FCC SAR TEST REPORT

FCC ID	:	RAS-MT7920
Equipment	:	2TX 11ax (WiFi6) BW80 + BT/BLE Combo Card
Brand Name	:	MediaTek
Model Name	:	MT7920
Marketing Name	:	2TX 11ax (WiFi6) BW80 + BT/BLE Combo Card
Applicant	:	MediaTek Inc. No.1, Dusing 1st Rd., Hsinchu Science Park,Hsinchu City 30078, Taiwan
Manufacturer	:	MediaTek Inc. No.1, Dusing 1st Rd., Hsinchu Science Park,Hsinchu City 30078, Taiwan
Standard	:	FCC 47 CFR Part 2 (2.1093)

The product was received on Mar. 19, 2024 and testing was started from Mar. 21, 2024 and completed on Mar. 27, 2024. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Laboratory, the test report shall not be reproduced except in full.

Approved by: Cona Huang / Deputy Manager

Testing Laboratory 3786

Sporton International Inc. Wensan Laboratory
No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan

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History of this test report

Report No.	Version	Description	Issued Date
FA431211-01	01	Initial issue of report	May 13, 2024

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) for **MediaTek Inc., 2TX 11ax (WiFi6) BW80 + BT/BLE Combo Card, MT7920**, are as follows.

<table>
<tr><th rowspan="3">Equipment Class</th><th rowspan="3" colspan="2">Frequency Band</th><th>Highest SAR Summary</th><th rowspan="3">Highest Simultaneous Transmission
1g SAR (W/kg)</th></tr>
<tr><th>Body
(Separation 5mm)</th></tr>
<tr><th>1g SAR (W/kg)</th></tr>
<tr><td>DTS</td><td rowspan="2">WLAN</td><td>2.4GHz WLAN</td><td>0.38</td><td>0.69</td></tr>
<tr><td>NII</td><td>5GHz WLAN</td><td>0.74</td><td>1.57</td></tr>
<tr><td>DSS</td><td>2.4GHz Band</td><td>Bluetooth</td><td>0.23</td><td>1.57</td></tr>
<tr><td colspan="3">Date of Testing:</td><td colspan="2">2024/03/21 ~ 2024/03/27</td></tr>
</table>

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation and the FCC designation No. TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test. This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR, 4.0 W/kg for Product Specific 10g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications

Reviewed by: Jason Wang
Report Producer: Daisy Peng

2. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards, the below KDB standard may not including in the TAF code without accreditation.

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02

3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	2TX 11ax (WiFi6) BW80 + BT/BLE Combo Card
Brand Name	MediaTek
Model Name	MT7920
Marketing Name	2TX 11ax (WiFi6) BW80 + BT/BLE Combo Card
FCC ID	RAS-MT7920
Wireless Technology and Frequency Range	WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3 GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6 GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz WLAN 5.9 GHz Band: 5850 MHz ~ 5895 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Mode	WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/HE20/HE40/HE80 Bluetooth BR/EDR/LE
Remark: 1. There two kinds of antenna performing SAR testing	

4. RF Exposure Limits

4.1 Uncontrolled Environment

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

4.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

1. Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

5. Specific Absorption Rate (SAR)

5.1 Introduction

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

5.2 SAR Definition

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

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

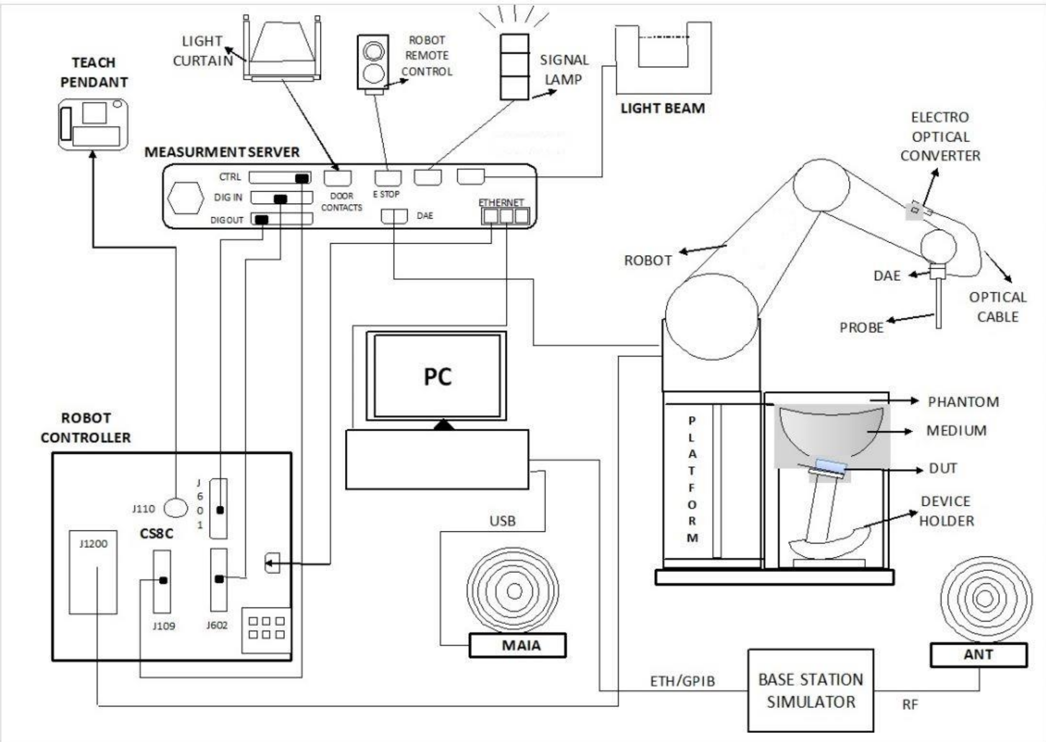
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

6. System Description and Setup

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



- The DASY system in SAR Configuration is shown above
- 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 amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- 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 windows software and the DASY 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.

6.1 Test Site Location

The SAR measurement facilities used to collect data are within both Sporton Lab list below test site location are accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190 and 3786) and the FCC designation No. TW1190 and TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Laboratory	EMC & Wireless Communications Laboratory		Wensan Laboratory				
Test Site Location	TW1190 No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan		TW3786 No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan				
Test Site No.	SAR01-HY	SAR03-HY	SAR08-HY	SAR09-HY	SAR15-HY	SAR18-HY	SAR21-HY
	SAR04-HY	SAR05-HY	SAR11-HY	SAR12-HY	SAR16-HY	SAR19-HY	SAR22-HY
	SAR06-HY	SAR10-HY	SAR13-HY	SAR14-HY	SAR17-HY	SAR20-HY	

6.2 E-Field Probe

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

<ES3DV3 Probe>

Construction	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	4 MHz – 4 GHz; Linearity: ±0.2 dB (30 MHz – 4 GHz)	
Directivity	±0.2 dB in TSL (rotation around probe axis) ±0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	5 μW/g – >100 mW/g; Linearity: ±0.2 dB	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 3.9 mm (body: 12 mm) Distance from probe tip to dipole centers: 3.0 mm	

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	4 MHz – >6 GHz Linearity: ±0.2 dB (30 MHz – 6 GHz)	
Directivity	±0.3 dB in TSL (rotation around probe axis) ±0.5 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 μW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 μW/g)	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

6.3 Data Acquisition Electronics (DAE)

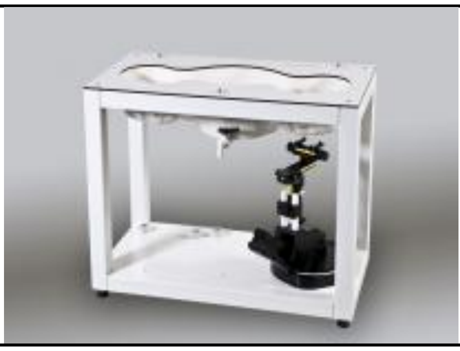
The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an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

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

Fig 5.1 Photo of DAE

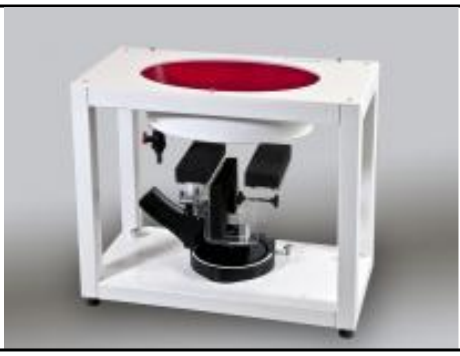
6.4 Phantom

<SAM Twin Phantom>

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

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

<ELI Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)	
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm	

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

6.5 Device Holder

<Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.

Mounting Device for Hand-Held Transmitters

Mounting Device Adaptor for Wide-Phones

<Mounting Device for Laptops and other Body-Worn Transmitters>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.

Mounting Device for Laptops

7. Measurement Procedures

The measurement procedures are as follows:

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
(b) Place the EUT in the positions as Appendix D demonstrates.
(c) Set scan area, grid size and other setting on the DASY software.
(d) Measure SAR results for the highest power channel on each testing position.
(e) Find out the largest SAR result on these testing positions of each band
(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

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

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

7.1 Spatial Peak SAR Evaluation

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

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

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

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

7.2 Power Reference Measurement

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

7.3 Area Scan

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

Area scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

<table>
<tr><th></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td>Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td>Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">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.</td></tr>
</table>

7.4 Zoom Scan

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

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ $1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

7.5 Volume Scan Procedures

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

7.6 Power Drift Monitoring

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

8. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	2450MHz System Validation Kit(2)	D2450V2	736	Aug. 17, 2021	Aug. 14, 2024
SPEAG	5GHz System Validation Kit(2)	D5GHzV2	1128	Feb. 22, 2023	Feb. 20, 2025
SPEAG	5GHz System Validation Kit	D5GHzV2	1171	Apr. 20, 2021	Apr. 17, 2024
SPEAG	Data Acquisition Electronics	DAE4	1707	Dec. 06, 2023	Dec. 05, 2024
SPEAG	Data Acquisition Electronics	DAE4	1805	May. 16, 2023	May. 15, 2024
SPEAG	Dosimetric E-Field Probe	EX3DV4	3931	Oct. 24, 2023	Oct. 23, 2024
SPEAG	Dosimetric E-Field Probe	EX3DV4	7793	Mar. 01, 2024	Feb. 28, 2025
Testo	Hygro meter	608-H1	45196600	Nov. 02, 2023	Nov. 01, 2024
R&S	BT Base Station	CBT	101136	Oct. 22, 2023	Oct. 21, 2024
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Sep. 27, 2023	Sep. 26, 2024
Keysight	ENA Network Analyzer	E5071C	MY46104758	Oct. 30, 2023	Oct. 29, 2024
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 19, 2023	Sep. 18, 2024
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3690	Aug. 09, 2023	Aug. 08, 2024
Anritsu	Power Meter	ML2495A	1419002	Aug. 17, 2023	Aug. 16, 2024
Anritsu	Power Sensor	MA2411B	1911176	Aug. 18, 2023	Aug. 17, 2024
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jul. 10, 2023	Jul. 09, 2024
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 16, 2023	Oct. 15, 2024
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Warison	Directional Coupler	WCOU-10-50S-10	WR889BMC4B1	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

General Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.
2. The dipole calibration interval can be extended to 3 years with justification according to KDB 865664 D01. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.

9. System Verification

9.1 Tissue Verification

The tissue dielectric parameters of tissue-equivalent media used for SAR measurements must be characterized within a temperature range of 18℃ to 25℃, measured with calibrated instruments and apparatuses, such as network analyzers and temperature probes. The temperature of the tissue-equivalent medium during SAR measurement must also be within 18℃ to 25℃ and within ± 2℃ of the temperature when the tissue parameters are characterized. The tissue dielectric measurement system must be calibrated before use. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements.
The liquid tissue depth was at least 15cm in the phantom for all SAR testing

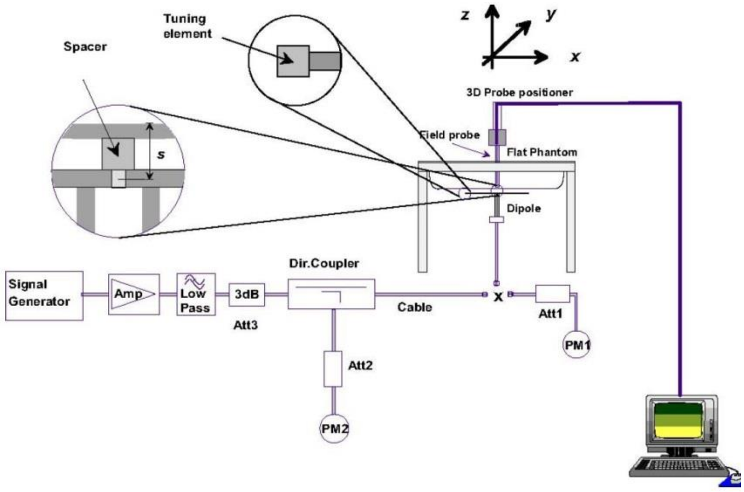
<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
2450	22.5	1.820	39.000	1.80	39.20	1.11	-0.51	±5	2024/3/21
2450	22.7	1.790	40.000	1.80	39.20	-0.56	2.04	±5	2024/3/27
5250	22.6	4.810	36.600	4.71	35.95	2.12	1.81	±5	2024/3/22
5250	22.7	4.680	35.800	4.71	35.95	-0.64	-0.42	±5	2024/3/23
5250	22.6	4.670	36.800	4.71	35.95	-0.85	2.36	±5	2024/3/26
5600	22.6	5.180	36.100	5.07	35.50	2.17	1.69	±5	2024/3/22
5600	22.7	5.080	35.200	5.07	35.50	0.20	-0.85	±5	2024/3/23
5600	22.6	5.050	36.300	5.07	35.50	-0.39	2.25	±5	2024/3/26
5750	22.6	5.350	35.900	5.22	35.35	2.49	1.56	±5	2024/3/22
5750	22.7	5.260	34.900	5.22	35.35	0.77	-1.27	±5	2024/3/23
5750	22.6	5.190	36.100	5.22	35.35	-0.57	2.12	±5	2024/3/26
5800	22.7	5.330	34.800	5.27	35.30	1.14	-1.42	±5	2024/3/23

9.2 System Performance Check Results

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

Date	Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)	Test Site
2024/3/21	2450	50	D2450V2-736	EX3DV4 - SN3931	DAE4 Sn1805	2.500	54.200	50	-7.75	SAR-14
2024/3/27	2450	50	D2450V2-736	EX3DV4 - SN7793	DAE4 Sn1707	2.550	54.200	51	-5.90	SAR-13
2024/3/22	5250	50	D5GHzV2-1171-5250	EX3DV4 - SN3931	DAE4 Sn1805	3.740	80.300	74.8	-6.85	SAR-14
2024/3/23	5250	50	D5GHzV2-1171-5250	EX3DV4 - SN3931	DAE4 Sn1805	3.730	80.300	74.6	-7.10	SAR-14
2024/3/26	5250	50	D5GHzV2-1171-5250	EX3DV4 - SN7793	DAE4 Sn1707	3.930	80.300	78.6	-2.12	SAR-13
2024/3/22	5600	50	D5GHzV2-1171-5600	EX3DV4 - SN3931	DAE4 Sn1805	4.280	83.400	85.6	2.64	SAR-14
2024/3/23	5600	50	D5GHzV2-1171-5600	EX3DV4 - SN3931	DAE4 Sn1805	4.240	83.400	84.8	1.68	SAR-14
2024/3/26	5600	50	D5GHzV2-1171-5600	EX3DV4 - SN7793	DAE4 Sn1707	4.550	83.400	91	9.11	SAR-13
2024/3/22	5750	50	D5GHzV2-1171-5750	EX3DV4 - SN3931	DAE4 Sn1805	3.880	80.400	77.6	-3.48	SAR-14
2024/3/23	5750	50	D5GHzV2-1171-5750	EX3DV4 - SN3931	DAE4 Sn1805	3.810	80.400	76.2	-5.22	SAR-14
2024/3/26	5750	50	D5GHzV2-1171-5750	EX3DV4 - SN7793	DAE4 Sn1707	3.910	80.400	78.2	-2.74	SAR-13
2024/3/23	5800	50	D5GHzV2-1128-5800	EX3DV4 - SN7793	DAE4 Sn1707	4.120	78.700	82.4	4.70	SAR-13



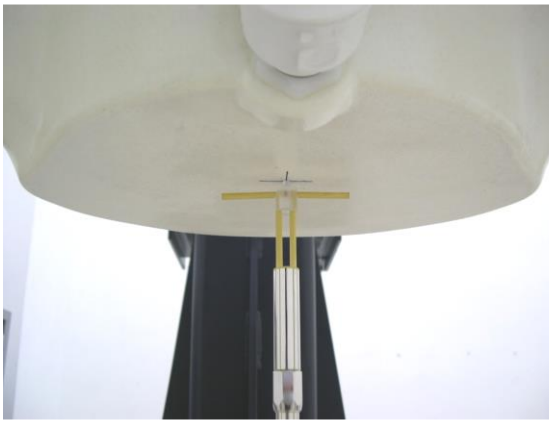


Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

10. WiFi/Bluetooth Output Power (Unit: dBm)

General Note:

1. For each antenna, transmit power in SISO operation is larger than (or equal to) the power in MIMO operation, RF exposure compliance of MIMO mode can be deduced from the compliance simultaneous transmission of antennas operating in SISO mode.
2. Per KDB 248227 D01v02r02, the simultaneous SAR provisions in KDB publication 447498 should be applied to determine simultaneous transmission SAR test exclusion for WiFi MIMO. If the sum of 1g single transmission chain SAR measurements is < 1.6W/kg and SAR peak to location ratio ≤ 0.04, no additional SAR measurements for MIMO.
3. The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) 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/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, additional output power measurements were not necessary.
4. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
5. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
6. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, 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/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
7. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
   a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
   b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
   c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
8. Per 201904 TCBC workshops, General principles of FCC KDB Publication 248227 D01 can be applied to determine the SAR Initial Test Configurations and test reduction for 802.11ax SAR testing. For the table below the 802.11ax maximum power is SU (non-OFDMA), and the SU maximum power also higher than RU (OFDMA)
9. In applying the test guidance, the IEEE 802.11 mode with the maximum output power (out of all modes) should be considered for testing
10. For modes with the same maximum output power, the guidance from section 5.3.2 a) of FCC KDB Publication 248227 D01 should be applied, with 802.11ax being considered as the highest 802.11 mode for the appropriate frequency bands
11. When SAR testing for 802.11ax is required
    a. If the maximum output power is highest for OFDMA scenarios, choose the tone size with the maximum number of tones and the highest maximum output power
    b. Otherwise, consider the fully allocated channel for SAR testing
    c. When SAR testing is required on RU sizes less than the fully allocated channel, use the RU number closest to the middle of the channel, choosing the higher RU number when two RUs are equidistant to the middle of the channel

<2.4GHz WLAN>

				Ant 0			Ant 1			Ant 0+1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	15.24	15.50	100.00	15.31	15.50	100.00	not required	18.50	not required
		6	2437	15.32	15.50		15.41	15.50			18.50	
		11	2462	15.25	15.50		15.35	15.50			18.50	
		12	2467	15.28	15.50		15.27	15.50			18.50	
		13	2472	11.57	12.00		11.43	12.00			15.00	
	802.11g 6Mbps	1	2412	not required	15.50	not required	not required	15.50	not required		18.50	
		6	2437		15.50			15.50			18.50	
		11	2462		15.50			15.50			18.50	
		12	2467		15.50			15.50			18.50	
		13	2472		12.00			12.00			15.00	
	802.11ac-VHT20 MCS0	1	2412		15.50			15.50			18.50	
		6	2437		15.50			15.50			18.50	
		11	2462		15.50			15.50			18.50	
		12	2467		15.50			15.50			18.50	
		13	2472		12.00			12.00			15.00	
	802.11ac-VHT40 MCS0	3	2422		15.50			15.50			18.50	
		6	2437		15.50			15.50			18.50	
		9	2452		15.50			15.50			18.50	
		10	2457		13.00			13.00			16.00	
		11	2462		12.00			12.00			15.00	
	802.11ax-HE20 MCS0	1	2412		15.50			15.50			18.50	
		6	2437		15.50			15.50			18.50	
		11	2462		15.50			15.50			18.50	
		12	2467		15.50			15.50			18.50	
		13	2472		12.00			12.00			15.00	
	802.11ax-HE40 MCS0	3	2422		15.50			15.50			18.50	
		6	2437		15.50			15.50			18.50	
		9	2452		15.50			15.50			18.50	
		10	2457		13.00			13.00			16.00	
		11	2462		12.00			12.00			15.00	

<5.2GHz WLAN>

				Ant 0			Ant 1			Ant 0+1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN (FCC only)	802.11a 6Mbps	36	5180	not required	14.00	not required	not required	14.00	not required	not required	17.00	not required
		40	5200		14.00			14.00			17.00	
		44	5220		14.00			14.00			17.00	
		48	5240		14.00			14.00			17.00	
	802.11ac-VHT20 MCS0	36	5180		14.00			14.00			17.00	
		40	5200		14.00			14.00			17.00	
		44	5220		14.00			14.00			17.00	
		48	5240		14.00			14.00			17.00	
	802.11ac-VHT40 MCS0	38	5190		14.00			14.00			17.00	
		46	5230		14.00			14.00			17.00	
	802.11ac-VHT80 MCS0	42	5210		14.00			14.00			17.00	
	802.11ax-HE20 MCS0	36	5180		14.00			14.00			17.00	
		40	5200		14.00			14.00			17.00	
		44	5220		14.00			14.00			17.00	
		48	5240		14.00			14.00			17.00	
	802.11ax-HE40 MCS0	38	5190		14.00			14.00			17.00	
		46	5230		14.00			14.00			17.00	
	802.11ax-HE80 MCS0	42	5210		14.00			14.00			17.00	

<5.3GHz WLAN>

				Ant 0			Ant 1			Ant 0+1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	not required	14.00	not required	not required	14.00	not required	not required	17.00	not required
		56	5280		14.00			14.00			17.00	
		60	5300		14.00			14.00			17.00	
		64	5320		14.00			14.00			17.00	
	802.11ac-VHT20 MCS0	52	5260		14.00			14.00			17.00	
		56	5280		14.00			14.00			17.00	
		60	5300		14.00			14.00			17.00	
		64	5320		14.00			14.00			17.00	
	802.11ac-VHT40 MCS0	54	5270		14.00			14.00			17.00	
		62	5310		14.00			14.00			17.00	
	802.11ac-VHT80 MCS0	58	5290	13.55	14.00	100.00	13.73	14.00	100.00		17.00	
	802.11ax-HE20 MCS0	52	5260	not required	14.00	not required	not required	14.00	not required		17.00	
		56	5280		14.00			14.00			17.00	
		60	5300		14.00			14.00			17.00	
		64	5320		14.00			14.00			17.00	
	802.11ax-HE40 MCS0	54	5270		14.00			14.00			17.00	
		62	5310		14.00			14.00			17.00	
	802.11ax-HE80 MCS0	58	5290		14.00			14.00			17.00	

<5.5GHz WLAN>

				Ant 0			Ant 1			Ant 0+1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	not required	14.00	not required	not required	14.00	not required	not required	17.00	not required
		116	5580		14.00			14.00			17.00	
		124	5620		14.00			14.00			17.00	
		132	5660		14.00			14.00			17.00	
		144	5720		14.00			14.00			17.00	
	802.11ac-VHT20 MCS0	100	5500		14.00			14.00			17.00	
		116	5580		14.00			14.00			17.00	
		124	5620		14.00			14.00			17.00	
		132	5660		14.00			14.00			17.00	
		144	5720		14.00			14.00			17.00	
	802.11ac-VHT40 MCS0	102	5510		14.00			14.00			17.00	
		110	5550		14.00			14.00			17.00	
		126	5630		14.00			14.00			17.00	
		134	5670		14.00			14.00			17.00	
		142	5710		14.00			14.00			17.00	
	802.11ac-VHT80 MCS0	106	5530	13.63	14.00	100.00	13.89	14.00	100.00		17.00	
		122	5610	13.96	14.00		13.71	14.00			17.00	
		138	5690	13.98	14.00		13.80	14.00			17.00	
	802.11ax-HE20 MCS0	100	5500	not required	14.00	not required	not required	14.00	not required		17.00	
		116	5580		14.00			14.00			17.00	
		124	5620		14.00			14.00			17.00	
		132	5660		14.00			14.00			17.00	
		144	5720		14.00			14.00			17.00	
	802.11ax-HE40 MCS0	102	5510		14.00			14.00			17.00	
		110	5550		14.00			14.00			17.00	
		126	5630		14.00			14.00			17.00	
		134	5670		14.00			14.00			17.00	
		142	5710		14.00			14.00			17.00	
	802.11ax-HE80 MCS0	106	5530		14.00			14.00			17.00	
		122	5610		14.00			14.00			17.00	
		138	5690		14.00			14.00			17.00	

<5.8GHz WLAN>

	Mode	Channel	Frequency (MHz)	Ant 0 Average power (dBm)	Ant 0 Tune-Up Limit	Ant 0 Duty Cycle %	Ant 1 Average power (dBm)	Ant 1 Tune-Up Limit	Ant 1 Duty Cycle %	Ant 0+1 Average power (dBm)	Ant 0+1 Tune-Up Limit	Ant 0+1 Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	not required	14.00	not required	not required	14.00	not required	not required	17.00	not required
		157	5785		14.00			14.00			17.00	
		165	5825		14.00			14.00			17.00	
	802.11n-HT20 MCS0	149	5745		14.00			14.00			17.00	
		157	5785		14.00			14.00			17.00	
		165	5825		14.00			14.00			17.00	
	802.11n-HT40 MCS0	151	5755		14.00			14.00			17.00	
		159	5795		14.00			14.00			17.00	
	802.11ac-VHT20 MCS0	149	5745		14.00			14.00			17.00	
		157	5785		14.00			14.00			17.00	
		165	5825		14.00			14.00			17.00	
	802.11ac-VHT40 MCS0	151	5755		14.00			14.00			17.00	
		159	5795		14.00			14.00			17.00	
	802.11ac-VHT80 MCS0	155	5775	13.75	14.00	100.00	13.69	14.00	100.00		17.00	
	802.11ax-HE20 MCS0	149	5745	not required	14.00	not required	not required	14.00	not required		17.00	
		157	5785		14.00			14.00			17.00	
		165	5825		14.00			14.00			17.00	
	802.11ax-HE40 MCS0	151	5755		14.00			14.00			17.00	
		159	5795		14.00			14.00			17.00	
	802.11ax-HE80 MCS0	155	5775		14.00			14.00			17.00	
	802.11be-EHT20 MCS0	149	5745		14.00			14.00			17.00	
		157	5785		14.00			14.00			17.00	
		165	5825		14.00			14.00			17.00	
	802.11be-EHT40 MCS0	151	5755		14.00			14.00			17.00	
		159	5795		14.00			14.00			17.00	
	802.11be-EHT80 MCS0	155	5775		14.00			14.00			17.00	

<5.9GHz WLAN UNII 4>

	Mode	Channel	Frequency (MHz)	Ant 0 Average power (dBm)	Ant 0 Tune-Up Limit	Ant 0 Duty Cycle %	Ant 1 Average power (dBm)	Ant 1 Tune-Up Limit	Ant 1 Duty Cycle %	Ant 0+1 Average power (dBm)	Ant 0+1 Tune-Up Limit	Ant 0+1 Duty Cycle %
5.9GHz WLAN UNII 4	802.11a 6Mbps	169	5845	not required	14.00	not required	not required	14.00	not required	not required	17.00	not required
		173	5865		14.00			14.00			17.00	
		177	5885		14.00			14.00			17.00	
	802.11ac-VHT20 MCS0	169	5845		14.00			14.00			17.00	
		173	5865		14.00			14.00			17.00	
		177	5885		14.00			14.00			17.00	
	802.11ac-VHT40 MCS0	167	5835		14.00			14.00			17.00	
		175	5875		14.00			14.00			17.00	
	802.11ac-VHT80 MCS0	171	5855	13.68	14.00	100.00	13.87	14.00	100.00		17.00	
	802.11ax-HE20 MCS0	169	5845	not required	14.00	not required	not required	14.00	not required		17.00	
		173	5865		14.00			14.00			17.00	
		177	5885		14.00			14.00			17.00	
	802.11ax-HE40 MCS0	167	5835		14.00			14.00			17.00	
		175	5875		14.00			14.00			17.00	
	802.11ax-HE80 MCS0	171	5855		14.00			14.00			17.00	

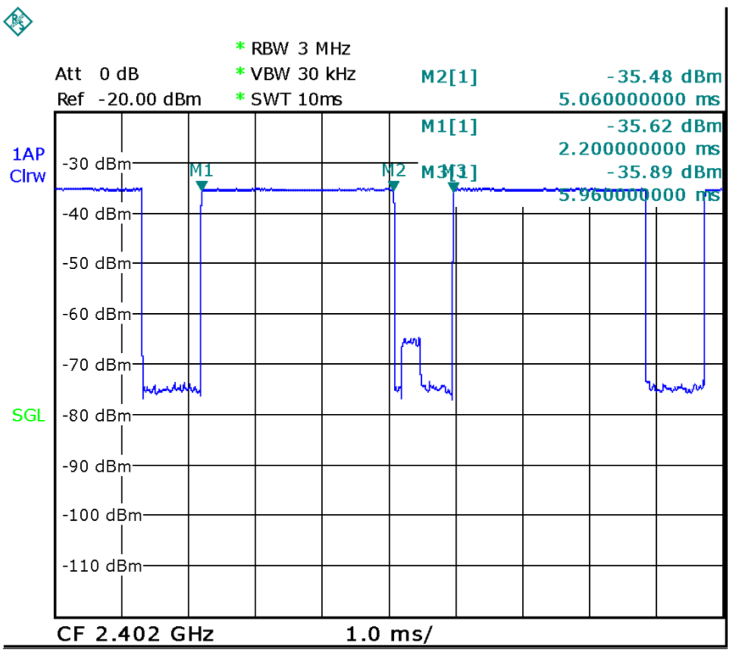
<2.4GHz Bluetooth>

				Ant 1		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
Bluetooth	BR / EDR 1Mbps	0	2402	12.72	13.00	76.06
		39	2441	12.78	13.00	
		78	2480	12.74	13.00	
	BR / EDR 2Mbps	0	2402	not required	12.00	not required
		39	2441		12.00	
		78	2480		12.00	
	BR / EDR 3Mbps	0	2402		12.00	
		39	2441		12.00	
		78	2480		12.00	
	LE 1Mbps	0	2402		12.00	
		19	2440		12.00	
		39	2480		12.00	
	LE 2Mbps	0	2402		12.00	
		19	2440		12.00	
		39	2480		12.00	

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps due to its highest average power and duty cycle is 76.06% considered in SAR testing, and the duty cycle would be scaled to theoretical 83.3% in reported SAR calculation.

BT Duty cycle



11. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN 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)"
   c. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.

WLAN Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per KDB 248227 D01v02r02, WLAN5.2GHz SAR testing is not required when the WLAN5.3GHz band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for WLAN5.2GHz band.
3. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
4. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
5. For WLAN SAR testing was performed on single antenna RF power in SISO mode is larger or equal to the single antenna RF power in MIMO mode, and for RF exposure assessment of MIMO mode simultaneous transmission exclusion analysis was performed with SAR test results of each antenna in SISO mode.
6. Per KDB 248227 D01v02r02, the simultaneous SAR provisions in KDB publication 447498 should be applied to determine simultaneous transmission SAR test exclusion for WiFi MIMO. If the sum of 1g single transmission chain SAR measurements is < 1.6W/kg and SAR peak to location ratio ≤ 0.04, no additional SAR measurements for MIMO.
7. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

11.1 Body SAR

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Antenna Type	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
01	WLAN2.4GHz	802.11b 1Mbps	Front	5mm	Ant 0	Monopole	6	2437	15.32	15.50	1.042	100	1.000	-0.11	0.344	0.359
	WLAN2.4GHz	802.11b 1Mbps	Back	5mm	Ant 0	Monopole	6	2437	15.32	15.50	1.042	100	1.000	0.01	0.229	0.239
	WLAN2.4GHz	802.11b 1Mbps	Left Side	5mm	Ant 0	Monopole	6	2437	15.32	15.50	1.042	100	1.000	0.03	0.061	0.064
	WLAN2.4GHz	802.11b 1Mbps	Right Side	5mm	Ant 0	Monopole	6	2437	15.32	15.50	1.042	100	1.000	-0.08	0.217	0.226
	WLAN2.4GHz	802.11b 1Mbps	Top Side	5mm	Ant 0	Monopole	6	2437	15.32	15.50	1.042	100	1.000	-0.08	0.079	0.082
	WLAN2.4GHz	802.11b 1Mbps	Bottom Side	5mm	Ant 0	Monopole	6	2437	15.32	15.50	1.042	100	1.000	0.1	0.001	0.001
	WLAN2.4GHz	802.11b 1Mbps	Front	5mm	Ant 1	Monopole	6	2437	15.41	15.50	1.021	100	1.000	-0.17	0.320	0.327
	WLAN2.4GHz	802.11b 1Mbps	Back	5mm	Ant 1	Monopole	6	2437	15.41	15.50	1.021	100	1.000	0.1	0.295	0.301
	WLAN2.4GHz	802.11b 1Mbps	Left Side	5mm	Ant 1	Monopole	6	2437	15.41	15.50	1.021	100	1.000	0.12	0.001	0.001
	WLAN2.4GHz	802.11b 1Mbps	Right Side	5mm	Ant 1	Monopole	6	2437	15.41	15.50	1.021	100	1.000	0.08	0.244	0.249
	WLAN2.4GHz	802.11b 1Mbps	Top Side	5mm	Ant 1	Monopole	6	2437	15.41	15.50	1.021	100	1.000	-0.17	0.027	0.028
	WLAN2.4GHz	802.11b 1Mbps	Bottom Side	5mm	Ant 1	Monopole	6	2437	15.41	15.50	1.021	100	1.000	-0.03	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 0	Monopole	58	5290	13.55	14.00	1.109	100	1.000	0.14	0.263	0.292
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 0	Monopole	58	5290	13.55	14.00	1.109	100	1.000	0.11	0.249	0.276
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 0	Monopole	58	5290	13.55	14.00	1.109	100	1.000	-0.05	0.044	0.049
02	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 0	Monopole	58	5290	13.55	14.00	1.109	100	1.000	-0.01	0.603	0.669
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 0	Monopole	58	5290	13.55	14.00	1.109	100	1.000	0.18	0.084	0.093
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 0	Monopole	58	5290	13.55	14.00	1.109	100	1.000	0.14	0.037	0.041
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 1	Monopole	58	5290	13.73	14.00	1.064	100	1.000	-0.17	0.238	0.253
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 1	Monopole	58	5290	13.73	14.00	1.064	100	1.000	0.17	0.269	0.286
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 1	Monopole	58	5290	13.73	14.00	1.064	100	1.000	-0.05	0.022	0.023
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 1	Monopole	58	5290	13.73	14.00	1.064	100	1.000	0.01	0.465	0.495
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 1	Monopole	58	5290	13.73	14.00	1.064	100	1.000	0.01	0.052	0.055
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 1	Monopole	58	5290	13.73	14.00	1.064	100	1.000	0.1	0.059	0.063
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 0	Monopole	138	5690	13.98	14.00	1.005	100	1.000	-0.17	0.363	0.365
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 0	Monopole	138	5690	13.98	14.00	1.005	100	1.000	0.04	0.446	0.448
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 0	Monopole	138	5690	13.98	14.00	1.005	100	1.000	-0.01	0.034	0.034
03	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 0	Monopole	138	5690	13.98	14.00	1.005	100	1.000	0.06	0.718	0.721
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 0	Monopole	106	5530	13.63	14.00	1.089	100	1.000	0.06	0.661	0.720
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 0	Monopole	122	5610	13.96	14.00	1.009	100	1.000	-0.09	0.699	0.705
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 0	Monopole	138	5690	13.98	14.00	1.005	100	1.000	-0.08	0.189	0.190
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 0	Monopole	138	5690	13.98	14.00	1.005	100	1.000	0.05	0.067	0.067
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 1	Monopole	106	5530	13.89	14.00	1.026	100	1.000	-0.08	0.233	0.239
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 1	Monopole	106	5530	13.89	14.00	1.026	100	1.000	0.13	0.253	0.259
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 1	Monopole	106	5530	13.89	14.00	1.026	100	1.000	0.12	0.026	0.027
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 1	Monopole	106	5530	13.89	14.00	1.026	100	1.000	0.01	0.601	0.616
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 1	Monopole	106	5530	13.89	14.00	1.026	100	1.000	0.03	0.073	0.075
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 1	Monopole	106	5530	13.89	14.00	1.026	100	1.000	0.18	0.058	0.059
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 0	Monopole	155	5775	13.75	14.00	1.059	100	1.000	0.07	0.154	0.163
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 0	Monopole	155	5775	13.75	14.00	1.059	100	1.000	0.18	0.104	0.110
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 0	Monopole	155	5775	13.75	14.00	1.059	100	1.000	-0.1	0.014	0.015
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 0	Monopole	155	5775	13.75	14.00	1.059	100	1.000	-0.09	0.452	0.479
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 0	Monopole	155	5775	13.75	14.00	1.059	100	1.000	0.01	0.081	0.086
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 0	Monopole	155	5775	13.75	14.00	1.059	100	1.000	-0.15	0.027	0.029
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 1	Monopole	155	5775	13.69	14.00	1.074	100	1.000	0.19	0.218	0.234
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 1	Monopole	155	5775	13.69	14.00	1.074	100	1.000	0.07	0.162	0.174
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 1	Monopole	155	5775	13.69	14.00	1.074	100	1.000	-0.18	0.029	0.031
04	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 1	Monopole	155	5775	13.69	14.00	1.074	100	1.000	-0.02	0.449	0.482
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 1	Monopole	155	5775	13.69	14.00	1.074	100	1.000	0.03	0.076	0.082

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Antenna Type	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 1	Monopole	155	5775	13.69	14.00	1.074	100	1.000	-0.15	0.056	0.060
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 0	Monopole	171	5855	13.68	14.00	1.076	100	1.000	-0.15	0.158	0.170
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 0	Monopole	171	5855	13.68	14.00	1.076	100	1.000	0.11	0.137	0.147
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 0	Monopole	171	5855	13.68	14.00	1.076	100	1.000	-0.08	0.027	0.029
05	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 0	Monopole	171	5855	13.68	14.00	1.076	100	1.000	0.03	0.273	0.294
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 0	Monopole	171	5855	13.68	14.00	1.076	100	1.000	-0.08	0.048	0.052
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 0	Monopole	171	5855	13.68	14.00	1.076	100	1.000	-0.04	0.028	0.030
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 1	Monopole	171	5855	13.87	14.00	1.030	100	1.000	-0.08	0.198	0.204
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 1	Monopole	171	5855	13.87	14.00	1.030	100	1.000	0.17	0.157	0.162
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 1	Monopole	171	5855	13.87	14.00	1.030	100	1.000	0.18	0.058	0.060
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 1	Monopole	171	5855	13.87	14.00	1.030	100	1.000	0.06	0.279	0.287
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 1	Monopole	171	5855	13.87	14.00	1.030	100	1.000	-0.08	0.069	0.071
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 1	Monopole	171	5855	13.87	14.00	1.030	100	1.000	-0.13	0.045	0.046

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Antenna Type	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	5mm	Ant 0	PIFA	6	2437	15.32	15.50	1.042	100	1.000	-0.07	0.203	0.212
	WLAN2.4GHz	802.11b 1Mbps	Back	5mm	Ant 0	PIFA	6	2437	15.32	15.50	1.042	100	1.000	0.05	0.197	0.205
	WLAN2.4GHz	802.11b 1Mbps	Left Side	5mm	Ant 0	PIFA	6	2437	15.32	15.50	1.042	100	1.000	-0.11	0.046	0.048
	WLAN2.4GHz	802.11b 1Mbps	Right Side	5mm	Ant 0	PIFA	6	2437	15.32	15.50	1.042	100	1.000	-0.12	0.109	0.114
	WLAN2.4GHz	802.11b 1Mbps	Top Side	5mm	Ant 0	PIFA	6	2437	15.32	15.50	1.042	100	1.000	0.05	0.317	0.330
06	WLAN2.4GHz	802.11b 1Mbps	Bottom Side	5mm	Ant 0	PIFA	6	2437	15.32	15.50	1.042	100	1.000	0.02	0.367	0.383
	WLAN2.4GHz	802.11b 1Mbps	Front	5mm	Ant 1	PIFA	6	2437	15.41	15.50	1.021	100	1.000	-0.02	0.244	0.249
	WLAN2.4GHz	802.11b 1Mbps	Back	5mm	Ant 1	PIFA	6	2437	15.41	15.50	1.021	100	1.000	0.15	0.110	0.112
	WLAN2.4GHz	802.11b 1Mbps	Left Side	5mm	Ant 1	PIFA	6	2437	15.41	15.50	1.021	100	1.000	-0.09	0.175	0.179
	WLAN2.4GHz	802.11b 1Mbps	Right Side	5mm	Ant 1	PIFA	6	2437	15.41	15.50	1.021	100	1.000	0.11	0.322	0.329
	WLAN2.4GHz	802.11b 1Mbps	Top Side	5mm	Ant 1	PIFA	6	2437	15.41	15.50	1.021	100	1.000	0.02	0.341	0.348
	WLAN2.4GHz	802.11b 1Mbps	Bottom Side	5mm	Ant 1	PIFA	6	2437	15.41	15.50	1.021	100	1.000	0.02	0.211	0.215
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 0	PIFA	58	5290	13.55	14.00	1.109	100	1.000	-0.11	0.430	0.477
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 0	PIFA	58	5290	13.55	14.00	1.109	100	1.000	0.16	0.075	0.083
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 0	PIFA	58	5290	13.55	14.00	1.109	100	1.000	-0.01	0.408	0.453
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 0	PIFA	58	5290	13.55	14.00	1.109	100	1.000	0.05	0.052	0.058
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 0	PIFA	58	5290	13.55	14.00	1.109	100	1.000	-0.03	0.252	0.280
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 0	PIFA	58	5290	13.55	14.00	1.109	100	1.000	-0.15	0.197	0.219
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 1	PIFA	58	5290	13.73	14.00	1.064	100	1.000	0.18	0.391	0.416
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 1	PIFA	58	5290	13.73	14.00	1.064	100	1.000	0.07	0.100	0.106
07	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 1	PIFA	58	5290	13.73	14.00	1.064	100	1.000	-0.02	0.686	0.730
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 1	PIFA	58	5290	13.73	14.00	1.064	100	1.000	0.13	0.065	0.069
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 1	PIFA	58	5290	13.73	14.00	1.064	100	1.000	-0.18	0.452	0.481
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 1	PIFA	58	5290	13.73	14.00	1.064	100	1.000	0.02	0.622	0.662
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 0	PIFA	138	5690	13.98	14.00	1.005	100	1.000	-0.08	0.472	0.474
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 0	PIFA	138	5690	13.98	14.00	1.005	100	1.000	0.16	0.149	0.150
08	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 0	PIFA	138	5690	13.98	14.00	1.005	100	1.000	-0.06	0.732	0.735
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 0	PIFA	106	5530	13.63	14.00	1.089	100	1.000	0.01	0.661	0.720
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 0	PIFA	122	5610	13.96	14.00	1.009	100	1.000	-0.07	0.722	0.729
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 0	PIFA	138	5690	13.98	14.00	1.005	100	1.000	0.07	0.087	0.087
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 0	PIFA	138	5690	13.98	14.00	1.005	100	1.000	0	0.399	0.401
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 0	PIFA	138	5690	13.98	14.00	1.005	100	1.000	0.01	0.645	0.648
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 1	PIFA	106	5530	13.89	14.00	1.026	100	1.000	-0.04	0.501	0.514
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 1	PIFA	106	5530	13.89	14.00	1.026	100	1.000	-0.09	0.133	0.136
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 1	PIFA	106	5530	13.89	14.00	1.026	100	1.000	0.02	0.499	0.512
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 1	PIFA	106	5530	13.89	14.00	1.026	100	1.000	-0.1	0.071	0.073
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 1	PIFA	106	5530	13.89	14.00	1.026	100	1.000	0.18	0.438	0.449
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 1	PIFA	106	5530	13.89	14.00	1.026	100	1.000	-0.17	0.492	0.505

	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 0	PIFA	155	5775	13.75	14.00	1.059	100	1.000	0.06	0.498	0.528
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 0	PIFA	155	5775	13.75	14.00	1.059	100	1.000	0	0.121	0.128
09	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 0	PIFA	155	5775	13.75	14.00	1.059	100	1.000	0.07	0.607	0.643
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 0	PIFA	155	5775	13.75	14.00	1.059	100	1.000	-0.01	0.075	0.079
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 0	PIFA	155	5775	13.75	14.00	1.059	100	1.000	-0.09	0.315	0.334
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 0	PIFA	155	5775	13.75	14.00	1.059	100	1.000	0.05	0.538	0.570
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 1	PIFA	155	5775	13.69	14.00	1.074	100	1.000	-0.02	0.470	0.505
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 1	PIFA	155	5775	13.69	14.00	1.074	100	1.000	0.02	0.093	0.100
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 1	PIFA	155	5775	13.69	14.00	1.074	100	1.000	0.03	0.510	0.548
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 1	PIFA	155	5775	13.69	14.00	1.074	100	1.000	0.17	0.054	0.058
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 1	PIFA	155	5775	13.69	14.00	1.074	100	1.000	0.06	0.344	0.369
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 1	PIFA	155	5775	13.69	14.00	1.074	100	1.000	0	0.377	0.405
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 0	PIFA	171	5855	13.68	14.00	1.076	100	1.000	-0.06	0.544	0.586
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 0	PIFA	171	5855	13.68	14.00	1.076	100	1.000	-0.15	0.108	0.116
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 0	PIFA	171	5855	13.68	14.00	1.076	100	1.000	0.11	0.474	0.510
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 0	PIFA	171	5855	13.68	14.00	1.076	100	1.000	-0.02	0.079	0.085
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 0	PIFA	171	5855	13.68	14.00	1.076	100	1.000	0.1	0.318	0.342
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 0	PIFA	171	5855	13.68	14.00	1.076	100	1.000	0.19	0.554	0.596
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 1	PIFA	171	5855	13.87	14.00	1.030	100	1.000	0.05	0.591	0.609
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 1	PIFA	171	5855	13.87	14.00	1.030	100	1.000	-0.18	0.177	0.182
10	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 1	PIFA	171	5855	13.87	14.00	1.030	100	1.000	0	0.615	0.634
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 1	PIFA	171	5855	13.87	14.00	1.030	100	1.000	-0.16	0.067	0.069
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 1	PIFA	171	5855	13.87	14.00	1.030	100	1.000	-0.15	0.504	0.519
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Side	5mm	Ant 1	PIFA	171	5855	13.87	14.00	1.030	100	1.000	-0.1	0.528	0.544

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Antenna Type	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
11	Bluetooth	1Mbps	Front	5mm	Ant 1	Monopole	39	2441	12.78	13.00	1.052	76.06	1.095	-0.18	0.137	0.158
	Bluetooth	1Mbps	Back	5mm	Ant 1	Monopole	39	2441	12.78	13.00	1.052	76.06	1.095	-0.13	0.127	0.146
	Bluetooth	1Mbps	Left Side	5mm	Ant 1	Monopole	39	2441	12.78	13.00	1.052	76.06	1.095	0.06	0.001	0.001
	Bluetooth	1Mbps	Right Side	5mm	Ant 1	Monopole	39	2441	12.78	13.00	1.052	76.06	1.095	-0.03	0.049	0.056
	Bluetooth	1Mbps	Top Side	5mm	Ant 1	Monopole	39	2441	12.78	13.00	1.052	76.06	1.095	-0.03	0.001	0.001
	Bluetooth	1Mbps	Bottom Side	5mm	Ant 1	Monopole	39	2441	12.78	13.00	1.052	76.06	1.095	0.08	0.001	0.001

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Antenna Type	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Front	5mm	Ant 1	PIFA	39	2441	12.78	13.00	1.052	76.06	1.095	-0.14	0.125	0.144
	Bluetooth	1Mbps	Back	5mm	Ant 1	PIFA	39	2441	12.78	13.00	1.052	76.06	1.095	-0.19	0.082	0.094
	Bluetooth	1Mbps	Left Side	5mm	Ant 1	PIFA	39	2441	12.78	13.00	1.052	76.06	1.095	0.01	0.091	0.105
	Bluetooth	1Mbps	Right Side	5mm	Ant 1	PIFA	39	2441	12.78	13.00	1.052	76.06	1.095	0.06	0.109	0.126
	Bluetooth	1Mbps	Top Side	5mm	Ant 1	PIFA	39	2441	12.78	13.00	1.052	76.06	1.095	-0.09	0.170	0.196
12	Bluetooth	1Mbps	Bottom Side	5mm	Ant 1	PIFA	39	2441	12.78	13.00	1.052	76.06	1.095	0.13	0.195	0.225

12. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
1.	WLAN2.4GHz Ant 0 + Bluetooth Ant 1	Yes
2.	WLAN2.4GHz Ant 0 + WLAN2.4GHz Ant 1	Yes
3.	WLAN5GHz Ant 0 + WLAN5GHz Ant 1 + Bluetooth Ant 1	Yes

General Note:

1. The worst case WLAN reported SAR for each configuration was used for SAR summation. Therefore, the following summations represent the absolute worst cases for simultaneous transmission with WLAN.
2. WLAN RF exposure assessment of MIMO mode simultaneous transmission exclusion analysis was performed with SAR test results of each antenna in SISO mode. Therefore SPLSR calculation was choose worst case with SAR test results of each antenna in SISO mode perform evaluation.
3. The Scaled SAR summation is calculated based on the same configuration and test position.
4. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

12.1 Body Exposure Conditions

<Monopole>

Exposure Position	1 WLAN2.4GHz Ant 0 1g SAR (W/kg)	2 WLAN2.4GHz Ant 1 1g SAR (W/kg)	3 WLAN5GHz Ant 0 1g SAR (W/kg)	4 WLAN5GHz Ant 1 1g SAR (W/kg)	5 Bluetooth Ant 1 1g SAR (W/kg)	1+5 Summed 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	3+4+5 Summed 1g SAR (W/kg)
Front at 5mm	0.359	0.327	0.365	0.253	0.158	**0.517**	**0.686**	**0.776**
Back at 5mm	0.239	0.301	0.448	0.286	0.146	**0.385**	**0.540**	**0.880**
Left Side at 5mm	0.064	0.001	0.049	0.060	0.001	**0.065**	**0.065**	**0.110**
Right Side at 5mm	0.226	0.249	0.721	0.616	0.056	**0.282**	**0.475**	**1.393**
Top Side at 5mm	0.082	0.028	0.190	0.082	0.001	**0.083**	**0.110**	**0.273**
Bottom Side at 5mm	0.001	0.001	0.067	0.063	0.001	**0.002**	**0.002**	**0.131**

<PIFA>

Exposure Position	1 WLAN2.4GHz Ant 0 1g SAR (W/kg)	2 WLAN2.4GHz Ant 1 1g SAR (W/kg)	3 WLAN5GHz Ant 0 1g SAR (W/kg)	4 WLAN5GHz Ant 1 1g SAR (W/kg)	5 Bluetooth Ant 1 1g SAR (W/kg)	1+5 Summed 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	3+4+5 Summed 1g SAR (W/kg)
Front at 5mm	0.212	0.249	0.586	0.609	0.144	**0.356**	**0.461**	**1.339**
Back at 5mm	0.205	0.112	0.150	0.182	0.094	**0.299**	**0.317**	**0.426**
Left Side at 5mm	0.048	0.179	0.735	0.730	0.105	**0.153**	**0.227**	**1.570**
Right Side at 5mm	0.114	0.329	0.087	0.073	0.126	**0.240**	**0.443**	**0.286**
Top Side at 5mm	0.330	0.348	0.401	0.519	0.196	**0.526**	**0.678**	**1.116**
Bottom Side at 5mm	0.383	0.215	0.648	0.662	0.225	**0.608**	**0.598**	**1.535**

Test Engineer： Andy Chiang

13. Uncertainty Assessment

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg. Therefore, the measurement uncertainty table is not required in this report.
Declaration of Conformity:
The test results with all measurement uncertainty excluded is presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

14. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.

[6] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[7] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[8] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.

Date: 2024-03-21

System Check_Head_2450MHz

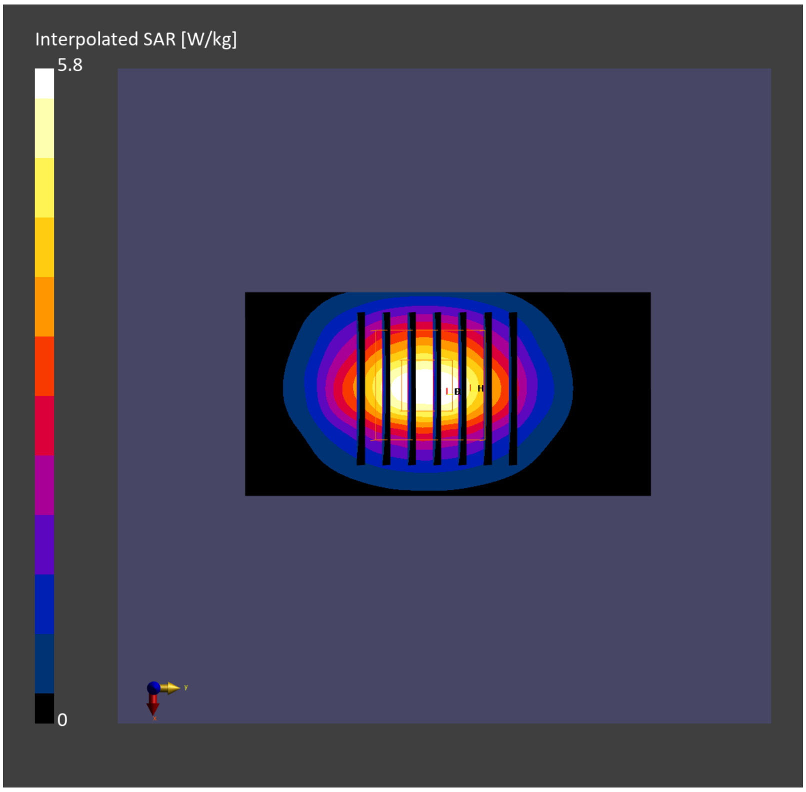
DUT: D2450V2 - SN736

Communication System: CW; Frequency: 2450.000 MHz; Duty Cycle: 1:1
Medium: HSL_2450_240321 Medium parameters used: f= 2450.000 MHz; σ= 1.82 S/m; ε_r = 39.0
Ambient Temperature: 23.5°C; Liquid Temperature: 22.5°C

DASY6 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(7.83, 7.83, 7.83); Calibrated: 2023-10-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1805; Calibrated: 2023-05-16
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: CW

Pin=17.0dBm/Area Scan (40.0 mm x 80.0 mm): Measurement Grid: 10.0 mm x 10.0 mm
SAR (1g) = 2.47 W/kg; SAR (10g) = 1.16 W/kg;

Pin=17.0dBm/Zoom Scan (30.0 mm x 30.0 mm x 30.0 mm): Measurement Grid: 5.0 mm x 5.0 mm x 1.5 mm
Power Drift = -0.02 dB
SAR (1g) = 2.50 W/kg; SAR (8g) = 1.27 W/kg; SAR (10g) = 1.15 W/kg
Smallest distance from peaks to all points 3 dB below = 9.0 mm
Ratio of SAR at M2 to SAR at M1 = 75.5 %



Date: 2024-03-27

System Check_Head_2450MHz

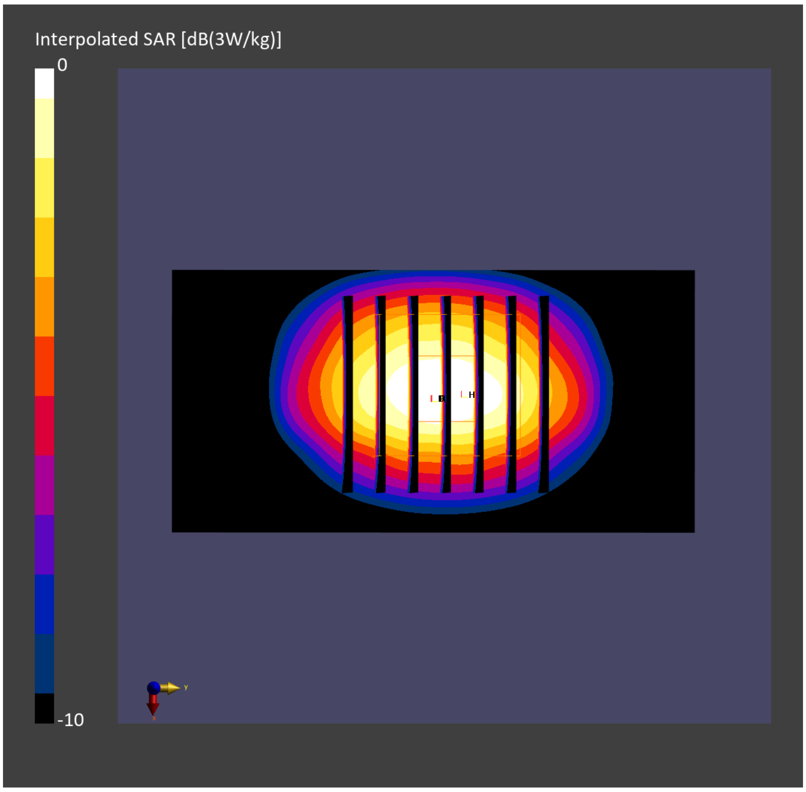
DUT: D2450V2 - SN736

Communication System: CW; Frequency: 2450.000 MHz; Duty Cycle: 1:1
Medium: HSL_2450_240327 Medium parameters used: f= 2450.000 MHz; σ= 1.79 S/m; ε_r = 40.0
Ambient Temperature: 23.7°C; Liquid Temperature: 22.7°C

DASY6 Configuration:
- Probe: EX3DV4 - SN7793; ConvF(6.63, 6.87, 6.92); Calibrated: 2024-03-01
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1707; Calibrated: 2023-12-06
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: CW

Pin=17.0dBm/Area Scan (40.0 mm x 80.0 mm): Measurement Grid: 10.0 mm x 10.0 mm
SAR (1g) = 2.31 W/kg; SAR (10g) = 1.10 W/kg;

Pin=17.0dBm/Zoom Scan (30.0 mm x 30.0 mm x 30.0 mm): Measurement Grid: 5.0 mm x 5.0 mm x 1.5 mm
Power Drift = 0.02 dB
SAR (1g) = 2.55 W/kg; SAR (8g) = 1.28 W/kg; SAR (10g) = 1.21 W/kg
Smallest distance from peaks to all points 3 dB below = 9.0 mm
Ratio of SAR at M2 to SAR at M1 = 81.8 %



Date: 2024-03-22

System Check_Head_5250MHz

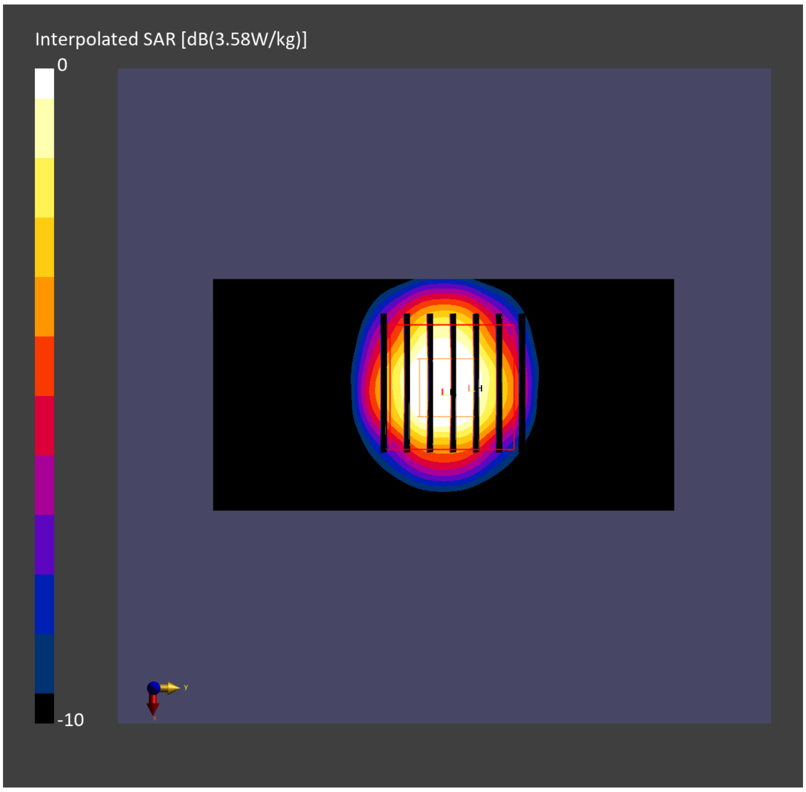
DUT: D5GHzV2 - SN1171

Communication System: CW; Frequency: 5250.000 MHz; Duty Cycle: 1:1
Medium: HSL_5250_240322 Medium parameters used: f= 5250.000 MHz; σ= 4.81 S/m; ε_r = 36.6
Ambient Temperature: 23.6°C; Liquid Temperature: 22.6°C

DASY6 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(5.17, 5.17, 5.17); Calibrated: 2023-10-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1805; Calibrated: 2023-05-16
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: CW

Pin=17.0dBm/Area Scan (40.0 mm x 80.0 mm): Measurement Grid: 10.0 mm x 10.0 mm
SAR (1g) = 3.58 W/kg; SAR (10g) = 1.03 W/kg;

Pin=17.0dBm/Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm
Power Drift = -0.02 dB
SAR (1g) = 3.74 W/kg; SAR (8g) = 1.24 W/kg; SAR (10g) = 1.06 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 63.6 %



Date: 2024-03-23

System Check_Head_5250MHz

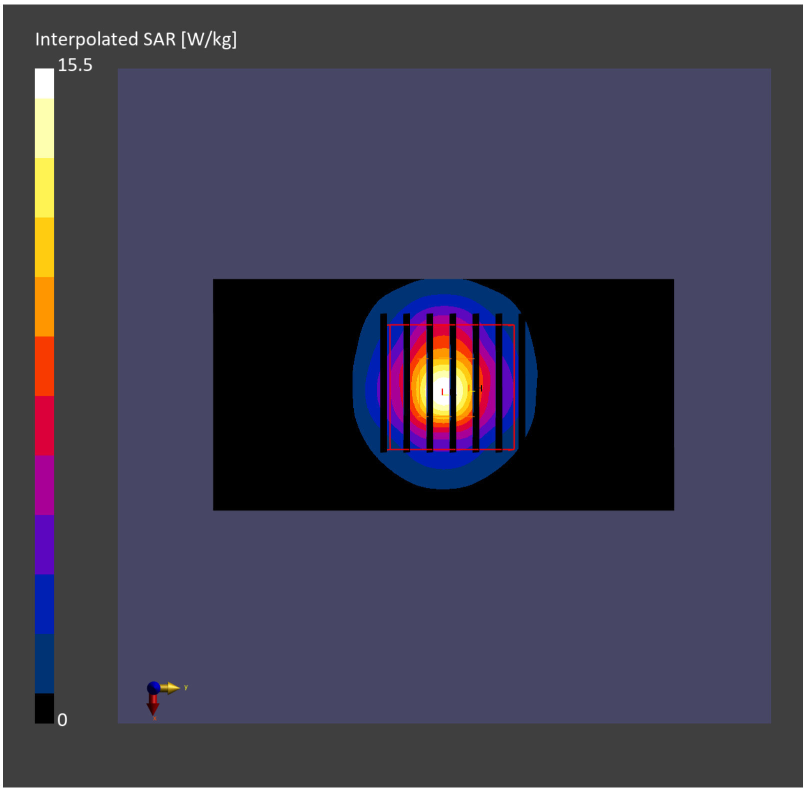
DUT: D5GHzV2 - SN1171

Communication System: CW; Frequency: 5250.000 MHz; Duty Cycle: 1:1
Medium: HSL_5250_240323 Medium parameters used: f= 5250.000 MHz; σ= 4.68 S/m; ε_r = 35.8
Ambient Temperature: 23.7°C; Liquid Temperature: 22.7°C

DASY6 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(5.17, 5.17, 5.17); Calibrated: 2023-10-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1805; Calibrated: 2023-05-16
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: CW

Pin=17.0dBm/Area Scan (40.0 mm x 80.0 mm): Measurement Grid: 10.0 mm x 10.0 mm
SAR (1g) = 3.56 W/kg; SAR (10g) = 1.03 W/kg;

Pin=17.0dBm/Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm
Power Drift = 0.02 dB
SAR (1g) = 3.73 W/kg; SAR (8g) = 1.24 W/kg; SAR (10g) = 1.06 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 63.3 %



Date: 2024-03-26

System Check_Head_5250MHz

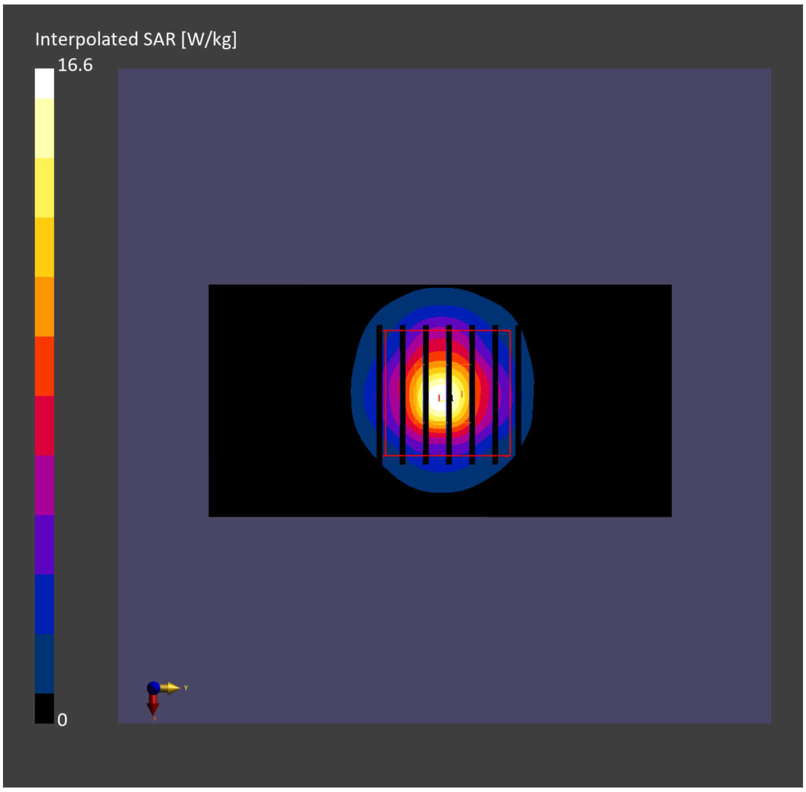
DUT: D5GHzV2 - SN1171

Communication System: CW; Frequency: 5250.000 MHz; Duty Cycle: 1:1
Medium: HSL_5250_240326 Medium parameters used: f= 5250.000 MHz; σ= 4.67 S/m; ε_r = 36.8
Ambient Temperature: 23.6°C; Liquid Temperature: 22.6°C

DASY6 Configuration:
- Probe: EX3DV4 - SN7793; ConvF(4.89, 5.03, 5.05); Calibrated: 2024-03-01
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1707; Calibrated: 2023-12-06
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: CW

Pin=17.0dBm/Area Scan (40.0 mm x 80.0 mm): Measurement Grid: 10.0 mm x 10.0 mm
SAR (1g) = 3.85 W/kg; SAR (10g) = 1.09 W/kg;

Pin=17.0dBm/Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm
Power Drift = 0.07 dB
SAR (1g) = 3.93 W/kg; SAR (8g) = 1.29 W/kg; SAR (10g) = 1.11 W/kg
Smallest distance from peaks to all points 3 dB below = 6.5 mm
Ratio of SAR at M2 to SAR at M1 = 62.6 %



Date: 2024-03-22

System Check_Head_5600MHz

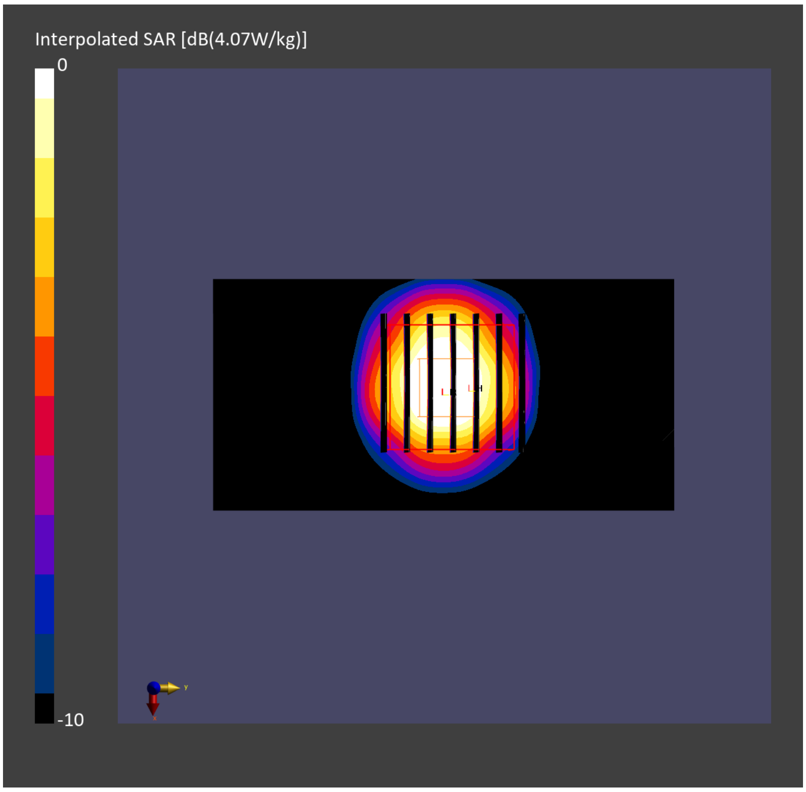
DUT: D5GHzV2 - SN1171

Communication System: CW; Frequency: 5600.000 MHz; Duty Cycle: 1:1
Medium: HSL_5600_240322 Medium parameters used: f= 5600.000 MHz; σ= 5.18 S/m; ε_r = 36.1
Ambient Temperature: 23.6°C; Liquid Temperature: 22.6°C

DASY6 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(4.48, 4.48, 4.48); Calibrated: 2023-10-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1805; Calibrated: 2023-05-16
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: CW

Pin=17.0dBm/Area Scan (40.0 mm x 80.0 mm): Measurement Grid: 10.0 mm x 10.0 mm
SAR (1g) = 4.07 W/kg; SAR (10g) = 1.17 W/kg;

Pin=17.0dBm/Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm
Power Drift = -0.02 dB
SAR (1g) = 4.28 W/kg; SAR (8g) = 1.41 W/kg; SAR (10g) = 1.21 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 60.7 %



Date: 2024-03-23

System Check_Head_5600MHz

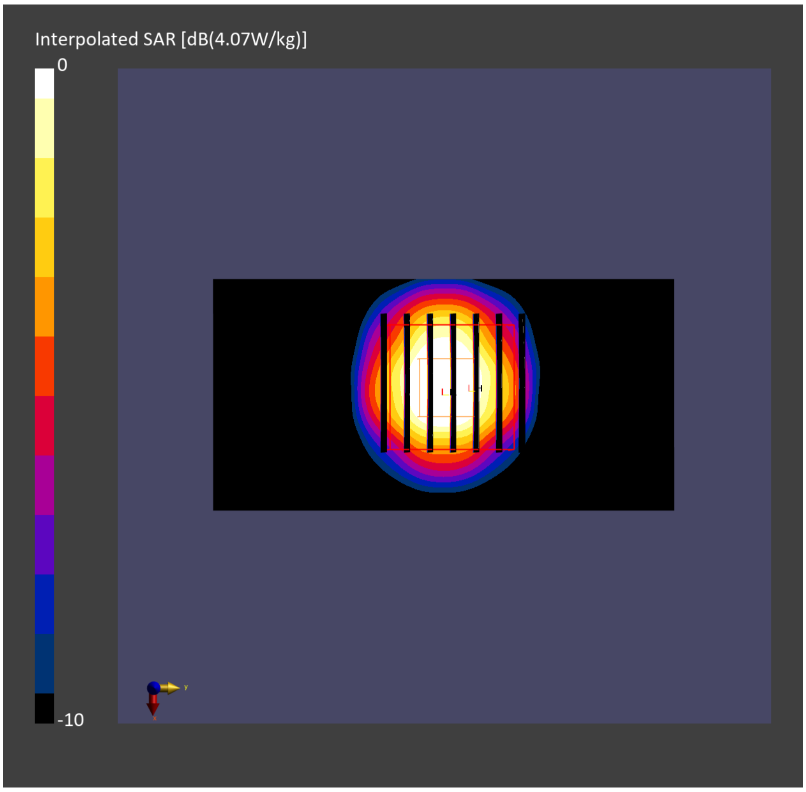
DUT: D5GHzV2 - SN1171

Communication System: CW; Frequency: 5600.000 MHz; Duty Cycle: 1:1
Medium: HSL_5600_240323 Medium parameters used: f= 5600.000 MHz; σ= 5.08 S/m; ε_r = 35.2
Ambient Temperature: 23.7°C; Liquid Temperature: 22.7°C

DASY6 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(4.48, 4.48, 4.48); Calibrated: 2023-10-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1805; Calibrated: 2023-05-16
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: CW

Pin=17.0dBm/Area Scan (40.0 mm x 80.0 mm): Measurement Grid: 10.0 mm x 10.0 mm
SAR (1g) = 4.07 W/kg; SAR (10g) = 1.17 W/kg;

Pin=17.0dBm/Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm
Power Drift = -0.01 dB
SAR (1g) = 4.24 W/kg; SAR (8g) = 1.40 W/kg; SAR (10g) = 1.20 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 60.8 %



Date: 2024-03-26

System Check_Head_5600MHz

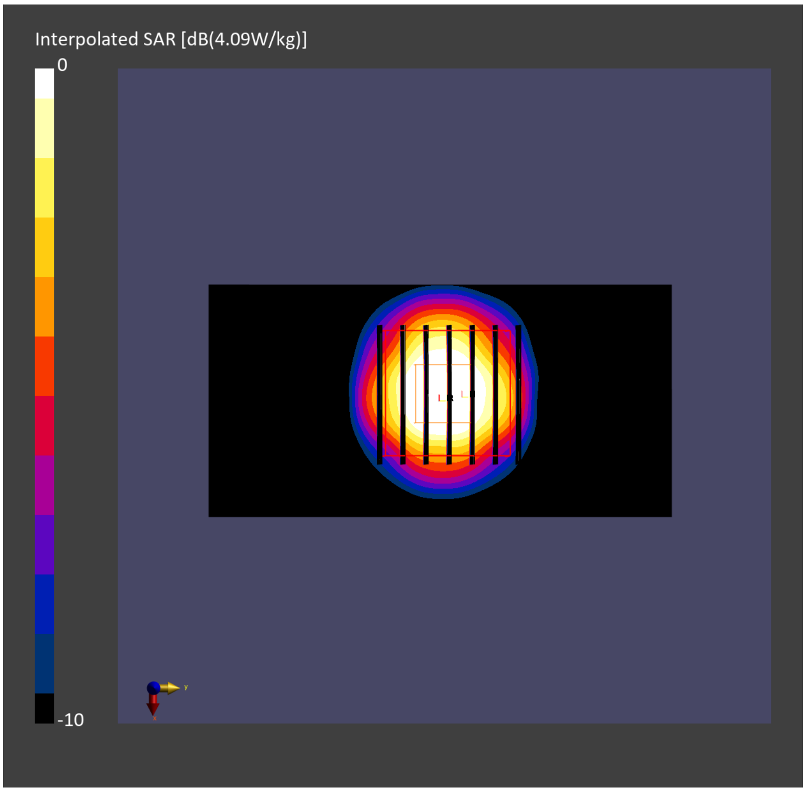
DUT: D5GHzV2 - SN1171

Communication System: CW; Frequency: 5600.000 MHz; Duty Cycle: 1:1
Medium: HSL_5600_240326 Medium parameters used: f= 5600.000 MHz; σ= 5.05 S/m; ε_r = 36.3
Ambient Temperature: 23.6°C; Liquid Temperature: 22.6°C

DASY6 Configuration:
- Probe: EX3DV4 - SN7793; ConvF(4.12, 4.35, 4.32); Calibrated: 2024-03-01
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1707; Calibrated: 2023-12-06
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: CW

Pin=17.0dBm/Area Scan (40.0 mm x 80.0 mm): Measurement Grid: 10.0 mm x 10.0 mm
SAR (1g) = 4.40 W/kg; SAR (10g) = 1.23 W/kg;

Pin=17.0dBm/Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm
Power Drift = -0.05 dB
SAR (1g) = 4.55 W/kg; SAR (8g) = 1.51 W/kg; SAR (10g) = 1.29 W/kg
Smallest distance from peaks to all points 3 dB below = 6.9 mm
Ratio of SAR at M2 to SAR at M1 = 60.2 %



Date: 2024-03-22

System Check_Head_5750MHz

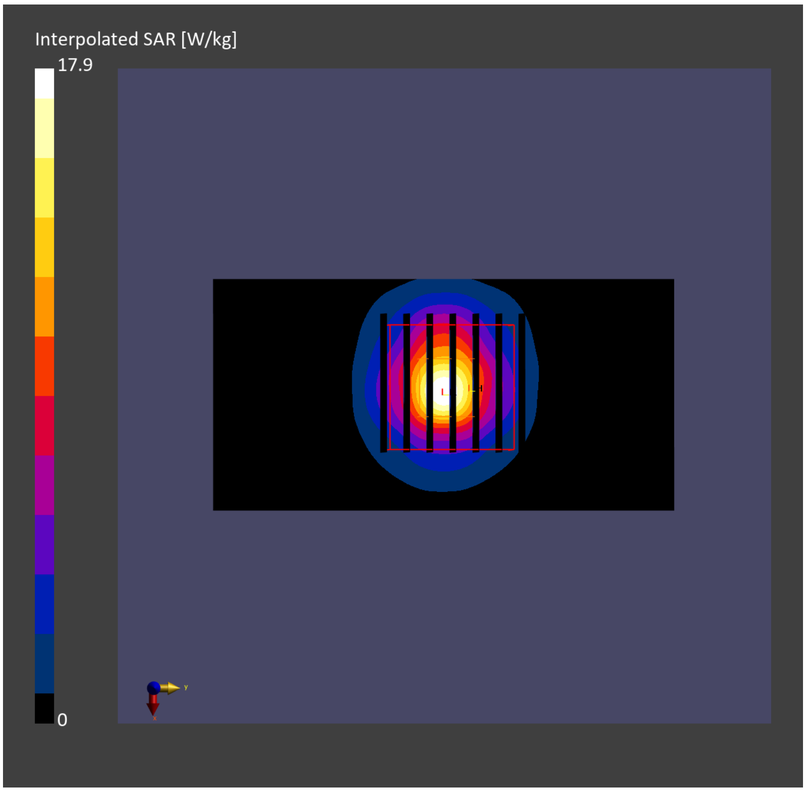
DUT: D5GHzV2 - SN1171

Communication System: CW; Frequency: 5750.000 MHz; Duty Cycle: 1:1
Medium: HSL_5750_240322 Medium parameters used: f= 5750.000 MHz; σ= 5.35 S/m; ε_r = 35.9
Ambient Temperature: 23.6°C; Liquid Temperature: 22.6°C

DASY6 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(4.8, 4.8, 4.8); Calibrated: 2023-10-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1805; Calibrated: 2023-05-16
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: CW

Pin=17.0dBm/Area Scan (40.0 mm x 80.0 mm): Measurement Grid: 10.0 mm x 10.0 mm
SAR (1g) = 3.70 W/kg; SAR (10g) = 1.06 W/kg;

Pin=17.0dBm/Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm
Power Drift = 0.01 dB
SAR (1g) = 3.88 W/kg; SAR (8g) = 1.27 W/kg; SAR (10g) = 1.09 W/kg
Smallest distance from peaks to all points 3 dB below = 7.6 mm
Ratio of SAR at M2 to SAR at M1 = 59.7 %



Date: 2024-03-23

System Check_Head_5750MHz

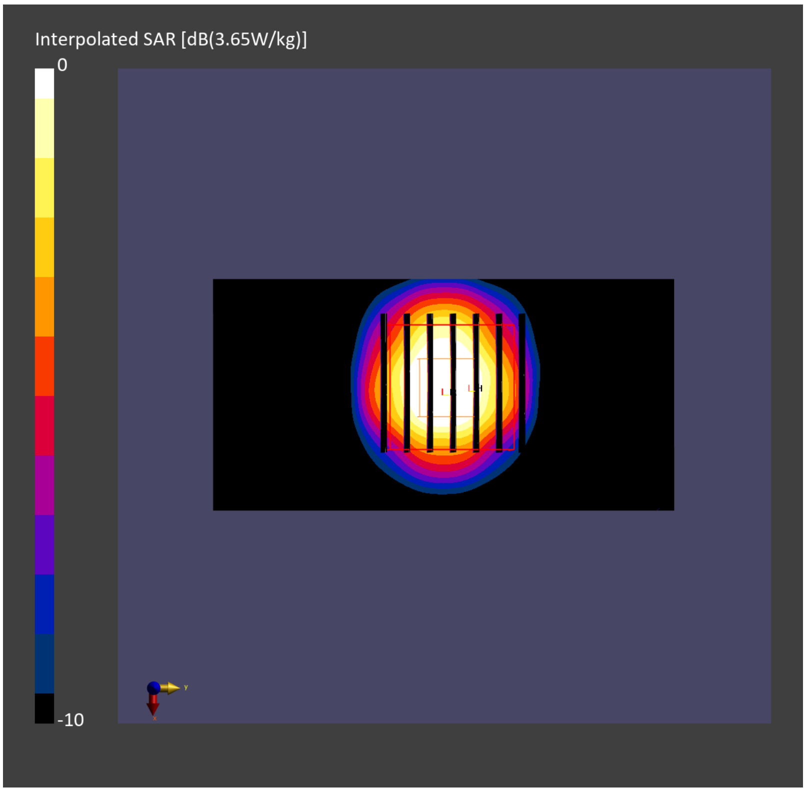
DUT: D5GHzV2 - SN1171

Communication System: CW; Frequency: 5750.000 MHz; Duty Cycle: 1:1
Medium: HSL_5750_240323 Medium parameters used: f= 5750.000 MHz; σ= 5.26 S/m; ε_r = 34.9
Ambient Temperature: 23.7°C; Liquid Temperature: 22.7°C

DASY6 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(4.8, 4.8, 4.8); Calibrated: 2023-10-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1805; Calibrated: 2023-05-16
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: CW

Pin=17.0dBm/Area Scan (40.0 mm x 80.0 mm): Measurement Grid: 10.0 mm x 10.0 mm
SAR (1g) = 3.65 W/kg; SAR (10g) = 1.05 W/kg;

Pin=17.0dBm/Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm
Power Drift = -0.01 dB
SAR (1g) = 3.81 W/kg; SAR (8g) = 1.26 W/kg; SAR (10g) = 1.08 W/kg
Smallest distance from peaks to all points 3 dB below = 7.6 mm
Ratio of SAR at M2 to SAR at M1 = 59.5 %



Date: 2024-03-26

System Check_Head_5750MHz

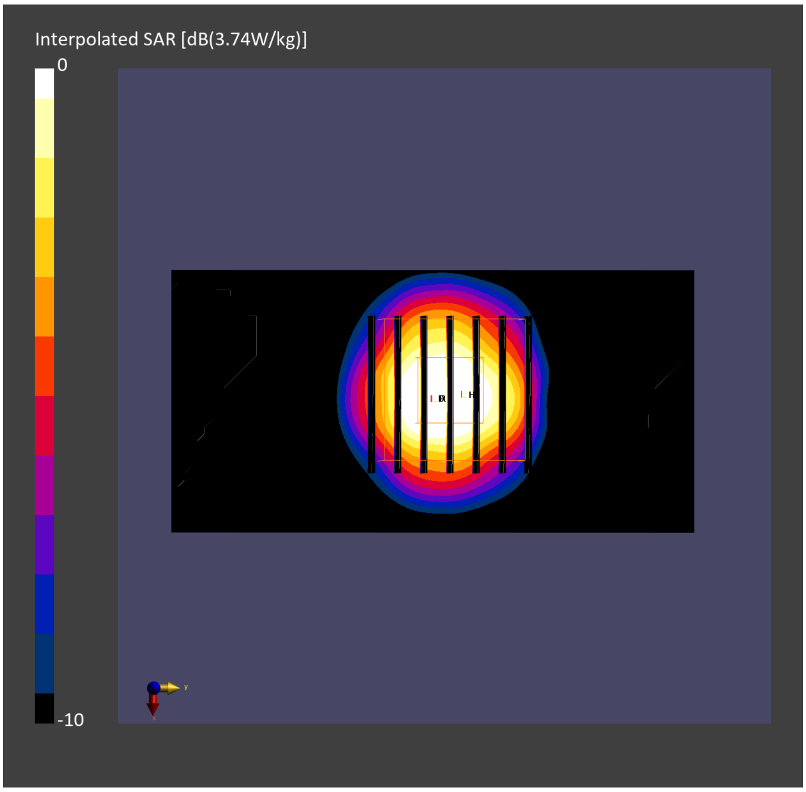
DUT: D5GHzV2 - SN1171

Communication System: CW; Frequency: 5750.000 MHz; Duty Cycle: 1:1
Medium: HSL_5750_240326 Medium parameters used: f= 5750.000 MHz; σ= 5.19 S/m; ε_r = 36.1
Ambient Temperature: 23.6°C; Liquid Temperature: 22.6°C

DASY6 Configuration:
- Probe: EX3DV4 - SN7793; ConvF(4.37, 4.42, 4.46); Calibrated: 2024-03-01
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1707; Calibrated: 2023-12-06
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: CW

Pin=17.0dBm/Area Scan (40.0 mm x 80.0 mm): Measurement Grid: 10.0 mm x 10.0 mm
SAR (1g) = 3.64 W/kg; SAR (10g) = 1.03 W/kg;

Pin=17.0dBm/Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm
Power Drift = -0.07 dB
SAR (1g) = 3.91 W/kg; SAR (8g) = 1.27 W/kg; SAR (10g) = 1.09 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 58.5 %



Date: 2024-03-23

System Check_Head_5800MHz

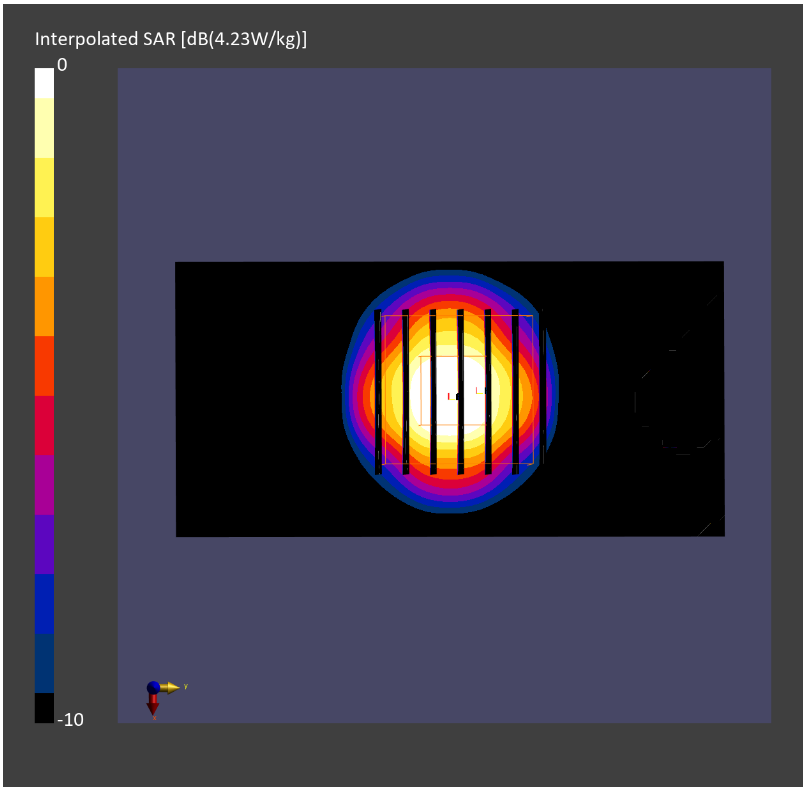
DUT: D5GHzV2 - SN1128

Communication System: CW; Frequency: 5800.000 MHz; Duty Cycle: 1:1
Medium: HSL_5800_240323 Medium parameters used: f= 5800.000 MHz; σ= 5.33 S/m; ε_r = 34.8
Ambient Temperature: 23.7°C; Liquid Temperature: 22.7°C

DASY6 Configuration:
- Probe: EX3DV4 - SN7793; ConvF(4.37, 4.42, 4.46); Calibrated: 2024-03-01
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1707; Calibrated: 2023-12-06
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: CW

Pin=17.0dBm/Area Scan (40.0 mm x 80.0 mm): Measurement Grid: 10.0 mm x 10.0 mm
SAR (1g) = 3.85 W/kg; SAR (10g) = 1.06 W/kg;

Pin=17.0dBm/Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm
Power Drift = 0.05 dB
SAR (1g) = 4.12 W/kg; SAR (8g) = 1.31 W/kg; SAR (10g) = 1.12 W/kg
Smallest distance from peaks to all points 3 dB below = 6.9 mm
Ratio of SAR at M2 to SAR at M1 = 58.3 %



Date: 2024-03-21

#01_WLAN2.4GHz_802.11b 1Mbps_Front_5mm_Ch6

Communication System: IEEE 802.11b WiFi 2.4 GHz ; Frequency: 2437.000 MHz;
Medium: HSL_2450_240321 Medium parameters used: f= 2437.000 MHz; σ= 1.82 S/m; ε_r = 39.1
Ambient Temperature: 23.5°C; Liquid Temperature: 22.5°C

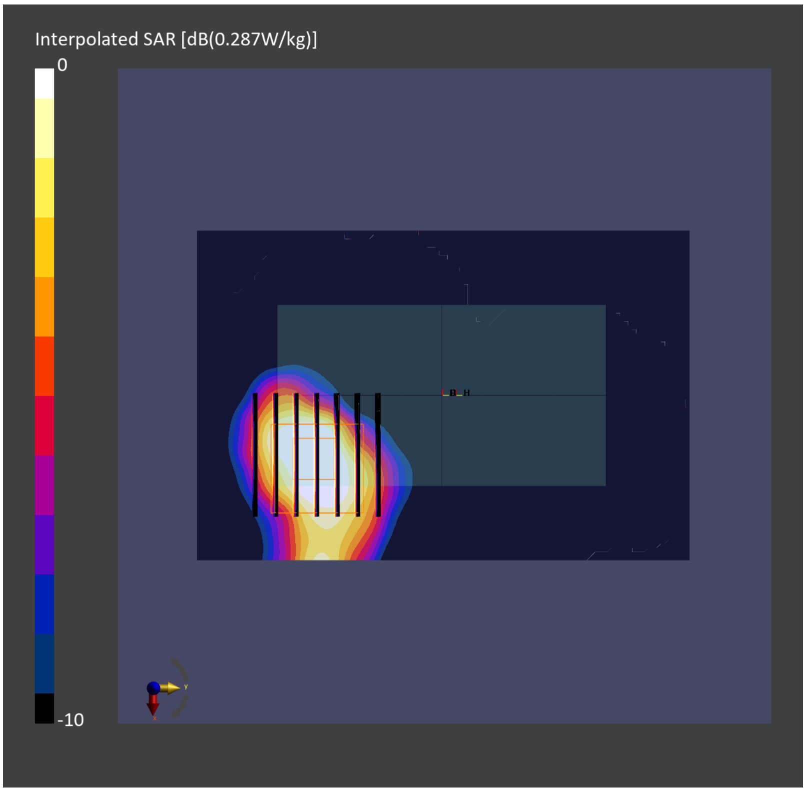
DASY6 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(7.83, 7.83, 7.83); Calibrated: 2023-10-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1805; Calibrated: 2023-05-16
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: WLAN, 10012-CAB

Area Scan (80.0 mm x 120.0 mm): Measurement Grid: 10.0 mm x 10.0 mm

SAR (1g) = 0.287 W/kg; SAR (10g) = 0.129 W/kg;

Zoom Scan (30.0 mm x 30.0 mm x 30.0 mm): Measurement Grid: 5.0 mm x 5.0 mm x 1.5 mm

Power Drift = -0.11 dB
SAR (1g) = 0.344 W/kg; SAR (8g) = 0.156 W/kg; SAR (10g) = 0.140 W/kg
Smallest distance from peaks to all points 3 dB below = 5.9 mm
Ratio of SAR at M2 to SAR at M1 = 68.5 %



Date: 2024-03-22

#02_WLAN5GHz_802.11ac-VHT80 MCS0_Right Side_5mm_Ch58

Communication System: IEEE 802.11ac WiFi; Frequency: 5290.000 MHz;
Medium: HSL_5G_240322 Medium parameters used: f= 5290.000 MHz; σ= 4.86 S/m; ε_r = 36.5
Ambient Temperature: 23.6°C; Liquid Temperature: 22.6°C

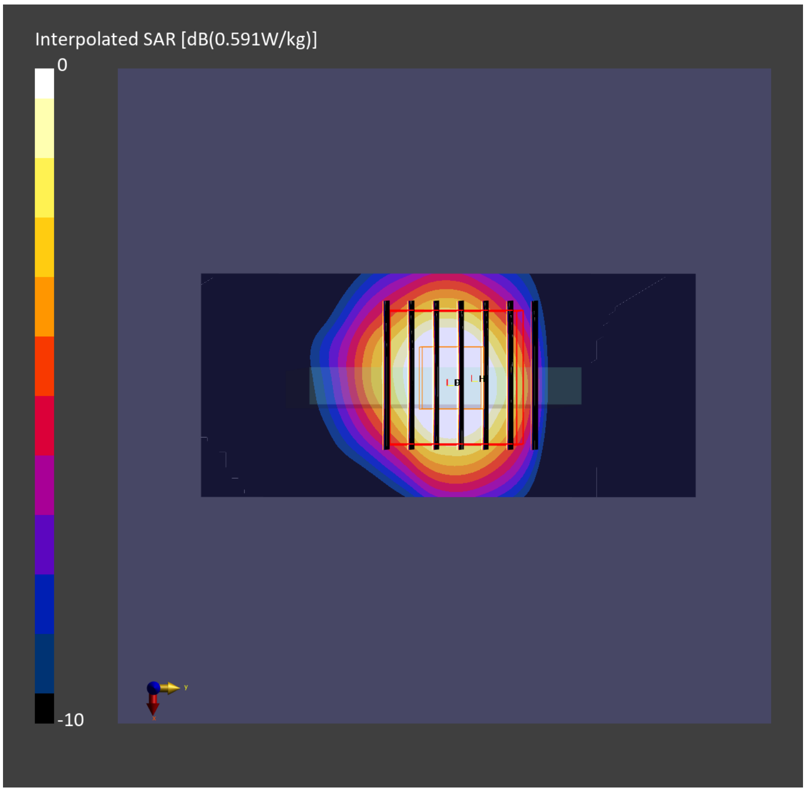
DASY6 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(5.17, 5.17, 5.17); Calibrated: 2023-10-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1805; Calibrated: 2023-05-16
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: WLAN, 10544-AAD

Area Scan (36.0 mm x 80.0 mm): Measurement Grid: 6.0 mm x 10.0 mm

SAR (1g) = 0.591 W/kg; SAR (10g) = 0.189 W/kg;

Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm

Power Drift = -0.01 dB
SAR (1g) = 0.603 W/kg; SAR (8g) = 0.221 W/kg; SAR (10g) = 0.192 W/kg
Smallest distance from peaks to all points 3 dB below = 8.7 mm
Ratio of SAR at M2 to SAR at M1 = 64.3 %



Date: 2024-03-22

#03_WLAN5GHz_802.11ac-VHT80 MCS0_Right Side_5mm_Ch138

Communication System: IEEE 802.11ac WiFi; Frequency: 5690.000 MHz;
Medium: HSL_5G_240322 Medium parameters used: f= 5690.000 MHz; σ= 5.28 S/m; ε_r = 36.0
Ambient Temperature: 23.6°C; Liquid Temperature: 22.6°C

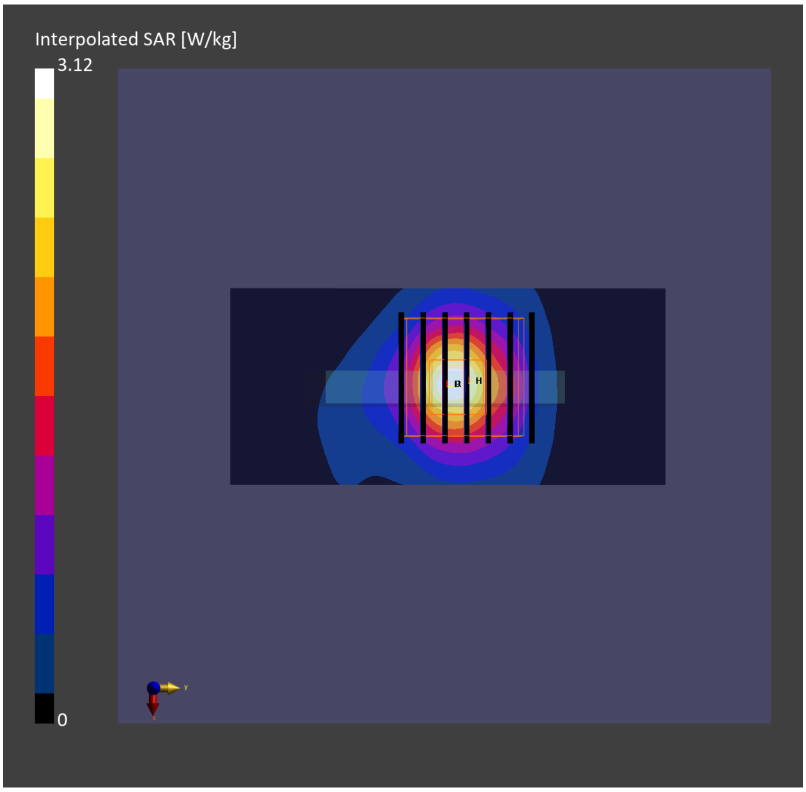
DASY6 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(4.8, 4.8, 4.8); Calibrated: 2023-10-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1805; Calibrated: 2023-05-16
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: WLAN, 10544-AAD

Area Scan (36.0 mm x 80.0 mm): Measurement Grid: 6.0 mm x 10.0 mm

SAR (1g) = 0.686 W/kg; SAR (10g) = 0.217 W/kg;

Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm

Power Drift = 0.06 dB
SAR (1g) = 0.718 W/kg; SAR (8g) = 0.253 W/kg; SAR (10g) = 0.218 W/kg
Smallest distance from peaks to all points 3 dB below = 8.4 mm
Ratio of SAR at M2 to SAR at M1 = 60.0 %



Date: 2024-03-22

#04_WLAN5GHz_802.11ac-VHT80 MCS0_Right Side_5mm_Ch155

Communication System: IEEE 802.11ac WiFi; Frequency: 5775.000 MHz;
Medium: HSL_5G_240322 Medium parameters used: f= 5775.000 MHz; σ= 5.38 S/m; ε_r = 35.9
Ambient Temperature: 23.6°C; Liquid Temperature: 22.6°C

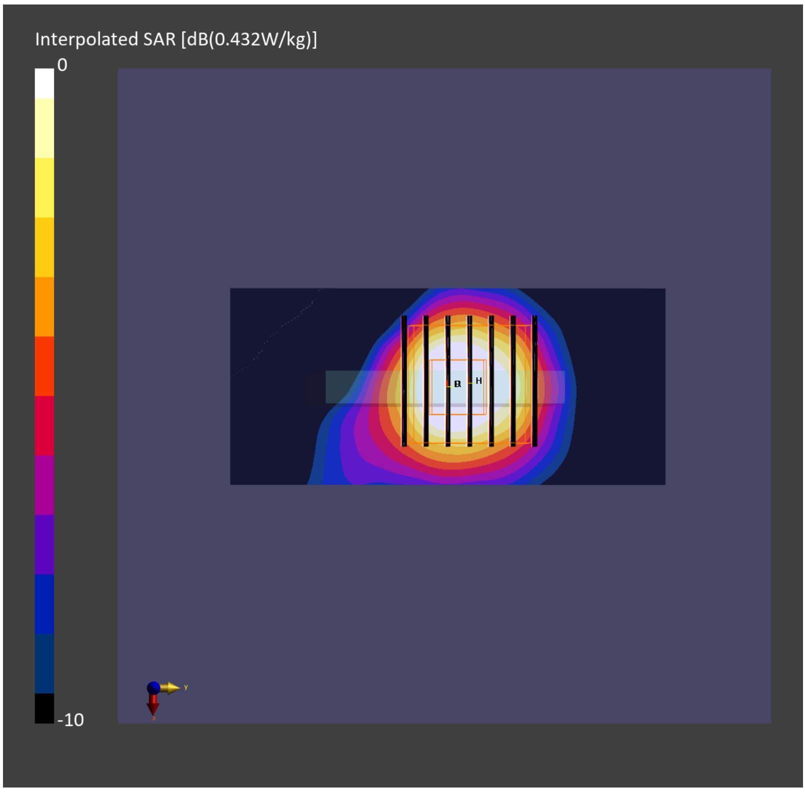
DASY6 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(4.8, 4.8, 4.8); Calibrated: 2023-10-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1805; Calibrated: 2023-05-16
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: WLAN, 10544-AAD

Area Scan (36.0 mm x 80.0 mm): Measurement Grid: 6.0 mm x 10.0 mm

SAR (1g) = 0.432 W/kg; SAR (10g) = 0.138 W/kg;

Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm

Power Drift = -0.02 dB
SAR (1g) = 0.449 W/kg; SAR (8g) = 0.156 W/kg; SAR (10g) = 0.135 W/kg
Smallest distance from peaks to all points 3 dB below = 8.4 mm
Ratio of SAR at M2 to SAR at M1 = 59.0 %



Date: 2024-03-23

#05_WLAN5GHz_802.11ac-VHT80 MCS0_Right Side_5mm_Ch171

Communication System: IEEE 802.11ac WiFi; Frequency: 5855.000 MHz;
Medium: HSL_5G_240323 Medium parameters used: f= 5855.000 MHz; σ= 5.38 S/m; ε_r = 34.7
Ambient Temperature: 23.7°C; Liquid Temperature: 22.7°C

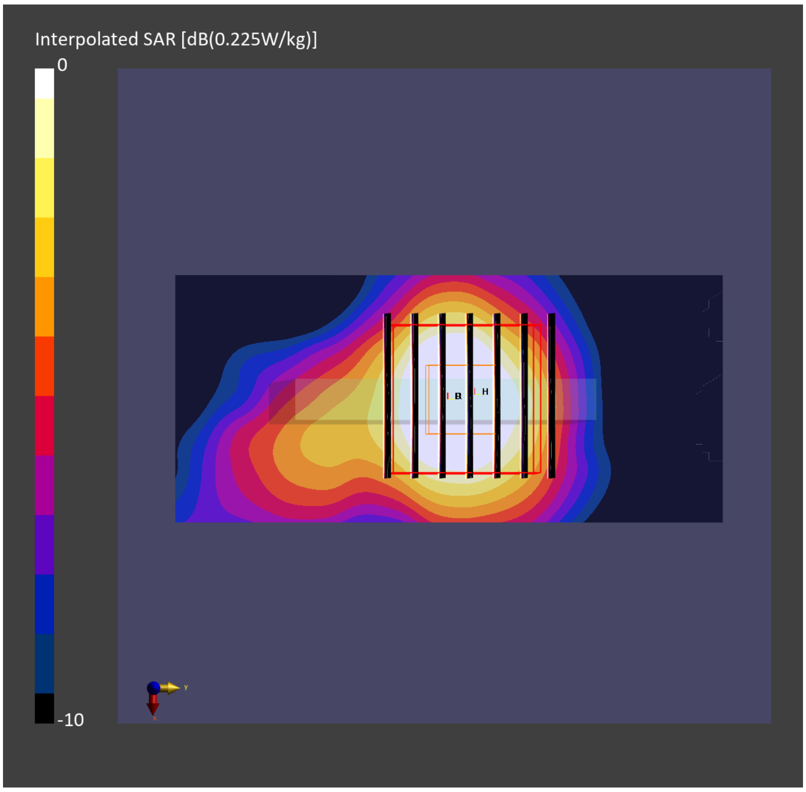
DASY6 Configuration:
- Probe: EX3DV4 - SN7793; ConvF(4.37, 4.42, 4.46); Calibrated: 2024-03-01
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1707; Calibrated: 2023-12-06
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: WLAN, 10544-AAD

Area Scan (36.0 mm x 80.0 mm): Measurement Grid: 6.0 mm x 10.0 mm

SAR (1g) = 0.258 W/kg; SAR (10g) = 0.083 W/kg;

Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm

Power Drift = 0.03 dB
SAR (1g) = 0.273 W/kg; SAR (8g) = 0.096 W/kg; SAR (10g) = 0.083 W/kg
Smallest distance from peaks to all points 3 dB below = 8.4 mm
Ratio of SAR at M2 to SAR at M1 = 58.1 %



Date: 2024-03-27

#06_WLAN2.4GHz_802.11b 1Mbps_Bottom Side_5mm_Ch6

Communication System: IEEE 802.11b WiFi 2.4 GHz; Frequency: 2437.000 MHz;
Medium: HSL_2450_240327 Medium parameters used: f= 2437.000 MHz; σ= 1.78 S/m; ε_r = 40.0
Ambient Temperature: 23.7°C; Liquid Temperature: 22.7°C

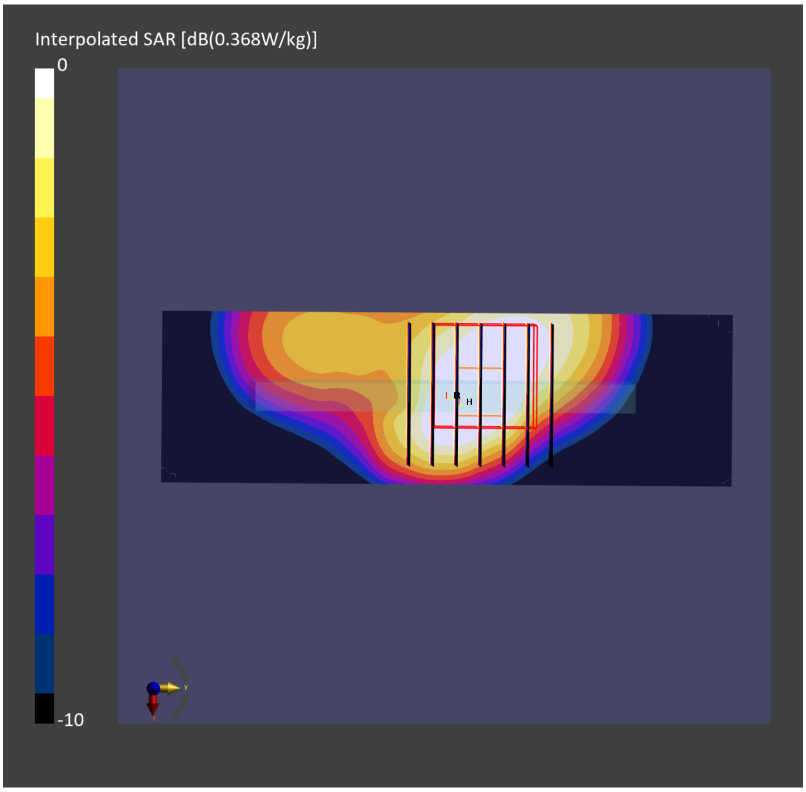
DASY6 Configuration:
- Probe: EX3DV4 - SN7793; ConvF(6.63, 6.87, 6.92); Calibrated: 2024-03-01
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1707; Calibrated: 2023-12-06
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: WLAN, 10415-AAA

Area Scan (36.0 mm x 120.0 mm): Measurement Grid: 6.0 mm x 10.0 mm

SAR (1g) = 0.366 W/kg; SAR (10g) = 0.189 W/kg;

Zoom Scan (30.0 mm x 30.0 mm x 30.0 mm): Measurement Grid: 5.0 mm x 5.0 mm x 1.5 mm

Power Drift = 0.02 dB
SAR (1g) = 0.367 W/kg; SAR (8g) = 0.198 W/kg; SAR (10g) = 0.182 W/kg
Smallest distance from peaks to all points 3 dB below = 9.3 mm
Ratio of SAR at M2 to SAR at M1 = 78.0 %



Date: 2024-03-26

#07_WLAN5GHz_802.11ac-VHT80 MCS0_Left Side_5mm_Ch58

Communication System: IEEE 802.11ac WiFi ; Frequency: 5290.000 MHz;
Medium: HSL_5G_240326 Medium parameters used: f= 5290.000 MHz; σ= 4.71 S/m; ε_r = 36.7
Ambient Temperature: 23.6°C; Liquid Temperature: 22.6°C

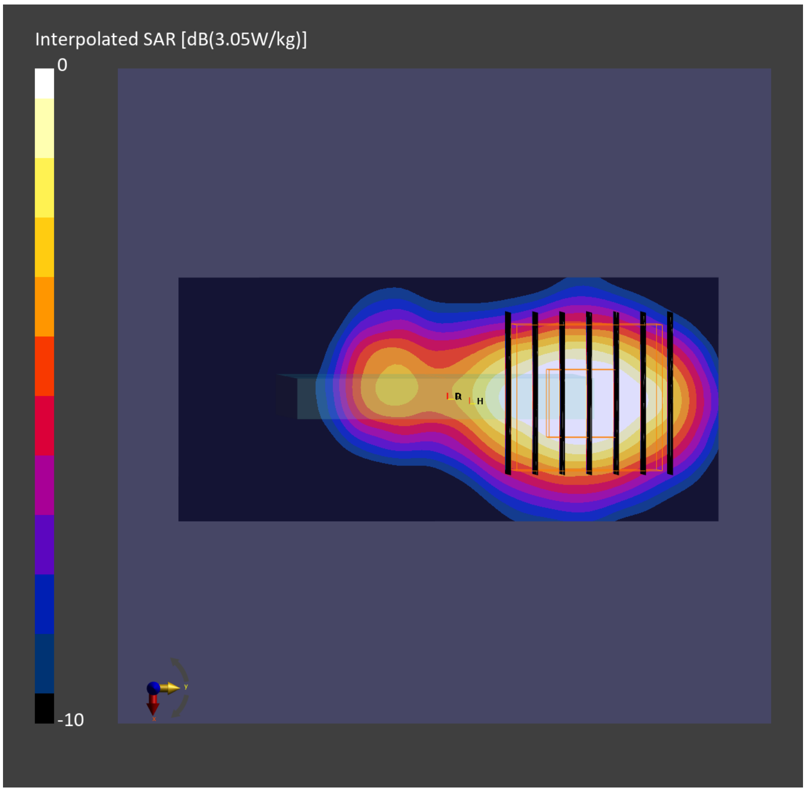
DASY6 Configuration:
- Probe: EX3DV4 - SN7793; ConvF(4.89, 5.03, 5.05); Calibrated: 2024-03-01
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1707; Calibrated: 2023-12-06
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227_0mm; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: WLAN, 10544-AAD

Area Scan (36.0 mm x 80.0 mm): Measurement Grid: 6.0 mm x 10.0 mm

SAR (1g) = 0.662 W/kg; SAR (10g) = 0.214 W/kg;

Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm

Power Drift = -0.02 dB
SAR (1g) = 0.686 W/kg; SAR (8g) = 0.246 W/kg; SAR (10g) = 0.213 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 59.2 %



Date: 2024-03-26

#08_WLAN5GHz_802.11ac-VHT80 MCS0_Left Side_5mm_Ch138

Communication System: IEEE 802.11ac WiFi; Frequency: 5690.000 MHz;
Medium: HSL_5G_240326 Medium parameters used: f= 5690.000 MHz; σ= 5.14 S/m; ε_r = 36.2
Ambient Temperature: 23.6°C; Liquid Temperature: 22.6°C

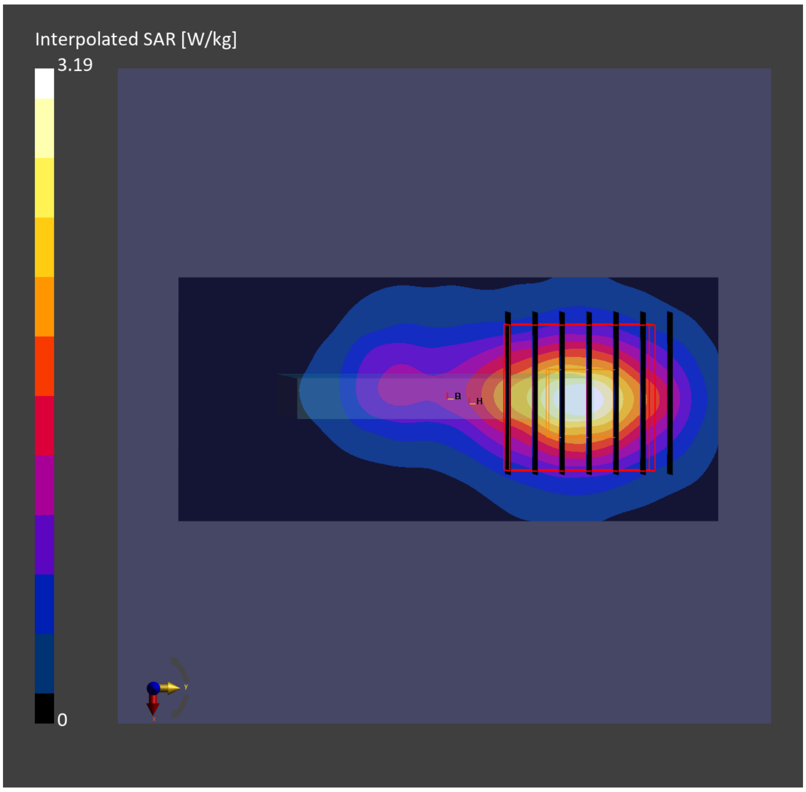
DASY6 Configuration:
- Probe: EX3DV4 - SN7793; ConvF(4.12, 4.35, 4.32); Calibrated: 2024-03-01
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1707; Calibrated: 2023-12-06
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: WLAN, 10544-AAD

Area Scan (36.0 mm x 80.0 mm): Measurement Grid: 6.0 mm x 10.0 mm

SAR (1g) = 0.721 W/kg; SAR (10g) = 0.230 W/kg;

Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm

Power Drift = -0.06 dB
SAR (1g) = 0.732 W/kg; SAR (8g) = 0.258 W/kg; SAR (10g) = 0.223 W/kg
Smallest distance from peaks to all points 3 dB below = 6.9 mm
Ratio of SAR at M2 to SAR at M1 = 60.0 %



Date: 2024-03-26

#09_WLAN5GHz_802.11ac-VHT80 MCS0_Left Side_5mm_Ch155

Communication System: IEEE 802.11ac WiFi; Frequency: 5775.000 MHz;
Medium: HSL_5G_240326 Medium parameters used: f= 5775.000 MHz; σ= 5.23 S/m; ε_r = 36.1
Ambient Temperature: 23.6°C; Liquid Temperature: 22.6°C

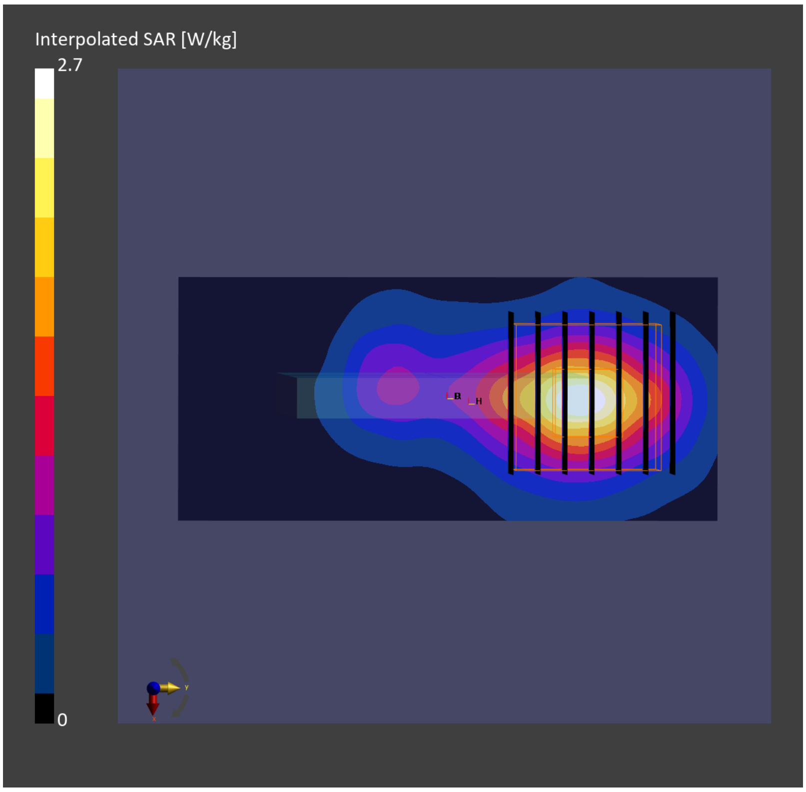
DASY6 Configuration:
- Probe: EX3DV4 - SN7793; ConvF(4.37, 4.42, 4.46); Calibrated: 2024-03-01
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1707; Calibrated: 2023-12-06
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: WLAN, 10544-AAD

Area Scan (36.0 mm x 80.0 mm): Measurement Grid: 6.0 mm x 10.0 mm

SAR (1g) = 0.600 W/kg; SAR (10g) = 0.190 W/kg;

Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm

Power Drift = 0.07 dB
SAR (1g) = 0.607 W/kg; SAR (8g) = 0.215 W/kg; SAR (10g) = 0.186 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 59.4 %



Date: 2024-03-23

#10_WLAN5GHz_802.11ac-VHT80 MCS0_Left Side_5mm_Ch171

Communication System: IEEE 802.11ac WiFi ; Frequency: 5855.000 MHz;
Medium: HSL_5G_240323 Medium parameters used: f= 5855.000 MHz; σ= 5.38 S/m; ε_r = 34.7
Ambient Temperature: 23.7°C; Liquid Temperature: 22.7°C

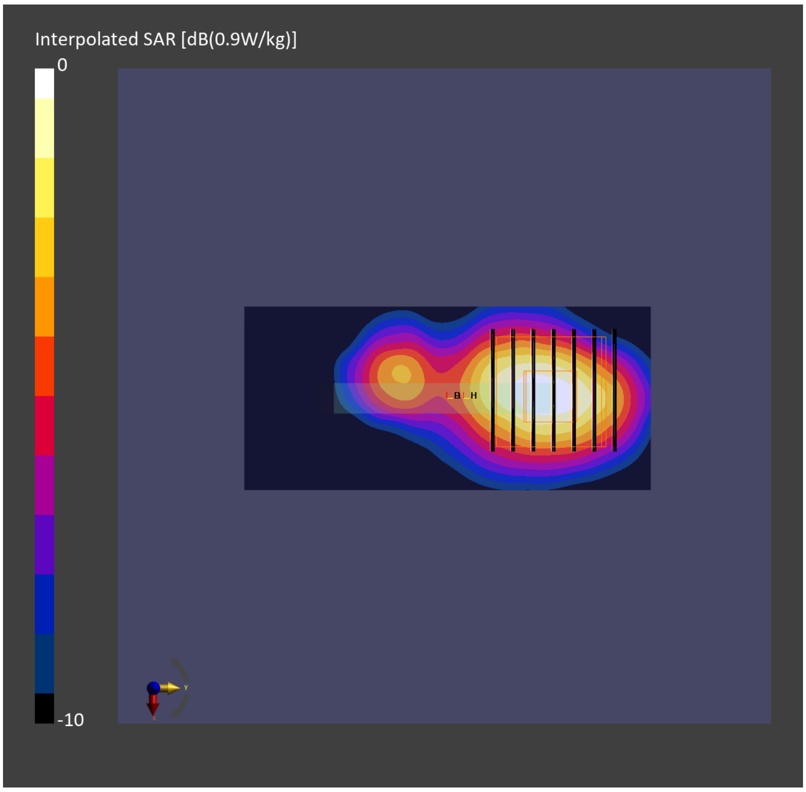
DASY6 Configuration:
- Probe: EX3DV4 - SN7793; ConvF(4.37, 4.42, 4.46); Calibrated: 2024-03-01
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1707; Calibrated: 2023-12-06
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: WLAN, 10544-AAD

Area Scan (36.0 mm x 80.0 mm): Measurement Grid: 6.0 mm x 10.0 mm

SAR (1g) = 0.623 W/kg; SAR (10g) = 0.211 W/kg;

Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 4.0 mm x 4.0 mm x 1.4 mm

Power Drift = -0.00 dB
SAR (1g) = 0.615 W/kg; SAR (8g) = 0.230 W/kg; SAR (10g) = 0.201 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 58.4 %



Date: 2024-03-21

#11_Bluetooth_1Mbps_Front_5mm_Ch39

Communication System: IEEE 802.15.1 Bluetooth; Frequency: 2441.000 MHz;
Medium: HSL_2450_240321 Medium parameters used: f= 2441.000 MHz; σ= 1.82 S/m; ε_r = 39.1
Ambient Temperature: 23.5°C; Liquid Temperature: 22.5°C

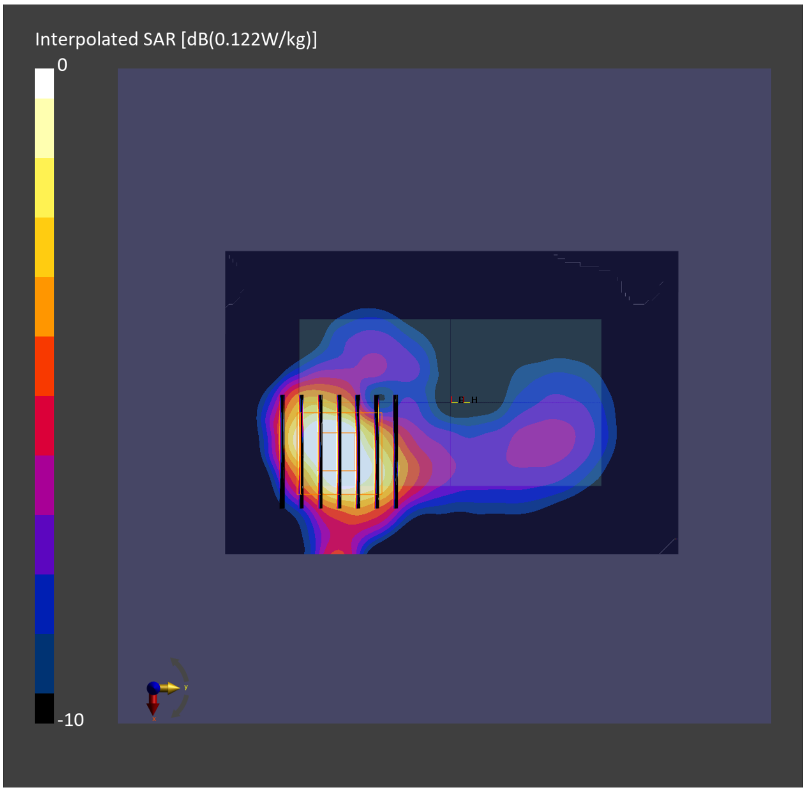
DASY6 Configuration:
- Probe: EX3DV4 - SN3931; ConvF(7.83, 7.83, 7.83); Calibrated: 2023-10-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1805; Calibrated: 2023-05-16
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: Bluetooth, 10032-CAA

Area Scan (80.0 mm x 120.0 mm): Measurement Grid: 10.0 mm x 10.0 mm

SAR (1g) = 0.122 W/kg; SAR (10g) = 0.054 W/kg;

Zoom Scan (30.0 mm x 30.0 mm x 30.0 mm): Measurement Grid: 5.0 mm x 5.0 mm x 1.5 mm

Power Drift = -0.18 dB
SAR (1g) = 0.137 W/kg; SAR (8g) = 0.062 W/kg; SAR (10g) = 0.055 W/kg
Smallest distance from peaks to all points 3 dB below = 6.5 mm
Ratio of SAR at M2 to SAR at M1 = 69.5 %



Date: 2024-03-27

#12_Bluetooth_1Mbps_Bottom Side_5mm_Ch39

Communication System: IEEE 802.15.1 Bluetooth; Frequency: 2441.000 MHz;
Medium: HSL_2450_240327 Medium parameters used: f= 2441.000 MHz; σ= 1.78 S/m; ε_r = 40.0
Ambient Temperature: 23.7°C; Liquid Temperature: 22.7°C

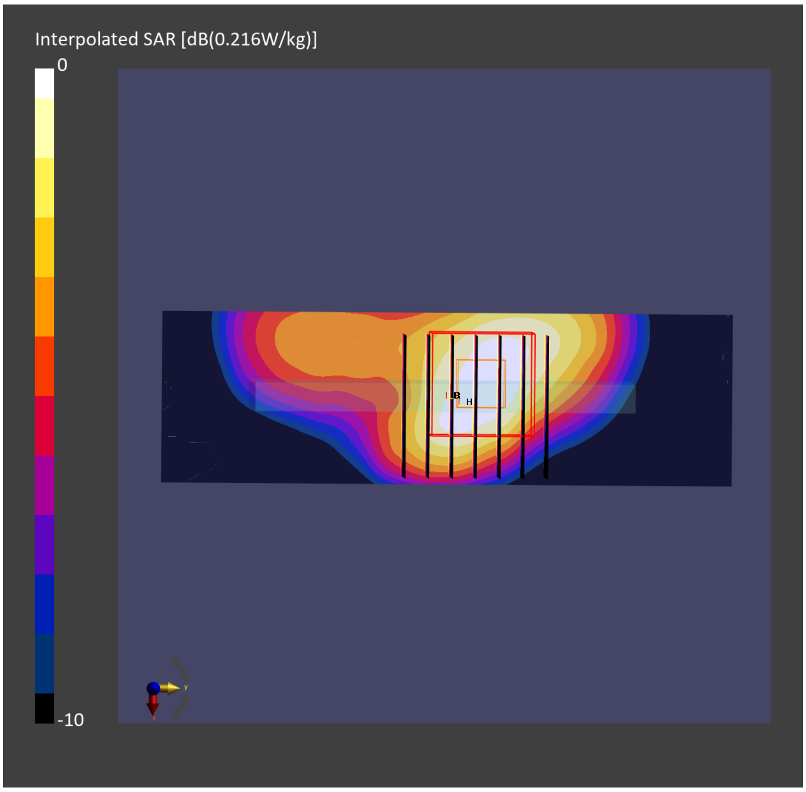
DASY6 Configuration:
- Probe: EX3DV4 - SN7793; ConvF(6.63, 6.87, 6.92); Calibrated: 2024-03-01
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1707; Calibrated: 2023-12-06
- Phantom: ELI V4.0 (20deg probe tilt); Serial: 1227; Section: Flat
- Measurement Software: 16.2.4.2524
- UID: Bluetooth, 10032-CAA

Area Scan (36.0 mm x 120.0 mm): Measurement Grid: 6.0 mm x 10.0 mm

SAR (1g) = 0.170 W/kg; SAR (10g) = 0.090 W/kg;

Zoom Scan (30.0 mm x 30.0 mm x 30.0 mm): Measurement Grid: 5.0 mm x 5.0 mm x 1.5 mm

Power Drift = 0.13 dB
SAR (1g) = 0.195 W/kg; SAR (8g) = 0.104 W/kg; SAR (10g) = 0.094 W/kg
Smallest distance from peaks to all points 3 dB below = 9.0 mm
Ratio of SAR at M2 to SAR at M1 = 74.9 %



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

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C **Service suisse d'étalonnage**
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Accreditation No.: SCS 0108

Client **Sporton**

Certificate No: D2450V2-736_Aug21

CALIBRATION CERTIFICATE

Object	D2450V2 - SN:736
Calibration procedure(s)	QA CAL-05.v11 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz
Calibration date:	August 17, 2021

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	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: BH9394 (20k)	09-Apr-21 (No. 217-03343)	Apr-22
Type-N mismatch combination	SN: 310982 / 06327	09-Apr-21 (No. 217-03344)	Apr-22
Reference Probe EX3DV4	SN: 7349	28-Dec-20 (No. EX3-7349_Dec20)	Dec-21
DAE4	SN: 601	02-Nov-20 (No. DAE4-601_Nov20)	Nov-21

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-21

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 25, 2021

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	37.9 ± 6 %	1.87 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	13.9 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**54.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.3 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	55.3 Ω + 3.6 jΩ
Return Loss	- 24.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.158 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: 17.08.2021

Test Laboratory: SPEAG, Zurich, Switzerland

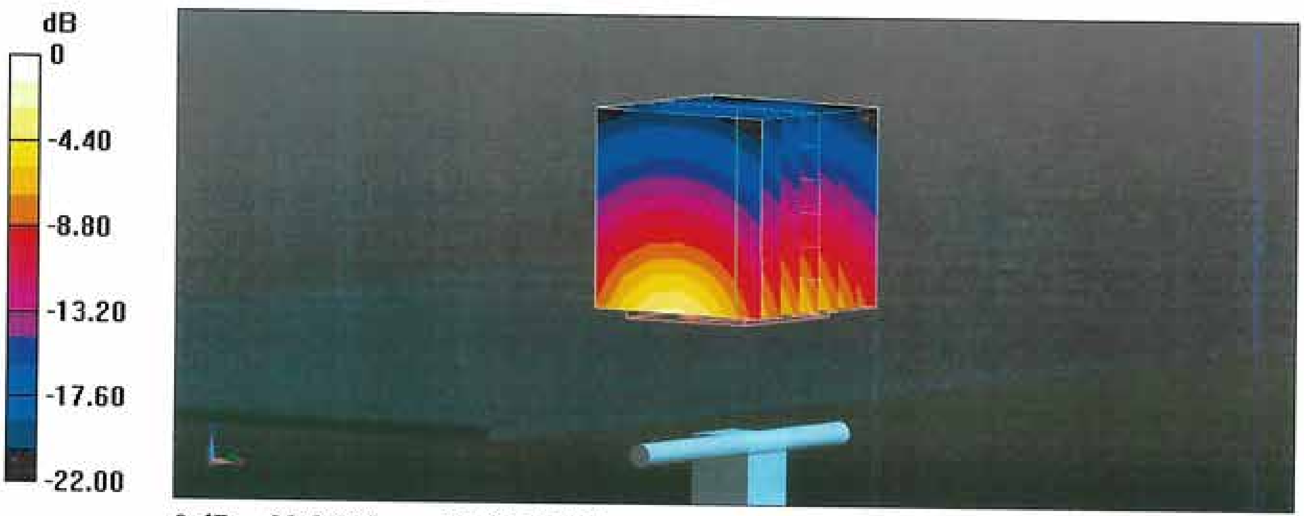
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:736

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.87 S/m; ε_r = 37.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

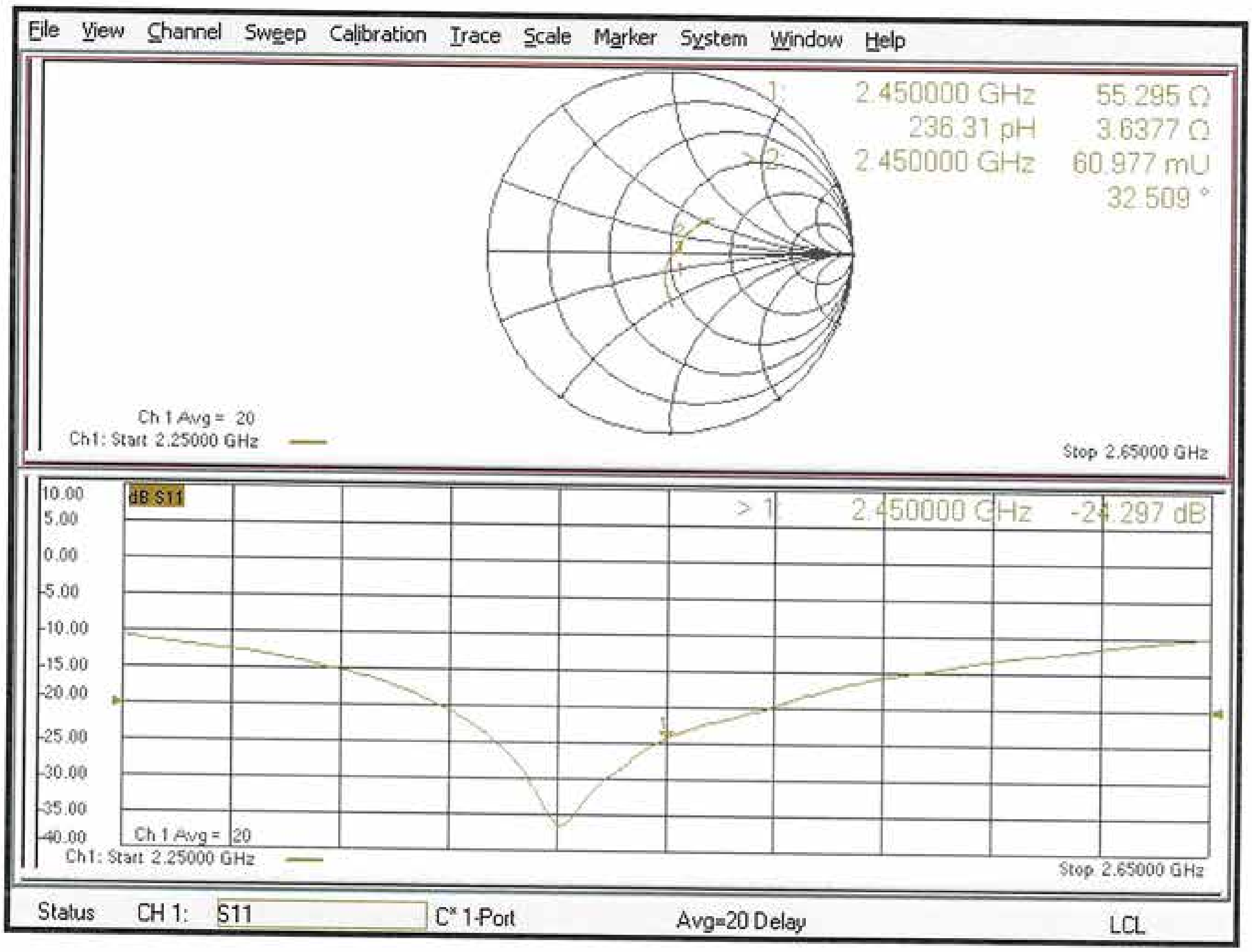
- Probe: EX3DV4 - SN7349; ConvF(7.96, 7.96, 7.96) @ 2450 MHz; Calibrated: 28.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

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 = 118.4 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 27.7 W/kg
SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.43 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 50.3%
Maximum value of SAR (measured) = 22.8 W/kg



0 dB = 22.8 W/kg = 13.58 dBW/kg

Impedance Measurement Plot for Head TSL



D2450V2, serial no. 736 Extended Dipole Calibrations

If dipoles are verified in return loss (<-20dB, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

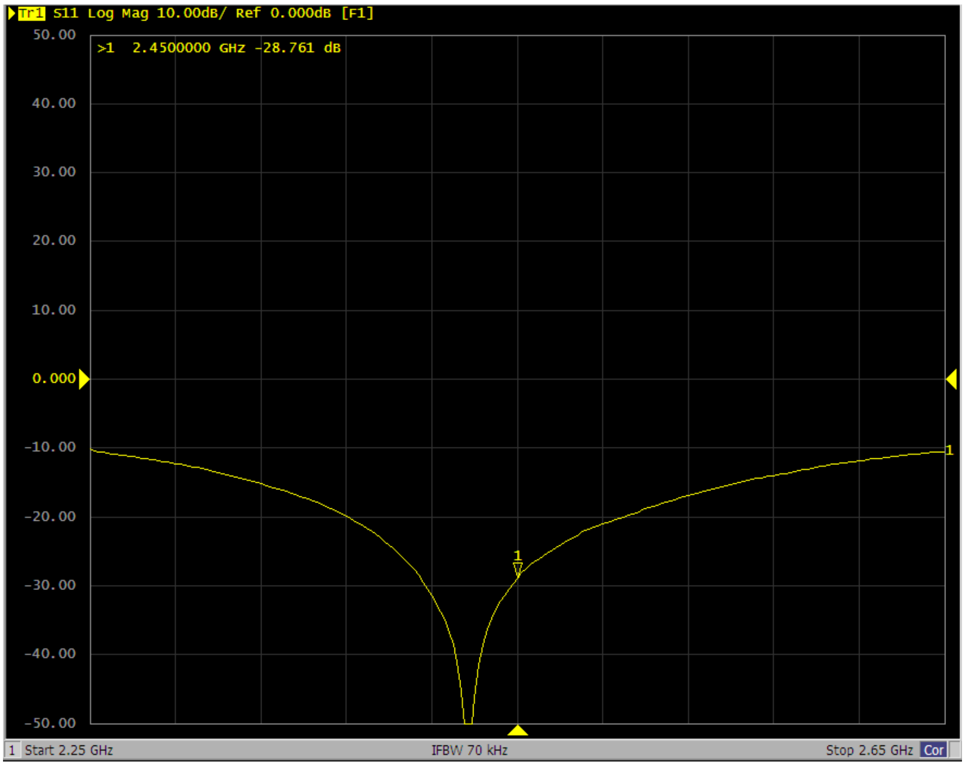
<Justification of the extended calibration>

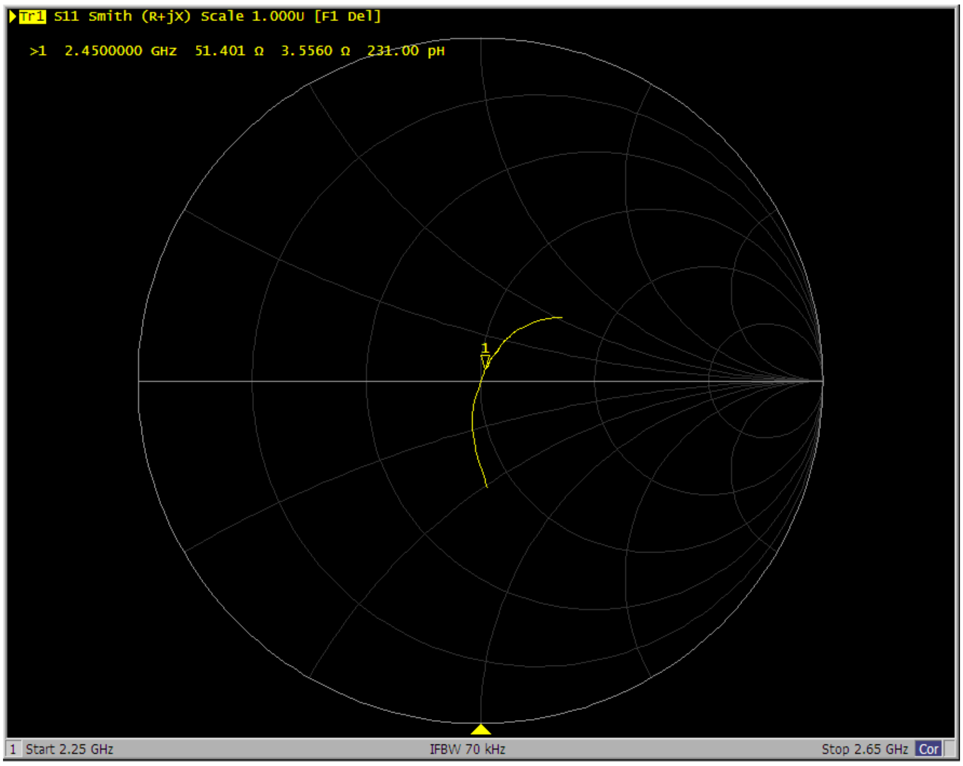
D2450V2 – serial no. **736**						
	2450MHZ					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
08.17.2021 (Cal. Report)	-24.297		55.295		3.6377	
08.16.2022 (extended)	-28.761	18.37	51.401	-3.894	3.556	-0.0817
08.15.2023 (extended)	-28.483	17.23	51.239	-4.056	3.496	-0.1417

The return loss is < -20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data> - D2450 V2, serial no. 736 (Data of Measurement : 08.16.2022)

2450 MHz - Head

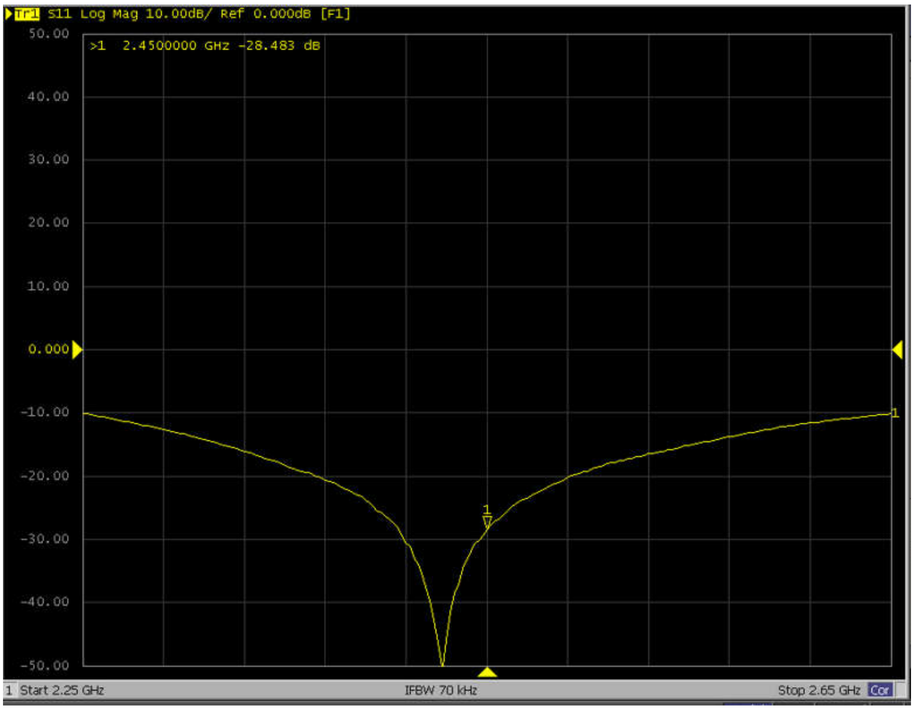


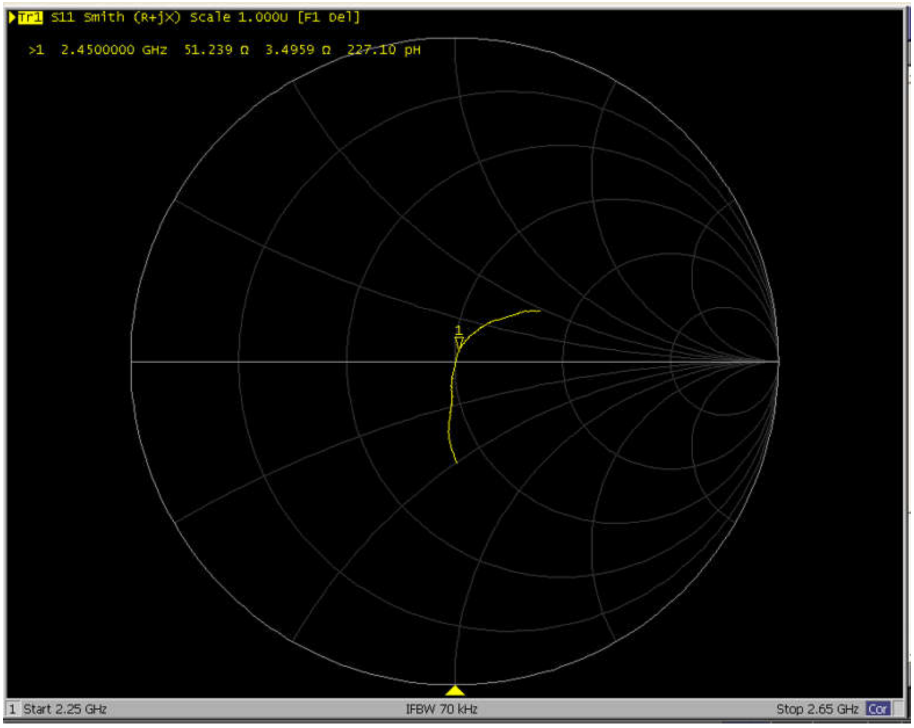


SPORTON INTERNATIONAL INC.
TEL : 886-3-327-3456
FAX : 886-3-328-4978

<Dipole Verification Data> - D2450V2, serial no. 736 (Data of Measurement : 08.15.2023)

D2450V2 MHz - Head





SPORTON INTERNATIONAL INC.
TEL : 886-3-327-3456
FAX : 886-3-328-4978

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

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Accreditation No.: SCS 0108

Client **Sporton**

Certificate No: D5GHzV2-1128_Feb23

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN:1128
Calibration procedure(s)	QA CAL-22.v7 Calibration Procedure for SAR Validation Sources between 3-10 GHz
Calibration date:	February 22, 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: 3503	08-Mar-22 (No. EX3-3503_Mar22)	Mar-23
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:	Paulo Pina	Laboratory Technician	
Approved by:	Niels Kuster	Quality Manager	

Issued: February 23, 2023

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

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 V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	36.1 ± 6 %	4.60 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.66 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**76.6 W/kg ± 19.9 % (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	**21.9 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.6 ± 6 %	5.21 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.86 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**78.7 W/kg ± 19.9 % (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	**22.2 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	48.7 Ω - 7.9 jΩ
Return Loss	- 21.9 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	49.4 Ω - 3.9 jΩ
Return Loss	- 28.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.208 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: 22.02.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1128

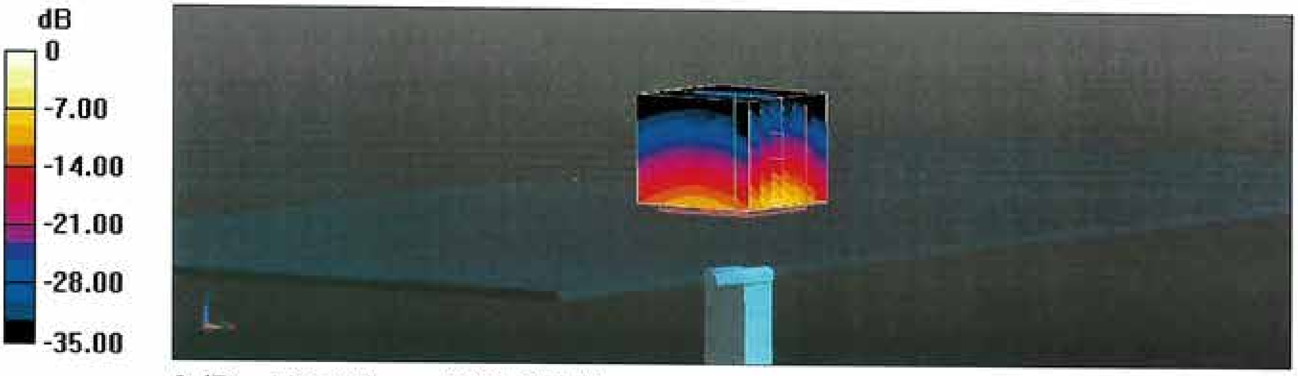
Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 4.6 S/m; ε_r = 36.1; ρ = 1000 kg/m^3
Medium parameters used: f = 5800 MHz; σ = 5.21 S/m; ε_r = 35.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.8, 5.8, 5.8) @ 5200 MHz, ConvF(5.01, 5.01, 5.01) @ 5800 MHz; Calibrated: 08.03.2022
- 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)

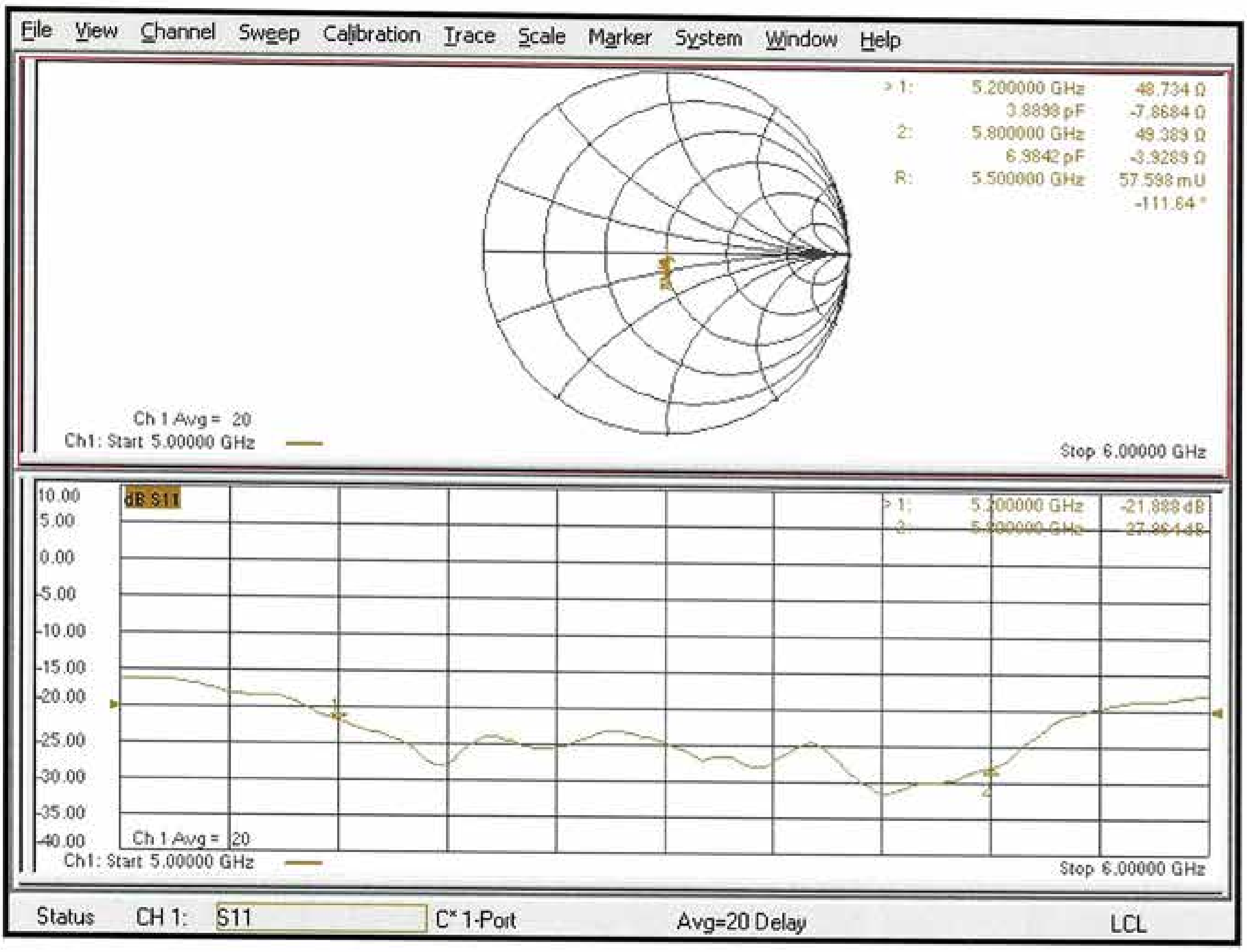
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 71.52 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 26.8 W/kg
SAR(1 g) = 7.66 W/kg; SAR(10 g) = 2.19 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 69.7%
Maximum value of SAR (measured) = 18.0 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 70.57 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 31.0 W/kg
SAR(1 g) = 7.86 W/kg; SAR(10 g) = 2.22 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 65.5%
Maximum value of SAR (measured) = 19.6 W/kg



0 dB = 19.6 W/kg = 12.92 dBW/kg

Impedance Measurement Plot for Head TSL



Appendix: Transfer Calibration at Four Validation Locations on SAM Head[1]

Evaluation Conditions (f=5200 MHz)

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L

SAR result with SAM Head (Top)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	normalized to 1W	**81.1 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR for nominal Head TSL parameters	normalized to 1W	**23.3 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	normalized to 1W	**84.9 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR for nominal Head TSL parameters	normalized to 1W	**24.5 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Neck)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	normalized to 1W	**81.0 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR for nominal Head TSL parameters	normalized to 1W	**23.1 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Ear)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	normalized to 1W	**51.6 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR for nominal Head TSL parameters	normalized to 1W	**17.6 W/kg ± 19.9 % (k=2)**

[1] Additional assessments outside the current scope of SCS 0108

Appendix: Transfer Calibration at Four Validation Locations on SAM Head[2]

Evaluation Conditions (f=5800 MHz)

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L

SAR result with SAM Head (Top)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	normalized to 1W	**81.8 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR for nominal Head TSL parameters	normalized to 1W	**23.1 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	normalized to 1W	**88.4 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR for nominal Head TSL parameters	normalized to 1W	**25.1 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Neck)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	normalized to 1W	**78.9 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR for nominal Head TSL parameters	normalized to 1W	**22.1 W/kg ± 19.9 % (k=2)**

SAR result with SAM Head (Ear)

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	normalized to 1W	**56.2 W/kg ± 20.3 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR for nominal Head TSL parameters	normalized to 1W	**18.8 W/kg ± 19.9 % (k=2)**

[2] Additional assessments outside the current scope of SCS 0108

D5000V2, serial no. 1128 Extended Dipole Calibrations

If dipoles are verified in return loss (<-20dB, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

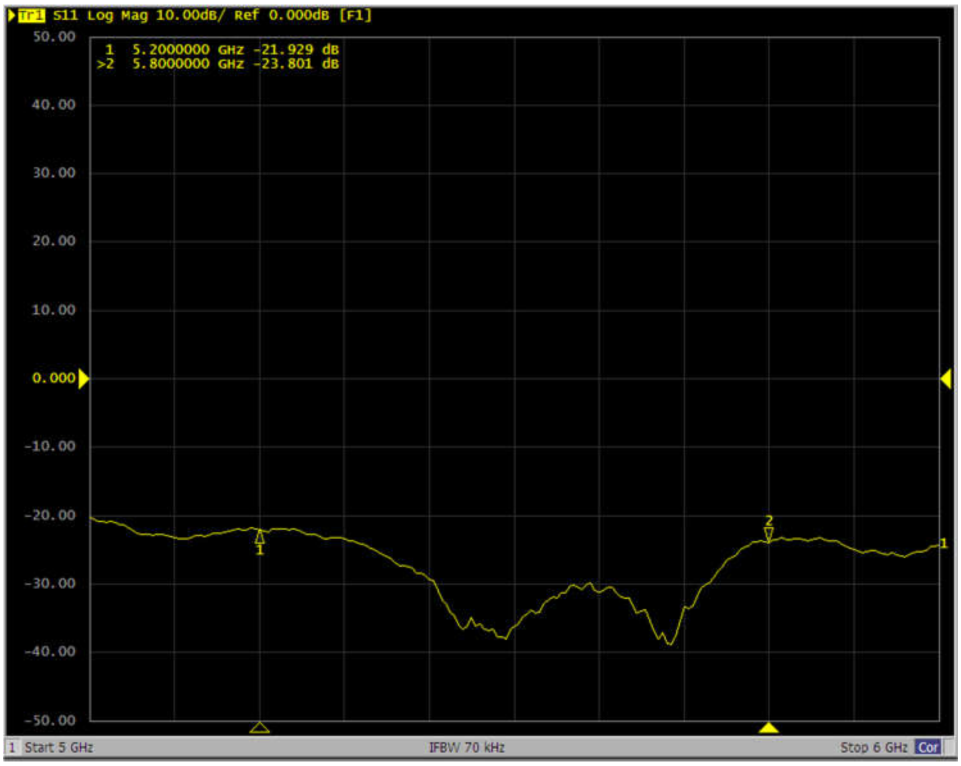
<Justification of the extended calibration>

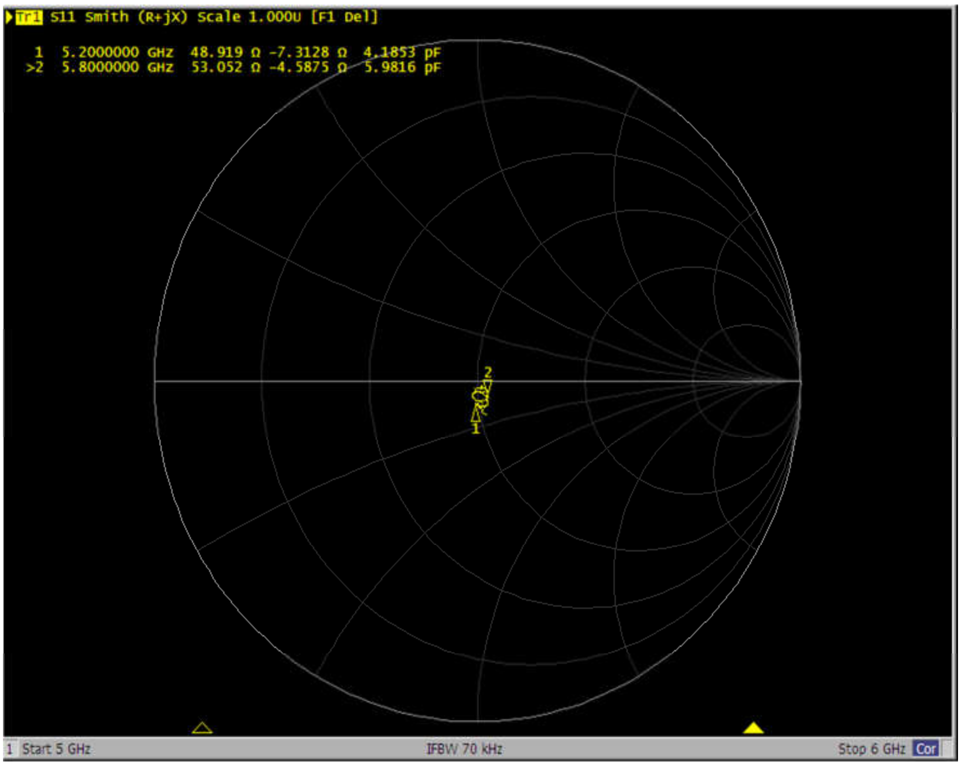
D**5000**V2 – serial no. **1128**						
	5200MHZ					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
02.22.2023 (Cal. Report)	-21.9		48.7		-7.9	
02.21.2024 (extended)	-21.9	0	48.9	0.2	-7.3	0.6
	5800MHZ					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
02.22.2023 (Cal. Report)	-28.0		49.4		-3.9	
02.21.2024 (extended)	-23.8	-15	53.0	3.6	-4.5	-0.6

The return loss is < -20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data> - D5000 V2, serial no. 1128 (Data of Measurement : 02.21.2024)

5000MHz - Head





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TEL : 886-3-327-3456
FAX : 886-3-328-4978

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

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Accreditation No.: SCS 0108

Client **Sporton**

Certificate No: D5GHzV2-1171_Apr21

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN:1171
Calibration procedure(s)	QA CAL-22.v6 Calibration Procedure for SAR Validation Sources between 3-10 GHz
Calibration date:	April 20, 2021

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	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: BH9394 (20k)	09-Apr-21 (No. 217-03343)	Apr-22
Type-N mismatch combination	SN: 310982 / 06327	09-Apr-21 (No. 217-03344)	Apr-22
Reference Probe EX3DV4	SN: 3503	30-Dec-20 (No. EX3-3503_Dec20)	Dec-21
DAE4	SN: 601	02-Nov-20 (No. DAE4-601_Nov20)	Nov-21

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-21

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 20, 2021

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) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) 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%.

Measurement Conditions

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

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz 5850 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

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	34.9 ± 6 %	4.57 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.08 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.0 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

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	34.4 ± 6 %	4.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.4 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.7 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5750 MHz

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	34.1 ± 6 %	5.09 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.4 W/kg ± 19.9 % (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 ± 19.5 % (k=2)**

Head TSL parameters at 5850 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.2	5.32 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.0 ± 6 %	5.19 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5850 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.29 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**82.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.1 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	50.4 Ω - 9.7 jΩ
Return Loss	- 20.3 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	55.5 Ω - 4.5 jΩ
Return Loss	- 23.5 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	55.9 Ω - 5.8 jΩ
Return Loss	- 22.1 dB

Antenna Parameters with Head TSL at 5850 MHz

Impedance, transformed to feed point	57.7 Ω - 6.6 jΩ
Return Loss	- 20.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.206 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: 20.04.2021

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1171

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz, Frequency: 5850 MHz
Medium parameters used: f = 5250 MHz; σ = 4.57 S/m; ε_r = 34.9; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 4.93 S/m; ε_r = 34.4; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 5.09 S/m; ε_r = 34.1; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5850 MHz; σ = 5.19 S/m; ε_r = 34; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

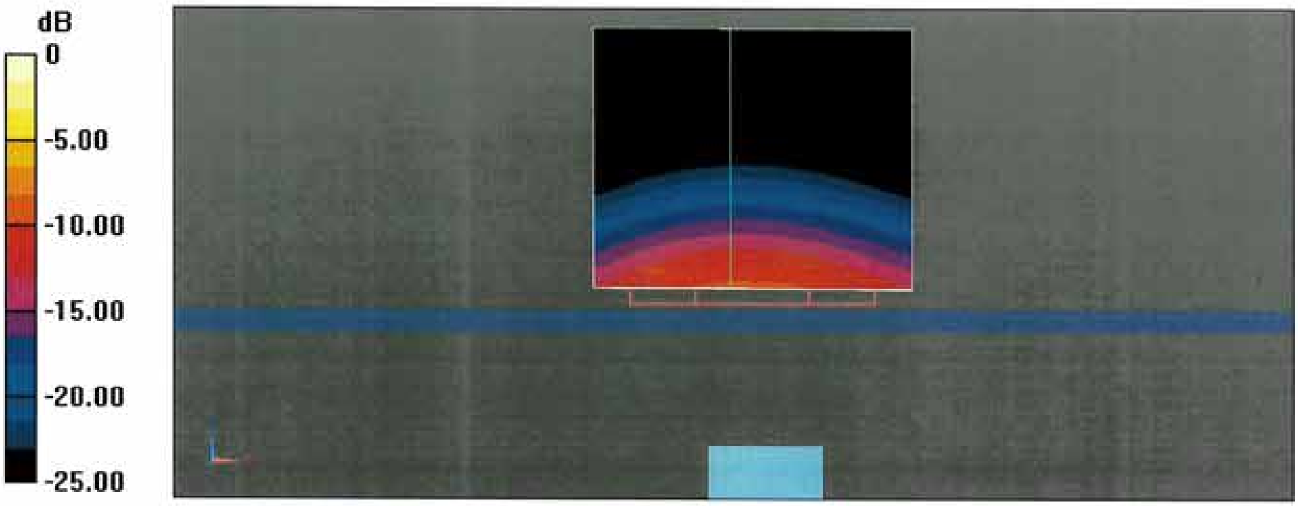
- Probe: EX3DV4 - SN3503; ConvF(5.5, 5.5, 5.5) @ 5250 MHz, ConvF(5.1, 5.1, 5.1) @ 5600 MHz, ConvF(5.08, 5.08, 5.08) @ 5750 MHz, ConvF(4.99, 4.99, 4.99) @ 5850 MHz; Calibrated: 30.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 76.43 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 27.7 W/kg
SAR(1 g) = 8.08 W/kg; SAR(10 g) = 2.32 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 71.2%
Maximum value of SAR (measured) = 18.2 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 77.80 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 31.0 W/kg
SAR(1 g) = 8.41 W/kg; SAR(10 g) = 2.39 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 68.6%
Maximum value of SAR (measured) = 19.6 W/kg

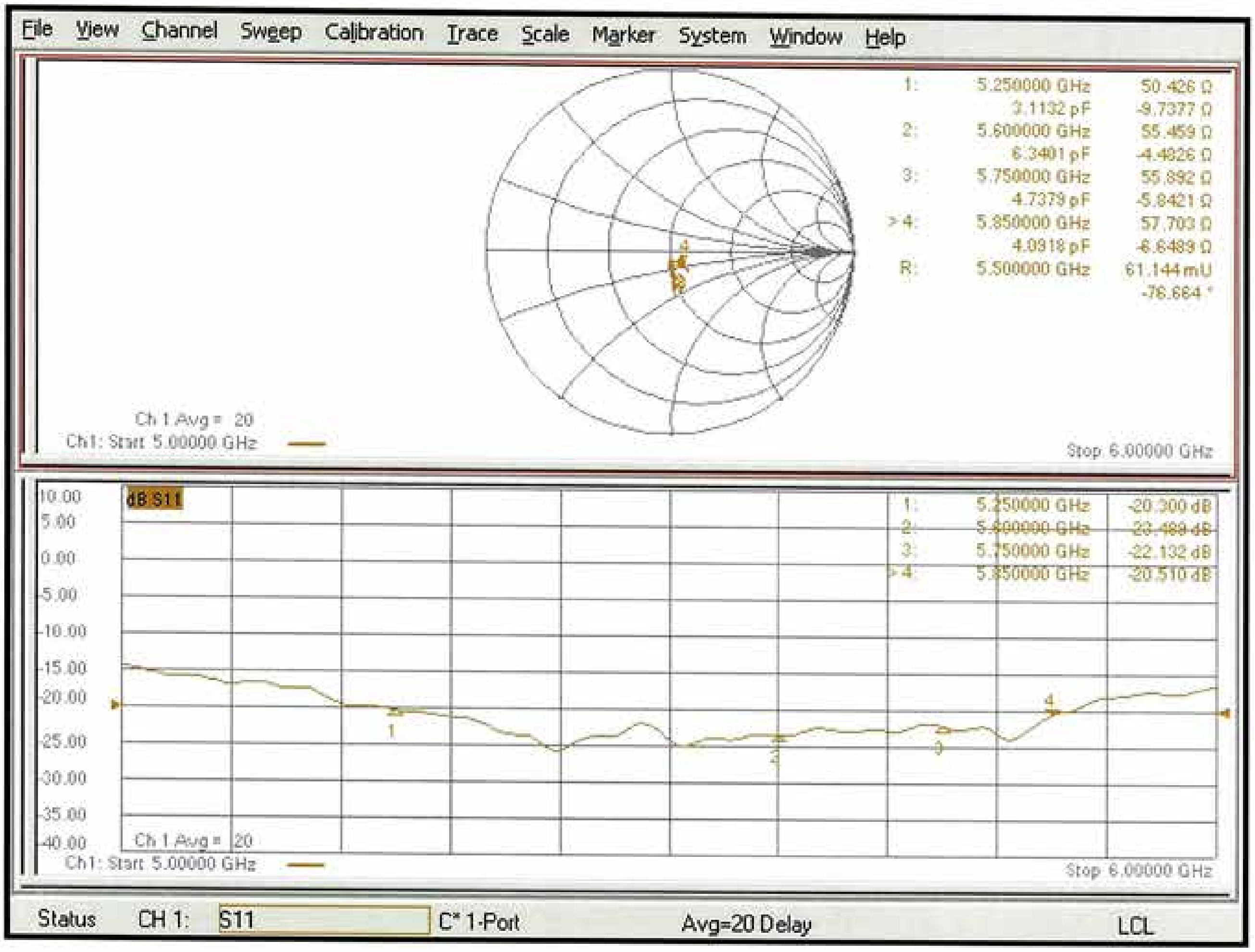
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.01 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 31.5 W/kg
SAR(1 g) = 8.11 W/kg; SAR(10 g) = 2.30 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 66.9%
Maximum value of SAR (measured) = 19.2 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5850 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 76.40 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 33.2 W/kg
SAR(1 g) = 8.29 W/kg; SAR(10 g) = 2.34 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 65.7%
Maximum value of SAR (measured) = 20.0 W/kg



0 dB = 20.0 W/kg = 13.00 dBW/kg

Impedance Measurement Plot for Head TSL



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D5000V2, serial no. 1171 Extended Dipole Calibrations

Referring to KDB 865664, if dipoles are verified in return loss (<-20dB, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

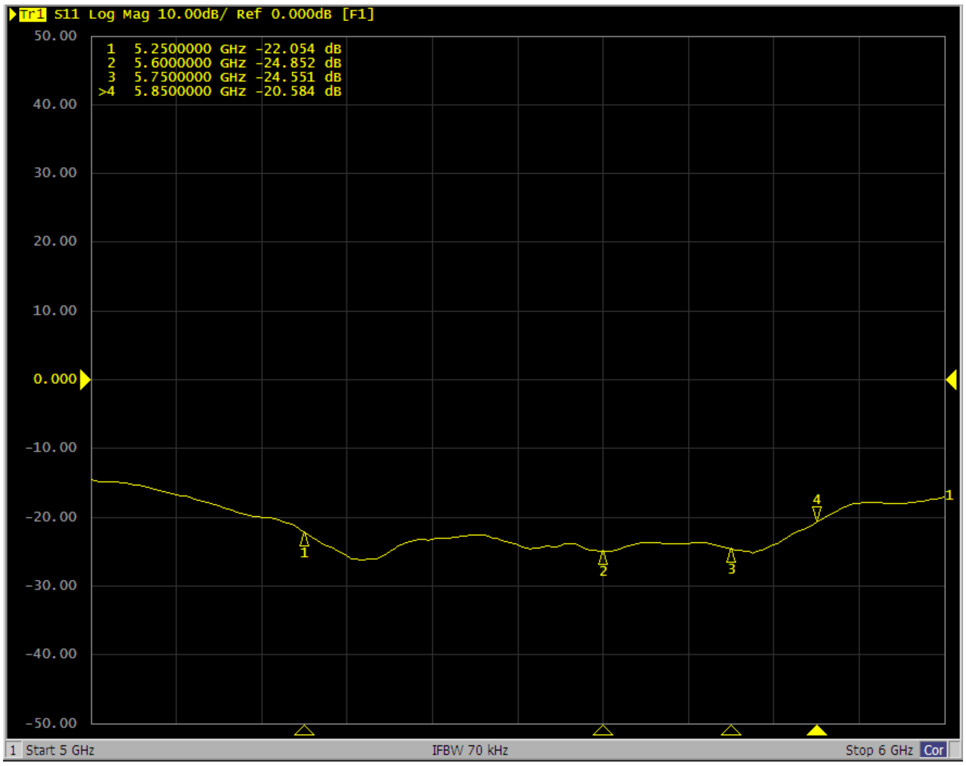
<Justification of the extended calibration>

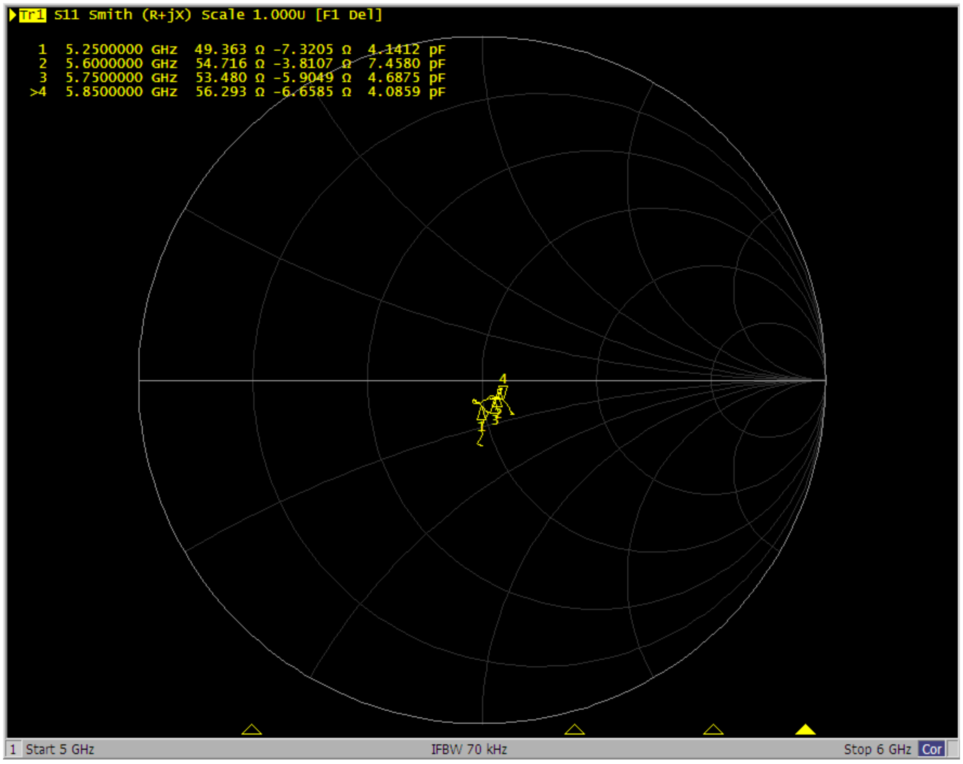
D**5000**V2 – serial no. **1171**						
	5250MHZ					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
04.20.2021 (Cal. Report)	-20.3		50.4		-9.7	
04.19.2022 (extended)	-22.054	8.6	49.363	-1.037	-7.3205	2.3795
	5600MHZ					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
04.20.2021 (Cal. Report)	-23.5		55.5		-4.5	
04.19.2022 (extended)	-24.852	5.8	54.716	-0.784	-3.8107	0.6893
	5750MHZ					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
04.20.2021 (Cal. Report)	-22.1		55.9		-5.8	
04.19.2022 (extended)	-24.551	11.1	53.48	-2.42	-5.9049	-0.1049
	5850MHZ					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
04.20.2021 (Cal. Report)	-20.5		57.7		-6.6	
04.19.2022 (extended)	-20.584	0.4	56.293	-1.407	-6.6585	-0.0585

The return loss is < -20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data> - D5000 V2, serial no. 1171 (Data of Measurement : 04.19.2022)

5000 MHz - Head





SPORTON INTERNATIONAL INC.
TEL : 886-3-327-3456
FAX : 886-3-328-4978

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Client **Sporton**
Taoyuan City

Certificate No: DAE4-1707_Dec23

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BO - SN: 1707
Calibration procedure(s)	QA CAL-06.v30 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	December 06, 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
Keithley Multimeter Type 2001	SN: 0810278	29-Aug-23 (No:37421)	Aug-24
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	27-Jan-23 (in house check)	In house check: Jan-24
Calibrator Box V2.1	SE UMS 006 AA 1002	27-Jan-23 (in house check)	In house check: Jan-24

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	i.V.

Issued: December 6, 2023

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
    - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
    - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
    - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
    - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
    - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
    - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
    - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
    - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
    - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.129 ± 0.02% (k=2)	404.037 ± 0.02% (k=2)	403.872 ± 0.02% (k=2)
Low Range	3.98063 ± 1.50% (k=2)	3.97261 ± 1.50% (k=2)	3.97535 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	26.5 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199994.25	-1.50	-0.00
Channel X	+ Input	20003.41	1.14	0.01
Channel X	- Input	-20000.41	1.63	-0.01
Channel Y	+ Input	199995.38	-0.72	-0.00
Channel Y	+ Input	19998.64	-3.49	-0.02
Channel Y	- Input	-20001.96	0.20	-0.00
Channel Z	+ Input	199993.26	-2.50	-0.00
Channel Z	+ Input	20000.10	-2.02	-0.01
Channel Z	- Input	-20001.57	0.64	-0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2001.14	-0.23	-0.01
Channel X	+ Input	202.11	0.67	0.33
Channel X	- Input	-198.27	0.38	-0.19
Channel Y	+ Input	2000.93	-0.23	-0.01
Channel Y	+ Input	200.66	-0.60	-0.30
Channel Y	- Input	-199.91	-1.09	0.55
Channel Z	+ Input	2002.46	1.38	0.07
Channel Z	+ Input	199.79	-1.53	-0.76
Channel Z	- Input	-200.33	-1.58	0.80

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	6.50	4.91
	- 200	-2.92	-5.03
Channel Y	200	0.31	-0.54
	- 200	-1.97	-1.70
Channel Z	200	-5.86	-5.90
	- 200	3.50	3.17

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	3.48	-3.51
Channel Y	200	6.80	-	4.69
Channel Z	200	8.05	4.81	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16122	16508
Channel Y	16230	14038
Channel Z	16093	17725

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.45	-0.81	1.54	0.42
Channel Y	-0.32	-1.34	0.75	0.33
Channel Z	-0.74	-1.72	0.84	0.44

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9

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

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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 **Sporton**
Taoyuan City

Certificate No: DAE4-1805_May23

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BP - SN: 1805
Calibration procedure(s)	QA CAL-06.v30 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	May 16, 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
Keithley Multimeter Type 2001	SN: 0810278	29-Aug-22 (No:34389)	Aug-23
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	27-Jan-23 (in house check)	In house check: Jan-24
Calibrator Box V2.1	SE UMS 006 AA 1002	27-Jan-23 (in house check)	In house check: Jan-24

	Name	Function	Signature
Calibrated by:	Adrian Gehring	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: May 16, 2023

Glossary

DAE data acquisition electronics
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle:* The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement:* Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	405.125 ± 0.02% (k=2)	404.948 ± 0.02% (k=2)	404.951 ± 0.02% (k=2)
Low Range	4.00003 ± 1.50% (k=2)	3.97120 ± 1.50% (k=2)	3.99478 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	97.5 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200037.01	0.80	0.00
Channel X	+ Input	20007.83	1.22	0.01
Channel X	- Input	-20005.28	0.34	-0.00
Channel Y	+ Input	200036.69	0.15	0.00
Channel Y	+ Input	20005.90	-0.67	-0.00
Channel Y	- Input	-20007.40	-1.65	0.01
Channel Z	+ Input	200036.79	-2.23	-0.00
Channel Z	+ Input	20006.04	-0.46	-0.00
Channel Z	- Input	-20006.69	-0.86	0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2002.26	0.29	0.01
Channel X	+ Input	201.25	-0.58	-0.29
Channel X	- Input	-199.29	-1.22	0.62
Channel Y	+ Input	2002.15	0.34	0.02
Channel Y	+ Input	200.58	-1.14	-0.57
Channel Y	- Input	-199.63	-1.37	0.69
Channel Z	+ Input	2002.11	0.23	0.01
Channel Z	+ Input	201.22	-0.49	-0.24
Channel Z	- Input	-199.02	-0.84	0.43

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-3.75	-5.81
	- 200	5.72	3.92
Channel Y	200	16.43	15.94
	- 200	-19.12	-19.52
Channel Z	200	0.88	0.23
	- 200	-1.64	-1.89

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	1.36	-3.59
Channel Y	200	6.24	-	3.90
Channel Z	200	7.86	3.96	-