

FCC SAR Test Report

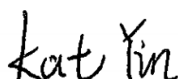
APPLICANT : RealWear, Inc.
EQUIPMENT : Head Mounted Tablet
BRAND NAME : realwear
MODEL NAME : T21G
FCC ID : 2AJOR2101GAA
STANDARD : FCC 47 CFR Part 2 (2.1093)

We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures and had been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.



Reviewed by: Nick Hu / Supervisor



Approved by: Kat Yin / Manager



Sporton International (Kunshan) Inc.

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

Table of Contents

1. Statement of Compliance	4
2. Administration Data	5
3. Guidance Applied	5
4. Equipment Under Test (EUT) Information	6
4.1 General Information.....	6
5. RF Exposure Limits.....	7
5.1 Uncontrolled Environment.....	7
5.2 Controlled Environment.....	7
6. Specific Absorption Rate (SAR)	8
6.1 Introduction	8
6.2 SAR Definition	8
7. System Description and Setup.....	9
7.1 E-Field Probe	10
7.2 Data Acquisition Electronics (DAE)	10
7.3 Phantom.....	11
7.4 Device Holder.....	12
8. Measurement Procedures.....	13
8.1 Spatial Peak SAR Evaluation	13
8.2 Power Reference Measurement.....	14
8.3 Area Scan.....	14
8.4 Zoom Scan.....	15
8.5 Volume Scan Procedures.....	15
8.6 Power Drift Monitoring.....	15
9. Test Equipment List	16
10. System Verification	17
10.1 Tissue Simulating Liquids.....	17
10.2 Tissue Verification	18
10.3 System Performance Check Results.....	19
11. RF Exposure Positions	20
11.1 Ear and handset reference point	20
11.2 Definition of the cheek position.....	21
11.3 Definition of the tilt position.....	22
11.4 Hand-Held Device	22
12. Conducted RF Output Power (Unit: dBm).....	23
13. Antenna Location	25
14. SAR Test Results	26
14.1 Head SAR	27
14.2 Extremity SAR.....	28
15. Simultaneous Transmission Analysis	30
16. Uncertainty Assessment.....	31
17. References	32
Appendix A. Plots of System Performance Check	
Appendix B. Plots of High SAR Measurement	
Appendix C. DASY Calibration Certificate	
Appendix D. Test Setup Photos	
Appendix E. Conducted RF Output Power Table	



Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA182305	Rev. 01	Initial issue of report	Oct. 13, 2021

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **RealWear, Inc., Head Mounted Tablet, T21G** are as follows.

Highest 1g SAR Summary			
Equipment Class	Frequency Band		Head (Separation 0mm)
			1g SAR (W/kg)
DTS	WLAN	2.4GHz WLAN	0.55
NII		5GHz WLAN	0.52
DSS	Bluetooth	2.4GHz Bluetooth	0.25
Highest 10g SAR Summary			
Equipment Class	Frequency Band		Body (Separation 0mm)
			10g SAR (W/kg)
DTS	WLAN	2.4GHz WLAN	0.21
NII		5GHz WLAN	0.55
DSS	Bluetooth	Bluetooth	0.13
Date of Testing:			2021/09/13~2021/09/25

Declaration of Conformity:

The test results with all measurement uncertainty excluded are 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.

The device head SAR is performed at head of SAM twin phantom, and 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.

2. Administration Data

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory			
Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR06-KS	CN1257	314309

Applicant	
Company Name	RealWear, Inc.
Address	600 Hatheway Road, Vancouver, WA, 98661

Manufacturer	
Company Name	RealWear, Inc.
Address	600 Hatheway Road, Vancouver, WA, 98661

3. Guidance Applied

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

- FCC 47 CFR Part 2 (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

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Head Mounted Tablet
Brand Name	realwear
Model Name	T21G
FCC ID	2AJOR2101GAA
S/N	Sample 1: D26M807D2892141 Sample 2: D26M807D2892418
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	A
SW Version	1.0.3-08-T.NAV5XX.G
EUT Stage	Identical Prototype
Remark: There are two samples. The difference note could be referred to the T21G_Operational Description of Product Equality Declaration which is exhibited separately. According to the difference, we choose sample 1 for full testing and sample 2 for worst case verification.	

5. RF Exposure Limits

5.1 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.

5.2 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

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.

6. Specific Absorption Rate (SAR)

6.1 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.

6.2 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:

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

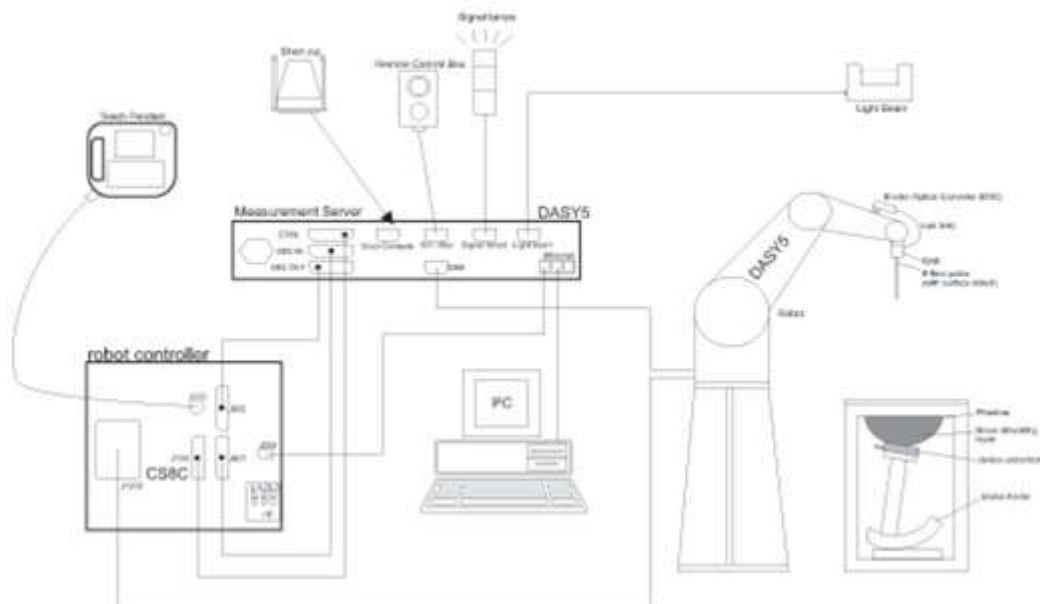
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. System Description and Setup

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal 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 WinXP or Win7 and the DASY5 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.

7.1 E-Field Probe

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

<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	10 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 μ W/g – >100 mW/g Linearity: ± 0.2 dB (noise: typically <1 μ W/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	

7.2 Data Acquisition Electronics (DAE)

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

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



Photo of DAE

7.3 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.

7.4 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

8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

- (a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- (b) Read the WWAN RF power level from the base station simulator.
- (c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
- (d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

- (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

8.1 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 from 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

8.2 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.

8.3 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.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$	≤ 2 GHz: ≤ 15 mm $2 - 3$ GHz: ≤ 12 mm	$3 - 4$ GHz: ≤ 12 mm $4 - 6$ GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

8.4 Zoom Scan

Zoom scans are used to 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 whose 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: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 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: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	$3 - 4$ GHz: ≤ 4 mm $4 - 5$ GHz: ≤ 3 mm $5 - 6$ GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	$3 - 4$ GHz: ≤ 3 mm $4 - 5$ GHz: ≤ 2.5 mm $5 - 6$ GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
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 <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> 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.				

8.5 Volume Scan Procedures

The volume scan is used to 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.

8.6 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.

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	2450MHz System Validation Kit	D2450V2	908	2019/3/25	2022/3/23
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	2019/9/24	2022/9/22
SPEAG	Data Acquisition Electronics	DAE4	690	2021/3/17	2022/3/16
SPEAG	Dosimetric E-Field Probe	EX3DV4	7630	2021/2/10	2022/2/9
SPEAG	SAM Twin Phantom	SAM Twin	TP-2022	NCR	NCR
Testo	Hygrometer	608-H1	1241332102	2021/1/7	2022/1/6
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Agilent	ENA Series Network Analyzer	E5071C	MY46106933	2021/7/31	2022/7/30
SPEAG	Dielectric Probe Kit	DAK-3.5	1144	2020/12/2	2021/12/1
Anritsu	Vector Signal Generator	MG3710A	6201682672	2021/1/7	2022/1/6
Rohde & Schwarz	Power Meter	NRVD	102081	2021/8/12	2022/8/11
Rohde & Schwarz	Power Sensor	NRV-Z5	100538	2021/8/12	2022/8/11
Rohde & Schwarz	Power Sensor	NRV-Z5	100539	2021/8/12	2022/8/11
R&S	CBT BLUETOOTH TESTER	CBT	101246	2021/4/12	2022/4/11
EXA	Spectrum Analyzer	FSV7	101632	2021/1/7	2022/1/6
FLUKE	DIGITAC THERMOMETER	51II	97240029	2021/8/13	2022/8/12
BONN	POWER AMPLIFIER	BLMA 0830-3	087193A	Note 1	
BONN	POWER AMPLIFIER	BLMA 2060-2	087193B	Note 1	
Agilent	Dual Directional Coupler	778D	20500	Note 1	
Agilent	Dual Directional Coupler	11691D	MY48151020	Note 1	
ARRA	Power Divider	A3200-2	N/A	Note 1	
MCL	Attenuation1	BW-S10W5+	N/A	Note 1	
MCL	Attenuation2	BW-S10W5+	N/A	Note 1	
MCL	Attenuation3	BW-S10W5+	N/A	Note 1	

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.
2. Referring to KDB 865664 D01v01r04, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.

10. System Verification

10.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.2.

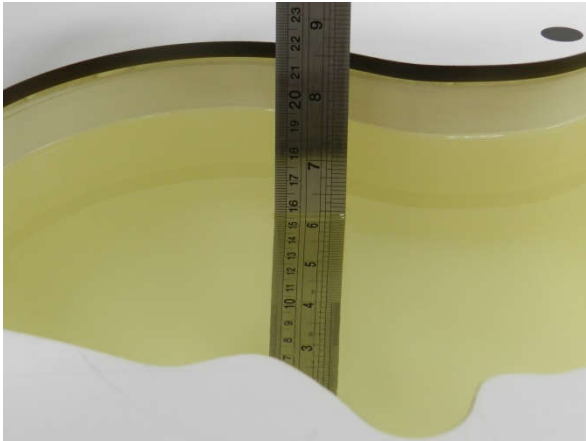


Fig 10.1 Photo of Liquid Height for Head SAR

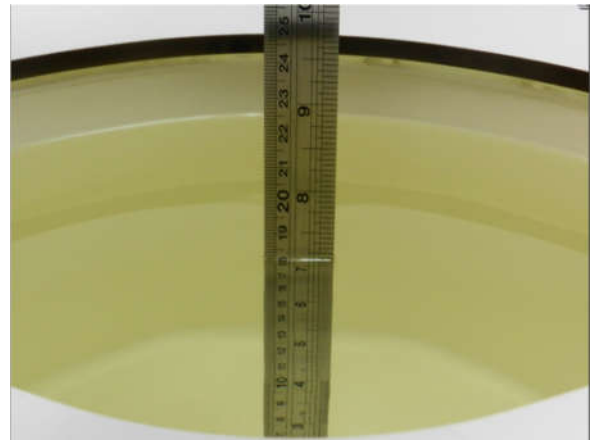


Fig 10.2 Photo of Liquid Height for Body SAR

10.2 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ϵ_r)
For Head								
2450	55.0	0	0	0	0	45.0	1.80	39.2

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
2450	Head	22.6	1.810	38.621	1.80	39.20	0.56	-1.48	±5	2021/9/13
5250	Head	22.6	4.596	35.944	4.71	35.90	-2.42	0.12	±5	2021/9/14
5600	Head	22.7	4.993	35.374	5.07	35.50	-1.52	-0.35	±5	2021/9/15
5750	Head	22.7	5.162	35.205	5.22	35.40	-1.11	-0.55	±5	2021/9/16
2450	Head	22.6	1.809	38.566	1.80	39.20	0.50	-1.62	±5	2021/9/25
5250	Head	22.7	4.573	35.964	4.71	35.90	-2.91	0.18	±5	2021/9/25
5600	Head	22.7	4.970	35.403	5.07	35.50	-1.97	-0.27	±5	2021/9/25
5750	Head	22.6	5.143	35.258	5.22	35.40	-1.48	-0.40	±5	2021/9/25

10.3 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.

<1g SAR>

Date	Frequency (MHz)	Tissue Type	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 (%)
2021/9/13	2450	Head	50	908	7630	690	2.450	52.80	49	-7.20
2021/9/14	5250	Head	50	1113	7630	690	3.720	80.50	74.4	-7.58
2021/9/15	5600	Head	50	1113	7630	690	3.910	83.40	78.2	-6.24
2021/9/16	5750	Head	50	1113	7630	690	3.970	80.00	79.4	-0.75
2021/9/25	2450	Head	50	908	7630	690	2.460	52.80	49.2	-6.82
2021/9/25	5250	Head	50	1113	7630	690	3.750	80.50	75	-6.83
2021/9/25	5600	Head	50	1113	7630	690	3.840	83.40	76.8	-7.91
2021/9/25	5750	Head	50	1113	7630	690	3.850	80.00	77	-3.75

<10g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2021/9/13	2450	Head	50	908	7630	690	1.150	24.20	23	-4.96
2021/9/14	5250	Head	50	1113	7630	690	1.210	23.10	24.2	4.76
2021/9/15	5600	Head	50	1113	7630	690	1.230	23.80	24.6	3.36
2021/9/16	5750	Head	50	1113	7630	690	1.210	22.80	24.2	6.14
2021/9/25	2450	Head	50	908	7630	690	1.130	24.20	22.6	-6.61
2021/9/25	5250	Head	50	1113	7630	690	1.150	23.10	23	-0.43
2021/9/25	5600	Head	50	1113	7630	690	1.170	23.80	23.4	-1.68
2021/9/25	5750	Head	50	1113	7630	690	1.180	22.80	23.6	3.51

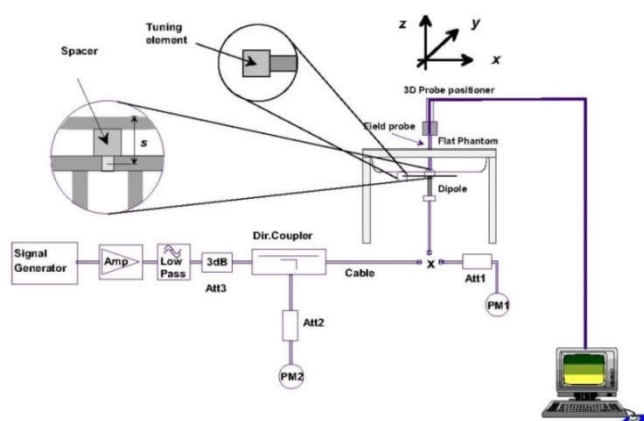


Fig 10.3.1 System Performance Check Setup



Fig 10.3.2 Setup Photo

11. RF Exposure Positions

11.1 Ear and handset reference point

Figure 11.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M,” the left ear reference point (ERP) is marked “LE,” and the right ERP is marked “RE.” Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Figure 11.1.2 The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Figure 11.1.3). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Figure 11.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

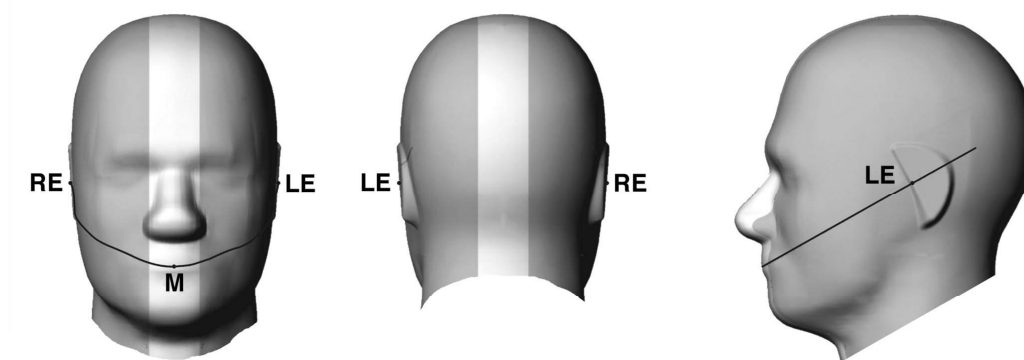


Fig 12.1.1 Front, back, and side views of SAM twin phantom

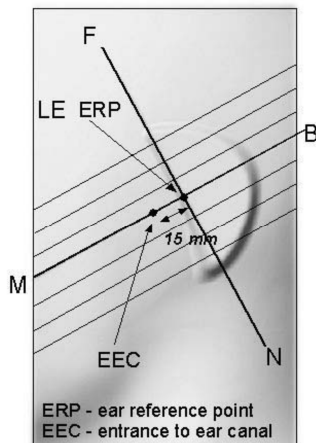


Fig 11.1.2 Close-up side view of phantom showing the ear region.

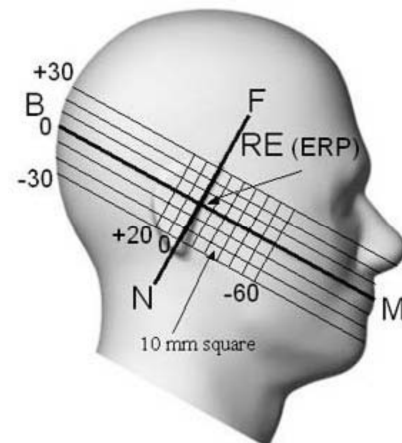


Fig 11.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

11.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width w_t of the handset at the level of the acoustic output (point A in Figure 12.2.1 and Figure 12.2.2), and the midpoint of the width w_b of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 12.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the handset. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 12.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 12.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 12.2.3. The actual rotation angles should be documented in the test report.

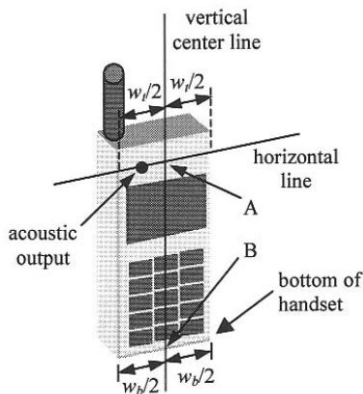


Fig 11.2.1 Handset vertical and horizontal reference lines—"fixed case"

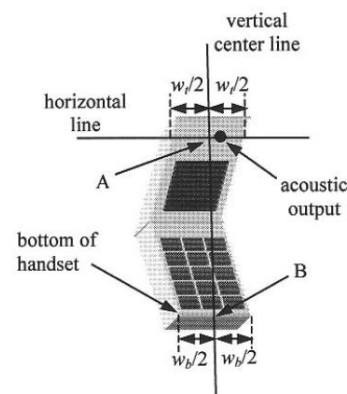


Fig 11.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

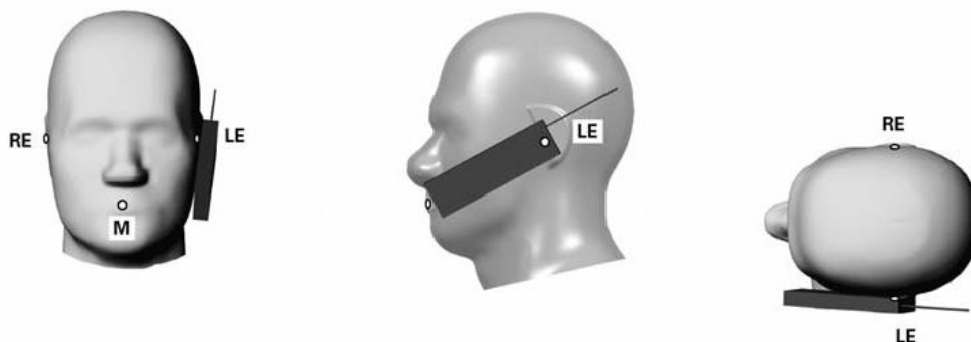


Fig 11.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

11.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 11.3.1. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

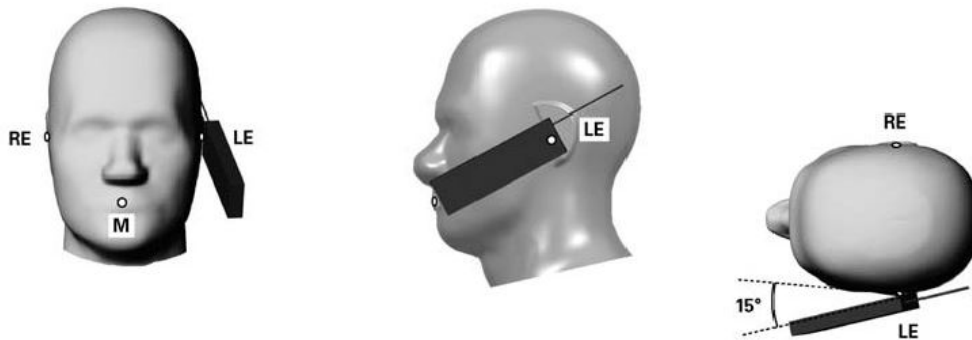


Fig 11.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

11.4 Hand-Held Device

- a) The device shall be placed directly against the flat phantom as shown in below table, for those sides of the device that are in contact with the hand during intended use.
- b) To adjust the device parallel to the flat phantom.
- c) To adjust the distance between the device surface and the flat phantom to 0cm.

12. Conducted RF Output Power (Unit: dBm)

The detailed conducted power table can refer to Appendix E.

<WLAN Conducted Power>

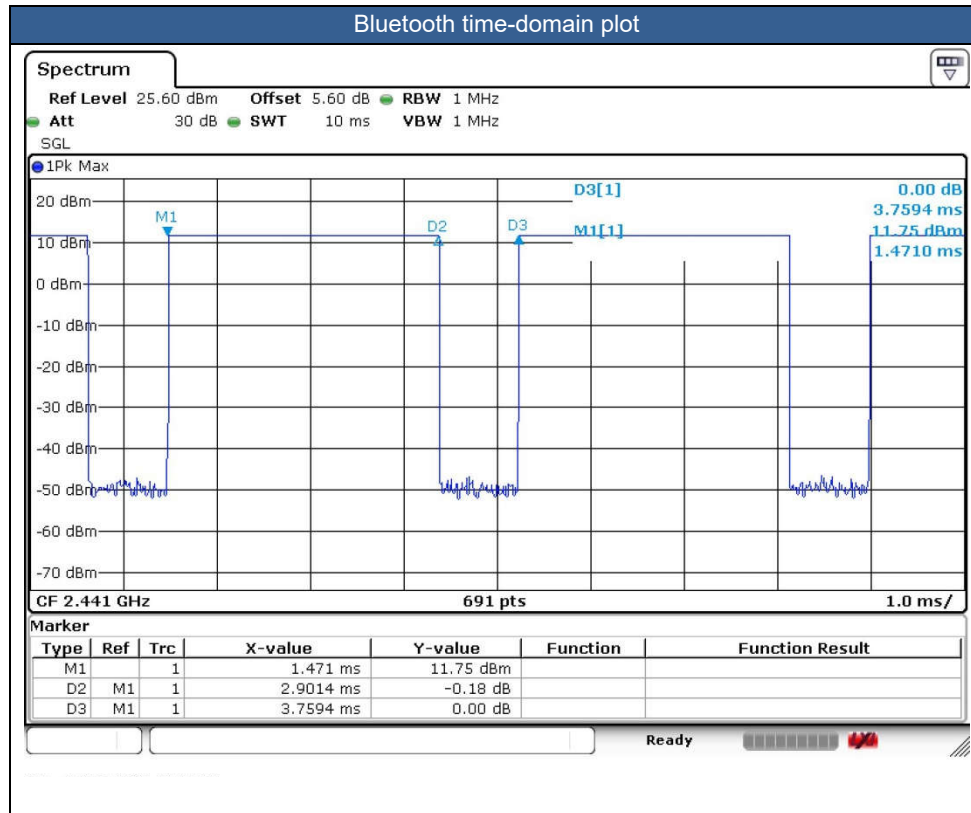
General Note:

1. 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.
2. 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).
3. 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.
4. 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.

<2.4GHz Bluetooth>

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle is 77.18 % as following figure, according to 2016 Oct. TCB workshop for Bluetooth SAR scaling need further consideration and the duty cycle is 100%, therefore the actual duty cycle will be scaled up to the value of Bluetooth reported SAR calculation.





13. Antenna Location

The detailed antenna location information can refer to SAR Test Setup Photos.

14. 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 BT/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 BT/WLAN: 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 when the measured SAR is ≥ 0.8 W/kg. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The device head SAR is performed at head of SAM twin phantom and extremity SAR at flat phantom.
5. Head SAR is evaluated with the inner surface of device and positioned at 0 mm from the SAM Twin phantom filled with head tissue-equivalent medium.
6. Only one side of the device need to perform head SAR testing, which is close to the camera, for radio chip and antenna are all located at the side of the device. The other side of the device has a battery and other non-RF layout, so the other side of the device does not need to consider SAR testing.
7. There are two wear modes, one is the camera near the right eye, the other is the camera near the left eye, so they will be tested separately.
8. Due to the raised camera near the antenna area, in order to get the antenna area closer to the Phantom, the camera was removed and a verification test was added, refer to test setup photo Edge 2b (without camera). The camera has a metal part close to the antenna. Direct removal may affect the performance of the antenna. The camera was not removed, refer to test setup photo Edge 2a (with camera). So in the above Edge 2a and 2b, both methods have been considered for testing.

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, U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 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. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

14.1 Head SAR

<WLAN2.4G SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Sample	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	Left Cheek	0mm	1	6	2437	15.26	16.00	1.187	98.97	1.010	0.1	0.456	0.547
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	2	6	2437	15.26	16.00	1.187	98.97	1.010	0.02	0.375	0.450
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	1	6	2437	15.26	16.00	1.187	98.97	1.010	0.05	0.377	0.452
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	1	1	2412	15.03	16.00	1.252	98.97	1.010	0.05	0.231	0.292
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	1	11	2462	15.10	16.00	1.232	98.97	1.010	0.04	0.408	0.508

<WLAN5G SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Sample	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)
	WLAN5.3GHz	802.11a 6Mbps	Left Cheek	0mm	1	52	5260	14.12	15.00	1.226	98.28	1.018	0.16	0.239	0.298
02	WLAN5.3GHz	802.11a 6Mbps	Left Cheek	0mm	2	52	5260	14.12	15.00	1.226	98.28	1.018	0.16	0.419	0.523
	WLAN5.3GHz	802.11a 6Mbps	Left Cheek	0mm	2	60	5300	14.08	15.00	1.237	98.28	1.018	-0.16	0.315	0.397
	WLAN5.3GHz	802.11a 6Mbps	Left Cheek	0mm	2	64	5320	14.11	15.00	1.229	98.28	1.018	-0.02	0.279	0.349
	WLAN5.3GHz	802.11a 6Mbps	Right Cheek	0mm	1	52	5260	14.12	15.00	1.226	98.28	1.018	0.07	0.196	0.245
	WLAN5.3GHz	802.11a 6Mbps	Left Cheek	0mm	1	60	5300	14.08	15.00	1.237	98.28	1.018	0.19	0.221	0.278
	WLAN5.3GHz	802.11a 6Mbps	Left Cheek	0mm	1	64	5320	14.11	15.00	1.229	98.28	1.018	-0.03	0.172	0.215
	WLAN5.5GHz	802.11a 6Mbps	Left Cheek	0mm	1	116	5580	15.25	15.50	1.060	98.28	1.018	0.05	0.076	0.082
	WLAN5.5GHz	802.11a 6Mbps	Right Cheek	0mm	1	116	5580	15.25	15.50	1.060	98.28	1.018	-0.02	0.038	0.041
	WLAN5.5GHz	802.11a 6Mbps	Left Cheek	0mm	1	100	5500	14.01	15.50	1.411	98.28	1.018	0.03	0.040	0.057
	WLAN5.5GHz	802.11a 6Mbps	Left Cheek	0mm	1	144	5720	13.13	14.50	1.372	98.28	1.018	-0.04	0.076	0.106
03	WLAN5.5GHz	802.11a 6Mbps	Left Cheek	0mm	2	144	5720	13.13	14.50	1.372	98.28	1.018	-0.05	0.159	0.222
	WLAN5.5GHz	802.11a 6Mbps	Left Cheek	0mm	2	116	5580	15.25	15.50	1.060	98.28	1.018	0.01	0.150	0.162
	WLAN5.5GHz	802.11a 6Mbps	Left Cheek	0mm	2	100	5500	14.01	15.50	1.411	98.28	1.018	0.03	0.138	0.198
	WLAN5.8GHz	802.11a 6Mbps	Left Cheek	0mm	1	165	5825	14.13	14.50	1.090	98.28	1.018	-0.09	0.197	0.219
04	WLAN5.8GHz	802.11a 6Mbps	Left Cheek	0mm	2	165	5825	14.13	14.50	1.090	98.28	1.018	-0.18	0.371	0.412
	WLAN5.8GHz	802.11a 6Mbps	Left Cheek	0mm	2	149	5745	13.60	14.50	1.232	98.28	1.018	-0.01	0.230	0.288
	WLAN5.8GHz	802.11a 6Mbps	Left Cheek	0mm	2	157	5785	13.15	14.50	1.366	98.28	1.018	0.02	0.292	0.406
	WLAN5.8GHz	802.11a 6Mbps	Right Cheek	0mm	1	165	5825	14.13	14.50	1.090	98.28	1.018	-0.15	0.169	0.188
	WLAN5.8GHz	802.11a 6Mbps	Left Cheek	0mm	1	149	5745	13.60	14.50	1.232	98.28	1.018	0.1	0.107	0.134
	WLAN5.8GHz	802.11a 6Mbps	Left Cheek	0mm	1	157	5785	13.15	14.50	1.366	98.28	1.018	0.08	0.149	0.207

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Sample	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	Left Cheek	0mm	1	0	2402	12.20	12.50	1.070	77.18	1.296	0.15	0.164	0.227
05	Bluetooth	1Mbps	Left Cheek	0mm	1	39	2441	11.98	12.50	1.126	77.18	1.296	0.03	0.174	0.254
	Bluetooth	1Mbps	Left Cheek	0mm	2	39	2441	11.98	12.50	1.126	77.18	1.296	0.01	0.168	0.245
	Bluetooth	1Mbps	Left Cheek	0mm	1	78	2480	11.85	12.50	1.160	77.18	1.296	0.12	0.165	0.248

14.2 Extremity SAR

<WLAN2.4G SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Sample	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Edge1	0mm	1	6	2437	15.26	16.00	1.187	98.97	1.010	0.07	0.136	0.163
	WLAN2.4GHz	802.11b 1Mbps	Edge2a	0mm	1	6	2437	15.26	16.00	1.187	98.97	1.010	0.07	0.109	0.131
06	WLAN2.4GHz	802.11b 1Mbps	Edge2b	0mm	1	6	2437	15.26	16.00	1.187	98.97	1.010	0.08	0.176	0.211
	WLAN2.4GHz	802.11b 1Mbps	Edge2b	0mm	2	6	2437	15.26	16.00	1.187	98.97	1.010	-0.03	0.139	0.167
	WLAN2.4GHz	802.11b 1Mbps	Edge3	0mm	1	6	2437	15.26	16.00	1.187	98.97	1.010	0.14	0.014	0.017
	WLAN2.4GHz	802.11b 1Mbps	Edge2b	0mm	1	1	2412	15.03	16.00	1.252	98.97	1.010	-0.18	0.133	0.168
	WLAN2.4GHz	802.11b 1Mbps	Edge2b	0mm	1	11	2462	15.10	16.00	1.232	98.97	1.010	0.02	0.167	0.208

<WLAN5G SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Sample	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WLAN5.3GHz	802.11a 6Mbps	Edge1	0mm	1	52	5260	14.12	15.00	1.226	98.28	1.018	-0.03	0.258	0.322
	WLAN5.3GHz	802.11a 6Mbps	Edge2a	0mm	1	52	5260	14.12	15.00	1.226	98.28	1.018	0.12	0.107	0.134
	WLAN5.3GHz	802.11a 6Mbps	Edge2b	0mm	1	52	5260	14.12	15.00	1.226	98.28	1.018	-0.05	0.295	0.368
07	WLAN5.3GHz	802.11a 6Mbps	Edge2b	0mm	2	52	5260	14.12	15.00	1.226	98.28	1.018	-0.02	0.430	0.537
	WLAN5.3GHz	802.11a 6Mbps	Edge2b	0mm	2	60	5300	14.08	15.00	1.237	98.28	1.018	0.01	0.326	0.411
	WLAN5.3GHz	802.11a 6Mbps	Edge2b	0mm	2	64	5320	14.11	15.00	1.229	98.28	1.018	0.03	0.311	0.389
	WLAN5.3GHz	802.11a 6Mbps	Edge3	0mm	1	52	5260	14.12	15.00	1.226	98.28	1.018	0.02	0.028	0.035
	WLAN5.3GHz	802.11a 6Mbps	Edge2b	0mm	1	60	5300	14.08	15.00	1.237	98.28	1.018	-0.11	0.246	0.310
	WLAN5.3GHz	802.11a 6Mbps	Edge2b	0mm	1	64	5320	14.11	15.00	1.229	98.28	1.018	0.02	0.221	0.276
	WLAN5.5GHz	802.11a 6Mbps	Edge1	0mm	1	116	5580	15.25	15.50	1.060	98.28	1.018	-0.14	0.135	0.146
	WLAN5.5GHz	802.11a 6Mbps	Edge2a	0mm	1	116	5580	15.25	15.50	1.060	98.28	1.018	-0.1	0.074	0.080
	WLAN5.5GHz	802.11a 6Mbps	Edge2b	0mm	1	116	5580	15.25	15.50	1.060	98.28	1.018	-0.08	0.198	0.214
08	WLAN5.5GHz	802.11a 6Mbps	Edge2b	0mm	2	116	5580	15.25	15.50	1.060	98.28	1.018	-0.03	0.236	0.255
	WLAN5.5GHz	802.11a 6Mbps	Edge2b	0mm	2	100	5500	14.01	15.50	1.411	98.28	1.018	0.01	0.176	0.253
	WLAN5.5GHz	802.11a 6Mbps	Edge2b	0mm	2	144	5720	13.13	14.50	1.372	98.28	1.018	0.01	0.181	0.253
	WLAN5.5GHz	802.11a 6Mbps	Edge3	0mm	1	116	5580	15.25	15.50	1.060	98.28	1.018	0.08	0.009	0.010
	WLAN5.5GHz	802.11a 6Mbps	Edge2b	0mm	1	100	5500	14.01	15.50	1.411	98.28	1.018	0.08	0.137	0.197
	WLAN5.5GHz	802.11a 6Mbps	Edge2b	0mm	1	144	5720	13.13	14.50	1.372	98.28	1.018	0.19	0.152	0.212
	WLAN5.8GHz	802.11a 6Mbps	Edge1	0mm	1	165	5825	14.13	14.50	1.090	98.28	1.018	-0.02	0.460	0.510
09	WLAN5.8GHz	802.11a 6Mbps	Edge1	0mm	2	165	5825	14.13	14.50	1.090	98.28	1.018	-0.03	0.495	0.549
	WLAN5.8GHz	802.11a 6Mbps	Edge1	0mm	2	149	5745	13.60	14.50	1.232	98.28	1.018	0.03	0.267	0.335
	WLAN5.8GHz	802.11a 6Mbps	Edge1	0mm	2	157	5785	13.15	14.50	1.366	98.28	1.018	0.01	0.390	0.542
	WLAN5.8GHz	802.11a 6Mbps	Edge1	0mm	1	149	5745	13.60	14.50	1.232	98.28	1.018	0.14	0.247	0.310
	WLAN5.8GHz	802.11a 6Mbps	Edge1	0mm	1	157	5785	13.15	14.50	1.366	98.28	1.018	0.02	0.334	0.464
	WLAN5.8GHz	802.11a 6Mbps	Edge2a	0mm	1	165	5825	14.13	14.50	1.090	98.28	1.018	0.13	0.157	0.174
	WLAN5.8GHz	802.11a 6Mbps	Edge2b	0mm	1	165	5825	14.13	14.50	1.090	98.28	1.018	0.03	0.348	0.386
	WLAN5.8GHz	802.11a 6Mbps	Edge3	0mm	1	165	5825	14.13	14.50	1.090	98.28	1.018	0.02	0.063	0.070

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Sample	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	Bluetooth	1Mbps	Edge2b	0mm	1	0	2402	12.20	12.50	1.070	77.18	1.296	-0.1	0.091	0.126
10	Bluetooth	1Mbps	Edge2b	0mm	2	0	2402	12.20	12.50	1.070	77.18	1.296	0.16	0.093	0.129
	Bluetooth	1Mbps	Edge2b	0mm	1	39	2441	11.98	12.50	1.126	77.18	1.296	0.02	0.077	0.112
	Bluetooth	1Mbps	Edge2b	0mm	1	78	2480	11.85	12.50	1.160	77.18	1.296	0.13	0.063	0.095

15. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations
1.	None

General Note:

1. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
2. According to the EUT Character, WLAN 5GHz and Bluetooth cannot transmit simultaneously.
3. WLAN 2.4GHz and Bluetooth share the same antenna, and cannot transmit simultaneously.

Test Engineer : Nick Hu, Seven Xu, Bruce Li

16. 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 $\leq 30\%$, 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 and highest measured 10-g SAR is less 3.75W/kg. Therefore, the measurement uncertainty table is not required in this report.

17. 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 865664 D01 v01r04, “SAR Measurement Requirements for 100 MHz to 6 GHz”, Aug 2015.
- [6] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.
- [7] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015
- [8] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.

-----THE END-----



Appendix A. Plots of System Performance Check

The plots are shown as follows.

System Check_Head_2450MHz**DUT: D2450V2 - SN:908**

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

Medium: HSL_2450 Medium parameters used: $f = 2450$ MHz; $\sigma = 1.81$ S/m; $\epsilon_r = 38.621$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(8.14, 8.14, 8.14); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 3.97 W/kg

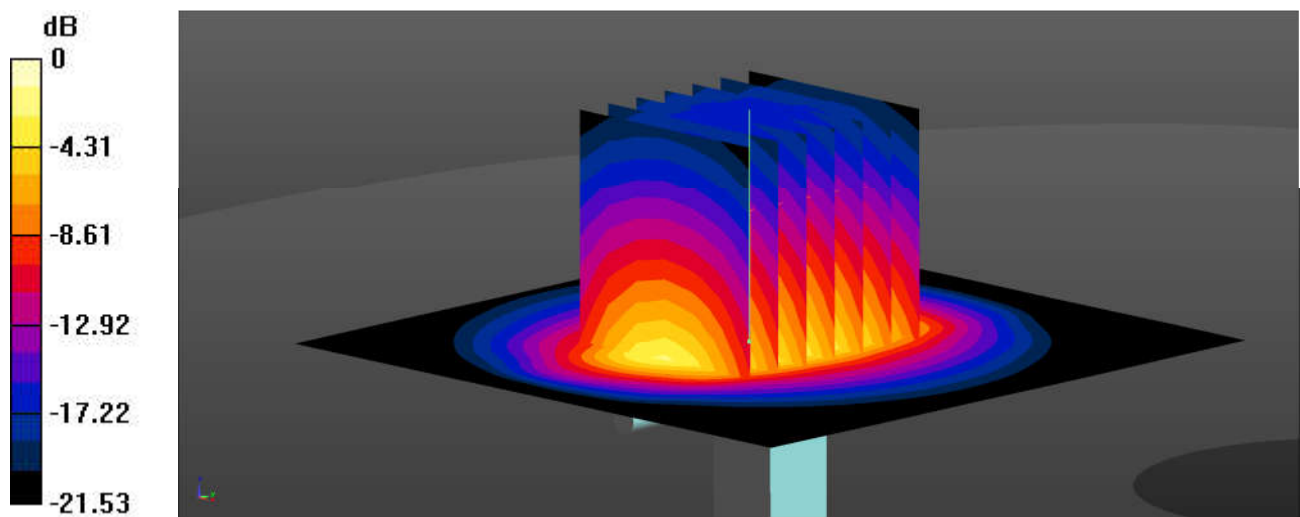
Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 47.22 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 4.96 W/kg

SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.15 W/kg

Maximum value of SAR (measured) = 3.99 W/kg



0 dB = 3.99 W/kg = 6.01 dBW/kg

System Check_Head_5250MHz**DUT: D5GHzV2 - SN:1113**

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

Medium: HSL_5000 Medium parameters used: $f = 5250$ MHz; $\sigma = 4.596$ S/m; $\epsilon_r = 35.944$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(5.55, 5.55, 5.55); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 7.64 W/kg

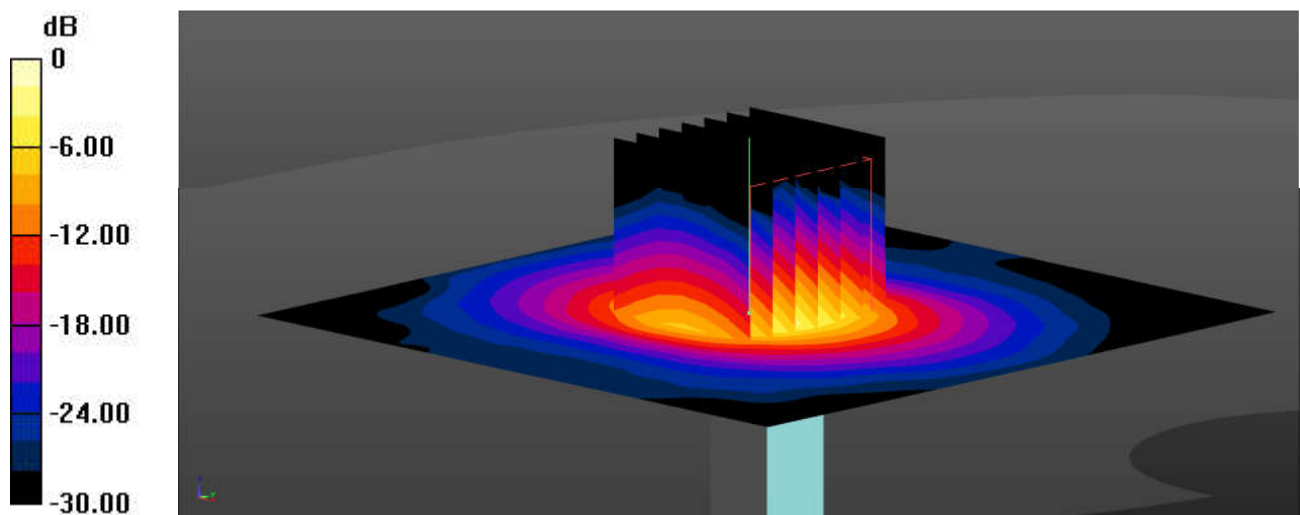
Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 46.26 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 13.5 W/kg

SAR(1 g) = 3.72 W/kg; SAR(10 g) = 1.21 W/kg

Maximum value of SAR (measured) = 8.45 W/kg



0 dB = 8.45 W/kg = 9.27 dBW/kg

System Check_Head_5600MHz**DUT: D5GHzV2 - SN:1113**

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

Medium: HSL_5000 Medium parameters used: $f = 5600$ MHz; $\sigma = 4.993$ S/m; $\epsilon_r = 35.374$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(4.85, 4.85, 4.85); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 8.63 W/kg

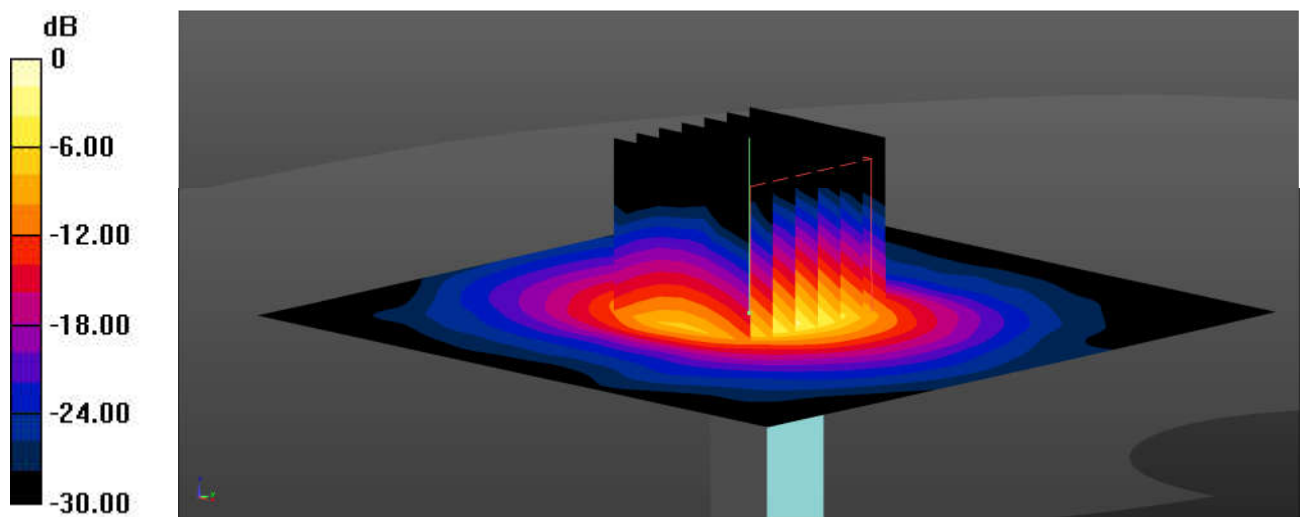
Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 46.99 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 16.0 W/kg

SAR(1 g) = 3.91 W/kg; SAR(10 g) = 1.23 W/kg

Maximum value of SAR (measured) = 9.40 W/kg



0 dB = 9.40 W/kg = 9.73 dBW/kg

System Check_Head_5750MHz**DUT: D5GHzV2 - SN:1113**

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

Medium: HSL_5000 Medium parameters used: $f = 5750$ MHz; $\sigma = 5.162$ S/m; $\epsilon_r = 35.205$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(5.07, 5.07, 5.07); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 7.77 W/kg

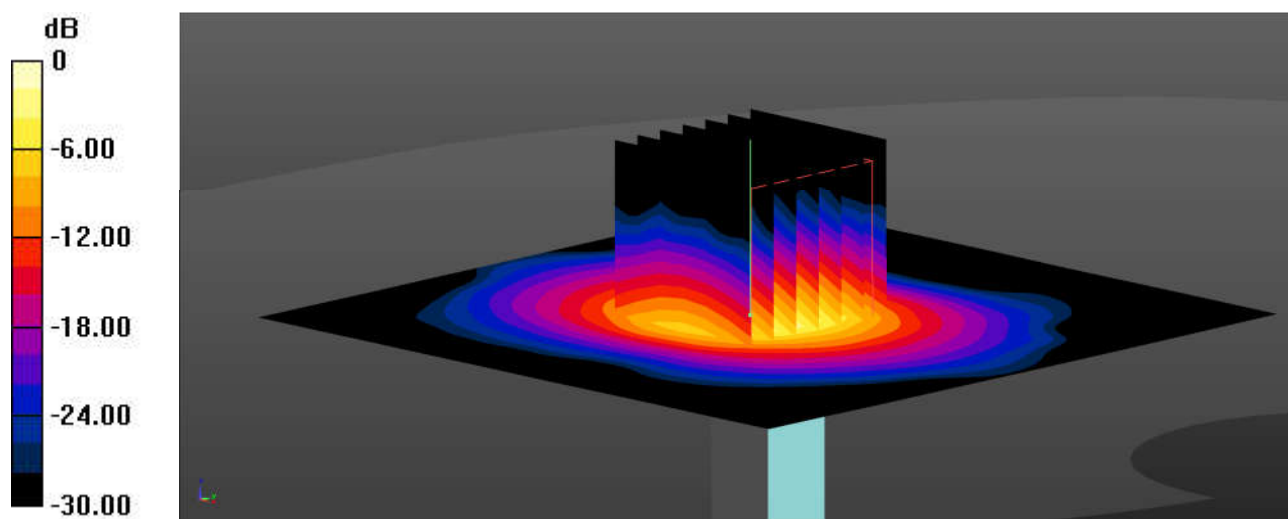
Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 43.87 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 14.9 W/kg

SAR(1 g) = 3.97 W/kg; SAR(10 g) = 1.21 W/kg

Maximum value of SAR (measured) = 8.58 W/kg



0 dB = 8.58 W/kg = 9.33 dBW/kg

System Check_Head_2450MHz**DUT: D2450V2 - SN:908**

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

Medium: HSL_2450 Medium parameters used: $f = 2450$ MHz; $\sigma = 1.809$ S/m; $\epsilon_r = 38.566$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.1 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(8.14, 8.14, 8.14); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 3.35 W/kg

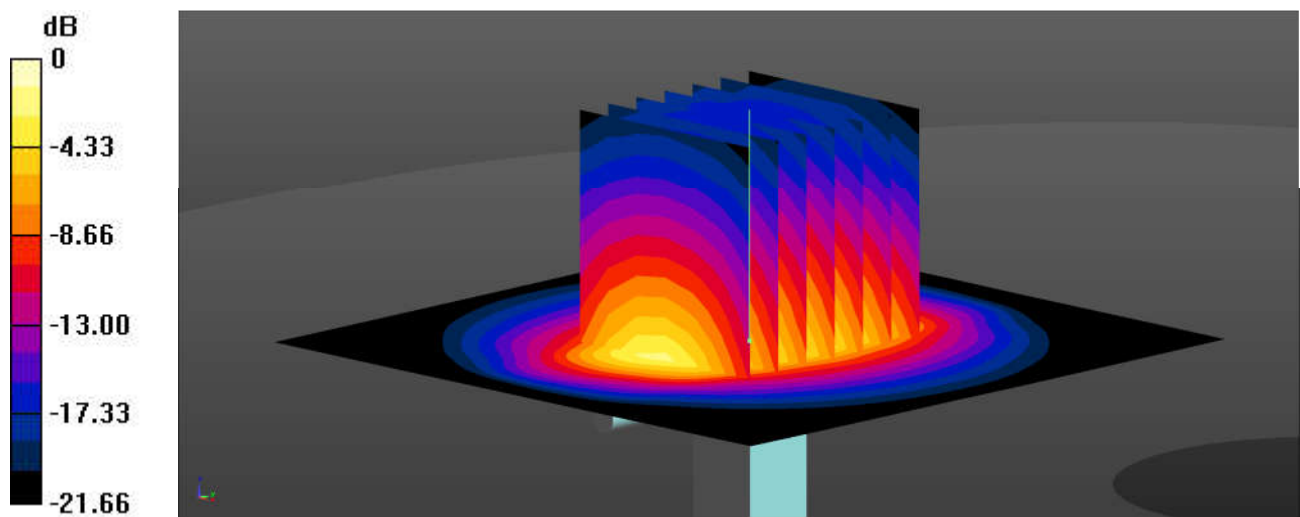
Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 44.98 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 4.09 W/kg

SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.13 W/kg

Maximum value of SAR (measured) = 3.29 W/kg



0 dB = 3.29 W/kg = 5.17 dBW/kg

System Check_Head_5250MHz**DUT: D5GHzV2 - SN:1113**

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

Medium: HSL_5000 Medium parameters used: $f = 5250$ MHz; $\sigma = 4.573$ S/m; $\epsilon_r = 35.964$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(5.55, 5.55, 5.55); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 6.55 W/kg

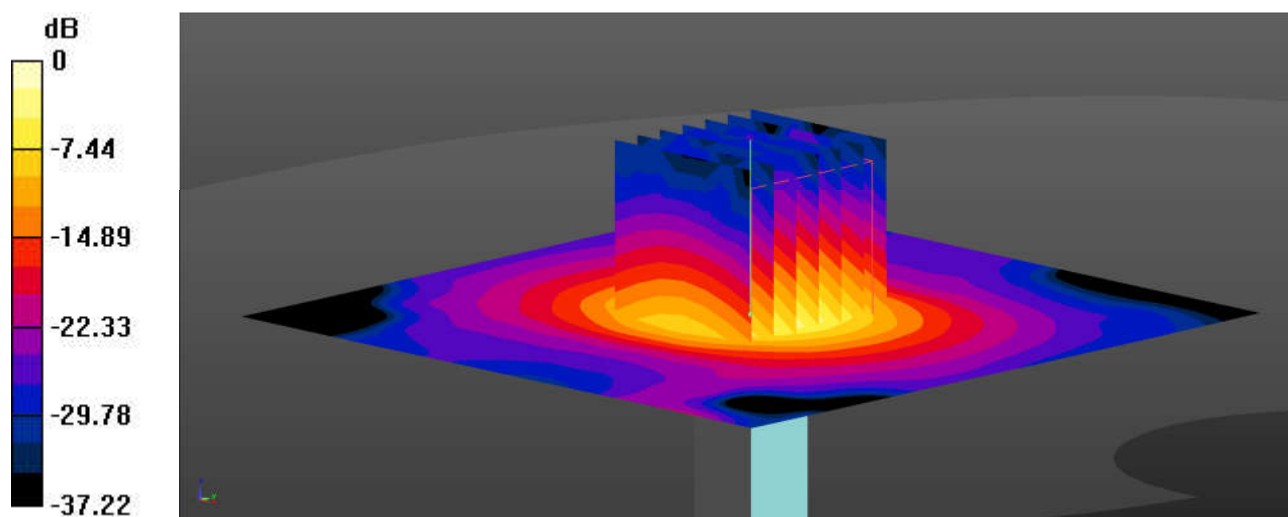
Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 42.90 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 11.5 W/kg

SAR(1 g) = 3.75 W/kg; SAR(10 g) = 1.15 W/kg

Maximum value of SAR (measured) = 7.18 W/kg



0 dB = 7.18 W/kg = 8.56 dBW/kg

System Check_Head_5600MHz**DUT: D5GHzV2 - SN:1113**

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

Medium: HSL_5000 Medium parameters used: $f = 5600$ MHz; $\sigma = 4.97$ S/m; $\epsilon_r = 35.403$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(4.85, 4.85, 4.85); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 7.62 W/kg

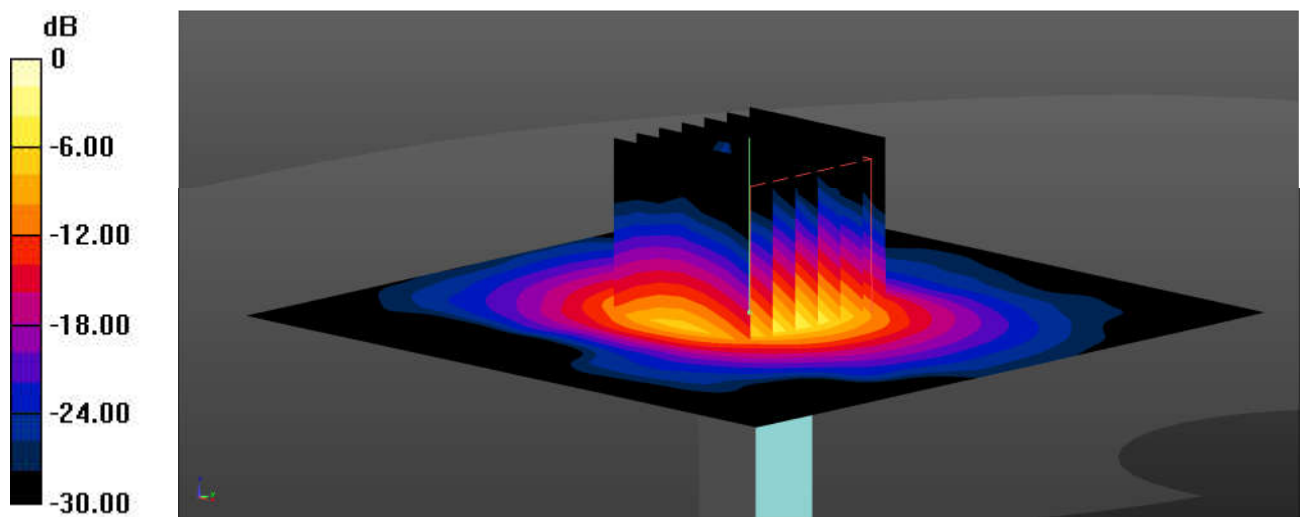
Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 44.65 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 14.2 W/kg

SAR(1 g) = 3.84 W/kg; SAR(10 g) = 1.17 W/kg

Maximum value of SAR (measured) = 8.26 W/kg



0 dB = 8.26 W/kg = 9.17 dBW/kg

System Check_Head_5750MHz**DUT: D5GHzV2 - SN:1113**

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

Medium: HSL_5000 Medium parameters used: $f = 5750$ MHz; $\sigma = 5.143$ S/m; $\epsilon_r = 35.258$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(5.07, 5.07, 5.07); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 6.95 W/kg

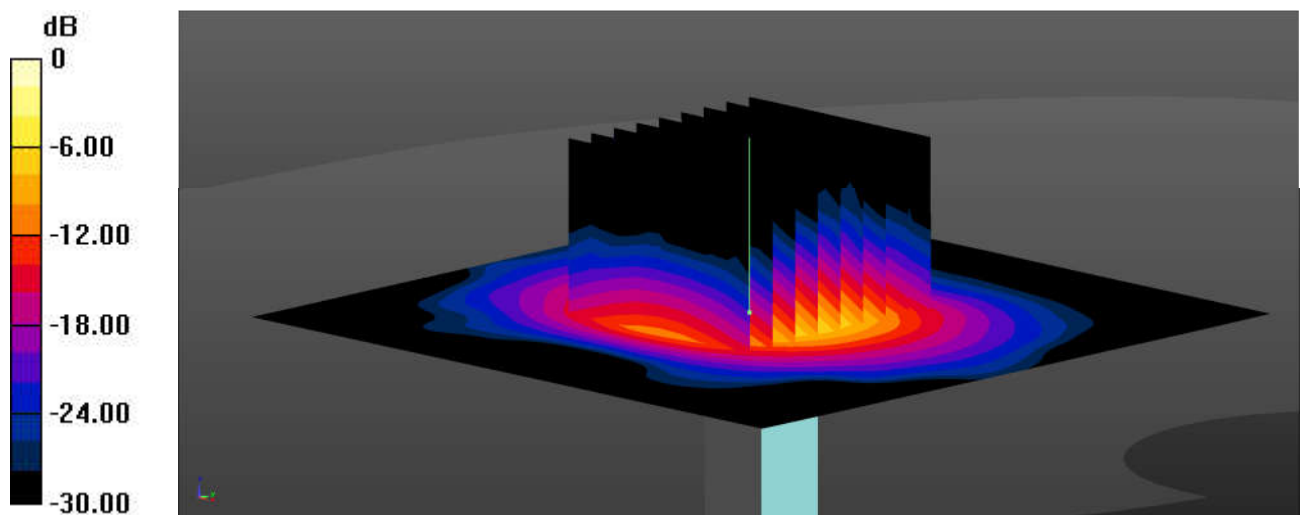
Pin=50mW/Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 41.63 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 13.5 W/kg

SAR(1 g) = 3.85 W/kg; SAR(10 g) = 1.18 W/kg

Maximum value of SAR (measured) = 7.50 W/kg



0 dB = 7.50 W/kg = 8.75 dBW/kg



Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

01_WLAN2.4G_802.11b 1Mbps_Left Cheek_0mm_Ch6

Communication System: UID 0, WLAN2.4GHz (0); Frequency: 2437 MHz; Duty Cycle: 1:1.01
Medium: HSL_2450 Medium parameters used: $f = 2437$ MHz; $\sigma = 1.801$ S/m; $\epsilon_r = 38.672$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(8.14, 8.14, 8.14); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (111x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.714 W/kg

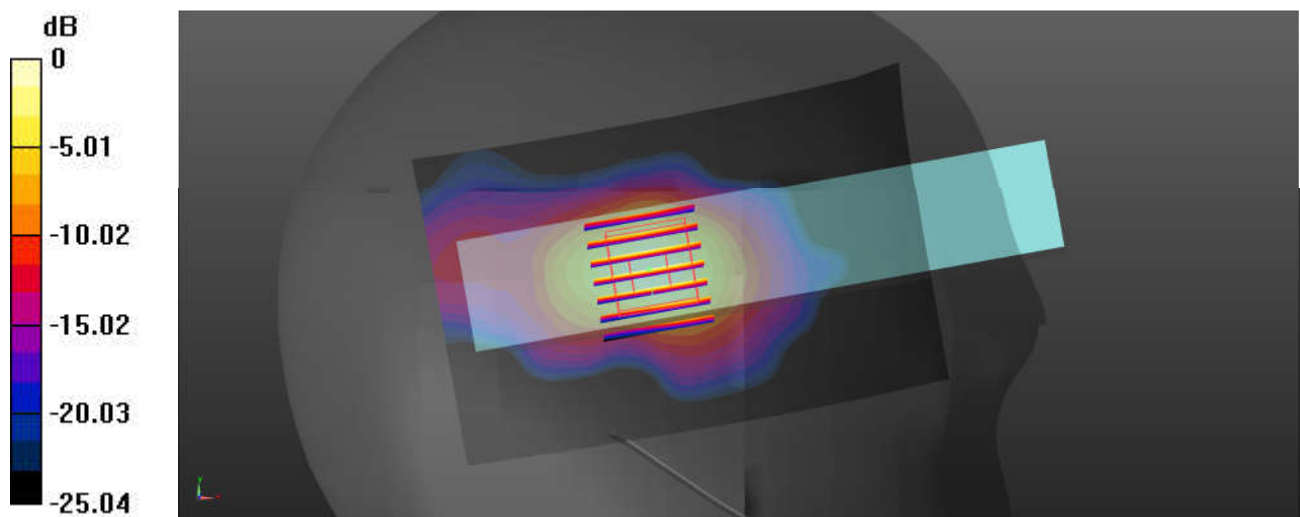
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.223 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.456 W/kg; SAR(10 g) = 0.197 W/kg

Maximum value of SAR (measured) = 0.770 W/kg



0 dB = 0.770 W/kg = -1.14 dBW/kg

02_WLAN5G_802.11a 6Mbps_Left Cheek_0mm_Ch52

Communication System: UID 0, WLAN5GHz (0); Frequency: 5260 MHz; Duty Cycle: 1:1.018

Medium: HSL_5000 Medium parameters used: $f = 5260$ MHz; $\sigma = 4.591$ S/m; $\epsilon_r = 35.956$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(5.55, 5.55, 5.55); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (151x71x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 1.13 W/kg

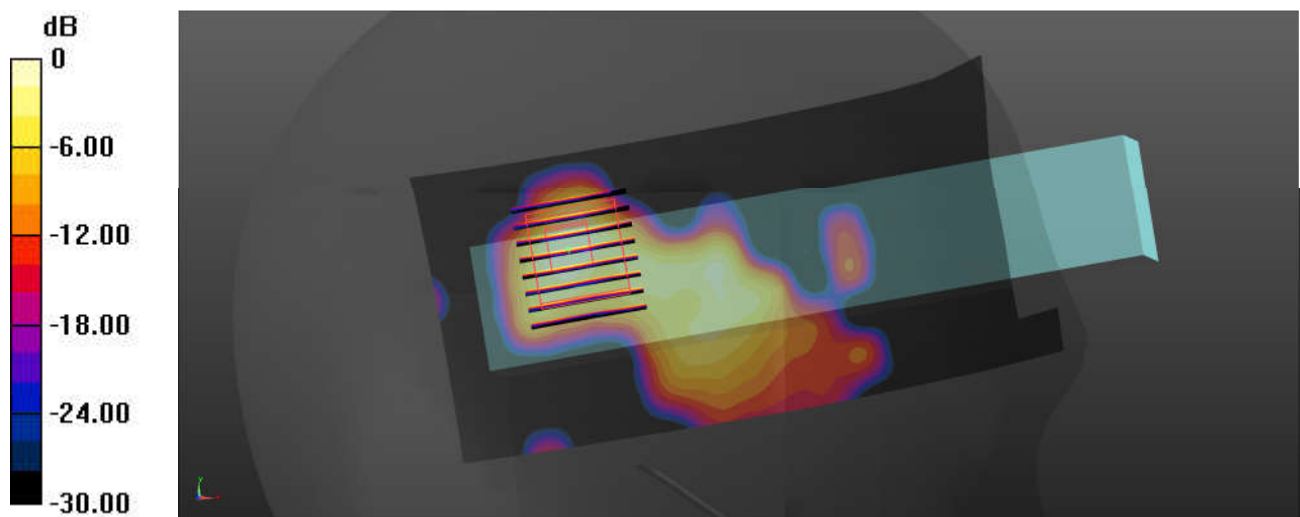
Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm

Reference Value = 10.14 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.56 W/kg

SAR(1 g) = 0.419 W/kg; SAR(10 g) = 0.122 W/kg

Maximum value of SAR (measured) = 1.00 W/kg



0 dB = 1.00 W/kg = 0.00 dBW/kg

03_WLAN5G_802.11a 6Mbps_Left Cheek_0mm_Ch144

Communication System: UID 0, WLAN5GHz (0); Frequency: 5720 MHz; Duty Cycle: 1:1.018

Medium: HSL_5000 Medium parameters used: $f = 5720$ MHz; $\sigma = 5.116$ S/m; $\epsilon_r = 35.252$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(5.07, 5.07, 5.07); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (151x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.590 W/kg

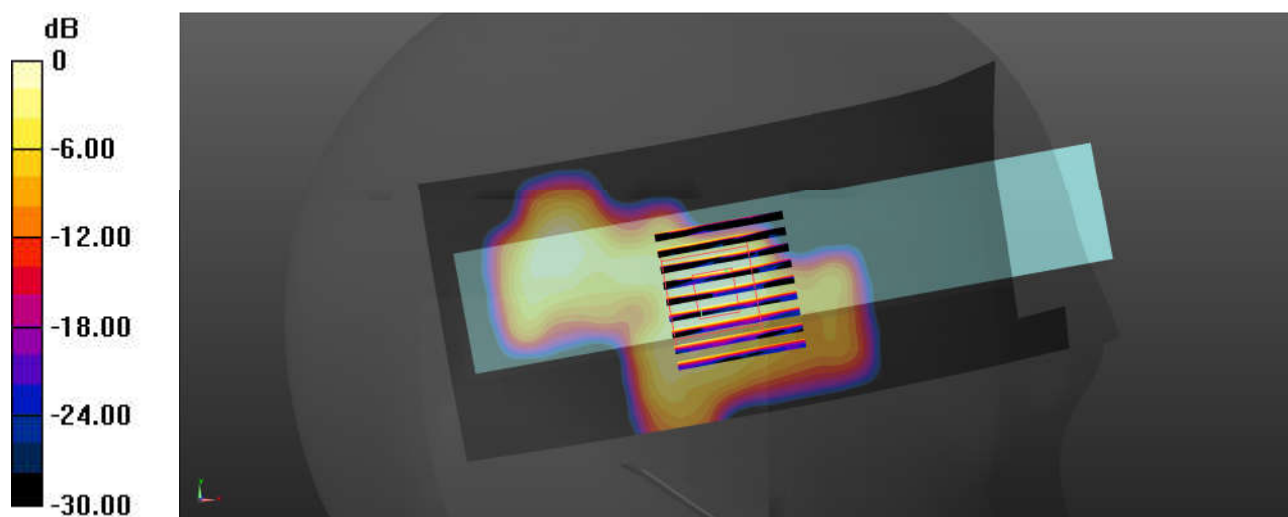
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 9.058 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.677 W/kg

SAR(1 g) = 0.159 W/kg; SAR(10 g) = 0.054 W/kg

Maximum value of SAR (measured) = 0.414 W/kg



0 dB = 0.414 W/kg = -3.83 dBW/kg

04_WLAN5G_802.11a 6Mbps_Left Cheek_0mm_Ch165

Communication System: UID 0, WLAN5GHz (0); Frequency: 5825 MHz; Duty Cycle: 1:1.018

Medium: HSL_5000 Medium parameters used: $f = 5825$ MHz; $\sigma = 5.241$ S/m; $\epsilon_r = 35.161$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(5.07, 5.07, 5.07); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (151x71x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 1.00 W/kg

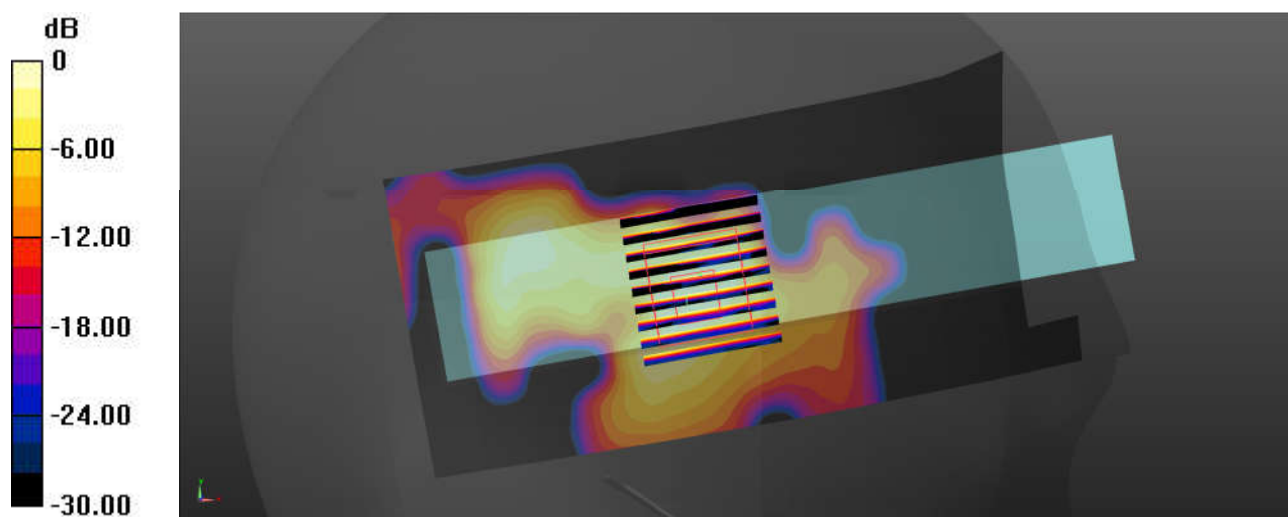
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm

Reference Value = 12.52 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 1.63 W/kg

SAR(1 g) = 0.371 W/kg; SAR(10 g) = 0.131 W/kg

Maximum value of SAR (measured) = 0.985 W/kg



0 dB = 0.985 W/kg = -0.07 dBW/kg

05_Bluetooth_1Mbps_Left Cheek_0mm_Ch39

Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz; Duty Cycle: 1:1.296

Medium: HSL_2450 Medium parameters used: $f = 2441$ MHz; $\sigma = 1.804$ S/m; $\epsilon_r = 38.661$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(8.14, 8.14, 8.14); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (101x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.319 W/kg

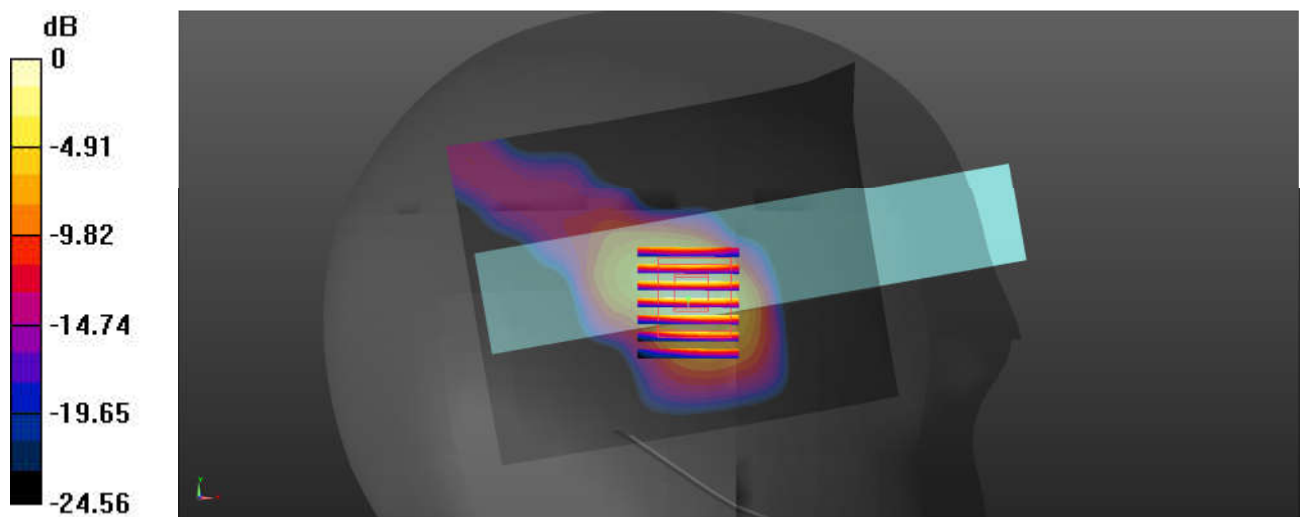
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.8330 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.401 W/kg

SAR(1 g) = 0.174 W/kg; SAR(10 g) = 0.077 W/kg

Maximum value of SAR (measured) = 0.298 W/kg



0 dB = 0.298 W/kg = -5.26 dBW/kg

06_WLAN2.4G_802.11b 1Mbps_Edge 2b_0mm_Ch6

Communication System: UID 0, WLAN2.4GHz (0); Frequency: 2437 MHz; Duty Cycle: 1:1.01
Medium: HSL_2450 Medium parameters used: $f = 2437$ MHz; $\sigma = 1.801$ S/m; $\epsilon_r = 38.672$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(8.14, 8.14, 8.14); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (51x161x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.795 W/kg

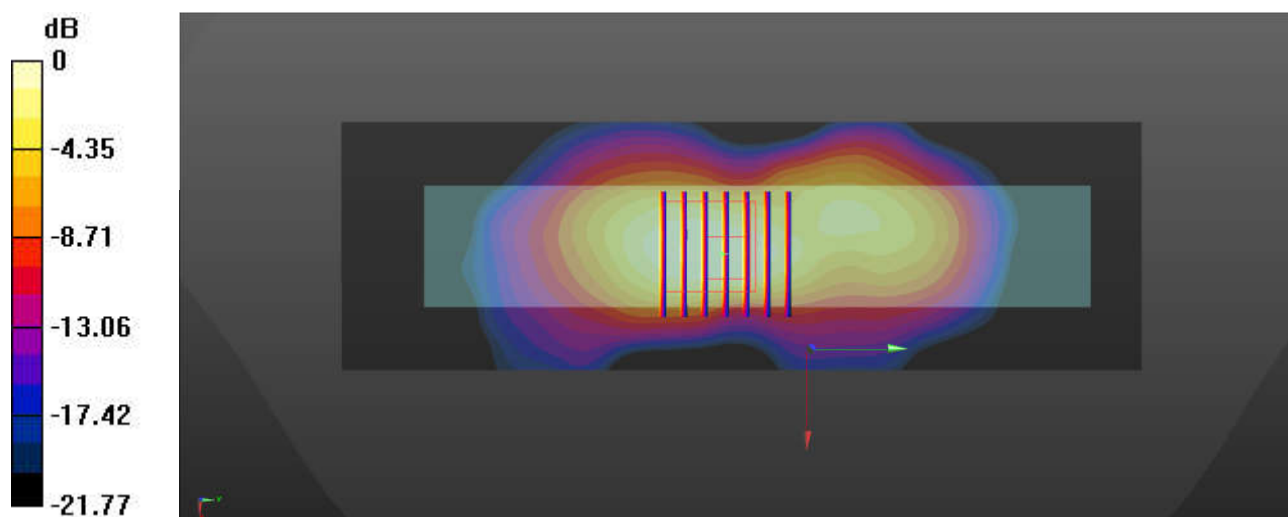
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.47 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.846 W/kg

SAR(1 g) = 0.353 W/kg; SAR(10 g) = 0.176 W/kg

Maximum value of SAR (measured) = 0.587 W/kg



0 dB = 0.587 W/kg = -2.31 dBW/kg

07_WLAN5G_802.11a 6Mbps_Edge 2b_0mm_Ch52

Communication System: UID 0, WLAN5GHz (0); Frequency: 5260 MHz; Duty Cycle: 1:1.018

Medium: HSL_5000 Medium parameters used: $f = 5260$ MHz; $\sigma = 4.591$ S/m; $\epsilon_r = 35.956$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(5.55, 5.55, 5.55); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (61x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 4.36 W/kg

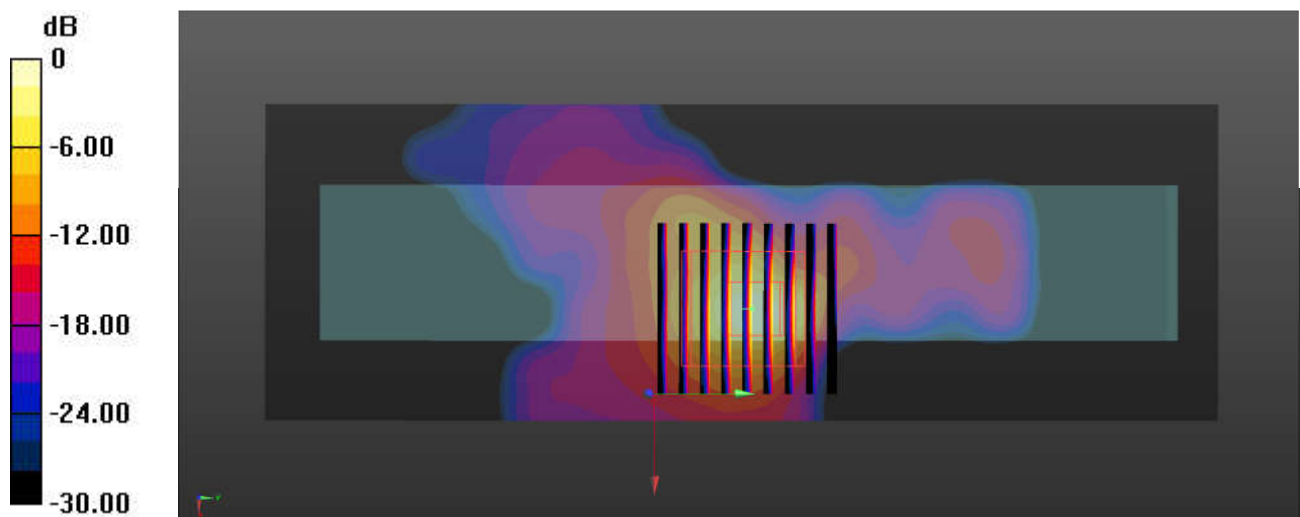
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 30.07 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 8.60 W/kg

SAR(1 g) = 1.82 W/kg; SAR(10 g) = 0.43 W/kg

Maximum value of SAR (measured) = 5.01 W/kg



08_WLAN5G_802.11a 6Mbps_Edge 2b_0mm_Ch116

Communication System: UID 0, WLAN5GHz (0); Frequency: 5580 MHz; Duty Cycle: 1:1.018

Medium: HSL_5000 Medium parameters used: $f = 5580$ MHz; $\sigma = 4.948$ S/m; $\epsilon_r = 35.465$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(4.85, 4.85, 4.85); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (61x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 2.71 W/kg

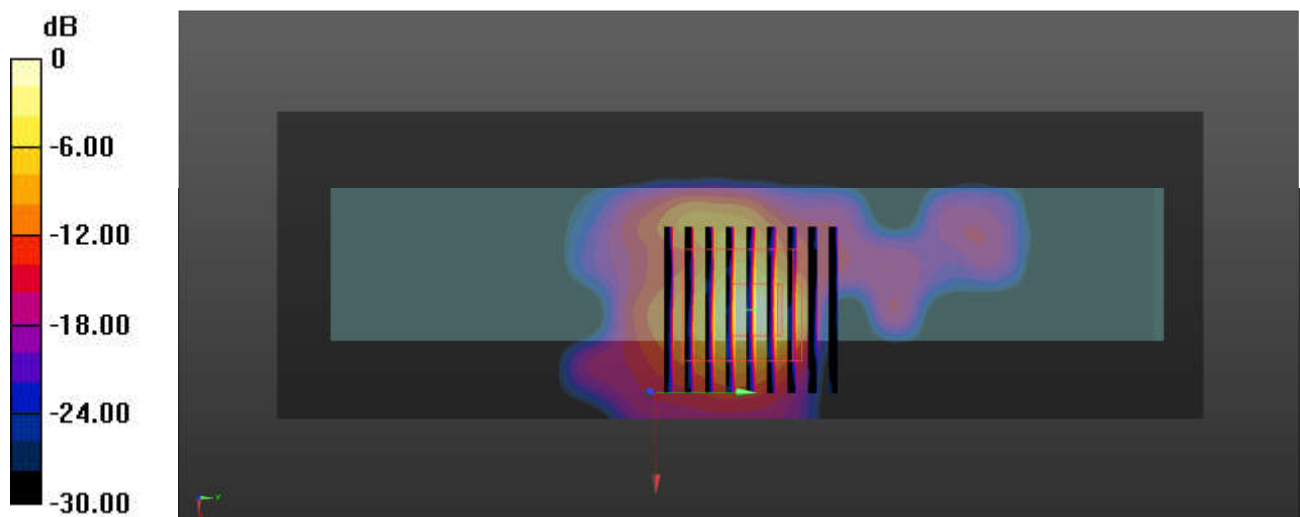
Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 22.57 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 5.38 W/kg

SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.236 W/kg

Maximum value of SAR (measured) = 3.06 W/kg



0 dB = 3.06 W/kg = 4.86 dBW/kg

09_WLAN5G_802.11a 6Mbps_Edge 1_0mm_Ch165

Communication System: UID 0, WLAN5GHz (0); Frequency: 5825 MHz; Duty Cycle: 1:1.018

Medium: HSL_5000 Medium parameters used: $f = 5825$ MHz; $\sigma = 5.241$ S/m; $\epsilon_r = 35.161$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(5.07, 5.07, 5.07); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (61x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 5.29 W/kg

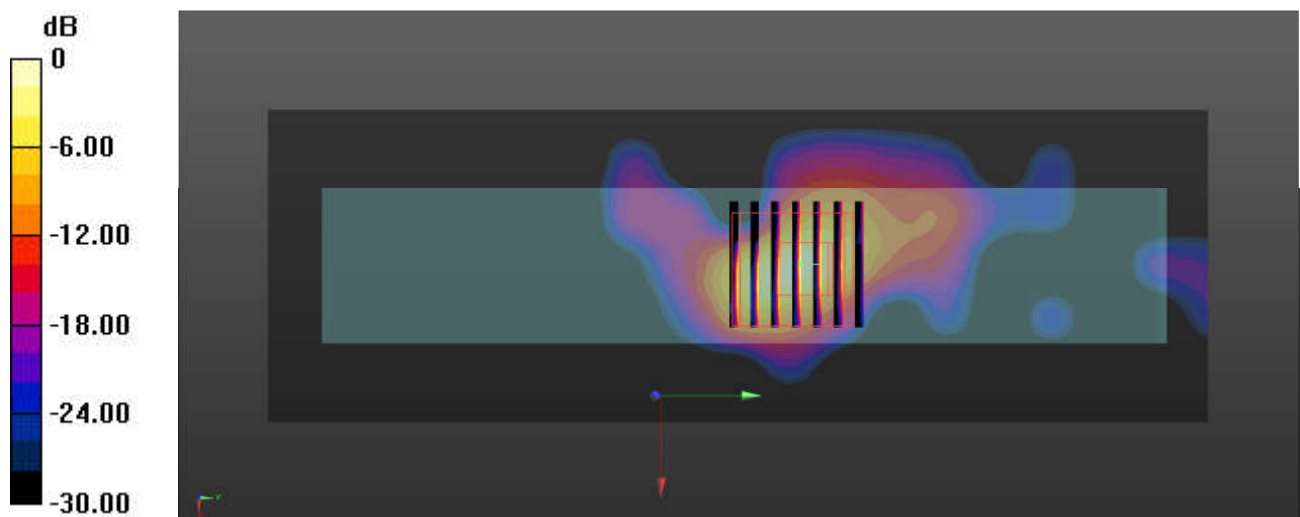
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 34.58 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 14.0 W/kg

SAR(1 g) = 2.09 W/kg; SAR(10 g) = 0.495 W/kg

Maximum value of SAR (measured) = 6.91 W/kg



10_Bluetooth_1Mbps_Edge2b_0mm_Ch0

Communication System: UID 0, Bluetooth (0); Frequency: 2402 MHz; Duty Cycle: 1:1.296

Medium: HSL_2450 Medium parameters used: $f = 2402$ MHz; $\sigma = 1.785$ S/m; $\epsilon_r = 38.607$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.1 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7630; ConvF(8.14, 8.14, 8.14); Calibrated: 2021.2.10
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 2021.3.17
- Phantom: SAM Twin Phantom; Type: SAM Twin; Serial: TP-2022
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Area Scan (51x151x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm

Maximum value of SAR (interpolated) = 0.362 W/kg

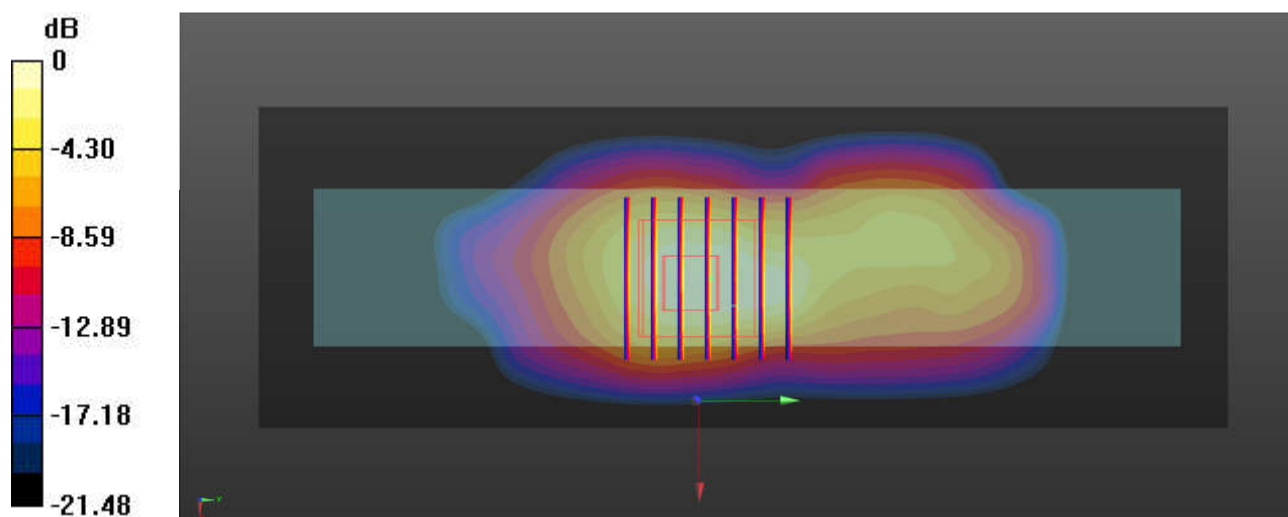
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 13.03 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.454 W/kg

SAR(1 g) = 0.185 W/kg; SAR(10 g) = 0.093 W/kg

Maximum value of SAR (measured) = 0.330 W/kg



0 dB = 0.330 W/kg = -4.81 dBW/kg



Appendix C. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.