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CNAS L6791

TEST REPORT

Applicant: Ugreen Group Limited
Address: URGEEN Building, Longcheng Industrial Park,
Longguanxi Road, Longhua, ShenZhen, China
Equipment Type: AX1800 High-Gain Dual Band Wireless Adapter
Model Name: CM495 (refer to section 2.3)
Brand Name: **UGREEN**
FCC ID: 2AQI5-CM495
Test Standard: 47 CFR Part 2.1093
(refer to section 3.1)
Maximum SAR: Body 2.4GHz(1 g@5mm): 0.56 W/kg
Body 5GHz(1 g@5mm): 1.01 W/kg
Sample Arrival Date: Aug. 11, 2023
Test Date: Aug. 14, 2023 - Aug. 16, 2023
Date of Issue: Sep. 05, 2023

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Fan Huimin

Checked by: Xu Rui

Approved by: Hanson Lin
(Vice General Manager)

Fan Huimin

Xu Rui

Hanson Lin

Revision History

Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>Sep. 05, 2023</u>	<u>Initial Issue</u>

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☒ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

1.3 Test Environment Condition

Ambient Temperature	18°C to 25°C
Ambient Relative Humidity	30% to 70%

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Ugreen Group Limited
Address	URGEEN Building, Longcheng Industrial Park, Longguanxi Road, Longhua, ShenZhen, China

2.2 Manufacturer Information

Manufacturer	Ugreen Group Limited
Address	URGEEN Building, Longcheng Industrial Park, Longguanxi Road, Longhua, ShenZhen, China

2.3 General Description for Equipment under Test (EUT)

EUT Name	AX1800 High-Gain Dual Band Wireless Adapter
Model Name Under Test	CM495
Series Model Name	25226
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in model name. (this information provided by the applicant)
Hardware Version	V1.2
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Ancillary Equipment

Note: Not application.

2.5 Technical Information

Network and Wireless connectivity	2.4G WIFI 802.11b, 802.11g, 802.11n(HT20/40) and 802.11ax(HE20/40) 5G WIFI 802.11a, 802.11n(HT20/40), 802.11ac(VHT20/40/80) and 802.11ax(HE20/40/80), U-NII-1/3
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	2.4G WLAN, 5G WLAN	
Frequency Range	802.11b/g/n(HT20/HT40)	2412 MHz ~ 2462 MHz
	802.11ax(HE20/HE40)	2412 MHz ~ 2462 MHz
	802.11a/n(HT20/HT40) /ac(VHT20/VHT40/VHT80)	5150 MHz ~ 5250 MHz
		5725 MHz ~ 5850 MHz
	802.11ax(HE20/HE40/HE80)	5150 MHz ~ 5250 MHz
		5725 MHz ~ 5850 MHz
Antenna Type	WLAN	Dipole Antenna
Hotspot Function	N/A	
Exposure Category	General Population/Uncontrolled exposure	
Product Type	Portable Device	
EUT Type	☒ Production unit	☐ Identical prototype

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2.1093	Radiofrequency radiation exposure evaluation: portable devices
2 ☆	ANSI/IEEE C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
3 ☆	KDB 447498 D04 v01	447498 D04 Interim General RF Exposure Guidance v01
4 ☆	KDB 447498 D02 v02r01	SAR MEASUREMENT PROCEDURES FOR USB DONGLE TRANSMITTERS
5 ☆	KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
6 ☆	KDB 865664 D02 v01r02	RF Exposure Reporting
7 ☆	KDB 248227 D01 v02r02	SAR Guidance for IEEE 802.11 (Wi-Fi) Transmitters

3.2 Device Category and SAR Limit

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.

Table of Exposure Limits:

Body Position	SAR Value (W/Kg)	
	General Population/ Uncontrolled Exposure	Occupational/ Controlled Exposure
Whole-Body SAR (averaged over the entire body)	0.08	0.4
Partial-Body SAR (averaged over any 1 gram of tissue)	1.60	8.0
SAR for hands, wrists, feet and ankles (averaged over any 10 grams of tissue)	4.0	20.0

NOTE:

General Population/Uncontrolled Exposure: Locations where there is the exposure of individuals who have no knowledge or control of their exposure. General population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Occupational/Controlled Exposure: Locations where there is exposure that may be incurred by persons who are aware of the potential for exposure. In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

3.3 Test Result Summary

3.3.1 Highest SAR (1 g Value)

Frequency Band		Maximum Report SAR			
		1 g (W/kg)			
		Body (Antenna 1 Close)	Body (Antenna 0 Close)	Body (Antenna 1Open)	Body (Antenna 0 Open)
		(Separation 5mm)	(Separation 5mm)	(Separation 5mm)	(Separation 5mm)
DTS	2.4G WLAN	0.56	0.16	0.44	0.36
U-NII-1	5.2G WLAN	0.44	0.16	0.32	0.17
U-NII-3	5.8G WLAN	1.01	0.14	0.82	0.17
Maximum Report SAR		1.01	0.16	0.82	0.36
Limits (W/kg)		1.6			
Test Verdict		Pass			

3.4 Test Uncertainty

According to KDB 865664 D01, when the highest measured 1 g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis is not required in SAR reports submitted for equipment approval.

The maximum 1 g SAR for the EUT in this report is 1.01 W/kg, which is lower than 1.5 W/kg, so the extensive SAR measurement uncertainty analysis is not required in this report.

4 MEASUREMENT SYSTEM

4.1 Specific Absorption Rate (SAR) Definition

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.

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:

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

SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

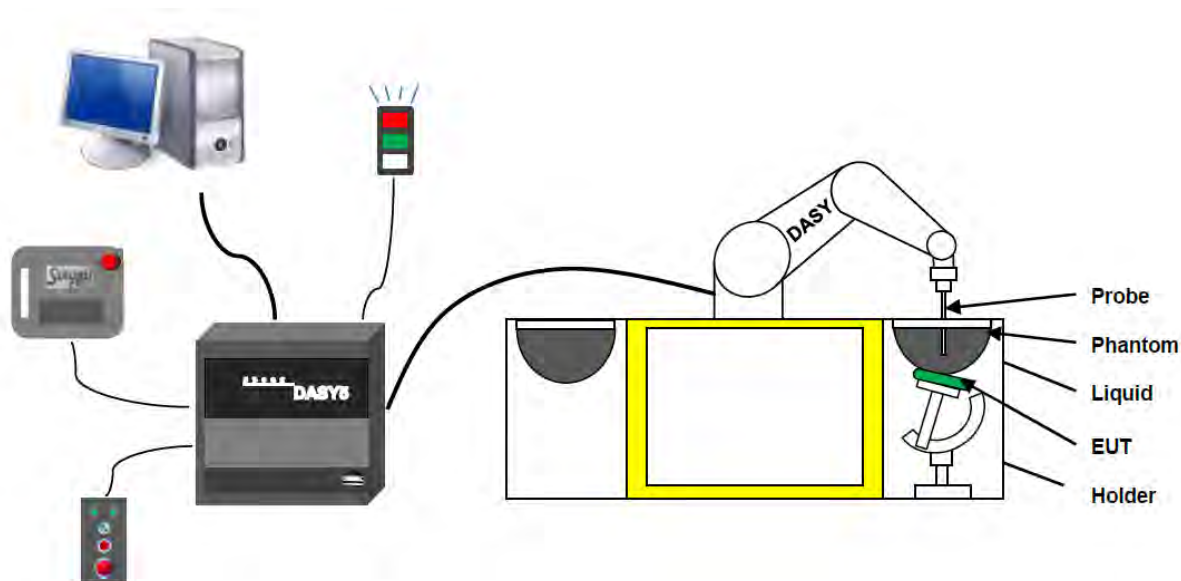
$$SAR = \frac{\sigma E^2}{\rho}$$

Where: σ is the conductivity of the tissue,

ρ is the mass density of the tissue and E is the RMS electrical field strength.

4.2 DASY SAR System

4.2.1 DASY SAR System Diagram



The DASY5 system for performing compliance tests consists of the following items:

1. A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
2. A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
3. A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
4. A unit to operate the optical surface detector which is connected to the EOC.
5. The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
6. The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation.
7. DASY5 software and SEMCAD data evaluation software.
8. Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
9. The generic twin phantom enabling the testing of left-hand and right-hand usage.
10. The device holder for handheld mobile phones.
11. Tissue simulating liquid mixed according to the given recipes.
12. System validation dipoles allowing to validate the proper functioning of the system.

4.2.2 Robot

The Dasy SAR system uses the high precision robots. Symmetrical design with triangular core Built-in optical fiber for surface detection system For the 6-axis controller system, Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents). The robot series have many features that are important for our application:



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

4.2.3 E-Field Probe

The probe is specially designed and calibrated for use in liquids with high permittivities for the measurements the Specific Dosimetric E-Field Probe EX3DV4-SN: 7510 with following specifications is used.

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ; ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic range	5 μ W/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 9 mm) Tip diameter: 2.5 mm (Body: 10 mm) Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms (EX3DV4)



E-Field Probe Calibration Process

Probe calibration is realized, in compliance with CENELEC EN 62209-1/-2 and IEEE 1528 std, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the EN 62209-1/2 annexe technique using reference guide at the five frequencies.

4.2.4 Data Acquisition Electronics

The data acquisition electronics (DAE) 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.



- Input Impedance: 200MΩ
- The Inputs: Symmetrical and Floating
- Common Mode Rejection: Above 80dB

4.2.5 Phantoms

Phantom 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 the latest draft of the standard IEC 62209 Part II and all known tissue simulating liquids. ELI4 has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points.



• Flat phantom

Photo of Phantom SN1012



Serial Number	Shell Thickness (mm)	Major ellipse axis (mm)	Minor axis (mm)
SN 1012 ELI4	2.0 ± 0.2	600	500

4.2.6 Device Holder

The DASY5 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65° . 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. This device holder is used for standard mobile phones or PDA's only. If necessary an additional support of polystyrene material is used. Larger DUT's (e.g. notebooks) cannot be tested using this device holder. Instead a support of bigger polystyrene cubes and thin polystyrene plates is used to position the DUT in all relevant positions to find and measure spots with maximum SAR values. Therefore those devices are normally only tested at the flat part of the SAM.



The positioning system allows obtaining cheek and tilting position with a very good accuracy. Incompliance with CENELEC, the tilt angle uncertainty is lower than 1° .

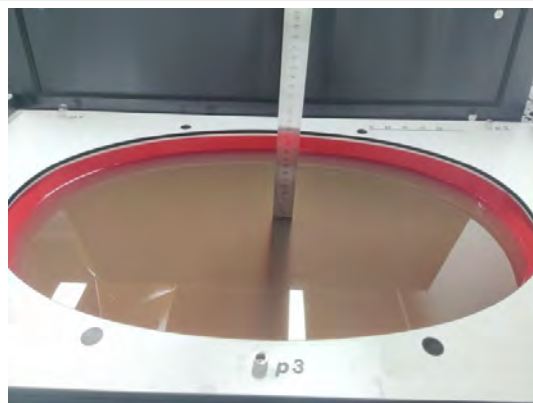
4.2.7 Simulating Liquid

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. 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. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5%.

Head Liquid Depth



Body Liquid Depth



The following table gives the recipes for tissue simulating liquid.

TSL	Manufacturer / Model	Freq Range (MHz)	Main Ingredients
Head WideBand	SPEAG HBBL600-10000V6	600-10000	Ethenediol, Sodium petroleum sulfonate, Hexylene Glycol / 2-Methyl-pentane-2.4-diol, Alkoxylated alcohol

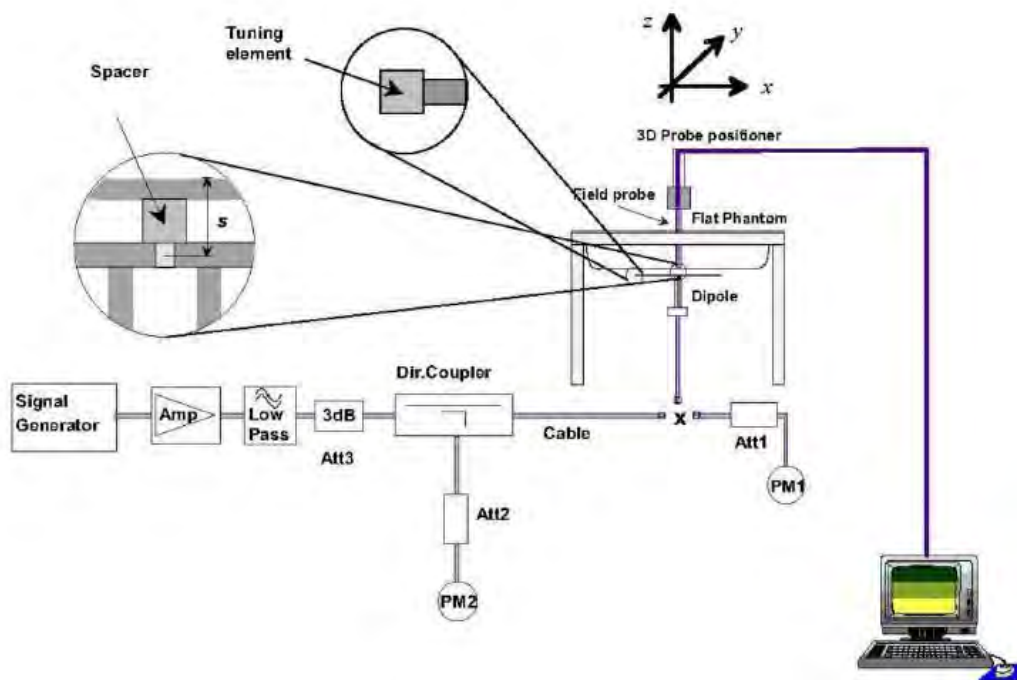
5 SYSTEM VERIFICATION

5.1 Purpose of System 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.

5.2 System Check 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:



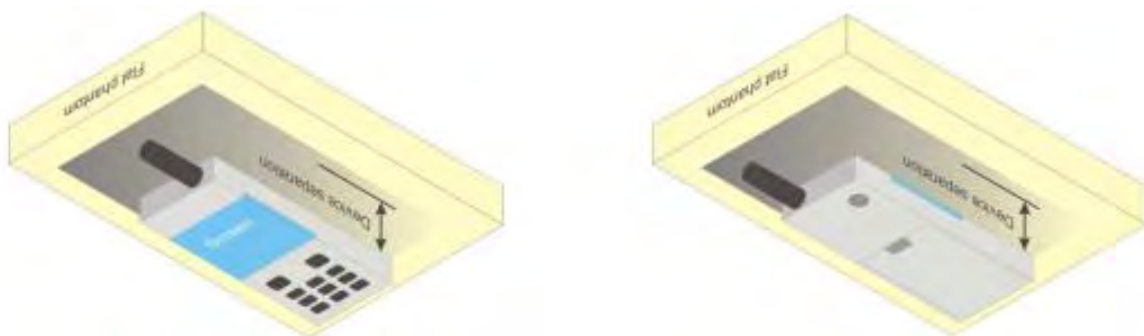
6 TEST POSITION CONFIGURATIONS

6.1 Body-worn Position Conditions

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 KDB 447498 are 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 the reported SAR for a body-worn accessory.

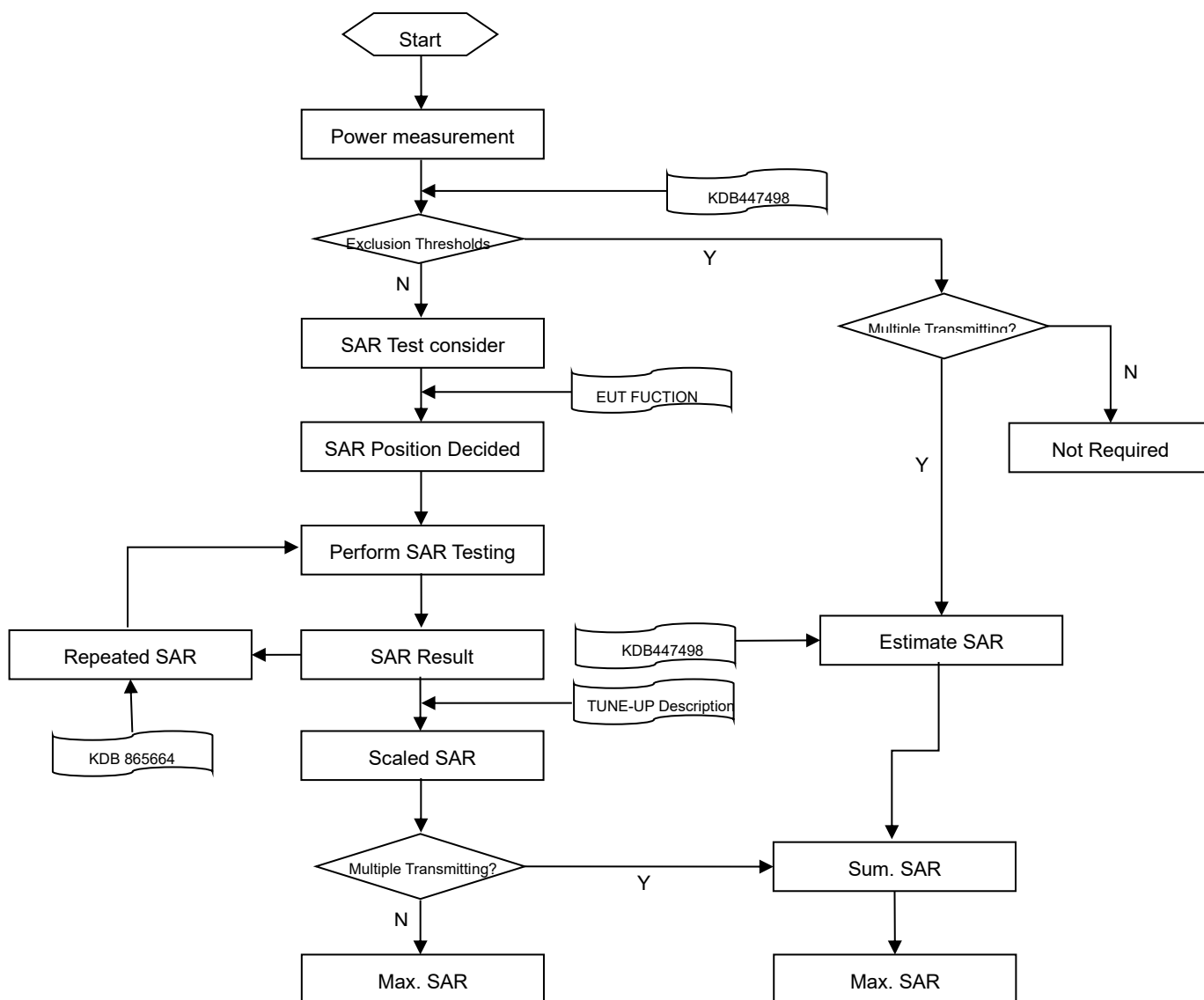
Body-worn accessories that do not contain metallic or conductive components may be tested according to worst-case exposure configurations, typically according to the smallest test separation distance required for the group of body-worn accessories with similar operating and exposure characteristics. All body-worn accessories containing metallic components are tested in conjunction with the host device.

Body-worn accessory SAR compliance is based on a single minimum test separation distance for all wireless and operating modes applicable to each body-worn accessory used by the host, and according to the relevant voice and/or data mode transmissions and operations. If a body-worn accessory supports voice only operations in its normal and expected use conditions, testing of data mode for body-worn compliance is not required. A conservative minimum test separation distance for supporting off-the-shelf body-worn accessories that may be acquired by users of consumer handsets is used to test for body-worn accessory SAR compliance. This distance is determined by the handset manufacturer, according to the requirements of Supplement C 01-01. Devices that are designed to operate on the body of users using lanyards and straps, or without requiring additional body-worn accessories, will be tested using a conservative minimum test separation distance ≤ 5 mm to support compliance.



7 MEASUREMENT PROCEDURE

7.1 Measurement Process Diagram



7.2 SAR Scan General Requirement

Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1 g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2013.

			≤3GHz	>3GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5±1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ 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.	
Maximum zoom scan spatial resolution: Δx Zoom , Δy Zoom			≤ 2 GHz: ≤ 8 mm 2 –3 GHz: ≤ 5 mm*	3–4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: Δz Zoom (n)		≤ 5 mm	3–4 GHz: ≤ 4 mm
				4–5 GHz: ≤ 3 mm
				5–6 GHz: ≤ 2 mm
	graded grid	Δz Zoom (1): between 1st two points closest to phantom surface	≤ 4 mm	3–4 GHz: ≤ 3 mm
				4–5 GHz: ≤ 2.5 mm
		Δz Zoom (n>1): between subsequent points	≤ 1.5·Δz Zoom (n-1)	
Minimum zoom scan volume	x, y, z		≥30 mm	3–4 GHz: ≥ 28 mm
				4–5 GHz: ≥ 25 mm
				5–6 GHz: ≥ 22 mm

Note:

1. δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
2. * When zoom scan is required and the reported SAR from the area scan based 1 g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

7.3 Measurement Procedure

The following steps are used for each test position

- a. Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface
- b. Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
- c. Measurement of the SAR distribution with a grid of 8 to 16mm * 8 to 16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
- d. Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

7.4 Area & Zoom Scan Procedure

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r04 quoted below.

When the 1 g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.

8 CONDUCTED RF OUPUT POWER

8.1 WIFI

8.1.1 2.4G WIFI (Antenna 0)

Band (GHz)	Mode	Channel	Freq. (MHz)	Average Power(dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
2.4 (2.4~2.4835)	802.11b	1	2412	13.32	13.50	Yes
		6	2437	13.06	13.50	Yes
		11	2462	13.49	13.50	Yes
	802.11g	1	2412	13.45	13.50	No
		6	2437	13.01	13.50	No
		11	2462	13.12	13.50	No
	802.11n(HT20)	1	2412	10.27	10.50	No
		6	2437	10.40	10.50	No
		11	2462	10.11	10.50	No
	802.11n(HT40)	3	2422	10.24	10.50	No
		6	2437	10.18	10.50	No
		9	2452	10.33	10.50	No
	802.11ax(HE20)	1	2412	10.40	10.50	No
		6	2437	10.48	10.50	No
		11	2462	10.09	10.50	No
	802.11ax(HE40)	3	2422	10.22	10.50	No
		6	2437	10.30	10.50	No
		9	2452	10.37	10.50	No

Note: According KDB 248227 D01 SAR is not required for the following 2.4 GHz OFDM conditions. 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.

Adjusted SAR = Report SAR * (max power (OFDM)/ max power (DSSS)) = 0.362 * (22.39 mw)/(22.39 mw) =0.362 W/kg, so the 2.4GHz OFDM SAR test is not required.

8.1.2 2.4G WIFI (Antenna 1)

Band (GHz)	Mode	Channel	Freq. (MHz)	Average Power(dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
2.4 (2.4~2.4835)	802.11b	1	2412	13.18	13.50	Yes
		6	2437	13.19	13.50	Yes
		11	2462	13.15	13.50	Yes
	802.11g	1	2412	13.20	13.50	No
		6	2437	13.39	13.50	No
		11	2462	13.44	13.50	No
	802.11n(HT20)	1	2412	10.01	10.50	No
		6	2437	10.35	10.50	No
		11	2462	10.39	10.50	No
	802.11n(HT40)	3	2422	10.33	10.50	No
		6	2437	10.00	10.50	No
		9	2452	10.08	10.50	No
	802.11ax(HE20)	1	2412	10.09	10.50	No
		6	2437	10.44	10.50	No
		11	2462	10.41	10.50	No
	802.11ax(HE40)	3	2422	10.46	10.50	No
		6	2437	10.11	10.50	No
		9	2452	10.12	10.50	No

Note: According KDB 248227 D01 SAR is not required for the following 2.4 GHz OFDM conditions. 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.

Adjusted SAR = Report SAR * (max power (OFDM)/ max power (DSSS)) = 0.563 * (22.39 mw)/(22.39 mw) =0.563 W/kg, so the 2.4GHz OFDM SAR test is not required.

8.1.3 2.4G WIFI (MIMO)

Band (GHz)	Mode	Channel	Freq. (MHz)	Average Power(dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
2.4 (2.4~2.4835)	802.11n(HT20)	1	2412	13.37	13.50	No
		6	2437	13.34	13.50	No
		11	2462	13.22	13.50	No
	802.11n(HT40)	3	2422	13.34	13.50	No
		6	2437	13.14	13.50	No
		9	2452	13.23	13.50	No
	802.11ax(HE20)	1	2412	13.30	13.50	No
		6	2437	13.39	13.50	No
		11	2462	13.21	13.50	No
	802.11ax(HE40)	3	2422	13.36	13.50	No
		6	2437	13.23	13.50	No
		9	2452	13.32	13.50	No

Note: For WiFi SAR testing was performed on single antenna RF power in SISO mode that is larger to the single antenna RF power in MIMO mode, and for RF exposure assessment of MIMO mode simultaneous transmission used more conservative "Max. (main ant) + Max. (aux. ant) " method to determine SAR compliance. When the sum of 1-g SISO transmission SAR measurement is <1.6 W/kg, MIMO SAR test is not required.

8.1.4 5G WIFI (Antenna 0)

Band (GHz)	Mode	Channel	Freq. (MHz)	Average Power(dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
5.2 (5.15~5.25)	802.11a	36	5180	13.30	13.50	No
		44	5220	13.12	13.50	No
		48	5240	13.02	13.50	No
	802.11n(HT20)	36	5180	13.26	13.50	No
		44	5220	13.08	13.50	No
		48	5240	13.48	13.50	No
	802.11n(HT40)	38	5190	13.02	13.50	No
		46	5230	13.46	13.50	No
	802.11ac(VHT20)	36	5180	13.23	13.50	No
		44	5220	13.11	13.50	No
		48	5240	13.02	13.50	No
	802.11ac(VHT40)	38	5190	13.01	13.50	No
		46	5230	13.47	13.50	No
	802.11ac(VHT80)	42	5210	13.22	13.50	Yes
	802.11ax(HE20)	36	5180	13.21	13.50	No
		44	5220	13.13	13.50	No
		48	5240	13.02	13.50	No
	802.11ax(HE40)	38	5190	13.12	13.50	No
		46	5230	12.99	13.50	No
	802.11ax(HE80)	42	5210	13.41	13.50	No
5.8 (5.725~5.850)	802.11a	149	5745	16.16	16.50	Yes
		157	5785	16.14	16.50	Yes
		165	5825	16.15	16.50	Yes
	802.11n(HT20)	149	5745	13.39	13.50	No
		157	5785	13.46	13.50	No
		165	5825	13.05	13.50	No
	802.11n(HT40)	151	5755	13.28	13.50	No
		159	5795	13.33	13.50	No
	802.11ac(VHT20)	149	5745	13.37	13.50	No
		157	5785	13.46	13.50	No
		165	5825	13.07	13.50	No
	802.11ac(VHT40)	151	5755	13.30	13.50	No
		159	5795	13.36	13.50	No
	802.11ac(VHT80)	155	5775	13.40	13.50	No
	802.11ax(HE20)	149	5745	13.41	13.50	No
		157	5785	13.49	13.50	No
		165	5825	13.08	13.50	No
	802.11ax(HE40)	151	5755	13.35	13.50	No
		159	5795	13.40	13.50	No

	802.11ax(HE80)	155	5775	13.01	13.50	No
Note: When multiple channel bandwidth configurations in a frequency band have the same maximum tune-up output power, the test configuration is determined by applying the following steps sequentially. 1) The largest channel bandwidth configuration is selected among the multiple configurations in a frequency band with the same maximum tune-up output power. 2) When multiple transmission modes (802.11a/n/ac/ax) have the same maximum tune-up output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n, and 802.11n chosen over 802.11ac then 802.11ax.						

8.1.5 5G WIFI (Antenna 1)

Band (GHz)	Mode	Channel	Freq. (MHz)	Average Power(dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
5.2 (5.15~5.25)	802.11a	36	5180	13.38	13.50	No
		44	5220	13.45	13.50	No
		48	5240	13.46	13.50	No
	802.11n(HT20)	36	5180	13.37	13.50	No
		44	5220	13.38	13.50	No
		48	5240	13.48	13.50	No
	802.11n(HT40)	38	5190	13.33	13.50	No
		46	5230	13.39	13.50	No
	802.11ac(VHT20)	36	5180	13.41	13.50	No
		44	5220	13.41	13.50	No
		48	5240	13.48	13.50	No
	802.11ac(VHT40)	38	5190	13.28	13.50	No
		46	5230	13.45	13.50	No
	802.11ac(VHT80)	42	5210	13.17	13.50	Yes
	802.11ax(HE20)	36	5180	13.46	13.50	No
		44	5220	13.04	13.50	No
		48	5240	13.49	13.50	No
	802.11ax(HE40)	38	5190	13.38	13.50	No
		46	5230	13.41	13.50	No
	802.11ax(HE80)	42	5210	13.36	13.50	No
5.8 (5.725~5.850)	802.11a	149	5745	16.19	16.50	Yes
		157	5785	16.16	16.50	Yes
		165	5825	16.13	16.50	Yes
	802.11n(HT20)	149	5745	13.44	13.50	No
		157	5785	13.37	13.50	No
		165	5825	13.25	13.50	No
	802.11n(HT40)	151	5755	13.37	13.50	No
		159	5795	13.41	13.50	No
	802.11ac(VHT20)	149	5745	13.38	13.50	No
		157	5785	13.45	13.50	No
		165	5825	13.27	13.50	No
	802.11ac(VHT40)	151	5755	13.29	13.50	No
		159	5795	13.36	13.50	No
	802.11ac(VHT80)	155	5775	13.23	13.50	No
	802.11ax(HE20)	149	5745	13.37	13.50	No
		157	5785	13.44	13.50	No
		165	5825	13.31	13.50	No
	802.11ax(HE40)	151	5755	13.40	13.50	No
		159	5795	13.41	13.50	No

	802.11ax(HE80)	155	5775	13.44	13.50	No
Note: When multiple channel bandwidth configurations in a frequency band have the same maximum tune-up output power, the test configuration is determined by applying the following steps sequentially. 1) The largest channel bandwidth configuration is selected among the multiple configurations in a frequency band with the same maximum tune-up output power. 2) When multiple transmission modes (802.11a/n/ac/ax) have the same maximum tune-up output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n, and 802.11n chosen over 802.11ac then 802.11ax.						

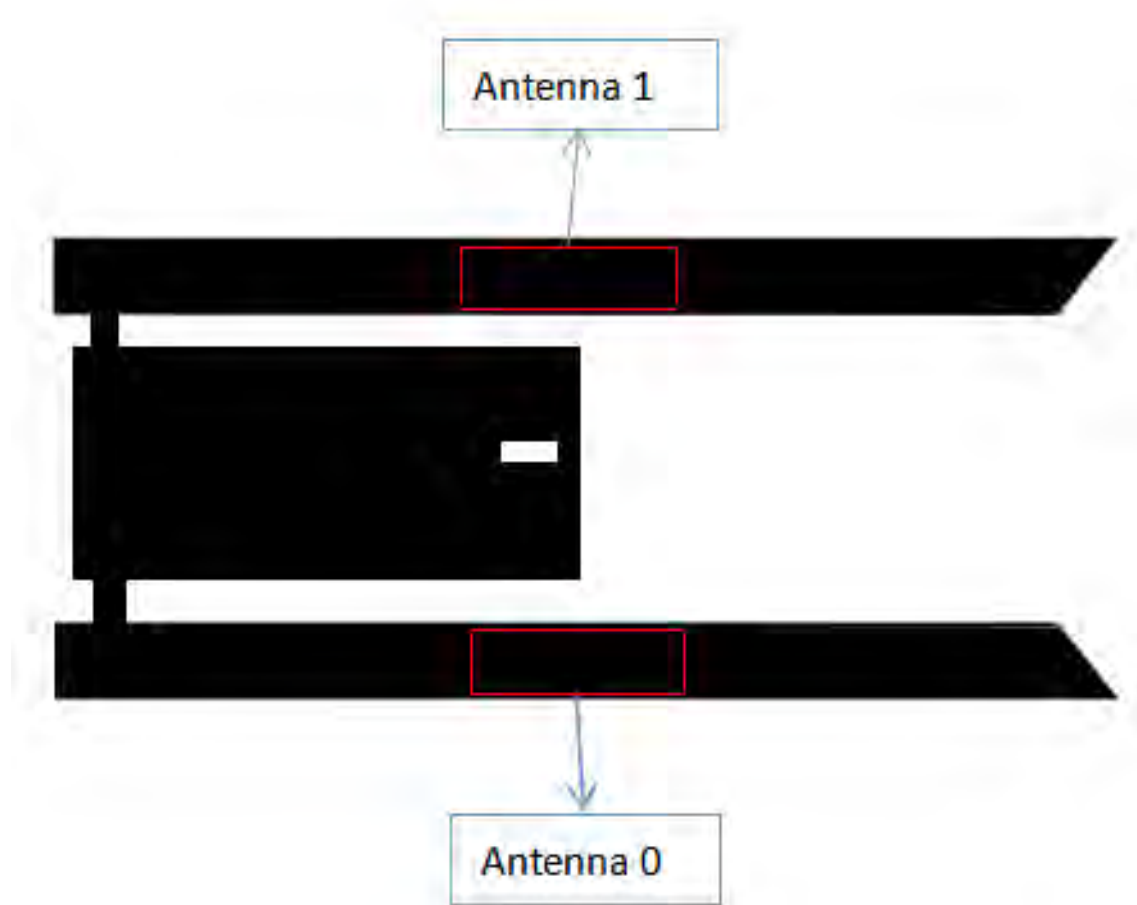
8.1.6 5G WIFI (MIMO)

Band (GHz)	Mode	Channel	Freq. (MHz)	Average Power(dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
5.2 (5.15~5.25)	802.11n(HT20)	36	5180	16.33	16.50	No
		44	5220	16.34	16.50	No
		48	5240	16.23	16.50	No
	802.11n(HT40)	38	5190	16.26	16.50	No
		46	5230	16.17	16.50	No
	802.11ac(VHT20)	36	5180	16.36	16.50	No
		44	5220	16.31	16.50	No
		48	5240	16.24	16.50	No
	802.11ac(VHT40)	38	5190	16.25	16.50	No
		46	5230	16.20	16.50	No
	802.11ac(VHT80)	42	5210	16.23	16.50	No
	802.11ax(HE20)	36	5180	16.34	16.50	No
		44	5220	16.35	16.50	No
		48	5240	16.25	16.50	No
	802.11ax(HE40)	38	5190	16.31	16.50	No
		46	5230	16.26	16.50	No
	802.11ax(HE80)	42	5210	16.13	16.50	No
5.8 (5.725~5.850)	802.11n(HT20)	149	5745	16.31	16.50	No
		157	5785	16.34	16.50	No
		165	5825	16.07	16.50	No
	802.11n(HT40)	151	5755	16.20	16.50	No
		159	5795	16.28	16.50	No
	802.11ac(VHT20)	149	5745	16.28	16.50	No
		157	5785	16.39	16.50	No
		165	5825	16.09	16.50	No
	802.11ac(VHT40)	151	5755	16.21	16.50	No
		159	5795	16.30	16.50	No
	802.11ac(VHT80)	155	5775	16.24	16.50	No
	802.11ax(HE20)	149	5745	16.32	16.50	No
		157	5785	16.34	16.50	No
		165	5825	16.12	16.50	No
	802.11ax(HE40)	151	5755	16.30	16.50	No
		159	5795	16.37	16.50	No
	802.11ax(HE80)	155	5775	16.43	16.50	No

Note: For WiFi SAR testing was performed on single antenna RF power in SISO mode that is larger to the single antenna RF power in MIMO mode, and for RF exposure assessment of MIMO mode simultaneous transmission used more conservative "Max. (main ant) + Max. (aux. ant) " method to determine SAR compliance. When the sum of 1-g SISO transmission SAR measurement is <1.6 W/kg, MIMO SAR test is not required.

9 TEST EXCLUSION CONSIDERATION

9.1 Antenna location sketch



Antenna	Support Bands
Antenna 1	2.4/5G WIFI
Antenna 0	2.4/5G WIFI

9.2 SAR Test Consideration Table

According with FCC KDB 447498 D04, Appendix B, The SAR-based exemption formula applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). The following table shows the power threshold from 5mm to 50mm.

Power Thresholds (mW)					
Frequency (MHz)	At separation distance of ≤ 5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
300	39 mW	65 mW	88 mW	110 mW	129 mW
450	22 mW	44 mW	67 mW	89 mW	112 mW
835	9 mW	25 mW	44 mW	66 mW	90 mW
1900	3 mW	12 mW	26 mW	44 mW	66 mW
2450	3 mW	10 mW	22 mW	38 mW	59 mW
3600	2 mW	8 mW	18 mW	32 mW	49 mW
5800	1 mW	6 mW	14 mW	25 mW	40 mW
Frequency (MHz)	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of 50 mm
300	148 mW	166 mW	184 mW	201 mW	217 mW
450	135 mW	158 mW	180 mW	203 mW	226 mW
835	116 mW	145 mW	175 mW	207 mW	240 mW
1900	92 mW	122 mW	157 mW	195 mW	236 mW
2450	83 mW	111 mW	143 mW	179 mW	219 mW
3600	71 mW	96 mW	125 mW	158 mW	195 mW
5800	58 mW	80 mW	106 mW	136 mW	169 mW

9.2.1 SAR Test Consideration

Band	Max. Peak Power		Antenna 0 Test Position Configurations							
			Close-0°	Close-180°	Left Edge	Right Edge	Open-0°	Open-90°	Open-180°	Open-270°
WIFI 2.4G	13.50	22.00	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
WIFI 5.2G	13.50	22.00	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
WIFI 5.8G	16.50	45.00	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

Band	Max. Peak Power		Antenna 1 Test Position Configurations							
			Close-0°	Close-180°	Left Edge	Right Edge	Open-0°	Open-90°	Open-180°	Open-270°
WIFI 2.4G	13.50	22.00	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
WIFI 5.2G	13.50	22.00	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
WIFI 5.8G	16.50	45.00	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes

Note:

- Maximum power is the source-based time-average power and represents the maximum RF output power including tune-up tolerance among production units
- Per KDB 447498 D04, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
- Per KDB 447498 D04, standalone SAR test exclusion threshold is applied; If the distance of the antenna to the user is < 5mm, 5mm is used to determine SAR exclusion threshold
- According with section 2.5.1 of RSS-102 Issue 5, SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm.
- Per KDB 248227 D01, choose the highest output power channel to test SAR and determine further SAR exclusion.8. For each frequency band, testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than 1/4dB higher than those measured at the lowest data rate
- Per KDB 248227 D01 SAR is not required for the following 2.4 GHz OFDM conditions.
 - When KDB Publication 447498 D04 SAR test exclusion applies to the OFDM configuration.
 - 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.
- Per KDB 248227 D01 SAR is not required for the following U-NII-1 and U-NII-2A bands conditions.
 - When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.
 - When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

10 TEST RESULT

10.1 WIFI 2.4GHz

Mode	Antenna	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (dB)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	Duty cycle (%)	Duty cycle Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (Antenna Close)														
802.11b	Antenna 1	Close-0°	5	6	2437	0.03	0.522	99.53	1.005	13.19	13.50	1.074	0.563	1#
		Close-180°	5	6	2437	0.17	0.356	99.53	1.005	13.19	13.50	1.074	0.384	/
		Left Edge	5	6	2437	0.12	0.311	99.53	1.005	13.19	13.50	1.074	0.336	/
	Antenna 0	Close-0°	5	11	2462	0.09	0.155	99.53	1.005	13.49	13.50	1.002	0.156	2#
		Close-180°	5	11	2462	-0.12	0.081	99.53	1.005	13.49	13.50	1.002	0.082	/
		Right Edge	5	11	2462	-0.07	0.071	99.53	1.005	13.49	13.50	1.002	0.071	/
Body (Antenna Open)														
802.11b	Antenna 1	Open-0°	5	6	2437	-0.16	0.411	99.53	1.005	13.19	13.50	1.074	0.444	3#
		Open-90°	5	6	2437	0.00	0.323	99.53	1.005	13.19	13.50	1.074	0.349	/
		Open-180°	5	6	2437	0.02	0.402	99.53	1.005	13.19	13.50	1.074	0.434	/
		Open-270°	5	6	2437	-0.05	0.355	99.53	1.005	13.19	13.50	1.074	0.383	/
	Antenna 0	Open-0°	5	11	2462	0.14	0.359	99.53	1.005	13.49	13.50	1.002	0.362	4#
		Open-90°	5	11	2462	0.03	0.155	99.53	1.005	13.49	13.50	1.002	0.156	/
		Open-180°	5	11	2462	0.06	0.284	99.53	1.005	13.49	13.50	1.002	0.286	/
		Open-270°	5	11	2462	-0.03	0.232	99.53	1.005	13.49	13.50	1.002	0.234	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.														

10.2WIFI 5GHz

Mode		Antenna	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (dB)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	Duty cycle (%)	Duty cycle Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (Antenna Close)															
U-NII-1	802.11 ac80	Antenna 1	Close-0°	5	42	5210	-0.02	0.374	92.14	1.085	13.17	13.50	1.079	0.438	5#
			Close-180°	5	42	5210	0.14	0.265	92.14	1.085	13.17	13.50	1.079	0.310	/
			Left Edge	5	42	5210	-0.13	0.253	92.14	1.085	13.17	13.50	1.079	0.296	/
		Antenna 0	Close-0°	5	42	5210	0.08	0.141	92.14	1.085	13.22	13.50	1.067	0.163	6#
			Close-180°	5	42	5210	0.05	0.115	92.14	1.085	13.22	13.50	1.067	0.133	/
			Right Edge	5	42	5210	-0.15	0.018	92.14	1.085	13.22	13.50	1.067	0.021	/
U-NII-3	802.11a	Antenna 1	Close-0°	5	149	5745	0.09	0.924	98.06	1.020	16.19	16.50	1.074	1.012	7#
			Close-180°	5	149	5745	0.04	0.722	98.06	1.020	16.19	16.50	1.074	0.791	/
			Left Edge	5	149	5745	0.04	0.658	98.06	1.020	16.19	16.50	1.074	0.721	/
			Close-0°	5	157	5785	-0.15	0.796	98.06	1.020	16.16	16.50	1.081	0.878	/
			Close-0°	5	165	5825	-0.03	0.777	98.06	1.020	16.13	16.50	1.089	0.863	/
		Antenna 0	Close-0°	5	149	5745	-0.14	0.129	98.06	1.020	16.16	16.50	1.081	0.142	8#
			Close-180°	5	149	5745	0.18	0.103	98.06	1.020	16.16	16.50	1.081	0.114	/
			Right Edge	5	149	5745	0.14	0.095	98.06	1.020	16.16	16.50	1.081	0.105	/
Body (Antenna Close)-Repeated SAR															
U-NII-3	802.11a	Antenna 1	Close-0°	5	149	5745	0.04	0.905	98.06	1.020	16.19	16.50	1.074	0.991	/
Body (Antenna Open)															
U-NII-1	802.11 ac80	Antenna 1	Open-0°	5	42	5210	0.01	0.271	92.14	1.085	13.17	13.50	1.079	0.317	9#
			Open-90°	5	42	5210	0.16	0.134	92.14	1.085	13.17	13.50	1.079	0.157	/
			Open-180°	5	42	5210	-0.19	0.235	92.14	1.085	13.17	13.50	1.079	0.275	/
			Open-270°	5	42	5210	-0.08	0.182	92.14	1.085	13.17	13.50	1.079	0.213	/
		Antenna 0	Open-0°	5	42	5210	0.01	0.148	92.14	1.085	13.22	13.50	1.067	0.171	10#
			Open-90°	5	42	5210	-0.05	0.111	92.14	1.085	13.22	13.50	1.067	0.129	/
			Open-180°	5	42	5210	-0.03	0.131	92.14	1.085	13.22	13.50	1.067	0.152	/
			Open-270°	5	42	5210	-0.07	0.097	92.14	1.085	13.22	13.50	1.067	0.112	/
U-NII-3	802.11a	Antenna 1	Open-0°	5	149	5745	0.08	0.751	98.06	1.020	16.19	16.50	1.074	0.823	11#
			Open-90°	5	149	5745	0.13	0.523	98.06	1.020	16.19	16.50	1.074	0.573	/
			Open-180°	5	149	5745	-0.09	0.612	98.06	1.020	16.19	16.50	1.074	0.670	/
			Open-270°	5	149	5745	0.02	0.455	98.06	1.020	16.19	16.50	1.074	0.498	/
			Open-0°	5	157	5785	0.13	0.606	98.06	1.020	16.16	16.50	1.081	0.668	/
			Open-0°	5	165	5825	-0.18	0.685	98.06	1.020	16.13	16.50	1.089	0.761	/
		Antenna 0	Open-0°	5	149	5745	0.02	0.158	98.06	1.020	16.16	16.50	1.081	0.174	12#
			Open-90°	5	149	5745	-0.13	0.120	98.06	1.020	16.16	16.50	1.081	0.132	/
			Open-180°	5	149	5745	0.11	0.142	98.06	1.020	16.16	16.50	1.081	0.157	/
			Open-270°	5	149	5745	-0.02	0.105	98.06	1.020	16.16	16.50	1.081	0.116	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.															

Note: Refer to ANNEX C for the detailed test data for each test configuration.

11 SAR Measurement Variability

According to KDB 865664 D01, SAR measurement variability was assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are ≤ 1.45 W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is ≤ 1.10 , the highest SAR configuration for either head or body tissue-equivalent medium may be used to perform the repeated measurement. 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.

SAR repeated measurement procedure:

1. When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
2. When the highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3. 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, perform a second repeated measurement.
4. If the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 , and the original, first or second repeated measurement is ≥ 1.5 W/kg, perform a third repeated measurement.

Frequency Band (MHz)	Wireless Band	Antenna	RF Exposure Conditions	Test Position	Highest Measured SAR (W/kg)	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Largest to Smallest SAR Ratio
5745	802.11a	Antenna 1	Body (Antenna Close)	Close-0°	0.924	Yes	0.905	1.02

Note: The ratio of largest to smallest SAR for the original and first repeated measurements is < 1.20 , the second repeated measurement is not required.

12 SIMULTANEOUS TRANSMISSION

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna. When the sum of SAR 1g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR 1g 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR 1g is greater than the SAR limit (SAR 1g 1.6 W/kg), SAR test exclusion is determined by the SAR to Peak Location Ratio (SPLSR).

According KDB 447498 D04, simultaneous transmission:

- a) $SPLSR = (SAR1 + SAR2)^{1.5} / R_i$ (min. separation distance, mm), and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
SAR1 is the highest reported or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition.
SAR2 is the highest reported or estimated SAR for the second of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition as the first.
- b) If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
- c) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

12.1 Simultaneous Transmission Mode Considerations

No.	Simultaneous Tx Combination	Body (Antenna Close)	Body (Antenna Open)
1	2.4G WLAN(Antenna 1) + 2.4G WLAN(Antenna 0)	Yes	Yes
2	5G WLAN(Antenna 1) + 5G WLAN(Antenna 0)	Yes	Yes
Note: 1. The maximum SAR summation is calculated based on the same configuration and test position. 2. When stand-alone SAR is not required for a side of antenna, its SAR is considered zero in the SAR summing process to assess Multi-band transmission SAR compliance.			

12.2 Sum SAR of Simultaneous Transmission

12.2.1 Body Simultaneous Transmission SAR Evaluation for WLAN Antenna 1 with WLAN Antenna 0

State	Position	Stand alone SAR						SUM SAR		
		1	2	3	4	5	6			
		2.4G WLAN (Antenna 1)	2.4G WLAN (Antenna 0)	5.2G WLAN (Antenna 1)	5.2G WLAN (Antenna 0)	5.8G WLAN (Antenna 1)	5.8G WLAN (Antenna 0)	Sum SAR (1+2)	Sum SAR (3+4)	Sum SAR (5+6)
Body (Antenna Close)	Close-0° 5mm	0.563	0.156	0.438	0.163	1.012	0.142	0.719	0.601	1.154
	Close-180° 5mm	0.384	0.082	0.310	0.133	0.791	0.114	0.466	0.443	0.905
	Left Edge 5mm	0.336	0.000	0.296	0.000	0.721	0.000	0.336	0.296	0.721
	Right Edge 5mm	0.000	0.071	0.000	0.021	0.000	0.105	0.071	0.021	0.105
Body (Antenna Open)	Open-0° 5mm	0.444	0.362	0.317	0.171	0.823	0.174	0.806	0.488	0.997
	Open-90° 5mm	0.349	0.156	0.157	0.129	0.573	0.132	0.505	0.286	0.705
	Open-180° 5mm	0.434	0.286	0.275	0.152	0.670	0.157	0.720	0.427	0.827
	Open-270° 5mm	0.383	0.234	0.213	0.112	0.498	0.116	0.617	0.325	0.614
Note: 1: The highest Summed 1g SAR is 1.154 W/Kg < 1.6 W/kg, so Simultaneous Transmission SAR test is not required.										

13 TEST EQUIPMENTS LIST

Description	Manufacturer	Model	Serial No./Version	Cal. Date	Cal. Due
PC	Dell	N/A	N/A	N/A	N/A
Test Software	Speag	DASY5	52.8.8.1222	N/A	N/A
2450MHz Validation Dipole	Speag	D2450V2	SN: 952	2021/05/19	2024/05/18
5GHz Validation Dipole	Speag	D5GHzV2	SN: 1200	2021/05/18	2024/05/17
E-Field Probe	Speag	EX3DV4	SN: 7510	2023/01/19	2024/01/18
Data Acquisition Electronicsr	Speag	DAE4	SN: 1454	2023/03/20	2024/03/19
Signal Generator	R&S	SMB100A	177746	2023/05/10	2024/05/09
Power Meter	R&S	NRVD-B2	835843/014	2022/09/06	2023/09/05
Power Sensor	R&S	NRV-Z4	100381	2022/09/06	2023/09/05
Power Sensor	R&S	NRV-Z2	100211	2022/09/06	2023/09/05
Network Analyzer	Agilent	E5071C	MY46103472	2022/12/06	2023/12/05
Thermometer	Elitech	RC-4HC	EF720B004811	2022/11/25	2023/11/24
Thermometer	Elitech	RC-4HC	EF720B004817	2022/11/18	2023/11/17
Power Amplifier	SATIMO	6552B	22374	N/A	N/A
Dielectric Probe Kit	Speag	DAK3.5	SN: 1312	N/A	N/A
Phantom	Speag	ELI4	SN: 1012	N/A	N/A
Attenuator	COM-MW	ZA-S1-31	1305003187	N/A	N/A
Directional coupler	AA-MCS	AAMCS-UDC	000272	N/A	N/A

Note: For dipole antennas, BALUN has adopted 3 years as calibration intervals, and on annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole;
2. System validation with specific dipole is within 10% of calibrated value;
3. Return-loss in within 20% of calibrated measurement.
4. Impedance (real or imaginary parts) in within 5 Ohms of calibrated measurement.

ANNEX A SIMULATING LIQUID VERIFICATION RESULT

The dielectric parameters of the liquids were verified prior to the SAR evaluation using a DAK3.5 Dielectric Probe Kit.

Head Liquid

Date	Liquid Type	Fre. (MHz)	Temp. (°C)	Meas. Conductivity (σ) (S/m)	Meas. Permittivity (ϵ)	Target Conductivity (σ) (S/m)	Target Permittivity (ϵ)	Conductivity Tolerance (%)	Permittivity Tolerance (%)
2023.08.14	Head	2450	21.4	1.80	39.50	1.80	39.20	0.00	0.77
2023.08.15	Head	5250	21.5	4.70	35.89	4.71	35.93	-0.21	-0.11
2023.08.16	Head	5750	21.4	5.22	35.59	5.22	35.36	0.00	0.65

Note: The tolerance limit of Conductivity and Permittivity is $\pm 5\%$.

ANNEX B SYSTEM CHECK RESULT

Comparing to the original SAR value provided by SPEAG, the validation data should be within its specification of 10 % (for 1 g).

Date	Liquid Type	Freq. (MHz)	Power (mW)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Dipole SAR (W/kg)	Tolerance (%)
2023.08.14	Head	2450	100	5.21	52.10	53.00	-1.70
2023.08.15	Head	5250	100	7.44	74.40	77.80	-4.37
2023.08.16	Head	5750	100	8.06	80.60	77.20	4.40
Note: The tolerance limit of System validation $\pm 10\%$.							

System Performance Check Data (2450MHz)

Date: 2023.08.14

Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.801$ S/m; $\epsilon_r = 39.504$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.3°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(7.78, 7.78, 7.78); Calibrated: 2023.01.19;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW2450/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 5.94 W/kg

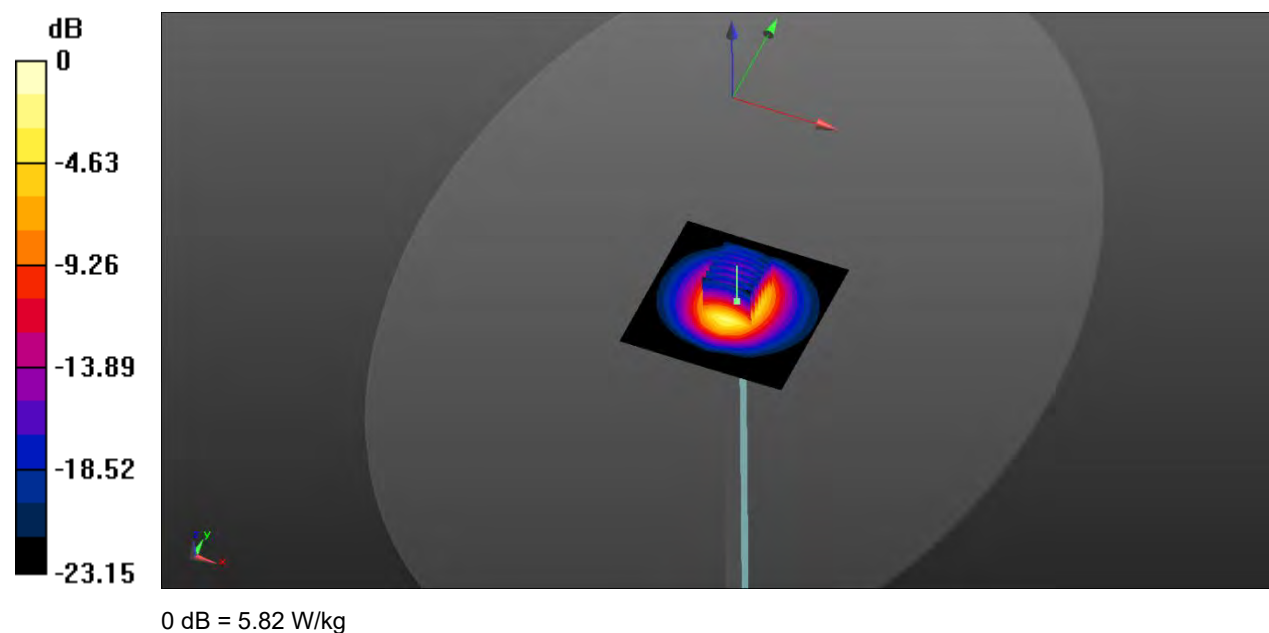
CW2450/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.68 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 11.5 W/kg

SAR(1 g) = 5.21 W/kg; SAR(10 g) = 2.32 W/kg

Maximum value of SAR (measured) = 5.82 W/kg



System Performance Check Data (5250MHz)

Date: 2023.08.15

Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5250 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 5250$ MHz; $\sigma = 4.704$ S/m; $\epsilon_r = 35.886$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(5.67, 5.67, 5.67); Calibrated: 2023.01.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW5250/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 15.0 W/kg

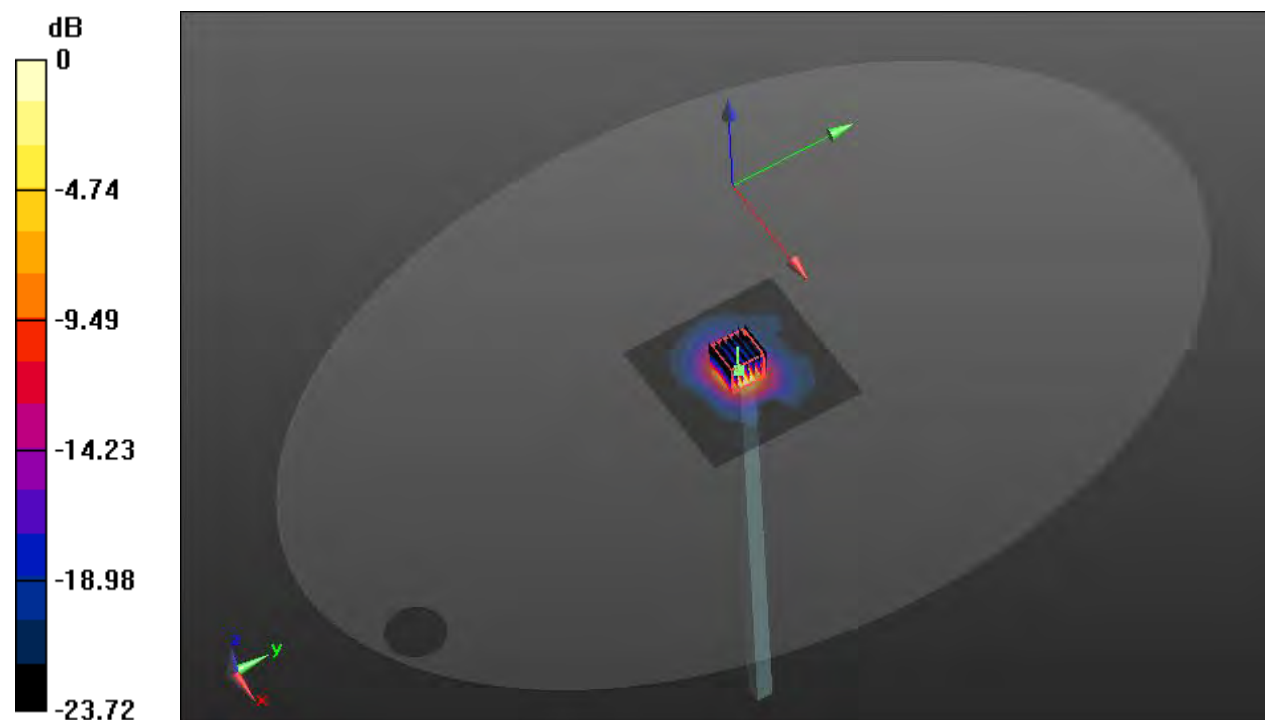
CW5250/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 40.07 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 31.6 W/kg

SAR(1 g) = 7.44 W/kg; SAR(10 g) = 2.14 W/kg

Maximum value of SAR (measured) = 15.7 W/kg



System Performance Check Data (5750MHz)

Date: 2023.08.16

Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5750 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 5750$ MHz; $\sigma = 5.216$ S/m; $\epsilon_r = 35.589$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(4.83, 4.83, 4.83); Calibrated: 2023.01.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW5750/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 16.5 W/kg

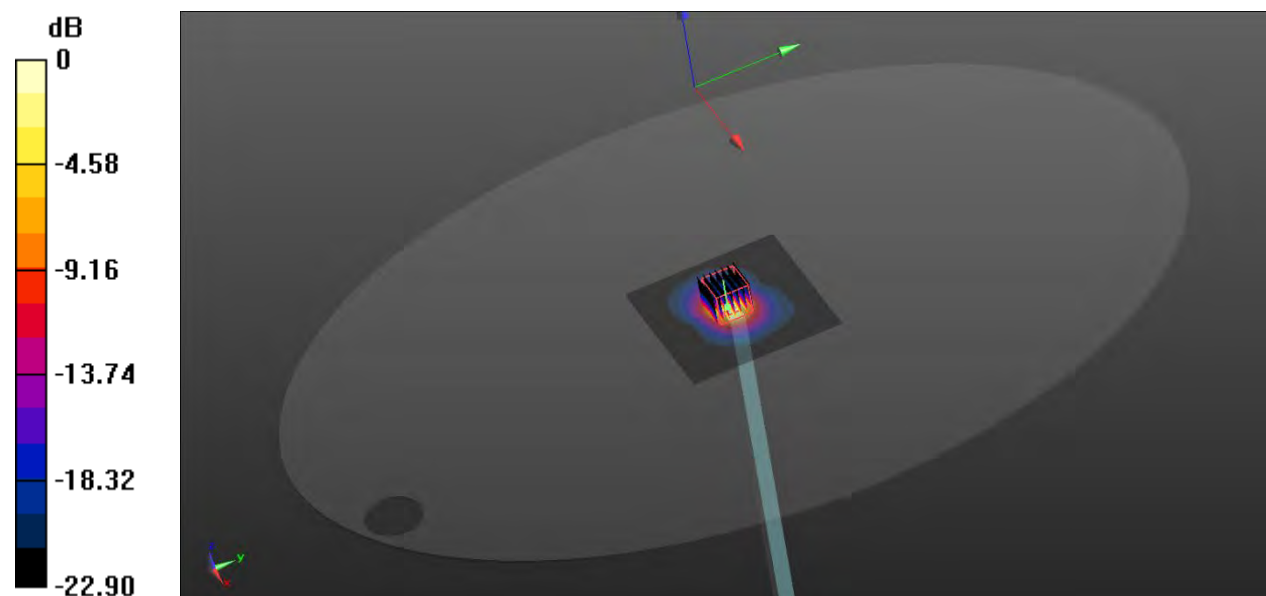
CW5750/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 38.95 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 36.3 W/kg

SAR(1 g) = 8.06 W/kg; SAR(10 g) = 2.35 W/kg

Maximum value of SAR (measured) = 16.8 W/kg



0 dB = 16.8 W/kg

ANNEX C TEST DATA

Meas.1 Body Plane with Close-0° 5mm on 6 Channel in IEEE802.11b mode with Antenna 1

Date: 2023.08.14

Communication System Band: WLAN(b); Frequency: 2437 MHz; Duty Cycle: 1:1.005

Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.783$ S/m; $\epsilon_r = 39.534$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.3°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(7.78, 7.78, 7.78); Calibrated: 2023.01.19;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch6/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.583 W/kg

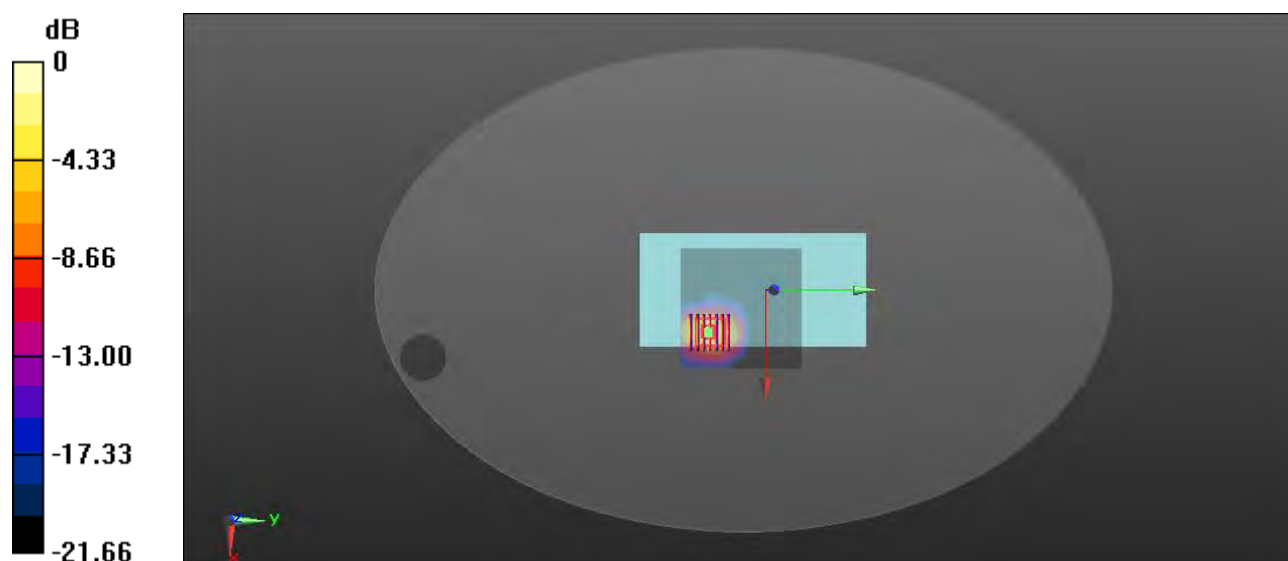
Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.522 W/kg; SAR(10 g) = 0.243 W/kg

Maximum value of SAR (measured) = 0.803 W/kg



0 dB = 0.803 W/kg

Meas.2 Body Plane with Close-0° 5mm on 11 Channel in IEEE802.11b mode with Antenna 0

Date: 2023.08.14

Communication System Band: WLAN(b); Frequency: 2462 MHz; Duty Cycle: 1:1.005

Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.811$ S/m; $\epsilon_r = 39.434$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.3°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(7.78, 7.78, 7.78); Calibrated: 2023.01.19;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch11/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.177 W/kg

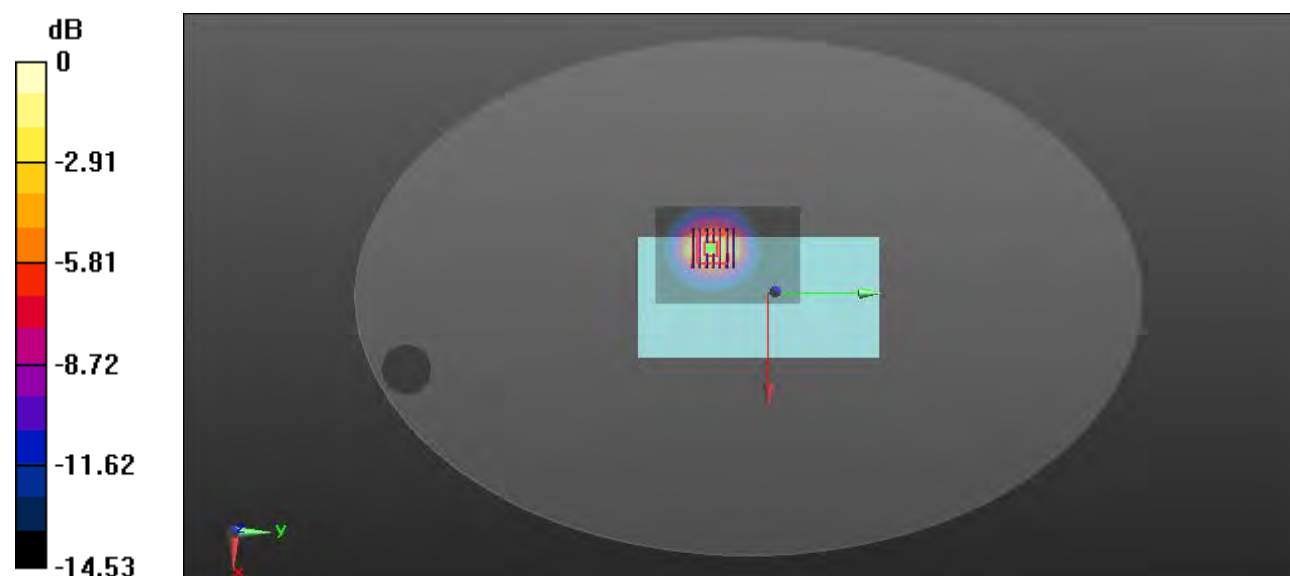
Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.950 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.308 W/kg

SAR(1 g) = 0.155 W/kg; SAR(10 g) = 0.077 W/kg

Maximum value of SAR (measured) = 0.174 W/kg



0 dB = 0.174 W/kg

Meas.3 Body Plane with Open-0° 5mm on 6 Channel in IEEE802.11b mode with Antenna 1

Date: 2023.08.14

Communication System Band: WLAN(b); Frequency: 2437 MHz; Duty Cycle: 1:1.005

Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.783$ S/m; $\epsilon_r = 39.534$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.3°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(7.78, 7.78, 7.78); Calibrated: 2023.01.19;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch6/Area Scan (81x81x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm

Maximum value of SAR (interpolated) = 0.494 W/kg

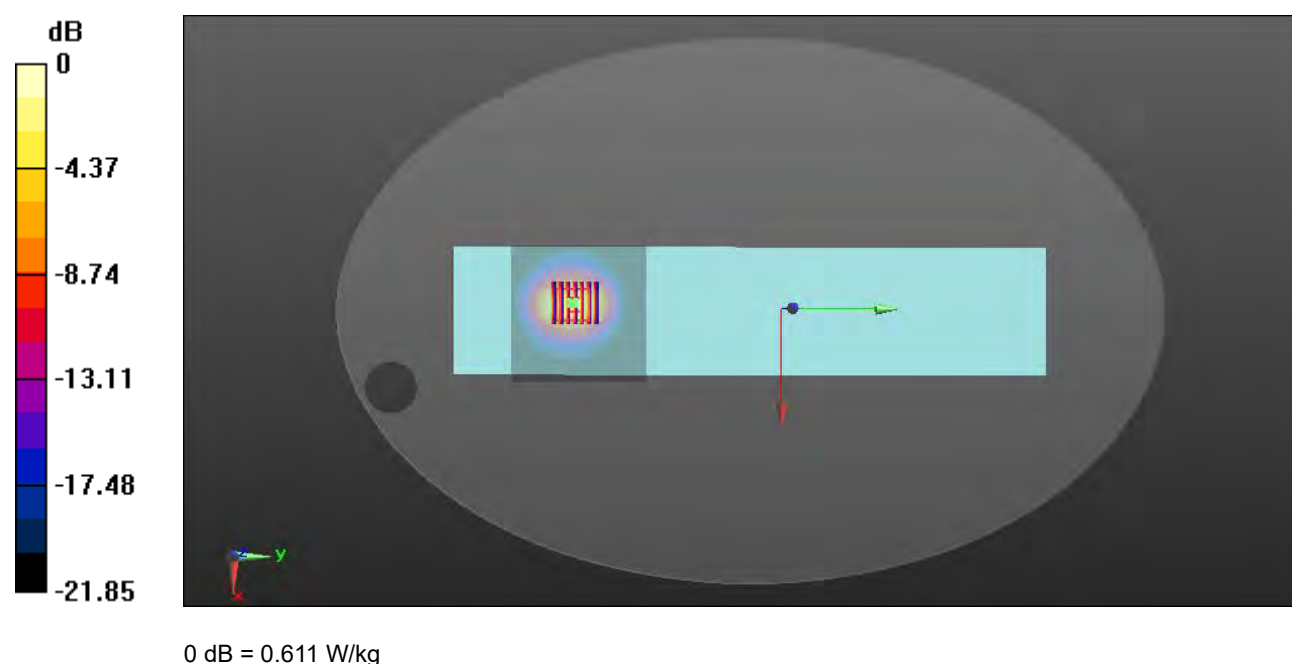
Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 0.9470 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.822 W/kg

SAR(1 g) = 0.411 W/kg; SAR(10 g) = 0.198 W/kg

Maximum value of SAR (measured) = 0.611 W/kg



Meas.4 Body Plane with Open-0° 5mm on 11 Channel in IEEE802.11b mode with Antenna 0

Date: 2023.08.14

Communication System Band: WLAN(b); Frequency: 2462 MHz; Duty Cycle: 1:1.005

Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.811$ S/m; $\epsilon_r = 39.434$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.3°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(7.78, 7.78, 7.78); Calibrated: 2023.01.19;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch11/Area Scan (81x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.416 W/kg

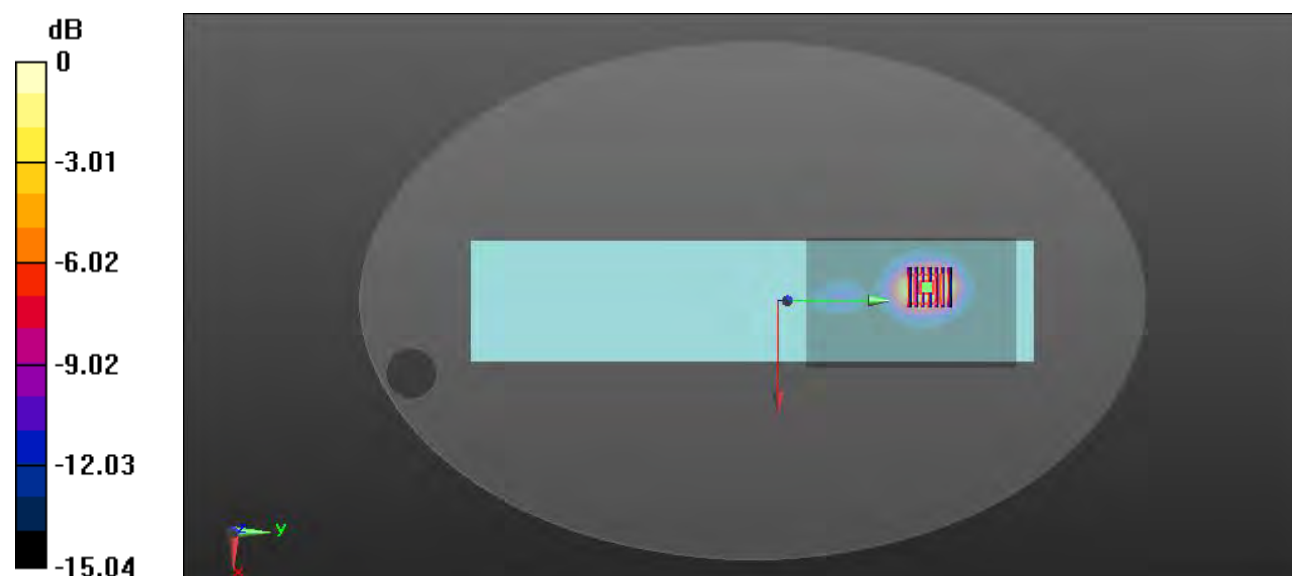
Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.242 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.751 W/kg

SAR(1 g) = 0.359 W/kg; SAR(10 g) = 0.171 W/kg

Maximum value of SAR (measured) = 0.406 W/kg



0 dB = 0.406 W/kg

Meas.5 Body Plane with Close-0° 5mm on 42 Channel in IEEE802.11ac80 mode with Antenna 1

Date: 2023.08.15

Communication System Band: WLAN(ac)80; Frequency: 5210 MHz; Duty Cycle: 1:1.085

Medium parameters used (interpolated): $f = 5210$ MHz; $\sigma = 4.628$ S/m; $\epsilon_r = 36.41$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(5.67, 5.67, 5.67); Calibrated: 2023.01.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch42/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.450 W/kg

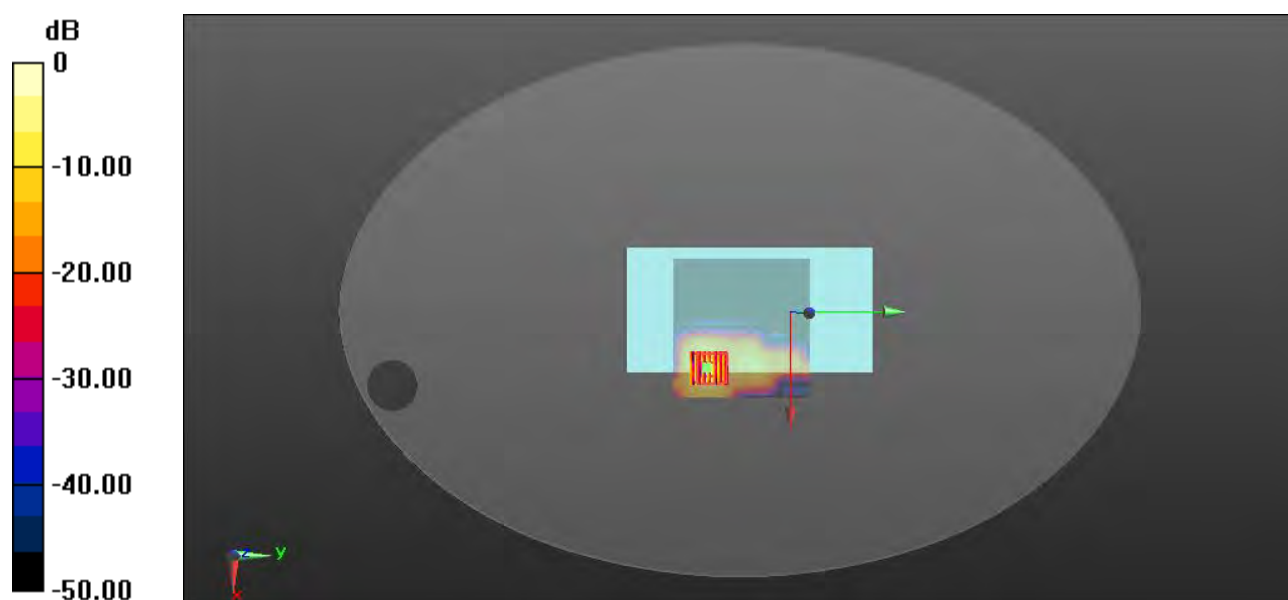
Ch42/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0.7620 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.50 W/kg

SAR(1 g) = 0.374 W/kg; SAR(10 g) = 0.108 W/kg

Maximum value of SAR (measured) = 0.750 W/kg



0 dB = 0.750 W/kg

Meas.6 Body Plane with Close-0° 5mm on 42 Channel in IEEE802.11ac80 mode with Antenna 0

Date: 2023.08.15

Communication System Band: WLAN(ac)80; Frequency: 5210 MHz; Duty Cycle: 1:1.085

Medium parameters used (interpolated): $f = 5210$ MHz; $\sigma = 4.628$ S/m; $\epsilon_r = 36.41$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(5.67, 5.67, 5.67); Calibrated: 2023.01.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch42/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.202 W/kg

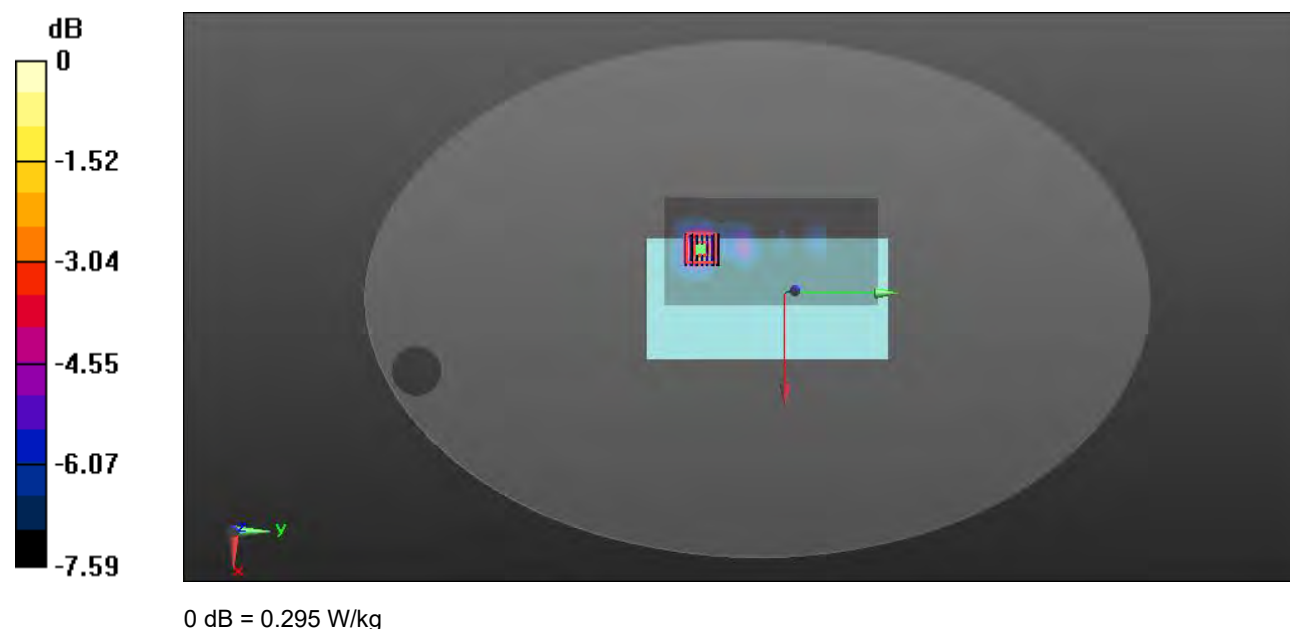
Ch42/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0.8300 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.554 W/kg

SAR(1 g) = 0.141 W/kg; SAR(10 g) = 0.043 W/kg

Maximum value of SAR (measured) = 0.295 W/kg



Meas.7 Body Plane with Close-0° 5mm on 149 Channel in IEEE802.11a mode with Antenna 1

Date: 2023.08.16

Communication System Band: WLAN(a); Frequency: 5745 MHz; Duty Cycle: 1:1.02

Medium parameters used (interpolated): $f = 5745$ MHz; $\sigma = 5.211$ S/m; $\epsilon_r = 35.726$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(4.83, 4.83, 4.83); Calibrated: 2023.01.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch149/Area Scan (101x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.01 W/kg

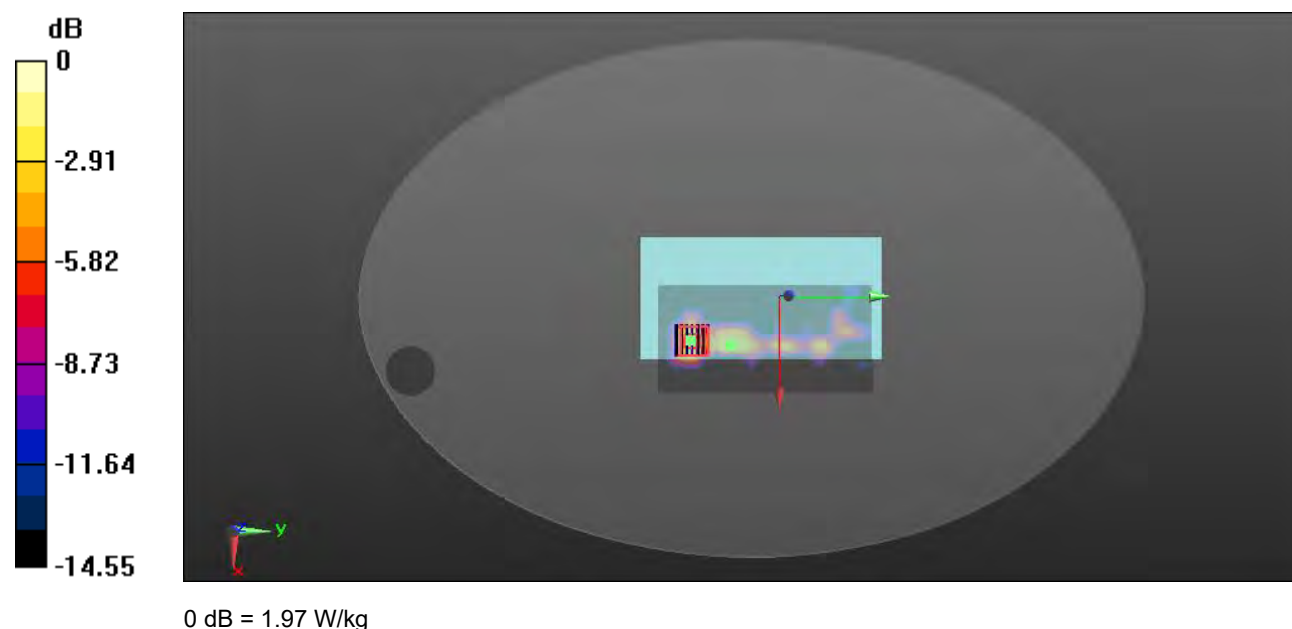
Ch149/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 4.21 W/kg

SAR(1 g) = 0.924 W/kg; SAR(10 g) = 0.246 W/kg

Maximum value of SAR (measured) = 1.97 W/kg



Meas.8 Body Plane with Close-0° 5mm on 149 Channel in IEEE802.11a mode with Antenna 0

Date: 2023.08.16

Communication System Band: WLAN(a); Frequency: 5745 MHz; Duty Cycle: 1:1.02

Medium parameters used (interpolated): $f = 5745$ MHz; $\sigma = 5.211$ S/m; $\epsilon_r = 35.726$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(4.83, 4.83, 4.83); Calibrated: 2023.01.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch149/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.182 W/kg

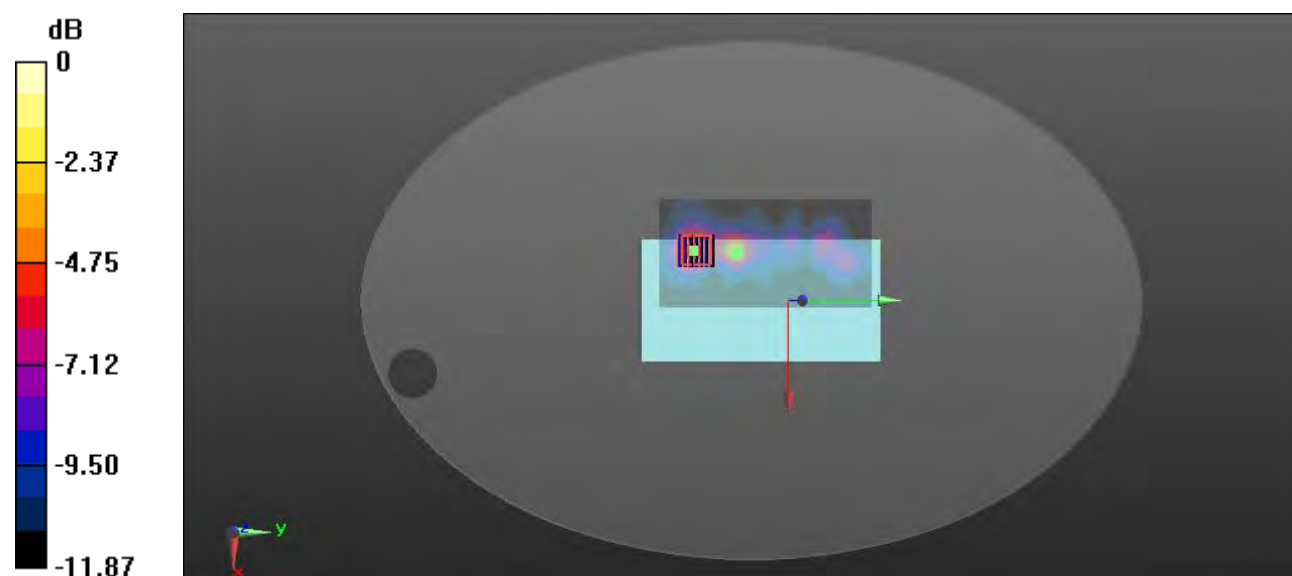
Ch149/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 0.928 W/kg

SAR(1 g) = 0.129 W/kg; SAR(10 g) = 0.036 W/kg

Maximum value of SAR (measured) = 0.271 W/kg



0 dB = 0.271 W/kg

Meas.9 Body Plane with Open-0° 5mm on 42 Channel in IEEE802.11ac80 mode with Antenna 1

Date: 2023.08.15

Communication System Band: WLAN(ac)80; Frequency: 5210 MHz; Duty Cycle: 1:1.085

Medium parameters used (interpolated): $f = 5210$ MHz; $\sigma = 4.628$ S/m; $\epsilon_r = 36.41$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(5.67, 5.67, 5.67); Calibrated: 2023.01.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch42/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.307 W/kg

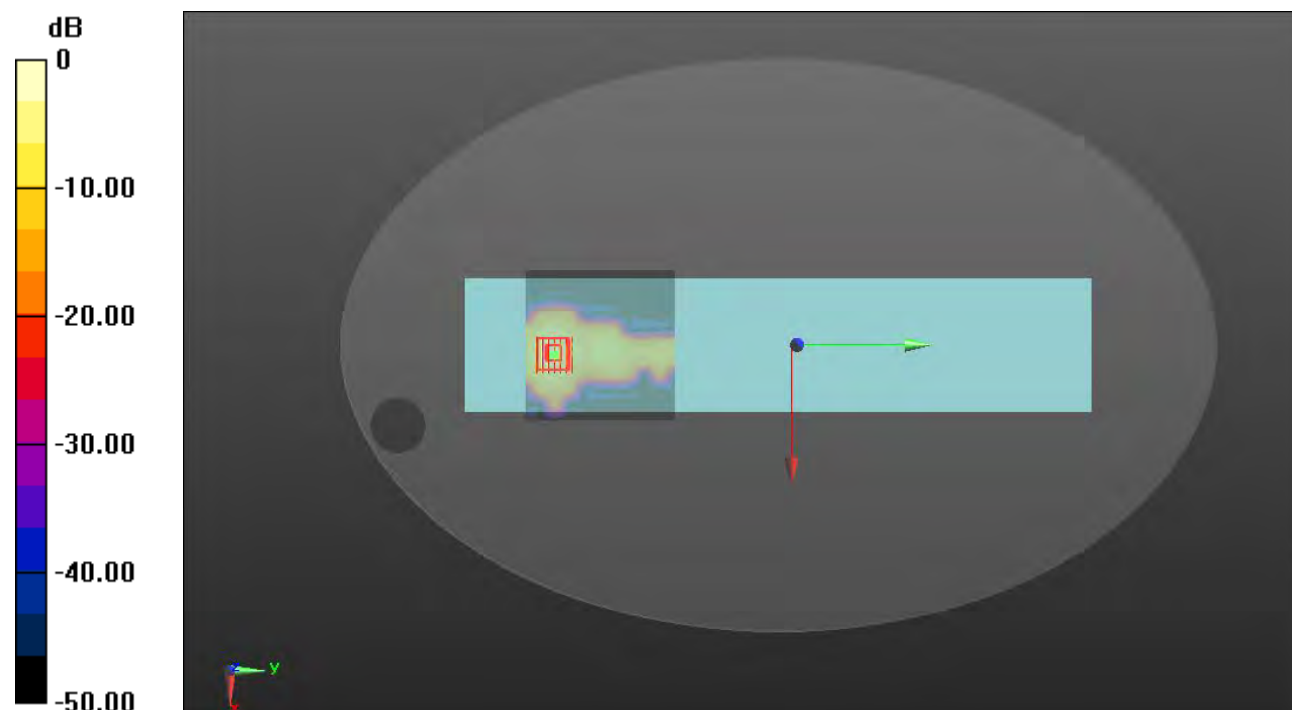
Ch42/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.993 W/kg

SAR(1 g) = 0.271 W/kg; SAR(10 g) = 0.086 W/kg

Maximum value of SAR (measured) = 0.531 W/kg



0 dB = 0.531 W/kg

Meas.10 Body Plane with Open-0° 5mm on 42 Channel in IEEE802.11ac80 mode with Antenna 0

Date: 2023.08.15

Communication System Band: WLAN(ac)80; Frequency: 5210 MHz; Duty Cycle: 1:1.085

Medium parameters used (interpolated): $f = 5210$ MHz; $\sigma = 4.628$ S/m; $\epsilon_r = 36.41$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(5.67, 5.67, 5.67); Calibrated: 2023.01.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch42/Area Scan (101x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.179 W/kg

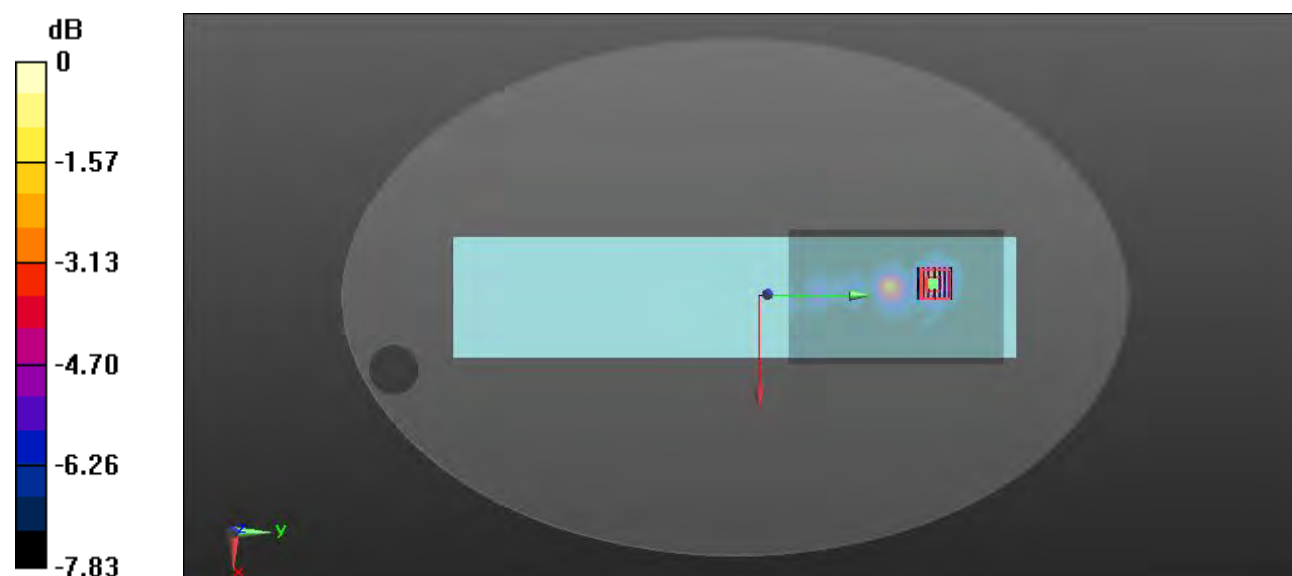
Ch42/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.216 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.616 W/kg

SAR(1 g) = 0.148 W/kg; SAR(10 g) = 0.040 W/kg

Maximum value of SAR (measured) = 0.312 W/kg



0 dB = 0.312 W/kg

Meas.11 Body Plane with Open-0° 5mm on 149 Channel in IEEE802.11a mode with Antenna 1

Date: 2023.08.16

Communication System Band: WLAN(a); Frequency: 5745 MHz; Duty Cycle: 1:1.02

Medium parameters used (interpolated): $f = 5745$ MHz; $\sigma = 5.211$ S/m; $\epsilon_r = 35.726$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(4.83, 4.83, 4.83); Calibrated: 2023.01.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1454; Calibrated: 2023.03.20
- Phantom: ELI v4.0 (30deg probe tilt); Type: QDOVA001BB; Serial: TP:1012
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch149/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.760 W/kg

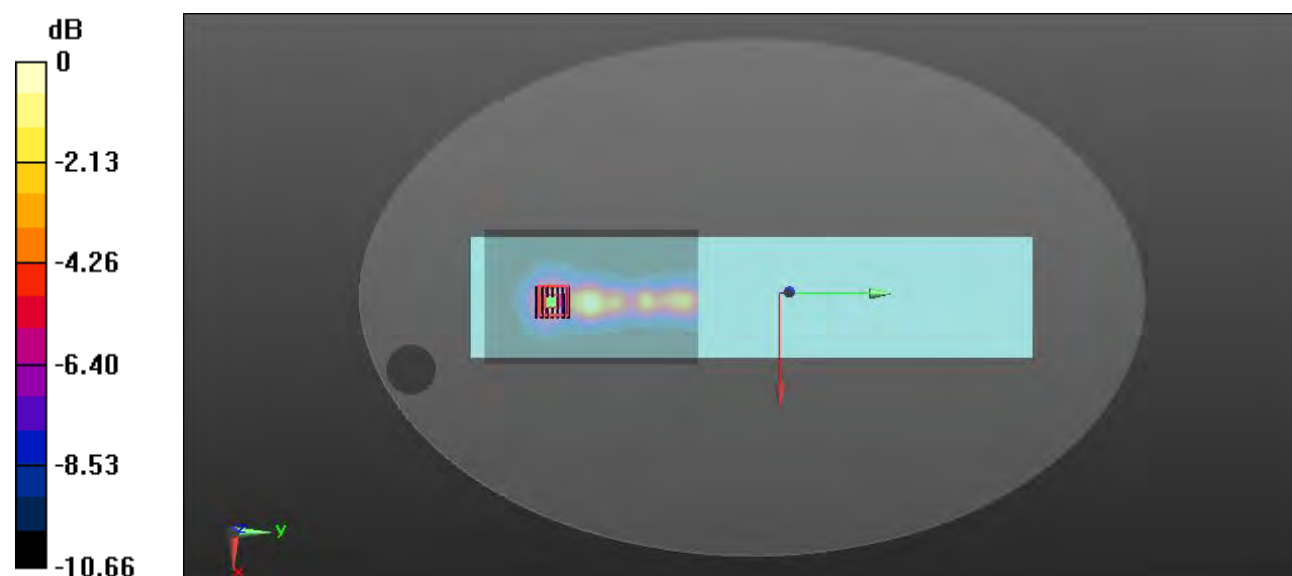
Ch149/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0.6270 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 3.18 W/kg

SAR(1 g) = 0.751 W/kg; SAR(10 g) = 0.229 W/kg

Maximum value of SAR (measured) = 1.50 W/kg



0 dB = 1.50 W/kg