中认信通
CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)

ACCREDITED
TESTING LABORATORY
CERTIFICATE # 6356.01

SAR TEST REPORT

Applicant: **QINGDAO HAINERGY TECHNOLOGY CORP.,LIMITED**

Address: Room 309 (A), Baotai Office Building, No. 45 Beijing Road, Bonded Port Area, Qingdao, SHANDONG, China

FCC ID: **2BDQO-HNBMD14H**

Product Name: **Personal Computer**

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

The above device has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: **2403T78885E-20**

Date Of Issue: **2024/06/17**

Reviewed By: **Ken Zong** Ken Zong

Title: SAR Engineer

Approved By: **Karl Gong** Karl Gong

Title: SAR Engineer

Test Laboratory: **China Certification ICT Co., Ltd (Dongguan)**

No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China
Tel: +86-769-82016888

SAR TEST RESULTS SUMMARY

Operation Frequency Bands	Highest Reported 1g SAR (W/kg)	Limits (W/kg)
	Body-Supported (0mm)	
WLAN 2.4G Chain 0	0.64	**1.6**
WLAN 2.4G Chain 1	0.41	
WLAN 5.2G Chain 0	0.32	
WLAN 5.2G Chain 1	0.22	
WLAN 5.3G Chain 0	0.30	
WLAN 5.3G Chain 1	0.23	
WLAN 5.6G Chain 0	0.42	
WLAN 5.6G Chain 1	0.46	
WLAN 5.8G Chain 0	0.24	
WLAN 5.8G Chain 1	0.31	
Bluetooth	0.14	
Maximum Simultaneous Transmission SAR		
Items	**Body-Supported (0mm)**	**Limits**
Sum SAR(W/kg)	**1.05**	**1.6**
SPLSR	N/A	**0.04**
EUT Received Date:	2024/05/30	
Tested Date:	2024/06/08	
Tested Result:	Pass	

Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2403T78885E-20	Original Report	2024/06/17

1. GENERAL INFORMATION

1.1 Product Description for Device under Test (EUT)

EUT Name:	Personal Computer
EUT Model:	HNBMD14HAWREG
Trade Name:	Ceibal
Device Type:	Portable
Exposure Category:	Population / Uncontrolled
Antenna Type(s):	Internal Antenna
Body-Worn Accessories:	None
Proximity Sensor:	None
Operation modes:	WLAN and Bluetooth
Frequency Band:	WLAN 2.4G: 2412 MHz-2462 MHz/2422-2452 MHz WLAN 5.2G: 5150 MHz-5250 MHz WLAN 5.3G: 5250 MHz-5350 MHz WLAN 5.6G: 5470 MHz-5725 MHz WLAN 5.8G: 5725 MHz-5850 MHz Bluetooth: 2402 MHz-2480 MHz
Conducted RF Power:	WLAN 2.4G: 14.6 dBm WLAN 5.2G: 13.32 dBm WLAN 5.3G: 12.68 dBm WLAN 5.6G: 13.7 dBm WLAN 5.8G: 11.58 dBm Bluetooth(BDR/EDR): 9.76 dBm BLE: 5.36 dBm
Dimensions (L*W*H):	280 mm (L) * 200 mm (W) * 18 mm (H)
Rated Input Voltage:	DC 11.4V from Rechargeable Battery
Serial Number:	2MBQ-1
Normal Operation:	Body Supported

1.2 Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE 1528-2013, the following FCC Published RF exposure KDB procedures:

KDB 447498 D01 General RF Exposure Guidance v06
KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02 RF Exposure Reporting v01r02
KDB 616217 D04 SAR for laptop and tablets v01r02
KDB 248227 D01 802 11 Wi-Fi SAR v02r02

TCB Workshop October 2016: RF Exposure Procedures
TCB Workshop April 2019: RF Exposure Procedures

1.3 SAR Limits

FCC Limit

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1 g of tissue)	**1.60**	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

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

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

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

1.4 FACILITIES

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The test sites and measurement facilities used to collect data are located at:

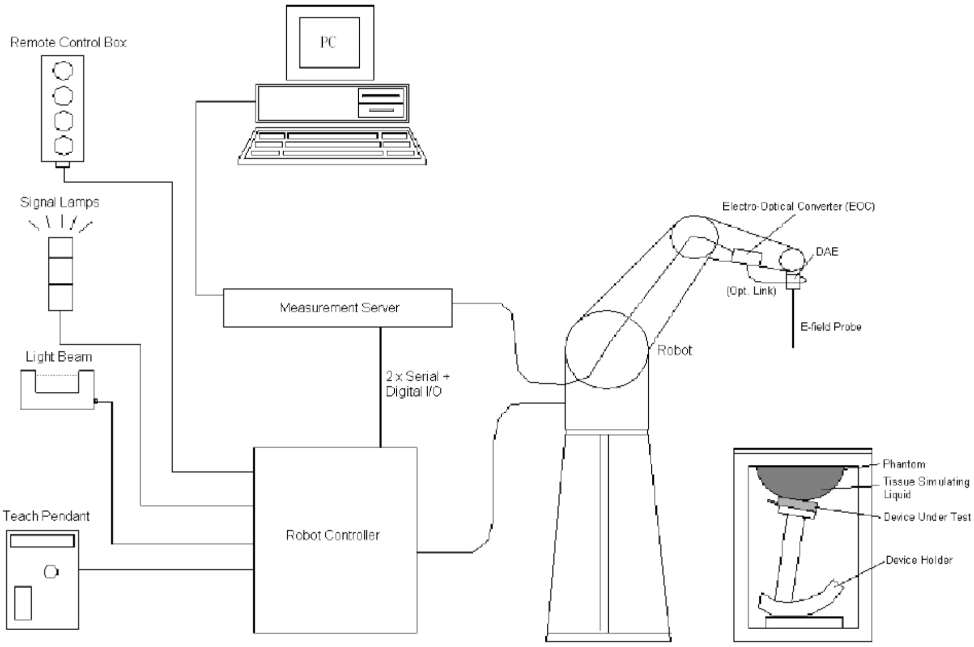
☒ SAR Lab 1	☐ SAR Lab 2

2. SAR MEASUREMENT SYSTEM

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

DASY5 System Description

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal application, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win7 professional operating system and the DASY52 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

DASY5 Measurement Server

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

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

Data Acquisition Electronics

The data acquisition electronics (DAE4) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

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

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

EX3DV4 E-Field Probes

Frequency	4 MHz - 10 GHz Linearity: ± 0.2 dB (30 MHz to 10 GHz)
Directivity	± 0.1 dB in TSL (rotation around probe axis) ± 0.3 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 μW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52, DASY6, DASY8 SAR, EASY6, EASY4/MRI

Calibration Frequency Points for EX3DV4 E-Field Probes SN: 7329 Calibrated: 2024/3/27

Calibration Frequency Point(MHz)	Frequency Range(MHz)		Conversion Factor		
	From	To	X	Y	Z
750 Head	650	810	8.79	10.07	9.05
900 Head	810	1000	8.42	9.50	8.93
1750 Head	1650	1810	7.56	8.56	7.71
1900 Head	1810	2000	7.37	8.32	7.54
2300 Head	2200	2399	7.21	8.13	7.41
2450 Head	2399	2500	7.05	7.92	7.22
2600 Head	2500	2700	6.91	7.77	7.08
5250 Head	5140	5360	4.96	5.61	5.16
5600 Head	5490	5675	4.38	4.98	4.56
5750 Head	5675	5860	4.54	5.16	4.70

SAM Twin Phantom

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

_ Left Head
_ Right Head
_ Flat phantom

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

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

Robots

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

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

The above mentioned robots are controlled by the Staubli CS8c robot controllers. All information regarding the use and maintenance of the robot arm and the robot controller is contained on the CDs delivered along with the robot. Paper manuals are available upon request direct from Staubli.

SAR Scan Procedures

Step 1: 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. The minimum distance of probe sensors to surface is 1.4 mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a 15mm 2 step integral, with 1.5mm interpolation used to locate the peak SAR area used for zoom scan assessments.

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

Area Scan Parameters extracted from 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 mm ± 1 mm	½·δ·ln(2) mm ± 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.	

Step 3: Zoom Scan (Cube Scan Averaging)

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

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

<table>
<tr><th colspan="3"></th><th>$\leq$ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>$\leq$ 2 GHz: $\leq$ 8 mm
2 – 3 GHz: $\leq$ 5 mm*</td><td>3 – 4 GHz: $\leq$ 5 mm*
4 – 6 GHz: $\leq$ 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>$\leq$ 5 mm</td><td>3 – 4 GHz: $\leq$ 4 mm
4 – 5 GHz: $\leq$ 3 mm
5 – 6 GHz: $\leq$ 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>$\leq$ 4 mm</td><td>3 – 4 GHz: $\leq$ 3 mm
4 – 5 GHz: $\leq$ 2.5 mm
5 – 6 GHz: $\leq$ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$ mm</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>$\geq$ 30 mm</td><td>3 – 4 GHz: $\geq$ 28 mm
4 – 5 GHz: $\geq$ 25 mm
5 – 6 GHz: $\geq$ 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 IEEE Std 1528-2013 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 Publication 447498 is $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 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>

Step 4: Power Drift Measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

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

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

Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE 1528-2013

Recommended Tissue Dielectric Parameters for Head liquid

Table 3—Target dielectric properties of head tissue-equivalent material in the 300 MHz to 6000 MHz frequency range

Frequency (MHz)	Relative permittivity (ε'_r)	Conductivity (σ) (S/m)
300	45.3	0.87
450	43.5	0.87
750	*41.9*	*0.89*
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
1500	*40.4*	*1.23*
1640	*40.2*	*1.31*
1750	*40.1*	*1.37*
1800	40.0	1.40
1900	40.0	1.40
2000	40.0	1.40
2100	*39.8*	*1.49*
2300	*39.5*	*1.67*
2450	39.2	1.80
2600	*39.0*	*1.96*
3000	38.5	2.40
3500	*37.9*	*2.91*
4000	*37.4*	*3.43*
4500	*36.8*	*3.94*
5000	*36.2*	*4.45*
5200	*36.0*	*4.66*
5400	*35.8*	*4.86*
5600	*35.5*	*5.07*
5800	35.3	5.27
6000	*35.1*	*5.48*

NOTE—For convenience, permittivity and conductivity values at some frequencies that are not part of the original data from Drossos et al. [B60] or the extension to 5800 MHz are provided (i.e., the values shown in italics). These values were linearly interpolated between the values in this table that are immediately above and below these values, except the values at 6000 MHz that were linearly extrapolated from the values at 3000 MHz and 5800 MHz.

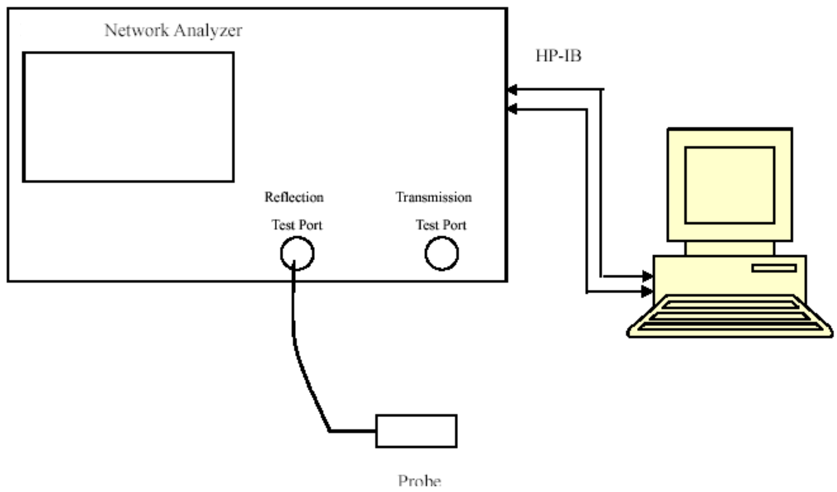
3. EQUIPMENT LIST AND CALIBRATION

3.1 Equipments List & Calibration Information

Equipment	Model	S/N	Calibration Date	Calibration Due Date
DASY5 Test Software	DASY52.10	N/A	NCR	NCR
DASY5 Measurement Server	DASY5 4.5.12	1567	NCR	NCR
Data Acquisition Electronics	DAE4	1354	2023/11/17	2024/11/16
E-Field Probe	EX3DV4	7329	2024/3/27	2025/3/26
Mounting Device	MD4HHTV5	BJPCTC0152	NCR	NCR
Twin SAM	Twin SAM V5.0	1412	NCR	NCR
Dipole, 2450 MHz	D2450V2	1102	2023/3/27	2026/3/26
Dipole,5GHz	D5GHzV2	1245	2023/8/23	2026/8/22
Simulated Tissue Liquid Head(500-9500 MHz)	HBBL600-10000V6	230728-1	Each Time	/
Network Analyzer	8753B	2828A00170	2023/10/17	2024/11/16
Dielectric assessment kit	1319	SM DAK 040 CA	NCR	NCR
MXG Vector Signal Generator	N5182B	MY51350144	2024/4/1	2025/3/31
Power Meter	ML2495A	1106009	2023/8/4	2024/8/3
Pulse Power Sensor	MA2411A	10780	2023/8/4	2024/8/3
Power Amplifier	ZVE-6W-83+	637202210	NCR	NCR
Directional Coupler	441493	520Z	NCR	NCR
Attenuator	20dB, 100W	LN749	NCR	NCR
Attenuator	6dB, 150W	2754	NCR	NCR
Thermohygrometer	HTC-1	N/A	2024/4/1	2025/3/31
Thermometer	DTM3000	3892	2024/4/1	2025/3/31
Spectrum Analyzer	FSU26	100147	2024/4/1	2025/3/31

4. SAR MEASUREMENT SYSTEM VERIFICATION

4.1 Liquid Verification



Liquid Verification Setup Block Diagram

Liquid Verification Results

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ	
2400	Simulated Tissue Liquid Head	39.988	1.731	39.3	1.76	1.75	-1.65	±5
2410	Simulated Tissue Liquid Head	39.763	1.749	39.28	1.77	1.23	-1.19	±5
2420	Simulated Tissue Liquid Head	39.631	1.752	39.26	1.77	0.94	-1.02	±5
2430	Simulated Tissue Liquid Head	39.489	1.763	39.24	1.78	0.63	-0.96	±5
2440	Simulated Tissue Liquid Head	39.244	1.775	39.22	1.79	0.06	-0.84	±5
2450	Simulated Tissue Liquid Head	39.085	1.782	39.2	1.8	-0.29	-1	±5
2460	Simulated Tissue Liquid Head	38.968	1.798	39.19	1.81	-0.57	-0.66	±5
2470	Simulated Tissue Liquid Head	38.865	1.814	39.17	1.82	-0.78	-0.33	±5
2480	Simulated Tissue Liquid Head	38.758	1.844	39.16	1.83	-1.03	0.77	±5

**Liquid Verification above was performed on 2024/06/08.*

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ	
5180	Simulated Tissue Liquid Head	37.371	4.547	36.02	4.64	3.75	-2	±5
5190	Simulated Tissue Liquid Head	37.215	4.498	36.01	4.65	3.35	-3.27	±5
5200	Simulated Tissue Liquid Head	37.139	4.52	36	4.66	3.16	-3	±5
5210	Simulated Tissue Liquid Head	37.021	4.557	35.99	4.67	2.86	-2.42	±5
5220	Simulated Tissue Liquid Head	36.916	4.572	35.98	4.68	2.6	-2.31	±5
5230	Simulated Tissue Liquid Head	36.874	4.702	35.97	4.69	2.51	0.26	±5
5240	Simulated Tissue Liquid Head	36.752	4.733	35.96	4.7	2.2	0.7	±5
5250	Simulated Tissue Liquid Head	36.626	4.606	35.95	4.71	1.88	-2.21	±5
5260	Simulated Tissue Liquid Head	36.529	4.641	35.94	4.72	1.64	-1.67	±5
5270	Simulated Tissue Liquid Head	36.471	4.657	35.93	4.73	1.51	-1.54	±5
5280	Simulated Tissue Liquid Head	36.346	4.754	35.92	4.74	1.19	0.3	±5
5290	Simulated Tissue Liquid Head	36.258	4.689	35.91	4.75	0.97	-1.28	±5
5300	Simulated Tissue Liquid Head	36.142	4.704	35.9	4.76	0.67	-1.18	±5
5310	Simulated Tissue Liquid Head	36.073	4.807	35.89	4.77	0.51	0.78	±5
5320	Simulated Tissue Liquid Head	35.927	4.765	35.88	4.78	0.13	-0.31	±5

**Liquid Verification above was performed on 2024/06/08.*

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ	
5500	Simulated Tissue Liquid Head	36.713	4.909	35.65	4.97	2.98	-1.23	±5
5510	Simulated Tissue Liquid Head	36.634	4.913	35.64	4.98	2.79	-1.35	±5
5520	Simulated Tissue Liquid Head	36.535	4.947	35.62	4.99	2.57	-0.86	±5
5530	Simulated Tissue Liquid Head	36.512	4.956	35.61	5	2.53	-0.88	±5
5540	Simulated Tissue Liquid Head	36.401	4.966	35.59	5.01	2.28	-0.88	±5
5550	Simulated Tissue Liquid Head	36.346	4.976	35.58	5.02	2.15	-0.88	±5
5560	Simulated Tissue Liquid Head	36.223	5.014	35.56	5.03	1.86	-0.32	±5
5570	Simulated Tissue Liquid Head	36.095	5.047	35.55	5.04	1.53	0.14	±5
5580	Simulated Tissue Liquid Head	35.976	5.058	35.53	5.05	1.26	0.16	±5
5590	Simulated Tissue Liquid Head	35.817	5.065	35.52	5.06	0.84	0.1	±5
5600	Simulated Tissue Liquid Head	35.694	5.074	35.5	5.07	0.55	0.08	±5
5610	Simulated Tissue Liquid Head	35.525	5.083	35.49	5.08	0.1	0.06	±5

**Liquid Verification above was performed on 2024/06/08.*

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	Ơ (S/m)	ε_r	Ơ (S/m)	$\Delta\varepsilon_r$	ΔƠ	
5640	Simulated Tissue Liquid Head	36.074	5.104	35.46	5.11	1.73	-0.12	±5
5650	Simulated Tissue Liquid Head	35.893	5.107	35.45	5.12	1.25	-0.25	±5
5660	Simulated Tissue Liquid Head	35.757	5.171	35.44	5.13	0.89	0.8	±5
5670	Simulated Tissue Liquid Head	35.541	5.173	35.43	5.14	0.31	0.64	±5
5680	Simulated Tissue Liquid Head	35.473	5.186	35.42	5.15	0.15	0.7	±5
5690	Simulated Tissue Liquid Head	35.436	5.202	35.41	5.16	0.07	0.81	±5
5700	Simulated Tissue Liquid Head	35.362	5.203	35.4	5.17	-0.11	0.64	±5
5710	Simulated Tissue Liquid Head	35.261	5.216	35.39	5.18	-0.36	0.69	±5
5720	Simulated Tissue Liquid Head	35.148	5.235	35.38	5.19	-0.66	0.87	±5
5730	Simulated Tissue Liquid Head	35.055	5.279	35.37	5.2	-0.89	1.52	±5
5740	Simulated Tissue Liquid Head	34.987	5.291	35.36	5.21	-1.05	1.55	±5
5750	Simulated Tissue Liquid Head	34.874	5.292	35.35	5.22	-1.35	1.38	±5
5760	Simulated Tissue Liquid Head	34.789	5.311	35.34	5.23	-1.56	1.55	±5
5770	Simulated Tissue Liquid Head	34.686	5.319	35.33	5.24	-1.82	1.51	±5
5780	Simulated Tissue Liquid Head	34.541	5.327	35.32	5.25	-2.21	1.47	±5
5790	Simulated Tissue Liquid Head	34.487	5.332	35.31	5.26	-2.33	1.37	±5
5800	Simulated Tissue Liquid Head	34.423	5.358	35.3	5.27	-2.48	1.67	±5
5810	Simulated Tissue Liquid Head	34.404	5.382	35.29	5.28	-2.51	1.93	±5
5820	Simulated Tissue Liquid Head	34.308	5.397	35.28	5.29	-2.76	2.02	±5
5830	Simulated Tissue Liquid Head	34.108	5.483	35.27	5.3	-3.29	3.45	±5

**Liquid Verification above was performed on 2024/06/08.*

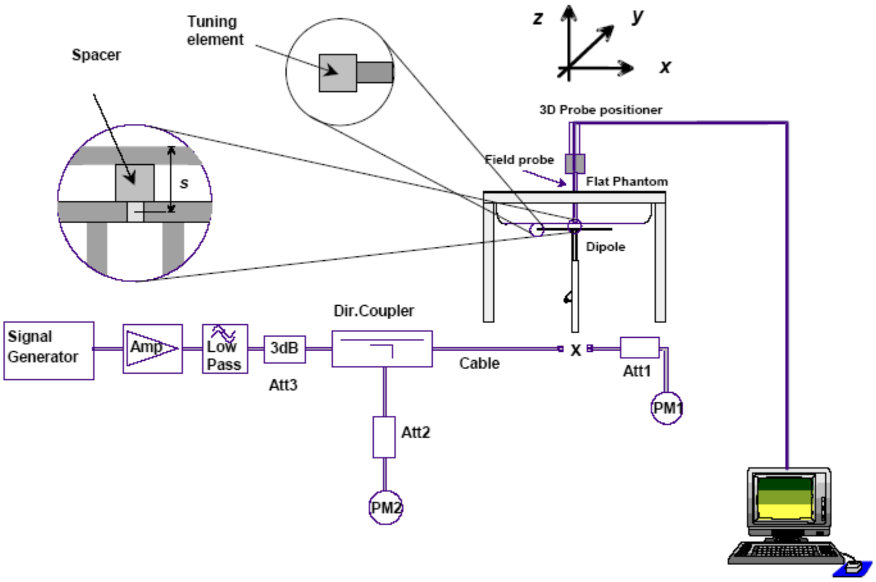
4.2 System Accuracy Verification

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

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

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

System Verification Setup Block Diagram



System Accuracy Check Results

Date	Frequency Band	Liquid Type	Input Power (mW)	Measured SAR (W/kg)		Normalized to 1W (W/kg)	Target Value (W/kg)	Delta (%)	Tolerance (%)
2024/06/08	2450	Simulated Tissue Liquid Head	100	1g	5.42	54.2	50.9	6.48	±10
2024/06/08	5250	Simulated Tissue Liquid Head	100	1g	7.94	79.4	78	1.79	±10
2024/06/08	5600	Simulated Tissue Liquid Head	100	1g	8.56	85.6	81	5.68	±10
2024/06/08	5750	Simulated Tissue Liquid Head	100	1g	8.12	81.2	77.8	4.37	±10

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

4.3 SAR SYSTEM VALIDATION DATA

System Performance 2450MHz Head was performed on 2024/06/08

DUT: D2450V2; Type: 2450 MHz; Serial: 1102

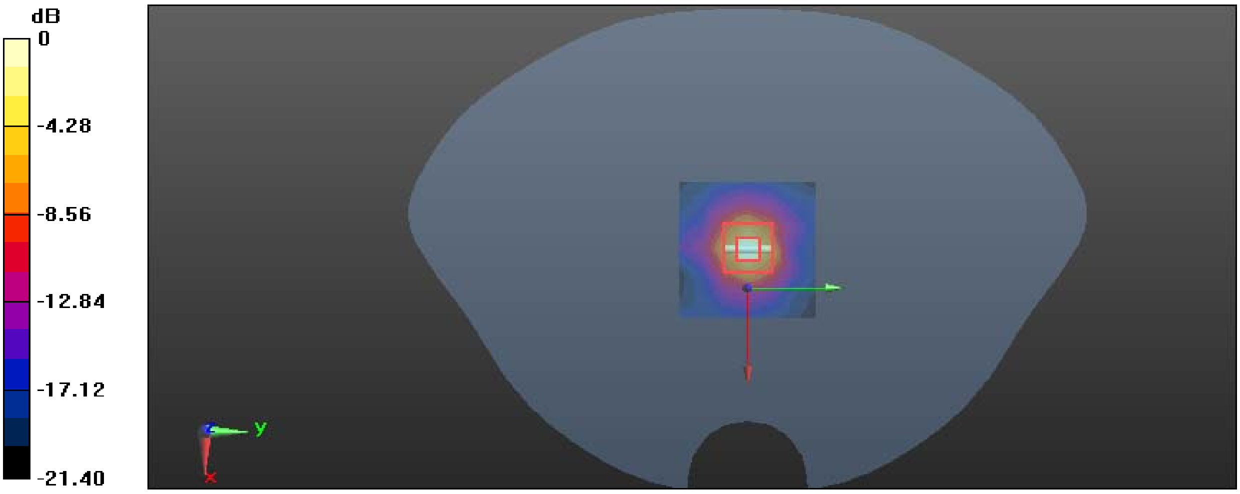
Communication System: CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.782 S/m; ε_r = 39.085; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.05, 7.92, 7.22) @2450 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Head 2450MHz Pin=100mW/ Area Scan (6x7x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 5.42 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.13 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 11.7 W/kg
SAR(1 g) = 5.42 W/kg; SAR(10 g) = 2.46 W/kg
Maximum value of SAR (measured) = 6.20 W/kg



0 dB = 6.20 W/kg = 7.92 dBW/kg

System Performance 5250 MHz Head was performed on 2024/06/08

DUT: D5GHzV2; Type: 5250 MHz; Serial: 1245

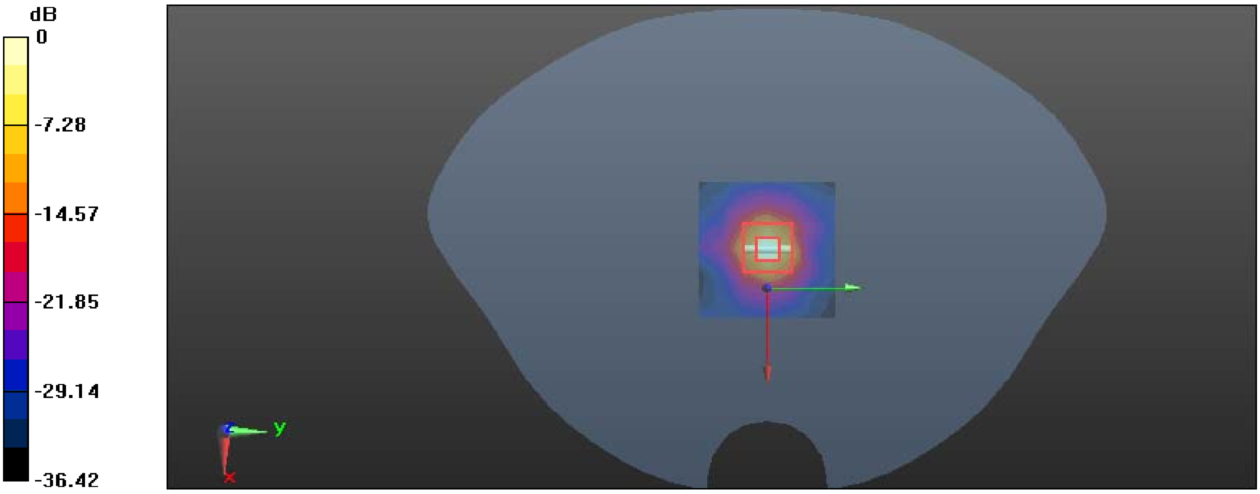
Communication System: CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5250 MHz; σ = 4.606 S/m; ε_r = 36.626; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.96, 5.61, 5.16) @ 5250 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Head 5250MHz Pin=100mW/Area Scan (7x9x1): Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (measured) = 20.6 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 44.557 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 33.7 W/kg
SAR(1 g) = 7.94 W/kg; SAR(10 g) = 2.25 W/kg
Maximum value of SAR (measured) = 20.1 W/kg



0 dB = 20.1 W/kg = 13.03 dBW/kg

System Performance 5600 MHz Head was performed on 2024/06/08

DUT: D5GHzV2; Type: 5600 MHz; Serial: 1245

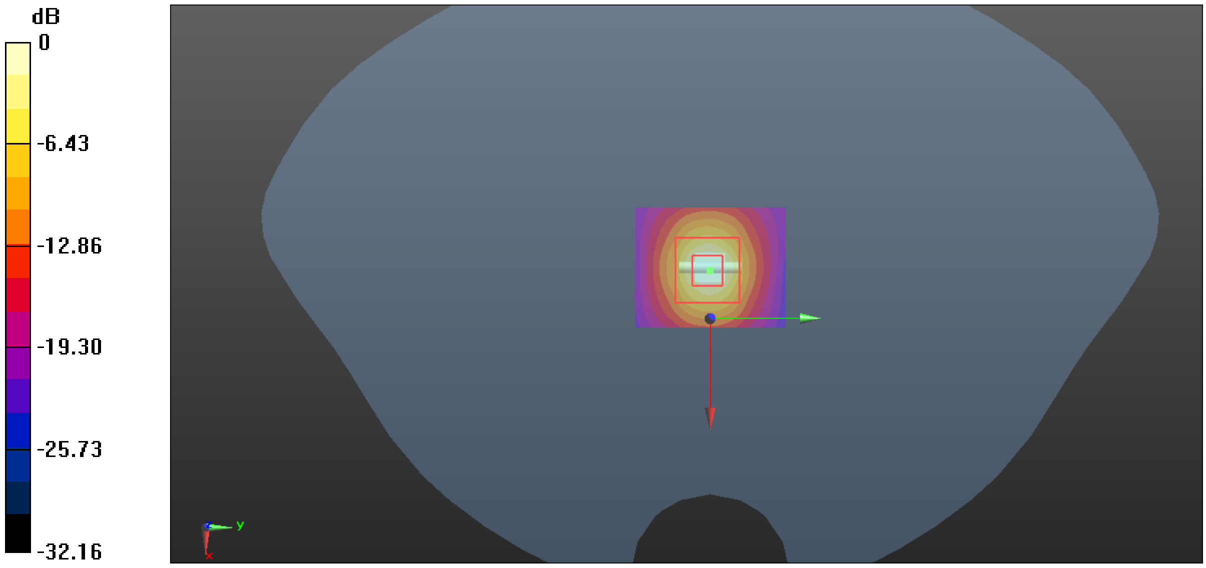
Communication System: CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.074 S/m; ε_r = 35.694; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.38, 4.98, 4.56) @ 5600 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Head 5600MHz Pin=100mW/Area Scan (7x9x1): Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (measured) = 22.3 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 43.14 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 40.5 W/kg
SAR(1 g) = 8.56 W/kg; SAR(10 g) = 2.42 W/kg
Maximum value of SAR (measured) = 22.7 W/kg



0 dB = 22.7 W/kg = 13.56 dBW/kg

System Performance 5750 MHz Head was performed on 2024/06/08

DUT: D5GHzV2; Type: 5750 MHz; Serial: 1245

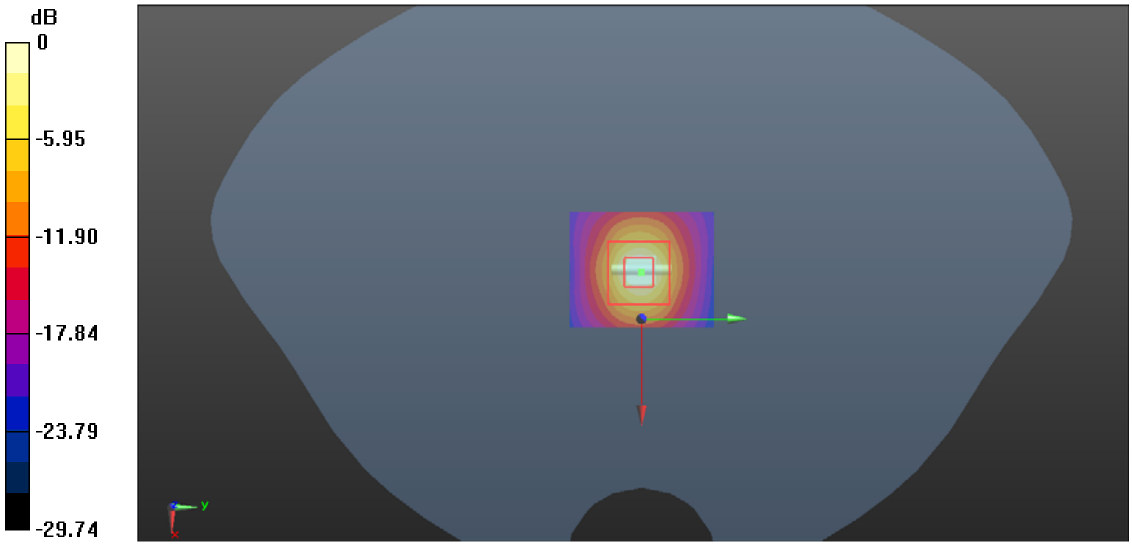
Communication System: CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5750 MHz; σ = 5.292 S/m; ε_r = 34.874; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.54, 5.16, 4.7) @ 5750 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Head 5750MHz Pin=100mW/Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 19.1 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 39.49 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 40.4 W/kg
SAR(1 g) = 8.12 W/kg; SAR(10 g) = 2.28 W/kg
Maximum value of SAR (measured) = 21.8 W/kg



0 dB = 21.8 W/kg = 13.38 dBW/kg

5. EUT TEST STRATEGY AND METHODOLOGY

5.1 Test positions for body-worn and other configurations

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

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

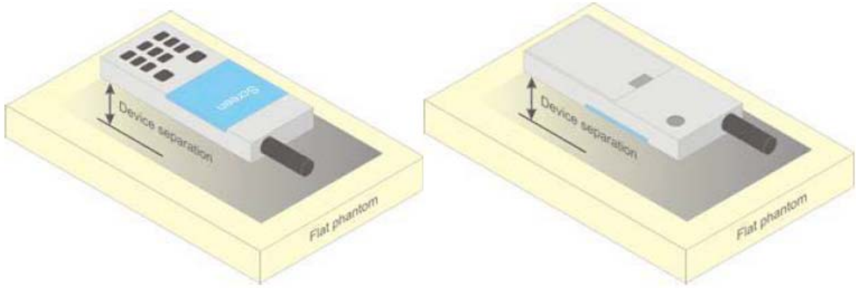


Figure 5 – Test positions for body-worn devices

5.2 Test Distance for SAR Evaluation

In this case the EUT(Equipment Under Test) is set 0mm away from the phantom, the test distance is 0mm.

5.3 SAR Evaluation Procedure

The evaluation was performed with the following procedure:

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

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

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

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

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

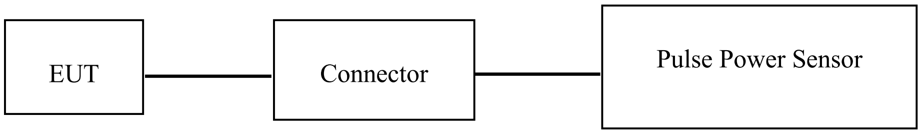
All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

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

6. CONDUCTED OUTPUT POWER MEASUREMENT

6.1 Test Procedure

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



BT/WLAN

6.2 Maximum Target Output Power

Max Target Power(dBm)			
Mode/Band	Channel		
	Low	Middle	High
WLAN 2.4G(802.11b) Chain 0	14.6	14.6	14.6
WLAN 2.4G(802.11g) Chain 0	14.3	14.3	14.3
WLAN 2.4G(802.11n ht20) Chain 0	12.2	12.2	12.2
WLAN 2.4G(802.11n ht40) Chain 0	11.8	11.8	11.8
WLAN 2.4G(802.11b) Chain 1	14.7	14.7	14.7
WLAN 2.4G(802.11g) Chain 1	14.6	14.6	14.6
WLAN 2.4G(802.11n ht20) Chain 1	12	12	12
WLAN 2.4G(802.11n ht40) Chain 1	11.9	11.9	11.9
WLAN 5.2G(802.11a) Chain 0	13.4	13.4	13.4
WLAN 5.2G(802.11n ht20) Chain 0	10.3	10.3	10.3
WLAN 5.2G(802.11n ht40) Chain 0	10.6	10.6	10.6
WLAN 5.2G(802.11ac 80) Chain 0	6.2	6.2	6.2
WLAN 5.2G(802.11a) Chain 1	13.3	13.3	13.3
WLAN 5.2G(802.11n ht20) Chain 1	10.3	10.3	10.3
WLAN 5.2G(802.11n ht40) Chain 1	10.5	10.5	10.5
WLAN 5.2G (802.11ac 80) Chain 1	6.1	6.1	6.1
WLAN 5.3G(802.11a) Chain 0	12.8	12.8	12.8
WLAN 5.3G(802.11n ht20) Chain 0	9.6	9.6	9.6
WLAN 5.3G(802.11n ht40) Chain 0	10.5	10.5	10.5
WLAN 5.3G (802.11ac 80) Chain 0	8.2	8.2	8.2
WLAN 5.3G(802.11a) Chain 1	12.6	12.6	12.6
WLAN 5.3G(802.11n ht20) Chain 1	9.4	9.4	9.4
WLAN 5.3G(802.11n ht40) Chain 1	10.3	10.3	10.3
WLAN 5.3G (802.11ac 80) Chain 1	7.9	7.9	7.9

Max Target Power(dBm)			
Mode/Band	Channel		
	Low	Middle	High
WLAN 5.6G(802.11a) Chain 0	13.7	13.7	13.7
WLAN 5.6G(802.11n ht20) Chain 0	11.5	11.5	11.5
WLAN 5.6G(802.11n ht40) Chain 0	10.8	12.8	12.8
WLAN 5.6G (802.11ac 80) Chain 0	8.0	8.0	8.0
WLAN 5.6G(802.11a) Chain 1	13.8	13.8	13.8
WLAN 5.6G(802.11n ht20) Chain 1	11.5	11.5	11.5
WLAN 5.6G(802.11n ht40) Chain 1	11.5	12.6	12.6
WLAN 5.6G (802.11ac 80) Chain 1	8.1	8.1	8.1
WLAN 5.8G(802.11a) Chain 0	11.7	11.7	11.7
WLAN 5.8G(802.11n ht20) Chain 0	8.4	8.4	8.4
WLAN 5.8G(802.11n ht40) Chain 0	8.5	8.5	8.5
WLAN 5.8G (802.11ac 80) Chain 0	6.8	6.8	6.8
WLAN 5.8G(802.11a) Chain 1	11.7	11.7	11.7
WLAN 5.8G(802.11n ht20) Chain 1	8.3	8.3	8.3
WLAN 5.8G(802.11n ht40) Chain 1	8.3	8.3	8.3
WLAN 5.8G (802.11ac80) Chain 1	7.0	7.0	7.0
Bluetooth BDR	8.0	10.0	10.0
Bluetooth EDR	7.5	7.5	7.5
BLE 1M	6.0	6.0	6.0
BLE 2M	6.0	6.0	6.0

6.3 Test Results:

WLAN 2.4G:

Mode	Channel frequency (MHz)	Duty cycle (%)	RF Average Output Power (dBm)		
			Chain 0	Chain 1	Total
802.11b	2412	98.12	14.16	**14.6**	/
	2437		14.45	14.36	/
	2462		**14.48**	14.43	/
802.11g	2412	97.54	13.74	14.48	/
	2437		14.16	14.03	/
	2462		14.02	14.3	/
802.11n ht20	2412	94.72	11.87	11.92	14.91
	2437		11.86	11.68	14.78
	2462		12.07	11.84	14.97
802.11n ht40	2422	95.17	11.11	11.23	14.18
	2437		11.63	11.72	14.69
	2452		11.39	11.24	14.33

Note: WLAN 2.4G Duty Cycle please refer to RF Report Number: 2403T78885E-RF-00C

Wi-Fi 5.2G:

Mode	Channel frequency (MHz)	Duty cycle (%)	RF Average Output Power (dBm)		
			Chain 0	Chain 1	Total
802.11a	5180	97.56	**13.32**	**13.19**	/
	5200		13.11	12.9	/
	5240		12.96	12.86	/
802.11n ht20	5180	94.89	10.18	10.16	13.18
	5200		9.95	9.7	12.84
	5240		9.72	9.56	12.65
802.11n ht40	5190	91.08	10.52	10.37	13.46
	5230		10.34	10.09	13.23
802.11ac vht80	5210	57.80	6.08	5.96	9.03

Wi-Fi 5.3G:

Mode	Channel frequency (MHz)	Duty cycle (%)	RF Average Output Power (dBm)		
			Chain 0	Chain 1	Total
802.11a	5260	97.56	**12.68**	12.32	/
	5280		12.61	12.46	/
	5320		12.53	**12.48**	/
802.11n ht20	5260	94.89	9.53	9.2	12.38
	5280		9.36	9.24	12.31
	5320		9.26	9.06	12.17
802.11n ht40	5270	91.08	10.42	10.16	13.3
	5310		9.27	9.15	12.22
802.11ac vht80	5290	57.80	8.13	7.74	10.95

Wi-Fi 5.6G:

Mode	Channel frequency (MHz)	Duty cycle (%)	RF Average Output Power (dBm)		
			Chain 0	Chain 1	Total
802.11a	5500	97.56	13.33	13.44	/
	5580		**13.62**	**13.7**	/
	5700		13.26	13.46	/
	5720		13.25	13.52	/
802.11n ht20	5500	94.89	10.95	11.03	14
	5580		11.42	11.4	14.42
	5700		10.7	10.89	13.81
	5720		10.82	11.08	13.96
802.11n ht40	5510	91.08	10.46	10.18	13.33
	5550		12.72	12.52	15.63
	5670		11.88	12.09	15
	5710		11.72	11.97	14.86
802.11ac vht80	5530	57.80	7.92	7.95	10.95
	5610		7.41	7.63	10.53
	5690		6.99	7.18	10.1

Wi-Fi 5.8G:

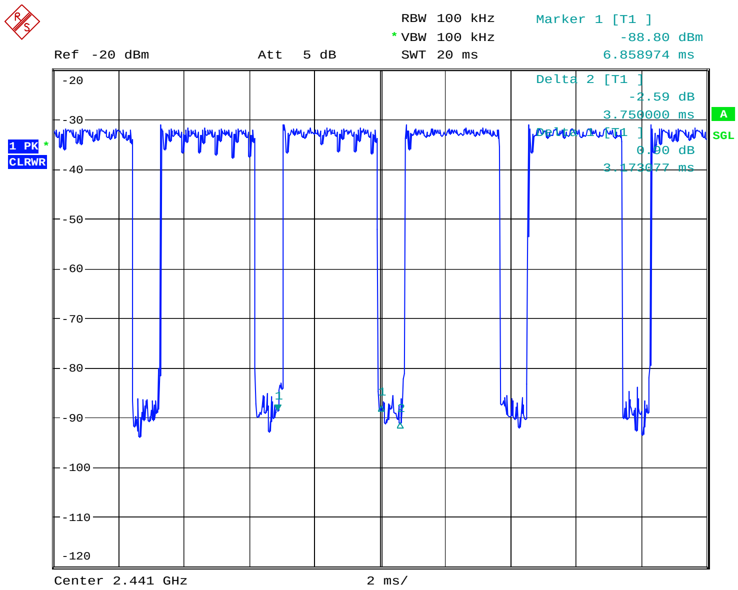
Mode	Channel frequency (MHz)	Duty cycle (%)	RF Average Output Power (dBm)		
			Chain 0	Chain 1	Total
802.11a	5745	97.56	11.55	11.56	/
	5785		11.55	**11.58**	/
	5825		**11.58**	11.55	/
802.11n ht20	5745	94.89	8.27	8.19	11.24
	5785		8.16	8.23	11.21
	5825		8.05	8.2	11.14
802.11n ht40	5755	91.08	8.38	8.17	11.29
	5795		7.68	7.85	10.78
802.11ac vht80	5775	57.80	6.71	6.88	9.81

Note:
1.The system support 802.11a/n ht20/n ht40/ac vht20/vht40/vht80, the vht20/vht40 were reduced since the identical parameters with 802.11n ht20 and ht40.
2.WLAN 5G Duty Cycle please refer to RF Report Number: 2403T78885E-RF-00D

Bluetooth:

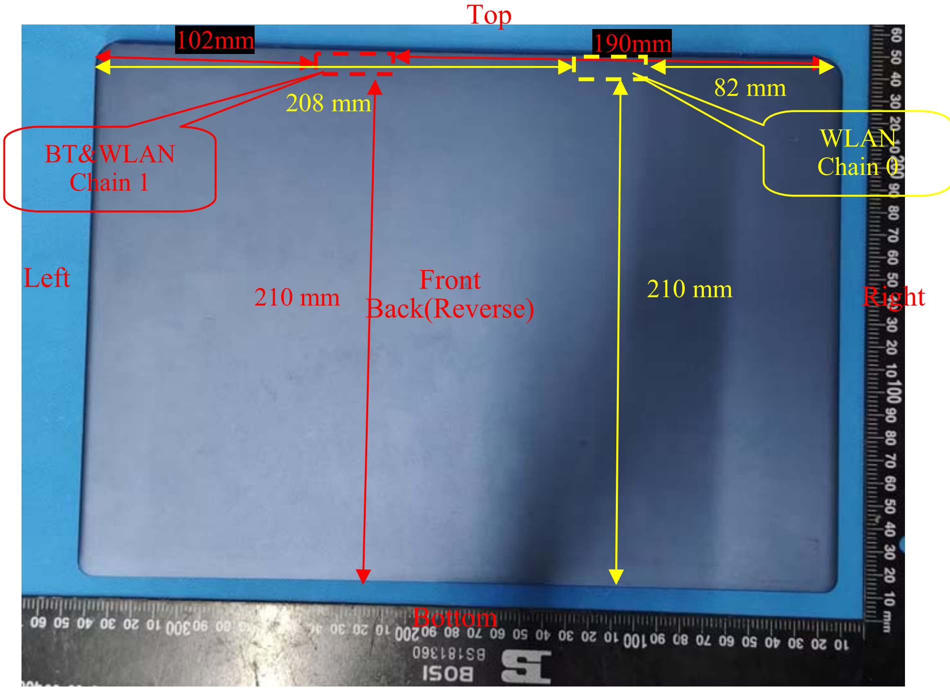
Mode	Channel frequency (MHz)	Conducted Output Power (dBm)
BDR(GFSK)	2402	7.37
	2441	8.95
	2480	**9.76**
EDR(π/4-DQPSK)	2402	6.14
	2441	7.1
	2480	6.91
EDR(8DPSK)	2402	6.19
	2441	7.08
	2480	7.11
BLE_1M	2402	4.57
	2440	5.34
	2480	5.13
BLE_2M	2402	4.67
	2440	**5.36**
	2480	5.12

Test Modes	Ton (ms)	Ton+off (ms)	Duty cycle (%)	Scaled Factor (1/duty cycle)
GFSK	3.173	3.75	84.6	1.18

Duty Cycle	
GFSK	 Comment: ProjectNo.:2403t78885 Tester:wen Date: 8.JUN.2024 15:31:09

7. Standalone SAR test exclusion considerations

Antennas Location:



7.1 Antenna Distance To Edge

Antenna Distance To Edge(mm)						
Antenna	**Front**	**Back**	**Left**	**Right**	**Top**	**Bottom**
BT&WLAN Chain 1	< 5	< 5	102	190	< 5	210
WLAN Chain 0	< 5	< 5	208	82	< 5	210

7.2 Standalone SAR test exclusion considerations

Mode	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
WLAN 2.4G	2462	14.7	29.51	0	9.3	3	NO
WLAN 5.2G	5240	13.4	21.88	0	10.0	3	NO
WLAN 5.3G	5320	12.8	19.05	0	8.8	3	NO
WLAN 5.6G	5720	13.8	23.99	0	11.5	3	NO
WLAN 5.8G	5825	11.7	14.79	0	7.1	3	NO
Bluetooth	2480	10	10	0	3.1	3	NO

Note: *The bluetooth based peak power for calculation, and Wi-Fi based average power for calculation.*

NOTE:

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

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [$\sqrt{f(GHz)}$] ≤ 3.0 for 1-g SAR and ≤7.5 for 10-g extremity SAR, where

1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

7.3 Standalone SAR test exclusion considerations:

Mode	Frequency (MHz)	Pavg (dBm)	Pavg (mW)	Test exclusion Threshold (mm)
WLAN 2.4G	2462	14.7	29.51	15.5
WLAN 5.2G	5240	13.4	21.88	16.7
WLAN 5.3G	5320	12.8	19.05	14.7
WLAN 5.6G	5720	13.8	23.99	19.2
WLAN 5.8G	5825	11.7	14.79	12.0
Bluetooth	2480	10	10	5.3

Note: *The bluetooth based peak power for calculation, and Wi-Fi based average power for calculation.*

SAR test exclusion for the EUT edge considerations detail:

Distance< 50mm(To Edges)

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(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, where
1.f(GHz) is the RF channel transmit frequency in GHz.
2.Power and distance are rounded to the nearest mW and mm before calculation.
3.The result is rounded to one decimal place for comparison.
4.When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

Distance> 50mm(To Edges)

At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following:
a.[Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
b.[Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz.

7.4 SAR test exclusion for the EUT edge considerations Result

According to KDB 616217 Section 4.3, SAR evaluation for the front surface of tablet display screens are generally not necessary.

Mode	Back Edge	Left Edge	Right Edge	Top Edge	Bottom Edge
WLAN 2.4G	**Required**	Exclusion	Exclusion	**Required**	Exclusion
WLAN 5.2G	**Required**	Exclusion	Exclusion	**Required**	Exclusion
WLAN 5.3G	**Required**	Exclusion	Exclusion	**Required**	Exclusion
WLAN 5.6G	**Required**	Exclusion	Exclusion	**Required**	Exclusion
WLAN 5.8G	**Required**	Exclusion	Exclusion	**Required**	Exclusion
Bluetooth	**Required**	Exclusion	Exclusion	**Required**	Exclusion

Note:
Required:The distance is less than **Test Exclusion Distance**, the SAR test is required.
Exclusion: The distance is large than **Test Exclusion Distance**, SAR test is not required.

8. SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

8.1 SAR Test Data

Environmental Conditions

Temperature:	22.8-23.9 ℃
Relative Humidity:	46 %
ATM Pressure:	100.4 kPa
Test Date:	2024/06/08

Testing was performed by Leo Lu, Aixlee Li.

WLAN 2.4G Chain 0:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Power Scaled Factor	Duty cycle Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body Back (0mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	14.45	14.6	1.035	1.019	0.609	0.64	1#
	2467	802.11b	/	/	/	/	/	/	/
Body Top (0mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	14.45	14.6	1.035	1.019	0.168	0.18	2#
	2467	802.11b	/	/	/	/	/	/	/

WLAN 2.4G Chain 1:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Power Scaled Factor	Duty cycle Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body Back (0mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	14.36	14.7	1.081	1.019	0.376	0.41	3#
	2467	802.11b	/	/	/	/	/	/	/
Body Top (0mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	14.36	14.7	1.081	1.019	0.137	0.15	4#
	2467	802.11b	/	/	/	/	/	/	/

Note:

1. When the 1-g SAR is≤ 0.8W/kg, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure. When OFDM tune up power is greater than DSSS, 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, OFDM SAR is not required.
4. When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11g/n mode is use for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.
5. According 2016 Oct. TCB Workshop, for SAR testing of 2.4G WIFI 802.11b signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to “1/(duty cycle)”.

WLAN 5.2G Chain 0:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Power Scaled Factor	Duty cycle Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body Back (0mm)	5180	802.11n20	/	/	/	/	/	/	/
	5200	802.11n20	13.11	13.4	1.069	1.025	0.274	0.30	5#
	5240	802.11n20	/	/	/	/	/	/	/
Body Top (0mm)	5180	802.11n20	/	/	/	/	/	/	/
	5200	802.11n20	13.11	13.4	1.069	1.025	0.288	0.32	6#
	5240	802.11n20	/	/	/	/	/	/	/

WLAN 5.2G Chain 1:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Power Scaled Factor	Duty cycle Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body Back (0mm)	5180	802.11a	/	/	/	/	/	/	/
	5200	802.11a	12.9	13.3	1.096	1.025	0.192	0.22	7#
	5240	802.11a	/	/	/	/	/	/	/
Body Top (0mm)	5180	802.11a	/	/	/	/	/	/	/
	5200	802.11a	12.9	13.3	1.096	1.025	0.156	0.18	8#
	5240	802.11a	/	/	/	/	/	/	/

Note:
1. When the 1-g SAR is≤ 0.8W/kg, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3. When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/n20/n40/ac20/ac40/ac80 mode is use for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band, 802.11a is the initial position for the SAR test.
4. According to 2016 Oct. TCB Workshop, for SAR testing of 5G WIFI 802.11a signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to “1/(duty cycle)”.

WLAN 5.3G Chain 0:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Power Scaled Factor	Duty cycle Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body Back (0mm)	5260	802.11a	/	/	/	/	/	/	/
	5280	802.11a	12.61	12.8	1.045	1.025	0.279	0.30	9#
	5320	802.11a	/	/	/	/	/	/	/
Body Top (0mm)	5260	802.11a	/	/	/	/	/	/	/
	5280	802.11a	12.61	12.8	1.045	1.025	0.264	0.28	10#
	5320	802.11a	/	/	/	/	/	/	/

WLAN 5.3G Chain 1:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Power Scaled Factor	Duty cycle Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body Back (0mm)	5260	802.11a	/	/	/	/	/	/	/
	5280	802.11a	12.46	12.6	1.033	1.025	0.219	0.23	11#
	5320	802.11a	/	/	/	/	/	/	/
Body Top (0mm)	5260	802.11a	/	/	/	/	/	/	/
	5280	802.11a	12.46	12.6	1.033	1.025	0.154	0.16	12#
	5320	802.11a	/	/	/	/	/	/	/

Note:
1. When the 1-g SAR is≤ 0.8W/kg, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3. When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/n20/n40/ac20/ac40/ac80 mode is use for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band, 802.11a is the initial position for the SAR test.
4. According to 2016 Oct. TCB Workshop, for SAR testing of 5G WIFI 802.11a signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)".

WLAN 5.6G Chain 0:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Power Scaled Factor	Duty cycle Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body Back (0mm)	5500	802.11a	/	/	/	/	/	/	/
	5580	802.11a	13.62	13.7	1.019	1.025	0.371	0.39	13#
	5700	802.11a	/	/	/	/	/	/	/
	5720	802.11a	/	/	/	/	/	/	/
Body Top (0mm)	5500	802.11a	/	/	/	/	/	/	/
	5580	802.11a	13.62	13.7	1.019	1.025	0.403	0.42	14#
	5700	802.11a	/	/	/	/	/	/	/
	5720	802.11a	/	/	/	/	/	/	/

WLAN 5.6G Chain 1:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Power Scaled Factor	Duty cycle Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body Back (0mm)	5500	802.11a	/	/	/	/	/	/	/
	5580	802.11a	13.7	13.8	1.023	1.025	0.322	0.34	15#
	5700	802.11a	/	/	/	/	/	/	/
Body Top (0mm)	5500	802.11a	/	/	/	/	/	/	/
	5580	802.11a	13.7	13.8	1.023	1.025	0.434	0.46	16#
	5700	802.11a	/	/	/	/	/	/	/

Note:

1. When the 1-g SAR is≤ 0.8W/kg, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3. When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/n20/n40/ac20/ac40/ac80 mode is use for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band, 802.11a is the initial position for the SAR test.
4. According to 2016 Oct. TCB Workshop, for SAR testing of 5G WIFI 802.11a signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to “1/(duty cycle)”.

WLAN 5.8G Chain 0:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Power Scaled Factor	Duty cycle Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body Back (0mm)	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	11.55	11.7	1.035	1.025	0.21	0.22	17#
	5825	802.11a	/	/	/	/	/	/	/
Body Top (0mm)	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	11.55	11.7	1.035	1.025	0.225	0.24	18#
	5825	802.11a	/	/	/	/	/	/	/

WLAN 5.8G Chain 1:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Power Scaled Factor	Duty cycle Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body Back (0mm)	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	11.58	11.7	1.028	1.025	0.197	0.21	19#
	5825	802.11a	/	/	/	/	/	/	/
Body Top (0mm)	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	11.58	11.7	1.028	1.025	0.294	0.31	20#
	5825	802.11a	/	/	/	/	/	/	/

Note:

1. When the 1-g SAR is≤ 0.8W/kg, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3. When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/n20/n40/ac20/ac40/ac80 mode is use for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band, 802.11a is the initial position for the SAR test.
4. According to 2016 Oct. TCB Workshop, for SAR testing of 5G WIFI 802.11a signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to “1/(duty cycle)”.

Bluetooth:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Power Scaled Factor	Duty cycle Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body Back (0mm)	2402	GFSK	/	/	/	/	/	/	/
	2441	GFSK	8.95	10	1.274	1.18	0.095	0.14	21#
	2480	GFSK	/	/	/	/	/	/	/
Body Top (0mm)	2402	GFSK	/	/	/	/	/	/	/
	2441	GFSK	8.95	10	1.274	1.18	0.00538	0.01	22#
	2480	GFSK	/	/	/	/	/	/	/

Note:

1. When the 1-g SAR is≤ 0.8W/kg, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.

9. Measurement Variability

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

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

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

The Highest Measured SAR Configuration in Each Frequency Band

Body

SAR probe calibration point	Frequency Band	Freq.(MHz)	EUT Position	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio
				Original	Repeated	
/	/	/	/	/	/	/

Note:

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

10. SAR SIMULTANEOUS TRANSMISSION DESCRIPTION

Simultaneous Transmission:

Description of Simultaneous Transmit Capabilities	
Transmitter Combination	**Simultaneous?**
WLAN 2.4G Chain 0+ WLAN 2.4G Chain 1	√
WLAN 5G Chain 0+ WLAN 5G Chain 1	√
2.4G/5G WLAN Chain 0+ BT	√
2.4G/5G WLAN Chain 1+ BT	×

SimultaneousSAR test exclusion considerations:

Mode(SAR1+SAR2)	Position	Reported SAR(W/kg)		ΣSAR < 1.6W/kg
		SAR1	SAR2	
WLAN 2.4G Chain 0+ WLAN 2.4G Chain 1	Body	0.64	0.41	1.05
WLAN 5.2G Chain 0+ WLAN 5.2G Chain 1		0.32	0.22	0.54
WLAN 5.3G Chain 0+ WLAN 5.3G Chain 1		0.30	0.23	0.53
WLAN 5.6G Chain 0+ WLAN 5.6G Chain 1		0.42	0.46	0.88
WLAN 5.8G Chain 0+ WLAN 5.8G Chain 1		0.24	0.31	0.55
2.4G/5G WLAN Chain 0+ BT		0.64	0.14	0.78

Conclusion:
Sum of SAR:**ΣSAR ≤1.6 W/kg** therefore simultaneous transmission SAR with Volume Scans is **not required**.

11. SAR Plots

Plot 1#: 2.4G WIFI Mid_ Body Back_ Chain 0

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

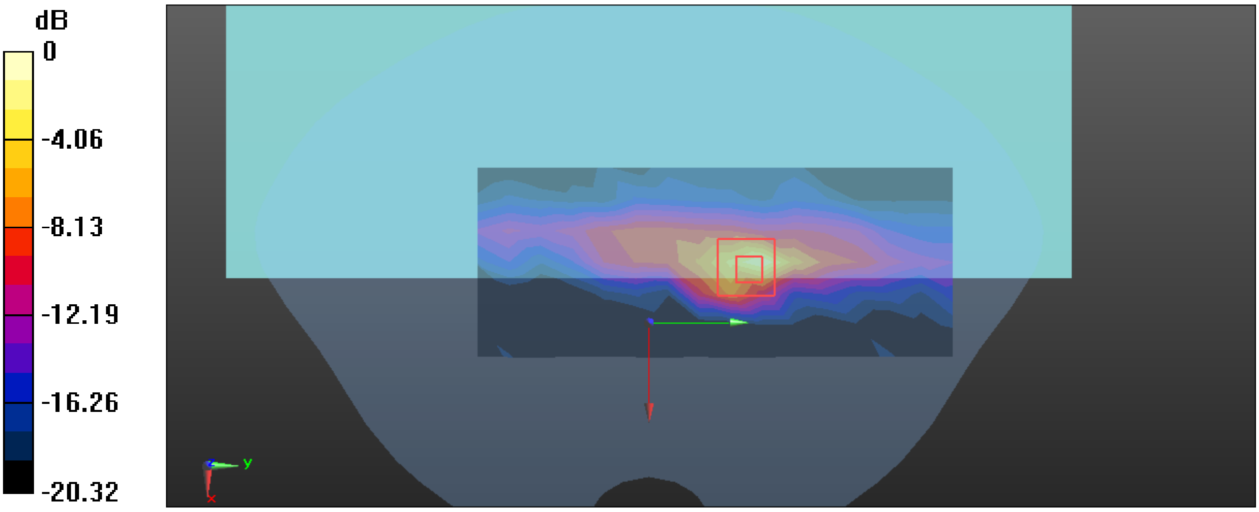
Communication System: UID 0, 802.11 b(0); Frequency: 2437 MHz;Duty Cycle: 1:1.019
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.771 S/m; ε_r = 39.318; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.05, 7.92, 7.22) @ 2437 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (7x16x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 1.02 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.733 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 1.85 W/kg
SAR(1 g) = 0.609 W/kg; SAR(10 g) = 0.225 W/kg
Maximum value of SAR (measured) = 1.36 W/kg



0 dB = 1.36 W/kg = 1.34 dBW/kg

Plot 2#: 2.4G WIFI Mid_ Body Top_ Chain 0

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

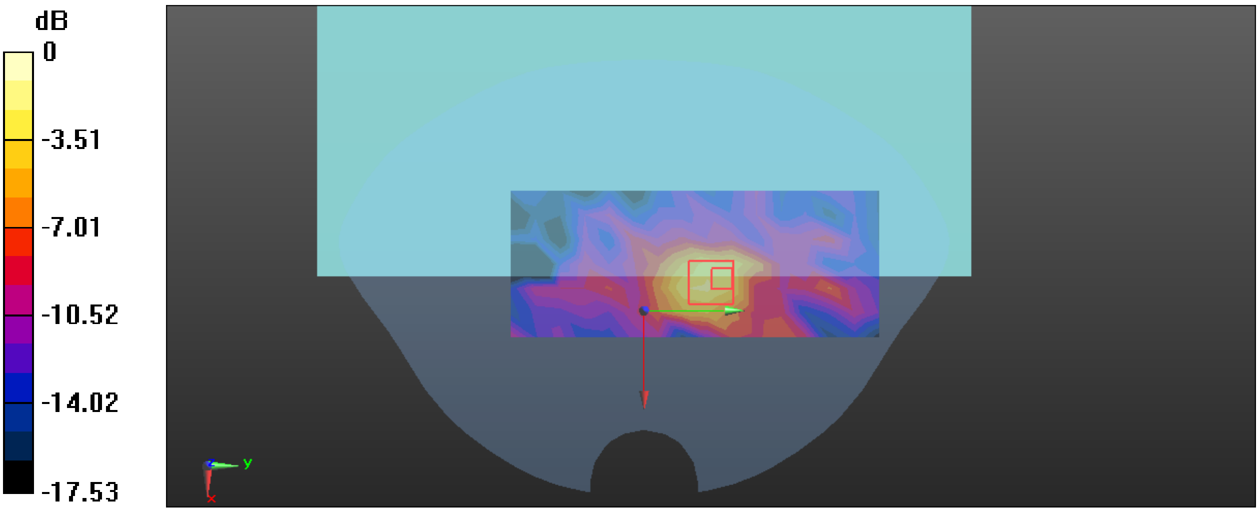
Communication System: UID 0, 802.11 b(0); Frequency: 2437 MHz;Duty Cycle: 1:1.019
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.771 S/m; ε_r = 39.318; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.05, 7.92, 7.22) @ 2437 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (7x16x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.203 W/kg

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.369 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.617 W/kg
SAR(1 g) = 0.168 W/kg; SAR(10 g) = 0.068 W/kg
Maximum value of SAR (measured) = 0.318 W/kg



0 dB = 0.318 W/kg = -4.98 dBW/kg

Plot 3#: 2.4G WIFI Mid _ Body Back_ Chain 1

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

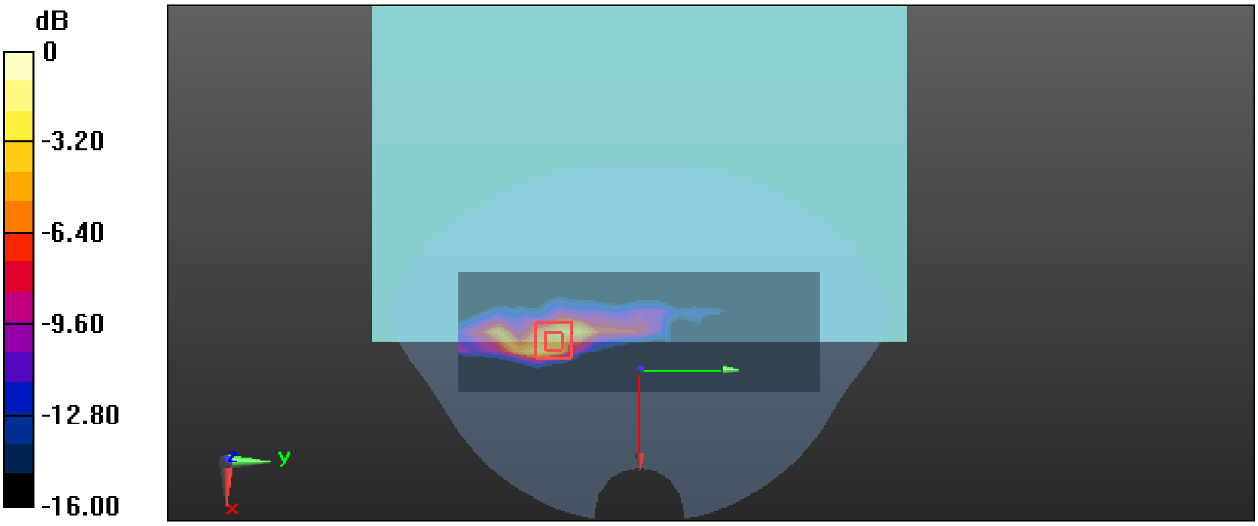
Communication System: UID 0, 802.11 b (0); Frequency: 2437 MHz;Duty Cycle: 1:1.019
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.771 S/m; ε_r = 39.318; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.05, 7.92, 7.22) @ 2437 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (7x19x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.519 W/kg

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.513 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.965 W/kg
SAR(1 g) = 0.376 W/kg; SAR(10 g) = 0.157 W/kg
Maximum value of SAR (measured) = 0.729 W/kg



0 dB = 0.729 W/kg = -1.37 dBW/kg

Plot 4#: 2.4G WIFI Mid _ Body Top_ Chain 1

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

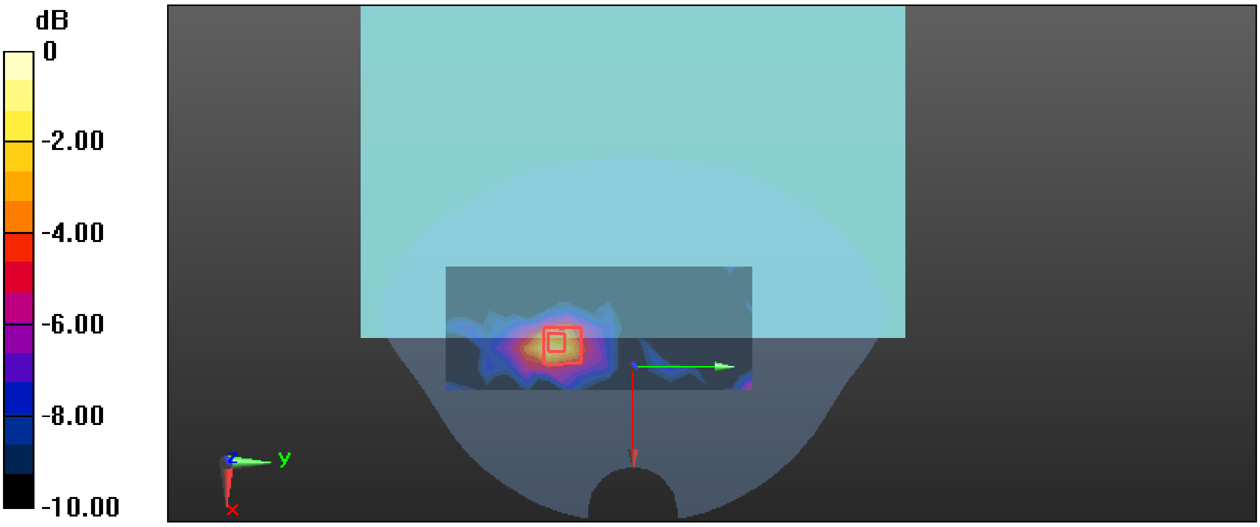
Communication System: UID 0, 802.11 b (0); Frequency: 2437 MHz;Duty Cycle: 1:1.019
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.771 S/m; ε_r = 39.318; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.05, 7.92, 7.22) @ 2437 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (7x16x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.251 W/kg

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.610 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 0.333 W/kg
SAR(1 g) = 0.137 W/kg; SAR(10 g) = 0.052 W/kg
Maximum value of SAR (measured) = 0.279 W/kg



0 dB = 0.279 W/kg = -5.54 dBW/kg

Plot 5#: 5.2G WIFI Mid_ Body Back_ Chain 0

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

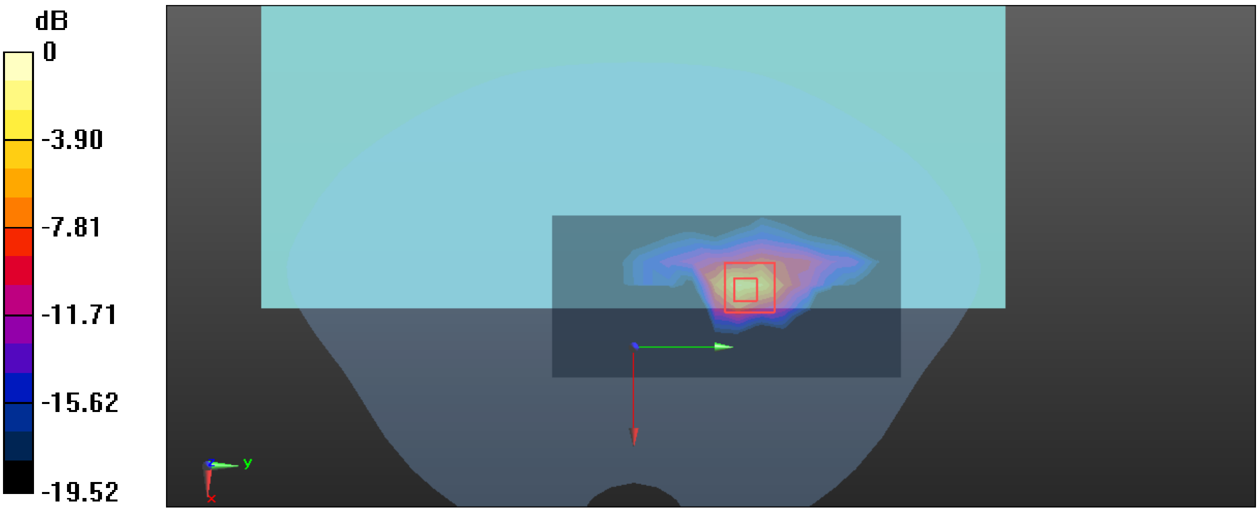
Communication System: UID 0, 802.11 a (0); Frequency: 5200 MHz;Duty Cycle: 1:1.025
Medium parameters used: f = 5200 MHz; σ = 4.52 S/m; ε_r = 37.139; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.96, 5.61, 5.16) @ 5200 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.477 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.504 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 2.96 W/kg
SAR(1 g) = 0.274 W/kg; SAR(10 g) = 0.077 W/kg
Maximum value of SAR (measured) = 0.817 W/kg



0 dB = 0.817 W/kg = -0.88 dBW/kg

Plot 6#: 5.2G WIFI Mid_ Body Top_ Chain 0

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

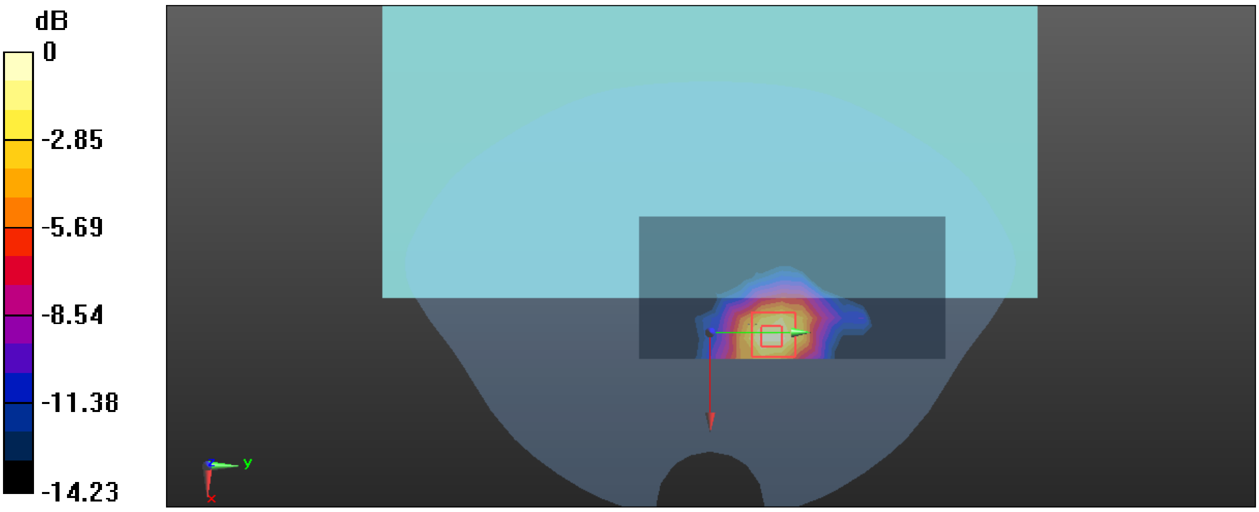
Communication System: UID 0, 802.11 a (0); Frequency: 5200 MHz;Duty Cycle: 1:1.025
Medium parameters used: f = 5200 MHz; σ = 4.52 S/m; ε_r = 37.139; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.96, 5.61, 5.16) @ 5200 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.568 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.436 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.288 W/kg; SAR(10 g) = 0.107 W/kg
Maximum value of SAR (measured) = 0.627 W/kg



0 dB = 0.627 W/kg = -2.03 dBW/kg

Plot 7#: 5.2G WIFI Mid _ Body Back_ Chain 1

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

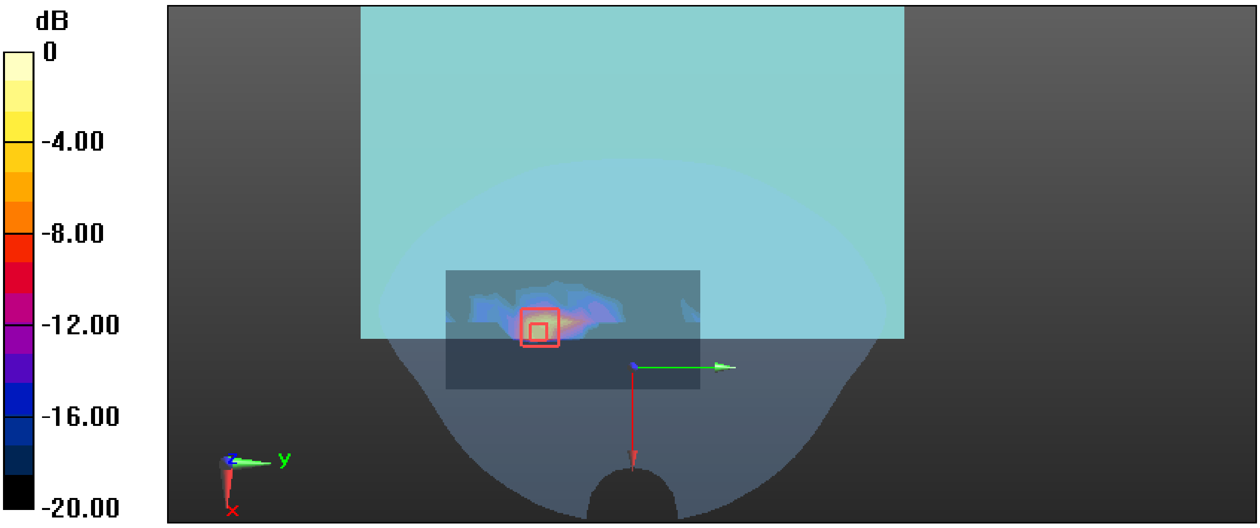
Communication System: UID 0, 802.11 a (0); Frequency: 5200 MHz;Duty Cycle: 1:1.025
Medium parameters used: f = 5200 MHz; $\sigma = 4.52$ S/m; $\varepsilon_r = 37.139$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.96, 5.61, 5.16) @ 5200 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.326 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.6050 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 2.27 W/kg
SAR(1 g) = 0.192 W/kg; SAR(10 g) = 0.047 W/kg
Maximum value of SAR (measured) = 0.755 W/kg



0 dB = 0.755 W/kg = -1.22 dBW/kg

Plot 8#: 5.2G WIFI Mid _ Body Top_ Chain 1

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

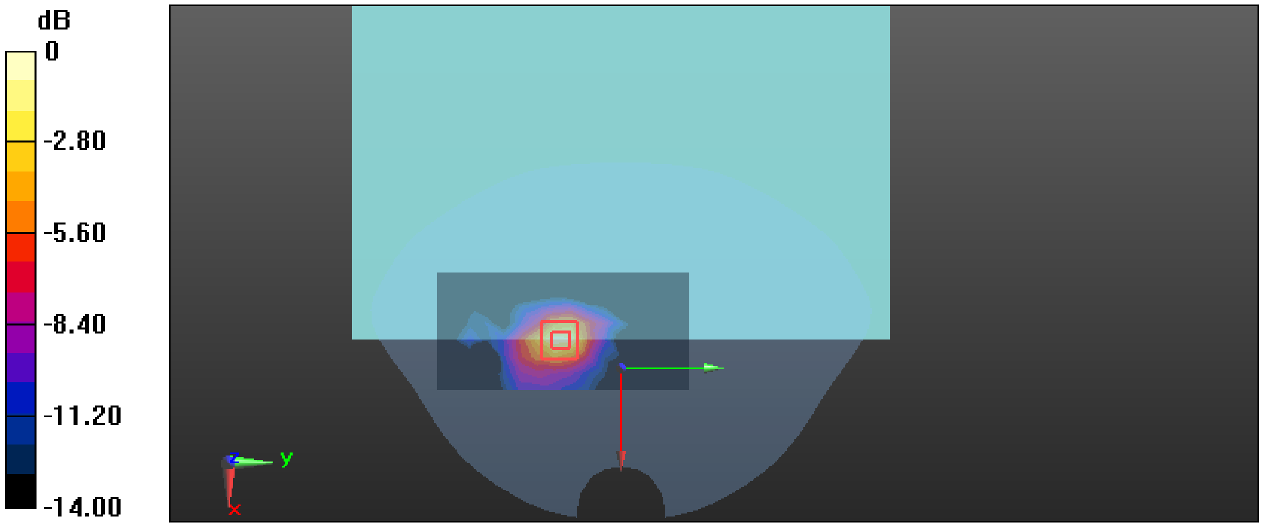
Communication System: UID 0, 802.11 a (0); Frequency: 5200 MHz;Duty Cycle: 1:1.025
Medium parameters used: f = 5200 MHz; σ = 4.52 S/m; ε_r = 37.139; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.96, 5.61, 5.16) @ 5200 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.332 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.011 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.512 W/kg
SAR(1 g) = 0.156 W/kg; SAR(10 g) = 0.057 W/kg
Maximum value of SAR (measured) = 0.331 W/kg



0 dB = 0.331 W/kg = -4.80 dBW/kg

Plot 9#: 5.3G WIFI Mid_ Body Back_ Chain 0

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

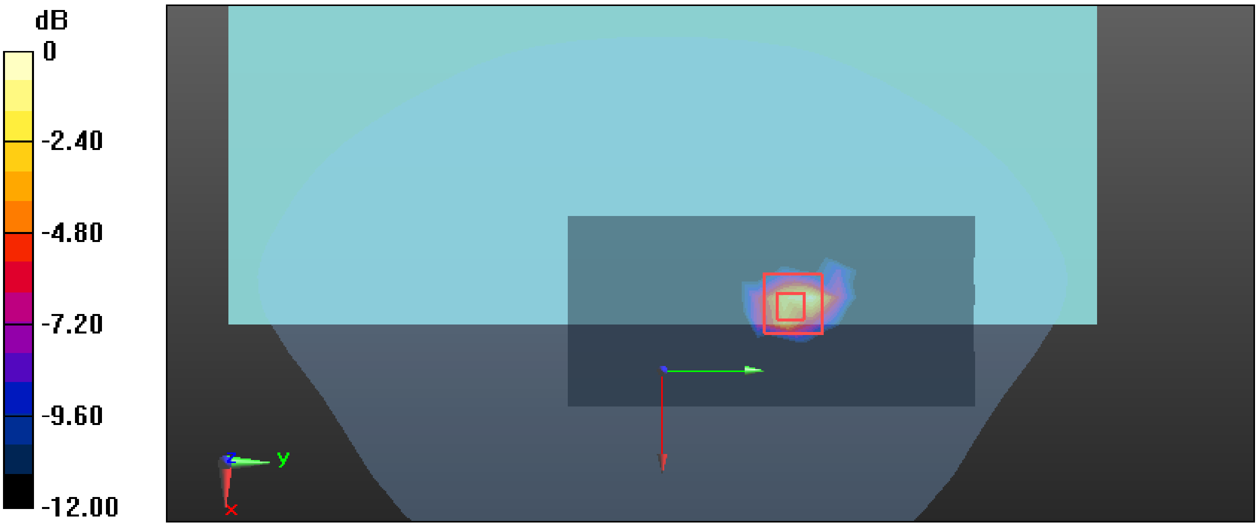
Communication System: UID 0, 802.11 a (0); Frequency: 5280 MHz;Duty Cycle: 1:1.025
Medium parameters used: f = 5280 MHz; σ = 4.754 S/m; ε_r = 36.346; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.96, 5.61, 5.16) @ 5280 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.729 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 7.440 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 1.78 W/kg
SAR(1 g) = 0.279 W/kg; SAR(10 g) = 0.087 W/kg
Maximum value of SAR (measured) = 0.805 W/kg



0 dB = 0.805 W/kg = -0.94 dBW/kg

Plot 10#: 5.3G WIFI Mid _ Body Top_ Chain 0

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

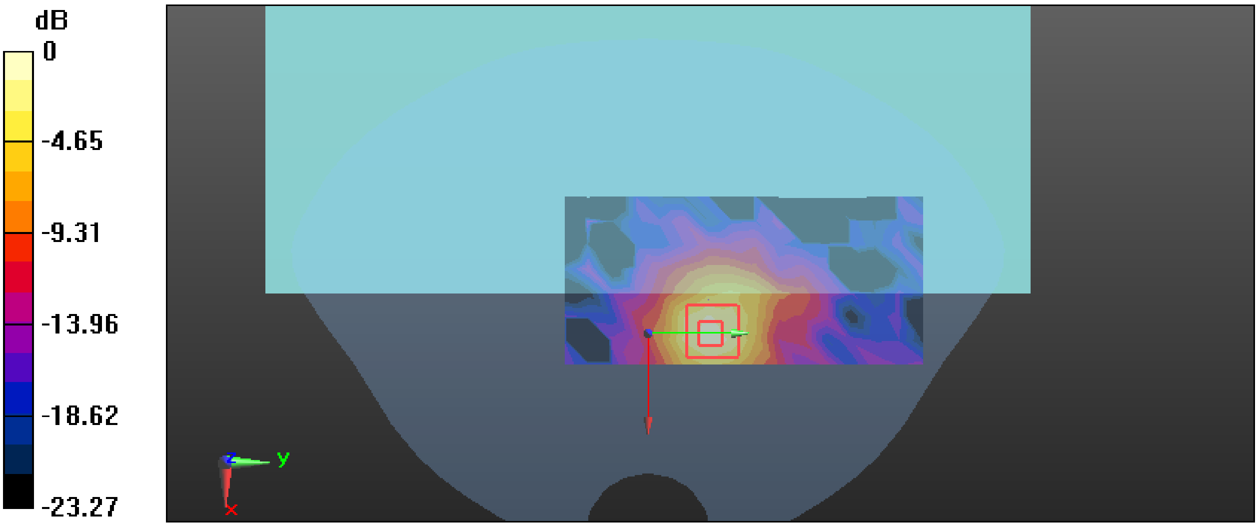
Communication System: UID 0, 802.11 a (0); Frequency: 5280 MHz;Duty Cycle: 1:1.025
Medium parameters used: f = 5280 MHz; σ = 4.754 S/m; ε_r = 36.346; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.96, 5.61, 5.16) @ 5280 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.527 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.801 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.965 W/kg
SAR(1 g) = 0.264 W/kg; SAR(10 g) = 0.097 W/kg
Maximum value of SAR (measured) = 0.591 W/kg



0 dB = 0.591 W/kg = -2.28 dBW/kg

Plot 11#: 5.3G WIFI Mid _ Body Back_ Chain 1

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

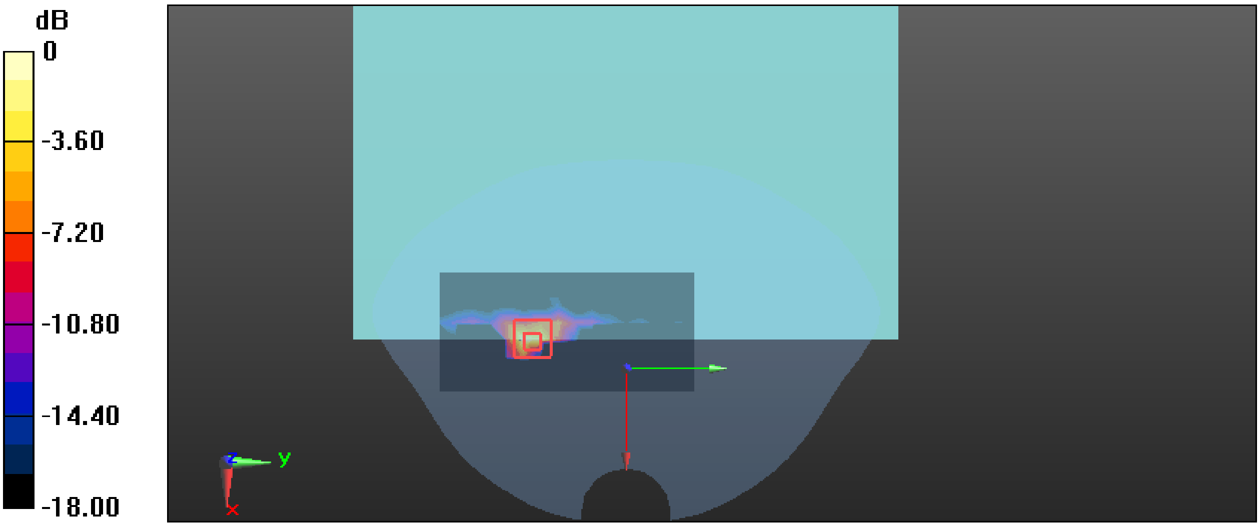
Communication System: UID 0, 802.11 a (0); Frequency: 5280 MHz;Duty Cycle: 1:1.025
Medium parameters used: f = 5280 MHz; σ = 4.754 S/m; ε_r = 36.346; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.96, 5.61, 5.16) @ 5280 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.545 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.734 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.974 W/kg
SAR(1 g) = 0.219 W/kg; SAR(10 g) = 0.055 W/kg
Maximum value of SAR (measured) = 0.593 W/kg



0 dB = 0.593 W/kg = -2.27 dBW/kg

Plot 12#: 5.3G WIFI Mid _ Body Top_ Chain 1

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

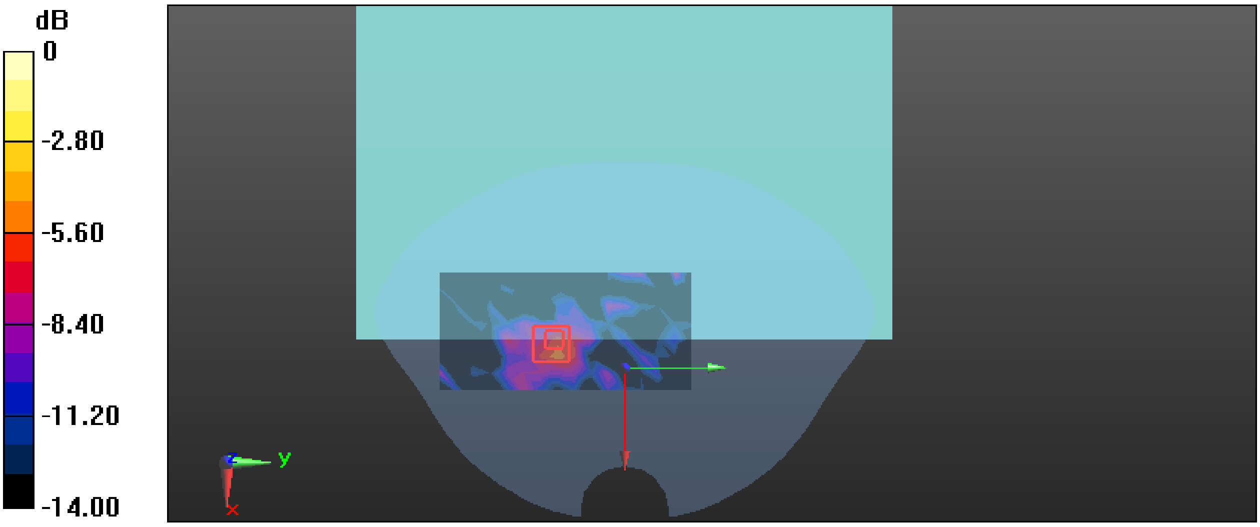
Communication System: UID 0, 802.11 a (0); Frequency: 5280 MHz;Duty Cycle: 1:1.025
Medium parameters used: f = 5280 MHz; σ = 4.754 S/m; ε_r = 36.346; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.96, 5.61, 5.16) @ 5280 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.363 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.817 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.154 W/kg; SAR(10 g) = 0.093 W/kg
Maximum value of SAR (measured) = 1.12 W/kg



0 dB = 1.12 W/kg = 0.49 dBW/kg

Plot 13#: 5.6G WIFI Mid_ Body Back_ Chain 0

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

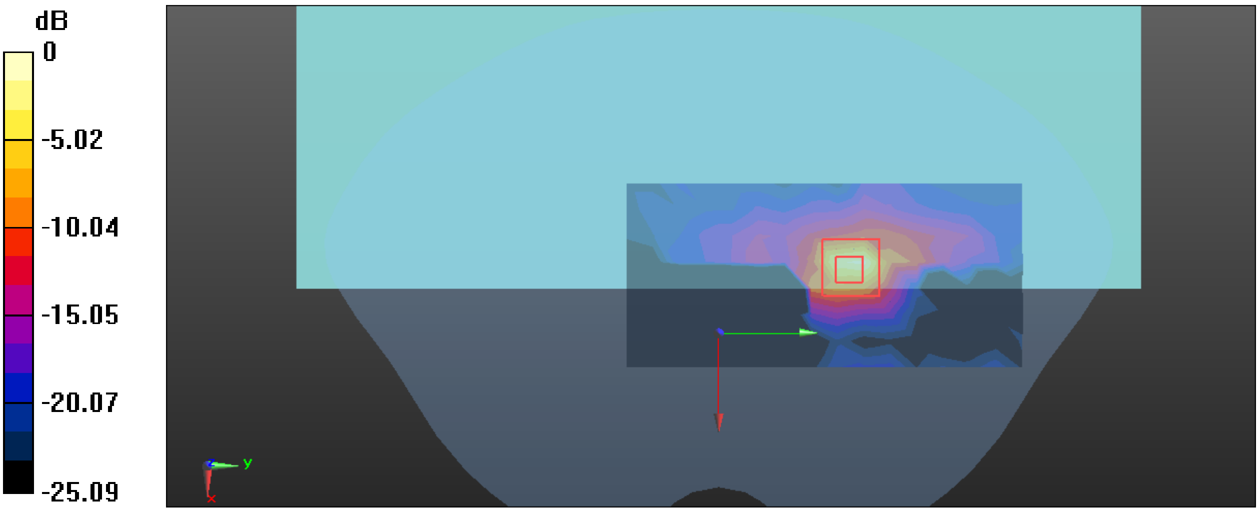
Communication System: UID 0, 802.11 a (0); Frequency: 5580 MHz;Duty Cycle: 1:1.025
Medium parameters used: f = 5580 MHz; σ = 5.058 S/m; ε_r = 35.976; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.38, 4.98, 4.56) @ 5580 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.880 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.801 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 2.20 W/kg
SAR(1 g) = 0.371 W/kg; SAR(10 g) = 0.102 W/kg
Maximum value of SAR (measured) = 1.09 W/kg



0 dB = 1.09 W/kg = 0.37 dBW/kg

Plot 14#: 5.6G WIFI Mid_ Body Top_ Chain 0

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

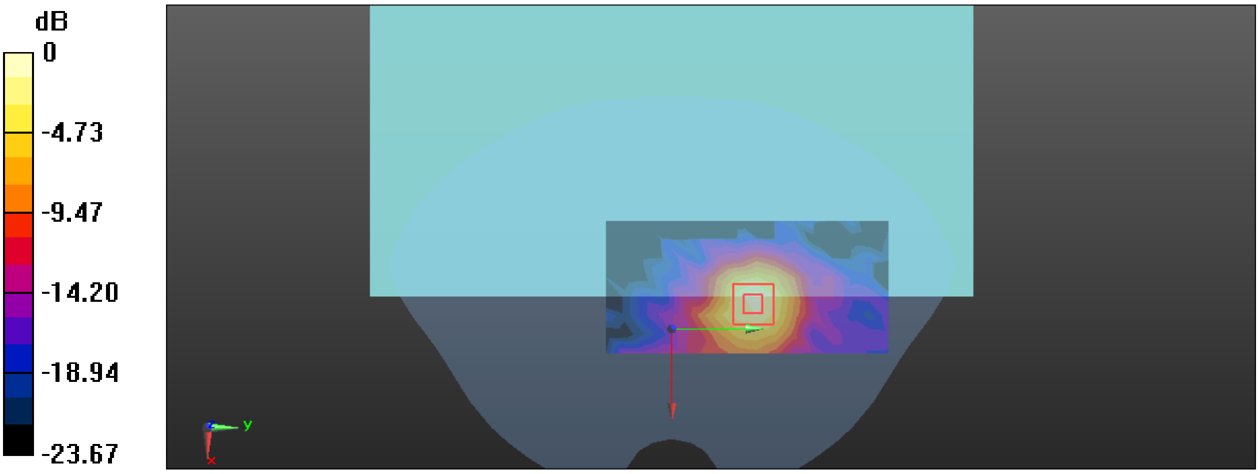
Communication System: UID 0, 802.11 a (0); Frequency: 5580 MHz;Duty Cycle: 1:1.025
Medium parameters used: f = 5580 MHz; σ = 5.058 S/m; ε_r = 35.976; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.38, 4.98, 4.56) @ 5580 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.873 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.142 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 1.58 W/kg
SAR(1 g) = 0.403 W/kg; SAR(10 g) = 0.146 W/kg
Maximum value of SAR (measured) = 0.952 W/kg



0 dB = 0.952 W/kg = -0.21 dBW/kg

Plot 15#: 5.6G WIFI Mid _ Body Back_ Chain 1

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

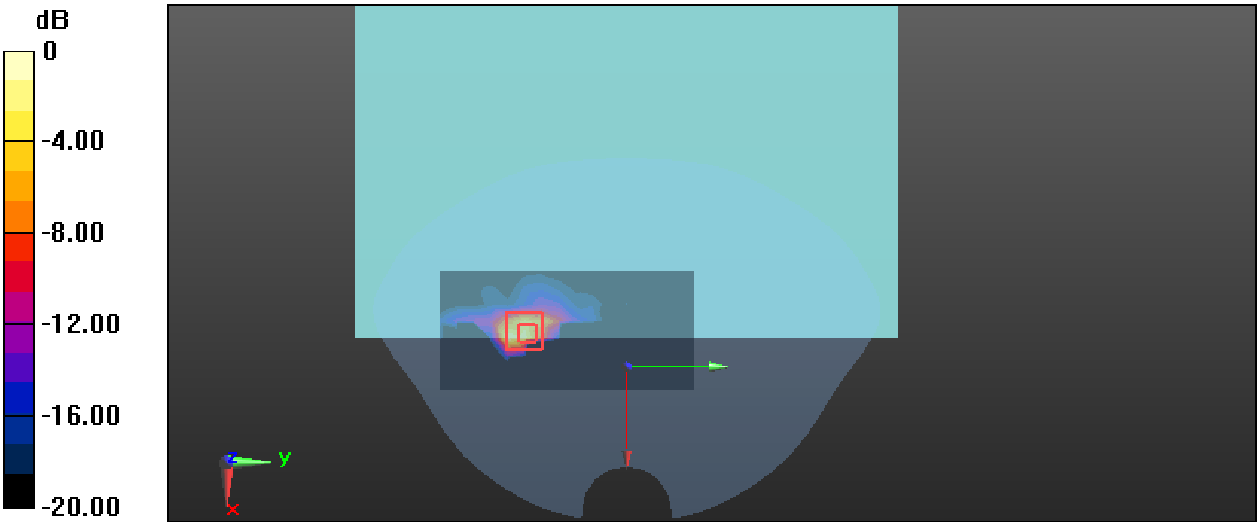
Communication System: UID 0, 802.11 a (0); Frequency: 5580 MHz;Duty Cycle: 1:1.025
Medium parameters used: f = 5580 MHz; σ = 5.058 S/m; ε_r = 35.976; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.38, 4.98, 4.56) @ 5580 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.814 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.963 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 1.69 W/kg
SAR(1 g) = 0.322 W/kg; SAR(10 g) = 0.090 W/kg
Maximum value of SAR (measured) = 1.07 W/kg



0 dB = 1.07 W/kg = 0.29 dBW/kg

Plot 16#: 5.6G WIFI Mid _ Body Top_ Chain 1

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

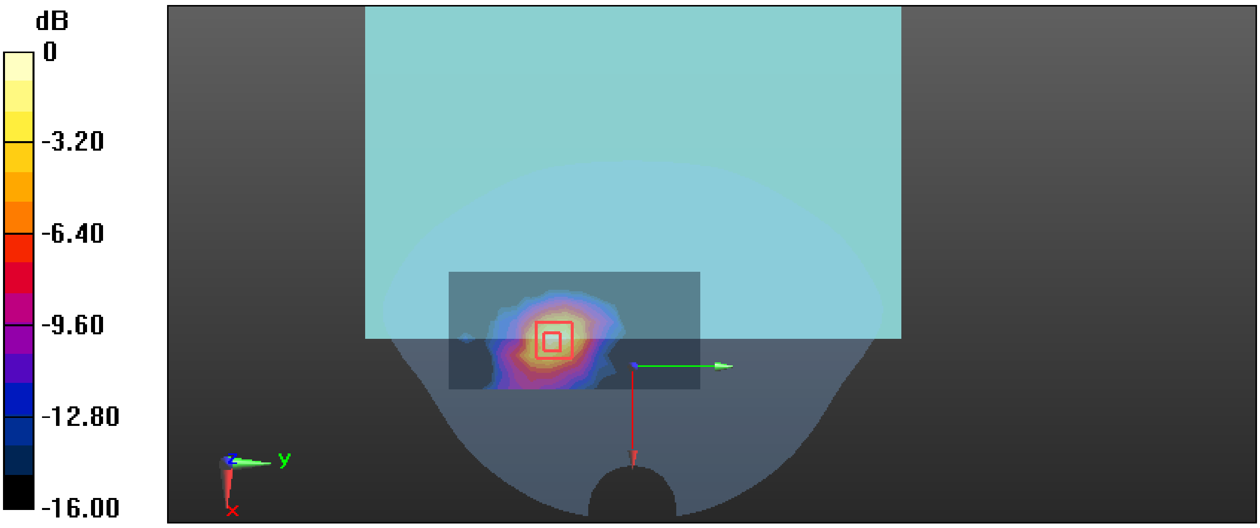
Communication System: UID 0, 802.11 a (0); Frequency: 5580 MHz;Duty Cycle: 1:1.025
Medium parameters used: f = 5580 MHz; σ = 5.058 S/m; ε_r = 35.976; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.38, 4.98, 4.56) @ 5580 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.05 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.658 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 1.70 W/kg
SAR(1 g) = 0.434 W/kg; SAR(10 g) = 0.150 W/kg
Maximum value of SAR (measured) = 1.06 W/kg



0 dB = 1.06 W/kg = 0.25 dBW/kg

Plot 17#: 5.8G WIFI Mid_ Body Back_ Chain 0

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

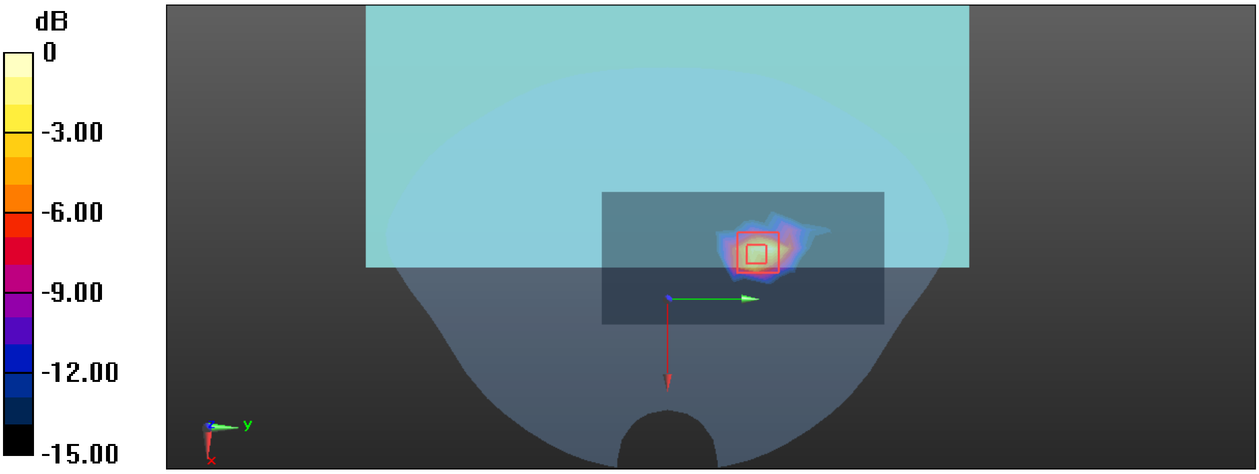
Communication System: UID 0, 802.11 a (0); Frequency: 5785 MHz;Duty Cycle: 1:1.025
Medium parameters used (interpolated): f = 5785 MHz; σ = 5.33 S/m; ε_r = 34.514; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.54, 5.16, 4.7) @ 5785 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.381 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.379 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 3.80 W/kg
SAR(1 g) = 0.210 W/kg; SAR(10 g) = 0.054 W/kg
Maximum value of SAR (measured) = 0.701 W/kg



0 dB = 0.701 W/kg = -1.54 dBW/kg

Plot 18#: 5.8G WIFI Mid_ Body Top_ Chain 0

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

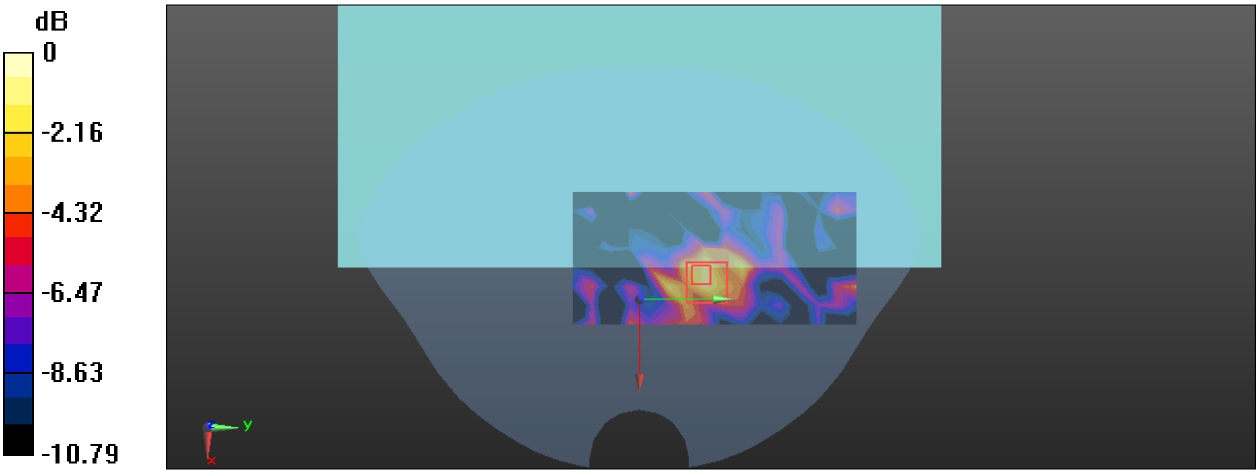
Communication System: UID 0, 802.11 a (0); Frequency: 5785 MHz;Duty Cycle: 1:1.025
Medium parameters used (interpolated): f = 5785 MHz; σ = 5.33 S/m; ε_r = 34.514; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.54, 5.16, 4.7) @ 5785 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.584 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.917 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 2.62 W/kg
SAR(1 g) = 0.225 W/kg; SAR(10 g) = 0.084 W/kg
Maximum value of SAR (measured) = 0.755 W/kg



0 dB = 0.755 W/kg = -1.22 dBW/kg

Plot 19#: 5.8G WIFI Mid _ Body Back_ Chain 1

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

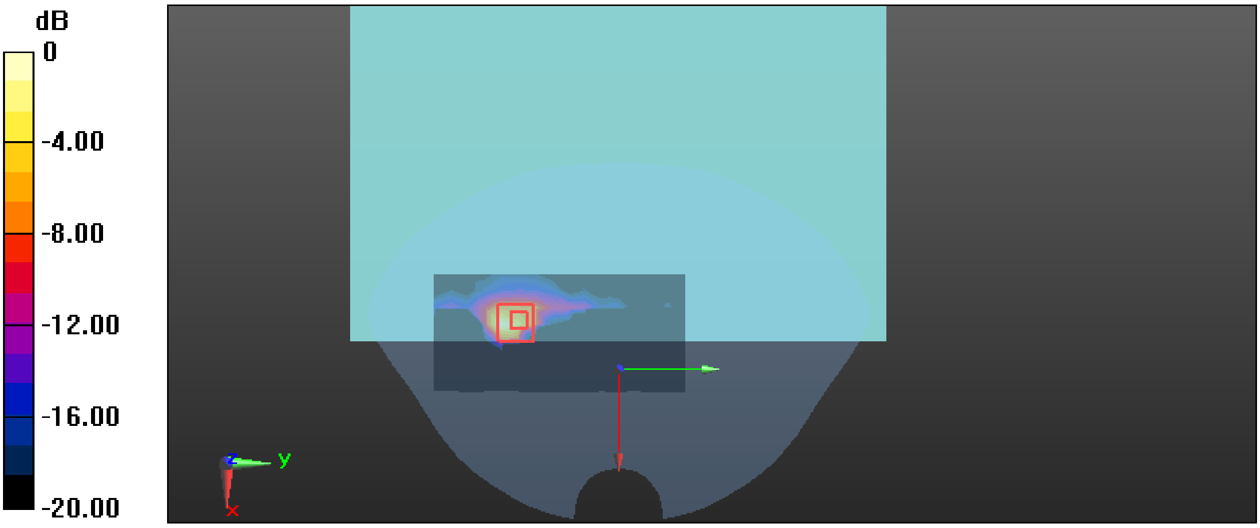
Communication System: UID 0, 802.11 a (0); Frequency: 5785 MHz;Duty Cycle: 1:1.025
Medium parameters used (interpolated): f = 5785 MHz; σ = 5.33 S/m; ε_r = 34.514; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.54, 5.16, 4.7) @ 5785 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.642 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 5.520 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.197 W/kg; SAR(10 g) = 0.049 W/kg
Maximum value of SAR (measured) = 0.675 W/kg



0 dB = 0.675 W/kg = -1.71 dBW/kg

Plot 20#: 5.8G WIFI Mid _ Body Top_ Chain 1

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

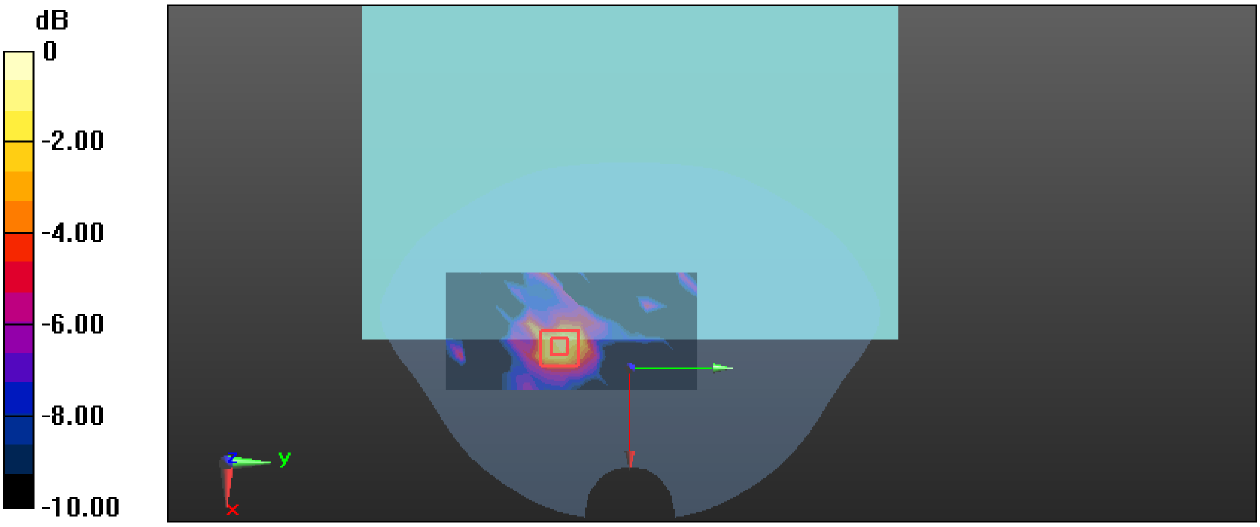
Communication System: UID 0, 802.11 a (0); Frequency: 5785 MHz;Duty Cycle: 1:1.025
Medium parameters used (interpolated): f = 5785 MHz; σ = 5.33 S/m; ε_r = 34.514; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.54, 5.16, 4.7) @ 5785 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x16x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.715 W/kg

Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.728 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 2.79 W/kg
SAR(1 g) = 0.294 W/kg; SAR(10 g) = 0.129 W/kg
Maximum value of SAR (measured) = 0.842 W/kg



0 dB = 0.842 W/kg = -0.75 dBW/kg

Plot 21#: BT Mid _ Body Back

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

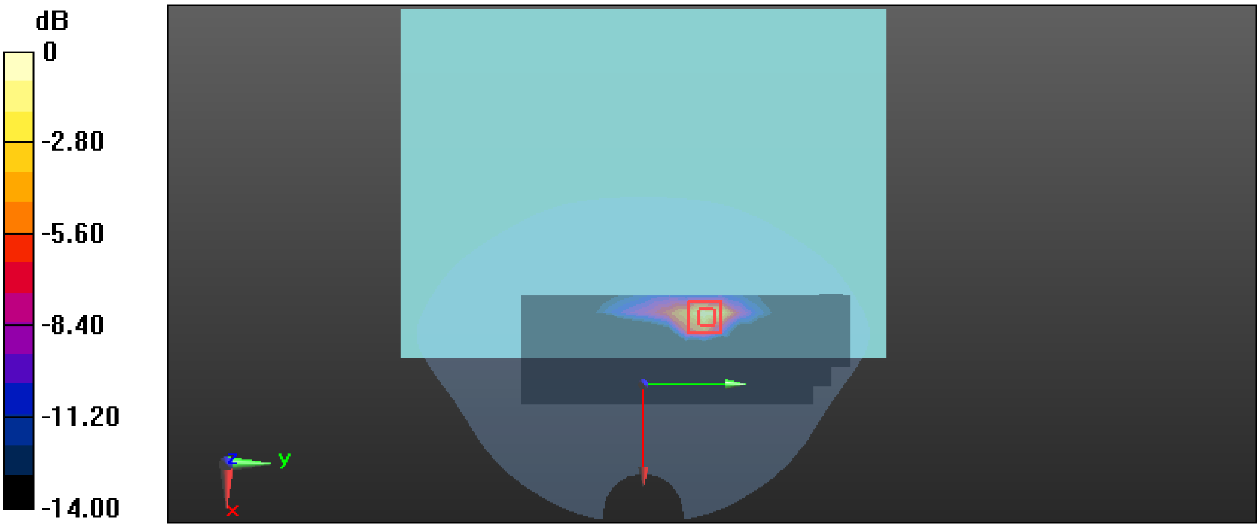
Communication System: UID 0, Bluetooth(GFSK,DH5) (0); Frequency: 2441 MHz;Duty Cycle: 1:1.18
Medium parameters used (interpolated): f = 2441 MHz; σ = 1.776 S/m; ε_r = 39.228; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.05, 7.92, 7.22) @ 2441 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (7x19x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.148 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.3000 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.233 W/kg
SAR(1 g) = 0.095 W/kg; SAR(10 g) = 0.038 W/kg
Maximum value of SAR (measured) = 0.175 W/kg



0 dB = 0.175 W/kg = -7.57 dBW/kg

Plot 22#: BT Mid _ Body Top

DUT: Personal Computer; Type: HNBMD14HAWREG; Serial: 2MBQ-1

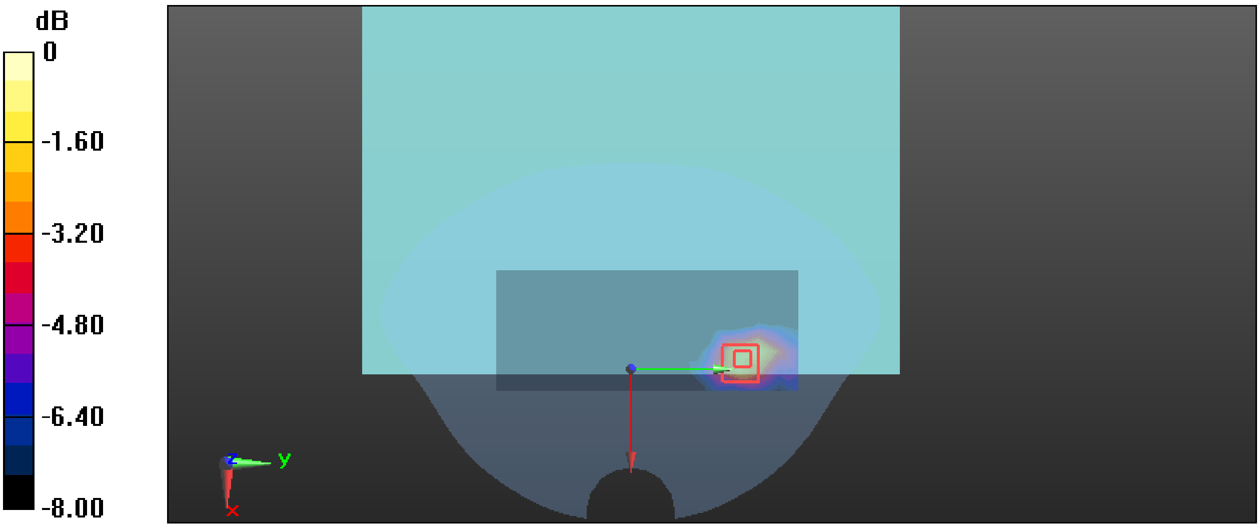
Communication System: UID 0, Bluetooth(GFSK,DH5) (0); Frequency: 2441 MHz;Duty Cycle: 1:1.18
Medium parameters used (interpolated): f = 2441 MHz; σ = 1.776 S/m; ε_r = 39.228; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.05, 7.92, 7.22) @ 2441 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (7x16x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.0129 W/kg

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.066 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.0310 W/kg
SAR(1 g) = 0.00538 W/kg; SAR(10 g) = 0.00132 W/kg
Maximum value of SAR (measured) = 0.0154 W/kg



0 dB = 0.0154 W/kg = -18.12 dBW/kg

APPENDIX A MEASUREMENT UNCERTAINTY

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

Measurement uncertainty evaluation for IEEE1528-2013 SAR test

Source of uncertainty	Tolerance/ uncertainty ± %	Probability distribution	Divisor	ci (1 g)	ci (10 g)	Standard uncertainty ± %, (1 g)	Standard uncertainty ± %, (10 g)
Measurement system							
Probe calibration	6.55	N	1	1	1	6.3	6.3
Axial Isotropy	4.7	R	√3	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	√3	0	0	0.0	0.0
Boundary effect	1.0	R	√3	1	1	0.6	0.6
Linearity	4.7	R	√3	1	1	2.7	2.7
Detection limits	1.0	R	√3	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	√3	1	1	0.0	0.0
Integration time	0.0	R	√3	1	1	0.0	0.0
RF ambient conditions – noise	1.0	R	√3	1	1	0.6	0.6
RF ambient conditions– reflections	1.0	R	√3	1	1	0.6	0.6
Probe positioner mech. Restrictions	0.8	R	√3	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.7	R	√3	1	1	3.9	3.9
Post-processing	2.0	R	√3	1	1	1.2	1.2
Test sample related							
Test sample positioning	2.8	N	1	1	1	2.8	2.8
Device holder uncertainty	6.3	N	1	1	1	6.3	6.3
Drift of output power	5.0	R	√3	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	√3	1	1	2.3	2.3
Liquid conductivity target)	5.0	R	√3	0.64	0.43	1.8	1.2
Liquid conductivity meas.)	2.5	N	1	0.64	0.43	1.6	1.1
Liquid permittivity target)	5.0	R	√3	0.6	0.49	1.7	1.4
Liquid permittivity meas.)	2.5	N	1	0.6	0.49	1.5	1.2
Combined standard uncertainty		RSS				12.2	12.0
Expanded uncertainty 95 % confidence interval)						24.1	23.7

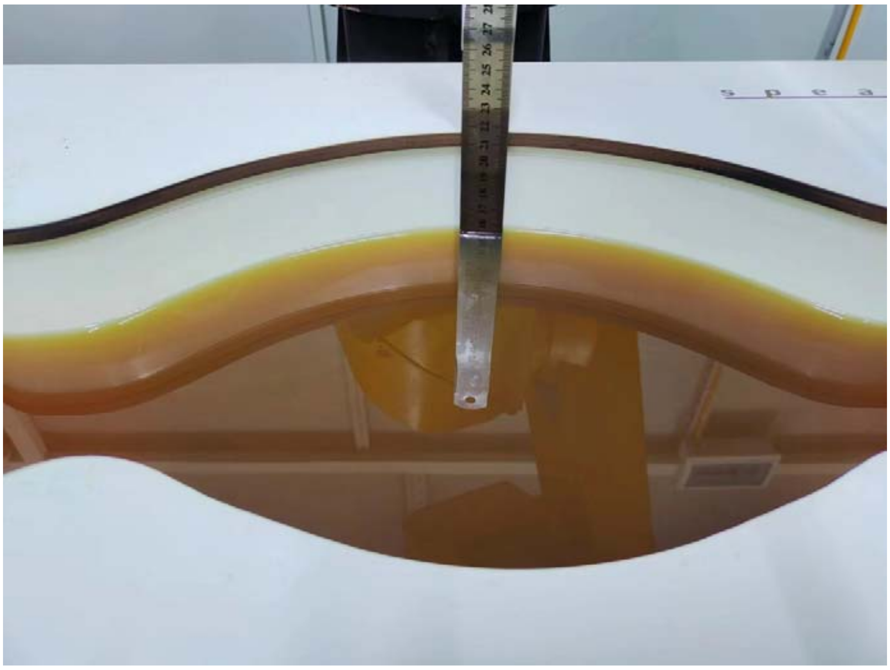
Measurement uncertainty evaluation for IEC62209-1 SAR test

Source of uncertainty	Tolerance/ uncertainty ± %	Probability distribution	Divisor	ci (1 g)	ci (10 g)	Standard uncertainty ± %, (1 g)	Standard uncertainty ± %, (10 g)
Measurement system							
Probe calibration	6.55	N	1	1	1	6.3	6.3
Axial Isotropy	4.7	R	√3	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	√3	0	0	0.0	0.0
Boundary effect	1.0	R	√3	1	1	0.6	0.6
Linearity	4.7	R	√3	1	1	2.7	2.7
Detection limits	1.0	R	√3	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	√3	1	1	0.0	0.0
Integration time	0.0	R	√3	1	1	0.0	0.0
RF ambient conditions – noise	1.0	R	√3	1	1	0.6	0.6
Probe positioning with respect to phantom shell	6.7	R	√3	1	1	3.9	3.9
Probe positioner mech. Restrictions	0.8	R	√3	1	1	0.5	0.5
RF ambient conditions– reflections	1.0	R	√3	1	1	0.6	0.6
Post-processing	2.0	R	√3	1	1	1.2	1.2
Test sample related							
Test sample positioning	2.8	N	1	1	1	2.8	2.8
Device holder uncertainty	6.3	N	1	1	1	6.3	6.3
Drift of output power	5.0	R	√3	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	√3	1	1	2.3	2.3
Liquid conductivity target)	5.0	R	√3	0.64	0.43	1.8	1.2
Liquid conductivity meas.)	2.5	N	1	0.64	0.43	1.6	1.1
Liquid permittivity target)	5.0	R	√3	0.6	0.49	1.7	1.4
Liquid permittivity meas.)	2.5	N	1	0.6	0.49	1.5	1.2
Combined standard uncertainty		RSS				12.2	12.0
Expanded uncertainty 95 % confidence interval)						24.0	23.6

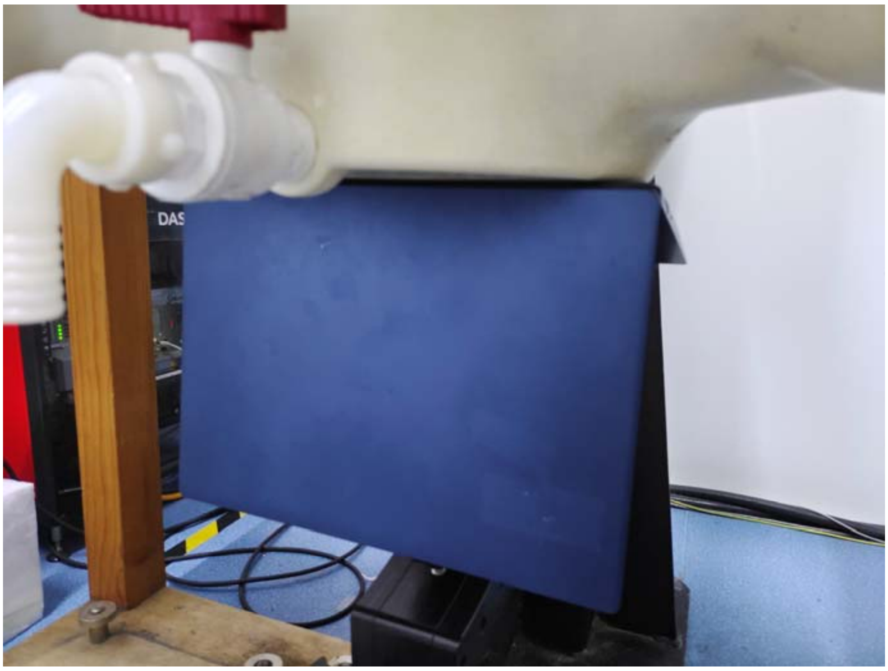
APPENDIX B EUT TEST POSITION PHOTOS

Liquid depth ≥ 15cm

Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412



Body Back Setup Photo (0mm)



Body Top Setup Photo (0mm)

APPENDIX C CALIBRATION CERTIFICATES

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **BACL**
Shenzhen

Certificate No. **EX-7329_Mar24**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:7329
Calibration procedure(s)	QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6, QA CAL-25.v8 Calibration procedure for dosimetric E-field probes
Calibration date	March 27, 2024

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laborabry facility: environment temperature (22 ± 3) °C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	30-Mar-23 (No. 217-03804/03805)	Mar-24
Power sensor NRP-Z91	SN: 103244	30-Mar-23 (No. 217-03804)	Mar-24
OCP DAK-3.5 (weighted)	SN: 1249	05-Oct-23 (OCP-DAK3.5-1249_Oct23)	Oct-24
OCP DAK-12	SN: 1016	05-Oct-23 (OCP-DAK12-1016_Oct23)	Oct-24
Reference 20 dB Attenuator	SN: CC2552 (20x)	30-Mar-23 (No. 217-03809)	Mar-24
DAE4	SN: 660	23-Feb-24 (No. DAE4-660_Feb24)	Feb-25
Reference Probe EX3DV4	SN: 7349	03-Nov-23 (No. EX3-7349_Nov23)	Nov-24

Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-22)	In house check: Jun-24
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by	Joanna Lleshaj	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	

Issued: March 27, 2024

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: EX-7329_Mar24 Page 1 of 9

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: **SCS 0108**

Glossary

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\theta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices – Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. DCP does not depend on frequency nor media.
- *PAR*: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Parameters of Probe: EX3DV4 - SN:7329

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc ($k=2$)
Norm ($\mu V/(V/m)^2$) [A]	0.51	0.41	0.62	±10.1%
DCP (mV) [B]	99.8	102.9	106.5	±4.7%

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B $dB\sqrt{\mu V}$	C	D dB	VR mV	Max dev.	Max Unc[E] $k=2$
0	CW	X	0.00	0.00	1.00	0.00	141.4	±1.4%	±4.7%
		Y	0.00	0.00	1.00		139.4		
		Z	0.00	0.00	1.00		136.0		

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 5).
[B] Linearization parameter uncertainty for maximum specified field strength.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Parameters of Probe: EX3DV4 - SN:7329

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	-29.0°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

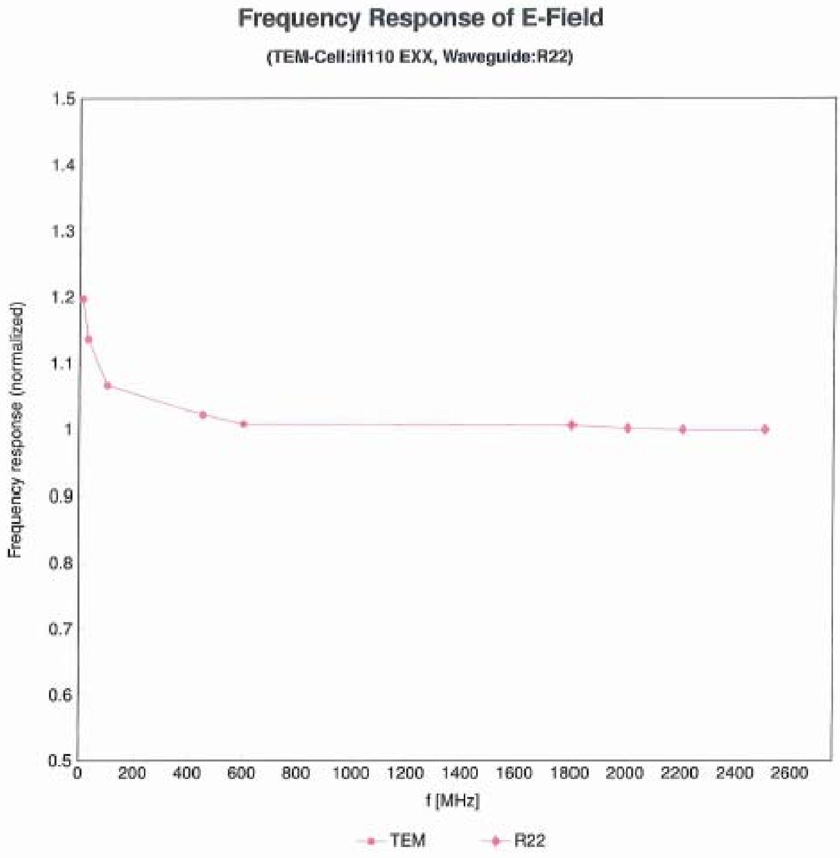
Note: Measurement distance from surface can be increased to 3–4 mm for an *Area Scan* job.

Parameters of Probe: EX3DV4 - SN:7329

Calibration Parameter Determined in Head Tissue Simulating Media

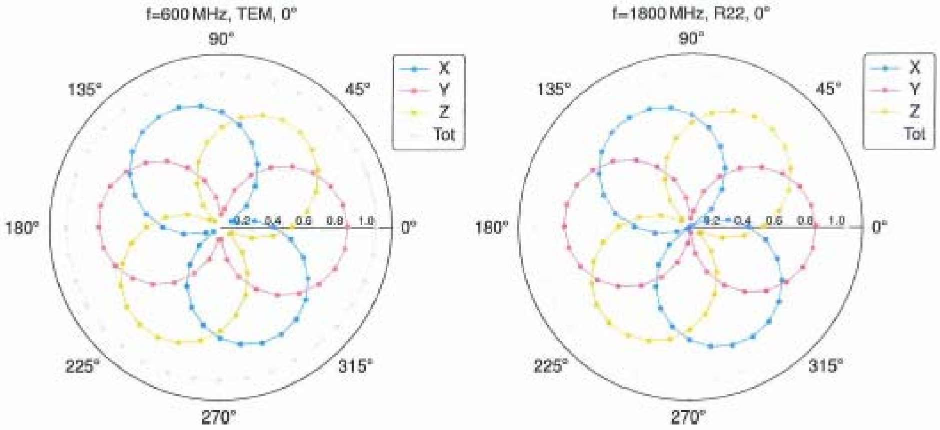
f (MHz)[C]	Relative Permittivity[F]	Conductivity[F] (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unc ($k = 2$)
750	41.9	0.89	8.79	10.07	9.05	0.38	1.27	±11.0%
900	41.5	0.97	8.42	9.50	8.93	0.37	1.27	±11.0%
1750	40.1	1.37	7.56	8.56	7.71	0.27	1.27	±11.0%
1900	40.0	1.40	7.37	8.32	7.54	0.29	1.27	±11.0%
2300	39.5	1.67	7.21	8.13	7.41	0.30	1.27	±11.0%
2450	39.2	1.80	7.05	7.92	7.22	0.29	1.27	±11.0%
2600	39.0	1.96	6.91	7.77	7.08	0.29	1.27	±11.0%
5250	35.9	4.71	4.96	5.61	5.16	0.38	1.53	±13.1%
5600	35.5	5.07	4.38	4.98	4.56	0.35	1.74	±13.1%
5750	35.4	5.22	4.54	5.16	4.70	0.35	1.83	±13.1%

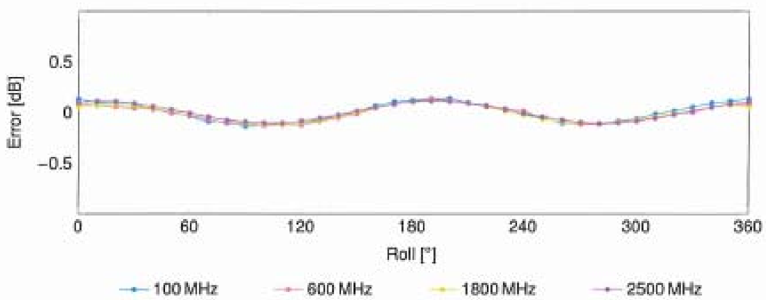
[C] Frequency validity above 300 MHz of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ±10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4–9 MHz, and ConvF assessed at 13 MHz is 9–19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.
[F] The probes are calibrated using tissue simulating liquids (TSL) that deviate for ε and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10% if SAR correction is applied.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz and below ±2% for frequencies between 3–6 GHz at any distance larger than half the probe tip diameter from the boundary.



Uncertainty of Frequency Response of E-field: ±6.3% (k=2)

Receiving Pattern (ϕ), $\vartheta = 0°$

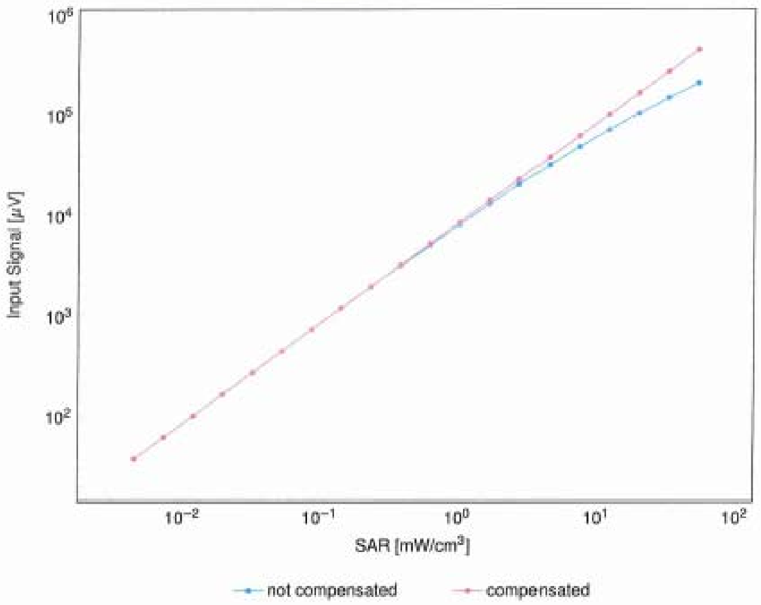


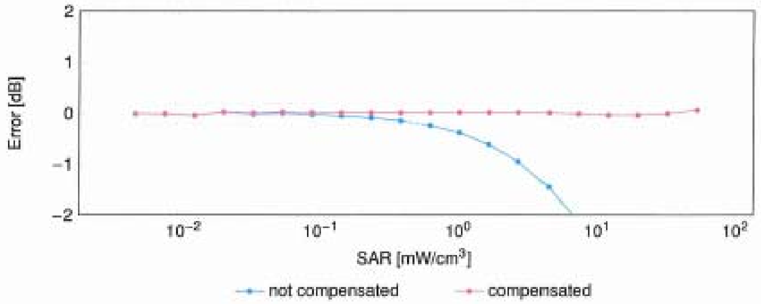


Uncertainty of Axial Isotropy Assessment: ±0.5% (k=2)

Dynamic Range f(SAR_{head})

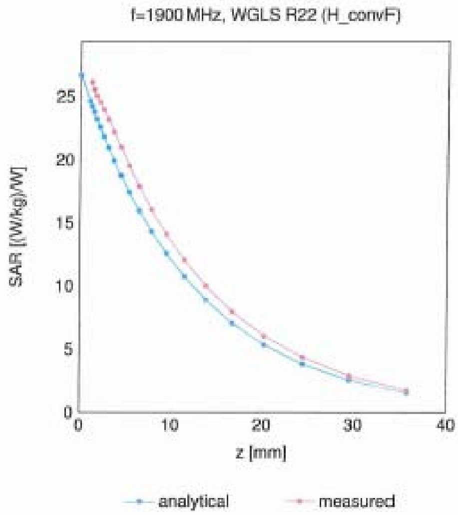
(TEM cell, f_{eval} = 1900 MHz)



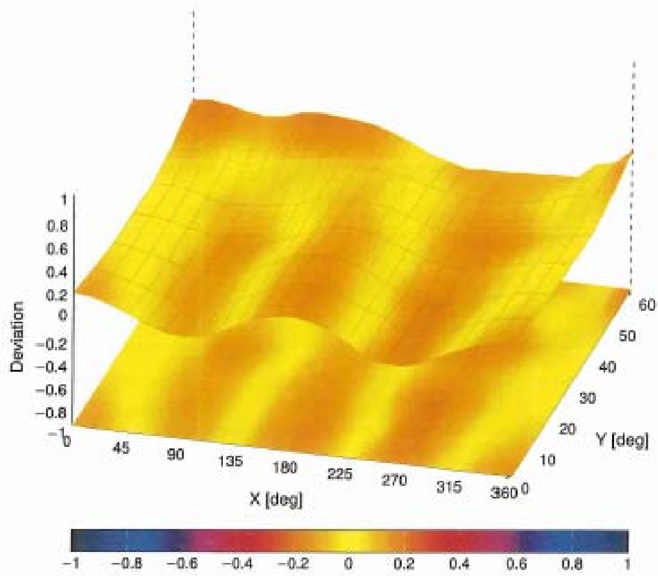


Uncertainty of Linearity Assessment: ±0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±2.6% (k=2)

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Accreditation No.: **SCS 0108**

Client **BACL**
Sunnyvale, USA

Certificate No. **D2450V2-1102_Mar23**

CALIBRATION CERTIFICATE

Object	D2450V2 - SN:1102
Calibration procedure(s)	QA CAL-05.v12 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz
Calibration date:	March 27, 2023

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	10-Jan-23 (No. EX3-7349_Jan23)	Jan-24
DAE4	SN: 601	19-Dec-22 (No. DAE4-601_Dec22)	Dec-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: March 27, 2023

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D2450V2-1102_Mar23 Page 1 of 6

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

c) DASY System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.0 ± 6 %	1.81 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	12.9 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**50.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.1 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.9 Ω + 4.8 jΩ
Return Loss	- 24.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.155 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 27.03.2023

Test Laboratory: SPEAG, Zurich, Switzerland

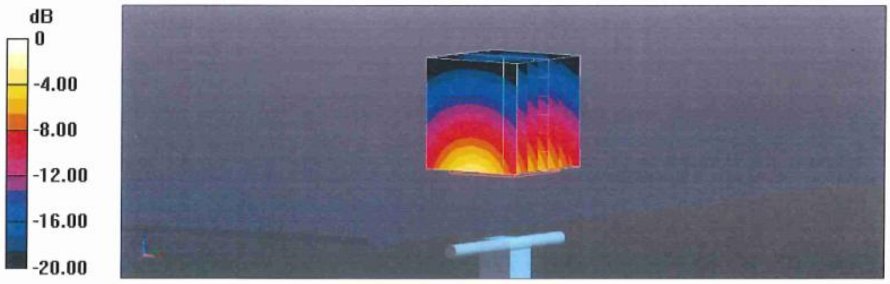
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:1102

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.81 S/m; ε_r = 38; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.88, 7.88, 7.88) @ 2450 MHz; Calibrated: 10.01.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

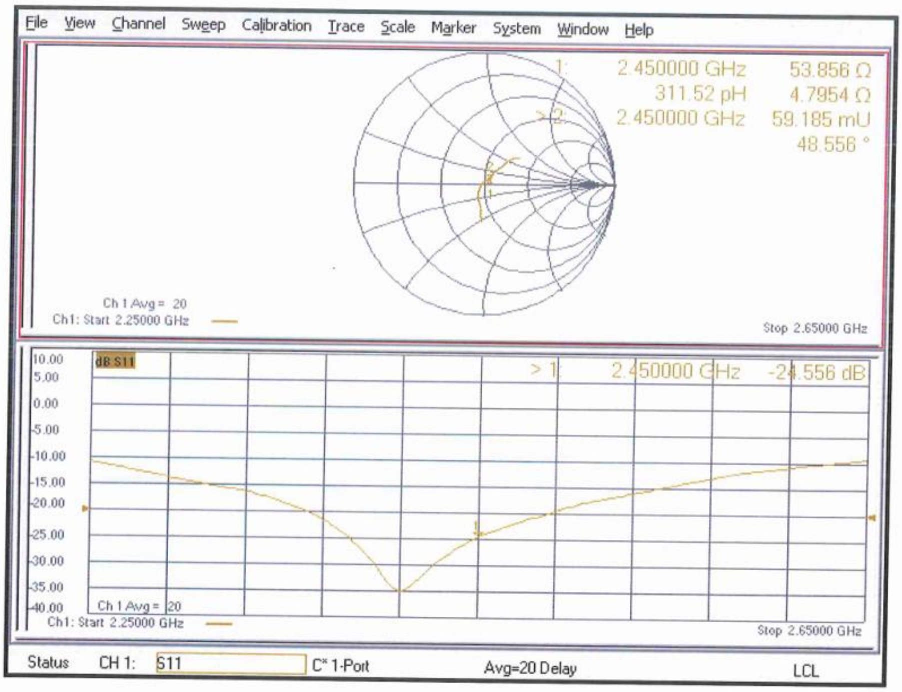
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 115.0 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 24.7 W/kg
SAR(1 g) = 12.9 W/kg; SAR(10 g) = 6.07 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 51.9%
Maximum value of SAR (measured) = 20.7 W/kg



0 dB = 20.7 W/kg = 13.16 dBW/kg

Certificate No: D2450V2-1102_Mar23 Page 5 of 6

Impedance Measurement Plot for Head TSL



Certificate No: D2450V2-1102_Mar23 Page 6 of 6

D2450V2 - SN:1102 Extended Dipole Calibrations

DUT Code:	ADK	Cal Date:	2024/3/26
Description	Antenna - Dipole	Temperature:	23.9℃
Model	D2450V2	Humidity:	51%
Manufacturer	SPEAG	Pressure	101.9 kPa
Certificate No.:	D2450V2-1102_Mar23	Tester:	Karl Gong (signature)

TEST SPECIFICATIONS

Specification:	WP 438 SAR Dipole Verification	Version:	2020 - Rev 0
Specification:		Version:	

TEST PARAMETERS

Device Received In Tolerance:	Yes	Calibrated Frequency Range:	N/A	Next Cal Due Date:	2024/3/26

Equipment Used to perform Measure

Item:	Network Analyzer	Identifier:	NAM	Model:	8753B	Last Cal:	2023/10/17	Cal Due:	2024/10/16
Item:	Calibration/Verification - Kit	Identifier:	NAM	Model:	85032F	Last Cal:	NCR	Cal Due:	NCR
Item:	Terminator	Identifier:	NANA	Model:	85032-10003	Last Cal:	2023/4/29	Cal Due:	2024/4/28
Item:		Identifier:		Model:		Last Cal:		Cal Due:	
Item:		Identifier:		Model:		Last Cal:		Cal Due:	

COMMENTS, OPINIONS and INTERPRETATIONS

None

Measurement Uncertainty

	Probability Distribution	Impedance (dB)	Insertion Loss（dB）	Value (dB)	Value (+/- %)
Expanded uncertainty U (level of confidebce = 95%)	Normal(k=2)			0.93	

RESULTS

Pass

This measurement was a calibration verification. (Instrument parameters are within tolerances.)
Measurements are traceable to the international System of Units (SI) via NIST

CALIBRATION DATA ATTACHED

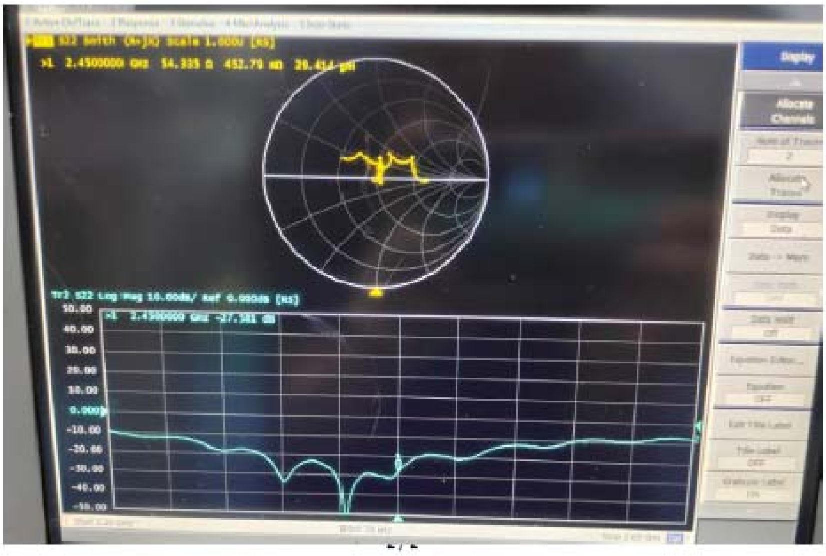
1 / 2

Per FCC KDB 865664 D01, calibration intervals of up to 3 years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements.

1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20 dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 3-year calibration period from calibration date.

		Return Loss		Real Impedence	Imaginary Impedence
D2450V2 - SN:1102	Measured Value (dB)	-27.581	Measured Value (Ω)	54.335	0.453
	Target Value (dB)	-24.556	Target Value (Ω)	53.856	4.795
	Devation (%)	12.319	Devation (Ω)	0.479	-4.342
	Limit (%)	±20	Limit (Ω)	5	5
	Limit (< dB)	20	Results	Pass	Pass
	Results	Pass			



In Collaboration with speag CALIBRATION LABORATORY

中国认可 国际互认 校准 CALIBRATION CNAS L0570

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E-mail: emf@caict.ac.cn http://www.caic.ac.cn

Client **BACL** Certificate No: **J23Z60368**

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN: 1245
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	August 23, 2023

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	22-Sep-22 (CTTL, No.J22X09561)	Sep-23
Power sensor NRP8S	104291	22-Sep-22 (CTTL, No.J22X09561)	Sep-23
Reference Probe EX3DV4	SN 3617	31-Mar-23(CTTL-SPEAG,No.Z23-60161)	Mar-24
DAE4	SN 1556	11-Jan-23(CTTL-SPEAG,No.Z23-60034)	Jan-24
Secondary Standards	**ID #**	**Cal Date (Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	05-Jan-23 (CTTL, No. J23X00107)	Jan-24
NetworkAnalyzer E5071C	MY46110673	10-Jan-23 (CTTL, No. J23X00104)	Jan-24

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: August 30, 2023

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices- Part 1528: Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020

b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

c) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.2 ± 6 %	4.63 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5250MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.84 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**78.0 W/kg ± 24.4 % (*k*=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.22 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.1 W/kg ± 24.2 % (*k*=2)**

Certificate No: J23Z60368 Page 3 of 8

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Head TSL parameters at 5600MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	5.00 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5600MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.15 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.0 W/kg ± 24.4 % (*k*=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.8 W/kg ± 24.2 % (*k*=2)**

Head TSL parameters at 5750MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.4 ± 6 %	5.16 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5750MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.83 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**77.8 W/kg ± 24.4 % (*k*=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.19 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**21.7 W/kg ± 24.2 % (*k*=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL at 5250MHz

Impedance, transformed to feed point	47.0Ω- 2.60jΩ
Return Loss	- 27.8dB

Antenna Parameters with Head TSL at 5600MHz

Impedance, transformed to feed point	49.8Ω+ 3.05jΩ
Return Loss	- 30.3dB

Antenna Parameters with Head TSL at 5750MHz

Impedance, transformed to feed point	51.9Ω+ 0.96jΩ
Return Loss	- 33.5dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.101 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feed-point may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Date: 2023-08-23

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1245

Communication System: CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz

Medium parameters used: f = 5250 MHz; σ = 4.627 S/m; ε_r = 35.17; ρ = 1000 kg/m^3

Medium parameters used: f = 5600 MHz; σ = 5 S/m; ε_r = 34.58; ρ = 1000 kg/m^3

Medium parameters used: f = 5750 MHz; σ = 5.162 S/m; ε_r = 34.36; ρ = 1000 kg/m^3

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(5.5, 5.5, 5.5) @ 5250 MHz; ConvF(5.01, 5.01, 5.01) @ 5600 MHz; ConvF(5.15, 5.15, 5.15) @ 5750 MHz; Calibrated: 2023-03-31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2023-01-11
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration /Pin=100mW, d=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 61.63 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 31.2 W/kg

SAR(1 g) = 7.84 W/kg; SAR(10 g) = 2.22 W/kg

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 65.4%

Maximum value of SAR (measured) = 18.5 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 61.43 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 35.6 W/kg

SAR(1 g) = 8.15 W/kg; SAR(10 g) = 2.3 W/kg

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 62.4%

Maximum value of SAR (measured) = 19.7 W/kg

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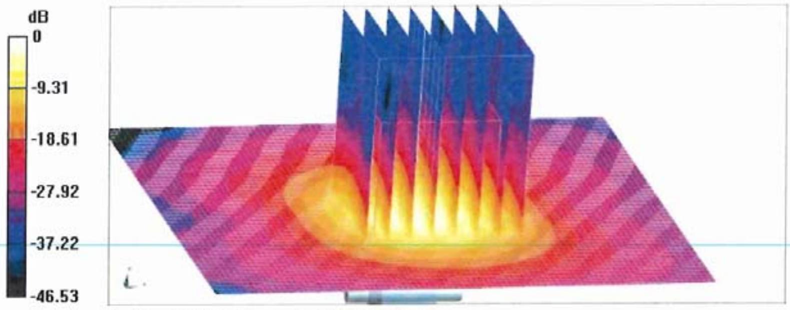
Dipole Calibration /Pin=100mW, d=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 61.00 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 36.0 W/kg
SAR(1 g) = 7.83 W/kg; SAR(10 g) = 2.19 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 61%
Maximum value of SAR (measured) = 19.8 W/kg



0 dB = 19.8 W/kg = 12.97 dBW/kg

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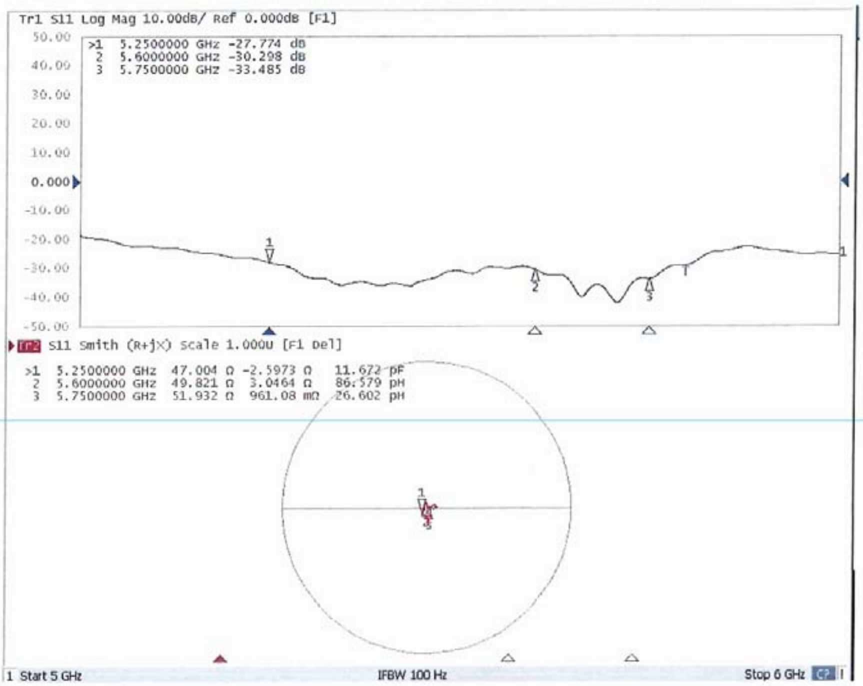
Impedance Measurement Plot for Head TSL



Certificate No: J23Z60368 Page 8 of 8

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