 2.4GHz + WLAN 6GHz	Yes
3.	WLAN 2.4GHz + Bluetooth	Yes
4.	WLAN 5GHz + Bluetooth	Yes
5.	WLAN 6GHz + Bluetooth	Yes

Note:

1. The EUT has no voice function means data only.
2. According to the EUT characteristic, WLAN 5GHz/6GHz and Bluetooth can transmit simultaneously.
3. According to the EUT characteristic, WLAN 5GHz/6GHz and WLAN 2.4GHz can transmit simultaneously.
4. According to the EUT characteristic, WLAN 5GHz and WLAN 6GHz cannot transmit simultaneously.
5. According to the EUT characteristic, WLAN 2.4GHz and Bluetooth can transmit simultaneously.
6. WLAN2.4GHz/WLAN5GHz/6GHz MIMO SAR can represent SISO SAR to do co-located SAR analysis.
7. The worst case 5 GHz WLAN SAR for each configuration was used for SAR summation.
8. The maximum SAR summation is calculated based on the same configuration and test position.
9. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) 1g 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 for 1g SAR, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band 1g SAR < 1.6W/kg.
10. The WLAN6GHz Sim-Tx analysis guidance with other transmitters was based on SAR test results. The simultaneous transmission and test exemption analysis were compliant with KDB 447498 D01. For the device does not support FR2 or other MPE field measurement, therefore section 15 in the SAR report has no TER analysis according to KDB 987594 requirement.

15.1 Body Exposure Conditions

<For Non DBS>

Exposure Position	1	2	3	4	5	2+4+5	3+4+5	1+4	1+5
	WLAN2.4GHz Ant 1+2	WLAN5GHz Ant 1+2	WLAN6GHz Ant 1+2	Bluetooth Ant 1	Bluetooth Ant 2	Summed	Summed	Summed	Summed
	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)
Bottom Face	0.730	0.995	1.174	0.199	0.203	1.40	**1.58**	0.93	0.93

<For DBS>

Exposure Position	1	2	3	1+2	1+3
	WLAN2.4GHz Ant 1+2	WLAN5GHz Ant 1+2	WLAN6GHz Ant 1+2	Summed	Summed
	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)
Bottom Face	0.730	0.773	0.796	**1.50**	**1.53**

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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 ≤ 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 and highest measured 10-g SAR is less 3.75W/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.

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.

Uncertainty Budget According to IEC/IEEE 62209-1528 (Frequency band: 4 MHz - 10 GHz range)							
Error Description	**Uncert. Value (±%)**	**Prob. Dist.**	**Div.**	**(Ci) 1g**	**(Ci) 10g**	**Standard Uncertainty (1g) (±%)**	**Standard Uncertainty (10g) (±%)**
Measurement System errors							
Probe calibration	18.6	N	2	1	1	9.3	9.3
Probe calibration drift	1.7	R	1.732	1	1	1.0	1.0
Probe linearity and detection Limit	4.7	R	1.732	1	1	2.7	2.7
Broadband signal	2.8	R	1.732	1	1	1.6	1.6
Probe isotropy	7.6	R	1.732	1	1	4.4	4.4
Other probe and data acquisition errors	2.4	N	1	1	1	2.4	2.4
RF ambient and noise	1.8	N	1	1	1	1.8	1.8
Probe positioning errors	0.006	N	1	0.5	0.5	0.0	0.0
Data processing errors	4.0	N	1	1	1	4.0	4.0
Phantom and Device Errors							
Measurement of phantom conductivity (σ)	2.5	N	1	0.78	0.71	2.0	1.8
Temperature effects (medium)	5.4	R	1.732	0.78	0.71	2.4	2.2
Shell permittivity	14.0	R	1.732	0.5	0.5	4.0	4.0
Distance between the radiating element of the DUT and the phantom medium	2.0	N	1	2	2	4.0	4.0
Repeatability of positioning the DUT or source against the phantom	1.0	N	1	1	1	1.0	1.0
Device holder effects	3.6	N	1	1	1	3.6	3.6
Effect of operating mode on probe sensitivity	2.4	R	1.732	1	1	1.4	1.4
Time-average SAR	1.7	R	1.732	1	1	1.0	1.0
Variation in SAR due to drift in output of DUT	2.5	N	1	1	1	2.5	2.5
Validation antenna uncertainty (validation measurement only)	0.0	N	1	1	1	0.0	0.0
Uncertainty in accepted power (validation measurement only)	0.0	N	1	1	1	0.0	0.0
Correction to the SAR results							
Phantom deviation from target (ε′,σ)	1.9	N	1	1	0.84	1.9	1.6
SAR scaling	0.0	R	1.732	1	1	0.0	0.0
Combined Std. Uncertainty						**14.5%**	**14.4%**
Coverage Factor for 95 %						**K=2**	**K=2**
Expanded STD Uncertainty						**29.0%**	**28.8%**

SAR Uncertainty Budget for frequency range 4MHz to 10GHz

cDASY6 Module mmWave Uncertainty Budget Evaluation Distances to the Antennas > λ/2π In Compliance with IEC TR 63170					
Error Description	**Uncertainty Value (±dB)**	**Probability**	**Divisor**	**(Ci)**	**Standard Uncertainty (±dB)**
Uncertainty terms dep endent on the measurement system					
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**

PD Uncertainty Budget

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] FCC KDB 616217 D04 v01r02, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, 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] IEC 62479:2010 Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)

[12] IEC TR 63170: 2018 Measurement procedure for the evaluation of power density related to human exposure to radio frequency fields from wireless communication devices operating between 6 GHz and 100 GHz

[13] SPEAG DASY6 System Handbook

[14] SPEAG DASY6 Application Note (Interim Procedures for Devices Operating at 6-10 GHz)

------THE END------