FCC SAR Test Report

Applicant	:	**Shenzhen Feima Robotics Co., Ltd.**
Address	:	**13th Floor, Building A4, Nanshan Zhiyuan, No. 1001 Xueyuan Avenue, Taoyuan Street, Nanshan District, Shenzhen**
Product Name	:	**LASER SCANNER**
Report Date	:	**Dec. 03, 2024**

Shenzhen Anbotek Compliance Laboratory Limited

Shenzhen Anbotek Compliance Laboratory Limited
Anbotek Product Safety
* Approved *

Contents

TEST REPORT

Applicant	:	Shenzhen Feima Robotics Co., Ltd.
Manufacturer	:	Shenzhen Feima Robotics Co., Ltd.
Product Name	:	LASER SCANNER
Model No.	:	SLAM1000,X40^{GO}
Trade Mark	:	N/A
Rating(s)	:	Input: 20V,18W
Test Standard(s)	:	**IEC/IEEE 62209-1528:2020; FCC 47 CFR Part 2.1093; ANSI/IEEE C95.1:2019; Reference FCC KDB 447498 D01 v06; KDB 248227 D01 v02r02;**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the IEC/IEEE 62209-1528:2020, FCC 47 CFR Part 2.1093, IEEE Std C95.1-2019 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt	Oct. 24, 2024
Date of Test	Oct. 24, 2024 to Dec.03,2024
Prepared By	Ella Liang (Ella Liang)
Test Engineer	Joker Huang (Joker Huang)
Approved & Authorized Signer	Kingkong Jin (kingkong Jin)

Version

Version No.	Date	Description
R00	Dec. 03, 2024	Original

1. Statement of Compliance

<Highest SAR Summary>

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2.1093 and IEEE Std C95.1-2019, and had been tested in accordance with the measurement methods and procedures specified in IEC/IEEE 62209-1528:2020. The maximum results of Specific Absorption Rate (SAR) found during testing are as follows.

<Highest SAR Summary>

Frequency Band	Highest Reported 1g-SAR(W/Kg)	Simultaneous SAR(W/Kg)	SAR Test Limit (W/Kg)
	Body-worn (0mm)		
WLAN2.4G ANT1	0.438	0.892	**1.6**
WLAN2.4G ANT2	0.454		
WLAN5.2G ANT1	0.542	1.086	
WLAN5.2G ANT2	0.544		
WLAN5.8G ANT1	0.583	**1.207**	
WLAN5.8G ANT2	0.642		
Test Result	**PASS**		

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2.1093 and IEEE Std C95.1-2019, and had been tested in accordance with the measurement methods and procedures specified in IEC/IEEE 62209-1528:2020.

2. General Information

2.1. Client Information

Applicant	:	Shenzhen Feima Robotics Co., Ltd.
Address	:	13th Floor, Building A4, Nanshan Zhiyuan, No. 1001 Xueyuan Avenue, Taoyuan Street, Nanshan District, Shenzhen
Manufacturer	:	Shenzhen Feima Robotics Co., Ltd.
Address	:	13th Floor, Building A4, Nanshan Zhiyuan, No. 1001 Xueyuan Avenue, Taoyuan Street, Nanshan District, Shenzhen
Factory	:	N/A
Address	:	N/A

2.2. Description of Equipment Under Test (EUT)

Product Name	:	LASER SCANNER
Model No.	:	SLAM1000,X40^{GO} (Note: All samples are the same except the model number, so we prepare "SLAM1000" for test only.)
Trade Mark	:	N/A
Test Power Supply	:	10.8 V, 3200mAh
Test Sample No.	:	1-2-1(Engineering Sample)
Tx Frequency	:	2.4G WIFI: 2412-2462MHz 5.2G WIFI: 5180-5240MHz 5.8G WIFI: 5745-5825MHz
Type of Modulation	:	2.4G WIFI: CCK, DQPSK, DBPSK,BPSK, QPSK, 16QAM, 64QAM, 256QAM,1024QAM 5G WIFI: BPSK, QPSK, 16QAM, 64QAM, 256QAM,1024QAM
Category of device	:	Portable device
Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.		

2.3. Device Category and SAR Limits

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

2.4. Applied Standard

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

- FCC 47 CFR Part 2.1093
- IEEE Std C95.1-2019
- IEC/IEEE 62209-1528:2020
- KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- KDB 865664 D02 RF Exposure Reporting v01r02
- KDB 447498 D01 General RF Exposure Guidance v06
- KDB 248227 D01 802 11 Wi-Fi SAR v02r02

2.5. Environment of Test Site

Items	Required	Actual
Temperature (℃)	18-25	22~23
Humidity (%RH)	30-70	55~65

2.6. Test Configuration

The device was controlled by using a base station emulator. Communication between the device and the emulator was established by air link. The distance between the EUT and the antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of EUT. The EUT was set from the emulator to radiate maximum output power during all tests. For WLAN SAR testing, WLAN engineering testing software installed on the EUT can provide continuous transmitting RF signal.

2.7. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.:434132

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 434132.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

Sogood Industrial Zone Laboratory & 1/F. of Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Subdistrict, Bao'an District, Shenzhen, Guangdong, China.

3. Specific Absorption Rate (SAR)

3.1. Introduction

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

3.2. SAR Definition

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

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

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

SAR measurement can be either related to the temperature elevation in tissue by

$$\mathbf{SAR} = \mathbf{C}\left(\frac{\boldsymbol{\delta}\mathbf{T}}{\boldsymbol{\delta}\mathbf{t}}\right)$$

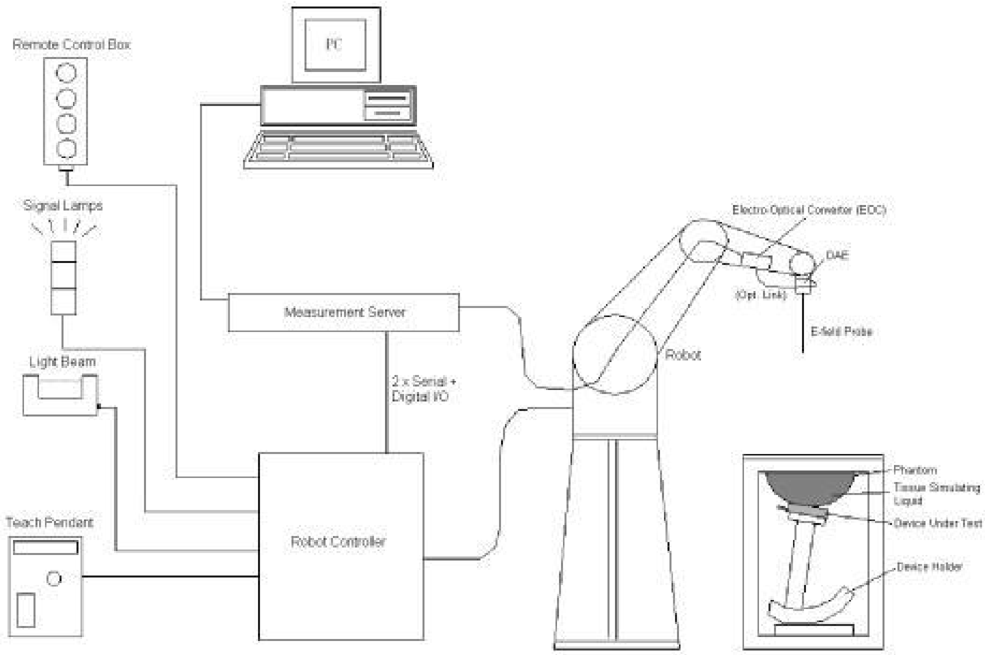
Where: C is the specific head capacity, δT is the temperature rise and δtisthe exposure duration, or related to the electrical field in the tissue by

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

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

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

4. SAR Measurement System



DASY System Configurations

The DASYsystem for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic (DAE) attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter (EOC) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows XP
- DASY software
- Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

components are described in details in the following sub-sections.

4.1. E-Field Probe

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

- **E-Field Probe Specification**

<EX3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	 **Photo of EX3DV4**
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 μW/g to 100 W/kg; Linearity: ± 0.2 dB (noise: typically< 1 μW/g)	
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

- **E-Field Probe Calibration**

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy shall be evaluated and within ± 0.25dB. The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix C of this report.

4.2. Data Acquisition Electronics (DAE)

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

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

Photo of DAE

4.3. Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX60XL) type from Stäubli SA (France). For the 6-axis controllersystem, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäublirobot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

Photo of DASY5

4.4. Measurement Server

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

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

Photo of Server for DASY5

4.5. Phantom

<SAM Twin Phantom>

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

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

<ELI4 Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)	
Filling Volume	Approx. 30 liters	

Dimensions	Major ellipse axis: 600 mm Minor axis:400 mm	**Photo of ELI4 Phantom**

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

4.6. Device Holder

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ± 20%. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (ERP).Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

Device Holder

4.7. Data Storage and Evaluation

- Data Storage

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The post-processing software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of erroneous parameter settings. For example, if a measurement has been performed with an incorrect crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be reevaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type (e.g., [V/m], [A/m], [W/kg]). Some of these units are not available in certain situations or give meaningless results, e.g., a SAR-output in a non-lose media, will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

➢ Data Evaluation

The DASY post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software：

Probe parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	dcp_i
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power.

The formula for each channel can be given as：

$$\mathbf{V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}}$$

with V_i= compensated signal of channel i, (i = x, y, z)

U_i = input signal of channel i, (i = x, y, z)

cf = crest factor of exciting field (DASY parameter)

dcp_i = diode compression point (DASY parameter)

From the compensated input signals, the primary field data for each channel can be evaluated：

E-field Probes： $\mathbf{E_i} = \sqrt{\frac{\mathbf{V_i}}{\mathbf{Norm_i \cdot ConvF}}}$

H-field Probes： $\mathbf{H_i} = \sqrt{\mathbf{V_i}} \cdot \frac{\mathbf{a_{i0} + a_{i1} f + a_{i2} f^2}}{\mathbf{f}}$

with V_i = compensated signal of channel i,(i= x, y, z)

$Norm_i$= sensor sensitivity of channel i, (i= x, y, z), μV/(V/m)^2 for E-field Probes

ConvF= sensitivity enhancement in solution

a_{ij}= sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i= electric field strength of channel iin V/m

H_i= magnetic field strength of channel iin A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude)：

$$\mathbf{E_{tot}} = \sqrt{\mathbf{E_x^2 + E_y^2 + E_z^2}}$$

The primary field data are used to calculate the derived field units.

$$\mathbf{SAR} = \mathbf{E_{tot}^2} \cdot \frac{\boldsymbol{\sigma}}{\boldsymbol{\rho} \cdot \mathbf{1000}}$$

with SAR = local specific absorption rate in W/kg

E_{tot}= total field strength in V/m

σ = conductivity in [mho/m] or [Siemens/m]

ρ = equivalent tissue density in g/cm^3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

5. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	2450MHz System Validation Kit	D2450V2	910	Jun. 11,2024	Jun. 10,2027
SPEAG	5GHz System Validation Kit	D5GHzV2	1160	Oct. 02, 2024	Oct. 01, 2027
SPEAG	Data Acquisition Electronics	DAE4	387	Sept.02,2024	Sept.01,2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	7396	May 06,2024	May 05,2025
Agilent	ENA Series Network Analyzer	E5071C	MY46317418	Oct.26, 2024	Oct.25, 2025
SPEAG	DAK	DAK-3.5	1226	NCR	NCR
SPEAG	SAM Twin Phantom	QD000P40CD	1802	NCR	NCR
SPEAG	ELI Phantom	QDOVA004AA	2058	NCR	NCR
AR	Amplifier	ZHL-42W	QA1118004	NCR	NCR
Agilent	Power Meter	N1914A	MY50001102	Oct.26, 2024	Oct.25, 2025
Agilent	Power Sensor	E9323A	US40410647	Jan. 23, 2024	Jan. 22, 2025
Agilent	Power Sensor	E9323A	MY53100007	Jan. 23, 2024	Jan. 22, 2025
CDKMV	Attenuator	6610	6610-1	Oct.20, 2024	Oct.19, 2025
CDKMV	Attenuator	6606	6606-1	Oct.20, 2024	Oct.19, 2025
Agilent	Spectrum Analyzer	N9020A	MY51170037	Oct.26, 2024	Oct.25, 2025
Agilent	Signal Generation	N5182A	MY48180656	Oct.26, 2024	Oct.25, 2025
Worken	Directional Coupler	0110A05601O-10	COM5BNW1A2	Oct.26, 2024	Oct.25, 2025

Note:

1. The calibration certificate of DASY can be referred to appendix C of this report.
2. The dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
4. The dielectric probe kit was calibrated via the network analyzer, with the specified procedure (calibrated in pure water) and calibration kit (standard) short circuit, before the dielectric measurement. The specific procedure and calibration kit are provided by Agilent.
5. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1W input power according to the ratio of 1W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it.

6. Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 6.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown as followed:

Photo of Liquid Height for Head SAR

The following table gives the recipes for tissue simulating liquid.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Head								
2450	55.0	0	0	0	0	45.0	1.80	39.2
5200	65.5	0	17.2	0	17.3	0	4.66	36.0
5800	65.4	0	17.3	0	17.3	0	5.27	35.3

The following table shows the measuring results for simulating liquid.

Measured Frequency (MHz)	Target Tissue		Measured Tissue				Liquid Temp.	Test Data
	ε_r	σ	ε_r	Dev. (%)	σ	Dev. (%)		
2450	39.2	1.80	39.05	-0.38	1.84	2.17	22.7	11/10/2024
2412	39.30	1.78	39.13	-0.43	1.85	3.78	22.8	11/10/2024
2437	39.26	1.81	39.21	-0.13	1.83	1.09	22.8	11/10/2024
2462	39.22	1.83	39.20	-0.05	1.87	2.14	22.8	11/10/2024
2402	39.32	1.77	39.11	-0.54	1.82	2.75	22.8	11/10/2024
2441	39.25	1.81	39.13	-0.31	1.83	1.09	22.8	11/10/2024
2480	39.19	1.85	39.08	-0.28	1.87	1.07	22.8	11/10/2024
5200	36.0	4.66	36.11	0.30	4.71	1.06	22.5	11/10/2024
5180	36.00	4.63	36.25	0.69	4.72	1.91	22.3	11/10/2024
5240	35.93	4.70	35.65	-0.79	4.74	0.84	22.5	11/10/2024
5800	35.3	5.27	35.23	-0.20	5.33	1.13	22.4	11/10/2024
5745	35.36	5.21	35.13	-0.65	5.22	0.19	22.5	11/10/2024
5775	35.34	5.24	35.14	-0.57	5.25	0.19	22.6	11/10/2024
5785	35.32	5.25	35.12	-0.57	5.33	1.50	22.4	11/10/2024
5795	35.30	5.27	35.16	-0.40	5.32	0.94	22.3	11/10/2024
5825	35.29	5.30	35.23	-0.17	5.31	0.19	22.3	11/10/2024

7. System Verification Procedures

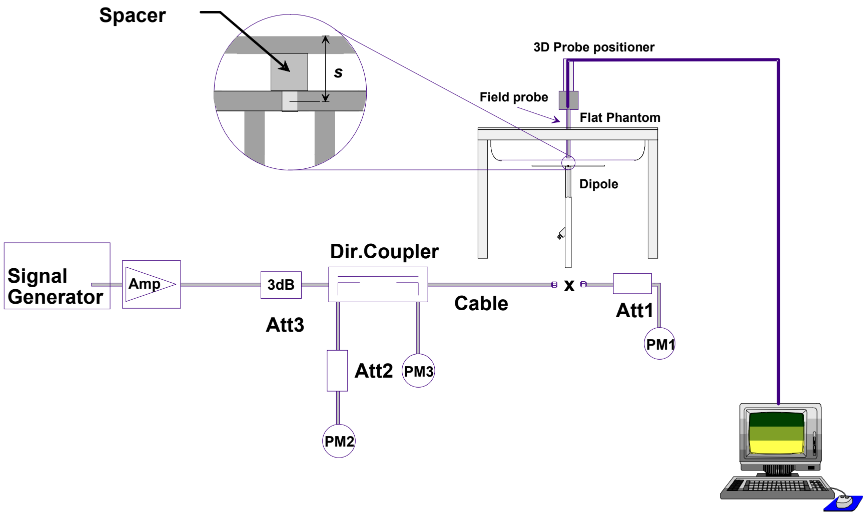
Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

- **Purpose of System Performance check**

  The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

- **System Setup**

  In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



System Setup for System Evaluation

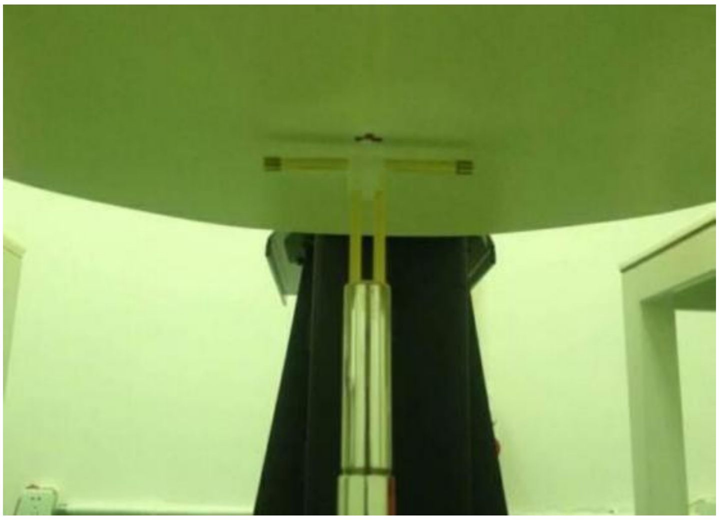


Photo of Dipole Setup

➢ **Validation Results**

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

Date	Frequency (MHz)	Power fed onto reference dipole (mW)	Targeted SAR (W/kg)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Deviation (%)
11/10/2024	2450	250	52.4	12.96	51.9	-1.15
11/10/2024	5200	100	77.8	7.64	76.40	-1.93
11/10/2024	5800	100	78.3	7.92	79.20	1.53

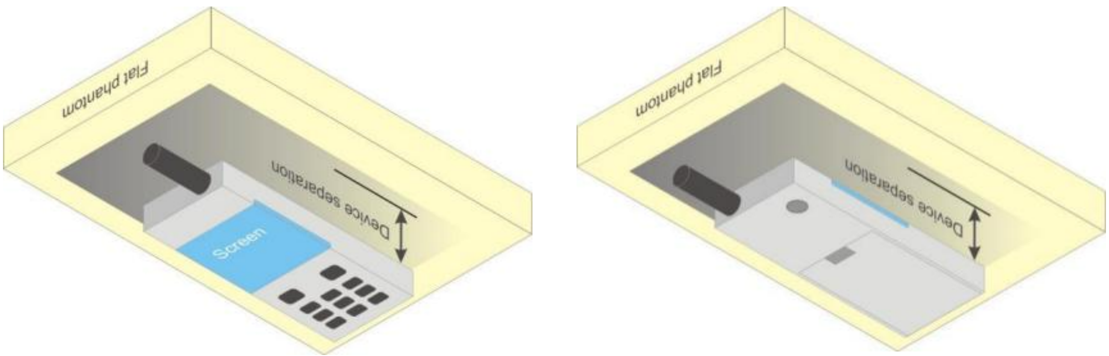
Target and Measurement SAR after Normalized

8. EUT Testing Position

8.1. Body Position

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per KDB 648474 D04, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01 v06, 2015 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is < 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

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



Body Worn Position

9. Measurement Procedures

The measurement procedures are as follows:

(a) Use base station simulator (if applicable) or engineering software to transmit RF power continuously (continuous Tx) in the middle channel.
(b) Keep EUT to radiate maximum output power or 100% duty factor (if applicable)
(c) Measure output power through RF cable and power meter.
(d) Place the EUT in the positions as setup photos demonstrates.
(e) Set scan area, grid size and other setting on the DASY software.
(f) Measure SAR transmitting at the middle channel for all applicable exposure positions.
(g) Identify the exposure position and device configuration resulting the highest SAR
(h) Measure SAR at the lowest and highest channels attheworst exposure position and device configuration if applicable.

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

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

9.1. Spatial Peak SAR Evaluation

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

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

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

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

9.2. Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

9.3. Area Scan Procedures

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

9.4. Zoom Scan Procedures

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

<table>
<tr><th colspan="3"></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\le 1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

9.5. Volume Scan Procedures

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

9.6. Power Drift Monitoring

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

10. Conducted Power

WIFI 2.4G

ANT1

Mode	Channel	Frequency (MHz)	Conducted Peak Output Power(dBm)	Conducted Average Output Power(dBm)	Tune-up power(dBm)
802.11b	1	2412	13.48	13.43	13.50
	6	2437	13.69	13.64	14.00
	11	2462	13.96	**13.91**	14.00
802.11g	1	2412	14.23	12.94	13.00
	6	2437	14.43	12.97	13.00
	11	2462	14.62	13.16	13.50
802.11n20	1	2412	12.48	10.37	10.50
	6	2437	12.52	10.41	10.50
	11	2462	12.76	10.65	11.00

ANT2

Mode	Channel	Frequency (MHz)	Conducted Peak Output Power(dBm)	Conducted Average Output Power(dBm)	Tune-up power(dBm)
802.11b	1	2412	13.34	13.29	13.50
	6	2437	13.48	13.43	13.50
	11	2462	13.80	**13.75**	14.00
802.11g	1	2412	14.34	12.88	13.00
	6	2437	14.40	12.94	13.00
	11	2462	14.37	13.08	13.50
802.11n20	1	2412	12.56	10.45	10.50
	6	2437	12.51	10.40	10.50
	11	2462	12.69	10.58	11.00

MIMO

Mode	Channel	Frequency (MHz)	Conducted Average Output Power(dBm)	Tune-up power(dBm)
802.11n20	1	2412	15.53	16.00
	6	2437	15.53	16.00
	11	2462	15.74	16.00

WIFI5.2G

ANT 1

Mode	Channel Frequency (MHz)	Average Power output (dBm)	**Tune-up power(dBm)**
802.11a	5180	11.96	12.00
	5200	11.96	12.00
	5240	12.60	13.00
802.11n 20	5180	12.06	12.50
	5200	12.10	12.50
	5240	12.69	13.00
802.11n 40	5190	11.88	12.00
	5230	12.32	12.50
802.11ac 20	5180	12.34	12.50
	5200	12.24	12.50
	5240	**12.85**	13.00
802.11ac 40	5190	12.20	12.50
	5230	12.58	13.00
802.11ac 80	5210	11.92	12.00

ANT 2

Mode	Channel Frequency (MHz)	Average Power output (dBm)	**Tune-up power(dBm)**
802.11a	5180	12.12	12.50
	5200	11.91	12.00
	5240	12.23	12.50
802.11n 20	5180	11.91	12.00
	5200	12.10	12.50
	5240	12.38	12.50
802.11n 40	5190	11.79	12.00
	5230	12.18	12.50
802.11ac 20	5180	12.20	12.50
	5200	12.10	12.50
	5240	**12.52**	13.00
802.11ac 40	5190	12.03	12.50
	5230	12.32	12.50
802.11ac 80	5210	11.80	12.00

MIMO

Mode	Channel Frequency (MHz)	Average Power output (dBm)	**Tune-up power(dBm)**
802.11n 20	5180	15.00	15.50
	5200	15.14	15.50
	5240	15.55	16.00
802.11n 40	5190	14.85	15.00
	5230	15.26	15.50
802.11ac 20	5180	15.28	15.50
	5200	15.18	15.50
	5240	**15.70**	16.00
802.11ac 40	5190	15.13	15.50
	5230	15.46	15.50
802.11ac 80	5210	14.87	15.00

WIFI 5.8G

ANT 1

Mode	Channel Frequency (MHz)	Average Power output (dBm)	**Tune-up power(dBm)**
802.11a	5745	11.59	12.00
	5785	10.86	11.00
	5825	10.85	11.00
802.11n 20	5745	11.70	11.00
	5785	11.09	11.50
	5825	10.96	11.00
802.11n 40	5755	11.20	11.50
	5795	10.76	11.00
802.11ac 20	5745	**11.80**	12.00
	5785	11.25	11.50
	5825	11.12	11.50
802.11ac 40	5755	11.53	12.00
	5795	10.88	11.00
802.11ac 80	5775	10.99	11.00

ANT 2

Mode	Channel Frequency (MHz)	Average Power output (dBm)	**Tune-up power(dBm)**
802.11a	5745	11.34	11.50
	5785	10.71	11.00
	5825	10.45	10.50
802.11n 20	5745	11.39	11.50
	5785	10.86	11.00
	5825	10.64	11.00
802.11n 40	5755	10.88	11.00
	5795	10.55	11.00
802.11ac 20	5745	**11.55**	12.00
	5785	11.05	11.50
	5825	10.82	11.00
802.11ac 40	5755	8.98	9.00
	5795	10.57	11.00
802.11ac 80	5775	10.66	11.00

MIMO

Mode	Channel Frequency (MHz)	Average Power output (dBm)	**Tune-up power(dBm)**
802.11n 20	5745	14.56	15.00
	5785	13.99	14.00
	5825	13.81	14.00
802.11n 40	5755	14.05	14.50
	5795	13.67	14.00
802.11ac 20	5745	**14.69**	15.00
	5785	14.16	14.50
	5825	13.98	14.00
802.11ac 40	5755	13.45	13.50
	5795	13.74	14.00
802.11ac 80	5775	13.84	14.00

Note:

1. Per KDB 447498 D01, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where
f(GHz) is the RF channel transmit frequency in GHz
Power and distance are rounded to the nearest mW and mm before calculation
The result is rounded to one decimal place for comparison
2. Base on the result of note1, RF exposure evaluation of 2.4G/5.2G/5.3G/5.4G/5.8G WIFI mode is required.
3. Per KDB 248227 D01, choose the highest output power channel to test SAR and determine further SAR exclusion.
4. Per KDB 248227 D01, In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. SAR is not required for the following 2.4 GHz OFDM conditions:
1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
2) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

<Bluetooth Conducted Power>

Mode	Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Average Power (dBm)	Tune-up power(dBm)
BT BDR (GFSK)	00	2402	3.30	3.26	3.50
	39	2441	4.79	4.75	5.00
	78	2480	3.93	3.90	4.00
BT EDR (Π/4DQPSK)	00	2402	5.67	5.64	6.00
	39	2441	6.77	6.73	7.00
	78	2480	5.51	5.48	5.50
BT EDR (8DPSK)	00	2402	6.12	6.08	6.50
	39	2441	6.91	6.87	7.00
	78	2480	5.76	5.72	6.00
BT BLE_1M (GFSK)	00	2402	3.89	3.85	4.00
	19	2440	5.08	5.02	5.50
	39	2480	4.34	4.29	4.50
BT BLE_2M (GFSK)	01	2404	3.91	3.86	4.00
	19	2440	5.12	5.07	5.50
	38	2478	4.67	4.63	5.00

Note:

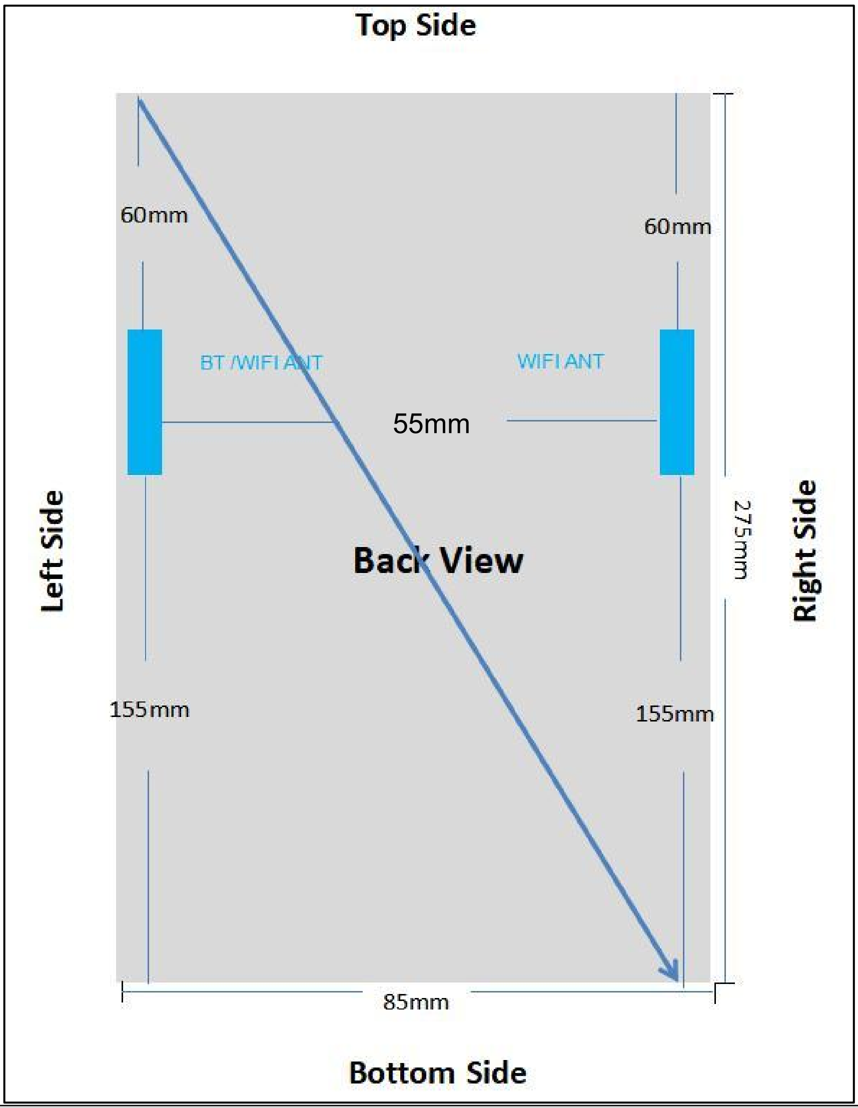
Per KDB 447498 D01v05r02, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at

test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
f(GHz) is the RF channel transmit frequency in GHz
Power and distance are rounded to the nearest mW and mm before calculation
The result is rounded to one decimal place for comparison

Bluetooth Max. Power (dBm)	Separation Distance (mm)	Frequency (GHz)	exclusion thresholds
7.00	5	2.441	2.19

Per KDB 447498 D01, when the minimum test separation distance is <10 mm, a distance of 10 mm is applied to determine SAR test exclusion. The test exclusion threshold is 2.19which is<= 3, SAR testing is not required.

11. Antenna Location



Distance of The Antenna to the EUT surface and edge						
Antennas	Front	Back	Top Side	Bottom Side	Left Side	Right Side
BT/WIFI	>25mm	<25mm	>25mm	>25mm	<25mm	<25mm
WIFI	>25mm	<25mm	>25mm	>25mm	<25mm	<25mm

12. SAR Test Results Summary

General Note:
1.Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.

Scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.

Reported SAR(W/kg)= Measured SAR(W/kg) Scaling Factor*

2.Per KDB 447498 D01v06, for each exposure position, if the highest output channel reported SAR≤0.8W/kg, other channels SAR testing are not necessary

12.1. Body-worn SAR Results

2.4GWIFI

ANT1

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	WIFI2.4GHz	802.11b	Left	0	11	2462	13.91	14.00	1.006	0.03	0.413	0.415
	WIFI2.4GHz	802.11b	Right	0	11	2462	13.91	14.00	1.006	-0.01	0.406	0.408
	WIFI2.4GHz	802.11b	Top	0	11	2462	13.91	14.00	1.006	0.04	0.312	0.314
	WIFI2.4GHz	802.11b	Bottom	0	11	2462	13.91	14.00	1.006	0.06	0.002	0.002
	WIFI2.4GHz	802.11b	Front	0	11	2462	13.91	14.00	1.006	0.02	0.321	0.323
#1	WIFI2.4GHz	802.11b	Back	0	11	2462	13.91	14.00	1.006	0.11	0.435	**0.438**

ANT2

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	WIFI2.4GHz	802.11b	Left	0	11	2462	13.75	14.00	1.018	0.02	0.405	0.412
	WIFI2.4GHz	802.11b	Right	0	11	2462	13.75	14.00	1.018	-0.03	0.394	0.401
	WIFI2.4GHz	802.11b	Top	0	11	2462	13.75	14.00	1.018	0.01	0.268	0.273
	WIFI2.4GHz	802.11b	Bottom	0	11	2462	13.75	14.00	1.018	0.04	0.001	0.001
	WIFI2.4GHz	802.11b	Front	0	11	2462	13.75	14.00	1.018	0.03	0.311	0.317
#2	WIFI2.4GHz	802.11b	Back	0	11	2462	13.75	14.00	1.018	0.08	0.446	**0.454**

5.2GWIFI

ANT1

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	WIFI5.2GHz	802.11ac20	Left	0	48	5240	12.85	13.00	1.012	0.05	0.393	0.398
	WIFI5.2GHz	802.11ac20	Right	0	48	5240	12.85	13.00	1.012	-0.02	0.421	0.426
	WIFI5.2GHz	802.11ac20	Top	0	48	5240	12.85	13.00	1.012	0.06	0.386	0.391
	WIFI5.2GHz	802.11ac20	Bottom	0	48	5240	12.85	13.00	1.012	0.04	0.003	0.003
	WIFI5.2GHz	802.11ac20	Front	0	48	5240	12.85	13.00	1.012	0.03	0.344	0.348
#3	WIFI5.2GHz	802.11ac20	Back	0	48	5240	12.85	13.00	1.012	0.12	0.536	**0.542**

ANT2

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	WIFI5.2GHz	802.11ac20	Left	0	48	5240	12.52	13.00	1.038	0.01	0.456	0.473
	WIFI5.2GHz	802.11ac20	Right	0	48	5240	12.52	13.00	1.038	-0.04	0.345	0.358
	WIFI5.2GHz	802.11ac20	Top	0	48	5240	12.52	13.00	1.038	0.02	0.358	0.372
	WIFI5.2GHz	802.11ac20	Bottom	0	48	5240	12.52	13.00	1.038	0.05	0.005	0.005
	WIFI5.2GHz	802.11ac20	Front	0	48	5240	12.52	13.00	1.038	0.07	0.306	0.318
#4	WIFI5.2GHz	802.11ac20	Back	0	48	5240	12.52	13.00	1.038	0.08	0.524	**0.544**

5.8GWIFI

ANT1

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	WIFI5.8GHz	802.11ac20	Left	0	149	5745	11.80	12.00	1.017	0.06	0.406	0.413
	WIFI5.8GHz	802.11ac20	Right	0	149	5745	11.80	12.00	1.017	-0.02	0.415	0.422
	WIFI5.8GHz	802.11ac20	Top	0	149	5745	11.80	12.00	1.017	0.01	0.231	0.235
	WIFI5.8GHz	802.11ac20	Bottom	0	149	5745	11.80	12.00	1.017	0.02	0.008	0.008
	WIFI5.8GHz	802.11ac20	Front	0	149	5745	11.80	12.00	1.017	0.03	0.411	0.418
#5	WIFI5.8GHz	802.11ac20	Back	0	149	5745	11.80	12.00	1.017	0.15	0.573	**0.583**

ANT2

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	WIFI5.8GHz	802.11ac20	Left	0	149	5745	11.55	12.00	1.039	0.01	0.458	0.476
	WIFI5.8GHz	802.11ac20	Right	0	149	5745	11.55	12.00	1.039	-0.04	0.426	0.443
	WIFI5.8GHz	802.11ac20	Top	0	149	5745	11.55	12.00	1.039	0.08	0.213	0.221
	WIFI5.8GHz	802.11ac20	Bottom	0	149	5745	11.55	12.00	1.039	0.05	0.004	0.004
	WIFI5.8GHz	802.11ac20	Front	0	149	5745	11.55	12.00	1.039	0.06	0.312	0.324
#6	WIFI5.8GHz	802.11ac20	Back	0	149	5745	11.55	12.00	1.039	0.07	0.601	**0.624**

13. Simultaneous Transmission Analysis

13.1. Simultaneous TX SAR Considerations

No.	Applicable Simultaneous Transmission
1.	WIFI 2.4G ANT1+WIFI 2.4G ANT2
2.	WIFI 5.2G ANT1+WIFI 5.2G ANT2
3.	WIFI 5.8G ANT1+WIFI 5.8G ANT2

Note:

1. WIFI 2.4GHz, WIFI 5GHz and Bluetooth cannot transmit simultaneously.

13.2. Evaluation of Simultaneous SAR

<Body Exposure Conditions>

Simultaneous transmission SAR for WIFI 2.4G ANT1+WIFI 2.4G ANT2

Test Position	WIFI 2.4G ANT1 SAR_{1g} (W/Kg)	WIFI 2.4G ANT2 SAR_{1g} (W/Kg)	MAX. ΣSAR_{1g} (W/Kg)	SAR_{1g} Limit (W/Kg)
Left	0.415	0.412	0.827	1.6
Right	0.408	0.401	0.809	1.6
Top	0.314	0.273	0.587	1.6
Bottom	0.002	0.001	0.003	1.6
Front	0.323	0.317	0.640	1.6
Back	**0.438**	**0.454**	0.892	1.6

Simultaneous transmission SAR for WIFI 5.2G ANT1+WIFI 5.2G ANT2

Test Position	WIFI 2.4G ANT1 SAR_{1g} (W/Kg)	WIFI 2.4G ANT2 SAR_{1g} (W/Kg)	MAX. ΣSAR_{1g} (W/Kg)	SAR_{1g} Limit (W/Kg)
Left	0.398	0.473	0.871	1.6
Right	0.426	0.358	0.784	1.6
Top	0.391	0.372	0.763	1.6
Bottom	0.003	0.005	0.008	1.6
Front	0.348	0.318	0.666	1.6
Back	**0.542**	**0.544**	1.086	1.6

Simultaneous transmission SAR for WIFI 5.8G ANT1+WIFI 5.8G ANT2

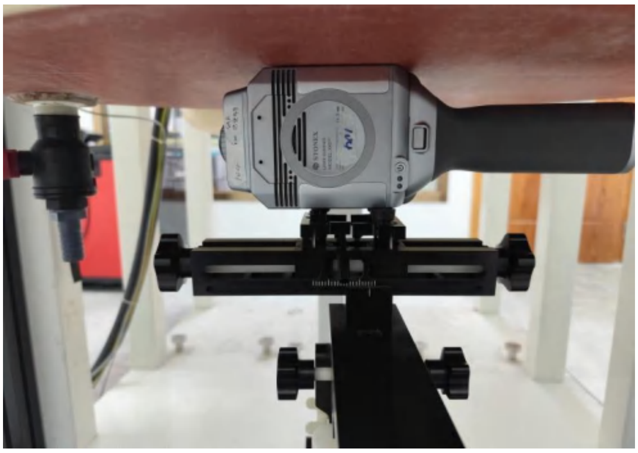
Test Position	WIFI 2.4G ANT1 SAR_{1g} (W/Kg)	WIFI 2.4G ANT2 SAR_{1g} (W/Kg)	MAX. ΣSAR_{1g} (W/Kg)	SAR_{1g} Limit (W/Kg)
Left	0.413	0.476	0.889	1.6
Right	0.422	0.443	0.865	1.6
Top	0.235	0.221	0.456	1.6
Bottom	0.008	0.004	0.012	1.6
Front	0.418	0.324	0.742	1.6
Back	**0.583**	**0.624**	1.207	1.6

14. Measurement Uncertainty

NO	Source	Uncert. ai（%）	Prob. Dist.	Div. k	ci (1g)	ci (10g)	Stand.Uncert. ui (1g)	Stand.Uncert. ui (10g)	*Veff*
1	Repeat	0. 4	N	1	1	1	0. 4	0. 4	9
Instrument									
2	Probe calibration	7	N	2	1	1	3.5	3.5	∞
3	Axial isotropy	4.7	R	√3	0.7	0.7	1.9	1.9	∞
4	Hemispherical isotropy	9.4	R	√3	0.7	0.7	3.9	3.9	∞
5	Boundary effect	1.0	R	√3	1	1	0.6	0.6	∞
6	Linearity	4.7	R	√3	1	1	2.7	2.7	∞
7	Detection limits	1.0	R	√3	1	1	0.6	0.6	∞
8	Readout electronics	0.3	N	1	1	1	0.3	0.3	∞
9	Response time	0.8	R	√3	1	1	0.5	0.5	∞
10	Integration time	2.6	R	√3	1	1	1.5	1.5	∞
11	Ambient noise	3.0	R	√3	1	1	1.7	1.7	∞
12	Ambient reflections	3.0	R	√3	1	1	1.7	1.7	∞
13	Probe positioner mech. restrictions	0.4	R	√3	1	1	0.2	0.2	∞
14	Probe positioning with respect to phantom shell	2.9	R	√3	1	1	1.7	1.7	∞
15	Max.SAR evaluation	1.0	R	√3	1	1	0.6	0.6	∞

Test sample related									
16	Device positioning	3.8	N	1	1	1	3.8	3.8	99
17	Device holder	5.1	N	1	1	1	5.1	5.1	5
18	Drift of output power	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up									
19	Phantom uncertainty	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
20	Liquid conductivity (target)	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
21	Liquid conductivity (meas)	2.5	N	1	0.64	0.43	1.6	1.2	∞
22	Liquid Permittivity (target)	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.5	∞
23	Liquid Permittivity (meas)	2.5	N	1	0.6	0.49	1.5	1.2	∞
Combined standard			RSS	$U_c = \sqrt{\sum_{i=1}^{n} C_i^2 U_i^2}$			11.4%	11.3%	236
Expanded uncertainty(P=95%)		$U = k U_c$,k=2					**22.8%**	**22.6%**	

Appendix A. EUT Photos and Test Setup Photos

	
Body Front(0mm)	Body Back(0mm)
	
Body Left(0mm)	Body Right(0mm)
	
Body Top(0mm)	Body Bottom(0mm)

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Appendix B. Plots of SAR System Check

2450MHz Body System Check Date:11/10/2024

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 910

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2450 MHz; σ = 1.84S/m; εr = 39.05; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN7396; ConvF(7.57, 7.57, 7.57); Calibrated: May 06, 2024;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn387; Calibrated: Sep.02.2024;

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Area Scan (61x91x1): Measurement grid: dx=10.00 mm, dy=10.00 mm

Maximum value of SAR (interpolated) = 19.664 W/kg

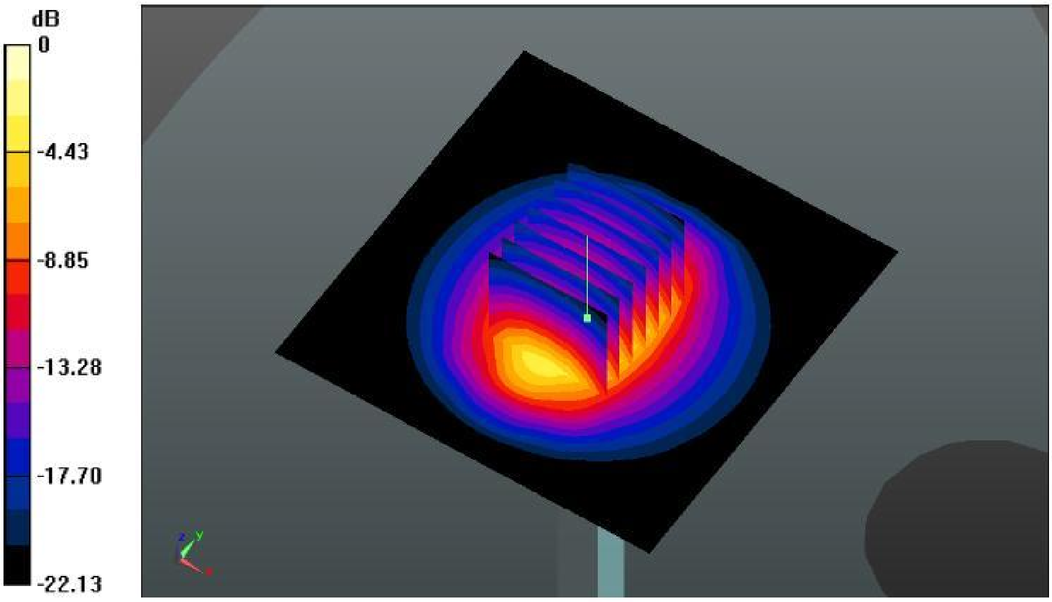
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 84.571 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 26.125 W/kg

SAR(1 g) = 12.96 W/kg; SAR(10 g) = 5.93 W/kg

Maximum value of SAR (measured) = 19.53W/kg



5200MHz Body System Check Date:11/10/2024

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1160

Communication System: UID 0, CW; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium parameters used: f = 5200 MHz; σ = 4.71 S/m; ε_r = 36.11; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 – SN7396; ConvF(5.33, 5.33, 5.33); Calibrated: May 06, 2024;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: Sep. 02, 2024
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.10 (7164)

Configuration/Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 20.9 W/kg

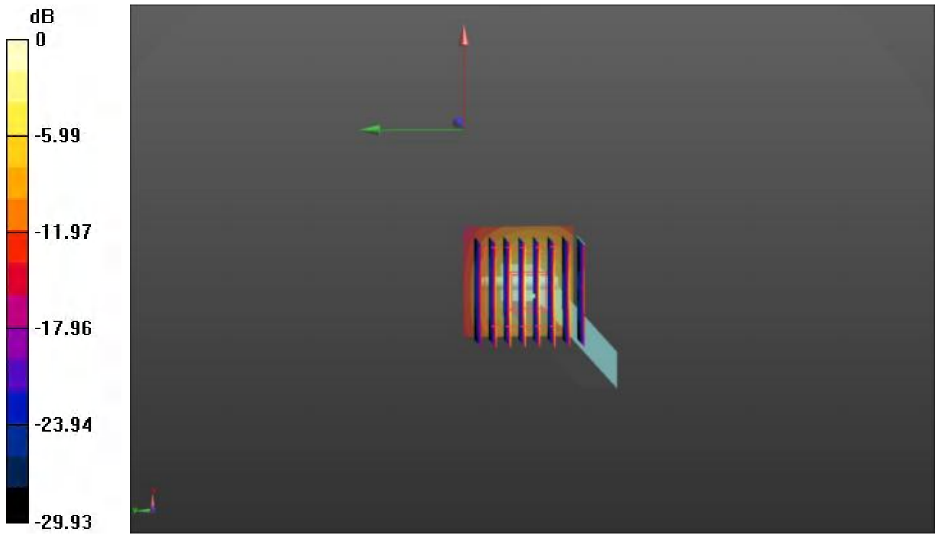
Configuration/Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 59.857 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 34.58 W/kg

SAR(1 g) = 7.64 W/kg; SAR(10 g) = 2.33 W/kg

Maximum value of SAR (measured) = 20.8 W/kg



5800MHz Body System Check Date:11/10/2024

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1160
Communication System: UID 0, CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 5.33 S/m; ε_r = 35.23; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 – SN7396; ConvF(4.92, 4.92, 4.92); Calibrated: May 06, 2024;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: Sep. 02, 2024
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.10 (7164)

Configuration/Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 18.8 W/kg

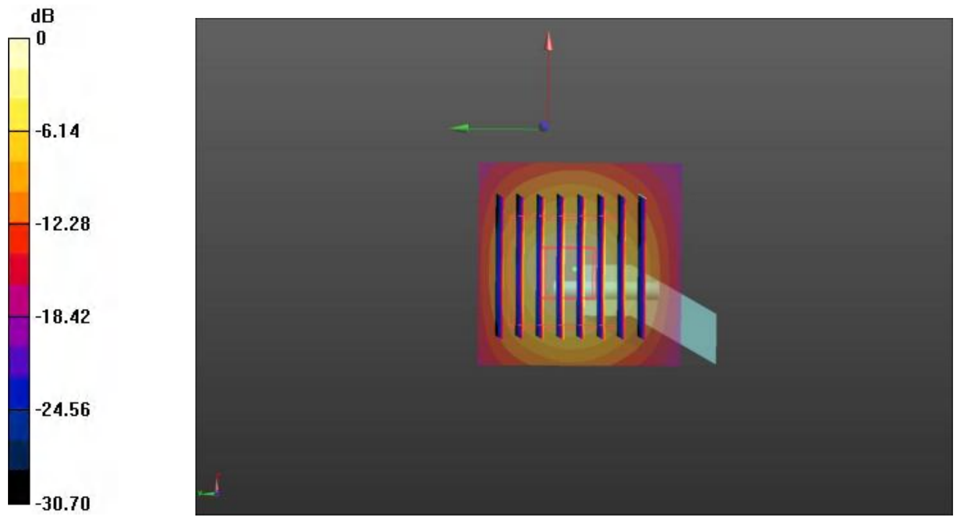
Configuration/Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 56.773 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 31.5 W/kg

SAR(1 g) = 7.92 W/kg; SAR(10 g) = 2.45 W/kg

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



Appendix C. Plots of SAR Test Data