NVLAP LAB CODE 600341-0

FCC SAR TEST REPORT

Applicant: SHENZHEN TENDA TECHNOLOGY CO.,LTD.

Address: 6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052

Product Name: AX900 Wi-Fi 6 Dual-band Wireless USB Adapter

FCC ID: V7TU11PV1

Standard(s): 47 CFR Part 2(2.1093)

Report Number: 2402X95326E-20

Report Date: 2024/10/15

The above device has been tested and found compliant with the requirement of the relative standards by Bay Area Compliance Laboratories Corp. (Dongguan).

Reviewed By: Mark Dong
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SAR TEST RESULTS SUMMARY

Mode		Max. Reported SAR Level(s) (W/kg)	Limit (W/kg)
WLAN 2.4G	1g Body SAR	**1.18**	1.6
WLAN 5.2G	1g Body SAR	1.15	
WLAN 5.8G	1g Body SAR	1.10	

Applicable Standards	**FCC 47 CFR part 2.1093** Radiofrequency radiation exposure evaluation: portable devices
	IEEE1528:2013 IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
	IEC 62209-2:2010 +AMD1:2019 Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices-Human models, instrumentation, and procedures-Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)
	KDB procedures KDB 447498 D01 General RF Exposure Guidance v06 KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04 KDB 865664 D02 RF Exposure Reporting v01r02 KDB 447498 D02 SAR Procedures for Dongle Xmtr v02r01. KDB 248227 D01 802.11 Wi-Fi SAR v02r02
Note: This wireless device has been shown to be capable of compliance for localized specific absorption rate (SAR) for General Population/Uncontrolled Exposure limits specified in **FCC 47 CFR part 2.1093** and has been tested in accordance with the measurement procedures specified in IEEE 1528-2013 and RF exposure KDB procedures. **The results and statements contained in this report pertain only to the device(s) evaluated.**	

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2402X95326E-20	Original Report	2024/10/15

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	AX900 Wi-Fi 6 Dual-band Wireless USB Adapter
EUT Model:	U11 Pro
Device Type:	Portable
Exposure Category:	Population / Uncontrolled
Antenna Type(s):	External Antenna
Body-Worn Accessories:	None
Operation Modes:	WLAN
Frequency Band:	WLAN 2.4G: 2412-2462 MHz /2422-2452 MHz (TX/RX)
	WLAN 5.2G: 5150-5250 MHz (TX/RX)
	WLAN 5.8G: 5725-5850 MHz (TX/RX)
Maximum Output Power	WLAN 2.4G: 16.19 dBm
	WLAN 5.2G: 15.74 dBm
	WLAN 5.8G: 19.25 dBm
Rated Input Voltage:	5Vdc from USB
Serial Number:	2RST-1
Normal Operation:	Body
EUT Received Date:	2024/09/19
Test Date:	2024/10/02~2024/10/03
EUT Received Status:	Good

2. REFERENCE, STANDARDS, AND GUIDELINES

FCC:

The Report and Order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g as recommended by the ANSI/IEEE standard C95.1-1992 [6] for an uncontrolled environment (Paragraph 65). According to the Supplement C of OET Bulletin 65 “Evaluating Compliance with FCC Guide-lines for Human Exposure to Radio frequency Electromagnetic Fields", released on Jun 29, 2001 by the FCC, the device should be evaluated at maximum output power (radiated from the antenna) under “worst-case” conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

This report describes the methodology and results of experiments performed on wireless data terminal. The objective was to determine if there is RF radiation and if radiation is found, what is the extent of radiation with respect to safety limits. SAR (Specific Absorption Rate) is the measure of RF exposure determined by the amount of RF energy absorbed by human body (or its parts) – to determine how the RF energy couples to the body or head which is a primary health concern for body worn devices. The limit below which the exposure to RF is considered safe by regulatory bodies in North America is 1.6 mW/g average over 1 gram of tissue mass.

2.1 SAR Limits

FCC Limit

EXPOSURE LIMITS	**SAR (W/kg)**	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1 g of tissue)	**1.6**	8
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4	20

Population/Uncontrolled Environments are defined as locations where there is the exposure of individual who have no knowledge or control of their exposure.

Occupational/Controlled Environments are defined as locations where there is exposure that maybe incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).

General Population/Uncontrolled environments Spatial Peak limit 1.6W/kg (FCC) for 1g Body SAR applied to the EUT.

2.2 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.

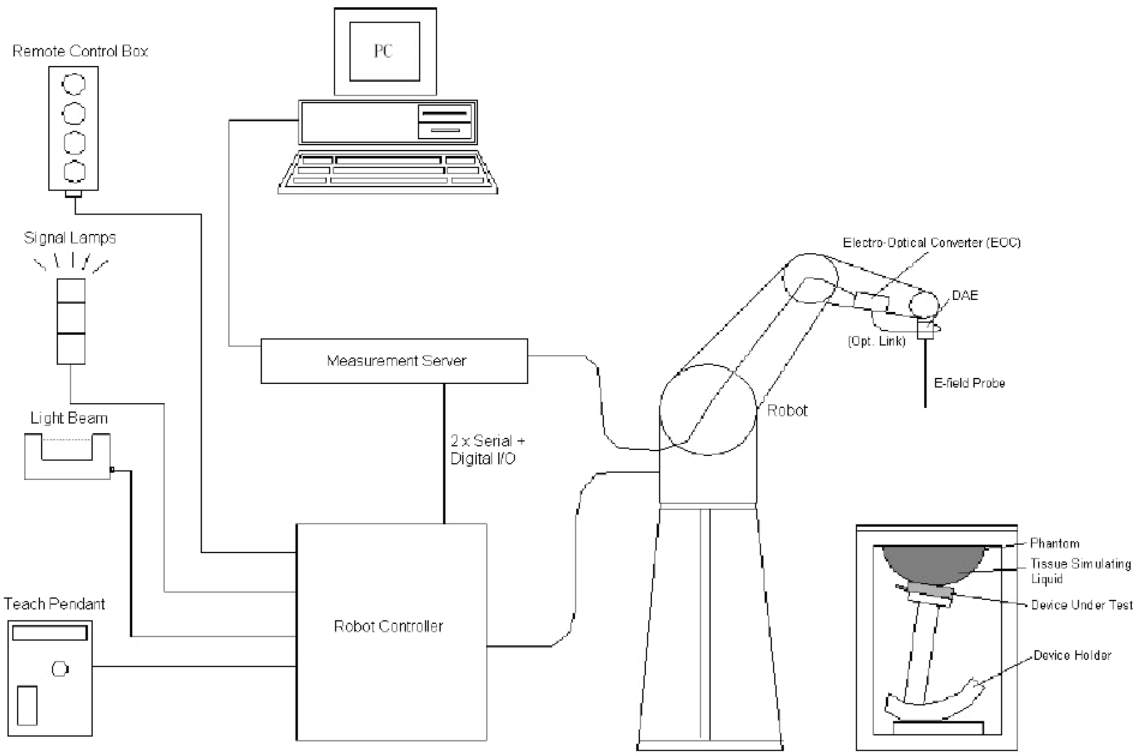
The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. :829273, the FCC Designation No. : CN5044.

3. DESCRIPTION OF TEST SYSTEM

These measurements were performed with the automated near-field scanning system DASY5 from Schmid & Partner Engineering AG (SPEAG) which is the Fifth generation of the system shown in the figure hereinafter:

DASY5 System Description

The DASY5 system 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 application, 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 professional operating system and the DASY52 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.

DASY5 Measurement Server

The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz Intel ULV Celeron, 128MB chip-disk and 128MB RAM. The necessary circuits for communication with the DAE4 (or DAE3) electronics box, as well as the 16 bit AD-converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized point out, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

Data Acquisition Electronics

The data acquisition electronics (DAE4) consist 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 with a 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 mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

The input impedance of both the DAE4 as well as of the DAE3 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

EX3DV4 E-Field Probes

Frequency	4 MHz–10 GHz Linearity: ± 0.2 dB (30 MHz–10 GHz)
Directivity(typical)	± 0.1 dB in TSL (rotation around probe axis) ± 0.3 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
Applications	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52, DASY6, DASY8, EASY6, EASY4/MRI

SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region, where shell thickness increases to 6 mm). The phantom has three measurement areas:
_ Left Head
_ Right Head
_ Flat phantom

The phantom table for the DASY systems based on the robots have the size of 100 x 50 x 85 cm (L x W x H). For easy dislocation these tables have fork lift cut outs at the bottom.
The bottom plate contains three pairs of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. Only one device holder is necessary if two phantoms are used (e.g., for different liquids)

A white cover is provided to cover the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. Free space scans of devices on top of this phantom cover are possible.
Three reference marks are provided on the phantom counter. These reference marks are used to teach the absolute phantom position relative to the robot.

Robots

The DASY5 system uses the high precision industrial robot. The robot offers the same features important for our application:

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchrony motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

The above mentioned robots are controlled by the Staubli CS7MB robot controllers. All information regarding the use and maintenance of the robot arm and the robot controller is contained on the CDs delivered along with the robot. Paper manuals are available upon request direct from Staubli.

Area Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a 15mm2 step integral, with 1.5mm interpolation used to locate the peak SAR area used for zoom scan assessments.

Where the system identifies multiple SAR peaks (which are within 25% of peak value) the system will provide the user with the option of assessing each peak location individually for zoom scan averaging.

Zoom Scan (Cube Scan Averaging)

The averaging zoom scan volume utilized in the DASY5 software is in the shape of a cube and the side dimension of a 1 g or 10 g mass is dependent on the density of the liquid representing the simulated tissue. A density of 1000 kg/m^3 is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1g cube is 10mm,with the side length of the 10g cube is 21.5mm.

When the cube intersects with the surface of the phantom, it is oriented so that 3 vertices touch the surface of the shell or the center of a face is tangent to the surface. The face of the cube closest to the surface is modified in order to conform to the tangent surface.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications (including FCC) utilize a physical step of 7 x7 x 7 (5mmx5mmx5mm) providing a volume of 30 mm in the X & Y & Z axis.

Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEC 62209-1:2016

Recommended Tissue Dielectric Parameters for Head liquid

Table A.3 – Dielectric properties of the head tissue-equivalent liquid

Frequency MHz	Relative permittivity ε_r	Conductivity (σ) S/m
300	45,3	0,87
450	43,5	0,87
750	*41,9*	*0,89*
835	41,5	0,90
900	41,5	0,97
1 450	40,5	1,20
1 500	*40,4*	*1,23*
1 640	*40,2*	*1,31*
1 750	*40,1*	*1,37*
1 800	40,0	1,40
1 900	40,0	1,40
2 000	40,0	1,40
2 100	*39,8*	*1,49*
2 300	*39,5*	*1,67*
2 450	39,2	1,80
2 600	*39,0*	*1,96*
3 000	38,5	2,40
3 500	*37,9*	*2,91*
4 000	*37,4*	*3,43*
4 500	*36,8*	*3,94*
5 000	*36,2*	*4,45*
5 200	*36,0*	*4,66*
5 400	*35,8*	*4,86*
5 600	*35,5*	*5,07*
5 800	*35,3*	*5,27*
6 000	*35,1*	*5,48*

NOTE For convenience, permittivity and conductivity values at those frequencies which are not part of the original data provided by Drossos et al. [33] or the extension to 5 800 MHz are provided (i.e. the values shown *in italics*). These values were linearly interpolated between the values in this table that are immediately above and below these values, except the values at 6 000 MHz that were linearly extrapolated from the values at 3 000 MHz and 5 800 MHz.

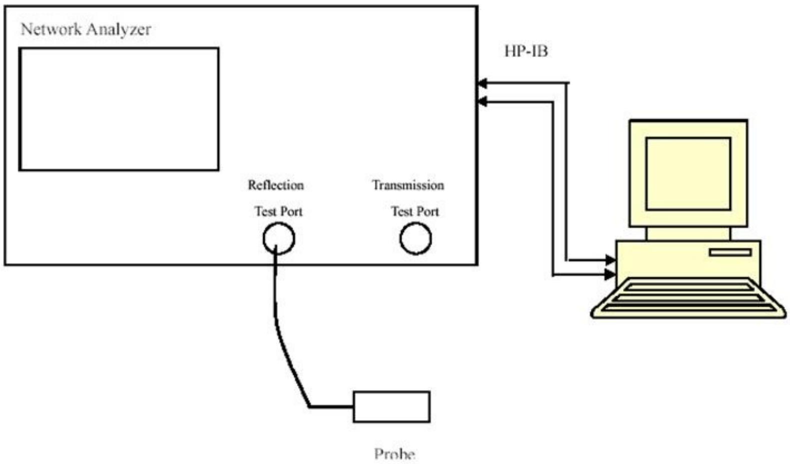
4. EQUIPMENT LIST AND CALIBRATION

4.1 Equipments List & Calibration Information

Equipment	Model	S/N	Calibration Date	Calibration Due Date
DASY5 Test Software	DASY52.10	N/A	NCR	NCR
DASY5 Measurement Server	DASY5 4.5.12	1470	NCR	NCR
Data Acquisition Electronics	DAE4	772	2024/1/23	2025/1/22
E-Field Probe	EX3DV4	7783	2024/4/12	2025/4/11
Mounting Device	MD4HHTV5	SD 000 H01 KA	NCR	NCR
Twin SAM	Twin SAM V5.0	1874	NCR	NCR
Dipole, 2450 MHz	D2450V2	971	2024/6/15	2027/6/14
Dipole,5GHz	D5GHzV2	1246	2022/11/1	2025/10/31
Simulated Tissue Liquid Head	HBBL600-10000V6	SL AAH U16 BC (Batch:220809-1)	Each Time	/
Network Analyzer	8753C	3033A02857	2023/11/18	2024/11/17
Dielectric assessment kit	1253	SM DAK 040 CA	NCR	NCR
synthesized signal generator	8665B	3438a00584	2023/10/18	2024/10/17
EPM Series Power Meter	E4419B	MY45103907	2023/10/18	2024/10/17
USB Wideband Power Sensor	U2022XA	MY54170006	2023/10/18	2024/10/17
Power Amplifier	ZVE-6W-83+	637202210	NCR	NCR
Directional Coupler	441493	520Z	NCR	NCR
Attenuator	20dB, 100W	LN749	NCR	NCR
Attenuator	6dB, 150W	2754	NCR	NCR
Thermometer	DTM3000	3635	2024/8/12	2025/8/11
Hygrothermograph	HTC-2	EM072	2023/11/6	2024/11/5

5. SAR MEASUREMENT SYSTEM VERIFICATION

5.1 Liquid Verification



5.2 Liquid Verification Results

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ (S/m)	
2400	Simulated Tissue Liquid Head	40.537	1.765	39.30	1.76	3.15	0.28	±5
2410	Simulated Tissue Liquid Head	40.403	1.775	39.28	1.77	2.86	0.28	±5
2420	Simulated Tissue Liquid Head	40.350	1.789	39.26	1.77	2.78	1.07	±5
2430	Simulated Tissue Liquid Head	40.325	1.797	39.24	1.78	2.77	0.96	±5
2440	Simulated Tissue Liquid Head	40.250	1.813	39.22	1.79	2.63	1.28	±5
2450	Simulated Tissue Liquid Head	40.188	1.827	39.20	1.80	2.52	1.50	±5
2460	Simulated Tissue Liquid Head	40.172	1.835	39.19	1.81	2.51	1.38	±5
2470	Simulated Tissue Liquid Head	40.153	1.845	39.17	1.82	2.51	1.37	±5
2480	Simulated Tissue Liquid Head	40.108	1.857	39.16	1.83	2.42	1.48	±5
2490	Simulated Tissue Liquid Head	40.028	1.867	39.15	1.84	2.24	1.47	±5
2500	Simulated Tissue Liquid Head	40.001	1.884	39.13	1.85	2.23	1.84	±5
2510	Simulated Tissue Liquid Head	39.969	1.896	39.12	1.86	2.17	1.94	±5
2520	Simulated Tissue Liquid Head	39.959	1.914	39.11	1.87	2.17	2.35	±5
2530	Simulated Tissue Liquid Head	39.928	1.925	39.09	1.89	2.14	1.85	±5
2540	Simulated Tissue Liquid Head	39.925	1.943	39.08	1.90	2.16	2.26	±5
2550	Simulated Tissue Liquid Head	39.858	1.963	39.07	1.91	2.02	2.77	±5

**Liquid Verification above was performed on 2024/10/03.*

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ (S/m)	
5150	Simulated Tissue Liquid Head	36.912	4.655	36.05	4.61	2.39	0.98	±5
5160	Simulated Tissue Liquid Head	36.935	4.663	36.04	4.62	2.48	0.93	±5
5170	Simulated Tissue Liquid Head	36.982	4.676	36.03	4.63	2.64	0.99	±5
5180	Simulated Tissue Liquid Head	37.012	4.688	36.02	4.64	2.75	1.03	±5
5190	Simulated Tissue Liquid Head	37.047	4.700	36.01	4.65	2.88	1.08	±5
5200	Simulated Tissue Liquid Head	37.065	4.707	36.00	4.66	2.96	1.01	±5
5210	Simulated Tissue Liquid Head	37.066	4.716	35.99	4.67	2.99	0.99	±5
5220	Simulated Tissue Liquid Head	37.078	4.726	35.98	4.68	3.05	0.98	±5
5230	Simulated Tissue Liquid Head	37.077	4.736	35.97	4.69	3.08	0.98	±5
5240	Simulated Tissue Liquid Head	37.054	4.744	35.96	4.70	3.04	0.94	±5
5250	Simulated Tissue Liquid Head	37.024	4.753	35.95	4.71	2.99	0.91	±5

**Liquid Verification above was performed on 2024/10/02.*

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ (S/m)	
5740	Simulated Tissue Liquid Head	35.862	5.350	35.36	5.21	1.42	2.69	±5
5750	Simulated Tissue Liquid Head	35.820	5.360	35.35	5.22	1.33	2.68	±5
5760	Simulated Tissue Liquid Head	35.792	5.369	35.34	5.23	1.28	2.66	±5
5770	Simulated Tissue Liquid Head	35.773	5.376	35.33	5.24	1.25	2.60	±5
5780	Simulated Tissue Liquid Head	35.755	5.384	35.32	5.25	1.23	2.55	±5
5790	Simulated Tissue Liquid Head	35.728	5.402	35.31	5.26	1.18	2.70	±5
5800	Simulated Tissue Liquid Head	35.717	5.421	35.30	5.27	1.18	2.87	±5
5810	Simulated Tissue Liquid Head	35.713	5.448	35.29	5.28	1.20	3.18	±5
5820	Simulated Tissue Liquid Head	35.718	5.486	35.28	5.29	1.24	3.71	±5
5830	Simulated Tissue Liquid Head	35.709	5.516	35.27	5.30	1.24	4.08	±5
5840	Simulated Tissue Liquid Head	35.706	5.543	35.26	5.31	1.26	4.39	±5
5850	Simulated Tissue Liquid Head	35.672	5.573	35.25	5.32	1.20	4.76	±5

**Liquid Verification above was performed on 2024/10/02.*

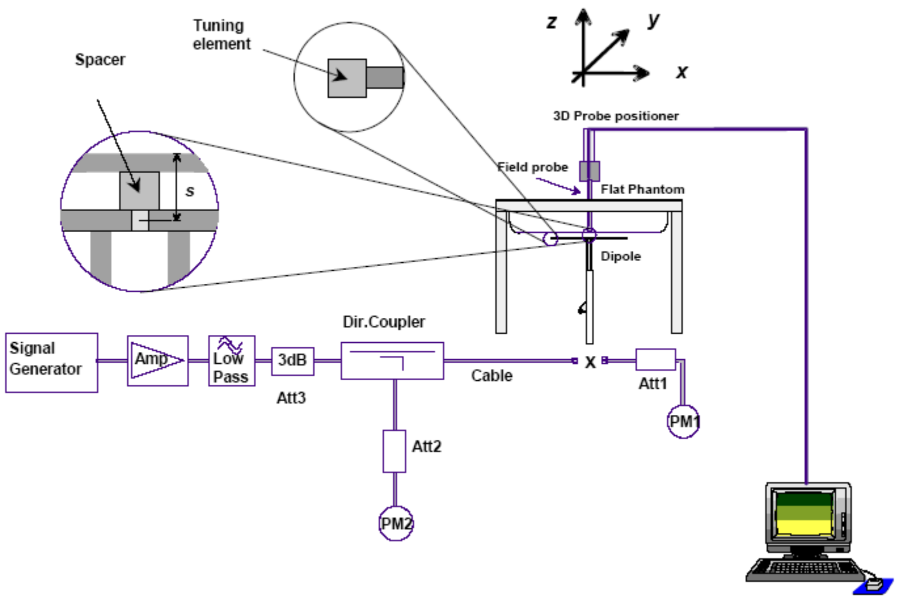
5.3 System Accuracy Verification

Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of ±10%. The validation results are tabulated below. And also the corresponding SAR plot is attached as well in the SAR plots files.

The spacing distances in the **System Verification Setup Block Diagram** is given by the following:

a) s = 15 mm ± 0,2 mm for 300 MHz ≤ f ≤ 1 000 MHz;
b) s = 10 mm ± 0,2 mm for 1 000 MHz < f ≤ 3 000 MHz;
c) s = 10 mm ± 0,2 mm for 3 000 MHz < f ≤ 6 000 MHz.

System Verification Setup Block Diagram



5.4 System Accuracy Check Results

Date	Frequency Band (MHz)	Liquid Type	Input Power (mW)	Measured SAR (W/kg)		Normalized to 1W (W/kg)	Target Value (W/Kg)	Delta (%)	Tolerance (%)
2024/10/03	2450	Simulated Tissue Liquid Head	100	1g	5.36	53.6	52.7	1.71	±10
2024/10/02	5250	Simulated Tissue Liquid Head	100	1g	7.77	77.7	77.5	0.26	±10
2024/10/02	5750	Simulated Tissue Liquid Head	100	1g	7.63	76.3	78.4	-2.68	±10

Note:
All the SAR values are normalized to 1Watt forward power.

5.5 SAR SYSTEM VALIDATION DATA

System Performance 2450 MHz Head

DUT: D2450V2; Type: 2450 MHz; Serial: SN:971

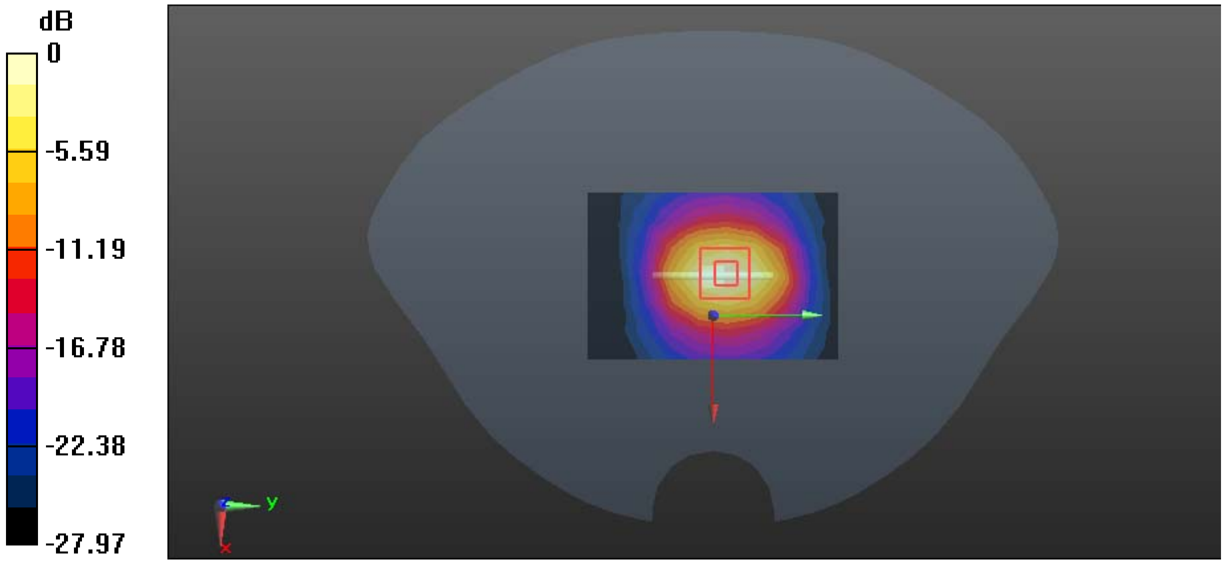
Communication System: CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.827 S/m; ε_r =40.188; ρ = 1000 kg/m^3;
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7783; ConvF(6.85, 6.85, 6.85) @ 2450 MHz; Calibrated: 2024/4/12
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn772; Calibrated: 2024/1/23
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (7x10x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 7.22 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.12 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 10.3 W/kg
SAR(1 g) = 5.36 W/kg; SAR(10 g) = 2.4 W/kg
Maximum value of SAR (measured) = 6.97 W/kg



0 dB = 6.97 W/kg = 8.43 dBW/kg

System Performance 5250 MHz Head

DUT: D5GHzV2; Type: 5250 MHz; Serial: SN:1246

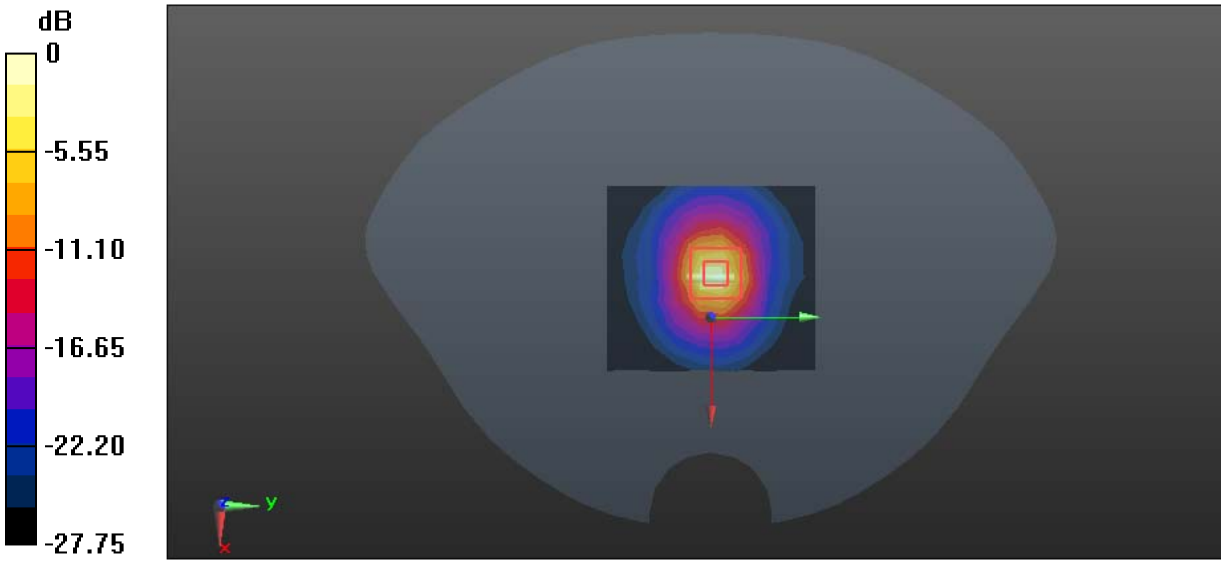
Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium parameters used : f = 5250 MHz; σ = 4.753 S/m; ε_r = 37.024; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7783; ConvF(5, 5, 5) @ 5250 MHz; Calibrated: 2024/4/12
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn772; Calibrated: 2024/1/23
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (9x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 13.1 W/kg

Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 41.78 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 25.0 W/kg
SAR(1 g) = 7.77 W/kg; SAR(10 g) = 2.3 W/kg
Maximum value of SAR (measured) = 17.5 W/kg



0 dB = 17.5 W/kg = 12.43 dBW/kg

System Performance 5750 MHz Head

DUT: D5GHzV2; Type: 5750 MHz; Serial: SN:1246

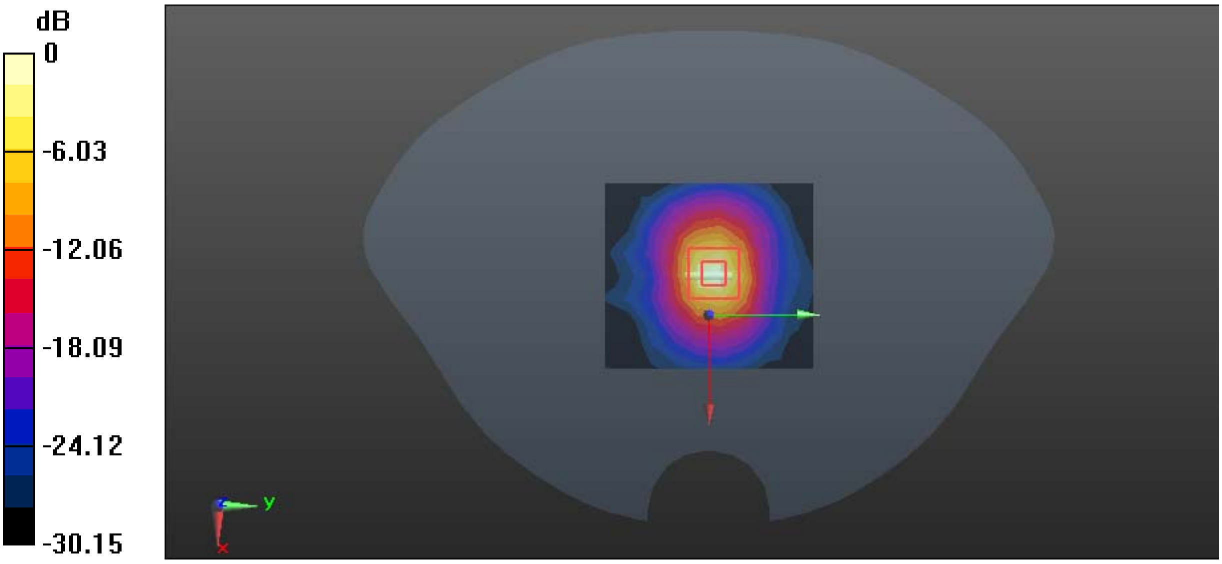
Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5750 MHz; σ = 5.36 S/m; ε_r = 35.82; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7783; ConvF(4.55, 4.55, 4.55) @ 5750 MHz; Calibrated: 2024/4/12
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn772; Calibrated: 2024/1/23
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (9x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 16.6 W/kg

Zoom Scan (8x8x15)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 37.76 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 27.1 W/kg
SAR(1 g) = 7.63 W/kg; SAR(10 g) = 2.09 W/kg
Maximum value of SAR (measured) = 15.6 W/kg

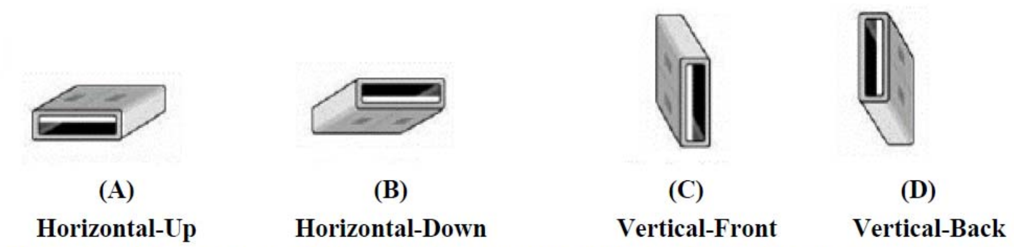


0 dB = 15.6 W/kg = 11.93 dBW/kg

6. EUT TEST STRATEGY AND METHODOLOGY

Dongle Testing Procedures

Test all USB orientations [see figure below: (A) Horizontal-Up, (B) Horizontal-Down, (C) Vertical-Front, and (D) Vertical-Back] with a device-to-phantom separation distance of 5 mm or less, according to KDB Publication 447498 D01 requirements. These test orientations are intended for the exposure conditions found in typical laptop/notebook/netbook or tablet computers with either horizontal or vertical USB connector configurations at various locations in the keyboard section of the computer. Current generation portable host computers should be used to establish the required SAR measurement separation distance. The same test separation distance must be used to test all frequency bands and modes in each USB orientation. The typical Horizontal-Up USB connection (A), found in the majority of host computers, must be tested using an appropriate host computer. A host computer with either Vertical-Front (C) or Vertical-Back (D) USB connection should be used to test one of the vertical USB orientations. If a suitable host computer is not available for testing the Horizontal-Down (B) or the remaining Vertical USB orientation, a high quality USB cable, 12 inches or less, may be used for testing these other orientations. It must be documented that the USB cable does not influence the radiating characteristics and output power of the transmitter.



Note: These are USB connector orientations on laptop computers; USB dongles have the reverse configuration for plugging into the corresponding laptop computers.

Figure 1 – USB Connector Orientations Implemented on Laptop Computers

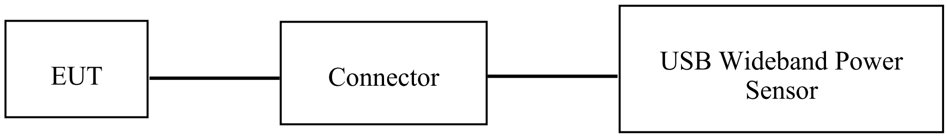
Test Distance for SAR Evaluation

For Body mode(1g Body SAR) the EUT is set 5mm away from the phantom, the test distance is 5mm

7. CONDUCTED OUTPUT POWER MEASUREMENT

7.1 Test Procedure

The RF output of the transmitter was connected to the input port of the USB Wideband Power Sensor through Connector.



WLAN

7.2 Maximum Target Output Power

Max Target Power(dBm)			
Mode/Band	Channel		
	Low	Middle	High
WLAN 2.4G(802.11b)	16.5	16.5	14
WLAN 2.4G(802.11g)	16	16	15
WLAN 2.4G(802.11n ht20)	16	16.5	14
WLAN 2.4G(802.11n ht40)	14	14	14
WLAN 2.4G(802.11ax20)	15	16	14
WLAN 2.4G(802.11ax40)	14	15	14
WLAN 5.2G(802.11a)	16	16	16
WLAN 5.2G(802.11n20)	15.5	15.5	15.5
WLAN 5.2G(802.11n40)	15.5	/	15.5
WLAN 5.2G(802.11ac20)	15.5	15.5	15.5
WLAN 5.2G(802.11ac40)	15.5	/	15.5
WLAN 5.2G(802.11ac80)	/	15.5	/
WLAN 5.2G(802.11ax20)	15.5	15.5	15.5
WLAN 5.2G(802.11ax40)	15.5	/	15.5
WLAN 5.2G(802.11ax80)	/	15.5	/
WLAN 5.8G(802.11a)	19.4	19.4	19
WLAN 5.8G(802.11n20)	19.2	19	19
WLAN 5.8G(802.11n40)	19.2	/	19
WLAN 5.8G(802.11ac20)	19	19	19
WLAN 5.8G(802.11ac40)	19.2	/	19
WLAN 5.8G(802.11ac80)	/	19.2	/
WLAN 5.8G(802.11ax20)	19.3	19.2	19
WLAN 5.8G(802.11ax40)	19.3	/	19
WLAN 5.8G(802.11ax80)	/	19	/

7.3 Test Results:

WLAN: 2.4G

Mode	Channel frequency (MHz)	Data Rate	Duty cycle (%)	RF Output Power (dBm)
802.11b	2412	1Mbps	98.14	16.1
	2437			**16.19**
	2462			13.99
802.11g	2412	6Mbps	87.24	15.37
	2437			15.97
	2462			14.65
802.11n ht20	2412	MCS0	97.75	15.7
	2437			16.15
	2462			13.7
802.11n ht40	2422	MCS0	95.59	13.39
	2437			13.95
	2452			13.87
802.11ax20	2412	MCS0	96.63	14.46
	2437			15.26
	2462			13.66
802.11ax40	2422	MCS0	94.36	13.38
	2437			14.22
	2452			13.87

Note: The test plots of duty cycle, please refer to the radio report: 2402X95326E-RF-00A, which was issued by Bay Area Compliance Laboratories Corp. (Dongguan).

WLAN: 5.2G

Mode	Channel frequency (MHz)	Data Rate	Duty cycle (%)	RF Output Power (dBm)
802.11a	5180	6Mbps	88.80	15.66
	5200			**15.74**
	5240			15.63
802.11n20	5180	MCS0	97.34	15.47
	5200			15.38
	5240			15.25
802.11n40	5190	MCS0	96.70	15.36
	5230			15.48
802.11ac20	5180	MCS0	98.32	15.23
	5200			15.32
	5240			15.21
802.11ac40	5190	MCS0	96.29	15.44
	5230			15.46
802.11ac80	5210	MCS0	98.28	15.31
802.11ax20	5180	MCS0	95.51	15.25
	5200			15.45
	5240			15.39
802.11ax40	5190	MCS0	96.17	15.47
	5230			15.45
802.11ax80	5210	MCS0	97.39	15.38

Note: The test plots of duty cycle, please refer to the radio report: 2402X95326E-RF-00B, which was issued by Bay Area Compliance Laboratories Corp. (Dongguan).

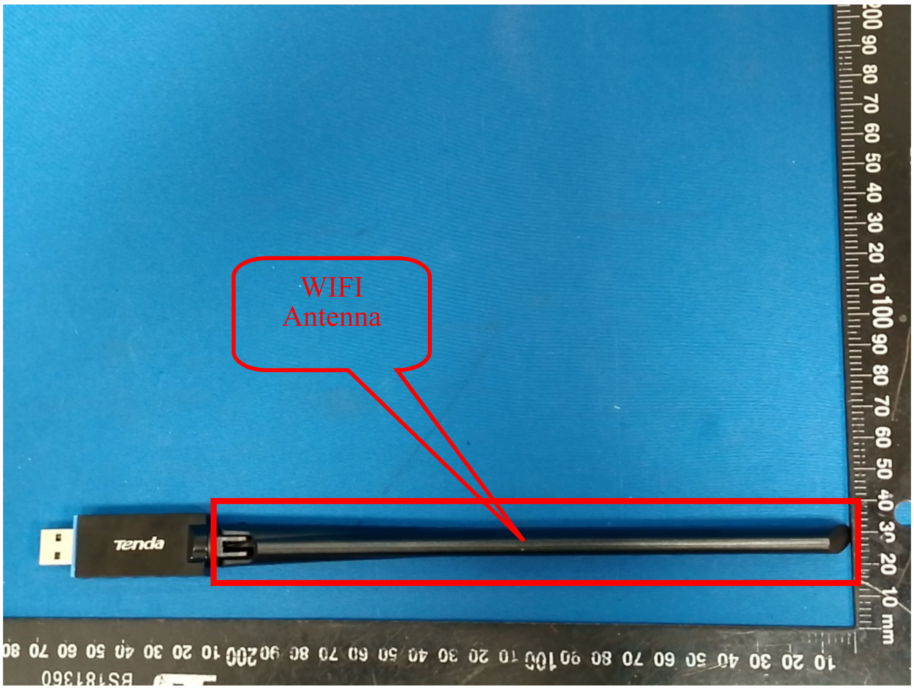
WLAN: 5.8G

Mode	Channel frequency (MHz)	Data Rate	Duty cycle (%)	RF Output Power (dBm)
802.11a	5745	6Mbps	88.80	18.92
	5785			**19.25**
	5825			18.99
802.11n20	5745	MCS0	97.34	19.14
	5785			18.97
	5825			18.3
802.11n40	5755	MCS0	96.70	19.06
	5795			18.78
802.11ac20	5745	MCS0	98.32	18.99
	5785			18.75
	5825			18.29
802.11ac40	5755	MCS0	96.29	19.22
	5795			18.89
802.11ac80	5775	MCS0	98.28	19.03
802.11ax20	5745	MCS0	95.51	19.22
	5785			19.07
	5825			18.55
802.11ax40	5755	MCS0	96.17	19.24
	5795			18.8
802.11ax80	5775	MCS0	97.39	18.97

Note: The test plots of duty cycle, please refer to the radio report: 2402X95326E-RF-00B, which was issued by Bay Area Compliance Laboratories Corp. (Dongguan).

8. STANDALONE SAR TEST EXCLUSION CONSIDERATIONS

8.1 Antennas Location:



9. SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

9.1 SAR Test Data

Environmental Conditions

Temperature:	22.2-22.9℃	22.5-23.2℃
Relative Humidity:	39%	40%
ATM Pressure:	100.2kPa	99.9 kPa
Test Date:	2024/10/02	2024/10/03

Testing was performed by Lily Yang, Petre Ma, Mark Dong.

WLAN 2.4G:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Scaled Factor	Duty cycle Factor	Meas. SAR	Scaled SAR	Plot
Horizontal-Up (5 mm)	2412	802.11b	16.1	16.5	1.096	1.02	0.81	0.91	/
	2437	802.11b	16.19	16.5	1.074	1.02	1.05	1.15	/
	2462	802.11b	13.99	14	1.002	1.02	1.15	**1.18**	1#
Horizontal-Up With Antenna Fold (5 mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	16.19	16.5	1.074	1.02	0.035	0.04	/
	2462	802.11b	/	/	/	/	/	/	/
Horizontal-Down (5 mm)	2412	802.11b	16.1	16.5	1.096	1.02	0.709	0.79	/
	2437	802.11b	16.19	16.5	1.074	1.02	1.01	1.11	/
	2462	802.11b	13.99	14	1.002	1.02	1.08	1.10	/
Body Top (5 mm)	2412	802.11b	16.1	16.5	1.096	1.02	0.778	0.87	/
	2437	802.11b	16.19	16.5	1.074	1.02	0.942	1.03	/
	2462	802.11b	13.99	14	1.002	1.02	1.02	1.04	/

Note:
1. When the 1-g SAR is≤ 0.8W/kg, testing for other channels are optional.
2.When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3.Per RF Exposure procedures of TCB Workshop April 2023, as mentioned in the second paragraph of FCC KDB Publication 447498 D02, when testing a dongle, for the Vertical-Front and Vertical-Back orientations a laptop with vertical USB ports is not needed.

WLAN 5.2G:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Scaled Factor	Duty cycle Factor	Meas. SAR	Scaled SAR	Plot
Horizontal-Up (5 mm)	5180	802.11a	/	/	/	/	/	/	/
	5200	802.11a	15.74	16	1.062	1.13	0.55	0.66	/
	5240	802.11a	/	/	/	/	/	/	/
Horizontal-Up With Antenna Fold (5 mm)	5180	802.11a	/	/	/	/	/	/	/
	5200	802.11a	15.74	16	1.062	1.13	0.036	0.04	/
	5240	802.11a	/	/	/	/	/	/	/
Horizontal-Down (5 mm)	5180	802.11a	/	/	/	/	/	/	/
	5200	802.11a	15.74	16	1.062	1.13	0.644	0.77	/
	5240	802.11a	/	/	/	/	/	/	/
Body Top (5 mm)	5180	802.11a	15.66	16	1.081	1.13	0.896	1.09	/
	5200	802.11a	15.74	16	1.062	1.13	0.925	1.11	/
	5240	802.11a	15.63	16	1.089	1.13	0.934	**1.15**	2#

Note:
1. When the 1-g SAR is≤ 0.8W/kg, testing for other channels are optional.
2.When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3.Per RF Exposure procedures of TCB Workshop April 2023, as mentioned in the second paragraph of FCC KDB Publication 447498 D02, when testing a dongle, for the Vertical-Front and Vertical-Back orientations a laptop with vertical USB ports is not needed.

WLAN 5.8G:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Scaled Factor	Duty cycle Factor	Meas. SAR	Scaled SAR	Plot
Horizontal-Up (5 mm)	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	19.25	19.4	1.035	1.13	0.647	0.76	/
	5825	802.11a	/	/	/	/	/	/	/
Horizontal-Up With Antenna Fold (5 mm)	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	19.25	19.4	1.035	1.13	0.047	0.05	/
	5825	802.11a	/	/	/	/	/	/	/
Horizontal-Down (5 mm)	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	19.25	19.4	1.035	1.13	0.654	0.76	/
	5825	802.11a	/	/	/	/	/	/	/
Body Top (5 mm)	5745	802.11a	18.92	19.4	1.117	1.13	0.711	0.90	/
	5785	802.11a	19.25	19.4	1.035	1.13	0.818	0.96	/
	5825	802.11a	18.99	19	1.002	1.13	0.975	**1.10**	3#

Note:
1. When the 1-g SAR is≤ 0.8W/kg, testing for other channels are optional.
2.When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3.Per RF Exposure procedures of TCB Workshop April 2023, as mentioned in the second paragraph of FCC KDB Publication 447498 D02, when testing a dongle, for the Vertical-Front and Vertical-Back orientations a laptop with vertical USB ports is not needed.

10. MEASUREMENT VARIABILITY

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz v01. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results

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

Note: The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

The Highest Measured SAR Configuration in Each Frequency Band

SAR probe calibration point	Frequency Band	Freq.(MHz)	EUT Position	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio
				Original	Repeated	
2450 MHz	WLAN 2.4G	2462 MHz	Horizontal-Up	1.15	1.13	1.02
5250 MHz	WLAN 5.2G	5240 MHz	Body Top	0.934	0.929	1.01
5750 MHz	WLAN 5.8G	5825MHz	Body Top	0.975	0.953	1.02

Note:

1. Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.
2. The measured SAR results **do not** have to be scaled to the maximum tune-up tolerance to determine if repeated measurements are required.
3. SAR measurement variability must be assessed for each frequency band, which is determined by the **SAR probe calibration point and tissue-equivalent medium** used for the device measurements.

11. SAR SIMULTANEOUS TRANSMISSION DESCRIPTION

11.1 Simultaneous Transmission:

Note: There is no multiple transmitters for the product, so simultaneous transmission need not to evaluate.

APPENDIX A - MEASUREMENT UNCERTAINTY

The uncertainty budget has been determined for the measurement system and is given in the following Table.

Measurement uncertainty evaluation for IEEE1528-2013 SAR test

Uncertainty component	Tolerance/ uncertainty ± %	Probability distribution	Divisor	ci (1 g)	ci (10 g)	Standard uncertainty ± %, (1 g)	Standard uncertainty ± %, (10 g)
Measurement system							
Probe calibration(k=1)	6.55	N	1	1	1	6.6	6.6
Axial isotropy	4.7	R	√3	√0.5	√0.5	1.9	1.9
Hemispherical isotropy	9.6	R	√3	√0.5	√0.5	3.9	3.9
Boundary effect	1.0	R	√3	1	1	0.6	0.6
Linearity	4.7	R	√3	1	1	2.7	2.7
System detection limits	1.0	R	√3	1	1	0.6	0.6
Modulation response	0.0	R	√3	1	1	0.0	0.0
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	√3	1	1	0.0	0.0
Integration time	0.0	R	√3	1	1	0.0	0.0
RF ambientconditions-noise	1.0	R	√3	1	1	0.6	0.6
RF ambient conditions-reflections	1.0	R	√3	1	1	0.6	0.6
Probe positioner mech.tolerance	0.8	R	√3	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.7	R	√3	1	1	3.9	3.9
Extrapolation, interpolation, and integrationsalgorithms for max. SAR evaluation	2.0	R	√3	1	1	1.2	1.2
Test sample related							
Test sample positioning	3.3	N	1	1	1	3.3	3.3
Device holder uncertainty	4.7	N	1	1	1	4.7	4.7
Output power variation –SAR draft measurement	5.0	R	√3	1	1	2.9	2.9
SAR scaling	2.8	R	√3	1	1	1.6	1.6
Phantom and tissue parameters							
Phantom shell uncertainty– shape, thicknessand permittivity	4.0	R	√3	1	1	2.3	2.3
Uncertainty in SARcorrection for deviationsin permittivity and conductivity	1.9	N	1	1	0.84	1.9	1.6
Liquid conductivity meas.	2.5	N	1	0.78	0.71	2.0	1.8
Liquid permittivity meas.	2.5	N	1	0.23	0.26	0.6	0.7
Liquid conductivity – temperatureuncertainty	1.7	R	√3	0.78	0.71	0.8	0.7
Liquid permittivity – temperatureuncertainty	0.3	R	√3	0.23	0.26	0.0	0.0
Combined standard uncertainty		RSS				12.1	12.0
Expanded uncertainty (95 % confidence interval)		k=2				24.2	24.0

Measurement uncertainty evaluation for IEC62209-2 SAR test

Source of uncertainty	Tolerance/ Uncertainty value ± %	Probability Distribution	Divisor	ci (1 g)	ci (10 g)	Standard uncertainty ± %, (1 g)	Standard uncertainty ± %, (10 g)
Measurement system							
Probe calibration	6.55	N	1	1	1	6.6	6.6
Isotropy	4.7	R	√3	1	1	2.7	2.7
Linearity	4.7	R	√3	1	1	2.7	2.7
Probe modulation response	0.0	R	√3	1	1	0.0	0.0
Detection limits	1.0	R	√3	1	1	0.6	0.6
Boundary effect	1.0	R	√3	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	√3	1	1	0.0	0.0
Integration time	0.0	R	√3	1	1	0.0	0.0
RF ambientconditions – noise	1.0	R	√3	1	1	0.6	0.6
RF ambient conditions–reflections	1.0	R	√3	1	1	0.6	0.6
Probe positioner mech. restrictions	0.8	R	√3	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.7	R	√3	1	1	3.9	3.9
Post-processing	2.0	R	√3	1	1	1.2	1.2
Test sample related							
Device holder uncertainty	4.7	N	1	1	1	4.7	4.7
Test sample positioning	3.3	N	1	1	1	3.3	3.3
Power scaling	4.5	R	√3	1	1	2.6	2.6
Drift of output power (measured SAR drift)	5.0	R	√3	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	√3	1	1	2.3	2.3
Algorithm for correcting SAR for deviations in permittivity and conductivity	1.9	N	1	1	0.84	1.9	1.6
Liquid conductivity (meas.)	2.5	N	1	0.78	0.71	2.0	1.8
Liquid permittivity (meas.)	2.5	N	1	0.23	0.26	0.6	0.7
Liquid conductivity – temperatureuncertainty	1.7	R	√3	0.78	0.71	0.8	0.7
Liquid permittivity – temperatureuncertainty	0.3	R	√3	0.23	0.26	0.0	0.0
Combined standard uncertainty		RSS				11.8	11.7
Expanded uncertainty (95 % confidence interval)						23.6	23.4

APPENDIX B - SAR PLOTS

Please refer to the attachment.

APPENDIX C - EUT TEST POSITION PHOTOS

Please refer to the attachment.

APPENDIX D - PROBE CALIBRATION CERTIFICATES

Please refer to the attachment.

APPENDIX E - DIPOLE CALIBRATION CERTIFICATES

Please refer to the attachment.

===== END OF REPORT ====