




# TEST REPORT

Report No. .... : **CHTEW21110079** Report verification: 

Project No..... : **SHT2109040109EW**

FCC ID..... : **BXZSH2V2**

Applicant's name..... : **Ascom (Sweden) AB**

Address..... : **Grimbodalen 2 P.O. Box 8783, Gothenburg, SE-417 49 Sweden**

Test item description ..... : **Ascom Myco 3**

Trade Mark ..... : **Ascom**

Model/Type reference..... : **SH2-ABAA**

Listed Model(s) ..... : **SH2-XXXX("X"=A-Z represents different appearance colors, sales areas and sales channels,and is only used for propaganda purposes.The change of "X"does not affect product safety and electromagnetic compatibility)**

Standard ..... : **FCC 47 CFR Part2.1093  
IEEE Std C95.1, 1999 Edition  
IEEE 1528: 2013**

Date of receipt of test sample..... : **Jul.28, 2021**

Date of testing..... : **Jul.28, 2021- Nov.05, 2021**

Date of issue..... : **Nov.08, 2021**

Result..... : **PASS**

Compiled by  
 ( position+printedname+signature).... : File administrators: Echo Wei

Supervised by  
 ( position+printedname+signature).... : Test Engineer: Xiaodong Zhao

Approved by  
 ( position+printedname+signature).... : Manager: Hans Hu

Testing Laboratory Name ..... : **Shenzhen Huatongwei International Inspection Co., Ltd**

Address..... : **1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China**

**Shenzhen Huatongwei International Inspection Co., Ltd. All rights reserved.**

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen Huatongwei International Inspection Co., Ltd is acknowledged as copyright owner and source of the material. Shenzhen Huatongwei International Inspection Co., Ltd takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

*The test report merely correspond to the test sample.*

## Contents

1.	<u>Statement of Compliance</u>	3
2.	<u>Test Standards and Report version</u>	4
2.1.	Test Standards	4
2.2.	Report version	4
3.	<u>Summary</u>	5
3.1.	Client Information	5
3.2.	Product Description	5
3.3.	RF Specification Description	5
3.4.	Testing Laboratory Information	7
3.5.	Environmental conditions	7
4.	<u>Equipments Used during the Test</u>	8
5.	<u>Measurement Uncertainty</u>	9
6.	<u>SAR Measurements System Configuration</u>	10
6.1.	SAR Measurement Set-up	10
6.2.	DASY5 E-field Probe System	11
6.3.	Phantoms	12
6.4.	Device Holder	12
7.	<u>SAR Test Procedure</u>	13
7.1.	Scanning Procedure	13
7.2.	Data Storage and Evaluation	15
8.	<u>Position of the wireless device in relation to the phantom</u>	17
8.1.	Head Position	17
8.2.	Body Position	18
9.	<u>Dielectric Property Measurements &amp; System Check</u>	19
9.1.	Tissue Dielectric Parameters	19
9.2.	System Check	21
10.	<u>SAR Exposure Limits</u>	27
11.	<u>Conducted Power Measurement Results</u>	28
11.1.	Wi-Fi	28
11.2.	Bluetooth	30
12.	<u>Maximum Tune-up Limit</u>	31
13.	<u>Antenna Location</u>	35
14.	<u>Measured and Reported SAR Results</u>	36
14.1.	Head SAR	37
14.2.	Body SAR	39
15.	<u>SAR Measurement Variability</u>	40
16.	<u>Simultaneous Transmission analysis</u>	41
16.1.	Head	41
16.2.	Body	42
17.	<u>TestSetup Photos</u>	43
18.	<u>External and Internal Photos of the EUT</u>	44

## 1. Statement of Compliance

Maximum Reported SAR (W/kg @1g)			
RF Exposure Conditions	WIFI	BT	Simultaneous TX
Head	0.677	0.166	0.843
Body-worn(Dist.= 0mm) Front(Dist.=10mm)	1.259	0.166	1.425

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (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 . Test Standards and Report version

### 2.1. Test Standards

The tests were performed according to following standards:

[FCC 47 Part 2.1093](#): Radiofrequency radiation exposure evaluation: portable devices.

[IEEE Std C95.1, 1999 Edition](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz

[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.

FCC published RF exposure KDB procedures:

[865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04](#): SAR Measurement Requirements for 100 MHz to 6 GHz

[865664 D02 RF Exposure Reporting v01r02](#): RF Exposure Compliance Reporting and Documentation Considerations

[447498 D01 General RF Exposure Guidance v06](#): Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies

[248227 D01 802.11 Wi-Fi SAR v02r02](#): SAR Measurement Procedures for 802.11 a/b/g Transmitters

[648474 D04 Handset SAR v01r03](#): SAR Evaluation Considerations for Wireless Handsets

[941225 D06 Hotspot Mode v02r01](#): SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

[TCB workshop](#) April, 2019; Page 19, Tissue Simulating Liquids (TSL)

### 2.2. Report version

Revision No.	Date of issue	Description
N/A	2021-11-08	Original

### 3. Summary

#### 3.1. Client Information

Applicant:	Ascom (Sweden) AB
Address:	Grimbodalen 2 P.O. Box 8783, Gothenburg, SE-417 49 Sweden
Manufacturer:	Shenzhen Chuangwei Electronic Appliance Tech Co., Ltd.
Address:	4F & 6F, Overseas plant south, Skyworth Industrial Park, Shiyan Street, Bao'an District, Shenzhen, P.R. China

#### 3.2. Product Description

Main unit	
Name of EUT:	Ascom Myco 3
Trade Mark:	Ascom
Model No.:	SH2-ABAA
Listed Model(s):	SH2-XXXX("X"=A-Z represents different appearance colors, sales areas and sales channels,and is only used for propaganda purposes.The change of"X"does not affect product safety and electromagnetic compatibility)
Power supply:	DC 3.8V
Device Category:	Portable
Product stage:	Production unit
RF Exposure Environment:	General Population/Uncontrolled
HTW test sample No.:	YPHT21070035011
Hardware version:	AM501-MB-H8-V03
Software version:	Ascom.Myco3. ABAA.V5.3
Device Dimension:	Overall (Length x Width x Thickness): 150x 75 x 20mm
Ancillary unit	
Battery Information:	3.8V 11.153Wh 2A

#### 3.3. RF Specification Description

Wi-Fi 2.4G	
Operating Mode:	802.11b 802.11g 802.11n(HT20) 802.11n(HT40)
Antenna Type:	LDS
Does this device 2.4GHz Wi-Fi support hotspot operation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

<b>Wi-Fi 5G</b>	
Operation Band:	U-NII-1 U-NII-2A U-NII-2C U-NII-3
Operating Mode:	802.11a 802.11n(HT20) 802.11n(HT40) 802.11ac(VHT20) 802.11ac(VHT40) 802.11ac(VHT80)
Antenna Type:	LDS
Does this device 5GHz Wi-Fi support hotspot operation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<b>Bluetooth</b>	
Bluetooth version:	V4.2
Support function:	EDR
Operating Mode:	GFSK $\pi/4$ DQPSK 8DPSK
Antenna Type:	LDS
Does this device support Bluetooth Tethering? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>Bluetooth</b>	
Bluetooth version:	V4.2
Support function:	BLE
Operating Mode:	GFSK
Antenna Type:	LDS
Does this device support Bluetooth Tethering? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<i>Remark:</i>	
1. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power.	

### 3.4. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	
Connect information:	Tel: 86-755-26715499 E-mail: <a href="mailto:cs@szhtw.com.cn">cs@szhtw.com.cn</a> <a href="http://www.szhtw.com.cn">http://www.szhtw.com.cn</a>	
Qualifications	Type	Accreditation Number
	FCC	762235

### 3.5. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Ambient temperature	18 °C to 25 °C
Ambient humidity	30%RH to 70%RH
Air Pressure	950-1050mbar

#### 4. Equipments Used during the Test

Used	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date (YY-MM-DD)	Due date (YY-MM-DD)
●	Data Acquisition Electronics DAEx	SPEAG	DAE4	1549	2021/03/23	2022/03/22
●	E-field Probe	SPEAG	EX3DV4	7494	2021/04/09	2022/04/08
●	Universal Radio Communication Tester	R&S	CMW500	137681	2021/05/27	2022/05/26
● Tissue-equivalent liquids Validation						
●	Dielectric Assessment Kit	SPEAG	DAK-3.5	1267	N/A	N/A
○	Dielectric Assessment Kit	SPEAG	DAK-12	1130	N/A	N/A
●	Network analyzer	Keysight	E5071C	MY46733048	2021/09/17	2022/09/16
● System Validation						
○	System Validation Antenna	SPEAG	CLA-150	4024	2021/01/25	2024/01/24
○	System Validation Dipole	SPEAG	D450V3	1102	2021/01/20	2024/01/19
●	System Validation Dipole	SPEAG	D750V3	1180	2021/01/22	2024/01/21
●	System Validation Dipole	SPEAG	D835V2	4d238	2021/01/22	2024/01/21
●	System Validation Dipole	SPEAG	D1750V2	1164	2021/01/22	2024/01/21
●	System Validation Dipole	SPEAG	D1900V2	5d226	2021/01/22	2024/01/21
●	System Validation Dipole	SPEAG	D2450V2	1009	2021/01/25	2024/01/24
●	System Validation Dipole	SPEAG	D2600V2	1150	2021/01/25	2024/01/24
●	System Validation Dipole	SPEAG	D5GHzV2	1273	2021/01/26	2024/01/25
●	Signal Generator	R&S	SMB100A	114360	2021/08/05	2022/08/04
●	Power Viewer for Windows	R&S	N/A	N/A	N/A	N/A
●	Power sensor	R&S	NRP18A	101010	2021/08/05	2022/08/04
●	Power sensor	R&S	NRP18A	101386	2021/05/27	2022/05/26
●	Power Amplifier	BONN	BLWA 0160-2M	1811887	2020/11/12	2021/11/11
●	Dual Directional Coupler	Mini-Circuits	ZHDC-10-62-S+	F975001814	2020/11/12	2021/11/11
●	Attenuator	Mini-Circuits	VAT-3W2+	1819	2020/11/12	2021/11/11
●	Attenuator	Mini-Circuits	VAT-10W2+	1741	2020/11/12	2021/11/11

**Note:**

1. The Probe, Dipole and DAE calibration reference to the Appendix B and C.
2. Referring to KDB865664 D01, the dipole calibration interval can be extended to 3 years with justification. The dipole are also not physically damaged or repaired during the interval.



## **5. Measurement Uncertainty**

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, 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.

Therefore, the measurement uncertainty is not required.

## 6. SAR Measurements System Configuration

### 6.1. SAR Measurement Set-up

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

A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).

A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

A unit to operate the optical surface detector which is connected to the EOC.

The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.

The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003.

DASY5 software and SEMCAD data evaluation software.

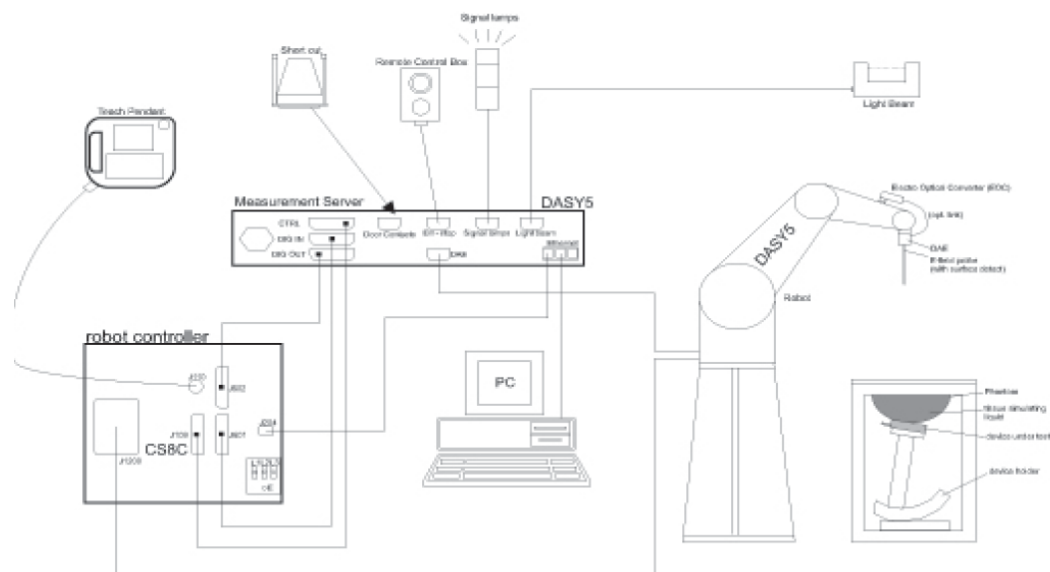
Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.

The generic twin phantom enabling the testing of left-hand and right-hand usage.

The device holder for handheld Mobile Phones.

Tissue simulating liquid mixed according to the given recipes.

System validation dipoles allowing to validate the proper functioning of the system.



## 6.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

### ● Probe Specification

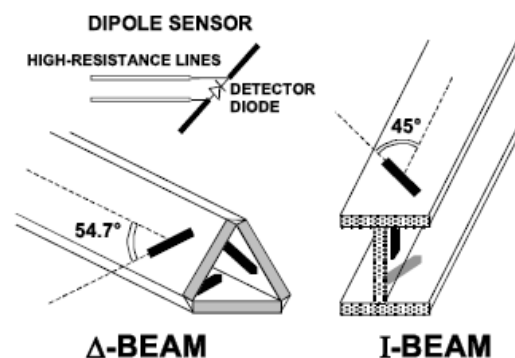
Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	4 MHz to 10 GHz; Linearity: $\pm 0.2$ dB (30 MHz to 6 GHz)
Directivity	$\pm 0.3$ dB in HSL (rotation around probe axis) $\pm 0.5$ dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 $\mu$ W/g to > 100 W/kg; Linearity: $\pm 0.2$ dB
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 6 GHz Dosimetry in strong gradient fields Compliance tests of Mobile Phones
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI



### ◆ Isotropic E-Field Probe

The isotropic E-Field probe has been fully calibrated and assessed for isotropicity, and boundary effect within a controlled environment. Depending on the frequency for which the probe is calibrated the method utilized for calibration will change.

The E-Field probe utilizes a triangular sensor arrangement as detailed in the diagram below:



### 6.3. Phantoms

The phantom used for all tests i.e. for both system checks and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG. The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region, where shell thickness increases to 6mm).

System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.



SAM-Twin Phantom

### 6.4. Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the DASY system.

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



Device holder supplied by SPEAG

## 7. SAR Test Procedure

### 7.1. Scanning Procedure

#### Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. Measure the local SAR at a test point within 8 mm of the phantom inner surface that is closest to the DUT. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

#### Step 2: 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 DASYS software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) 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 Resolutions per FCC KDB Publication 865664 D01v04

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

**Step 3: Zoom Scan**

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1g and 10g 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 g and 10 g and displays these values next to the job's label.

**Zoom Scan Resolutions per FCC KDB Publication 865664 D01v04**

Maximum zoom scan spatial resolution: $\Delta x_{Zoom}$ , $\Delta y_{Zoom}$		$\leq 2$ GHz: $\leq 8$ mm 2 – 3 GHz: $\leq 5$ mm*	3 – 4 GHz: $\leq 5$ mm* 4 – 6 GHz: $\leq 4$ mm*	
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	$\leq 5$ mm	3 – 4 GHz: $\leq 4$ mm 4 – 5 GHz: $\leq 3$ mm 5 – 6 GHz: $\leq 2$ mm	
	graded grid	$\Delta z_{Zoom}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface	$\leq 4$ mm	3 – 4 GHz: $\leq 3$ mm 4 – 5 GHz: $\leq 2.5$ mm 5 – 6 GHz: $\leq 2$ mm
		$\Delta z_{Zoom}(n>1)$ : between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z	$\geq 30$ mm	3 – 4 GHz: $\geq 28$ mm 4 – 5 GHz: $\geq 25$ mm 5 – 6 GHz: $\geq 22$ mm	
Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details. * When zoom scan is required and the <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB Publication 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

**Step 4: Power drift measurement**

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1. The SAR drift shall be kept within  $\pm 5\%$ .

## 7.2. Data Storage and Evaluation

### Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors),s together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension “.DA4”. The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [W/kg], [mW/cm<sup>2</sup>], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

### Data Evaluation

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

Probe parameters:	Sensitivity:	Normi, ai0, ai1, ai2
	Conversion factor:	ConvFi
	Diode compression point:	Dcpi
Device parameters:	Frequency:	f
	Crest factor:	cf
Media parameters:	Conductivity:	σ
	Density:	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

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

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

Vi:	compensated signal of channel ( i = x, y, z )
Ui:	input signal of channel ( i = x, y, z )
cf:	crest factor of exciting field (DASY parameter)
dcp <sub>i</sub> :	diode compression point (DASY parameter)

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

$$E - \text{fieldprobes} : \quad E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

$$H - \text{fieldprobes} : \quad H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1}f + a_{i2}f^2}{f}$$

Vi:	compensated signal of channel ( i = x, y, z )
Norm <sub>i</sub> :	sensor sensitivity of channel ( i = x, y, z ), [mV/(V/m) <sup>2</sup> ] for E-field Probes
ConvF:	sensitivity enhancement in solution
a <sub>ij</sub> :	sensor sensitivity factors for H-field probes
f:	carrier frequency [GHz]
E <sub>i</sub> :	electric field strength of channel i in V/m
H <sub>i</sub> :	magnetic field strength of channel i in A/m

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

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

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

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1'000}$$

SAR: local specific absorption rate in W/kg  
Etot: total field strength in V/m  
 $\sigma$ : conductivity in [mho/m] or [Siemens/m]  
 $\rho$ : equivalent tissue density in g/cm<sup>3</sup>

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid.



## 8. Position of the wireless device in relation to the phantom

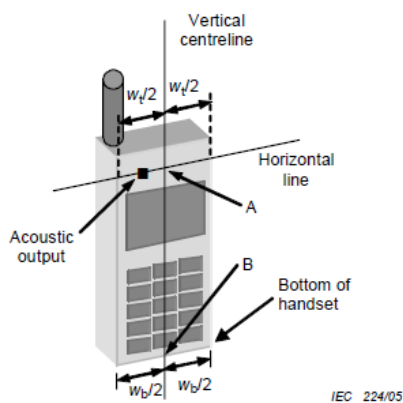
### 8.1. Head Position

The wireless device define two imaginary lines on the handset, the vertical centreline and the horizontal line, for the handset in vertical orientation as shown in Figures 5a and 5b.

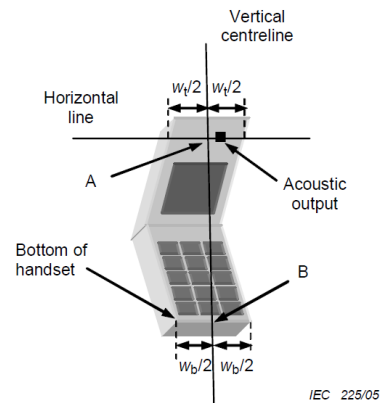
**The vertical centreline** passes through two points on the front side of the handset: the midpoint of the width  $W_t$  of the handset at the level of the acoustic output (point A in Figures 5a and 5b), and the midpoint of the width  $W_b$  of the bottom of the handset (point B).

**The horizontal line** is perpendicular to the vertical centreline and passes through the centre of the acoustic output (see Figures 5a and 5b). The two lines intersect at point A.

Note that for many handsets, point A coincides with the centre of the acoustic output. However, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centreline is not necessarily parallel to the front face of the handset (see Figure 5b), especially for clam-shell handsets, handsets with flip cover pieces, and other irregularly shaped handsets.



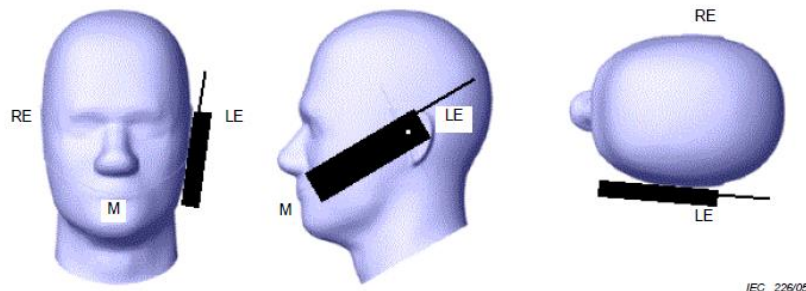
Figures 5a



Figures 5b

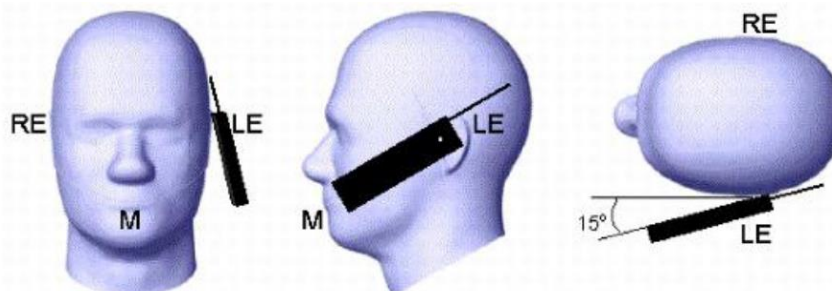
- $W_t$  Width of the handset at the level of the acoustic
- $W_b$  Width of the bottom of the handset
- A Midpoint of the width  $w_t$  of the handset at the level of the acoustic output
- B Midpoint of the width  $w_b$  of the bottom of the handset

### Cheek position



Picture 2 Cheek position of the wireless device on the left side of SAM

### Tilt position

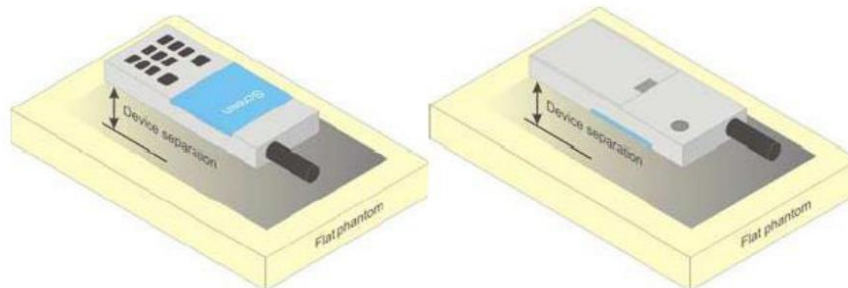


Picture 3 Tilt position of the wireless device on the left side of SAM

## 8.2. Body Position

Devices that support transmission while used with body-worn accessories must be tested for body-worn accessory SAR compliance, typically according to the smallest test separation distance required for the group of body-worn accessories with similar operating and exposure characteristics.

Devices that are designed to operate on the body of users using lanyards and straps or without requiring additional body-worn accessories must be tested for SAR compliance using a conservative minimum test separation distance  $\leq 5\text{mm}$  to support compliance.



Picture 4 Test positions for body-worn devices

## 9. Dielectric Property Measurements & System Check

### 9.1. Tissue Dielectric Parameters

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within  $\pm 2^\circ\text{C}$  of the temperature when the tissue parameters are characterized.

The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3-4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

The dielectric constant ( $\epsilon_r$ ) and conductivity ( $\sigma$ ) of typical tissue-equivalent media recipes are expected to be within  $\pm 5\%$  of the required target values; but for SAR measurement systems that have implemented the SAR error compensation algorithms documented in IEEE Std 1528-2013, to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, the tolerance for  $\epsilon_r$  and  $\sigma$  may be relaxed to  $\pm 10\%$ . This is limited to frequencies  $\leq 3$  GHz.

#### Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Tissue dielectric parameters for Head and Body				
Target Frequency (MHz)	Head		Body	
	$\epsilon_r$	$\sigma(\text{S/m})$	$\epsilon_r$	$\sigma(\text{S/m})$
2450	39.2	1.80	52.7	1.95
5200	36.0	4.66	49.0	5.30
5600	35.5	5.07	48.5	5.77
5800	35.3	5.27	48.2	6.00

#### IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

**Dielectric Property Measurements Results:**

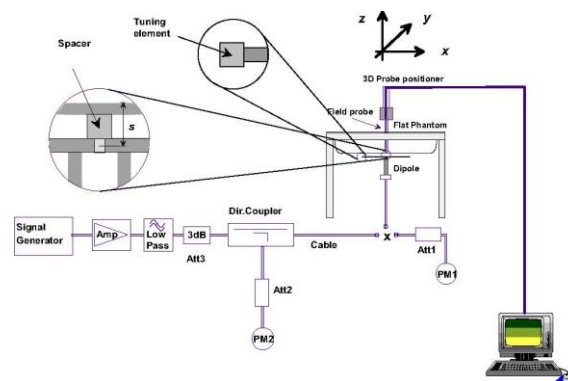
<b>Dielectric performance of Head tissue simulating liquid</b>									
Frequency (MHz)	$\epsilon_r$		$\sigma$ (S/m)		Delta ( $\epsilon_r$ )	Delta ( $\sigma$ )	Limit	Temp (°C)	Date
	Target	Measured	Target	Measured					
2450	39.20	40.69	1.800	1.753	3.80%	-2.61%	±5%	22.0	2021/10/15
5250	35.93	34.93	4.706	4.526	-2.78%	-3.82%	±5%	22.0	2021/11/4
5600	35.53	34.60	5.065	4.854	-2.62%	-4.17%	±5%	22.0	2021/11/5
5750	35.36	34.04	5.219	4.988	-3.73%	-4.43%	±5%	22.0	2021/11/5

## 9.2. System Check

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

### System Performance Check Measurement Conditions:

- ◆ The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness:  $2.0 \pm 0.2$  mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- ◆ The depth of tissue-equivalent liquid in a phantom must be  $\geq 15.0$  cm for SAR measurements  $\leq 3$  GHz and  $\geq 10.0$  cm for measurements  $> 3$  GHz.
- ◆ The DASY system with an E-Field Probe was used for the measurements.
- ◆ The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- ◆ The coarse grid with a grid spacing of 15 mm was aligned with the dipole.  
For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- ◆ Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- ◆ The results are normalized to 1 W input power.



System Performance Check Setup



Photo of Dipole Setup

**System Check Result:**

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within  $\pm 10\%$  of the manufacturer calibrated dipole SAR target.

Head											
Frequency (MHz)	1g SAR			10g SAR			Delta (1g)	Delta (10g)	Limit	Temp (°C)	Date
	Target 1W	Normalize to 1W	Measured 250mW	Target 1W	Normalize to 1W	Measured 250mW					
2450	52.00	50.40	12.60	23.90	23.72	5.93	-3.08%	-0.75%	$\pm 10\%$	22.4	2021/10/15

Head											
Frequency (MHz)	1g SAR			10g SAR			Delta (1g)	Delta (10g)	Limit	Temp (°C)	Date
	Target 1W	Normalize to 1W	Measured 100mW	Target 1W	Normalize to 1W	Measured 100mW					
5250	78.20	80.20	8.02	22.30	23.00	2.30	2.56%	3.14%	$\pm 10\%$	22.4	2021/11/4
5600	81.60	84.10	8.41	23.30	24.20	2.42	3.06%	3.86%	$\pm 10\%$	22.4	2021/11/5
5750	79.30	85.50	8.55	22.50	24.50	2.45	7.82%	8.89%	$\pm 10\%$	22.4	2021/11/5

## Plots of System Performance Check

### SystemPerformanceCheck-Head 2450MHz

DUT: D2450V2; Type: D2450V2; Serial: 1009

Date: 2021-10-15

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

Medium parameters used (interpolated):  $f = 2450$  MHz;  $\sigma = 1.753$  S/m;  $\epsilon_r = 40.69$ .;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Ambient Temperature:22.6°C;Liquid Temperature:22.4°C;

#### DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(7.97, 7.97, 7.97) @ 2450 MHz; Calibrated: 4/9/2021
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/23/2021
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Head/d=10mm,Pin=250mW/Area Scan (41x61x1):** Interpolated grid: dx=1.200 mm, dy=1.200 mm

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

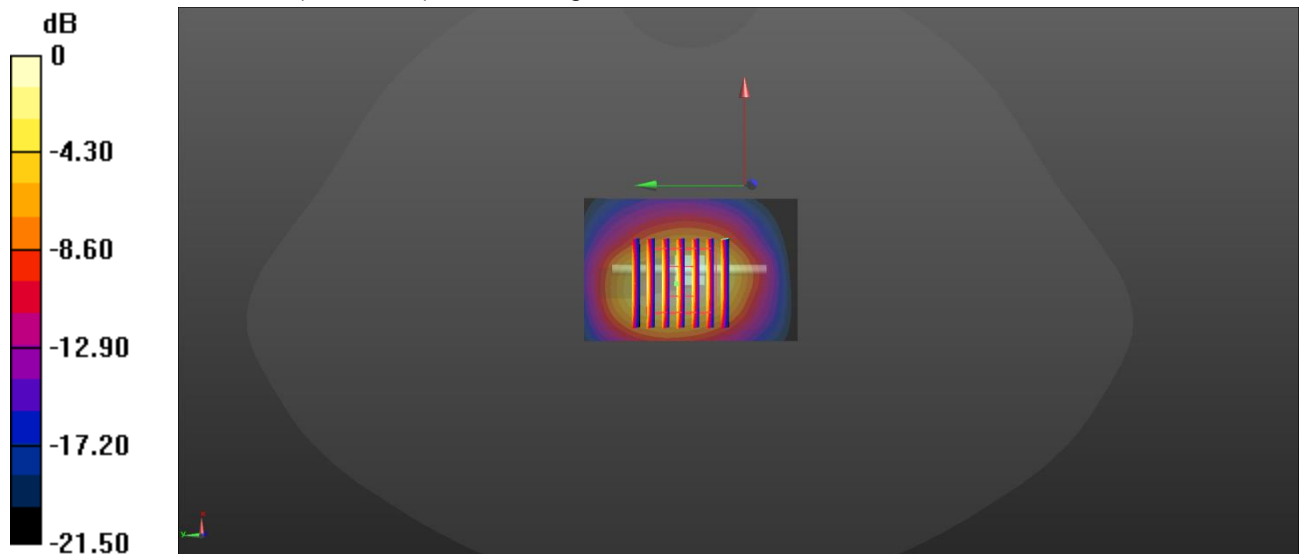
**Head/d=10mm,Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 91.02 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 25.4 W/kg

**SAR(1 g) = 12.6 W/kg; SAR(10 g) = 5.93 W/kg**

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



0 dB = 16.5 W/kg = 12.17 dBW/kg

**SystemPerformanceCheck-Head 5250MHz**

DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273

Date: 2021-11-04

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

Medium parameters used (interpolated):  $f = 5250$  MHz;  $\sigma = 4.526$  S/m;  $\epsilon_r = 34.929$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Ambient Temperature: 22.4°C; Liquid Temperature: 22.2°C;

**DASY Configuration:**

- Probe: EX3DV4 - SN7494; ConvF(5.65, 5.65, 5.65) @ 5250 MHz; Calibrated: 4/9/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/23/2021
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Head/d=10mm, pin=100mW/Area Scan (31x31x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 20.2 W/kg

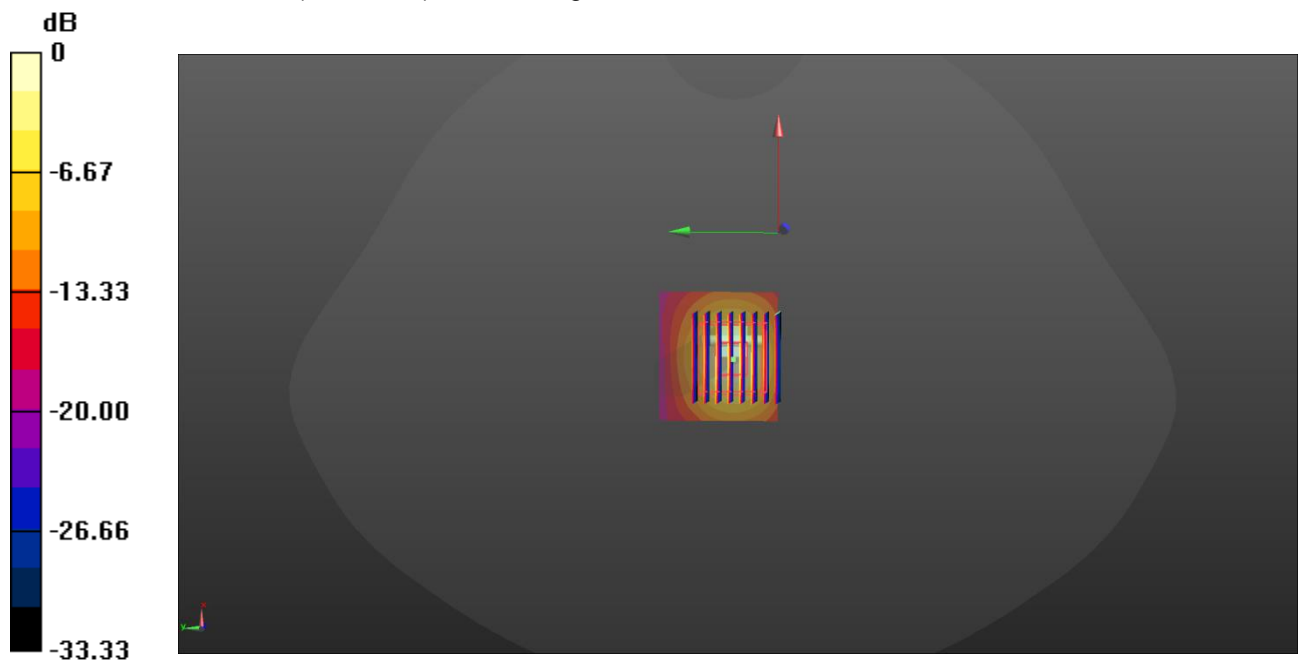
**Head/d=10mm, pin=100mW/Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 43.61 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 33.1 W/kg

**SAR(1 g) = 8.02 W/kg; SAR(10 g) = 2.3 W/kg**

Maximum value of SAR (measured) = 18.6 W/kg



0 dB = 18.6 W/kg = 12.70 dBW/kg



**SystemPerformanceCheck-Head 5600MHz**

DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273

Date: 2021-11-05

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

Medium parameters used:  $f = 5600$  MHz;  $\sigma = 4.854$  S/m;  $\epsilon_r = 34.546$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Ambient Temperature: 22.4°C; Liquid Temperature: 22.2°C;

**DASY Configuration:**

- Probe: EX3DV4 - SN7494; ConvF(4.95, 4.95, 4.95) @ 5600 MHz; Calibrated: 4/9/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/23/2021
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Head/d=10mm, Pin=100mW/Area Scan (41x41x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 22.1 W/kg

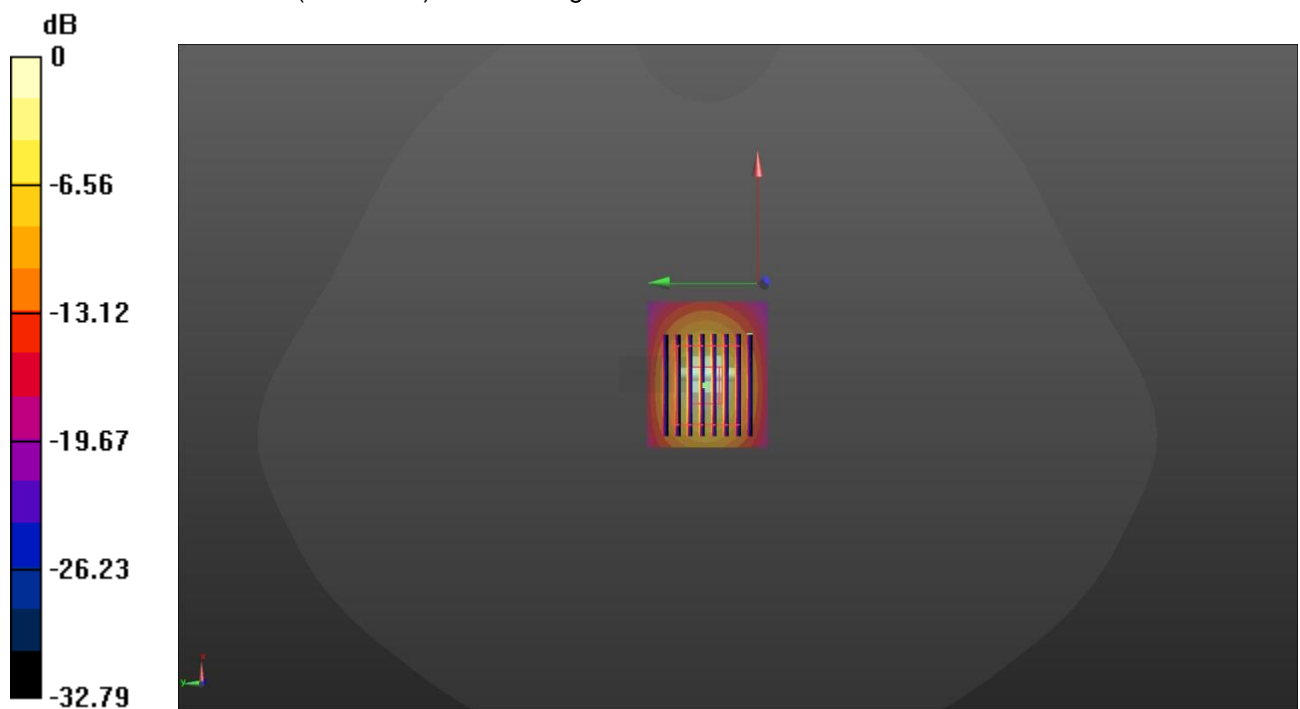
**Head/d=10mm, Pin=100mW/Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 62.57 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 35.4 W/kg

**SAR(1 g) = 8.41 W/kg; SAR(10 g) = 2.42 W/kg**

Maximum value of SAR (measured) = 20.1 W/kg



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

**SystemPerformanceCheck-Head 5750MHz**

DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273

Date: 2021-11-05

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

Medium parameters used:  $f = 5750$  MHz;  $\sigma = 4.988$  S/m;  $\epsilon_r = 34.037$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Ambient Temperature: 22.4°C; Liquid Temperature: 22.2°C;

**DASY Configuration:**

- Probe: EX3DV4 - SN7494; ConvF(4.86, 4.86, 4.86) @ 5750 MHz; Calibrated: 4/9/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/23/2021
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Head/d=10mm, Pin=100mW/Area Scan (41x41x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 22.6 W/kg

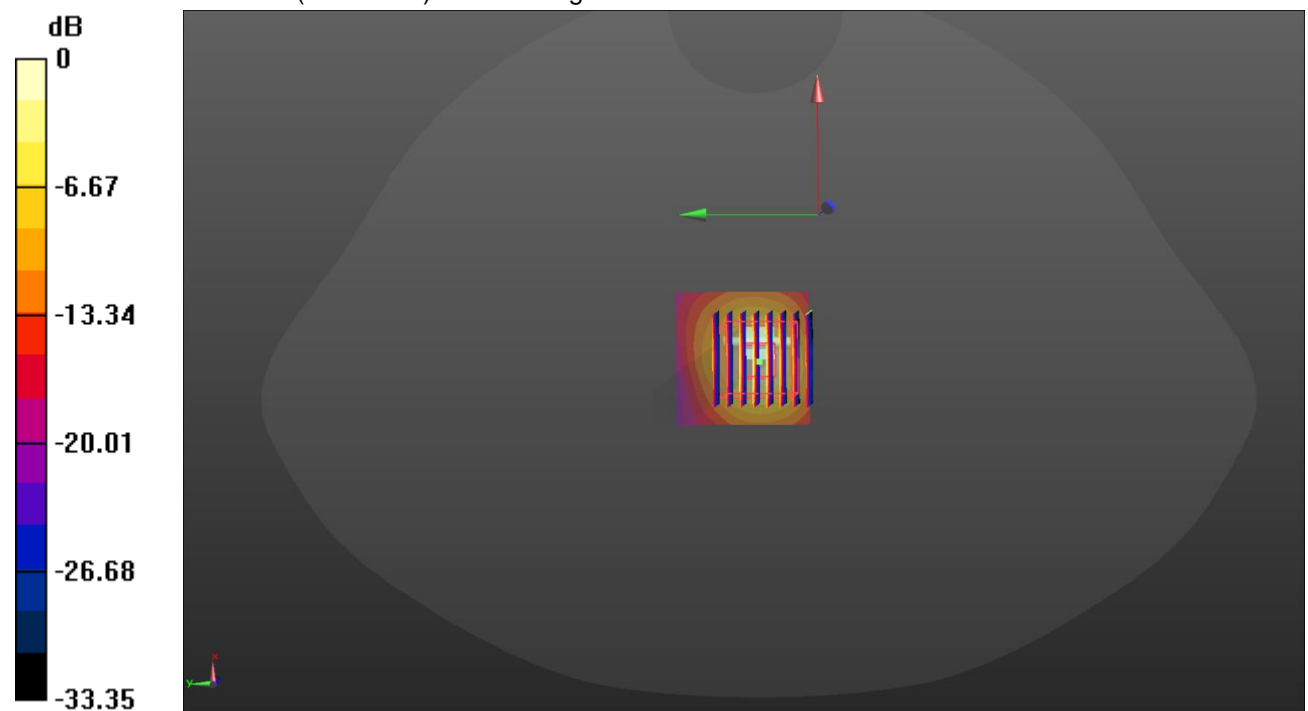
**Head/d=10mm, Pin=100mW/Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 61.72 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 36.9 W/kg

**SAR(1 g) = 8.55 W/kg; SAR(10 g) = 2.45 W/kg**

Maximum value of SAR (measured) = 21.1 W/kg



## 10. SAR Exposure Limits

SAR assessments have been made in line with the requirements of FCC 47 CFR § 2.1093.

Type Exposure	Limit (W/kg)	
	General Population/ Uncontrolled Exposure Environment	Occupational/ Controlled Exposure Environment
Spatial Average SAR (whole body)	0.08	0.4
Spatial Peak SAR (1g cube tissue for head and trunk)	1.6	8.0
Spatial Peak SAR (10g for limb)	4.0	20.0

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

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

## 11. Conducted Power Measurement Results

### 11.1. Wi-Fi

For 2.4GHz Wi-Fi SAR testing, highest average RF output power channel for the lowest data rate for 802.11b were for SAR evaluation.

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.

SAR testing is not required for OFDM mode(s) 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  $\leq 1.2$  W/kg.

Wi-Fi 2.4G				
Mode	Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Average Power (dBm)
802.11b	1	2412	19.43	17.43
	6	2437	18.45	16.36
	11	2462	19.34	17.16
802.11g	1	2412	23.92	20.45
	6	2437	22.90	19.47
	11	2462	23.11	19.97
802.11n (HT20)	1	2412	24.19	20.76
	6	2437	22.74	19.22
	11	2462	23.17	19.87
802.11n (HT40)	3	2422	23.6	20.06
	6	2437	23.53	20.04
	9	2452	23.79	20.20

Wi-Fi 5G U-NII-1			
Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)
802.11ac (VHT20)	36	5180	15.16
	44	5220	15.36
	48	5240	15.36
802.11n (HT20)	36	5180	14.93
	44	5220	15.07
	48	5240	15.14
802.11a	36	5180	14.98
	44	5220	15.07
	48	5240	15.17
802.11ac (VHT40)	38	5190	11.29
	46	5230	15.30
802.11n (HT40)	38	5190	11.15
	46	5230	15.34
802.11ac (VHT80)	42	5210	11.70

Wi-Fi 5G U-NII-2A			
Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)
802.11ac (VHT20)	52	5260	15.51
	56	5280	15.57
	64	5320	15.61
802.11n (HT20)	52	5260	15.19
	56	5280	15.18
	64	5320	15.35
802.11a	52	5260	15.33
	56	5280	15.37
	64	5320	15.35
802.11ac (VHT40)	54	5270	15.69
	62	5310	11.59
802.11n (HT40)	54	5270	15.52
	62	5310	11.61
802.11ac (VHT80)	58	5290	12.09

Wi-Fi 5G U-NII-2C			
Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)
802.11ac (VHT20)	100	5500	15.55
	120	5600	15.80
	140	5700	12.07
802.11n (HT20)	100	5500	15.37
	120	5600	15.64
	140	5700	11.95
802.11a	100	5500	15.55
	120	5600	15.76
	140	5700	11.98
802.11ac (VHT40)	102	5510	11.35
	118	5590	16.06
	134	5670	12.10
802.11n (HT40)	102	5510	11.35
	118	5590	16.06
	134	5670	12.09
802.11ac (VHT80)	106	5530	12.23
	122	5610	15.79
	138	5690	16.52

Wi-Fi 5G U-NII-3			
Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)
802.11ac (VHT20)	149	5745	16.32
	157	5785	16.44
	165	5825	16.56
802.11n (HT20)	149	5745	16.14
	157	5785	16.27
	165	5825	16.39
802.11a	149	5745	16.15
	157	5785	16.27
	165	5825	16.29
802.11ac (VHT40)	151	5755	16.60
	159	5795	16.70
802.11n (HT40)	151	5755	16.63
	159	5795	16.76
802.11ac (VHT80)	155	5775	16.36

## 11.2. Bluetooth

Bluetooth				
Mode	Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Average Power (dBm)
GFSK	0	2402	5.42	5.33
	39	2441	<b>6.08</b>	<b>5.99</b>
	78	2480	5.15	5.05
$\pi/4$ QPSK	0	2402	3.98	3.09
	39	2441	4.67	3.79
	78	2480	3.77	2.85
8DPSK	0	2402	4.26	3.15
	39	2441	4.97	3.82
	78	2480	4.02	2.86
BLE	0	2402	4.41	4.27
	19	2440	5.07	4.91
	39	2480	4.06	3.91

**12. Maximum Tune-up Limit**

<b>Wi-Fi 2.4G</b>		
Mode	Channel	Maximum Tune-up (dBm) Conducted Average Power
802.11b	1	17.50
	6	17.00
	11	17.50
802.11g	1	20.50
	6	19.50
	11	20.00
802.11n(HT20)	1	21.00
	6	19.50
	11	20.00
802.11n(HT40)	3	20.50
	6	20.50
	9	20.50

<b>Wi-Fi 5G U-NII-1</b>		
Mode	Channel	Maximum Tune-up (dBm) Conducted Average Power
802.11ac (VHT20)	36	16.00
	40	16.00
	48	16.00
802.11n (HT20)	36	16.00
	40	16.00
	48	16.00
802.11a	36	16.00
	40	16.00
	48	16.00
802.11ac (VHT40)	38	11.50
	46	15.50
802.11n (HT40)	38	11.50
	46	15.50
802.11ac (VHT80)	42	12.00

Wi-Fi 5G U-NII-2A		
Mode	Channel	Maximum Tune-up (dBm) Conducted Average Power
802.11ac (VHT20)	52	16.00
	56	16.00
	64	16.00
802.11n (HT20)	52	16.00
	56	16.00
	64	16.00
802.11a	52	16.00
	56	16.00
	64	16.00
802.11ac (VHT40)	54	16.00
	62	12.00
802.11n (HT40)	54	16.00
	62	12.00
802.11ac (VHT80)	58	12.50

Wi-Fi 5G U-NII-2C		
Mode	Channel	Maximum Tune-up (dBm) Conducted Average Power
802.11ac (VHT20)	100	16.00
	120	16.00
	140	12.50
802.11n (HT20)	100	16.00
	120	16.00
	140	12.50
802.11a	100	16.00
	120	16.00
	140	12.50
802.11ac (VHT40)	102	12.50
	118	16.50
	134	12.50
802.11n (HT40)	102	12.50
	118	16.50
	134	12.50
802.11ac (VHT80)	106	12.50
	122	16.50
	138	17.00



Wi-Fi 5G U-NII-3		
Mode	Channel	Maximum Tune-up (dBm) Conducted Average Power
802.11ac (VHT20)	149	17.00
	157	17.00
	165	17.00
802.11n (HT20)	149	17.00
	157	17.00
	165	17.00
802.11a	149	17.00
	157	17.00
	165	17.00
802.11ac (VHT40)	151	17.00
	159	17.00
802.11n (HT40)	151	17.00
	159	17.00
802.11ac (VHT80)	155	17.00

Bluetooth		
Mode	Channel	Maximum Tune-up (dBm) Conducted Average Power
GFSK	0	5.50
	39	6.00
	78	5.50
$\pi/4$ QPSK	0	3.50
	39	4.00
	78	3.00
8DPSK	0	3.50
	39	4.00
	78	3.00
BLE	0	4.50
	19	5.00
	39	4.00

Per KDB 447498 D01, the 1-g and 10-g SAR test exclusion thresholds for 100MHz to 6GHz at test separation distances  $\leq 50$ mm are determined by:

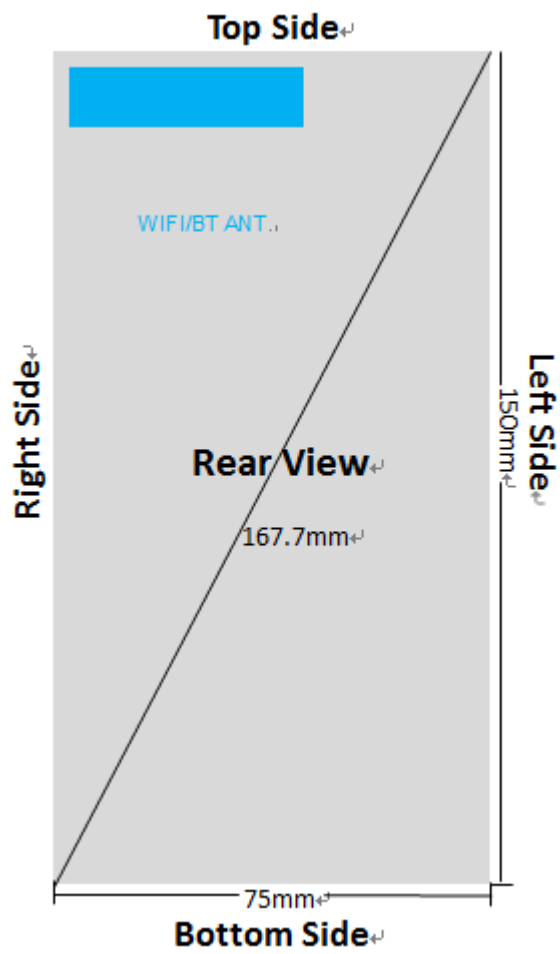
$$\left[ \frac{\text{max. Power of channel, including tune-up tolerance, mW}}{\text{min. test separation distance, mm}} \right] * [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR}$$

Band/Mode	F(GHz)	Position	Separation Distance (mm)	Exclusion Thresholds	Estimated SAR
Bluetooth	2.45	Head	0	1.2	0.166
		Body-Rear	0	1.2	0.166
		Body-Front	10	0.6	0.083

Per KDB 447498 D01, when the minimum test separation distance is <5mm, a distance of 5mm is applied to determine SAR test exclusion.

The test exclusion threshold is  $\leq 3$ , SAR testing is not required.

### 13. Antenna Location



## 14. Measured and Reported SAR Results

### SAR Test Reduction criteria are as follows:

- Reported SAR(W/kg) for WWAN = Measured SAR \*Tune-up Scaling Factor
- Reported SAR(W/kg) for Wi-Fi and Bluetooth = Measured SAR \* Tune-up scaling factor \* Duty Cycle scaling factor
- Duty Cycle scaling factor = 1 / Duty cycle (%)

### KDB 447498 D01 General RF Exposure Guidance:

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:

- $\leq 0.8$  W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz
- $\leq 0.6$  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
- $\leq 0.4$  W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  MHz

### KDB 648474 D04 Handset SAR:

With headset attached, when the reported SAR for body-worn accessory, measured without a headset connected to the handset, is  $> 1.2$  W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset. Additional 1-g SAR testing at 5 mm is not required when hotspot mode 10-g extremity SAR is not required for the surfaces and edges; since all 1-g reported SAR  $< 1.2$  W/kg.

### KDB 248227 D01 SAR meas for 802.11:

When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the initial test position(s) by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The initial test position(s) is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the reported SAR for the initial test position is:

- $\leq 0.4$  W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- $> 0.4$  W/kg, SAR is repeated using the same wireless mode test 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 reported SAR is  $\leq 0.8$  W/kg or all required test positions are tested.
  - For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
  - When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is  $> 0.8$  W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is  $\leq 1.2$  W/kg or all required test channels are considered.
  - The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.
- When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported

SAR for UNII 2A is  $\leq 1.2$  W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.

- When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is  $\leq 1.2$  W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.

To determine the initial test position, Area Scans were performed to determine the position with the Maximum Value of SAR (measured). The position that produced the highest Maximum Value of SAR is considered the worst case position; thus used as the initial test position.

## 14.1. Head SAR

Wi-Fi 2.4G												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift (dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz									
802.11b	Left Cheek	1	2412	17.43	17.50	1.016	99.60%	1.00	-0.15	0.664	0.677	1
		6	2437	16.36	17.00	1.159	99.60%	1.00	-	-	-	-
		11	2462	17.16	17.50	1.081	99.60%	1.00	-	-	-	-
	Left Tilt	1	2412	17.43	17.50	1.016	99.60%	1.00	-0.08	0.546	0.557	-
		6	2437	16.36	17.00	1.159	99.60%	1.00	-	-	-	-
		11	2462	17.16	17.50	1.081	99.60%	1.00	-	-	-	-
	Right Cheek	1	2412	17.43	17.50	1.016	99.60%	1.00	-0.05	0.303	0.309	-
		6	2437	16.36	17.00	1.159	99.60%	1.00	-	-	-	-
		11	2462	17.16	17.50	1.081	99.60%	1.00	-	-	-	-
	Right Tilt	1	2412	17.43	17.50	1.016	99.60%	1.00	-0.06	0.286	0.292	-
		6	2437	16.36	17.00	1.159	99.60%	1.00	-	-	-	-
		11	2462	17.16	17.50	1.081	99.60%	1.00	-	-	-	-

Wi-Fi 5G U-NII-1												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift (dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz									
802.11a	Left Cheek	36	5180	14.98	16.00	1.265	97.36%	1.027	-	-	-	-
		44	5220	15.07	16.00	1.239	97.36%	1.027	-	-	-	-
		48	5240	15.17	16.00	1.211	97.36%	1.027	-0.17	0.163	0.203	-
	Left Tilt	36	5180	14.98	16.00	1.265	97.36%	1.027	-	-	-	-
		44	5220	15.07	16.00	1.239	97.36%	1.027	-	-	-	-
		48	5240	15.17	16.00	1.211	97.36%	1.027	-0.11	0.154	0.191	-
	Right Cheek	36	5180	14.98	16.00	1.265	97.36%	1.027	-	-	-	-
		44	5220	15.07	16.00	1.239	97.36%	1.027	-	-	-	-
		48	5240	15.17	16.00	1.211	97.36%	1.027	-0.09	0.262	0.326	2
	Right Tilt	36	5180	14.98	16.00	1.265	97.36%	1.027	-	-	-	-
		44	5220	15.07	16.00	1.239	97.36%	1.027	-	-	-	-
		48	5240	15.17	16.00	1.211	97.36%	1.027	-0.10	0.244	0.303	-

Wi-Fi 5G U-NII-2A												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift (dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz									
802.11n (HT40)	Left Cheek	54	5270	15.52	16.00	1.117	94.65%	1.057	-0.06	0.225	0.265	-
		62	5310	11.61	12.00	1.094	94.65%	1.057	-	-	-	-
	Left Tilt	54	5270	15.52	16.00	1.117	94.65%	1.057	-0.11	0.202	0.238	-
		62	5310	11.61	12.00	1.094	94.65%	1.057	-	-	-	-
	Right Cheek	54	5270	15.52	16.00	1.117	94.65%	1.057	-0.14	0.277	0.327	3
		62	5310	11.61	12.00	1.094	94.65%	1.057	-	-	-	-
	Right Tilt	54	5270	15.52	16.00	1.117	94.65%	1.057	0.04	0.255	0.301	-
		62	5310	11.61	12.00	1.094	94.65%	1.057	-	-	-	-

Wi-Fi 5G U-NII-2C												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift (dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz									
802.11ac (VHT80)	Left Cheek	106	5530	12.23	12.50	1.064	89.84%	1.113	-	-	-	-
		122	5610	15.79	16.50	1.178	89.84%	1.113	-	-	-	-
		138	5690	16.52	17.00	1.117	89.84%	1.113	-0.03	0.335	0.416	-
	Left Tilt	106	5530	12.23	12.50	1.064	89.84%	1.113	-	-	-	-
		122	5610	15.79	16.50	1.178	89.84%	1.113	-	-	-	-
		138	5690	16.52	17.00	1.117	89.84%	1.113	-0.09	0.306	0.380	-
	Right Cheek	106	5530	12.23	12.50	1.064	89.84%	1.113	-	-	-	-
		122	5610	15.79	16.50	1.178	89.84%	1.113	-	-	-	-
		138	5690	16.52	17.00	1.117	89.84%	1.113	-0.11	0.381	0.474	4
	Right Tilt	106	5530	12.23	12.50	1.064	89.84%	1.113	-	-	-	-
		122	5610	15.79	16.50	1.178	89.84%	1.113	-	-	-	-
		138	5690	16.52	17.00	1.117	89.84%	1.113	-0.05	0.332	0.413	-

Wi-Fi 5G U-NII-3												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift (dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz									
802.11ac (VHT80)	Left Cheek	155	5775	16.36	17.00	1.159	89.84%	1.113	-0.10	0.192	0.248	-
	Left Tilt	155	5775	16.36	17.00	1.159	89.84%	1.113	-0.06	0.186	0.240	-
	Right Cheek	155	5775	16.36	17.00	1.159	89.84%	1.113	-0.12	0.251	0.324	5
	Right Tilt	155	5775	16.36	17.00	1.159	89.84%	1.113	-0.04	0.223	0.288	-

## 14.2. Body SAR

Wi-Fi 2.4G												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift (dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz									
802.11b	Front	1	2412	17.43	17.50	1.016	99.60%	1.00	0.03	0.087	0.089	-
		6	2437	16.36	17.00	1.159	99.60%	1.00	-	-	-	-
		11	2462	17.16	17.50	1.081	99.60%	1.00	-	-	-	-
	Rear	1	2412	17.43	17.50	1.016	99.60%	1.00	-0.11	0.239	0.244	6
		6	2437	16.36	17.00	1.159	99.60%	1.00	-	-	-	-
		11	2462	17.16	17.50	1.081	99.60%	1.00	-	-	-	-

Wi-Fi 5G U-NII-1												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift (dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz									
802.11a	Front	36	5180	14.98	16.00	1.265	97.36%	1.027	-	-	-	-
		44	5220	15.07	16.00	1.239	97.36%	1.027	-	-	-	-
		48	5240	15.17	16.00	1.211	97.36%	1.027	-0.06	0.148	0.184	-
	Rear	36	5180	14.98	16.00	1.265	97.36%	1.027	-0.07	0.812	1.055	-
		44	5220	15.07	16.00	1.239	97.36%	1.027	-0.06	0.855	1.088	-
		48	5240	15.17	16.00	1.211	97.36%	1.027	-0.09	0.890	1.107	7

Wi-Fi 5G U-NII-2A												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift (dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz									
802.11n (HT40)	Front	54	5270	15.52	16.00	1.117	94.65%	1.057	-0.02	0.219	0.258	-
		62	5310	11.61	12.00	1.094	94.65%	1.057	-	-	-	-
	Rear	54	5270	15.52	16.00	1.117	94.65%	1.057	-0.07	0.988	1.166	8
		62	5310	11.61	12.00	1.094	94.65%	1.057	-0.10	0.411	0.475	-

Wi-Fi 5G U-NII-2C												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift (dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz									
802.11ac (VHT80)	Front	106	5530	12.23	12.50	1.064	89.84%	1.113	-	-	-	-
		122	5610	15.79	16.50	1.178	89.84%	1.113	-	-	-	-
		138	5690	16.52	17.00	1.117	89.84%	1.113	-0.08	0.274	0.341	-
	Rear	106	5530	12.23	12.50	1.064	89.84%	1.113	-0.09	0.378	0.448	-
		122	5610	15.79	16.50	1.178	89.84%	1.113	-0.03	0.896	1.174	-
		138	5690	16.52	17.00	1.117	89.84%	1.113	-0.12	0.985	1.225	9

Wi-Fi 5G U-NII-3												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift (dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz									
802.11ac (VHT80)	Front	151	5755	16.36	17.00	1.159	89.84%	1.113	-0.10	0.301	0.388	-
	Rear	151	5755	16.36	17.00	1.159	89.84%	1.113	-0.12	0.976	1.259	10

SAR Test Data Plots to the Appendix A.

## 15. SAR Measurement Variability

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

- 1) Repeated measurement is not required when the original highest measured SAR is <math><0.8</math> or 2 W/kg (1-g or 10-g respectively); steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is  $\geq 0.8$  or 2 W/kg (1-g or 10-g respectively), repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is  $> 1.20$  or when the original or repeated measurement is  $\geq 1.45$  or 3.6 W/kg (~ 10% from the 1-g or 10-g respective SAR limit).
- 4) Perform a third repeated measurement only if the original, first, or second repeated measurement is  $\geq 1.5$  or 3.75 W/kg (1-g or 10-g respectively) and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .

Band	Test Position	Frequency		Highest Measured SAR (W/kg)	First Repeated		Second Repeated	
		CH	MHz		Measured SAR(W/kg)	Largest to Smallest SAR Ratio	Measured SAR(W/kg)	Largest to Smallest SAR Ratio
WIFI 5G U-NII-1	Rear	48	5240	0.890	0.855	1.041	N/A	N/A
WIFI 5G U-NII-2A	Rear	54	5270	0.988	0.957	1.032	N/A	N/A
WIFI 5G U-NII-2C	Rear	138	5690	0.985	0.951	1.036	N/A	N/A
WIFI 5G U-NII-3	Rear	151	5755	0.976	0.939	1.039	N/A	N/A



## 16. Simultaneous Transmission analysis

No.	Simultaneous Transmission Configurations	Head	Body-worn	Hotspot	Note
1	WLAN (data) + Bluetooth (data)	Yes	Yes	NA	

General note:

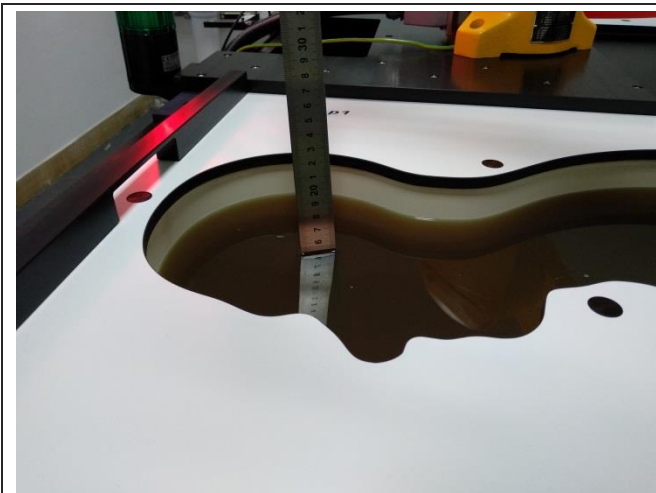
### 16.1. Head

WLAN + BT				
WLAN Band	Exposure Position	Max SAR (W/kg)		Summed SAR
		WLAN	BT	(W/kg)
2.4G	Left Cheek	0.677	0.166	<b>0.843</b>
	Left Tilted	0.557	0.166	0.723
	Right Cheek	0.309	0.166	0.475
	Right Tilted	0.292	0.166	0.458
5G U-NII-1	Left Cheek	0.203	0.166	0.369
	Left Tilted	0.191	0.166	0.357
	Right Cheek	0.326	0.166	0.492
	Right Tilted	0.303	0.166	0.469
5G U-NII-2A	Left Cheek	0.265	0.166	0.431
	Left Tilted	0.238	0.166	0.404
	Right Cheek	0.327	0.166	0.493
	Right Tilted	0.301	0.166	0.467
5G U-NII-2C	Left Cheek	0.416	0.166	0.582
	Left Tilted	0.380	0.166	0.546
	Right Cheek	0.474	0.166	0.640
	Right Tilted	0.413	0.166	0.579
5G U-NII-3	Left Cheek	0.248	0.166	0.414
	Left Tilted	0.240	0.166	0.406
	Right Cheek	0.324	0.166	0.490
	Right Tilted	0.288	0.166	0.454

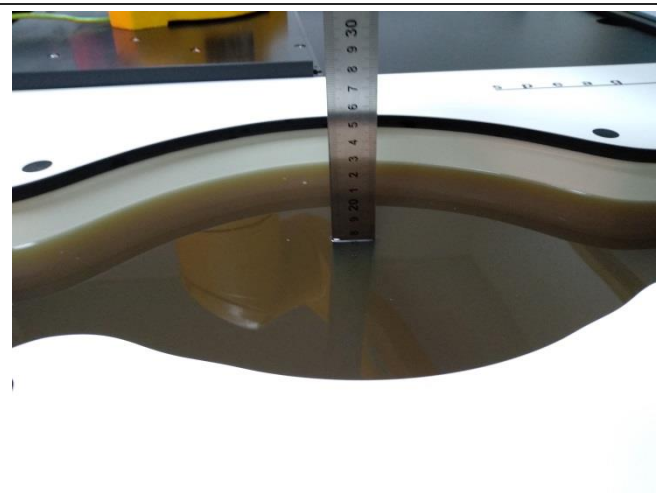
**16.2. Body**

<b>WLAN + BT</b>				
WWAN Band	Exposure Position	Max SAR (W/kg)		Summed SAR
		WLAN	BT	(W/kg)
2.4G	Front	0.089	0.083	0.172
	Rear	0.244	0.166	0.410
5G U-NII-1	Front	0.184	0.083	0.267
	Rear	1.107	0.166	1.273
5G U-NII-2A	Front	0.258	0.083	0.341
	Rear	0.475	0.166	0.641
5G U-NII-2C	Front	0.341	0.083	0.424
	Rear	1.225	0.166	1.391
5G U-NII-3	Front	0.388	0.083	0.471
	Rear	1.259	0.166	<b>1.425</b>

### 17. TestSetup Photos



Liquid depth in the Head phantom



Liquid depth in the Body phantom



Left Head Touch



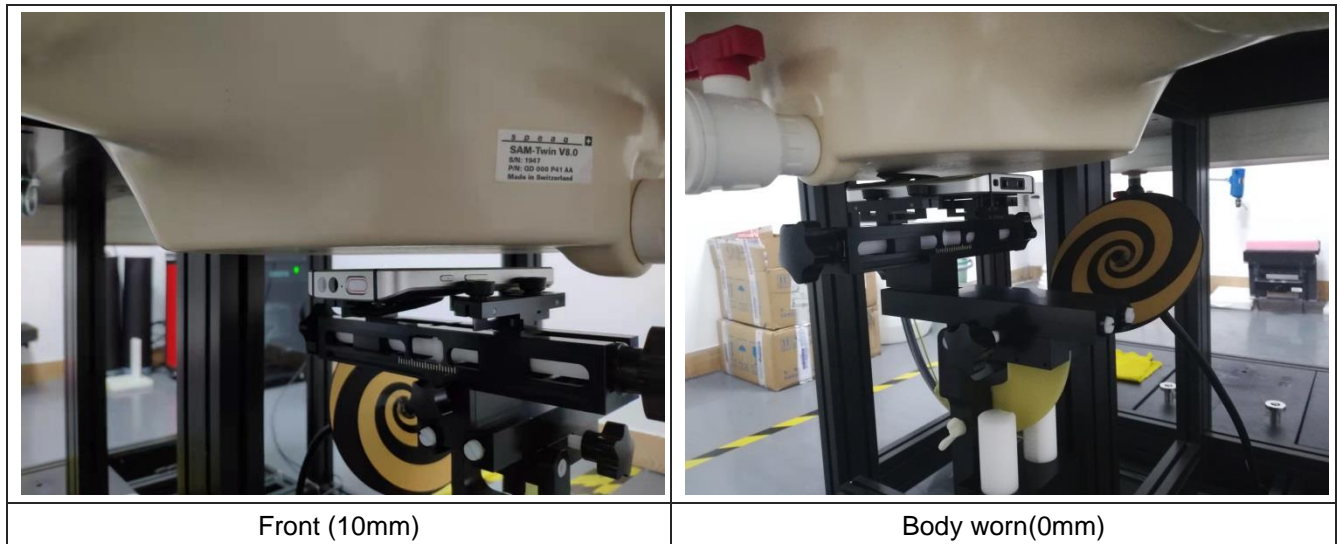
Right Head Touch



Left Head Tilt (15°)



Right Head Tilt (15°)



## **18. External and Internal Photos of the EUT**

Please reference to the report No.: CHTEW21110043

***-----End of Report-----***

Test Laboratory: Huatongwei International Inspection Co., Ltd.,SAR Lab

Date: 10/15/2021

**WiFi 2.4G-L-Head**

Communication System: UID 0, Generic WIFI (0); Frequency: 2412 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 2412$  MHz;  $\sigma = 1.727$  S/m;  $\epsilon_r = 40.752$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

Ambient Temperature:22.4°C;Liquid Temperature:22.2°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(7.97, 7.97, 7.97) @ 2412 MHz; Calibrated: 4/9/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/23/2021
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Left Cheek Touch/CH 1/Area Scan (81x141x1):** Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.993 W/kg

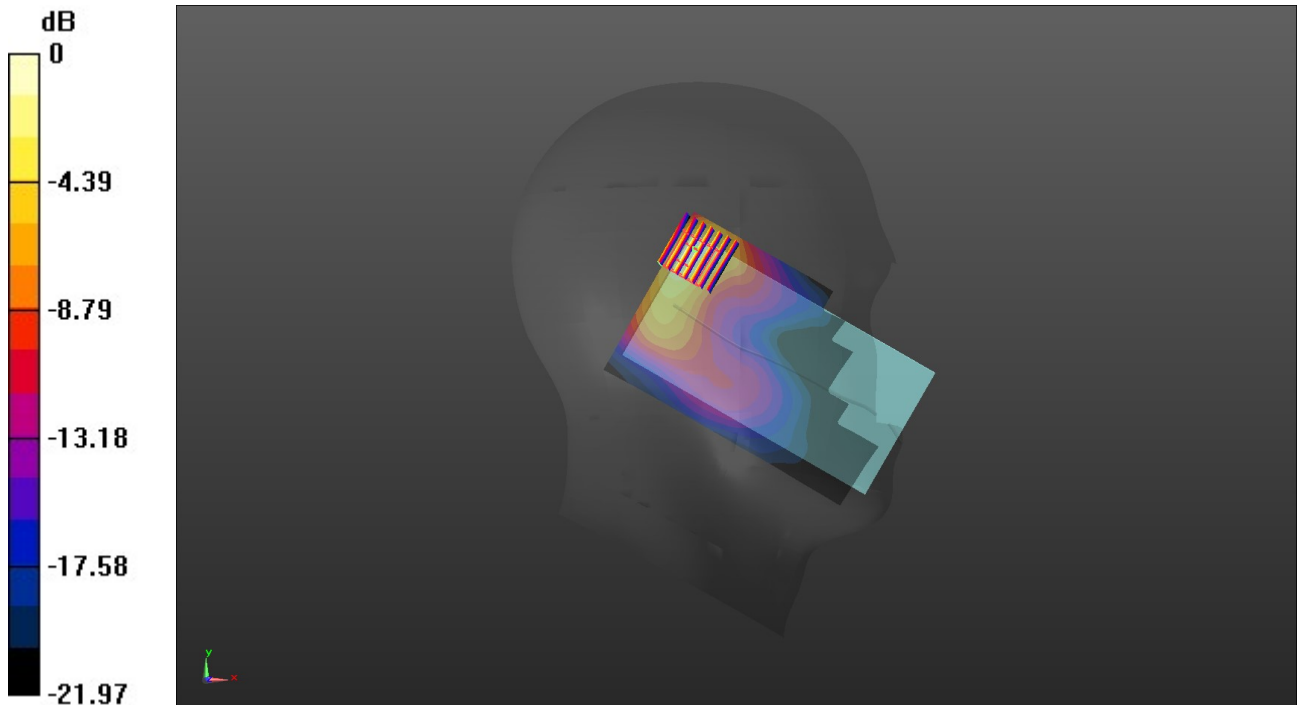
**Left Cheek Touch/CH 1/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.13 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 1.44 W/kg

**SAR(1 g) = 0.664 W/kg; SAR(10 g) = 0.300 W/kg**

Maximum value of SAR (measured) = 1.12 W/kg



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

**WiFi 5G U-NII-1-H-Head**

Communication System: UID 0, Generic WIFI (0); Frequency: 5240 MHz;Duty Cycle: 1:1

Medium parameters used:  $f = 5240$  MHz;  $\sigma = 4.518$  S/m;  $\epsilon_r = 35.08$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

Ambient Temperature:22.3°C;Liquid Temperature:22.1°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(5.65, 5.65, 5.65) @ 5240 MHz; Calibrated: 4/9/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/23/2021
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Right Touch Cheek/CH 48/Area Scan (91x171x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.554 W/kg

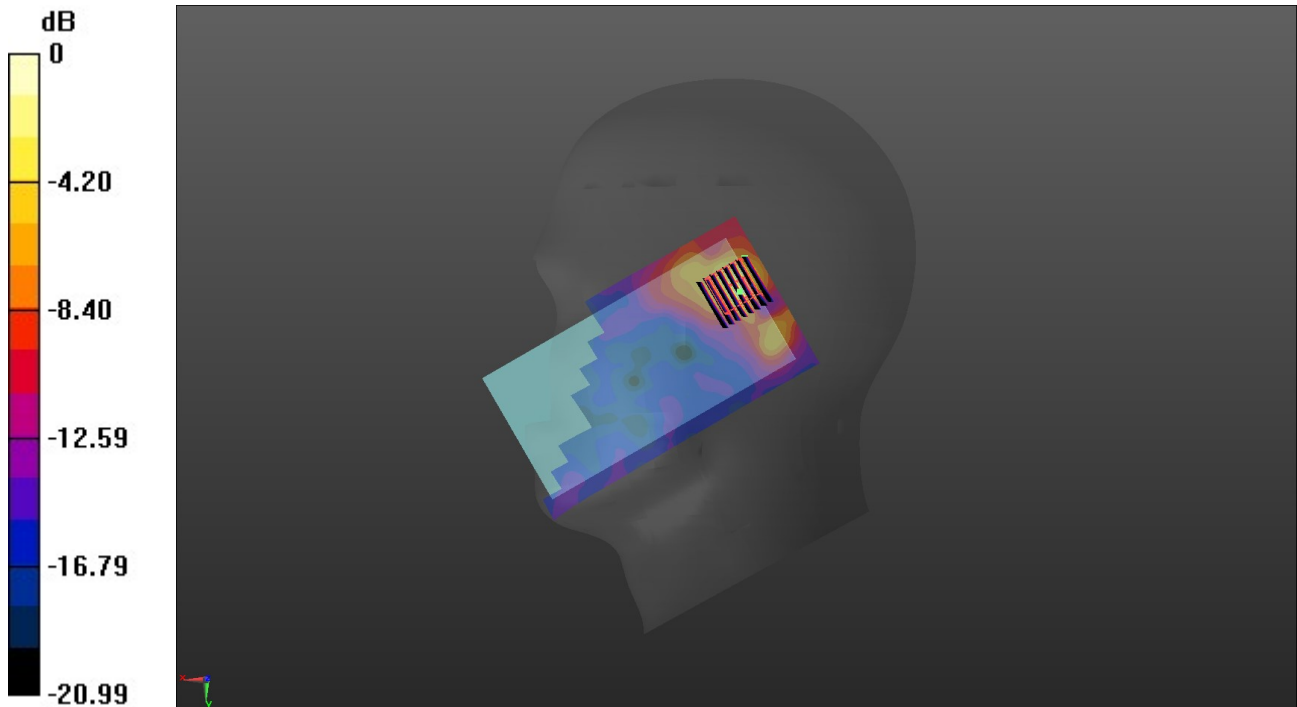
**Right Touch Cheek/CH 48/Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 8.439 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 1.13 W/kg

**SAR(1 g) = 0.262 W/kg; SAR(10 g) = 0.081 W/kg**

Maximum value of SAR (measured) = 0.682 W/kg



0 dB = 0.682 W/kg = -1.66 dBW/kg

**WiFi 5G U-NII-2A-L-Head**

Communication System: UID 0, Generic WIFI (0); Frequency: 5270 MHz;Duty Cycle: 1:1

Medium parameters used:  $f = 5270$  MHz;  $\sigma = 4.527$  S/m;  $\epsilon_r = 34.597$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

Ambient Temperature:22.4°C;Liquid Temperature:22.2°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(5.65, 5.65, 5.65) @ 5270 MHz; Calibrated: 4/9/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/23/2021
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Right Touch Cheek/CH 5270/Area Scan (91x171x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.647 W/kg

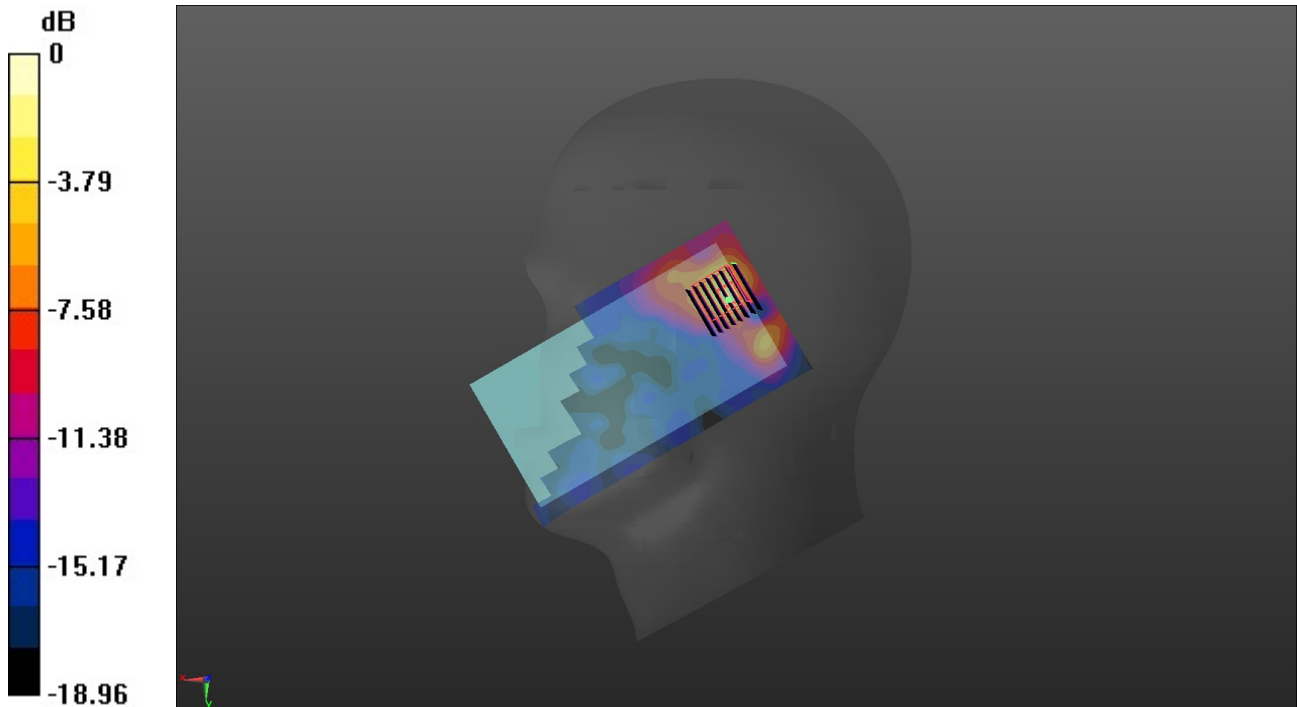
**Right Touch Cheek/CH 5270/Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 7.161 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 1.20 W/kg

**SAR(1 g) = 0.277 W/kg; SAR(10 g) = 0.085 W/kg**

Maximum value of SAR (measured) = 0.744 W/kg



0 dB = 0.744 W/kg = -1.28 dBW/kg

**WiFi 5G U-NII-2C-H-Head**

Communication System: UID 0, Generic WIFI (0); Frequency: 5690 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 5690$  MHz;  $\sigma = 5.027$  S/m;  $\epsilon_r = 33.996$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

Ambient Temperature:22.3°C;Liquid Temperature:22.1°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(4.95, 4.95, 4.95) @ 5690 MHz; Calibrated: 4/9/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/23/2021
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Right Touch Cheek/CH 138/Area Scan (91x171x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.740 W/kg

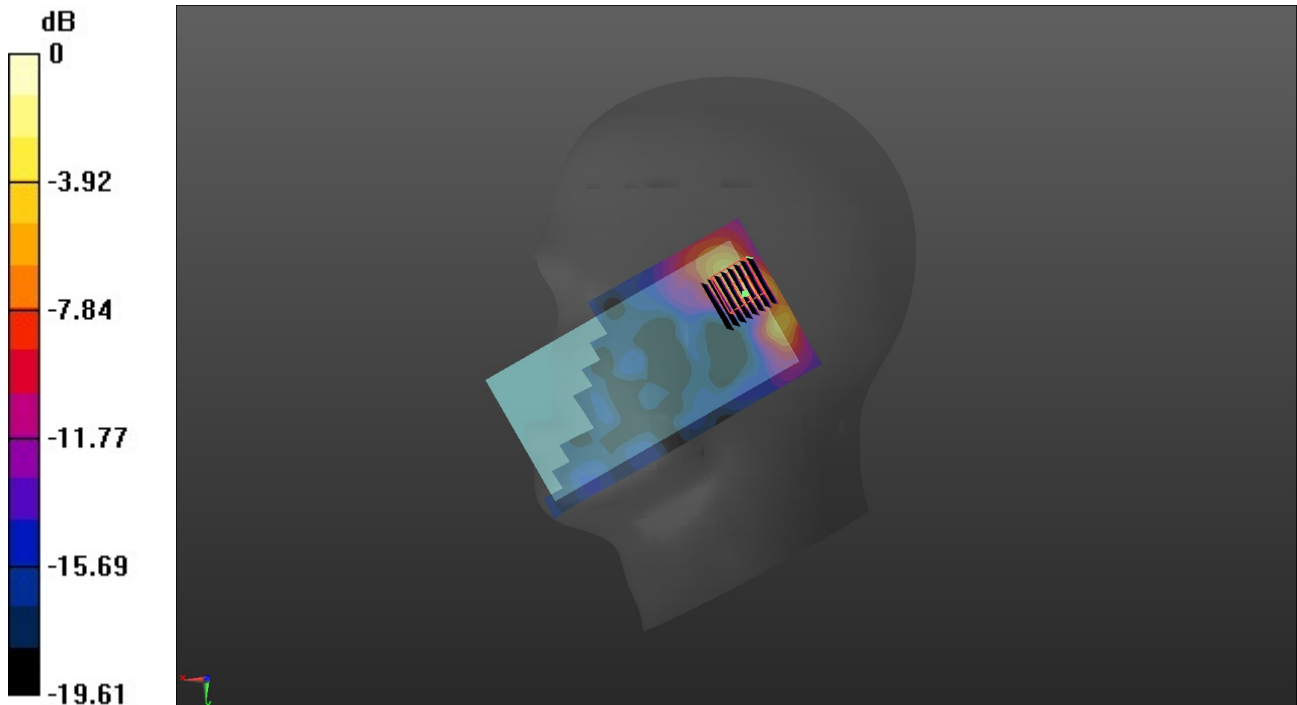
**Right Touch Cheek/CH 138/Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 6.865 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 1.75 W/kg

**SAR(1 g) = 0.381 W/kg; SAR(10 g) = 0.106 W/kg**

Maximum value of SAR (measured) = 1.09 W/kg



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



**WiFi 5G U-NII-3-H-Head**

Communication System: UID 0, Generic WIFI (0); Frequency: 5775 MHz;Duty Cycle: 1:1

Medium parameters used:  $f = 5775$  MHz;  $\sigma = 4.976$  S/m;  $\epsilon_r = 33.667$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

Ambient Temperature:22.2°C;Liquid Temperature:22.0°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(4.86, 4.86, 4.86) @ 5775 MHz; Calibrated: 4/9/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/23/2021
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Right Touch Cheek/CH 155/Area Scan (91x171x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.481 W/kg

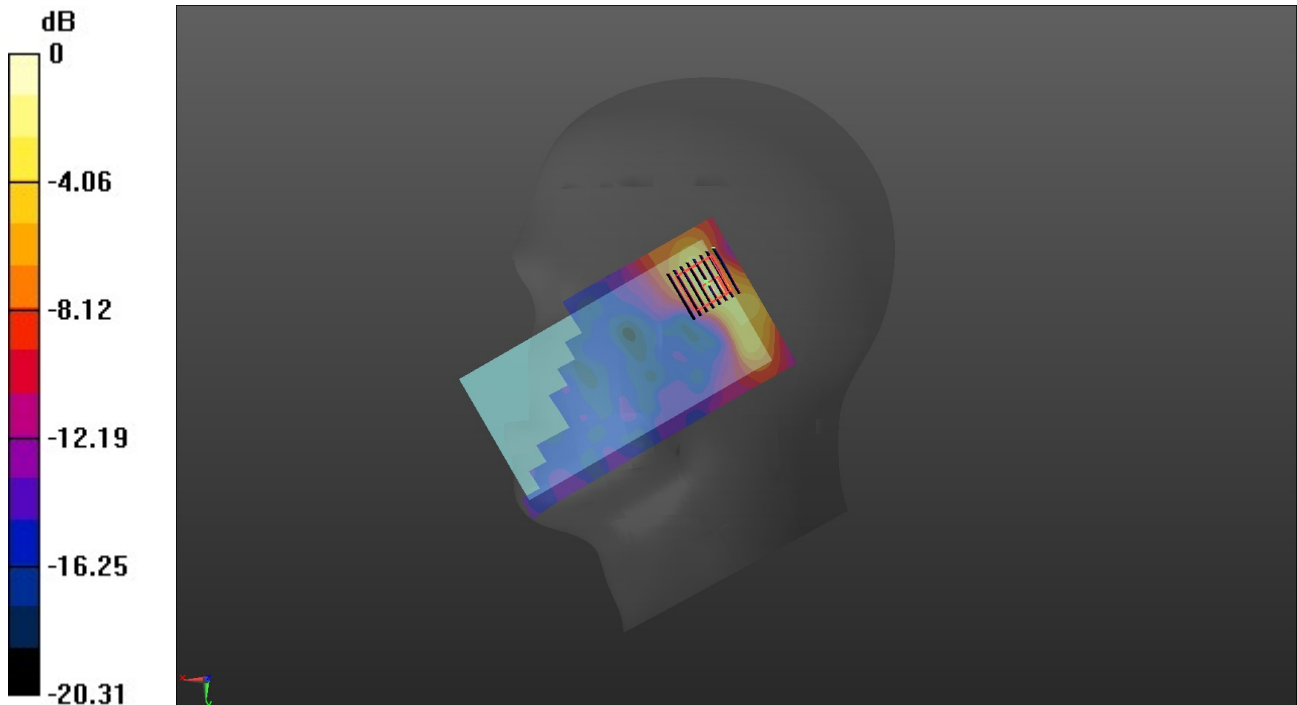
**Right Touch Cheek/CH 155/Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 5.408 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 1.14 W/kg

**SAR(1 g) = 0.251 W/kg; SAR(10 g) = 0.074 W/kg**

Maximum value of SAR (measured) = 0.679 W/kg



**WiFi 2.4G-Body**

Communication System: UID 0, Generic WIFI (0); Frequency: 2412 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 2412$  MHz;  $\sigma = 1.727$  S/m;  $\epsilon_r = 40.752$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Ambient Temperature:22.6°C;Liquid Temperature:22.4°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(7.97, 7.97, 7.97) @ 2412 MHz; Calibrated: 4/9/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/23/2021
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Rear/CH 1/Area Scan (81x141x1):** Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.400 W/kg

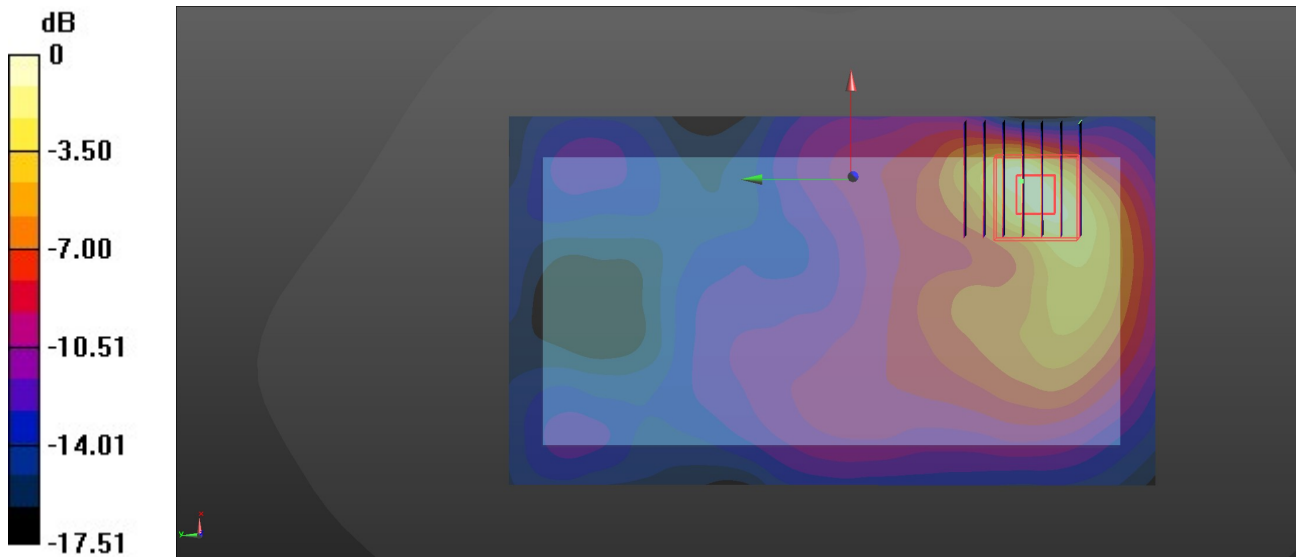
**Rear/CH 1/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.183 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.546 W/kg

**SAR(1 g) = 0.239 W/kg; SAR(10 g) = 0.103 W/kg**

Maximum value of SAR (measured) = 0.413 W/kg



0 dB = 0.413 W/kg = -3.84 dBW/kg

**WiFi 5G U-NII-1-H-Body worn**

Communication System: UID 0, Generic WIFI (0); Frequency: 5240 MHz;Duty Cycle: 1:1

Medium parameters used:  $f = 5240$  MHz;  $\sigma = 4.518$  S/m;  $\epsilon_r = 35.08$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Ambient Temperature:22.3°C;Liquid Temperature:23.1°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(5.65, 5.65, 5.65) @ 5240 MHz; Calibrated: 4/9/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/23/2021
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Rear/CH 48/Area Scan (91x171x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 2.06 W/kg

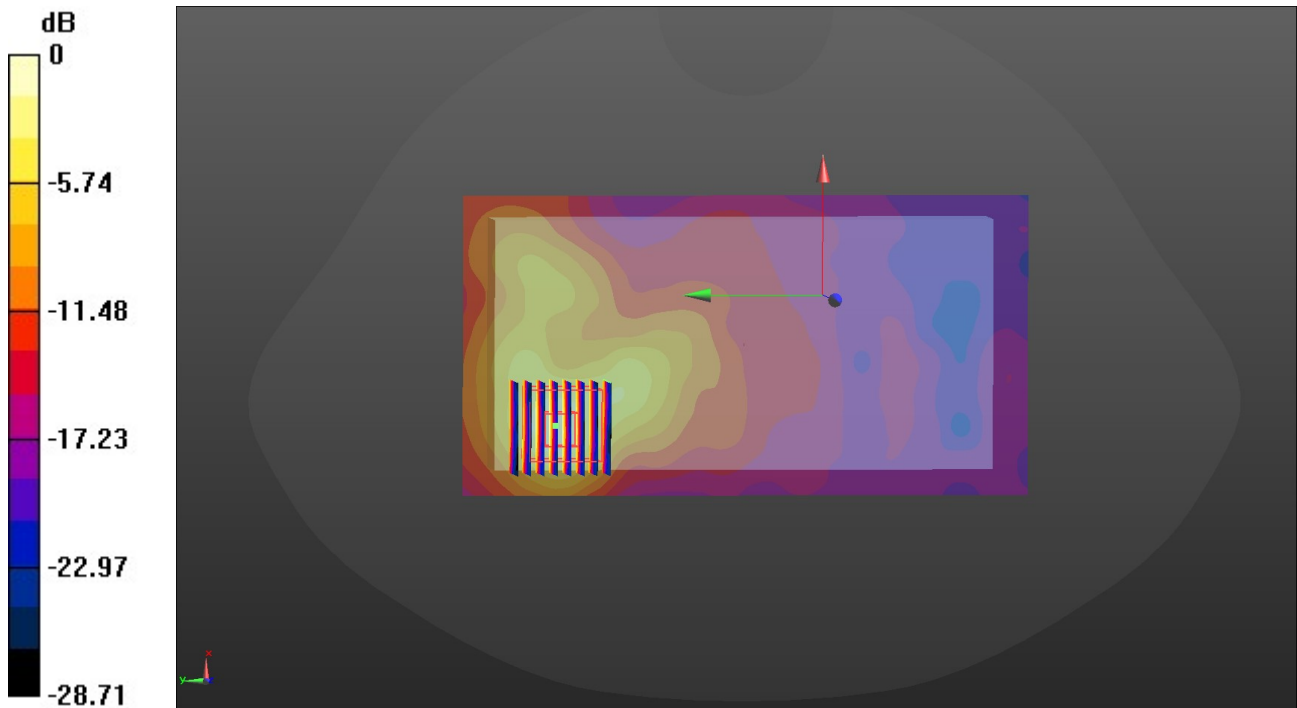
**Rear/CH 48/Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 4.498 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 3.20 W/kg

**SAR(1 g) = 0.890 W/kg; SAR(10 g) = 0.320 W/kg**

Maximum value of SAR (measured) = 2.01 W/kg



0 dB = 2.01 W/kg = 3.03 dBW/kg

**WiFi 5G U-NII-2A-L-Body worn**

Communication System: UID 0, Generic WIFI (0); Frequency: 5270 MHz;Duty Cycle: 1:1

Medium parameters used:  $f = 5270$  MHz;  $\sigma = 4.527$  S/m;  $\epsilon_r = 34.597$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Ambient Temperature:22.4°C;Liquid Temperature:22.2°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(5.65, 5.65, 5.65) @ 5270 MHz; Calibrated: 4/9/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/23/2021
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Rear/CH 54/Area Scan (91x171x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 2.31 W/kg

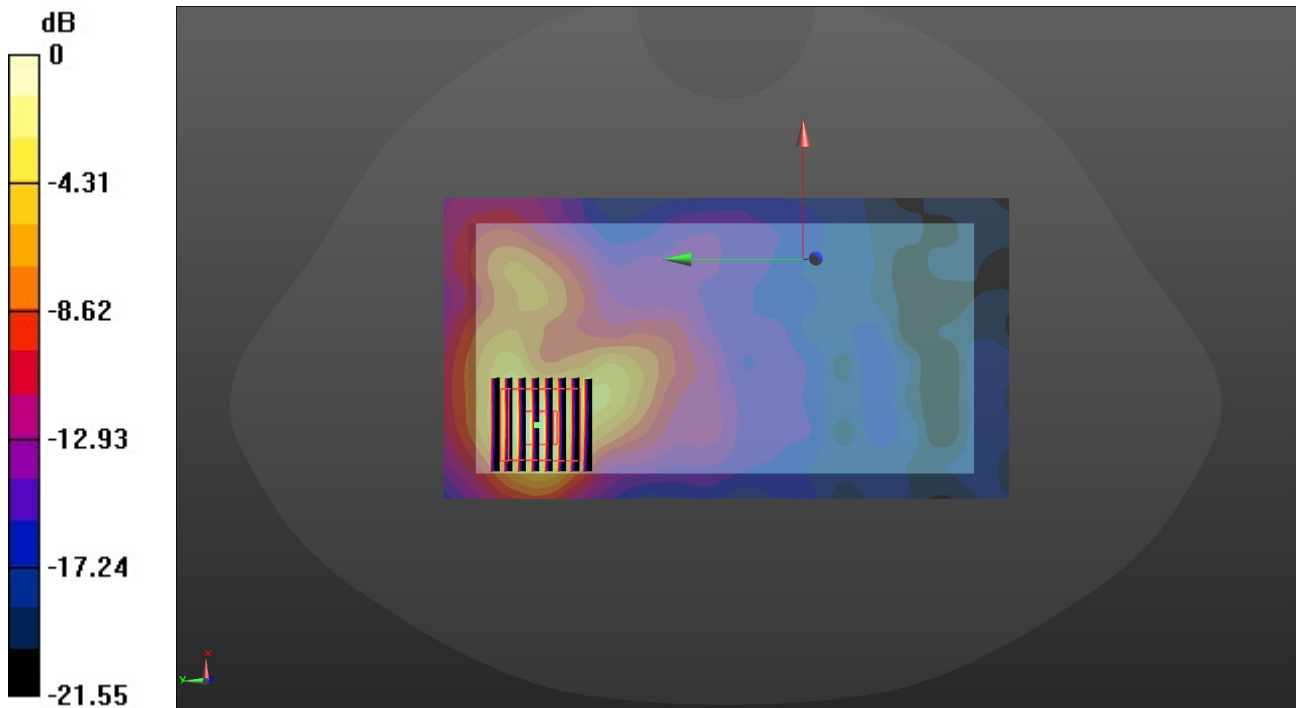
**Rear/CH 54/Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 4.221 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 3.55 W/kg

**SAR(1 g) = 0.988 W/kg; SAR(10 g) = 0.353 W/kg**

Maximum value of SAR (measured) = 2.19 W/kg



0 dB = 2.19 W/kg = 3.40 dBW/kg