

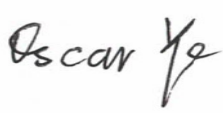
SAR EVALUATION REPORT

For

ACSL Ltd

Hulic Kasai Rinkai Bldg. 2F, 3-6-4 Rinkaicho, Edogawa-ku, Tokyo, Japan 134-0086

FCC ID: 2A8JK-GS5US-FALCON

Report Type: Original Report		Product Type: Smart Controller	
Project Engineer:	Bard Liu		
Report Number:	RSHA240424001-20B		
Report Date:	2024-07-12		
Reviewed By:	Oscar Ye EMC Manager		
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248, Chenghu Road, Development Zone, Yushan, Kunshan, Suzhou, Jiangsu, China Tel: +86-512-86175000 Fax: +86-512-88934268 www.baclcorp.com.cn		

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Kunshan). This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, or any agency of the U.S. Government.

Attestation of Test Results			
EUT Information	EUT Description	Smart Controller	
	Tested Model	TENSO-F3	
	FCC ID	2A8JK-GS5US-FALCON	
	Serial Number	RSHA240424001-1	
	Test Date	2024-05-15~ 2024-05-16	
MODE		Max. SAR Level(s) Reported(W/kg)	Limit
2.4GHz WLAN		0.187 W/kg 1g Body SAR	1.6 W/kg
5.2GHz WLAN		0.184 W/kg 1g Body SAR	
5.3GHz WLAN		0.099 W/kg 1g Body SAR	
5.6GHz WLAN		0.209 W/kg 1g Body SAR	
5.8GHz WLAN		0.447 W/kg 1g Body SAR	
2.4G SRD		1.191 W/kg 1g Body SAR	
Simultaneous		1.585 W/kg 1g Body SAR	
Applicable Standards	FCC 47 CFR part 2.1093 Radiofrequency radiation exposure evaluation: portable devices		
	RF Exposure Procedures: TCB Workshop April 2019		
	IEEE 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		
	IEC 62209-1:2016 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 1: Devices used next to the ear (Frequency range of 300 MHz to 6 GHz)		
	IEC 62209-2:2010 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 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	RSHA240424001-20B	Original Report	2024-07-12

EUT DESCRIPTION

**All measurement and test data in this report was gathered from production sample serial number: : RSHA240424001-1 Assigned by BACL(kunshan). The EUT supplied by the applicant was received on 2024-04-24.*

Technical Specification

Device Type:	Portable
Exposure Category:	Population / Uncontrolled
Antenna Type(s):	Omin Antenna
Body-Worn Accessories:	None
Face-Head Accessories:	None
Operation Mode :	WLAN2.4G/WLAN 5G Bluetooth BLE SRD
Frequency Band:	2.4G Wi-Fi: 2412-2462 MHz(802.11b/g/n20), 2422-2452 MHz(802.11n40) BT/BLE(1Mbps): 2402 -2480 MHz 5G WIFI:Band 1: 5150~5250 MHz, Band 2: 5250-5350 MHz, Band 3: 5470-5725 MHz, Band 4: 5725~5850 MHz 2.4G SRD:2412~2467 MHz
Power Source:	DC 3.7V
Normal Operation:	Body Supported

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.

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)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

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 may be 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 for 1g Body SAR and 4.0 W/kg for 10g Extremity SAR applied to the EUT.

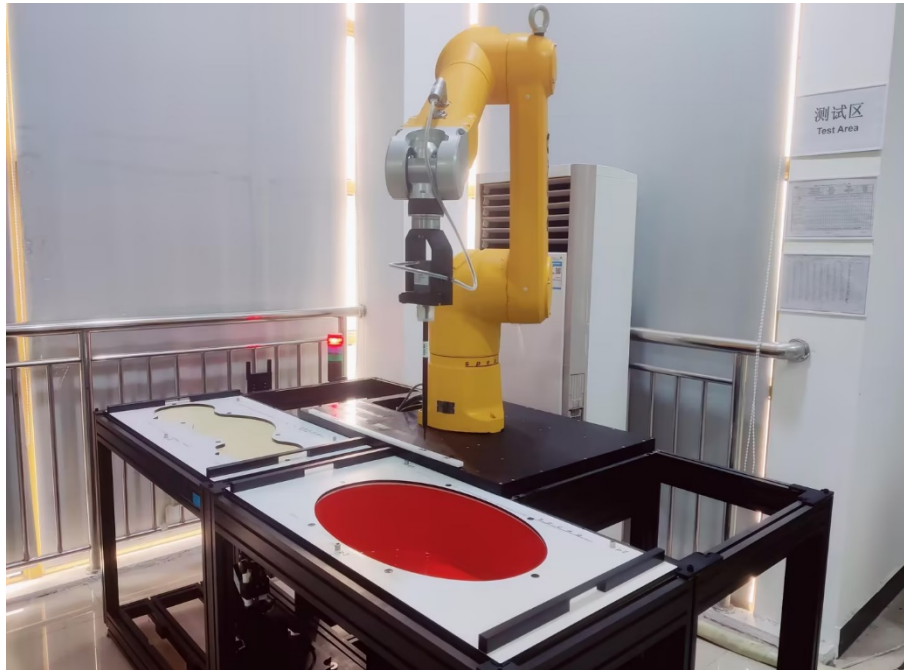
FACILITIES

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) is accredited in accordance with ISO/IEC 17025:2017 by NVLAP (Lab code: 600338-0), and the lab has been recognized as the FCC accredited lab under the KDB 974614 D01, the FCC Designation No. : CN5055.

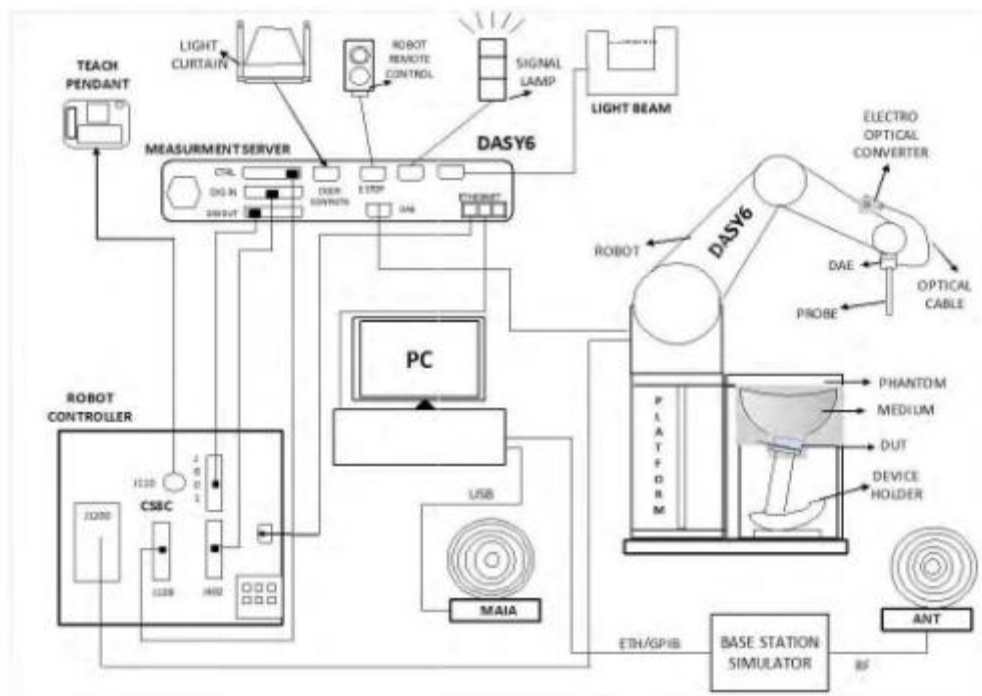
DESCRIPTION OF TEST SYSTEM

These measurements were performed with the automated near-field scanning system DASY6 from Schmid & Partner Engineering AG (SPEAG) which is the Fifth generation of the system shown in the figure hereinafter:



DASY6 System Description

The DASY6 system for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot (Staubli TX=RX family) 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.

DASY6 Measurement Server

The DASY6 measurement server is based on a PC/104 CPU board with a 400 MHz Intel ULV Celeron, 128 MB chip-disk and 128 MB 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 DASY6 I/O board, which is directly connected to the PC/104 bus of the CPU board.



The measurement server performs all real-time data evaluations of field measurements and surface detection, controls robot movements, and handles safety operations. 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 pinout, and therefore only devices provided by SPEAG can be connected. Connection of 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.

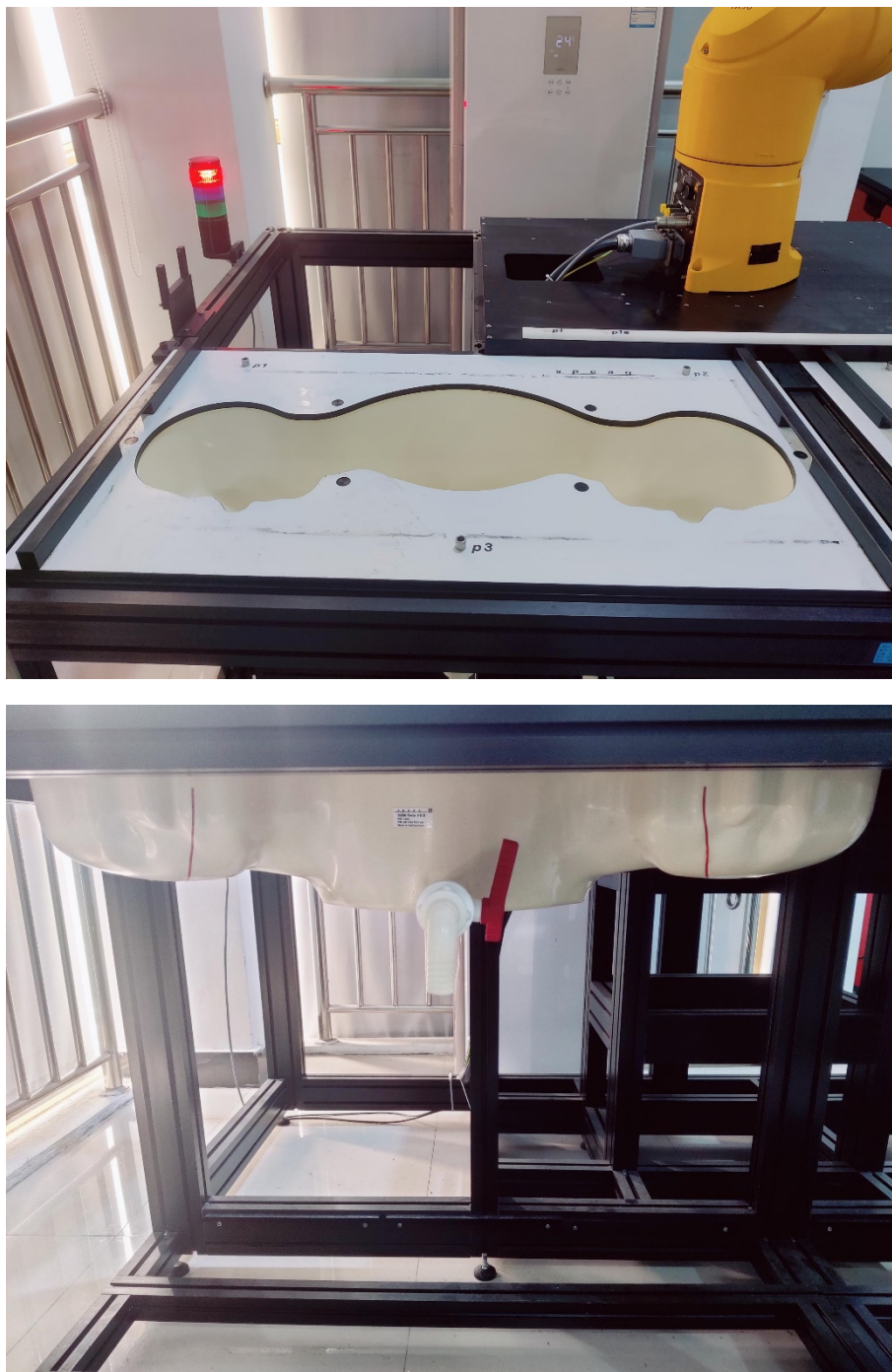
The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

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

EX3DV4 E-Field Probes

Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 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 $\mu\text{W/g}$ to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 $\mu\text{W/g}$)
Dimensions	Overall length: 337 mm (Tip: 9 mm) Tip diameter: 2.5 mm (Body: 10 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	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 SAR and higher, EASY4/MRI

SAM Twin Phantom



The SAM Twin Phantom (shown in front of DASY6) is a fiberglass shell phantom with shell thickness 2 mm, except in the ear region where the thickness is increased to 6 mm. The phantom has three measurement areas: 1) Left Head, 2) Right Head, and 3) Flat Section. For larger devices, the use of the ELI-Phantom (shown behind DASY6) is required. For devices such as glasses with a wireless link, the Face Down Phantom is the most suitable (between the SAM Twin and ELI phantoms).

When the phantom is mounted inside allocated slot of the DASY6 platform, phantom reference points can be taught directly in the DASY5 V5.2 software. When the DASY6 platform is used to mount the Phantom, some of the phantom teaching points cannot be reached by the robot in DASY5 V5.2. A special tool called P1a-P2aX-Former is provided to transform two of the three points, P1 and P2, to reachable locations. To use these new teaching points, a revised phantom configuration file is required.

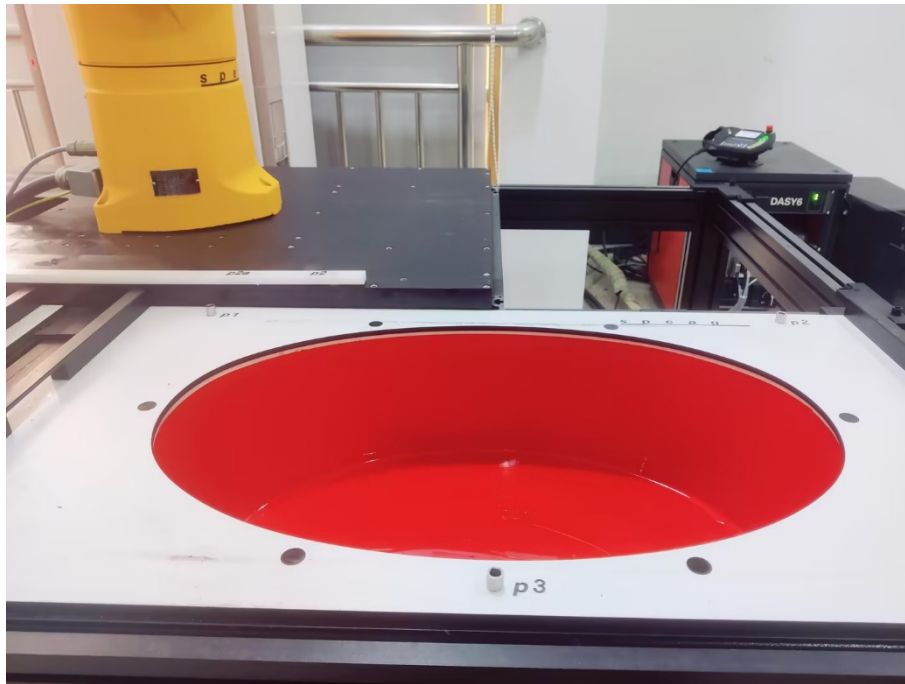
In addition to our standard broadband liquids, the phantom can be used with the following tissue simulating liquids:

Sugar-water-based liquids can be left permanently in the phantom. Always cover the liquid when the system is not in use to prevent changes in liquid parameters due to water evaporation.

DGBE-based liquids should be used with care. As DGBE is a softener for most plastics, the liquid should be taken out of the phantom, and the phantom should be dried when the system is not in use (desirable at least once a week).

Do not use other organic solvents without previously testing the solvent resistivity of the phantom.

Approximately 25 liters of liquid is required to fill the SAM Twin phantom.

ELI Phantom

The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30MHz to 6 GHz. ELI is fully compatible with the latest draft of the standard IEEE 1528:2013 and the use of all known tissue simulating liquids. ELI has been optimized for performance and can be integrated into a SPEAG standard phantom table. A cover is provided to prevent evaporation of water and changes in liquid parameters. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points.

The phantom can be used with the following tissue simulating liquids:

- Sugar-water-based liquids can be left permanently in the phantom. Always cover the liquid when the system is not in use to prevent changes in liquid parameters due to water evaporation.
- DGBE-based liquids should be used with care. As DGBE is a softener for most plastics, the liquid should be taken out of the phantom, and the phantom should be dried when the system is not in use (desirable at least once a week).
- Do not use other organic solvents without previously testing the solvent resistivity of the phantom.

Approximately 25 liters of liquid is required to _fill the ELI phantom.

Robots

The DASY6 system uses the high-precision industrial robots TX60L, TX90XL, and RX160L from Staubli SA (France). The TX robot family - the successor of the well-known RX robot family - continues to offer the features important for DASY6 applications:

- 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 robots are controlled by the Staubli CS8c robot controllers. All information regarding the use and maintenance of the robot arm and the robot controller is provided

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 15mm 2 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/m³ 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 x 7 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 IEEE 1528:2013

Recommended Tissue Dielectric Parameters for Head liquid

Table 2 – Dielectric properties of the tissue-equivalent medium

Frequency MHz	Real part of the complex relative permittivity, ϵ'_r	Conductivity, σ S/m	Penetration depth (E-field), δ mm
4	55,0	0,75	293,0
13	55,0	0,75	165,5
30	55,0	0,75	112,8
150	52,3	0,76	62,0
300	45,3	0,87	46,1
450	43,5	0,87	43,0
750	41,9	0,89	39,8
835	41,5	0,90	39,0
900	41,5	0,97	36,2
1 450	40,5	1,20	28,6
1 800	40,0	1,40	24,3
1 900	40,0	1,40	24,3
1 950	40,0	1,40	24,3
2 000	40,0	1,40	24,3
2 100	39,8	1,49	22,8
2 450	39,2	1,80	18,7
2 600	39,0	1,96	17,2
3 000	38,5	2,40	14,0
3 500	37,9	2,91	11,4
4 000	37,4	3,43	10,0
4 500	36,8	3,94	9,7

Frequency MHz	Real part of the complex relative permittivity, ϵ'	Conductivity, σ S/m	Penetration depth (E-field), δ mm
5 000	36,2	4,45	1,5
5 200	36,0	4,66	8,4
5 400	35,8	4,86	8,1
5 600	35,5	5,07	7,5
5 800	35,3	5,27	7,3
6 000	35,1	5,48	7,0
6 500	34,5	6,07	6,7
7 000	33,9	6,65	6,4
7 500	33,3	7,24	6,1
8 000	32,7	7,84	5,9
8 500	32,1	8,46	5,3
9 000	31,6	9,08	4,8
9 500	31,0	9,71	4,4
10 000	30,4	10,40	4,0

NOTE For convenience, permittivity and conductivity values are linearly interpolated for frequencies that are not a part of the original data from Drossos et al. [2]. They are shown in italics in Table 2. The italicized values are linearly interpolated (below 5800 MHz) or extrapolated (above 5800 MHz) from the non-italicized values that are immediately above and below these values.

Note:

- 1, Effective February 19, 2019, FCC has permitted the use of single head-tissue simulating liquid specified in IEEE 1528:2013 for all SAR tests.
- 2, Mix and Match of traditional FCC SAR TSLs and IEEE 1528:2013 TSL in a single application is not permitted TSL can be changed in a Permissive Change.
- 3, If SAR increases and original SAR > 1.2 W/kg, additional SAR measurements will be required IEEE 1528:2013 TSL is an alternative, not mandatory at this time.
- 4, If FCC parameters are used, $\pm 5\%$ tolerance. If IEC parameters, $\pm 10\%$.
- 5, In this case, IEC parameters applied.

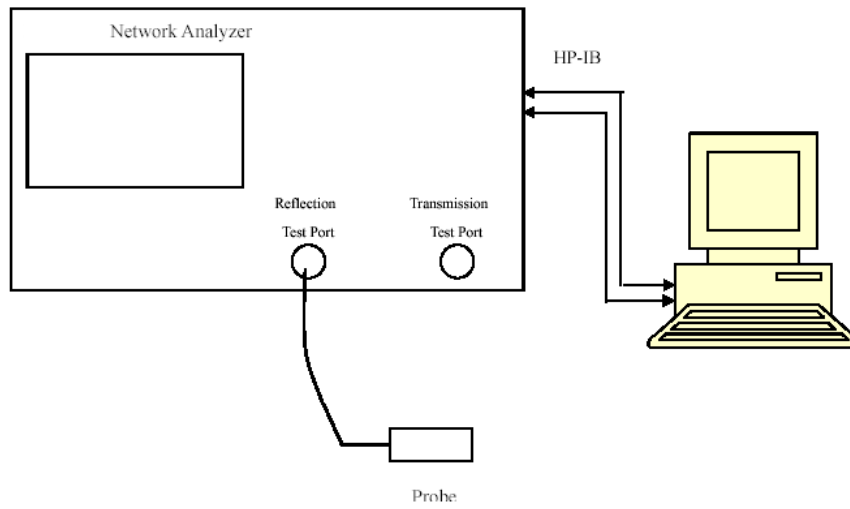
EQUIPMENT LIST AND CALIBRATION

Equipments List & Calibration Information

Equipment	Model	S/N	Calibration Date	Calibration Due Date
DASY5 Test Software	DASY52 52.10.2	N/A	N/A	N/A
DASY6 Measurement Server	DASY6 6.0.31	N/A	N/A	N/A
Data Acquisition Electronics	DAE4	527	2024/03/26	2025/03/25
E-Field Probe	EX3DV4	7557	2024/03/26	2025/03/25
Mounting Device	MD4HHTV5	SD 000 H01 KA	N/A	N/A
ELI V8.0 Phantom	QD OVA 004 Ax	2095	N/A	N/A
Dipole, 750MHz	D750V3	1166	2021/08/31	2024/08/30
Dipole, 835MHz	D835V2	445	2023/02/10	2026/02/09
Dipole,1750MHz	D1750V2	1140	2021/06/29	2024/06/28
Dipole,1900MHz	D1900V2	5d206	2021/09/01	2024/08/31
Dipole,2300MHz	D2300V2	1098	2022/08/23	2025/08/22
Dipole,2450MHz	D2450V2	970	2021/06/28	2024/06/27
Dipole,2600MHz	D2600V2	1162	2022/08/22	2025/08/21
Dipole,5GHz	D5GHzV2	1296	2022/08/17	2025/08/16
Simulated Tissue LiquidHead	HBBL600-6000V6	180611-3	Each Time	
Network Analyzer	E5071B	SG42400155	2023/05/23	2024/05/22
Dielectric Assessment Kit	DAK-3.5	SM DAK 300AB	N/A	N/A
Signal Generator	N5182B	MY53051592	2023/05/23	2024/05/22
Power Amplifier	5S1G4	71377	N/A	N/A
Directional Coupler	4242-10	3307	N/A	N/A
Attenuator	3dB	5402	N/A	N/A
Attenuator	10dB	AU 3842	N/A	N/A
Radio Communication Analyzer	MT8820C	6200930956	2023/06/15	2024/06/14
Hygrothermograph	HTC-1	N/A	2023/5/22	2024/5/21
Thermometer	UL-IL01	N/A	2023/5/22	2024/5/21
Power Meter	E4419B	MY41291878	2023/05/23	2024/05/22

SAR MEASUREMENT SYSTEM VERIFICATION

Liquid Verification



Liquid Verification Setup Block Diagram

Liquid Verification Results

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		O (S/m)	ϵ_r	O (S/m)	ϵ_r	ΔO	$\Delta \epsilon_r$	
2450	Head	1.877	38.346	1.800	39.200	4.28	-2.18	± 5
2437	Head	1.862	38.403	1.788	39.219	4.14	-2.08	± 5
2412	Head	1.833	38.511	1.765	39.256	3.85	-1.90	± 5
2462	Head	1.891	38.296	1.812	39.183	4.36	-2.26	± 5
2442	Head	1.868	38.382	1.793	39.212	4.36	-2.11	± 5
2467	Head	1.897	38.277	1.816	39.176	4.23	-2.30	± 5

*Liquid Verification above was performed on 2024/05/15

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		O (S/m)	ϵ_r	O (S/m)	ϵ_r	ΔO	$\Delta \epsilon_r$	
5250	Head	4.730	37.477	4.710	35.900	0.42	4.39	± 5
5200	Head	4.68	37.551	4.640	36.020	0.86	4.25	± 5
5180	Head	4.661	37.577	4.660	36.000	0.02	4.38	± 5
5240	Head	4.723	37.491	4.701	35.960	0.47	4.26	± 5
5280	Head	4.762	37.435	4.740	35.920	0.46	4.22	± 5
5260	Head	4.74	37.467	4.721	35.940	0.40	4.25	± 5
5320	Head	4.802	37.379	4.780	35.880	0.46	4.18	± 5

*Liquid Verification above was performed on 2024/05/16

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		O (S/m)	ϵ_r	O (S/m)	ϵ_r	ΔO	$\Delta \epsilon_r$	
5600	Head	5.088	36.996	5.070	35.500	0.36	4.21	± 5
5500	Head	4.981	37.14	4.965	35.650	0.22	4.18	± 5
5700	Head	5.195	36.858	5.170	35.400	0.48	4.12	± 5
5580	Head	5.066	37.03	5.049	35.523	0.32	4.25	± 5

*Liquid Verification above was performed on 2024/05/16

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		O (S/m)	ϵ_r	O (S/m)	ϵ_r	ΔO	$\Delta \epsilon_r$	
5750	Head	5.249	36.792	5.220	35.400	0.56	3.93	± 5
5785	Head	5.282	36.752	5.255	35.315	0.51	4.07	± 5
5745	Head	5.242	36.799	5.215	35.355	0.52	4.08	± 5
5825	Head	5.326	36.699	5.296	35.275	0.57	4.04	± 5

*Liquid Verification above was performed on 2024/05/16

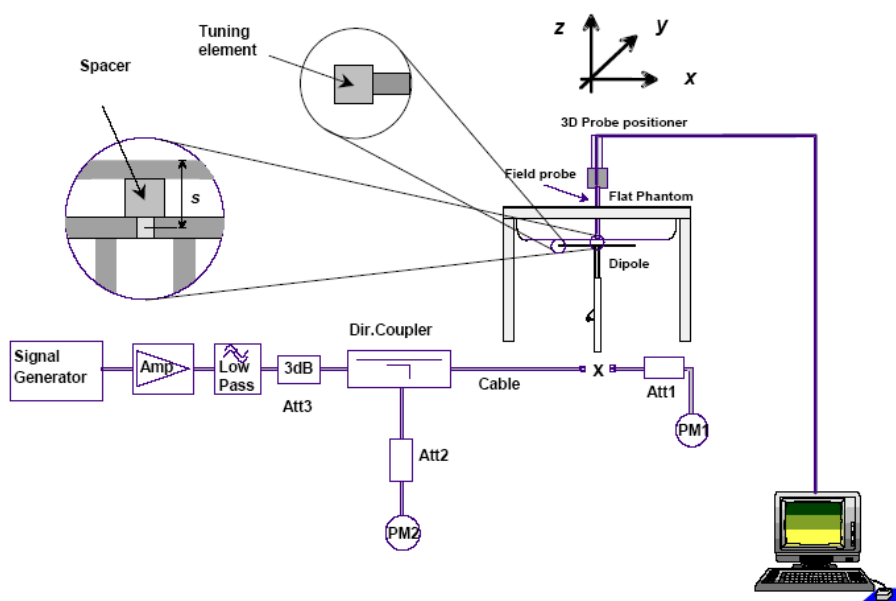
System Accuracy Verification

Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of $\pm 10\%$. 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:

- $s = 15 \text{ mm} \pm 0,2 \text{ mm}$ for $300 \text{ MHz} \leq f \leq 1\,000 \text{ MHz}$;
- $s = 10 \text{ mm} \pm 0,2 \text{ mm}$ for $1\,000 \text{ MHz} < f \leq 3\,000 \text{ MHz}$;
- $s = 10 \text{ mm} \pm 0,2 \text{ mm}$ for $3\,000 \text{ MHz} < f \leq 6\,000 \text{ MHz}$.

System Verification Setup Block Diagram



System Accuracy Check Results

Date	Frequency Band	Liquid Type	Input Power (mW)	Measured SAR (W/kg)		Normalized to 1W (W/kg)	Target Value (W/kg)	Delta (%)	Tolerance (%)
2024/05/15	2450 MHz	Head	250	1g	13.3	53.2	53.1	0.19	±10
2024/05/16	5250 MHz	Head	100	1g	7.79	77.9	79.40	-1.89	±10
2024/05/16	5600MHz	Head	100	1g	8.46	84.6	81.50	3.80	±10
2024/05/16	5750 MHz	Head	100	1g	8.51	85.1	79.00	7.72	±10

*The SAR values above are normalized to 1 Watt forward power.

SAR SYSTEM VALIDATION DATA

System Check_Head_2450MHz

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:970

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.877$ S/m; $\epsilon_r = 38.346$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Probe: EX3DV4 - SN7557; ConvF(7.27, 7.27, 7.27); Calibrated: 3/26/2024;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn527; Calibrated: 3/26/2024
- Phantom: ELI V8.0; Type: QD OVA 004 Ax; Serial: 2095
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437)

Pin=250mW/Area Scan (7x7x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 16.6 W/kg

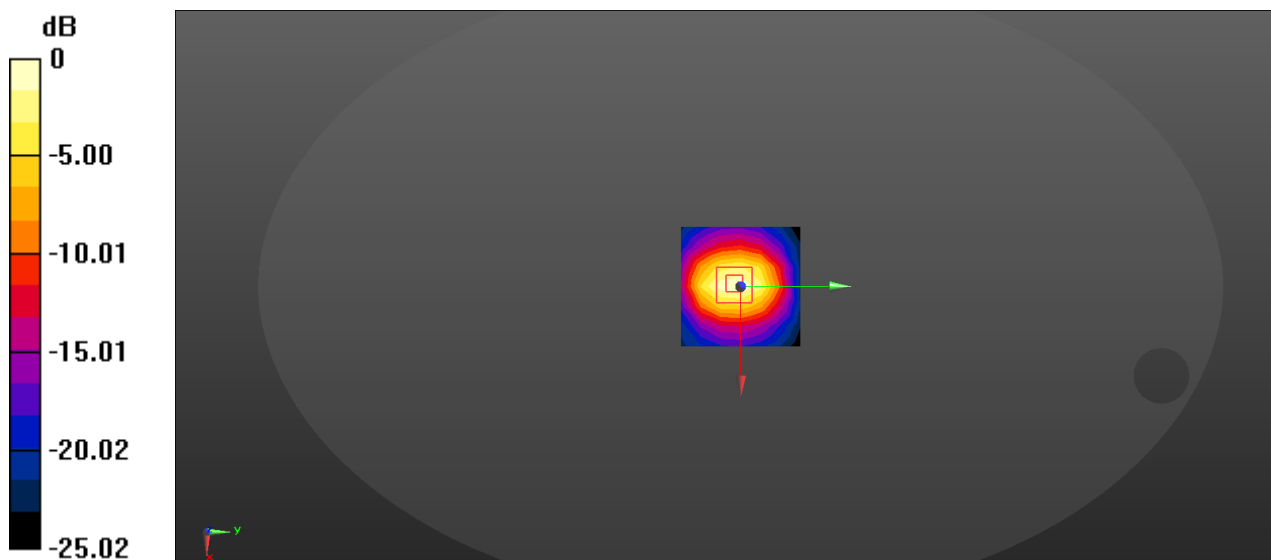
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.57 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 27.5 W/kg

SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.25 W/kg

Maximum value of SAR (measured) = 17.5 W/kg



$$0 \text{ dB} = 17.5 \text{ W/kg} = 12.43 \text{ dBW/kg}$$

System Check_Head_5250MHz

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1296

Communication System: UID 0, CW (0); Frequency: 5250 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5250$ MHz; $\sigma = 4.73$ S/m; $\epsilon_r = 37.477$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Probe: EX3DV4 - SN7557; ConvF(5.25, 5.25, 5.25); Calibrated: 3/26/2024;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn527; Calibrated: 3/26/2024
- Phantom: ELI V8.0; Type: QD OVA 004 Ax; Serial: 2095
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437)

Pin=100mW/Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 19.6 W/kg

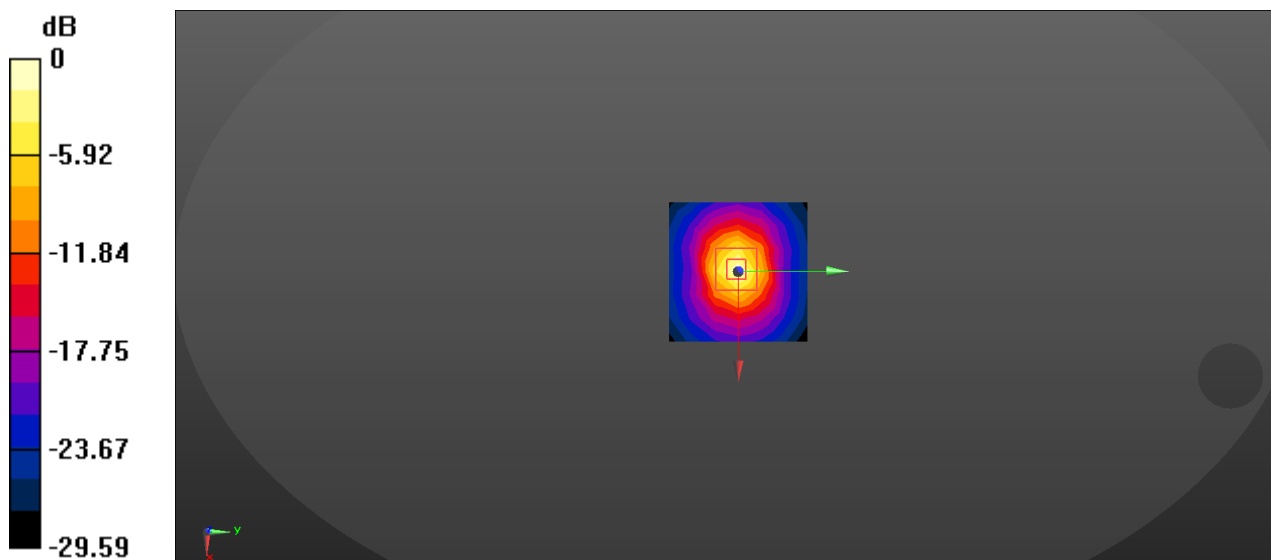
Pin=100mW/Zoom Scan (7x7x17)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 70.10 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 32.5 W/kg

SAR(1 g) = 7.79 W/kg; SAR(10 g) = 2.23 W/kg

Maximum value of SAR (measured) = 19.5 W/kg

 $0 \text{ dB} = 19.6 \text{ W/kg} = 12.92 \text{ dBW/kg}$

System Check_Head_5600MHz

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1296

Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.088$ S/m; $\epsilon_r = 36.996$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Probe: EX3DV4 - SN7557; ConvF(4.63, 4.63, 4.63); Calibrated: 3/26/2024;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn527; Calibrated: 3/26/2024
- Phantom: ELI V8.0; Type: QD OVA 004 Ax; Serial: 2095
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437)

Pin=100mW/Area Scan (8x8x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 15.9 W/kg

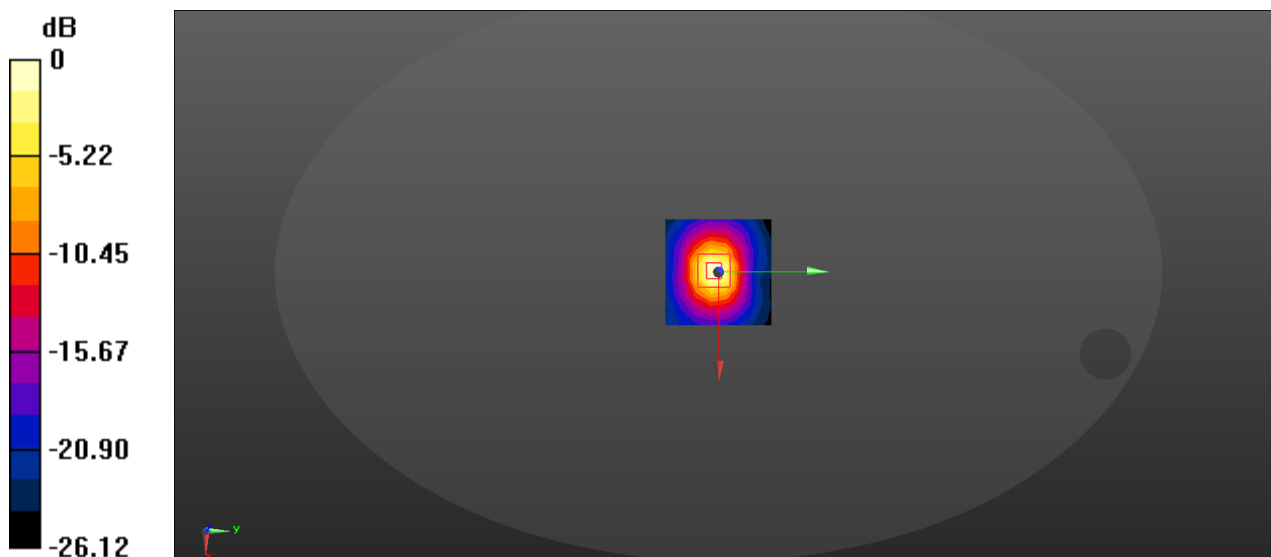
Pin=100mW/Zoom Scan (8x8x17)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 68.33 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 34.9 W/kg

SAR(1 g) = 8.46 W/kg; SAR(10 g) = 2.5 W/kg

Maximum value of SAR (measured) = 20.2 W/kg



$$0 \text{ dB} = 20.2 \text{ W/kg} = 13.05 \text{ dBW/kg}$$

System Check_Head_5750MHz

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1296

Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 5750$ MHz; $\sigma = 5.249$ S/m; $\epsilon_r = 36.792$; $\rho = 1000$ kg/m³

DASY5 Configuration:

- Probe: EX3DV4 - SN7557; ConvF(4.78, 4.78, 4.78); Calibrated: 3/26/2024;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn527; Calibrated: 3/26/2024
- Phantom: ELI V8.0; Type: QD OVA 004 Ax; Serial: 2095
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7437)

Pin=100mW/Area Scan (8x8x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 19.0 W/kg

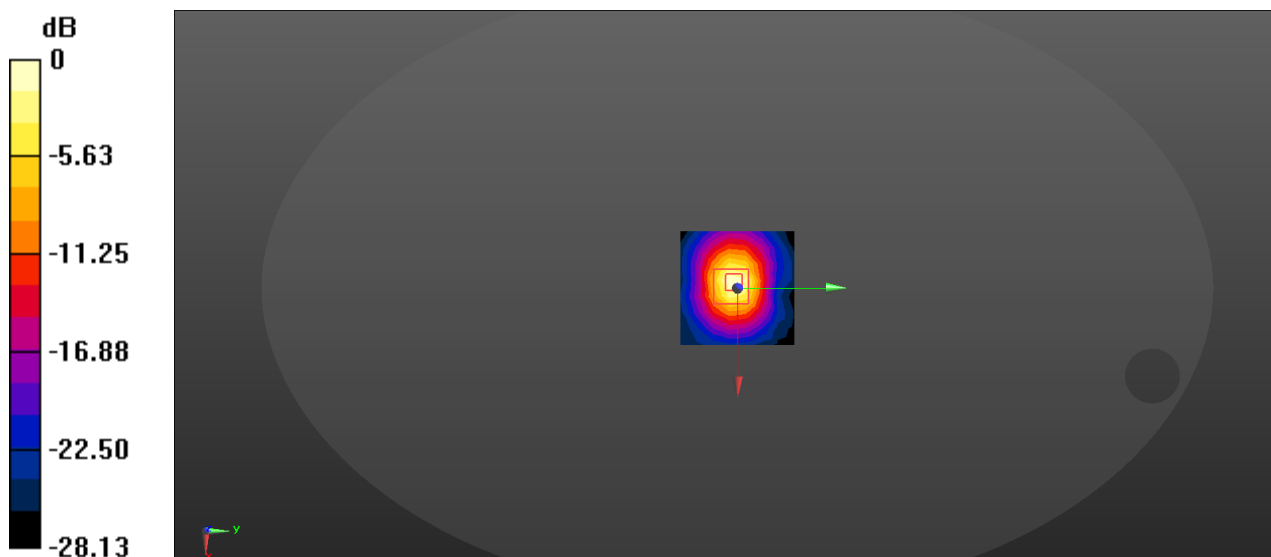
Pin=100mW/Zoom Scan (7x7x17)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.90 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 38.2 W/kg

SAR(1 g) = 8.51 W/kg; SAR(10 g) = 2.44 W/kg

Maximum value of SAR (measured) = 21.7 W/kg



$$0 \text{ dB} = 21.7 \text{ W/kg} = 13.36 \text{ dBW/kg}$$

EUT TEST STRATEGY AND METHODOLOGY

Test positions for body-worn and other configurations

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device. When multiple accessories that do not contain metallic components are supplied with the device, the device may be tested with only the accessory that dictates the closest spacing to the body. When multiple accessories that contain metallic components are supplied with the device, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (e.g., the same metallic belt-clip used with different holsters with no other metallic components), only the accessory that dictates the closest spacing to the body must be tested.

Body-worn accessories may not always be supplied or available as options for some devices that are intended to be authorized for body-worn use. A separation distance of 1.5 cm between the back of the device and a flat phantom is recommended for testing body-worn SAR compliance under such circumstances. Other separation distances may be used, but they should not exceed 2.5 cm. In these cases, the device may use body-worn accessories that provide a separation distance greater than that tested for the device provided however that the accessory contains no metallic components.

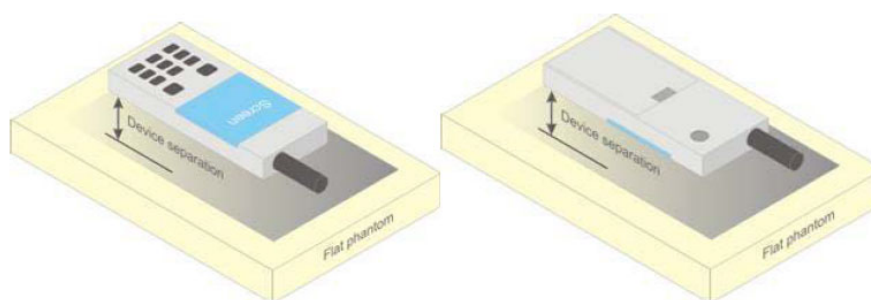


Figure 5 – Test positions for body-worn devices

Test Distance for SAR Evaluation

In this case the EUT (Equipment under Test) is set against from the phantom, the test distance is 0mm(Body supported)

SAR Evaluation Procedure

The evaluation was performed with the following procedure:

Step 1: Measurement of the SAR value at a fixed location above the ear point or central position was used as a reference value for assessing the power drop. The SAR at this point is measured at the start of the test and then again at the end of the testing.

Step 2: The SAR distribution at the exposed side of the head was measured at a distance of 4 mm from the inner surface of the shell. The area covered the entire dimension of the head or radiating structures of the EUT, the horizontal grid spacing was 15 mm x 15 mm, and the SAR distribution was determined by integrated grid of 1.5mm x 1.5mm. Based on these data, the area of the maximum absorption was determined by spline interpolation. The first Area Scan covers the entire dimension of the EUT to ensure that the hotspot was correctly identified.

Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7x 7 x 7 points. On the basis of this data set, the spatial peak SAR value was evaluated under the following procedure:

- 1) The data at the surface were extrapolated, since the center of the dipoles is 1.2 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

- 2) The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed by the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one dimensional splines with the "Not a knot"-condition (in x, y and z-directions). The volume was integrated with the trapezoidal-algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the averages.

All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Re-measurement of the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation was repeated.

CONDUCTED OUTPUT POWER MEASUREMENT

Test Procedure

The RF output of the transmitter was connected to the input of the Communication Test Set and Power Meter through Connector.



Maximum Target Output Power**Full Power Target power**

Max Target Power(dBm)			
Mode/Band	Channel		
	Low	Middle	High
2.4G WLAN (802.11b)	14.8	14.8	14.8
2.4G WLAN (802.11g)	14.5	14.5	11.5
2.4G WLAN (802.11n HT20)	14	14	12
2.4G WLAN (802.11n HT40)	11.5	11.5	11.5
Bluetooth(BDR GFSK)	7	7	4.5
Bluetooth(EDR $\pi/4$ -DQPSK)	6	6	3
Bluetooth(BDR 8DPSK)	6.5	6	4
BLE(1Mbps)	-1.5	-2	-3
5.2G WLAN (802.11a)	19.2	19.2	19.2
5.2G WLAN (802.11ac20)	18.5	18.5	18.5
5.2G WLAN G(802.11ac40)	19	/	19
5.2G WLAN (802.11n20)	18.5	18.5	18.5
5.2G WLAN G(802.11n40)	19	/	19
5.2G WLAN G(802.11ac80)	/	18	/
5.3G WLAN (802.11a)	19.2	19.2	19.2
5.3G WLAN (802.11ac20)	19	19	19
5.3G WLAN G(802.11ac40)	19.1	/	19.1
5.3G WLAN (802.11n20)	19	19	19
5.3G WLAN G(802.11n40)	19.1	/	19.1
5.3G WLAN G(802.11ac80)	/	19	/
5.6G WLAN (802.11a)	20.4	19	19
5.6G WLAN (802.11ac20)	19.5	19.5	19.5
5.6G WLAN G(802.11ac40)	20.3	20.3	20.3
5.6G WLAN (802.11n20)	19.5	19.5	19.5
5.6G WLAN G(802.11n40)	20.3	20.3	20.3
5.6G WLAN G(802.11ac80)	19	19	19
5.8G WLAN (802.11a)	19.7	19.5	19.5
5.8G WLAN (802.11ac20)	19	19	19
5.8G WLAN (802.11ac40)	19.5	/	19.5
5.8G WLAN (802.11n20)	19	19	19
5.8G WLAN (802.11n40)	19.5	/	19.5
5.8G WLAN (802.11ac80)	/	19.6	/
2.4G SRD	19.2	18.95	19.2

Test Results:**WLAN 2.4G:**

Mode	Channel frequency (MHz)	Data Rate	Conducted Average Output Power(dBm)
802.11b	2412	1Mbps	14.47
	2437		14.31
	2462		14.06
802.11g	2412	6Mbps	13.97
	2437		13.79
	2462		10.76
802.11n HT20	2412	MCS0	13.72
	2437		13.63
	2462		11.53
802.11n HT40	2422	MCS0	11.03
	2437		10.96
	2452		11.03

Note:

2.4G wifi duty cycle is 98.45%. Refer to the report for details RKSA240424001-00B

WLAN 5.2G:

Test mode	Band	Frequency (MHz)	Average Conducted Output Power (dBm)
802.11a	5150-5250 MHz	5180	17.93
		5200	17.96
		5240	18.16
802.11ac20	5150-5250 MHz	5180	17.97
		5200	18.01
		5240	18.23
802.11ac40	5150-5250 MHz	5190	18.18
		5230	18.76
802.11n20	5150-5250 MHz	5180	17.84
		5200	17.96
		5240	18.11
802.11n40	5150-5250 MHz	5190	18.11
		5230	18.64
802.11ac80	5150-5250 MHz	5210	17.15

Note:

5.2G wifi duty cycle is 94.78%. Refer to the report for details RKSA240424001-00E

WLAN 5.3G:

Test mode	Band	Frequency (MHz)	Average Conducted Output Power (dBm)
802.11a	5250-5350 MHz	5260	18.16
		5280	18.22
		5320	18.45
802.11ac20	5250-5350 MHz	5260	18.33
		5280	18.29
		5320	18.55
802.11ac40	5250-5350 MHz	5270	19.08
		5310	18.07
802.11n20	5250-5350 MHz	5260	18.21
		5280	18.14
		5320	18.51
802.11n40	5250-5350 MHz	5270	19.04
		5310	18.01
802.11ac80	5250-5350 MHz	5290	18.12

Note:

5.3G wifi duty cycle is 94.32%. Refer to the report for details RKSA240424001-00E

WLAN 5.6G:

Test mode	Band	Frequency (MHz)	Average Conducted Output Power (dBm)
802.11a	5470-5725 MHz	5500	19.17
		5580	18.37
		5700	18.32
802.11ac20	5470-5725 MHz	5500	19.29
		5580	19.11
		5700	18.52
		5720	18.42
802.11ac40	5470-5725 MHz	5510	20.22
		5550	20.19
		5670	19.63
		5710	19.36
802.11n20	5470-5725 MHz	5500	19.21
		5580	19.08
		5700	18.48
		5720	18.39
802.11n40	5470-5725 MHz	5510	20.13
		5550	20.14
		5670	19.58
		5710	19.31
802.11ac80	5470-5725 MHz	5530	18.86
		5610	18.47
		5690	18.14

Note:

5.6G wifi duty cycle is 93.85%. Refer to the report for details RKSA240424001-00E

WLAN 5.8G:

Test mode	Band	Frequency (MHz)	Average Conducted Output Power (dBm)
802.11a	5725-5850 MHz	5745	18.33
		5785	18.29
		5825	18.26
802.11ac20	5725-5850 MHz	5745	18.47
		5785	18.46
		5825	18.32
802.11ac40	5725-5850 MHz	5755	19.36
		5795	19.31
802.11n20	5725-5850 MHz	5745	18.44
		5785	18.41
		5825	18.14
802.11n40	5725-5850 MHz	5755	19.14
		5795	19.17
802.11ac80	5725-5850 MHz	5775	19.54

Note:

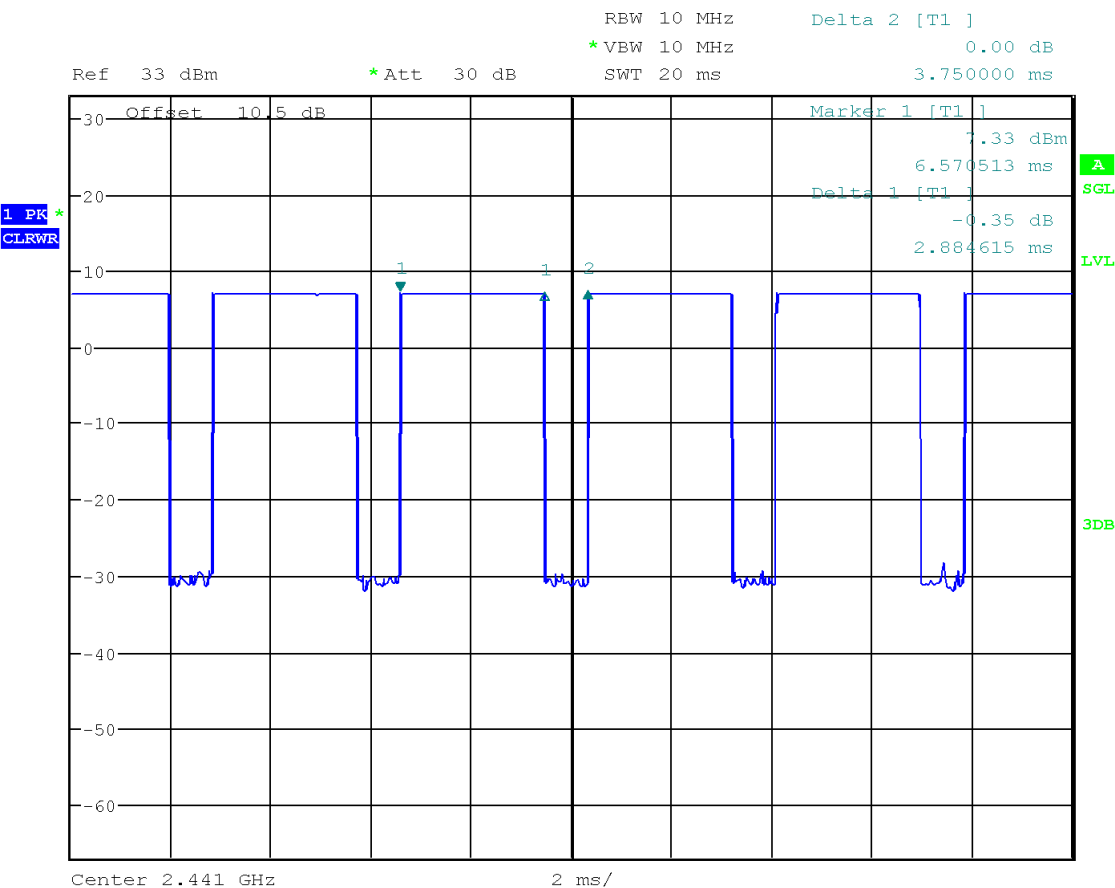
5.8G wifi duty cycle is 94.72%. Refer to the report for details RKSA240424001-00E

Bluetooth:

Mode	Channel frequency (MHz)	RF Output Power (dBm)
BDR(GFSK)	2402	6.65
	2441	6.03
	2480	3.80
EDR($\pi/4$ -DQPSK)	2402	5.70
	2441	5.03
	2480	2.76
EDR(8DPSK)	2402	6.00
	2441	5.34
	2480	3.11

Note:

Bluetooth duty cycle is 76.8 %, as shown below



ProjectNo.:RSHA240424001 Tester:Bard Liu
Date: 10.JUL.2024 16:34:56

BLE:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)
BLE(1Mbps) Mode		
Low	2402	-1.77
Middle	2440	-2.24
High	2480	-3.81

2.4G SRD

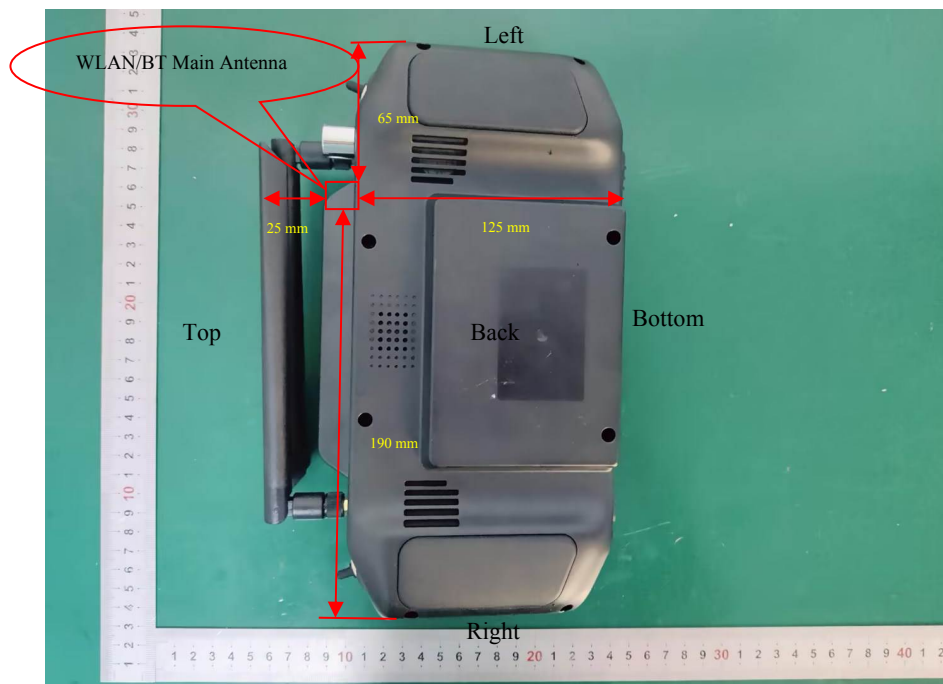
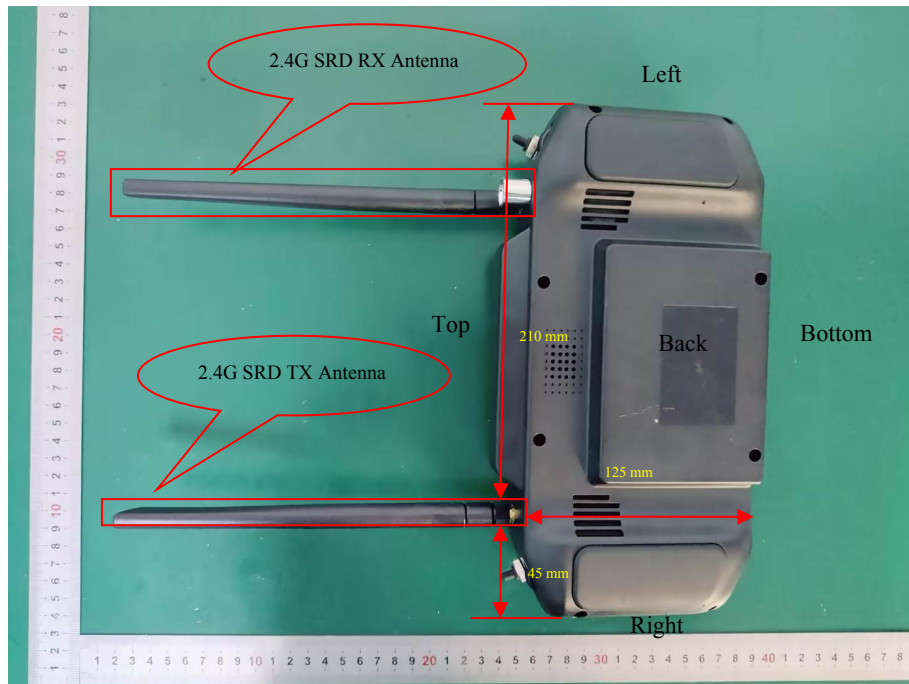
Channel	Frequency (MHz)	Max Conducted Average Output Power (dBm)
Low	2412	19.01
Middle	2442	18.89
High	2467	19.05

Note:

2.4G SRD duty cycle is 89.44%. Refer to the report for details RKSA240424001-00D

Standalone SAR test exclusion considerations

Antennas Location:



Antenna Distance To Edge

Antenna	Antenna Distance To Edge(mm)					
	Back	Front	Left	Right	Top	Bottom
WLAN/BT Main	<5	<5	65	190	25	125
SRD	<5	<5	210	45	<5	125

Standalone SAR Test Exclusion Considerations

Mode	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
WLAN 2.4G	2462	14.8	30.20	0	9.48	3	No
WLAN 5.2G	5240	19.2	83.18	0	38.08	3	No
WLAN 5.3G	5320	19.2	83.18	0	38.37	3	No
WLAN 5.6G	5500	20.4	109.65	0	51.43	3	No
WLAN 5.8G	5825	19.7	93.33	0	45.05	3	No
Bluetooth	2480	7	5.01	0	1.58	3	YES
BLE	2480	-1.5	0.71	0	0.22	3	YES

NOTE:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot$

$[\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

1. $f(\text{GHz})$ is the RF channel transmit frequency in GHz.

2. Power and distance are rounded to the nearest mW and mm before calculation.

3. The result is rounded to one decimal place for comparison.

4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

Standalone SAR estimation:

Mode	Frequency (MHz)	Pavg (dBm)	Pavg (mW)	Distance (mm)	Estimated 1-g (W/kg)
BT Body	2480	7	5.01	0	0.21
BLE Body	2480	-1.5	0.71	0	0.03

Note: The bluetooth based Peak power for calculation.

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot$

$[\sqrt{f(\text{GHz})/x}]$

W/kg for test separation distances ≤ 50 mm;

where $x = 7.5$ for 1-g SAR. and $x = 18.75$ for 10-g SAR.

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion

Standalone SAR test exclusion considerations

Mode	Frequency (MHz)	Pavg (dBm)	Pavg (mW)	Test Exclusion Distance(mm)
WLAN 2.4G Antenna	2462	14.8	30.20	15.80
WLAN 5.2G Antenna	5240	19.2	83.18	51.76
WLAN 5.3G Antenna	5320	19.2	83.18	51.81
WLAN 5.6G Antenna	5500	20.4	109.65	54.56
WLAN 5.8G Antenna	5825	19.7	93.33	53.11
Bluetooth	2480	7	5.01	2.63
BLE	2480	-1.5	0.71	0.37
2.4G SRD	2467	19.2	83.18	43.55

SAR test exclusion for the EUT edge considerations Result

Mode	Back	Front	Left	Right	Top	Bottom
WLAN 2.4G Antenna	Required	Required	Exclusion	Exclusion	Exclusion	Exclusion
WLAN 5.2G Antenna	Required	Required	Exclusion	Exclusion	Required	Exclusion
WLAN 5.3G Antenna	Required	Required	Exclusion	Exclusion	Required	Exclusion
WLAN 5.6G Antenna	Required	Required	Exclusion	Exclusion	Required	Exclusion
WLAN 5.8G Antenna	Required	Required	Exclusion	Exclusion	Required	Exclusion
Bluetooth	Exclusion	Exclusion	Exclusion	Exclusion	Exclusion	Exclusion
BLE	Exclusion	Exclusion	Exclusion	Exclusion	Exclusion	Exclusion
2.4G SRD	Required	Required	Exclusion	Exclusion	Required	Exclusion

Distance < 50mm (To Edges)

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot$

$[\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

1. $f(\text{GHz})$ is the RF channel transmit frequency in GHz.

2. Power and distance are rounded to the nearest mW and mm before calculation.

3. The result is rounded to one decimal place for comparison.

4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

5. The Time based average Power is used for calculation

Distance > 50mm (To Edges)

At 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following:

a) $[\text{Power allowed at numeric threshold for 50 mm in step 1}) + (\text{test separation distance} - 50 \text{ mm}) \cdot (f(\text{MHz})/150)]$ mW, at 100 MHz to 1500 MHz

b) $[\text{Power allowed at numeric threshold for 50 mm in step 1}) + (\text{test separation distance} - 50 \text{ mm}) \cdot 10]$ mW at > 1500 MHz and ≤ 6 GHz.

SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

SAR Test Data

Environmental Conditions

Temperature:	22.5-23.8 °C	22.5-23.6 °C
Relative Humidity:	55 %	52 %
Test Date:	2024/05/15	2024/05/16

Testing was performed by Jason and Allen

WLAN 2.4G:

Band	EUT Position	Freq. (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	Scaled Factor	Duct cycle Factor	Meas. (W/Kg)	Scaled SAR (W/Kg)	Limit (W/Kg)	Plot
WLAN2.4G	Front(0mm)	2437	802.11b 1Mbps	14.31	14.80	1.119	1.016	0.063	0.072	1.6	1#
WLAN2.4G	Back(0mm)	2437	802.11b 1Mbps	14.31	14.80	1.119	1.016	0.164	0.187	1.6	2#
WLAN2.4G	Back(0mm)	2412	802.11b 1Mbps	14.47	14.80	1.079	1.016	0.156	0.171	1.6	3#
WLAN2.4G	Back(0mm)	2462	802.11b 1Mbps	14.06	14.80	1.186	1.016	0.077	0.093	1.6	4#
WLAN2.4G	Left Side(0mm)	2437	802.11b 1Mbps	/	/	/	/	/	/	1.6	/
WLAN2.4G	Right Side(0mm)	2437	802.11b 1Mbps	/	/	/	/	/	/	1.6	/
WLAN2.4G	Top Side(0mm)	2437	802.11b 1Mbps	/	/	/	/	/	/	1.6	/
WLAN2.4G	Bottom Side(0mm)	2437	802.11b 1Mbps	/	/	/	/	/	/	1.6	/

WLAN 5.2G:

Band	EUT Position	Freq. (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	Scaled Factor	Duct cycle Factor	Meas. (W/Kg)	Scaled SAR (W/Kg)	Limit (W/Kg)	Plot
WLAN5.2G	Front(0mm)	5200	802.11a 6Mbps	17.96	19.20	1.330	1.055	0.110	0.154	1.6	5#
WLAN5.2G	Back(0mm)	5200	802.11a 6Mbps	17.96	19.20	1.330	1.055	0.115	0.161	1.6	6#
WLAN5.2G	Back(0mm)	5180	802.11a 6Mbps	17.93	19.20	1.340	1.055	0.117	0.165	1.6	7#
WLAN5.2G	Back(0mm)	5240	802.11a 6Mbps	18.16	19.20	1.271	1.055	0.137	0.184	1.6	8#
WLAN5.2G	Left Side(0mm)	5200	802.11a 6Mbps	/	/	/	/	/	/	1.6	/
WLAN5.2G	Right Side(0mm)	5200	802.11a 6Mbps	/	/	/	/	/	/	1.6	/
WLAN5.2G	Top Side(0mm)	5200	802.11a 6Mbps	17.96	19.20	1.330	1.055	0.040	0.056	1.6	40#
WLAN5.2G	Bottom Side(0mm)	5200	802.11a 6Mbps	/	/	/	/	/	/	1.6	/

WLAN 5.3G:

Band	EUT Position	Freq. (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	Scaled Factor	Duct cycle Factor	Meas. (W/Kg)	Scaled SAR (W/Kg)	Limit (W/Kg)	Plot
WLAN5.3G	Front(0mm)	5280	802.11a 6Mbps	18.22	19.20	1.253	1.060	0.057	0.076	1.6	9#
WLAN5.3G	Back(0mm)	5280	802.11a 6Mbps	18.22	19.20	1.253	1.060	0.063	0.084	1.6	10#
WLAN5.3G	Back(0mm)	5260	802.11a 6Mbps	18.16	19.20	1.271	1.060	0.073	0.099	1.6	11#
WLAN5.3G	Back(0mm)	5320	802.11a 6Mbps	18.45	19.20	1.189	1.060	0.053	0.067	1.6	12#
WLAN5.3G	Left Side(0mm)	5280	802.11a 6Mbps	/	/	/	/	/	/	1.6	/
WLAN5.3G	Right Side(0mm)	5280	802.11a 6Mbps	/	/	/	/	/	/	1.6	/
WLAN5.3G	Top Side(0mm)	5280	802.11a 6Mbps	18.22	19.20	1.253	1.060	0.029	0.038	1.6	41#
WLAN5.3G	Bottom Side(0mm)	5280	802.11a 6Mbps	/	/	/	/	/	/	1.6	/

WLAN 5.6G:

Band	EUT Position	Freq. (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	Scaled Factor	Duct cycle Factor	Meas. (W/Kg)	Scaled SAR (W/Kg)	Limit (W/Kg)	Plot
WLAN5.6G	Front(0mm)	5580	802.11a 6Mbps	18.37	19.00	1.156	1.066	0.086	0.106	1.6	13#
WLAN5.6G	Back(0mm)	5580	802.11a 6Mbps	18.37	19.00	1.156	1.066	0.140	0.173	1.6	14#
WLAN5.6G	Back(0mm)	5500	802.11a 6Mbps	19.17	20.40	1.327	1.066	0.095	0.135	1.6	15#
WLAN5.6G	Back(0mm)	5700	802.11a 6Mbps	18.32	19.00	1.169	1.066	0.168	0.209	1.6	16#
WLAN5.6G	Left Side(0mm)	5580	802.11a 6Mbps	/	/	/	/	/	/	1.6	/
WLAN5.6G	Right Side(0mm)	5580	802.11a 6Mbps	/	/	/	/	/	/	1.6	/
WLAN5.6G	Top Side(0mm)	5580	802.11a 6Mbps	18.37	19.00	1.156	1.066	0.069	0.085	1.6	42#
WLAN5.6G	Bottom Side(0mm)	5580	802.11a 6Mbps	/	/	/	/	/	/	1.6	/

WLAN 5.8G:

Band	EUT Position	Freq. (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	Scaled Factor	Duct cycle Factor	Meas. (W/Kg)	Scaled SAR (W/Kg)	Limit (W/Kg)	Plot
WLAN5.8G	Front(0mm)	5785	802.11a 6Mbps	18.29	19.50	1.321	1.056	0.232	0.324	1.6	17#
WLAN5.8G	Back(0mm)	5785	802.11a 6Mbps	18.29	19.50	1.321	1.056	0.287	0.400	1.6	18#
WLAN5.8G	Back(0mm)	5745	802.11a 6Mbps	18.33	19.70	1.371	1.056	0.229	0.332	1.6	19#
WLAN5.8G	Back(0mm)	5825	802.11a 6Mbps	18.26	19.50	1.330	1.056	0.318	0.447	1.6	20#
WLAN5.8G	Left Side(0mm)	5785	802.11a 6Mbps	/	/	/	/	/	/	1.6	/
WLAN5.8G	Right Side(0mm)	5785	802.11a 6Mbps	/	/	/	/	/	/	1.6	/
WLAN5.8G	Top Side(0mm)	5785	802.11a 6Mbps	18.29	19.50	1.321	1.056	0.174	0.243	1.6	43#
WLAN5.8G	Bottom Side(0mm)	5785	802.11a 6Mbps	/	/	/	/	/	/	1.6	/

SRD 2.4G:

Band	EUT Position	Freq. (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	Scaled Factor	Duct cycle Factor	Meas. (W/Kg)	Scaled SAR (W/Kg)	Limit (W/Kg)	Plot
SRD	Front(0mm)-Z	2442	2.4G	18.89	18.95	1.014	1.118	0.962	1.090	1.6	44#
SRD	Front(0mm) -Z	2412	2.4G	19.01	19.20	1.045	1.118	0.866	1.011	1.6	45#
SRD	Front(0mm)-Z	2467	2.4G	19.05	19.20	1.035	1.118	1.010	1.169	1.6	46#
SRD	Front(0mm)-Y	2442	2.4G	18.89	18.95	1.014	1.118	0.704	0.798	1.6	47#
SRD	Front(0mm)-X	2442	2.4G	18.89	18.95	1.014	1.118	0.005	0.005	1.6	48#
SRD	Back(0mm)-Z	2442	2.4G	18.89	18.95	1.014	1.118	0.990	1.122	1.6	49#
SRD	Back(0mm)-Z	2412	2.4G	19.01	19.20	1.045	1.118	0.974	1.138	1.6	50#
SRD	Back(0mm)-Z	2467	2.4G	19.05	19.20	1.035	1.118	0.887	1.027	1.6	51#
SRD	Back(0mm)-Y	2442	2.4G	18.89	18.95	1.014	1.118	0.129	0.146	1.6	52#
SRD	Back(0mm)-X	2442	2.4G	18.89	18.95	1.014	1.118	0.004	0.004	1.6	53#
SRD	Top Side(0mm)-Z	2442	2.4G	18.89	18.95	1.014	1.118	0.003	0.003	1.6	54#
SRD	Top Side(0mm)-Y	2442	2.4G	18.89	18.95	1.014	1.118	0.976	1.106	1.6	55#
SRD	Top Side(0mm)-Y	2412	2.4G	19.01	19.20	1.045	1.118	1.020	1.191	1.6	56#
SRD	Top Side(0mm)-Y	2467	2.4G	19.05	19.20	1.035	1.118	0.894	1.035	1.6	57#
SRD	Top Side(0mm)-X	2442	2.4G	18.89	18.95	1.014	1.118	0.968	1.097	1.6	58#
SRD	Top Side(0mm)-X	2412	2.4G	19.01	19.20	1.045	1.118	0.891	1.041	1.6	59#
SRD	Top Side(0mm)-X	2467	2.4G	19.05	19.20	1.035	1.118	0.980	1.134	1.6	60#

Note:

1. When the SAR Value is less than half of the limit, 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. When the maximum output power variation across the required test channels is $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel must be used.
4. According to IEEE 1528:2013, If the correction Δ SAR is within $\pm 5\%$, the measured SAR results should not be corrected.
- 5 X,Y, and Z in EUT Position refer to the direction of the 2.4GSRD antenna

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 ($\sim 10\%$ 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

Body

SAR probe calibration point	Frequency Band	Freq.(MHz)	EUT Position	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio
				Original	Repeated	
2450MHz (2400~2550MHz)	2.4G SRD	2412	Body TOP	1.02	0.98	1.04

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..

SAR SIMULTANEOUS TRANSMISSION DESCRIPTION

Simultaneous Transmission:

Description of Simultaneous Transmit Capabilities		
Transmitter Combination	Simultaneous?	Hotspot
2.4GSRD+ 2.4GWLAN	√	√
2.4GSRD + 5GWLAN	√	√
2.4GSRD+ Bluetooth	√	X
2.4G/5GWLAN + Bluetooth	X	X

Note:

5G band 1/2/3 does not support hotspot mode, only 5G band 4 supports hotspot

Simultaneous Transmission Consideration Detail

Transmitter Combination	Position	Max SAR(W/kg)		ΣSAR< 1.6W/kg
		SAR1(WWAN)	SAR2(WLAN)	
2.4GSRD + 2.4GWLAN	Front Side	1.169	0.072	1.241
	Back Side	1.138	0.187	1.325
	Left Side	/	/	/
	Right Side	/	/	/
	Top Side	1.191	/	1.191
	Bottom Side	/	/	/

Transmitter Combination	Position	Max SAR(W/kg)		ΣSAR< 1.6W/kg
		SAR1(WWAN)	SAR2(WLAN)	
2.4GSRD + 5GWLAN	Front Side	1.169	0.324	1.493
	Back Side	1.138	0.447	1.585
	Left Side	/	/	/
	Right Side	/	/	/
	Top Side	1.191	0.243	1.434
	Bottom Side	/	/	/

Transmitter Combination	Position	Max SAR(W/kg)		ΣSAR< 1.6W/kg
		SAR1(WWAN)	SAR2(WLAN)	
2.4GSRD + Bluetooth	Top Side	1.191	0.21	1.401

Conclusion:

Sum of SAR: ΣSAR ≤ 1.6 W/kg therefore simultaneous transmission SAR result is **Compliance**.

APPENDIX A SAR PLOTS OF SAR MEASUREMENT

Please Refer to the Attachment.

APPENDIX B MEASUREMENT UNCERTAINTY

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

Measurement uncertainty evaluation for IEEE 1528:2013 SAR test

Source of uncertainty	Tolerance/ uncertainty ± %	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
Axial Isotropy	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	$\sqrt{3}$	0	0	0.0	0.0
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
Detection limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
Integration time	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
RF ambient conditions – noise	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
RF ambient conditions–reflections	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Probe positioner mech. Restrictions	0.8	R	$\sqrt{3}$	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.7	R	$\sqrt{3}$	1	1	3.9	3.9
Post-processing	2.0	R	$\sqrt{3}$	1	1	1.2	1.2
Test sample related							
Test sample positioning	2.8	N	1	1	1	2.8	2.8
Device holder uncertainty	6.3	N	1	1	1	6.3	6.3
Drift of output power	5.0	R	$\sqrt{3}$	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	$\sqrt{3}$	1	1	2.3	2.3
Liquid conductivity target)	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2
Liquid conductivity meas.)	2.5	N	1	0.64	0.43	1.6	1.1
Liquid permittivity target)	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4
Liquid permittivity meas.)	2.5	N	1	0.6	0.49	1.5	1.2
Combined standard uncertainty		RSS				12.2	12.0
Expanded uncertainty 95 % confidence interval)						24.3	23.9

Measurement uncertainty evaluation for IEC 62209-2 SAR test

Source of uncertainty	Tolerance/ uncertainty ± %	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
Axial Isotropy	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	$\sqrt{3}$	0	0	0.0	0.0
Linearity	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
Modulation Response	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
Detection limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
Integration time	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
RF ambient conditions – noise	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
RF ambient conditions–reflections	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Probe positioner mech. Restrictions	0.8	R	$\sqrt{3}$	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.7	R	$\sqrt{3}$	1	1	3.9	3.9
Post-processing	2.0	R	$\sqrt{3}$	1	1	1.2	1.2
Test sample related							
Device holder Uncertainty	6.3	N	1	1	1	6.3	6.3
Test sample positioning	2.8	N	1	1	1	2.8	2.8
Power scaling	4.5	R	$\sqrt{3}$	1	1	2.6	2.6
Drift of output power	5.0	R	$\sqrt{3}$	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	$\sqrt{3}$	1	1	2.3	2.3
Algorithm for correcting SAR for deviations in permittivity and conductivity	1.9	N	1	1	0.84	1.1	0.9
Liquid conductivity (meas.)	2.5	N	1	0.64	0.43	1.6	1.1
Liquid permittivity (meas.)	2.5	N	1	0.6	0.49	1.5	1.2
Temp. unc. - Conductivity	1.7	R	$\sqrt{3}$	0.78	0.71	0.8	0.7
Temp. unc. - Permittivity	0.3	R	$\sqrt{3}$	0.23	0.26	0.0	0.0
Combined standard uncertainty		RSS				12.2	12.1
Expanded uncertainty 95 % confidence interval)						24.5	24.2

APPENDIX C EUT TEST POSITION PHOTOS

Liquid depth $\geq 15\text{cm}$



WLAN Front(0mm)



WLAN Back(0mm)



WLAN Top(0mm)



2.4GSRD Front(0mm)-X



2.4GSRD Front(0mm)-Y



2.4GSRD Front(0mm)-Z



2.4GSRD Back(0mm)-X



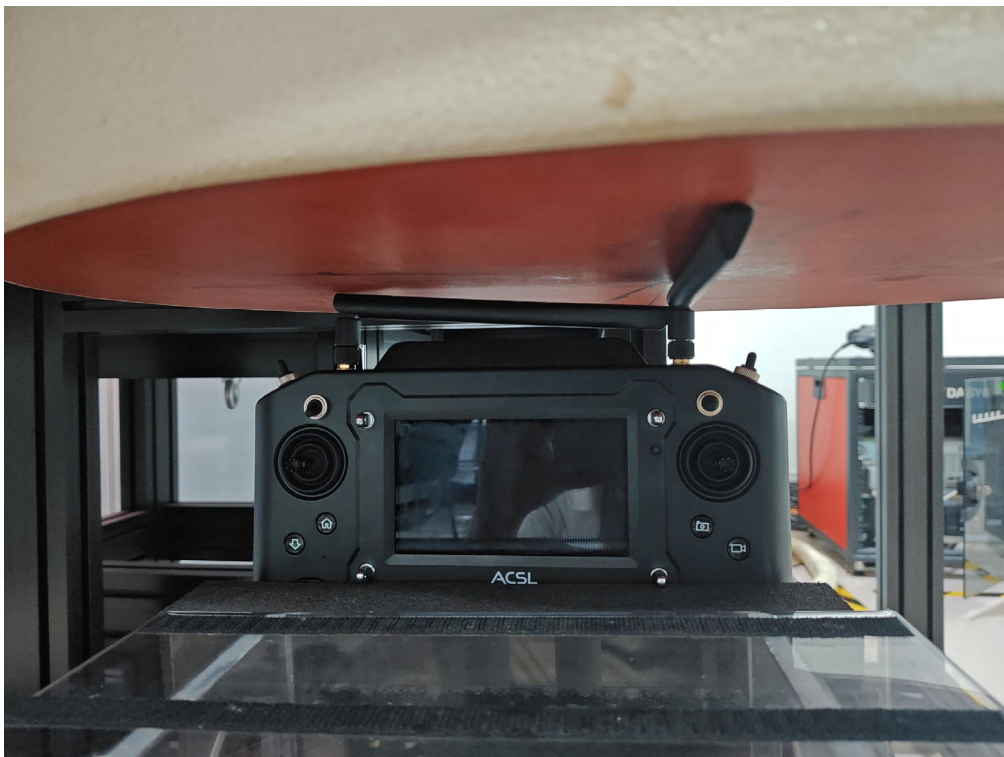
2.4GSRD Back(0mm)-Y



2.4GSRD Back(0mm)-Z



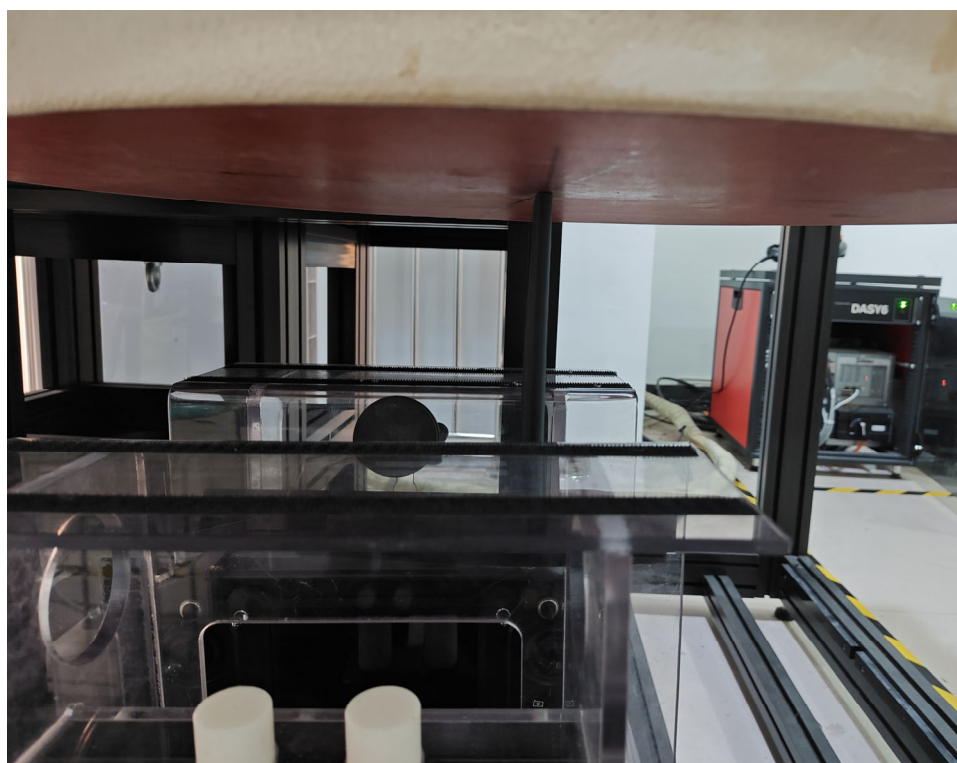
2.4GSRD Top (0mm)-X



2.4GSRD Top (0mm)-Y



2.4GSRD Top (0mm)-Z



APPENDIX D CALIBRATION CERTIFICATES

Please Refer to the Attachment.

Declarations

1. The laboratory is not responsible for the authenticity of any information provided by the applicant. Information from the applicant that may affect test results is marked with “★”.
2. The test data was only valid for the test sample(s).
3. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.
4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor $k=2$ with the 95.45% confidence interval.

******* END OF REPORT *******