

FCC SAR REPORT

Report No.: JYTSZ-R14-2500133

Applicant: Shenzhen Troy Tenda Technology Co., Ltd

Address of Applicant: Room 918, 9th Floor, Building C, Tianhui Building, Fukang Community, Longhua Street, Longhua District, Shenzhen China

Equipment Under Test (EUT)

Product Name: Wireless Digital Full-duplex Real-time Two-way Voice Intercom System

Model No.: UT-001F, UT-001P

Trade mark Unitalk

FCC ID: 2BQFX-UT001

Applicable standards: FCC 47 CFR Part 2.1093

Date of Test: 25 Jun., 2025

Test Result: Maximum Reported 1-g SAR (W/kg)
Body: 0.216

Project by: Eric Wang

Date: 01 Aug., 2025

Reviewed by: Project Engineer

Date: 01 Aug., 2025

Approved by: Janet Wei

Date: 01 Aug., 2025

Manager

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

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2 Version

Version No.	Date	Description
00	01 Aug., 2025	Original

3 Contents

1	COVER PAGE.....	1
2	VERSION.....	2
3	CONTENTS.....	3
4	SAR RESULTS SUMMARY.....	4
5	GENERAL INFORMATION.....	5
5.1	CLIENT INFORMATION.....	5
5.2	GENERAL DESCRIPTION OF EUT.....	5
5.3	MAXIMUM RF OUTPUT POWER.....	6
5.4	ENVIRONMENT OF TEST SITE	6
5.5	TEST LOCATION	6
6	INTRODUCTION.....	7
6.1	INTRODUCTION	7
6.2	SAR DEFINITION	7
7	RF EXPOSURE LIMITS	8
7.1	UNCONTROLLED ENVIRONMENT.....	8
7.2	CONTROLLED ENVIRONMENT	8
7.3	RF EXPOSURE LIMITS.....	8
8	SAR MEASUREMENT SYSTEM.....	9
8.1	E-FIELD PROBE.....	10
8.2	DATA ACQUISITION ELECTRONICS (DAE).....	10
8.3	ROBOT	11
8.4	MEASUREMENT SERVER	11
8.5	LIGHT BEAM UNIT.....	11
8.6	PHANTOM	12
8.7	DEVICE HOLDER.....	13
8.8	DATA STORAGE AND EVALUATION	14
8.9	TEST EQUIPMENT LIST	16
9	TISSUE SIMULATING LIQUIDS	17
10	SAR SYSTEM VERIFICATION.....	19
11	EUT TESTING POSITION.....	21
11.1	BODY WORN ACCESSORY CONFIGURATIONS	21
12	MEASUREMENT PROCEDURES	22
12.1	Spatial Peak SAR Evaluation	22
12.2	POWER REFERENCE MEASUREMENT.....	23
12.3	AREA & ZOOM SCAN PROCEDURES.....	23
12.4	VOLUME SCAN PROCEDURES	24
12.5	SAR AVERAGED METHODS	24
12.6	POWER DRIFT MONITORING	24
13	CONDUCTED RF OUTPUT POWER.....	25
13.1	DECT CONDUCTED POWER.....	25
14	EXPOSURE POSITIONS CONSIDERATION	26
14.1	EUT ANTENNA LOCATIONS.....	26
15	SAR TEST RESULTS SUMMARY	27
15.1	STANDALONE BODY SAR	27
15.2	MULTI-BAND SIMULTANEOUS TRANSMISSION CONSIDERATIONS.....	28
15.3	MEASUREMENT UNCERTAINTY.....	29
15.4	MEASUREMENT CONCLUSION	30
16	REFERENCE.....	31
	APPENDIX A: EUT PHOTOS	32
	APPENDIX B: TEST SETUP PHOTOS	35
	APPENDIX C: PLOTS OF SAR SYSTEM CHECK	38
	APPENDIX D: PLOTS OF SAR TEST DATA	40

4 SAR Results Summary

The maximum results of Specific Absorption Rate (SAR) found during test as below:

<Highest Reported standalone SAR Summary>

Exposure Position	Frequency Band	Reported 1-g SAR (W/kg)	Equipment Class	Highest Reported 1-g SAR (W/kg)
Body (0 mm Gap)	DECT	0.216	PUT	0.216

Note:

1. The highest simultaneous transmission is scalar summation of Reported standalone SAR per FCC KDB 690783 D01 v01r03, and scalar SAR summation of all possible simultaneous transmission scenarios are < 1.6W/kg.
2. This device is 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 C95.1-2005, and had been tested in accordance with the measurement methods and procedures specified in IEEE Std. 1528-2013.

5 General Information

5.1 Client Information

Applicant:	Shenzhen Troy Tenda Technology Co., Ltd
Address of Applicant:	Room 918, 9th Floor, Building C, Tianhui Building, Fukang Community, Longhua Street, Longhua District, Shenzhen China
Manufacturer:	Shenzhen Troy Tenda Technology Co., Ltd
Address of Manufacturer:	Room 918, 9th Floor, Building C, Tianhui Building, Fukang Community, Longhua Street, Longhua District, Shenzhen China
Factory:	Shenzhen Troy Tenda Technology Co., Ltd
Address of Factory:	Room 918, 9th Floor, Building C, Tianhui Building, Fukang Community, Longhua Street, Longhua District, Shenzhen China

5.2 General Description of EUT

Product Name:	Wireless Digital Full-duplex Real-time Two-way Voice Intercom System	
Model No.:	UT-001F, UT-001P	
Category of device	Portable device	
Operation Frequency:	Tx/Rx:1921.536 MHz~1928.448MHz	
Modulation technology:	DECT:GFSK	
Antenna Type:	Internal Antenna	
Antenna Gain:	ANT 1: 3.95 dBi (declare by Applicant) ANT 2: 3.95 dBi (declare by Applicant)	
Dimensions (L*W*H):	170 mm (L)× 140 mm (W)× 33 mm (H)	
Accessories information:	Adapter: Model: SK01T2-0500100U Input: AC100-240V, 50/60Hz, 0.2A Output: DC 5.0V, 1000mA	Battery: Rechargeable Li-ion Battery DC3.7V, 2000mAh for UT-001F Rechargeable Li-ion Battery DC3.7V, 1200mAh for UT-001P
Remark:	The model No. UT-001F is for FP, the model No. UT-001P is for PP.	

5.3 Maximum RF Output Power

FP:

Mode	Average Power (dBm)
DECT 1900	
DECT	17.98

PP:

Mode	Average Power (dBm)
DECT 1900	
DECT	16.25

5.4 Environment of Test Site

Temperature:	18°C ~25 °C
Humidity:	35%~75% RH
Atmospheric Pressure:	1010 mbar

5.5 Test Location

JianYan Testing Group Shenzhen Co., Ltd.
No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community,Xinqiao Street,
Bao'an District, Shenzhen, Guangdong,People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYFee@lets.com, Website: <http://jyt.lets.com>

6 Introduction

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:

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

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

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = C \left(\frac{\delta T}{\delta t} \right)$$

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength. However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7 RF Exposure Limits

7.1 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.

7.2 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. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

7.3 RF Exposure Limits

SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT <i>General Population</i> (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT <i>Occupational</i> (W/kg) or (mW/g)
SPATIAL PEAK SAR Brain	1.6	8.0
SPATIAL AVERAGE SAR Whole Body	0.08	0.4
SPATIAL PEAK SAR Hands, Feet, Ankles, Wrists	4.0	20

Note:

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

8 SAR Measurement System

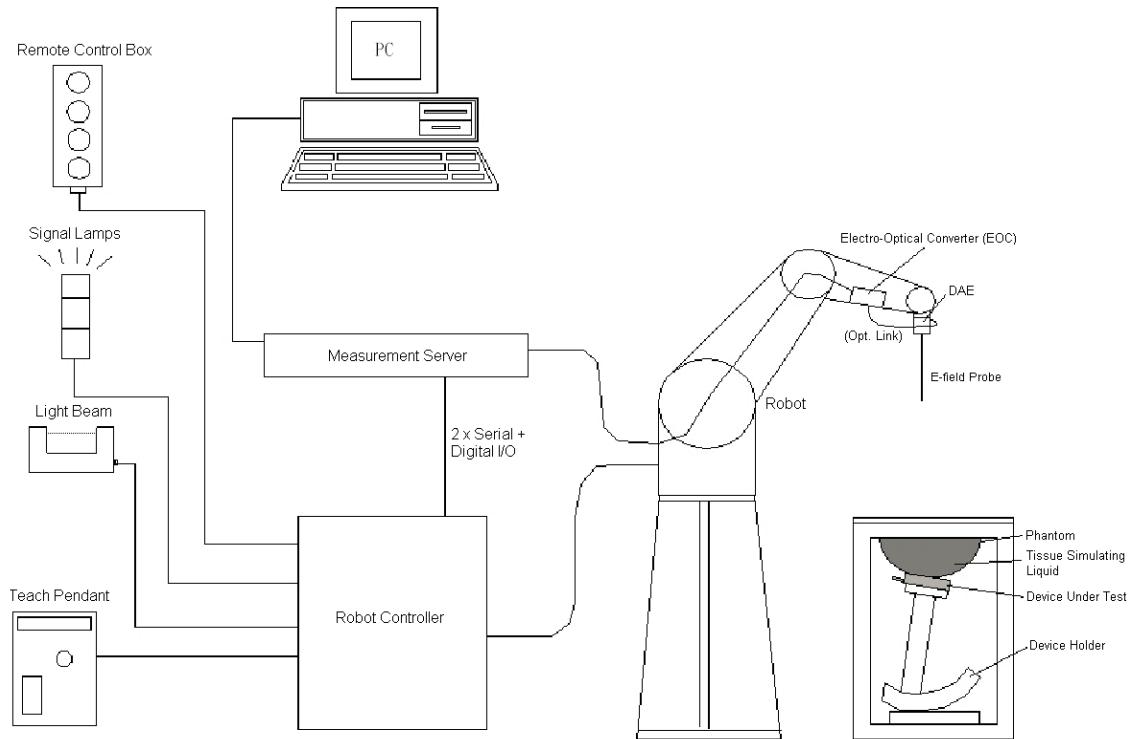


Fig. 8.1 SPEAG DASY System Configurations

The DASY system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic (DAE) attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter (EOC) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows XP
- DASY software
- Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

Component details are described in the following sub-sections.

8.1 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.

➤ E-Field Probe Specification <EX3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency Directivity	10 MHz to 6 GHz; Linearity: ± 0.2 dB ± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 μ W/g to 100 mW/g; Linearity: ± 0.2 dB (noise: typically $< 1 \mu$ W/g)	
Dimensions	Overall length: 330 mm (Tip: 20mm) Tip diameter: 2.5 mm (Body: 12mm) Typical distance from probe tip to dipole centers: 1 mm	

Fig. 8.2 Photo of E-Field Probe

➤ E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than $\pm 10\%$. The spherical isotropy shall be evaluated and within ± 0.25 dB. The sensitivity parameters (Norm X, Norm Y and Norm Z), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix E of this report.

8.2 Data Acquisition Electronics (DAE)

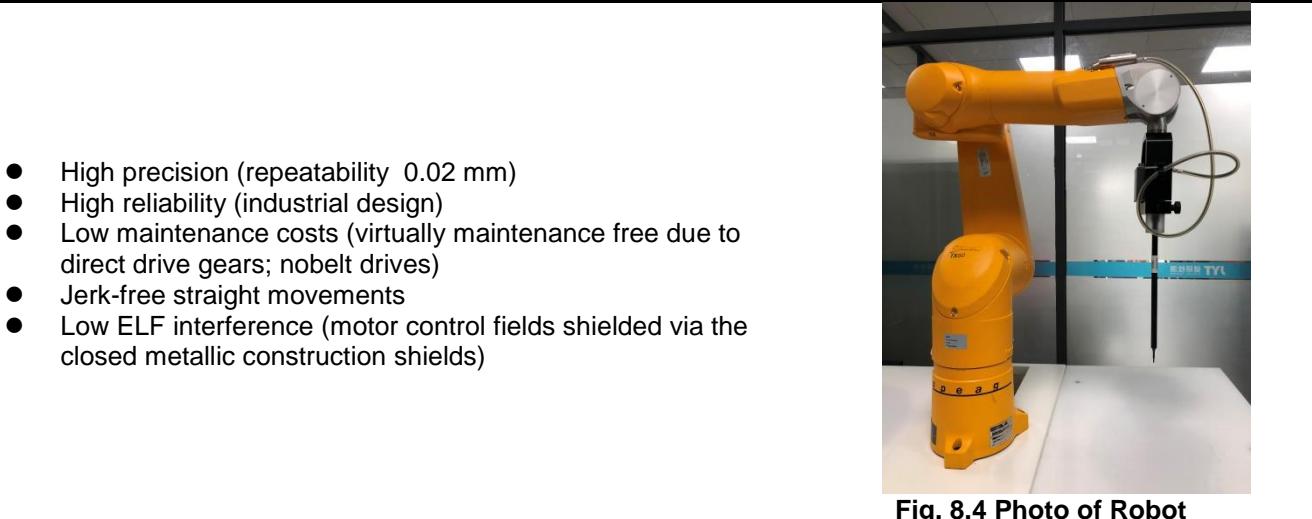
The Data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an 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 M Ω ; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



Fig. 8.3 Photo of DAE

8.3 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX60L) type from St?ubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from St?ubli is used. The St?ubli robot series have many features that are important for our application:



- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; nobelt drives)
- Jerk-free straight movements
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

8.4 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY 5: 400MHz, Intel Celeron), chip-disk (DASY5: 128 MB), RAM (DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.



8.5 Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.

The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.



8.6 Phantom

<SAM Twin Phantom>

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



Fig. 8.7 Photo of SAM Twin 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.

<ELI4 Phantom >

The ELI4 phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30MHz to 6 GHz. ELI4 is fully compatible with the latest draft of the standard IEC 62209-2 and all known tissue simulating liquids.

ELI4 has been optimized regarding its performance and can be integrated into a SPEAG standard phantom table. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom can be used with the following tissue simulating liquids:

- Water-sugar based liquids can be left permanently in the phantom. Always cover the liquid if the system is not in use; otherwise the parameters will change due to water evaporation.
- DGBE based liquids should be used with care. As DGBE is a softener for most plastics, the liquid should be taken out of the phantom and the phantom should be dried when the system is not in use (desirable at least once a week).
- Do not use other organic solvents without previously testing the phantom resistiveness



Fig.8.8 Photo of ELI4 Phantom

8.7 Device Holder

<Device Holder for SAM Twin Phantom>

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of $\pm 20\%$. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (ERP).

Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-low POM material having the following dielectric parameters: relative permittivity $\epsilon = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.



Fig. 8.9 Photo of Device Holder

8.8 Data storage and Evaluation

➤ Data Storage

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The post-processing software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verifications of the complete software setup even after the measurement and allows correction of erroneous parameter settings. For example, if a measurement has been performed with an incorrect crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be reevaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type (e.g., [V/m], [mW/g]). Some of these units are not available in certain situations or give meaningless results, e.g., a SAR-output in a non-lose media, will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

➤ Data Evaluation

The DASY post-processing software (SEMCAD) 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	Norm _i , a _{i0} , a _{i1} , a _{i2}
	- Conversion	ConvF _i
	- Diode compression point	dcp _i
Device Parameters:	- Frequency	f
	- Crest	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 DASY components. In the direct measuring mode of the multi-meter 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:

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

With

V_i = compensated signal of channel i, ($i = x, y, z$)

U_i = input signal of channel i, ($i = x, y, z$)

cf = crest factor of exciting field (DASY parameter)

dcp_i = diode compression point (DASY parameter)

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

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

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

With

V_i = compensated signal of channel i, ($i = x, y, z$)

$Norm_i$ = sensor sensitivity of channel i, ($i = x, y, z$), $\mu\text{V}/(\text{V}/\text{m})^2$

$ConvF$ = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency (GHz)

E_i = electric field strength of channel i in V/m

H_i = 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.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}$$

With

SAR = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m

σ = conductivity in (mho/m) or ($\text{Siemens}/\text{m}$)

ρ = equipment tissue density in g/cm^3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

8.9 Test Equipment List

Manufacturer	Equipment Description	Model	Management Number	Cal. Information	
				Last Cal.	Due Date
SPEAG	1900MHz System Validation Kit	D1900V2	WXJ023-2	05.15.2025	05.14.2028
SPEAG	Data Acquisition Electronics	DAE4	WXJ021-1	04.10.2025	04.09.2026
SPEAG	Dosimetric E-Field Probe	EX3DV4	WXJ022	04.11.2025	04.10.2026
SPEAG	DASY 52 Measurement Software	DASY 52	Version 52.10.4.1527	N.C.R	N.C.R
SPEAG	DASY 52 File Conversion Software	SEMCAD X	Version 14.6.14 (7501)	N.C.R	N.C.R
SPEAG	Robot Controller	CS8Cspeag-TX60	WXG021-1	N.C.R	N.C.R
SPEAG	Phantom	Twin SAM Phantom	WXG021-4	N.C.R	N.C.R
SPEAG	Phantom	ELI V5.0	WXG021-5	N.C.R	N.C.R
SPEAG	Phone Positioner	N/A	WXG021-6	N.C.R	N.C.R
St?ubli	Robot	TX60Lspeag	WXG021-3	N.C.R	N.C.R
R&S	Universal Radio Communication Tester	CMD60	WXJ010-1	03.17/2025	03.16.2026
KEYSIGHT	Network Analyzer	E5071C	WXJ091	12.16.2024	12.15.2025
KEYSIGHT	EPM Series Power Meter	N1914A	WXJ075	05.08.2025	05.07.2026
KEYSIGHT	E-Series Power Sensor	E9300H	WXJ075-1	05.08.2025	05.07.2026
KEYSIGHT	E-Series Power Sensor	E9300H	WXJ075-2	05.08.2025	05.07.2026
KEYSIGHT	Signal Generator	N5173B	WXJ006-3	09.09.2024	09.08.2025
SPEAG	Dielectric Assessment Kit	3.5 Probe	WXJ022-2	02.17.2025	02.16.2026
deli	Temperature and Humidity Indicator	8840	WXJ073-11	12.18.2024	12.17.2025
ZH	thermometer	DTM-180A	WXJ101-1	09.13.2024	09.12.2025
Huber Suhner	RF Cable	SUCOFLEX	WXG008-13	See Note 3	
Huber Suhner	RF Cable	SUCOFLEX	WXG008-14	See Note 3	
Huber Suhner	RF Cable	SUCOFLEX	WXG008-15	See Note 3	
Weinschel	Attenuator	23-3-34	WXG008-16	See Note 3	
Anritsu	Directional Coupler	MP654A	WXG008-17	See Note 3	
SPEAG	DAK Measurement Software	DAK	Version: DAK 3.5	N.C.R	
TXC	Broadband Amplifier	BBA018000	WXG008-11	See Note 4	

Note:

1. The calibration certificate of DASY can be referred to appendix C of this report.
2. Referring to KDB 865664 D01v01r03, 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 Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
4. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1 W input power according to the ratio of 1 W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it.
5. Attenuator insertion loss is calibrated by the network Analyzer, which the calibration is valid, before system check.
6. N.C.R means No Calibration Requirement.

9 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. 9.1, for body SAR testing, the liquid height from the center of the flat phantom to liquid top surface is larger than 15 cm, which is shown in Fig. 9.2.

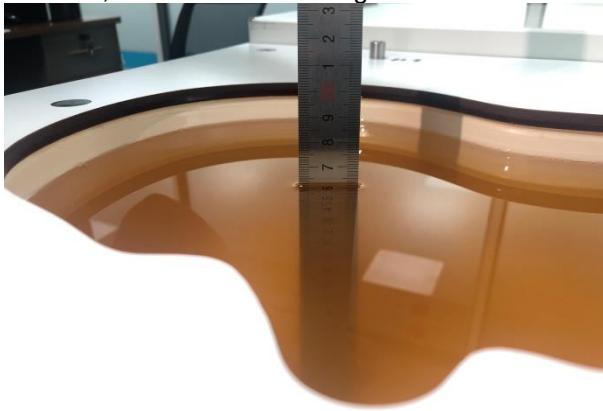


Fig. 9.3 Photo of Liquid Height for Head SAR (depth>15cm)

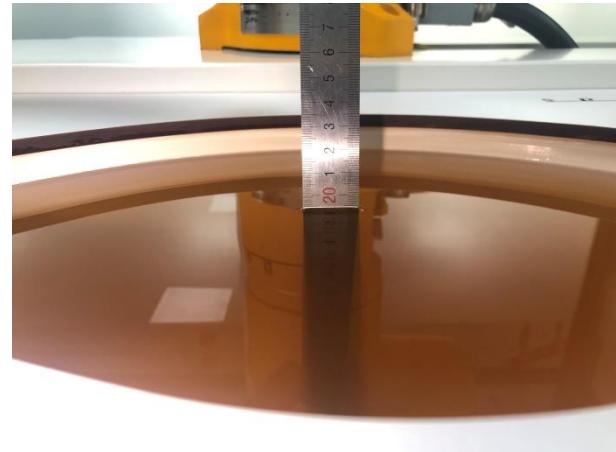


Fig. 9.4 Photo of Liquid Height for Body SAR (depth>15cm)

The relative permittivity and conductivity of the tissue material should be within $\pm 5\%$ of the values given in the table below recommended by the FCC OET 65 supplement C and RSS 102 Issue 5.

Target Frequency (MHz)	ϵ_r	σ (S/m)
150	52.3	0.76
300	45.3	0.87
450	43.5	0.87
835	41.5	0.90
900	41.5	0.97
915	41.5	0.98
1450	40.5	1.20
1610	40.3	1.29
1800-2000	40.0	1.40
2450	39.2	1.80
3000	38.5	2.40
5800	35.3	5.27

(ϵ_r = relative permittivity, σ = conductivity and $\rho = 1000 \text{ kg/m}^3$)

The dielectric parameters of liquids were verified prior to the SAR evaluation using a Speag Dielectric Probe Kit and an Agilent Network Analyzer.

The following table shows the measuring results for simulating liquid.

Frequency (MHz)	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (εr)	Conductivity Target(σ)	Permittivity Target(εr)	Delta (σ)%	Delta (εr)%	Limit (%)	Date (mm/dd/yy)
1900	22.1	1.44	39.09	1.40	40.00	2.86	-2.27	±5	6/25/2025

10 SAR System Verification

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

➤ Purpose of System Performance check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

➤ System Setup

In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:

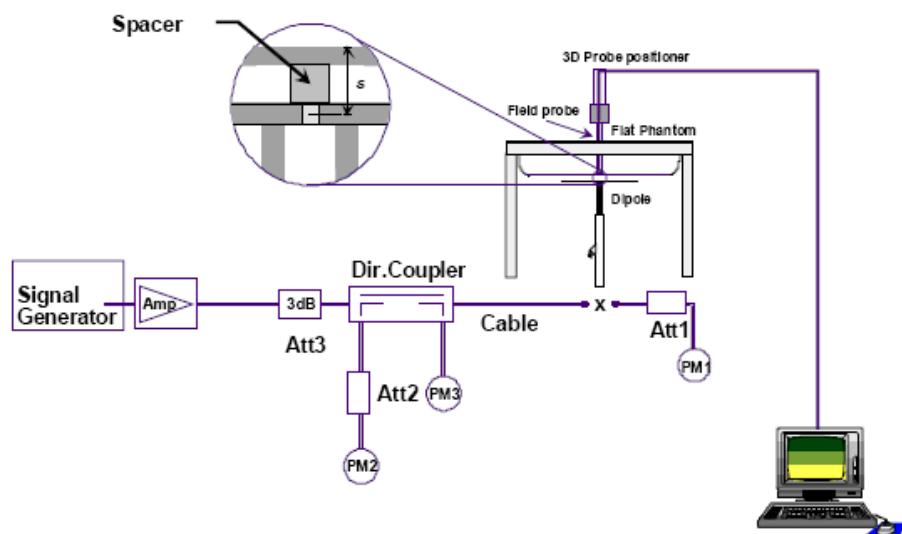


Fig.10.1 System Verification Setup Diagram



Fig.10.2 Photo of Dipole setup

➤ System Verification Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10%. The table as below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix C of this report.

Date (mm/dd/yy)	Frequency (MHz)	Power fed onto dipole (mW)	Measured 1g SAR (W/kg)	Normalized to 1W 1g SAR (W/kg)	1W Target 1g SAR (W/kg)	Deviation (%)
6/25/2025	1900	40	1.560	39.00	39.7	-1.76

11 EUT Testing Position

This EUT was tested in six different positions. They are Front/Back/Left Side/Right Side/Top Side/Bottom Side of the EUT with phantom 0mm gap, as illustrated below, please refer to Appendix B for the test setup photos.

11.1 Body Worn Accessory Configurations

- To position the device parallel to the phantom surface with either keypad up or down.
- To adjust the device parallel to the flat phantom.
- To adjust the distance between the device surface and the flat phantom to 1.0 cm or holster surface and the flat phantom to 0 cm.

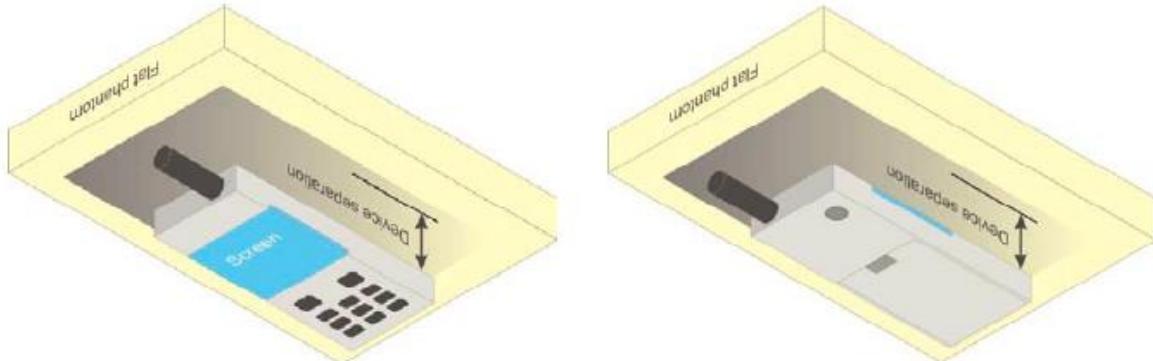


Fig.11.5 Illustration for Body Worn Position

12 Measurement Procedures

The measurement procedures are as below:

<Conducted power measurement>

- For WWAN power measurement, use base station simulator to configure EUT WWAN transition in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- Read the WWAN RF power level from the base station simulator.
- 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.
- Connect EUT RF port through RF cable to the power meter or spectrum analyzer, and measure WLAN/BT output power.

<Conducted power measurement>

- 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.
- Place the EUT in positions as Appendix B demonstrates.
- Set scan area, grid size and other setting on the DASY software.
- Measure SAR results for the highest power channel on each testing position.
- Find out the largest SAR result on these testing positions of each band.
- Measure SAR results for other channels in worst SAR testing position if the Reported SAR or 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:

- Power reference measurement
- Area scan
- Zoom scan
- Power drift measurement

12.1 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 10 g 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 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

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

12.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurement 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.

12.3 Area & Zoom Scan Procedures

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

		≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		5 ± 1 mm	$\frac{5}{4} \cdot 5 \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location		$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
		≤ 2 GHz: ≤ 15 mm $2 - 3$ GHz: ≤ 12 mm	$3 - 4$ GHz: ≤ 12 mm $4 - 6$ GHz: ≤ 10 mm
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}		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.	
Maximum zoom scan spatial resolution: Δx_{Zoom} , Δy_{Zoom}		≤ 2 GHz: ≤ 8 mm $2 - 3$ GHz: ≤ 5 mm*	$3 - 4$ GHz: ≤ 5 mm* $4 - 6$ GHz: ≤ 4 mm*
	uniform grid: $\Delta z_{\text{Zoom}}(n)$	≤ 5 mm	$3 - 4$ GHz: ≤ 4 mm $4 - 5$ GHz: ≤ 3 mm $5 - 6$ GHz: ≤ 2 mm
Maximum zoom scan spatial resolution, normal to phantom surface	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface $\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	≤ 4 mm $\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$
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 reported SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

12.4 Volume Scan Procedures

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

12.5 SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1g and 10g cubes, the extrapolation distance should not be larger than 5 mm.

12.6 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.

13 Conducted RF Output Power

13.1 DECT Conducted Power

FP:

Band: DECT	Burst Average Power (dBm)			Frame-Average Power(dBm)		
Channel	4	2	0	4	2	0
Frequency (MHz)	1921.536	1924.992	1928.448	1921.536	1924.992	1928.448
DECT	17.77	17.88	17.98	6.98	7.09	7.19

Remark:

The frame-averaged power is linearly reported the maximum burst averaged power over 12 time slots. The calculated method are shown as below:

The duty cycle "x" is 1/12.

Based on the calculation formula:

Frame-averaged power = Burst averaged power + 10 log (x)

So, Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot) – 10.79

PP:

Band: DECT	Burst Average Power (dBm)			Frame-Average Power(dBm)		
Channel	4	2	0	4	2	0
Frequency (MHz)	1921.536	1924.992	1928.448	1921.536	1924.992	1928.448
DECT	16.25	16.13	16.00	5.46	5.34	5.21

Remark:

The frame-averaged power is linearly reported the maximum burst averaged power over 12 time slots. The calculated method are shown as below:

The duty cycle "x" is 1/12.

Based on the calculation formula:

Frame-averaged power = Burst averaged power + 10 log (x)

So, Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot) – 10.79

Note:

1. For Body worn SAR testing, DECT Voice mode should be evaluated, therefore the EUT was set in DECT 1900 Voice mode.
2. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
3. The EUT do not support DTM and VoIP function.
4. Applying the subtest setup in Table C.11.1.3 of 3GPP TS 34.121-1

14 Exposure Positions Consideration

14.1 EUT Antenna Locations

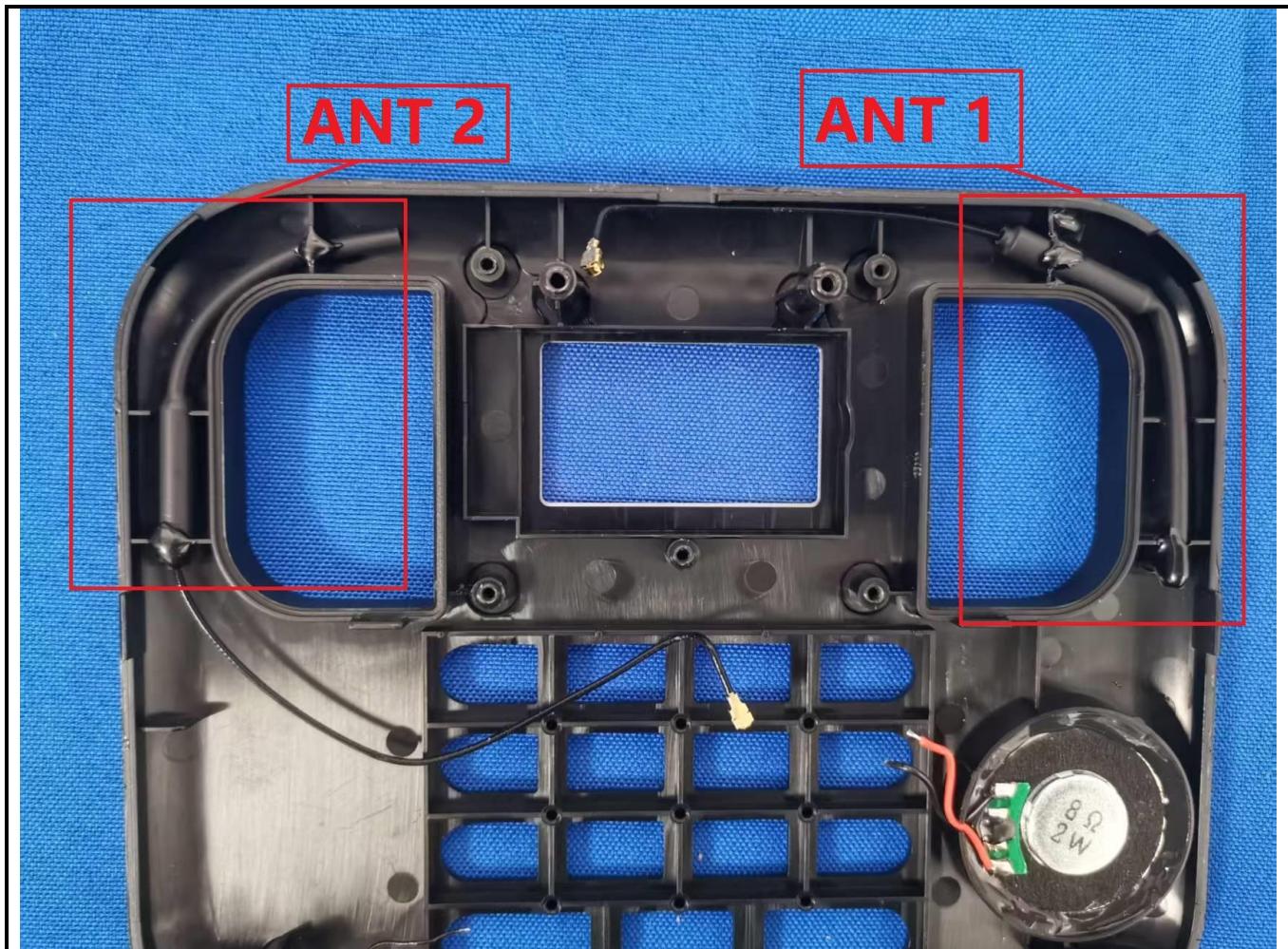


Fig.14.1 EUT Antenna Locations

Note: This antenna diagram is only used as a reference for the distance from the antenna to each edge. For the specific shape of the antenna, please refer to the physical photo.

15 SAR Test Results Summary

15.1 Standalone Body SAR

➤ DECT(FP) Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
1	DECT/FP	Front	0	1928.45	17.98	0.05	18.0	0.097	1.005	0.098
	DECT/FP	Back	0	1928.45	17.98	0.04	18.0	0.017	1.005	0.017
	DECT/FP	Left	0	1928.45	17.98	0.07	18.0	0.052	1.005	0.052
	DECT/FP	Right	0	1928.45	17.98	0.09	18.0	0.056	1.005	0.056
	DECT/FP	Top	0	1928.45	17.98	0.05	18.0	0.012	1.005	0.012
	DECT/FP	Bottom	0	1928.45	17.98	0.02	18.0	<0.001*	1.005	<0.001*
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1g					

➤ DECT(PP) Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	DECT/PP	Front	4	1921.54	16.25	0.00	16.5	0.158	1.059	0.167
	DECT/PP	Back	4	1921.54	16.25	0.00	16.5	0.014	1.059	0.014
2	DECT/PP	Left	4	1921.54	16.25	0.08	16.5	0.204	1.059	0.216
	DECT/PP	Right	4	1921.54	16.25	-0.06	16.5	0.087	1.059	0.092
	DECT/PP	Top	4	1921.54	16.25	-0.06	16.5	0.011	1.059	0.012
	DECT/PP	Bottom	4	1921.54	16.25	-0.08	16.5	<0.001*	1.059	<0.001*
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1g					

Note:

1. Body SAR testing was performed at 0mm separation, and this distance is determined by the handset manufacturer that there will be body-worn accessories that users may acquire at the time of equipment certification, to enable users to purchase aftermarket body-worn accessories with the required minimum separation.
2. Per KDB 648474 D04v01r03, when the *Reported* SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
3. Per KDB 447498 D01v06, for each exposure position, if the highest output channel *Reported* SAR ≤ 0.8 W/kg, other channels SAR testing is not necessary.
4. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8 W/kg.
5. According to KDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.
6. ANT 1 and ANT 2 are the same antennas, can be switched. ANT 1 and ANT 2 have both been tested and only reflect the worst case in the report.
7. Highlight part of test data means repeated test.

15.2 Multi-Band Simultaneous Transmission Considerations

ANT 1 and ANT 2 cannot transmitters at the same time. This device does not contain transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is not required.

15.3 Measurement Uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std. 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

15.4 Measurement Conclusion

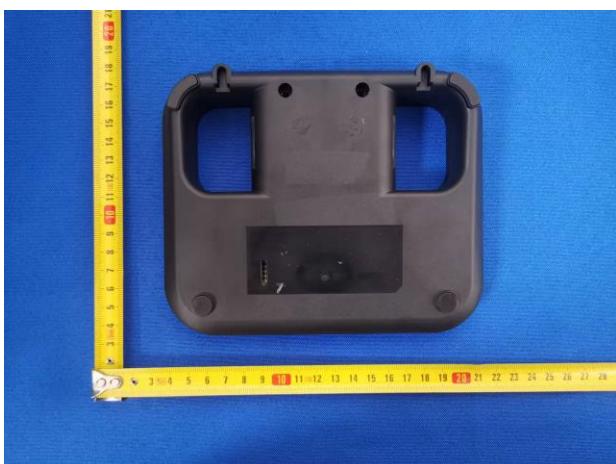
The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Industry Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested. Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

16 Reference

- [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 DASY52 System Handbook
- [5]. FCC KDB 447498 D01 v06, "RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES", October 2015
- [6]. FCC KDB 865664 D01 v01r04, "SAR MEASUREMENT REQUIREMENTS FOR 100 MHz TO 6 GHz", August 2015

Appendix A: EUT Photos

FP:



PP:



Appendix B: Test Setup Photos

FP:

Body



Front side (0mm)



Back side(0mm)



Left side(0mm)



Right side(0mm)



Top side(0mm)



Bottom side(0mm)

PP:

Body



Front side (0mm)



Back side(0mm)



Left side(0mm)



Right side(0mm)



Top side(0mm)



Bottom side(0mm)

Appendix C: Plots of SAR System Check

Test Laboratory: JYTSZ

Date: 2025/6/25

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN:5d175

Communication System: UID 0, CW (0); Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.443$ S/m; $\epsilon_r = 39.093$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.13, 8.13, 8.13) @ 1900 MHz; Calibrated: 2025/4/11
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 2025/4/10
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

System Performance Check at Frequency 1900 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Area Scan (41x71x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.50 W/kg

System Performance Check at Frequency 1900 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 41.55 V/m; Power Drift = 0.08 dB

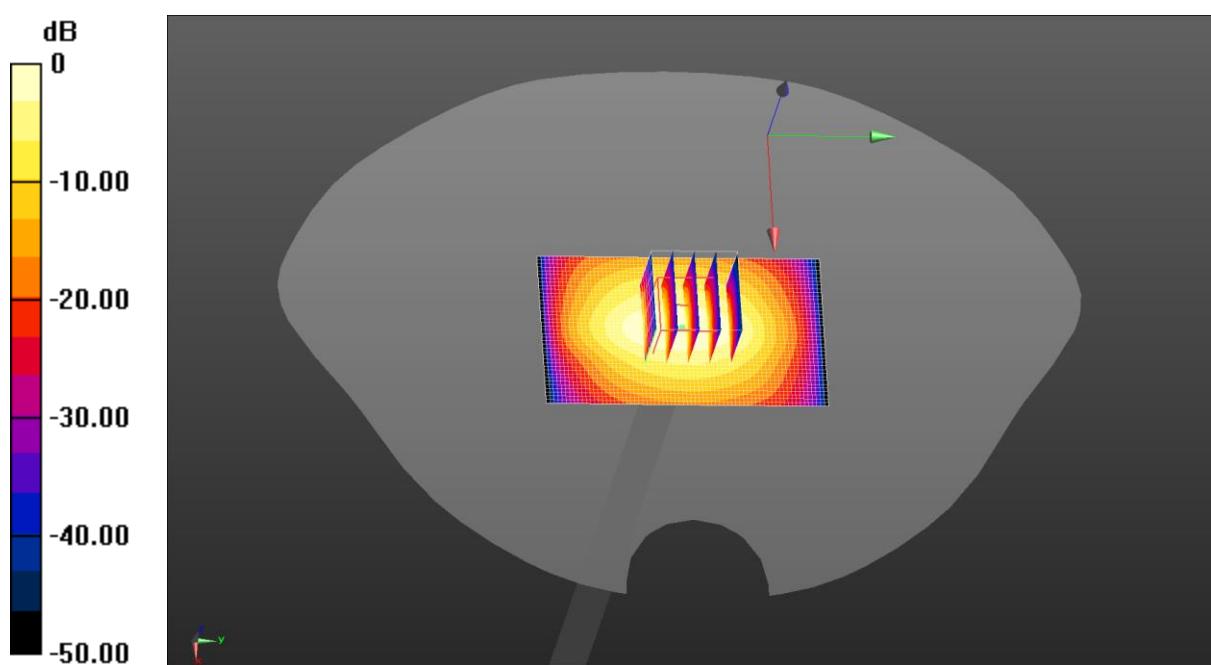
Peak SAR (extrapolated) = 2.85 W/kg

SAR(1 g) = 1.56 W/kg; SAR(10 g) = 0.823 W/kg

Smallest distance from peaks to all points 3 dB below = 9.6 mm

Ratio of SAR at M2 to SAR at M1 = 55%

Maximum value of SAR (measured) = 2.37 W/kg



$$0 \text{ dB} = 2.50 \text{ W/kg} = 3.98 \text{ dBW/kg}$$

Appendix D: Plots of SAR Test Data

Test Laboratory: JYTSZ

Date: 2025/6/25

DUT: Wireless Digital Full-duplex Real-time Two-way Voice Intercom System; Type: UT-001F (FP); Serial: 2#

Communication System: UID 0, DECT (0); Frequency: 1928.45 MHz; Duty Cycle: 1:12.0005
Medium parameters used (interpolated): $f = 1928.45$ MHz; $\sigma = 1.39$ S/m; $\epsilon_r = 39.083$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.13, 8.13, 8.13) @ 1928.45 MHz; Calibrated: 2025/4/11
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 2025/4/10
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

DECT Body Front/High Channel/Area Scan (51x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.0498 W/kg

DECT Body Front/High Channel/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.711 V/m; Power Drift = 0.05 dB

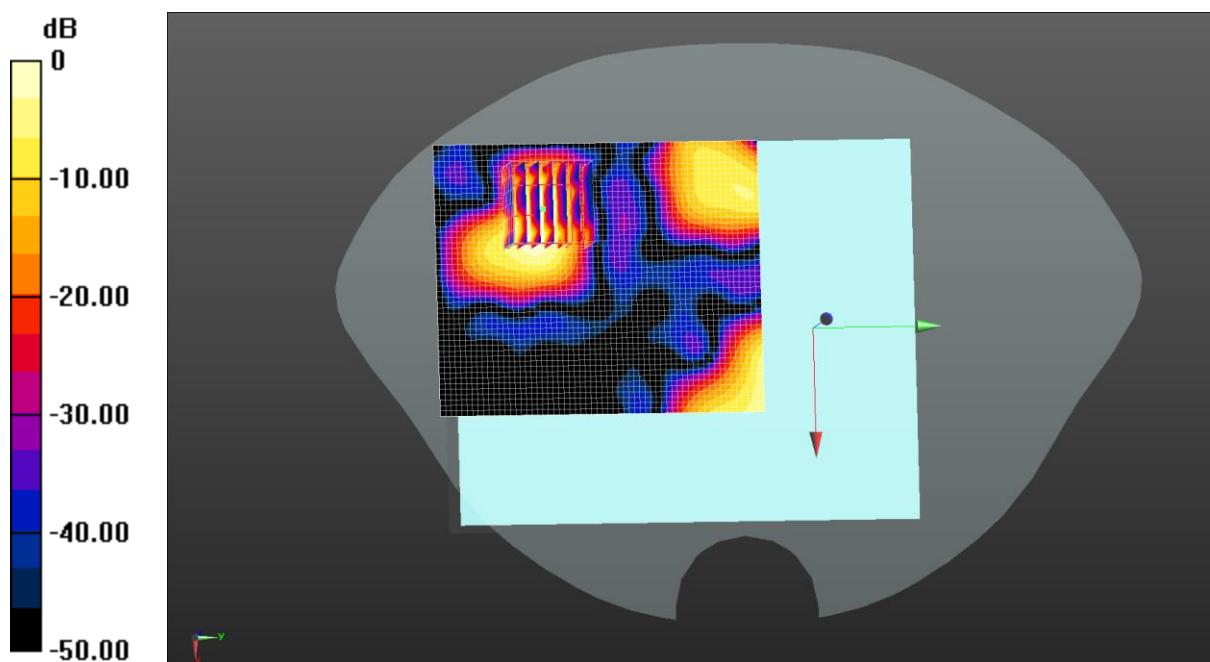
Peak SAR (extrapolated) = 0.647 W/kg

SAR(1 g) = 0.097 W/kg; SAR(10 g) = 0.033 W/kg

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

Ratio of SAR at M2 to SAR at M1 = 54.9%

Maximum value of SAR (measured) = 0.220 W/kg



$$0 \text{ dB} = 0.0498 \text{ W/kg} = -13.03 \text{ dBW/kg}$$

Test Laboratory: JYTSZ

Date: 2025/6/25

DUT: Wireless Digital Full-duplex Real-time Two-way Voice Intercom System; Type: UT-001P (PP); Serial: 2#

Communication System: UID 0, DECT (0); Frequency: 1921.54 MHz; Duty Cycle: 1:12.0005
Medium parameters used (interpolated): $f = 1921.54$ MHz; $\sigma = 1.439$ S/m; $\epsilon_r = 39.087$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.13, 8.13, 8.13) @ 1921.54 MHz; Calibrated: 2025/4/11
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 2025/4/10
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

DECT Body Left/Low Channel/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.101 W/kg

DECT Body Left/Low Channel/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.8510 V/m; Power Drift = 0.08 dB

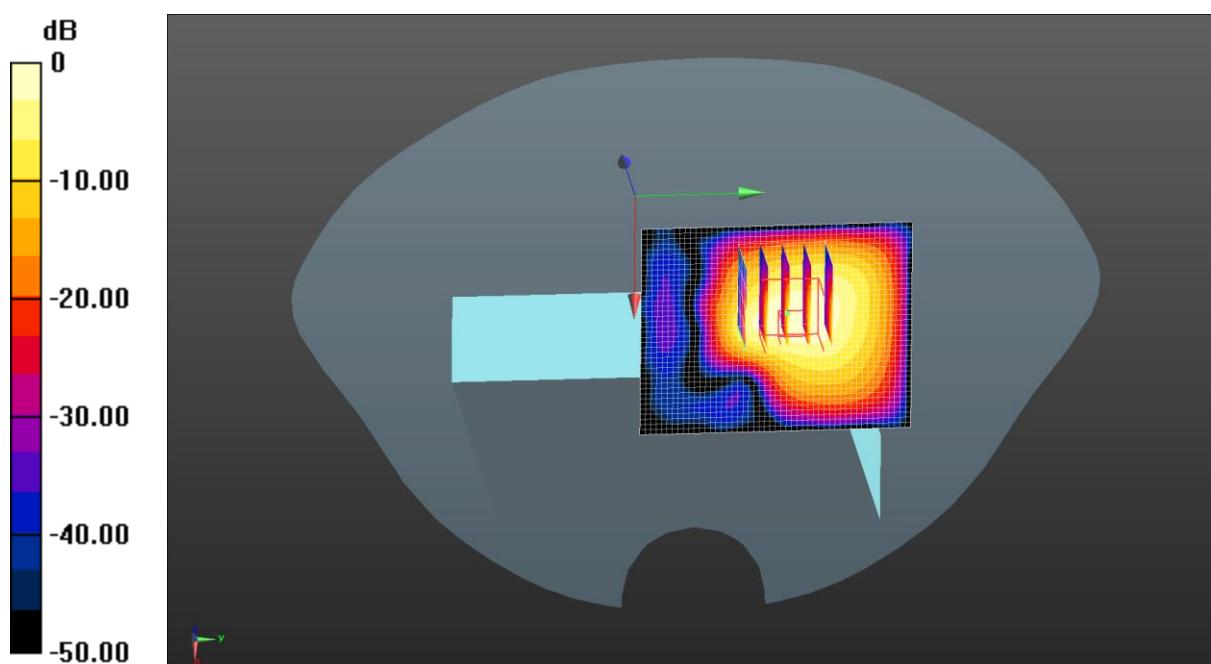
Peak SAR (extrapolated) = 0.402 W/kg

SAR(1 g) = 0.204 W/kg; SAR(10 g) = 0.099 W/kg

Smallest distance from peaks to all points 3 dB below = 9.3 mm

Ratio of SAR at M2 to SAR at M1 = 50.9%

Maximum value of SAR (measured) = 0.334 W/kg



$$0 \text{ dB} = 0.101 \text{ W/kg} = -9.94 \text{ dBW/kg}$$

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