TEST REPORT

APPLICANT	:	Great Talent Technology Limited
PRODUCT NAME	:	Android device
MODEL NAME	:	U2-PLUS-TE-VR
BRAND NAME	:	UMX
FCC ID	:	2ALZM-U2-PLUS-TE-VR
STANDARD(S)	:	47CFR 2.1093 IEEE 1528-2013
RECEIPT DATE	:	2019-07-04
TEST DATE	:	2019-07-24 to 2019-07-27
ISSUE DATE	:	2019-07-30

Edited by: Gan Yueming (Rapporteur)

Approved by: Peng Huarui (Supervisor)

DIRECTORY

Change History		
Version	**Date**	**Description**
1.0	2019-07-30	Original

1 SAR Results Summary

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

<Highest Reported standalone SAR Summary>

Frequency Band		Highest SAR Summary (1g SAR (W/kg))	
		Head	Body
		Separation(0mm)	Separation (5mm)
WLAN	2.4GHz WLAN	**0.703**	0.421
	5GHz WLAN	0.512	**1.077**
2.4GHz Band	Bluetooth	N/A	0.373

Max Scaled SAR_{1g} (W/Kg):	Head	0.703 W/kg	Limit(W/kg): 1.6 W/kg
	Body	1.077 W/kg	

Highest Simultaneous Transmission 1g SAR (W/kg)	1.45 W/kg	Limit(W/kg): 1.6 W/kg

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 1528-2013.

2 Technical Information

Note: Provide by manufacturer.

2.1 Applicant and Manufacturer Information

Applicant:	Great Talent Technology Limited
Applicant Address:	RM602,T3 Software Park,Nanshan,Shenzhen,China
Manufacturer:	Great Talent Technology Limited
Manufacturer Address:	RM602,T3 Software Park,Nanshan,Shenzhen,China

2.2 Equipment Under Test (EUT) Description

EUT Name:	Android device
Hardware Version:	U2+_P0
Software Version:	U2-PLUS-TE-VR-Z96K04E00V017-user_190726185443
Frequency Bands:	WLAN: 802.11b/g/n-HT20:2412 MHz ~2462 MHz WLAN 5.2GHz: 5180 MHz ~ 5240 MHz WLAN 5.3GHz: 5260 MHz ~ 5320 MHz WLAN 5.5GHz: 5500 MHz ~ 5720 MHz WLAN 5.8GHz: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Modulation Mode:	802.11b: DSSS 802.11a/g/n HT20/HT40: OFDM 802.11ac-VHT20/VHT40/VHT80: OFDM Bluetooth: GFSK, π/4-DQPSK, 8-DPSK BLE:GFSK
Multi-slot Class:	N/A
Operation Class	Class B
Hotspot Mode:	Support
Antenna Type:	FPC Antenna
SIM cards description:	No SIM Card

Note: For a more detailed description, please refer to specification or user's manual supplied by the applicant and/or manufacturer.

2.3 Environment of Test Site

Temperature:	20 ... 25 ° C
Humidity:	30 ... 75 %
Atmospheric Pressure:	980 ... 1020 hPa

Test frequency:	WLAN; Bluetooth;
Operation mode:	Call established
Power Level:	2.4GHz WLAN power setting=11; 5GHz WLAN power setting=9; Bluetooth;

During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established.

The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the Factory. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link is used, the antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the handset.

The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the handset by at least 35 dB.

3 Introduction

3.1 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.

3.2 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:

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

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

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

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

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

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

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.

4 RF Exposure Limits

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

Type Exposure	Uncontrolled Environment Limit
Spatial Peak SAR (1g cube tissue for head and trunk)	1.60W/kg
Spatial Peak SAR (10g cube tissue for limbs)	4.00W/kg
Spatial Peak SAR (1g cube tissue for whole body)	0.08W/kg

Note:
1. This limit is according to recommendation1999/519/EC, Annex II (Basic Restrictions)
2. Occupational/Uncontrolled 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)

5 Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title
1	47 CFR§2.1093	Radio Frequency Radiation Exposure Evaluation: Portable Devices
2	IEEE 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
3	KDB 447498 D01v06	General RF Exposure Guidance
4	KDB 865664 D01v01r04	SAR Measurement 100 MHz to 6 GHz
5	KDB 865664 D02v01r02	RF Exposure Reporting
6	KDB 648474 D04v01r03	Handset SAR
7	KDB 941225 D01v03r01	3G SAR Measurement Procedures
8	KDB 941225 D07v01r02	SAR EVALUATION PROCEDURES FOR UMPC MINI-TABLET DEVICES

6 SAR Measurement System

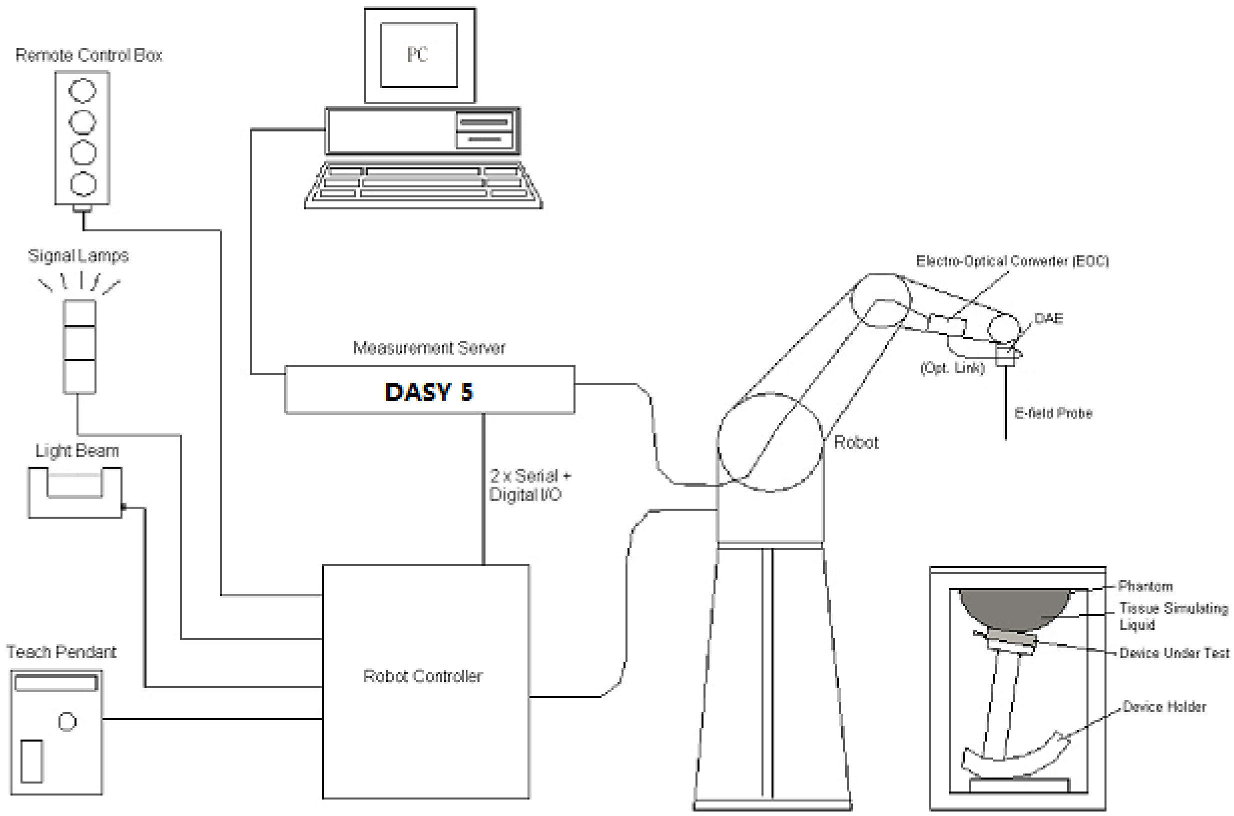


Fig.6.1 SPEAG DASY System Configurations

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 operationand 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

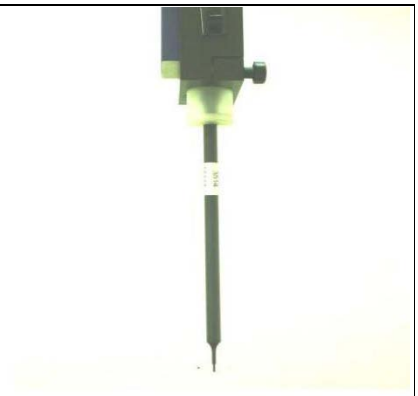
Component details are described in the following sub-sections.

6.1 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	10 MHz to 6 GHz; Linearity: ± 0.2 dB	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 µW/g to 100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

➢ **E-Field Probe Calibration**

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than ±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.

6.2 Data Acquisition Electronics (DAE)

The Data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock. The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

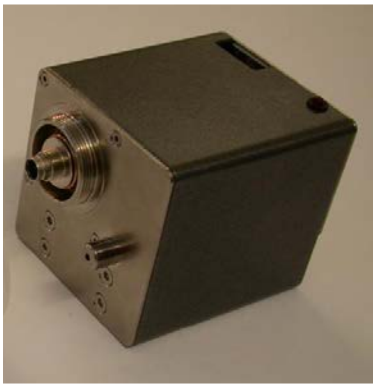


Fig. 6.2 Photo of DAE

6.3 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX60XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubliis used. The Stäublirobot series have many features that are important for our application:

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

Fig. 6.3 Photo of Robot

6.4 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.

Fig. 6.4 Photo of Server for DASY5

6.5 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 repeat ability of this process is better than0.1 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.

Fig. 6.5 Photo of Light Beam

6.6 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%) Center ear point: 6 ± 0.2 mm
Filling Volume Dimensions	Approx. 25 liters Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Head, Right Head, Flat phantom

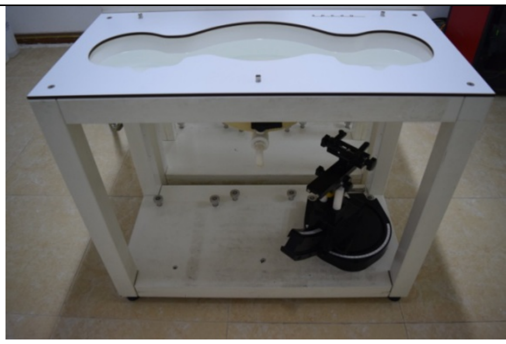


Fig. 6.6Photo of SAM Phantom

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.

6.7 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 ± 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.

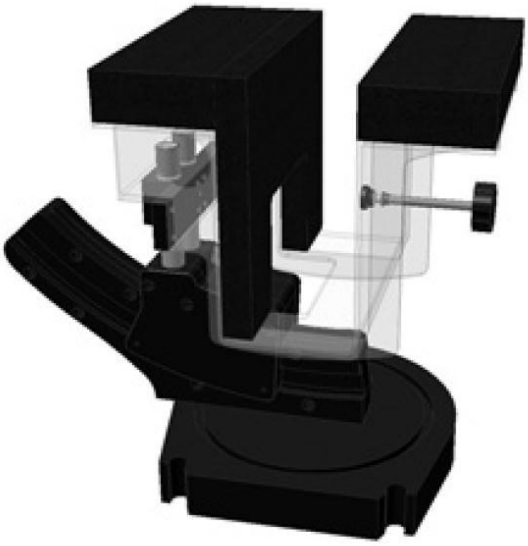
The DASY device holder is constructed of low-low POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence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

Fig. 6.7Photo of Device Holder

<Laptop Extension Kit>

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

Fig 6.8 Laptop Extension Kit



6.8 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:

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

WithV_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:

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

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

WithV_i = compensated signal of channel i, (i = x, y, z)
$Norm_i$= senor sensitivity of channel i, (i = x, y, z), µV/ (V/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
Hi = 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 (Siemens/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.

6.9 Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	2450MHz System Validation Kit	D2450V2	805	2018.10.26	2019.10.25
SPEAG	5000MHz System Validation Kit	D5GHzV2	1176	2018.11.06	2019.11.05
SPEAG	Dosimetric E-Field Probe	EX3DV4	7445	2018.09.04	2019.09.03
SPEAG	Dosimetric E-Field Probe	EX3DV4	3823	2018.11.12	2019.11.11
SPEAG	Data Acquisition Electronics	DAE4	480	2018.10.29	2019.10.28
SPEAG	Data Acquisition Electronics	DAE4	1516	2018.07.14	2019.07.13
SPEAG	Dielectric Assessment KIT	DAK-3.5	1279	2018.11.03	2019.11.02
SPEAG	SAM Twin Phantom 1	QD 000 P40 CB	TP-1471	NCR	NCR
SPEAG	SAM Twin Phantom 2	QD 000 P40 CB	TP-1464	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
R&S	Network Emulator	CMW500	124534	2018.04.17	2019.04.16
Agilent	Network Analyzer	E5071B	MY42404762	2018.04.17	2019.04.16
mini-circuits	Amplifier	ZHL-42W+	608501717	NCR	NCR
mini-circuits	Amplifier	ZVE-8G+	754401735	NCR	NCR
Agilent	Signal Generator	SMP_02	N/A	2018.04.17	2019.04.16
Agilent	Signal Generator	N5182B	MY53050509	2018.04.17	2019.04.16
Agilent	Power Senor	N8482A	MY41091706	2018.04.17	2019.04.16
Agilent	Power Meter	E4416A	MY45102093	2018.04.17	2019.04.16
Anritsu	Power Sensor	MA2411B	N/A	2018.04.17	2019.04.16
R&S	Power Meter	NRVD	101066	2018.04.17	2019.04.16
MCL	Attenuation1	351-218-010	N/A	NA	NA
Agilent	Dual Directional Coupler	778D	50422	NA	NA
THERMOMETER	Thermo meter	DC-803	N/A	2018.11.22	2019.11.21
N/A	Tissue Simulating Liquids	HSL2450-6000MHz HSL2450-6000MHz	N/A	24H	

Note:

1. The calibration certificate of DASY can be referred to appendix E of this report.
2. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
3. The dielectric probe kit was calibrated via the network analyzer, with the specified procedure (calibrated in pure water) and calibration kit (standard) short circuit, before the dielectric measurement. The specific procedure and calibration kit are provided by Speag.
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 1W input power according to the ratio of1W 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.

6.10 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. 6.11, 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. 6.12.

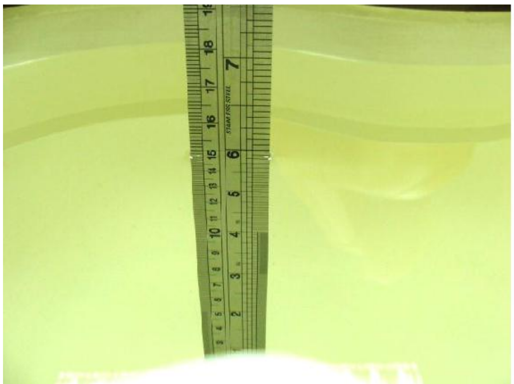


Fig 6.10 Photo of Liquid Height for Head SAR

Fig 6.11 Photo of Liquid Height for Body SAR

The following table gives the recipes for tissue simulating liquids

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0
Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.96	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

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

Target Frequency	Head		Body	
(MHz)	ε r	σ (S/m)	ε r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800-2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

(ε r = relative permittivity, σ = conductivity and ρ = 1000 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)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Conductivity Target (σ)	Delta (σ) (%)	Limit (%)	Date
2450	HSL	22.1	1.798	1.80	-0.11	±5	2019/7/26
5250	HSL	22.4	4.699	4.66	0.84	±5	2019/7/27
5600	HSL	22.4	5.097	5.07	0.53	±5	2019/7/27
5750	HSL	22.4	5.298	5.22	1.49	±5	2019/7/27
Frequency (MHz)	**Tissue Type**	**Liquid Temp. (℃)**	**Permittivity (εr)**	**Permittivity Target (εr)**	**Delta (σ) (%)**	**Limit (%)**	**Date**
2450	HSL	22.1	40.115	39.20	2.33	±5	2019/7/26
5250	HSL	22.4	36.146	36.00	0.41	±5	2019/7/27
5600	HSL	22.4	36.169	35.50	1.88	±5	2019/7/27
5750	HSL	22.4	35.258	35.35	-0.26	±5	2019/7/27

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Conductivity Target (σ)	Delta (εr) (%)	Limit (%)	Date
2450	MSL	22.5	1.898	1.95	-2.67	±5	2019/7/24
5250	MSL	22.3	5.420	5.30	2.26	±5	2019/7/25
5600	MSL	22.3	5.788	5.77	0.31	±5	2019/7/25
5750	MSL	22.3	6.058	5.94	1.99	±5	2019/7/25
Frequency (MHz)	**Tissue Type**	**Liquid Temp. (℃)**	**Permittivity (εr)**	**Permittivity Target (εr)**	**Delta (σ) (%)**	**Limit (%)**	**Date**
2450	MSL	22.5	53.560	52.70	1.63	±5	2019/7/24
5250	MSL	22.3	48.366	49.00	-1.29	±5	2019/7/25
5600	MSL	22.3	47.939	48.50	-1.16	±5	2019/7/25
5750	MSL	22.3	47.482	48.28	-1.65	±5	2019/7/25

7 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:

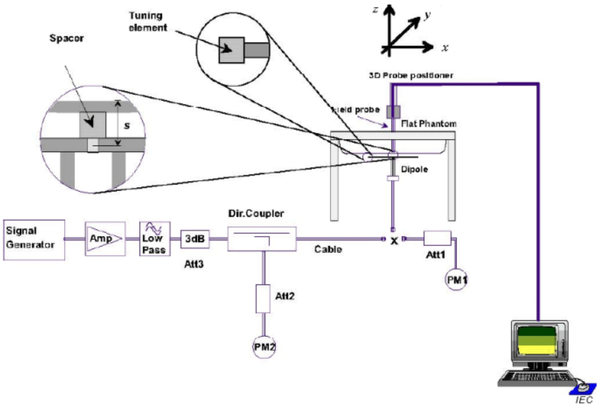


Fig.7.1 System Verification Setup Diagram

Fig.7.2 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%. Below table shows the target SAR and measured SAR after normalized to 1W input power. 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.

Dipole/S/N	Probe/S/N	DAE/S/N
D2450V2-805	3823/7445	480/1516
D5GHzV2-1176-5250	3823/7445	480/1516
D5GHzV2-1176-5600	3823/7445	480/1516
D5GHzV2-1176-5750	3823/7445	480/1516

<Test Results>

Date	Freq. (MHz)	Tissue Type	Input Power (mW)	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2019/7/26	2450	HSL	250	13.24	52.00	52.96	1.85
2019/7/27	5250	HSL	100	7.66	78.20	76.6	-2.05
2019/7/27	5600	HSL	100	7.95	80.90	79.5	-1.73
2019/7/27	5750	HSL	100	8.02	80.00	80.2	0.25

Date	Freq. (MHz)	Tissue Type	Input Power (mW)	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2019/7/26	2450	HSL	250	6.09	24.10	24.36	1.08
2019/7/27	5250	HSL	100	2.21	22.50	22.1	-1.78
2019/7/27	5600	HSL	100	2.30	23.10	23	-0.43
2019/7/27	5750	HSL	100	2.25	22.60	22.5	-0.44

Date	Freq. (MHz)	Tissue Type	Input Power (mW)	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2019/7/24	2450	MSL	250	12.30	50.50	49.2	-2.57
2019/7/25	5250	MSL	100	7.43	74.60	74.3	-0.40
2019/7/25	5600	MSL	100	7.85	77.30	78.5	1.55
2019/7/25	5750	MSL	100	7.66	75.30	76.6	1.73

Date	Freq. (MHz)	Tissue Type	Input Power (mW)	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2019/7/24	2450	MSL	250	5.77	23.50	23.08	-1.79
2019/7/25	5250	MSL	100	2.14	21.10	21.4	1.42
2019/7/25	5600	MSL	100	2.15	21.80	21.5	-1.38
2019/7/25	5750	MSL	100	2.09	21.10	20.9	-0.95

Note: System checks the specific test data please see Annex C

8 EUT Testing Position

This EUT was tested in ten different positions. They are right cheek/right tilted/left cheek/left tilted for head, Front/Back/Right Side/Top Side/Bottom Side of the EUT with phantom 10 mm gap, as illustrated below, please refer to Appendix B for the test setup photos.

8.1 Handset Reference Points

- 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, and the midpoint of the width w_b of the bottom of the handset.
- The horizontal line is perpendicular to the vertical centreline and passes the center of the acoustic output. The horizontal line is also tangential to the handset at point A.
- The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centreline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

Fig.8.1 Illustration for Front, Back and Side of SAM Phantom

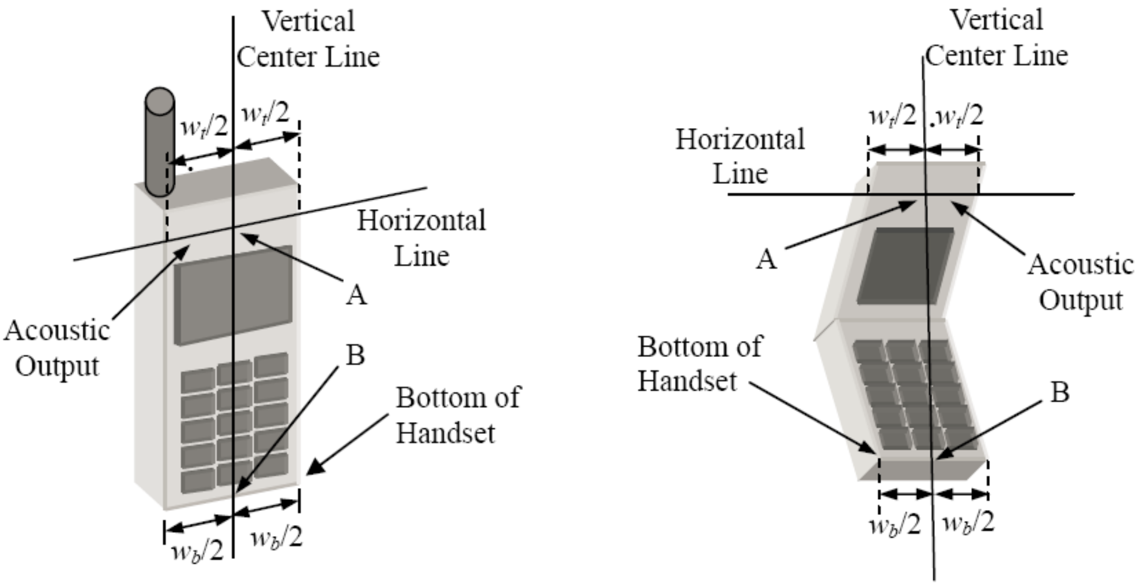


Fig. 8.2Illustration for Handset Vertical and Horizontal Reference Lines

8.2 Positioning for Cheek / Touch

- To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear and LE: Left Ear) and align the center of the ear piece with the line RE-LE.
- To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see below figure)

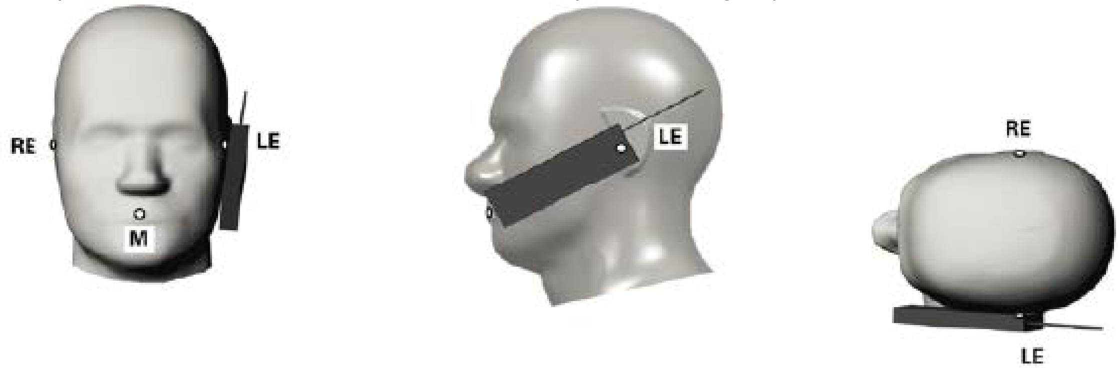


Fig. 8.3 Illustration for Cheek Position

8.3 Positioning for Ear / 15º Tilt

- To position the device in the “cheek” position described above.
- While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see figure below).

Fig.8.4 Illustration for Tilted Position

8.4 SAR Evaluations near the Mouth/Jaw Regions of the SAM Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones.
Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04v01r03. The SAR required in these regions of SAM should be measured using a flat phantom. The phone should be positioned with a separation distance of 4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR locations identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SAR location to the phone is determined by the straight line passing perpendicularly through the phantom surface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing the required separation at the peak SAR location, the top edge of the phone will be allowed to touch the phantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right while placed in this inclined position to the flat phantom.

8.5 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 10 mm or holster surface and the flat phantom to 0 mm.

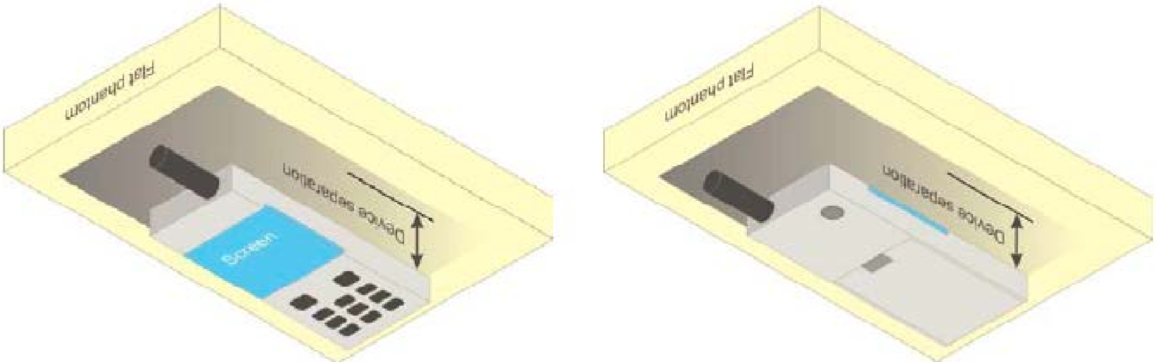


Fig.8.5 Illustration for Body Worn Position

8.6 Hotspot Mode Exposure Position Conditions

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing functions, the relevant hand and body exposure conditions are tested according to the hotspot SAR procedures in KDB 941225. A test separation distance of 10 mm is required between the phantom and all surfaces and edges with a transmitting antenna located within 25 mm from that surface or edge. When the form factor of a handset is smaller than 9 cm x 5 cm, a test separation distance of 5 mm (instead of 10 mm) is required for testing hotspot mode. When the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface).

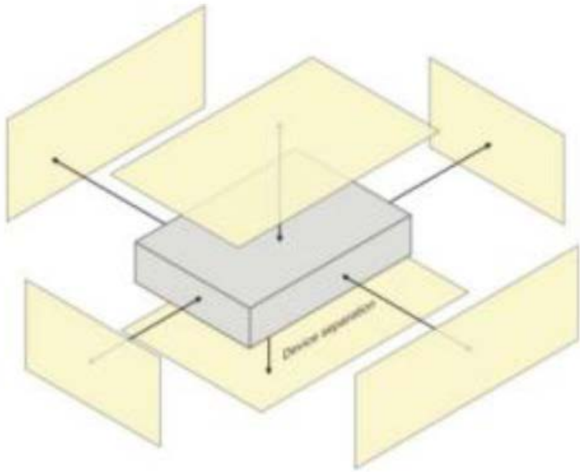


Fig 8.6 Illustration for Hotspot Position

9 Measurement Procedures

The measurement procedures are as bellows:

<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

9.1 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 form 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.

9.2 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.

9.3 Area Scan Procedures

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a10mm^2 step integral, with 1mm interpolation used to locate the peak SAR area used for zoom scan assessments.
When an Area Scan has measured all reachable points, it computes the field maxima 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 IEEE1528-2003, EN 50361 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan).

9.4 Zoom Scan Procedures

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. A density of 1000 kg/m^3 is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1g cube is 10mm, with the side length of the 10 g cube 21,5mm.The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications utilize a physical step of 5x5x7 (8mmx8mmx5mm)providing a volume of 32mm in the X & Y axis, and 30mm in the Z axis.

9.5 SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Sheppard'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.

9.6 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.

10 Conducted RF Output Power

10.1 WLAN 2.4 GHz Band Conducted Power

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	CH 1	2412	**15.18**	**15.50**	15	99.2
		CH 6	2437	15.03	15.50	15	
		CH 11	2462	15.15	15.50	15	
	802.11g 6Mbps	CH 1	2412	12.73	13.00	13	98.1
		CH 6	2437	12.43	13.00	13	
		CH 11	2462	12.59	13.00	13	
	802.11n-HT20 MCS0	CH 1	2412	10.57	11.00	11	97.96
		CH 6	2437	10.49	11.00	11	
		CH 11	2462	10.55	11.00	11	
	802.11n-HT40 MCS0	CH 3	2422	11.22	11.50	11	94.97
		CH 6	2437	10.79	11.50	11	
		CH 9	2452	11.15	11.50	11	

Note:

1. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
b/CH 11	2.462	15.50	35.48	5	11.1	3.0
g/CH 1	2.412	13.00	19.95	5	6.2	3.0

2. Base on the result of note1, RF exposure evaluation of 802.11 b and g mode is required.
3. Per KDB 248227 D01v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.
4. Per KDB 248227 D01v02r02, In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. SAR is not required for the following 2.4 GHz OFDM conditions:
   1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
   2) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
5. The output power of all data rate were pre-scan, just the worst case (the lowest data rate) of all mode were shown in report.

10.2 WLAN 2.4 GHz Band Conducted Power

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	CH 36	5180	9.35	10.00	9	98.09
		CH 44	5220	9.73	10.50	9	
		CH 48	5240	**9.94**	**10.50**	9	
	802.11n-HT20 MCS0	CH 36	5180	9.16	10.00	9	98.37
		CH 44	5220	9.51	10.00	9	
		CH 48	5240	9.47	10.00	9	
	802.11n-HT40 MCS0	CH 38	5190	8.79	9.00	8	97.97
		CH 46	5230	9.01	9.50	8	
	802.11ac-VHT20 MCS0	CH 36	5180	9.19	10.00	9	96.34
		CH 44	5220	9.72	10.00	9	
		CH 48	5240	9.71	10.00	9	
	802.11ac-VHT40 MCS0	CH 38	5190	8.85	9.50	8	96.36
		CH 46	5230	9.41	10.00	8	
	802.11ac-VHT80 MCS0	CH 42	5210	8.87	9.00	8	92.80

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	CH 52	5260	**10.35**	**11.00**	9	98.09
		CH 60	5300	10.09	11.00	9	
		CH 64	5320	10.15	11.00	9	
	802.11n-HT20 MCS0	CH 52	5260	9.57	10.00	9	98.37
		CH 60	5300	9.44	10.00	9	
		CH 64	5320	9.65	10.00	9	
	802.11n-HT40 MCS0	CH 54	5270	9.02	9.50	8	97.97
		CH 62	5310	8.61	9.00	8	
	802.11ac-VHT20 MCS0	CH 52	5260	9.77	10.00	9	96.34
		CH 60	5300	9.80	10.00	9	
		CH 64	5320	9.67	10.00	9	
	802.11ac-VHT40 MCS0	CH 54	5270	9.49	10.00	8	96.36
		CH 62	5310	9.52	10.00	8	
	802.11ac-VHT80 MCS0	CH 58	5290	9.23	10.00	8	92.80

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	CH 100	5500	9.36	10.00	9	98.09
		CH 120	5600	**10.04**	**10.50**	9	
		CH 144	5720	9.79	10.00	9	
	802.11n-HT20 MCS0	CH 100	5500	8.75	9.00	9	98.37
		CH 120	5600	9.52	10.00	9	
		CH 144	5720	9.45	10.00	9	
	802.11n-HT40 MCS0	CH 102	5510	8.20	9.00	8	97.97
		CH 126	5630	8.94	9.00	8	
	802.11ac-VHT20 MCS0	CH 142	5710	8.62	9.00	8	96.34
		CH 100	5500	8.01	9.00	9	
		CH 120	5600	9.50	10.00	9	
	802.11ac-VHT40 MCS0	CH 144	5720	8.76	9.00	9	96.36
		CH 102	5510	8.17	9.00	8	
	802.11ac-VHT80 MCS0	CH 126	5630	9.28	9.50	8	92.80

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	CH 149	5745	**10.11**	**10.50**	9	98.09
		CH 157	5785	9.77	10.50	9	
		CH 165	5825	9.82	10.50	9	
	802.11n-HT20 MCS0	CH 149	5745	9.53	10.00	9	98.37
		CH 157	5785	9.03	9.50	9	
		CH 165	5825	8.99	9.50	9	
	802.11n-HT40 MCS0	CH 151	5755	8.44	9.00	8	97.97
		CH 159	5795	8.61	9.00	8	
	802.11ac-VHT20 MCS0	CH 149	5745	8.91	9.50	9	96.34
		CH 157	5785	8.48	9.00	9	
		CH 165	5825	8.15	9.00	9	
	802.11ac-VHT40 MCS0	CH 151	5755	8.40	9.00	8	96.36
		CH 159	5795	8.12	9.00	8	
	802.11ac-VHT80 MCS0	CH 155	5775	8.60	9.00	8	92.80

A)U-NII-1 and U-NII-2A Bands

For devices that operate in only one of the U-NII-1 and U-NII-2A bands, the normally required SAR procedures for OFDM configurations are applied. For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following：

1) When the same maximum output power is specified for both bands, begin SAR measurement in U- NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, both bands are tested independently for SAR.

2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, both bands are tested independently for SAR.

3)The two U-NII bands may be aggregated to support a 160 MHz channel on channel number 50. Without additional testing, the maximum output power for this is limited to the lower of the maximum output power certified for the two bands. When SAR measurement is required for at least one of the bands and the highest reported SAR adjusted by the ratio of specified maximum output power of aggregated to standalone band is > 1.2 W/kg, SAR is required for the 160 MHz channel. This procedure does not apply to an aggregated band with maximum output higher than the standalone band(s); the aggregated band must be tested independently for SAR. SAR is not required when the 160 MHz channel is operating at a reduced maximum power and also qualifies for SAR test exclusion.

B)U-NII-2C and U-NII-3 Bands

The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. when Terminal Doppler Weather Radar (TDWR) restriction applies, all channels that operate at 5.60 – 5.65 GHz must be included to apply the SAR test reduction and measurement procedures. When the same transmitter and antenna(s) are used for U-NII-2C band and U-NII-3 band or 5.8 GHz band of §15.247, the bands may be aggregated to enable additional channels with 20, 40 or 80 MHz bandwidth to span across the band gap, as illustrated in Appendix B. The maximum output power for the additional band gap channels is limited to the lower of those certified for the bands. Unless band gap channels are permanently disabled, they must be considered for SAR testing. The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz may be grouped with the 5.8 GHz channels in U-NII-3 or §15.247 band to enable two SAR probe calibration frequency points to cover the bands, including the band gap channels. When band gap channels are supported and the bands are not aggregated for SAR testing, band gap channels must be considered independently in each band according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

C)OFDM Transmission Mode SAR Test Configuration and Channel Selection Requirements

The initial test configuration for 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple configurations in a frequency band have

the same specified maximum output power, the initial test configuration is determined according to the following steps applied sequentially.
1)The largest channel bandwidth configuration is selected among the multiple configurations with thesame specified maximum output power.
2)If multiple configurations have the same specified maximum output power and largest channelbandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
3)If multiple configurations have the same specified maximum output power, largest channel bandwidthand lowest order modulation, the lowest data rate configuration among these configurations is selected.
4)When multiple transmission modes (802.11a/g/n/ac) have the same specified maximum output power,largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n. After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following. These channel selection procedures apply to both the initial test configuration and subsequent test configuration(s), with respect to the default power measurement procedures or additional power measurements required for further SAR test reduction. The same procedures also apply to subsequent highest output power channel(s) selection.
1)The channel closest to mid-band frequency is selected for SAR measurement.
2)For channels with equal separation from mid-band frequency; for example, high and low channels ortwo mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

D)SAR Test Requirements for OFDM configurations

When SAR measurement is required for 802.11 a/n/ac OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. When the sametransmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction Vapplies. When band gap channels between U-NII-2C band and 5.8 GHz U-NII-3 or §15.247 bandare supported, the highest maximum output power transmission mode configuration and maximumoutput power channel across the bands must be used to determine SAR test reduction, accordingto the initial test configuration and subsequent test configuration requirements. In applying theinitial test configuration and subsequent test configuration procedures, the 802.11 transmissionconfiguration with the highest specified maximum output power and the channel within a testconfiguration with the highest measured maximum output power should be clearly distinguished toapply the procedures.

10.3 Bluetooth Conducted Power

Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	7.03	3.40	3.41
	CH 39	2441	7.65	3.65	3.23
	CH 78	2480	**9.26**	6.08	6.19
Tune-up Limit (dBm)			9.5	6.5	6.5

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
LE	CH 00	2402	5.54
	CH 19	2440	5.82
	CH 39	2480	8.35
Tune-up Limit (dBm)			9.0

Note:

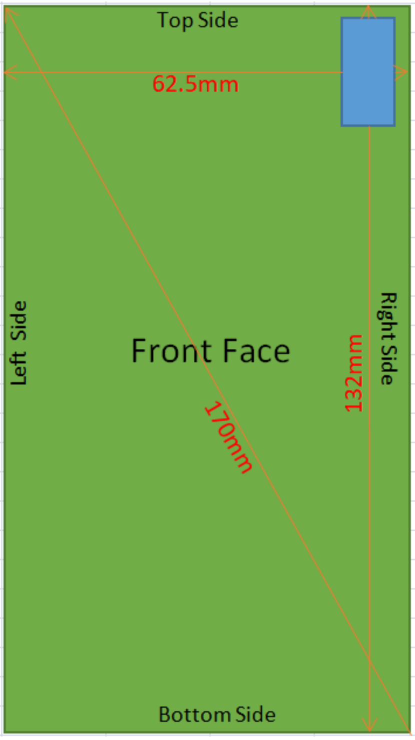
1. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
CH 78	2.480	9.5	8.91	5	2.81	3.0

2. The max. tune-up power was provided by manufacturer, base on the result of note 1, RF exposure evaluation is not required.
3. The output power of all data rate were pre-scan, just the worst case of all mode were shown in report.
4. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according is applied to determine SAR test exclusion.

11 Exposure Positions Consideration

11.1 EUT Antenna Location



11.2 Test Positions Consideration

Distance of Antennas to EUT edge/surface Test distance: 10mm						
Antennas	**Back**	**Front**	**Top Side**	**Bottom Side**	**Right Side**	**Left Side**
WLAN/Bluetooth	<25mm	<25mm	2.5mm	132mm	2mm	<62.5mm

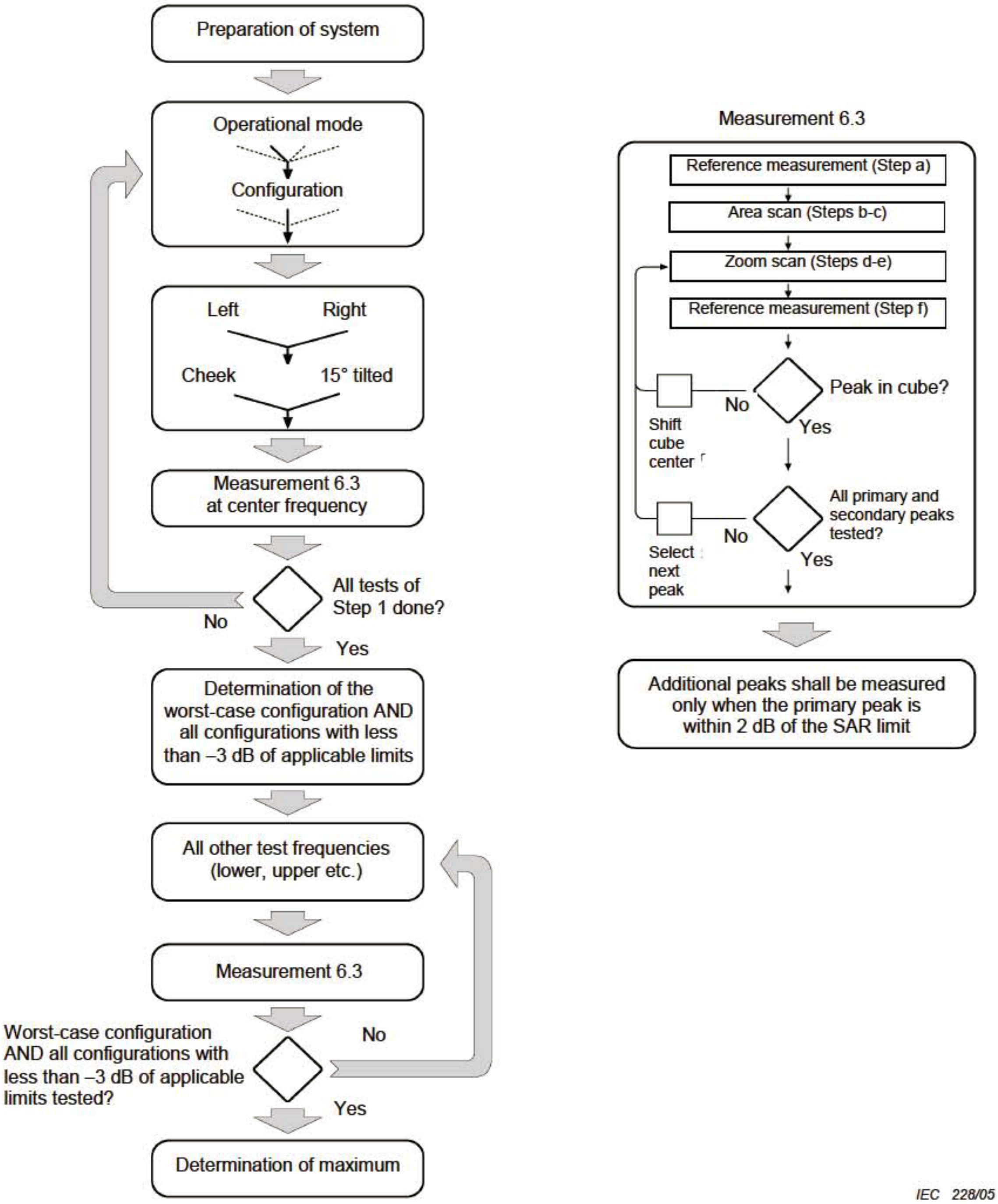
Test Positions Test distance: 10mm						
Antennas	**Back**	**Front**	**Top Side**	**Bottom Side**	**Right Side**	**Left Side**
WLAN/Bluetooth	Yes	Yes	Yes	No	Yes	No

Note:

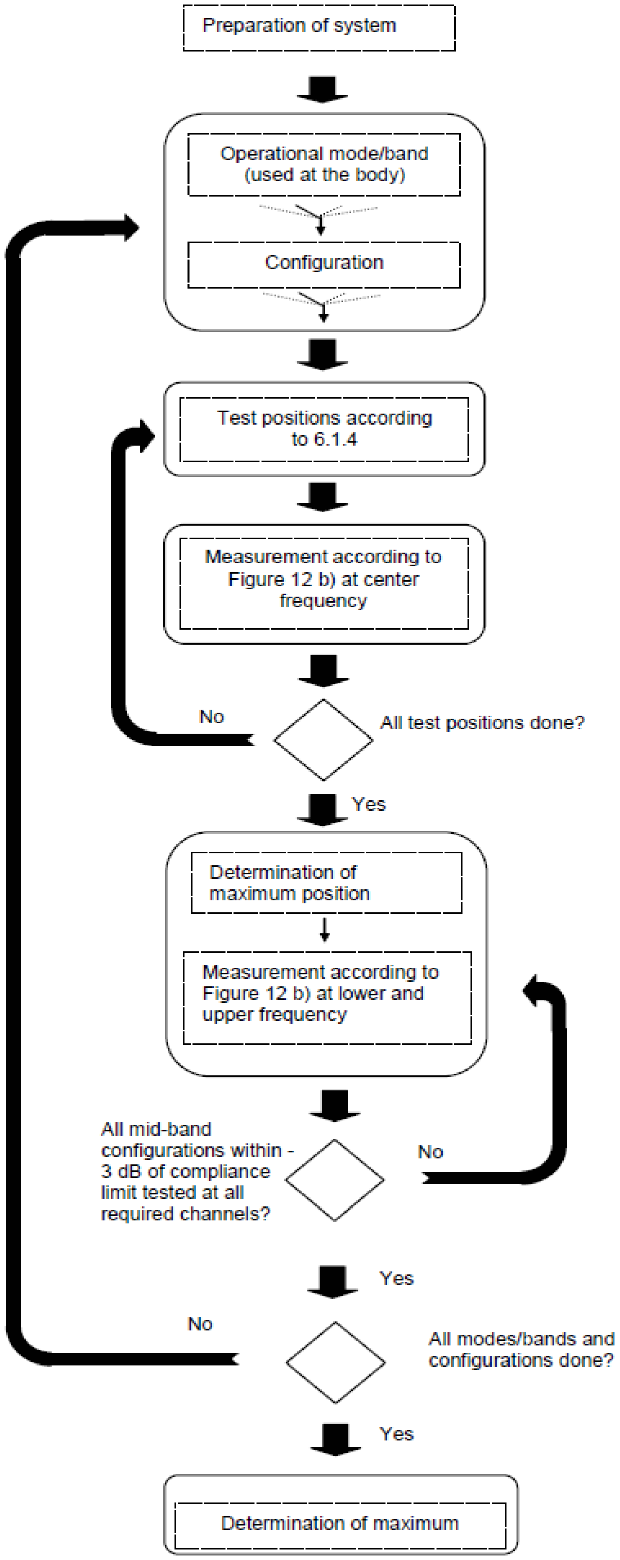
1. Head/Body-worn/hotspot mode SAR assessments are required.
2. Per KDB 941225 D07v01r02, the test procedures are applicable to devices with a display and overall diagonal dimension ≤ 20 cm (~7.9”). These devices are typically operated like a mini-tablet and are usually designed with certain UMPC features and operating characteristics; therefore, the term “UMPC Mini-Tablet” is used to identify the SAR test requirements for this category of devices. A composite test separation distance of 5 mm is applied to test UMPC mini-tablet transmitters and to maintain RF exposure conservativeness for the interactive operations associated with this type of devices.

12 Block diagram of the tests to be performed

12.1 Head



12.2 Body



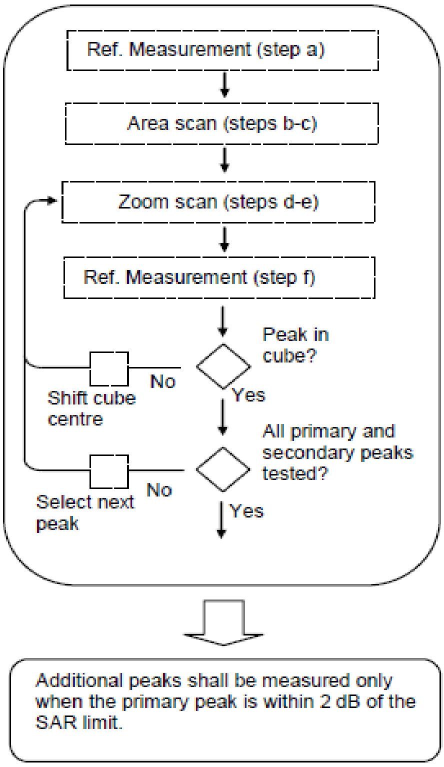


Figure 12b – General procedure

13 Test Results List

Test Guidance:

1. The reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v06, for each exposure position, if the highest output power channel Reported SAR ≤ 0.8W/kg, other channels SAR testing is not necessary.
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8W/kg.
4. Per KDB 941225 D05v02r05, 100% RB allocation SAR measurement is not required when the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg.
5. Per KDB 248227 D01v02r02, for 802.11b DSSS , when the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in that exposure configuration.
6. 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.
7. Per KDB 941225 D07v01r02, the test procedures are applicable to devices with a display and overall diagonal dimension ≤ 20 cm (~7.9"). These devices are typically operated like a mini-tablet and are usually designed with certain UMPC features and operating characteristics; therefore, the term "UMPC Mini-Tablet" is used to identify the SAR test requirements for this category of devices. A composite test separation distance of 5 mm is applied to test UMPC mini-tablet transmitters and to maintain RF exposure conservativeness for the interactive operations associated with this type of devices.

13.1 Standalone Head SAR

➢ **WLAN 2.4 GHz&5GHz Head SAR**

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR1g (W/kg)	Reported SAR1g (W/kg)
	2.4GHz/802.11b	Right Cheek	11	15.18	15.5	1.076	0.418	0.454
	2.4GHz/802.11b	Right Tilt	11	15.18	15.5	1.076	0.489	0.531
1#	2.4GHz/802.11b	Left Cheek	11	15.18	15.5	1.076	**0.648**	**0.703**
	2.4GHz/802.11b	Left Tilt	11	15.18	15.5	1.076	0.594	0.645
	WLAN5.2GHz/802.11a	Right Cheek	48	9.94	10.5	1.138	0.225	0.261
	WLAN5.2GHz/802.11a	Right Tilt	48	9.94	10.5	1.138	0.253	0.293
2#	WLAN5.2GHz/802.11a	Left Cheek	48	9.94	10.5	1.138	**0.442**	**0.512**
	WLAN5.2GHz/02.11a	Left Tilt	48	9.94	10.5	1.138	0.390	0.452
	WLAN5.3GHz/802.11a	Right Cheek	52	10.35	11	1.161	0.215	0.254
	WLAN5.3GHz/802.11a	Right Tilt	52	10.35	11	1.161	0.246	0.291
3#	WLAN5.3GHz/802.11a	Left Cheek	52	10.35	11	1.161	**0.362**	**0.428**
	WLAN5.3GHz/802.11a	Left Tilt	52	10.35	11	1.161	0.315	0.373
	WLAN5.5GHz/802.11a	Right Cheek	120	10.04	10.5	1.112	0.194	0.220
	WLAN5.5GHz/802.11a	Right Tilt	120	10.04	10.5	1.112	0.206	0.233
4#	WLAN5.5GHz/802.11a	Left Cheek	120	10.04	10.5	1.112	**0.398**	**0.451**
	WLAN5.5GHz/802.11a	Left Tilt	120	10.04	10.5	1.112	0.347	0.393
	WLAN5.8GHz/802.11a	Right Cheek	149	10.11	10.5	1.094	0.221	0.246
	WLAN5.8GHz/802.11a	Right Tilt	149	10.11	10.5	1.094	0.182	0.203
5#	WLAN5.8GHz/802.11a	Left Cheek	149	10.11	10.5	1.094	**0.368**	**0.410**
	WLAN5.8GHz/802.11a	Left Tilt	149	10.11	10.5	1.094	0.353	0.394

Note:

1. Per KDB 447498 D01v06, for each exposure position, if the highest output power channel Reported SAR ≤ 0.8W/kg, other channels SAR testing is not necessary.
2. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8W/kg.
3. Per KDB 941225 D05v02r05, 100% RB allocation SAR measurement is not required when the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg.
4. Per KDB 248227 D01v02r02, for 802.11b DSSS , when the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in that exposure configuration.
5. Per KDB 248227 D01v02r02, OFDM SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg. Cuz the maximum output power specified for OFDM and DSSS are 19.95mW(13.0dBm) and 35.48mW(15.5dBm), the scaled SAR will be 0.648×(19.95/35.48)=0.364W/Kg<1.2W/kg, therefore, SAR is not required for OFDM.
6. According to KDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.
7. Both the duty cycle scaling factor of WLAN 2.4GHz & 5GHz are 1.008 and 1.109, they will be used for scaling the report SAR.

13.2 Standalone Body SAR

➢ **WLAN 2.4GHz&5GHz Body SAR**

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	2.4GHz/802.11b	Front Side	1	15.18	15.5	1.076	0.173	0.188
	2.4GHz/802.11b	Back Side	1	15.18	15.5	1.076	0.196	0.213
6#	2.4GHz/802.11b	Right Side	1	15.18	15.5	1.076	**0.388**	**0.421**
	2.4GHz/802.11b	Top Side	1	15.18	15.5	1.076	0.283	0.307
	WLAN5.2GHz/802.11a	Front Side	48	9.94	10.5	1.138	0.534	0.619
	WLAN5.2GHz/802.11a	Back Side	48	9.94	10.5	1.138	0.629	0.729
	WLAN5.2GHz/802.11a	Right Side	48	9.94	10.5	1.138	0.590	0.684
	WLAN5.2GHz/802.11a	Top Side	48	9.94	10.5	1.138	0.212	0.246
7#	WLAN5.2GHz/802.11a	Back Side	36	9.35	10.0	1.161	**0.883**	**1.045**
	WLAN5.2GHz/802.11a	Back Side	44	9.73	10.5	1.194	0.635	0.773
	WLAN5.3GHz/802.11a	Front Side	52	10.35	11.0	1.161	0.528	0.625
	WLAN5.3GHz/802.11a	Back Side	52	10.35	11.0	1.161	0.631	0.747
	WLAN5.3GHz/802.11a	Right Side	52	10.35	11.0	1.161	0.592	0.701
	WLAN5.3GHz/802.11a	Top Side	52	10.35	11.0	1.161	0.210	0.249
	WLAN5.3GHz/802.11a	Back Side	60	10.09	11.0	1.233	0.604	0.759
8#	WLAN5.3GHz/802.11a	Back Side	64	10.15	11.0	1.216	**0.869**	**1.077**
	WLAN5.5GHz/802.11a	Front Side	120	10.04	10.5	1.112	0.448	0.734
9#	WLAN5.5GHz/802.11a	Back Side	120	10.04	10.5	1.112	**0.768**	**0.870**
	WLAN5.5GHz/802.11a	Right Side	120	10.04	10.5	1.112	0.546	0.619
	WLAN5.5GHz/802.11a	Top Side	120	10.04	10.5	1.112	0.204	0.231
	WLAN5.5GHz/802.11a	Back Side	100	9.36	10.0	1.159	0.529	0.625
	WLAN5.5GHz/802.11a	Back Side	144	9.79	10.0	1.050	0.537	0.574
	WLAN5.8GHz/802.11a	Front Side	149	10.11	10.5	1.094	0.616	0.687
10#	WLAN5.8GHz/802.11a	Back Side	149	10.11	10.5	1.094	**0.766**	**0.854**
	WLAN5.8GHz/802.11a	Right Side	149	10.11	10.5	1.094	0.470	0.524
	WLAN5.8GHz/802.11a	Top Side	149	10.11	10.5	1.094	0.220	0.245
	WLAN5.8GHz/802.11a	Back Side	157	5785	9.77	10.50	0.574	0.692
	WLAN5.8GHz/802.11a	Back Side	165	5825	9.82	10.50	0.560	0.667

Note:

1. Per KDB 447498 D01v06, for each exposure position, if the highest output channel Reported SAR ≤ 0.8W/kg, other channels SAR testing is not necessary.
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA output power is < 0.25dB higher than RMC 12.2kbps, or Reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA SAR evaluation can be excluded.
3. According to KDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.
4. Both the duty cycle scaling factor of WLAN 2.4GHz & 5GHz are 1.008 and 1.109, they will be used for scaling the report SAR.

13.3 Repeated SAR Measurement

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

Band/ Mode	Test Position	CH.	Freq. (MHz)	Measured SAR (W/kg)				
				Original	1st Repeated		2nd Repeated	
					Value	Ratio	Value	Ratio
WLAN5.2GHz/02.11a	Back Side	36	5210	0.883	0.867	1.81	/	/
WLAN5.3GHz/02.11a	Back Side	64	5320	0.869	0.858	1.10	/	/

14 Multi-Band Simultaneous Transmission Considerations

➢ **Simultaneous Transmission Capabilities**

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the EUT are shown in below Figure and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

Fig.15.1 Simultaneous Transmission Paths

➢ **Simultaneous Transmission Procedures**

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v06, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas ina specific a physical test configuration is ≤1.6 W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v06 4.3.2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(GHz)}}{7.5} \cdot \frac{\text{Max. power of channel, mW}}{\text{Min. Separation Distance, mm}}$$

Mode	Max. tune-up Power (dBm)	Exposure Position	Body
		Test Distance (mm)	5
Bluetooth	9.5	Estimated SAR (W/kg)	0.373

Note:

1. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according is applied to determine estimated SAR.

➢ **Multi-Band simultaneous Transmission Consideration**

Simultaneous Transmission Consideration	Position	Applicable Combination
	Head	WLAN 2.4GHz/5GHz+Bluetooth
	Body	WLAN 2.4GHz/5GHz+Bluetooth

Note:

1. GSM/WCDMA/LTE shares the same antenna, and cannot transmit simultaneously.
2. WLAN/Bluetooth shares the same antenna, and cannot transmit simultaneously.
3. The Report SAR summation is calculated based on the same configuration and test position.
4. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i. Scalar SAR summation < 1.6W/kg.
   ii. SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*), and the peak separation distance is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary
   iii. Simultaneously transmission SAR measurement, and the Reported multi-band SAR < 1.6W/kg

MORLAB SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China
Tel: 86-755-36698555 Fax: 86-755-36698525
Http://www.morlab.cn E-mail: service@morlab.cn

15 Measurement Uncertainty

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A Type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in below Table.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor	1/k(b)	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	5.83	N	1	1	1	5.83	5.83	∞
Axial Isotropy	E.2.2	3.5	R	$\sqrt{3}$	1	1	2.02	2.02	∞
Hemispherical Isotropy	E.2.2	5.9	R	$\sqrt{3}$	1	1	3.41	3.41	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	4.7	R	$\sqrt{3}$	1	1	2.71	2.71	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	E.2.6	0.5	N	1	1	1	0.5	0.5	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	3.0	3.0	∞
Integration Time	E.2.8	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	E.6.2	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to Phantom Shell	E.6.3	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
Test sample Related									
Test sample positioning	E.4.2.1	2.6	N	1	1	1	2.6	2.6	N-1
Device Holder Uncertainty	E.4.1.1	3.0	N	1	1	1	5.11	5.11	∞
Output power Power drift - SAR drift measurement	6.6.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	4.0	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Liquid conductivity - deviation from target value	E.3.2	2.0	R	$\sqrt{3}$	0.64	0.43	1.69	1.13	∞
Liquid conductivity - measurement uncertainty	E.3.3	2.5	N	1	0.64	0.43	3.20	2.15	M
Liquid permittivity - deviation from target value	E.3.2	2.5	R	$\sqrt{3}$	0.6	0.49	1.28	1.04	∞
Liquid permittivity - measurement uncertainty	E.3.3	5.0	N	1	0.6	0.49	6.00	4.90	M
Liquid conductivity – temperature uncertainty	E.3.4		R	$\sqrt{3}$	0.78	0.41			∞
Liquid permittivity – temperature uncertainty	E.3.4		R	$\sqrt{3}$	0.23	0.26			∞
Combined Standard Uncertainty			RSS				11.55	12.07	

Expanded Uncertainty (95% Confidence interval)			K=2				±23.20	±24.17	

16 Measurement Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the India, 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.

Annex A General Information

1. Identification of the Responsible Testing Laboratory

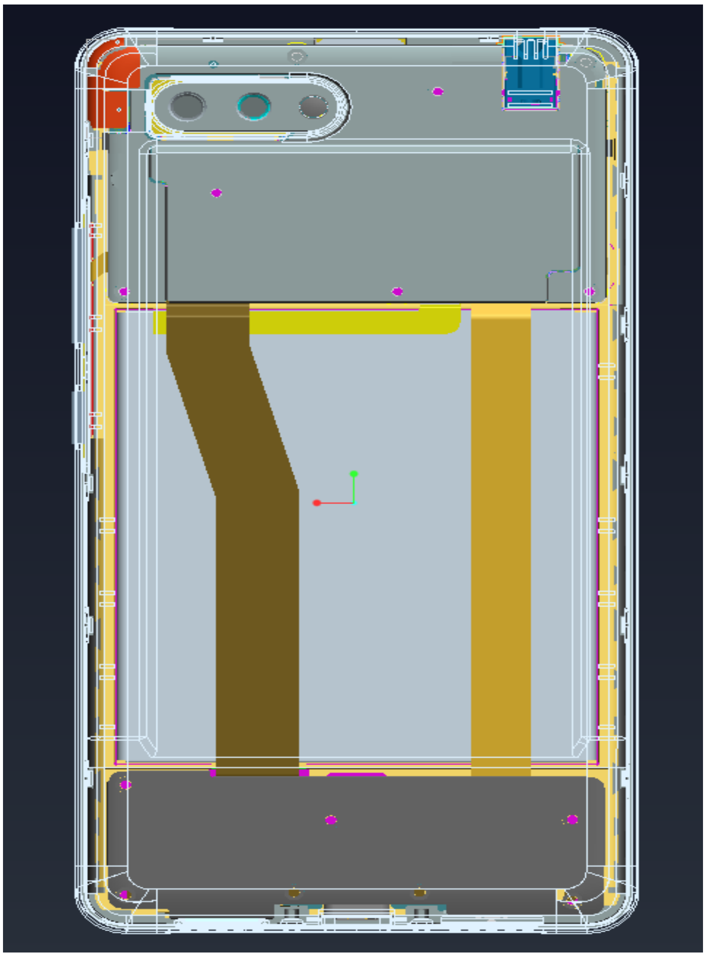
Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.Morlab Laboratory
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

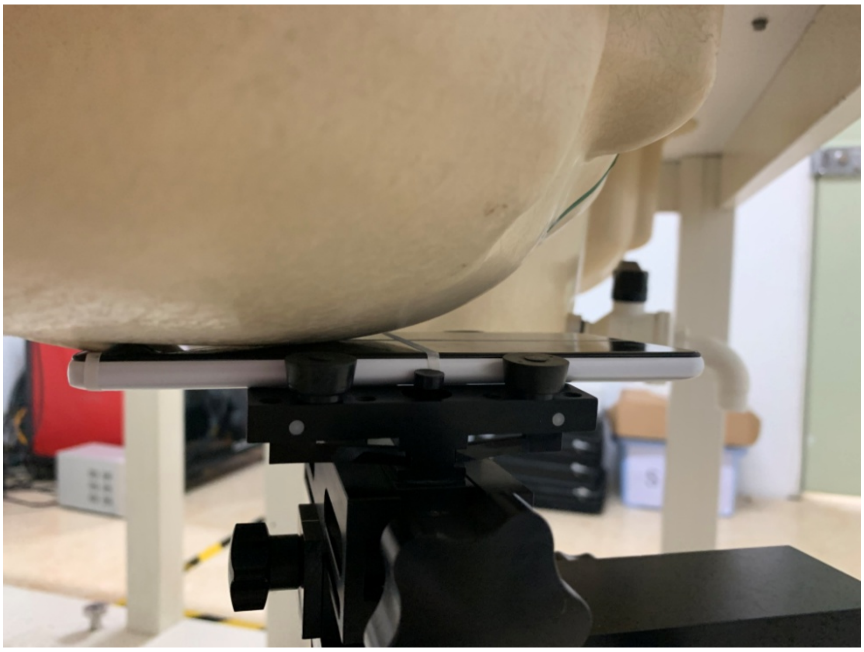
Annex B Test Setup Photos

EUT Antenna Location

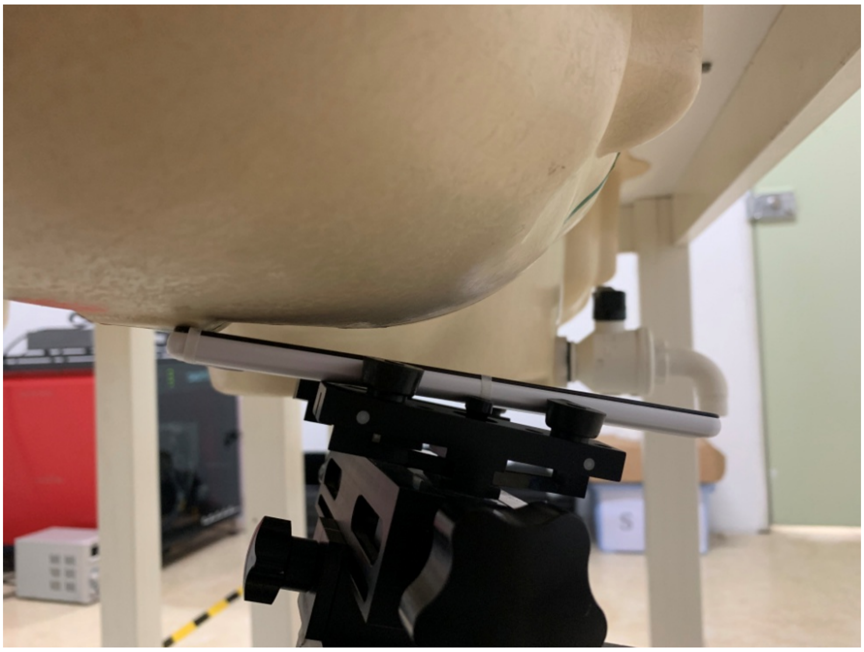


Dimensions (L*W*H):156mm (L)× 76mm (W)× 9mm (H)

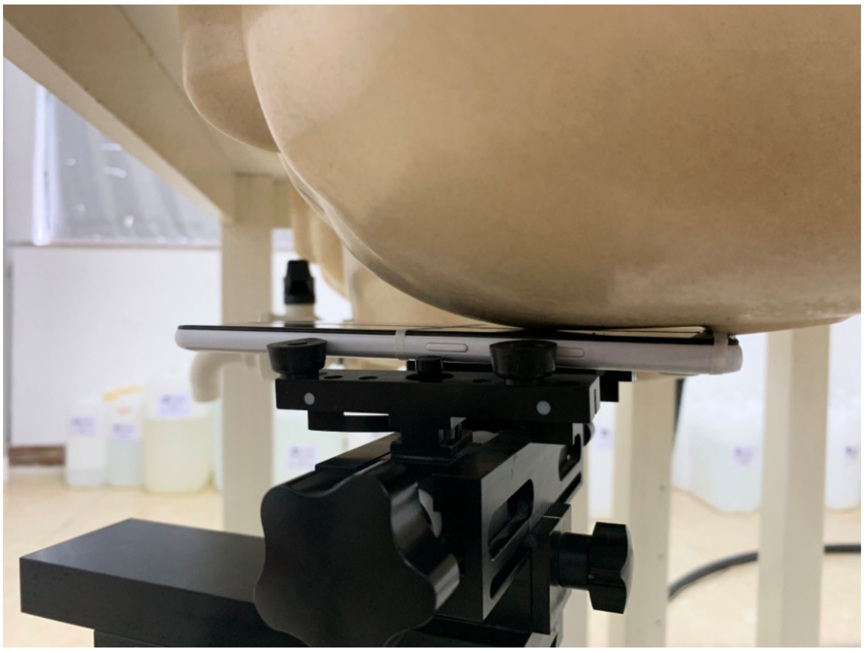
Head



Right Cheek



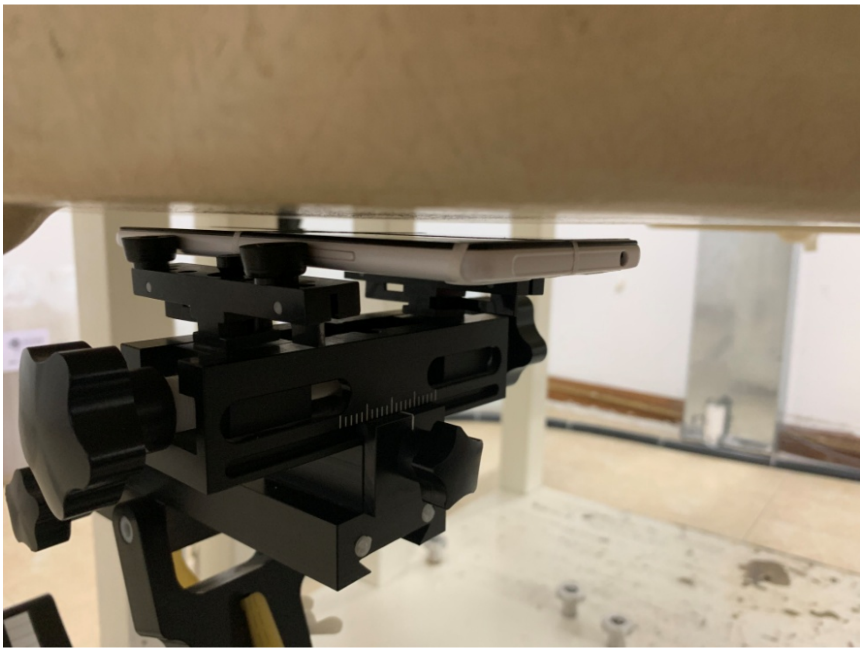
Right Tilt



Left Cheek

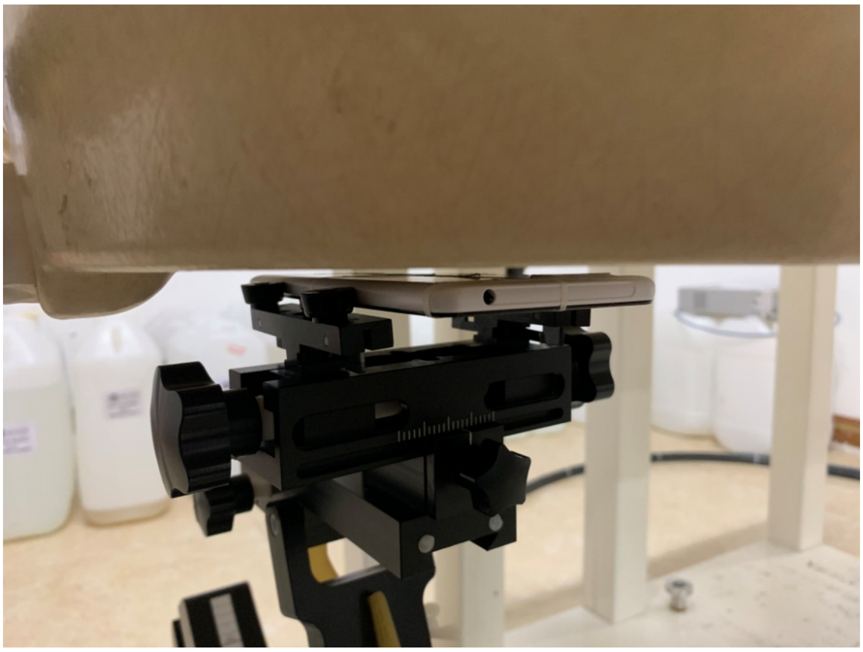
Left Tilt

Body



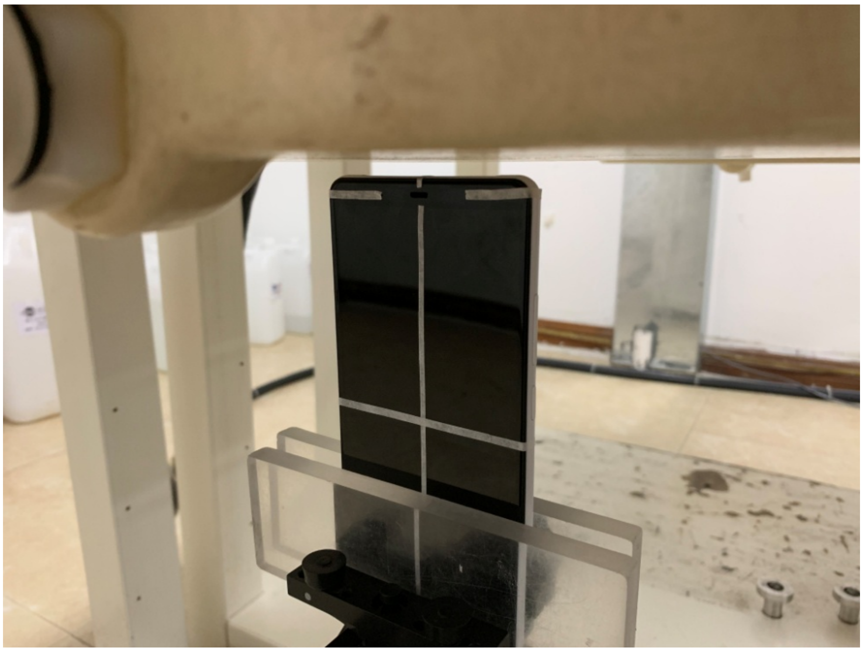
Body worn _ Front

(Test distance: 5mm, Thickness of DUT: 9mm)



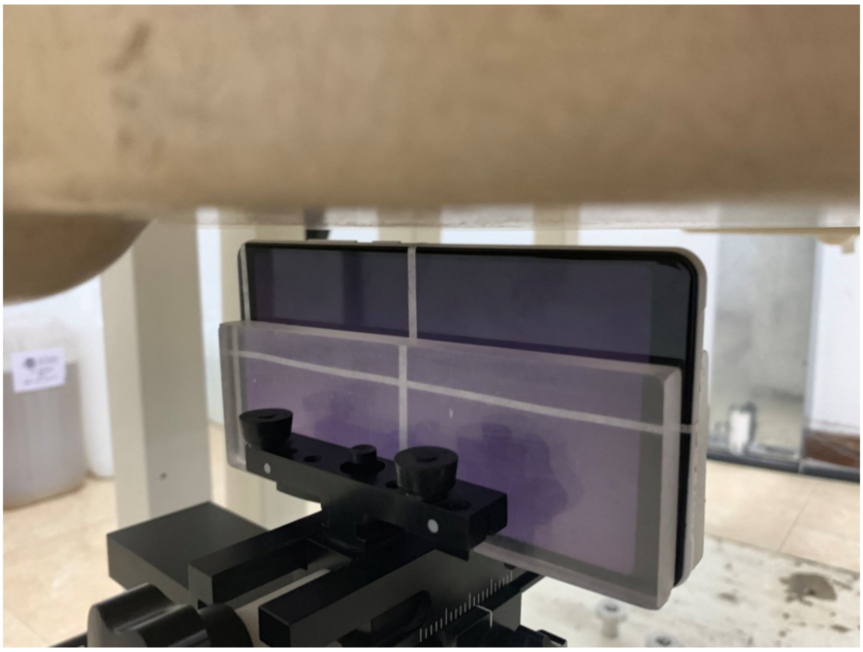
Body worn _ Back

(Test distance: 5mm, Thickness of DUT: 9mm)



Body worn _ Top

(Test distance: 5mm, Thickness of DUT: 9mm)



Body worn _ Right

(Test distance: 5mm, Thickness of DUT: 9mm)

Annex C Plots of System Performance Check

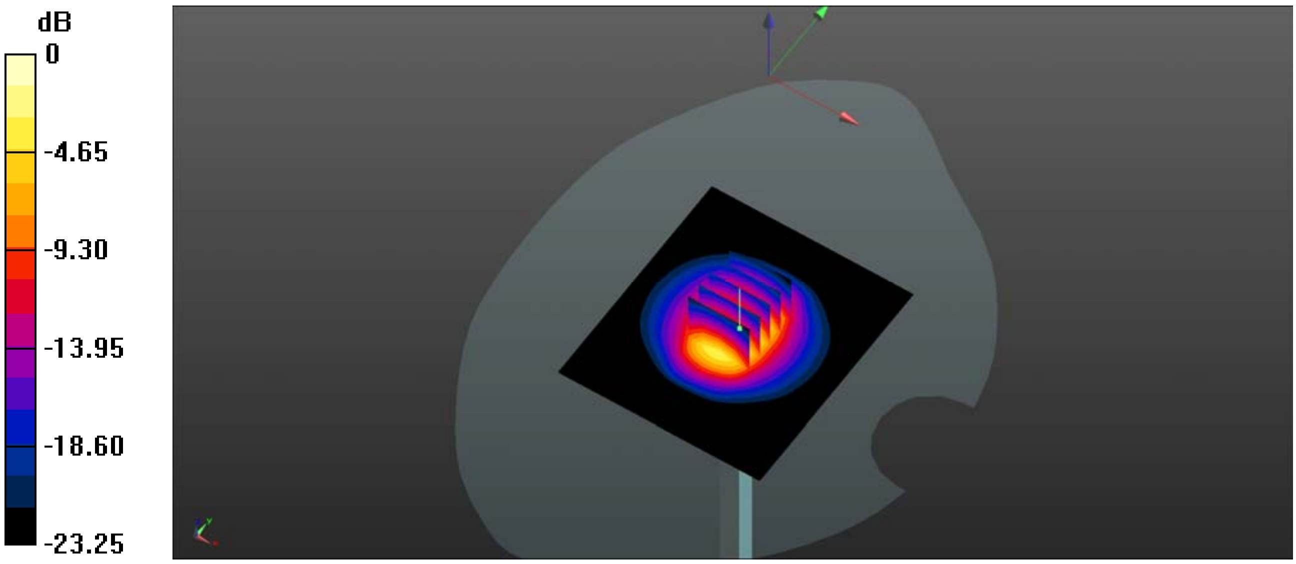
System Check_2450MHz_Head_190726

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL_2450 Medium parameters used: f = 2450 MHz; σ = 1.798 S/m; ε_r = 40.115; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7445; ConvF(7.4, 7.4, 7.4); Calibrated: 2018.09.04;;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1516; Calibrated: 2018.07.14
- Phantom: SAM 2; Type: QD000P40CC; Serial: TP:1464
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW2450/Area Scan (71x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 16.6 W/kg

CW2450/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 90.71 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 28.5 W/kg
SAR(1 g) = 13.24 W/kg; SAR(10 g) = 6.09 W/kg
Maximum value of SAR (measured) = 15.1 W/kg



0 dB = 16.6 W/kg

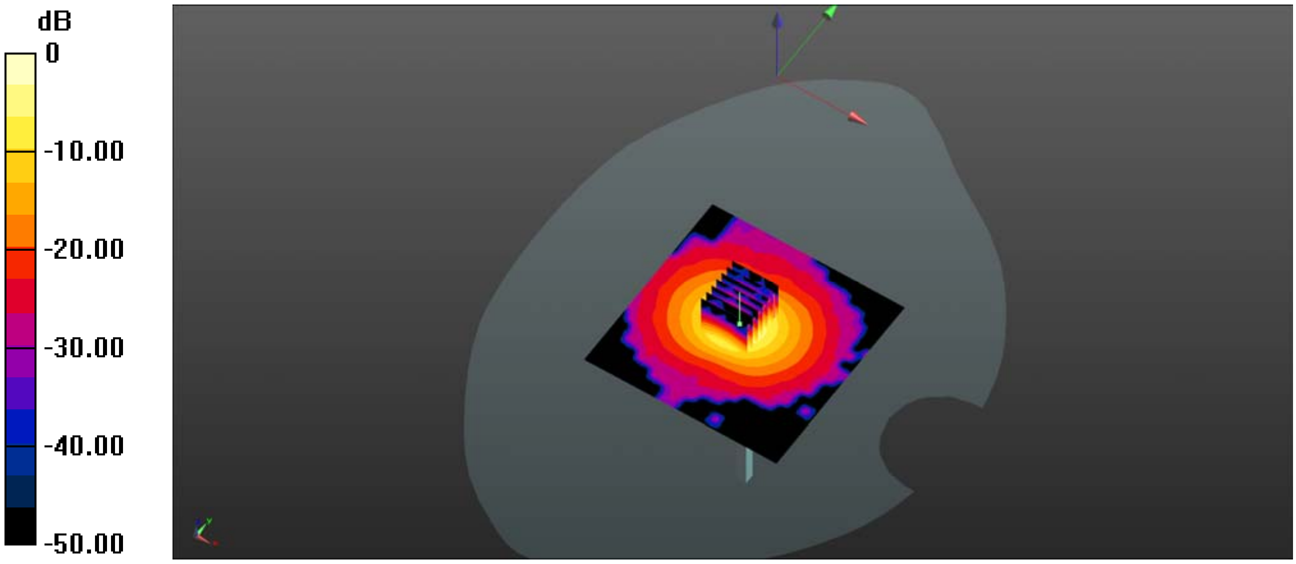
System Check_5250MHz_Head_190727

Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium: HSL_5250 Medium parameters used: f = 5250 MHz; σ = 4.699 S/m; ε_r = 36.146; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7445; ConvF(4.98, 4.98, 4.98); Calibrated: 2018.09.04;;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1516; Calibrated: 2018.07.14
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1471
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 5250/Area Scan (201x201x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 8.65 W/kg

CW 5250/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=4mm
Reference Value = 35.37 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 46.7 W/kg
SAR(1 g) = 7.66 W/kg; SAR(10 g) = 2.21 W/kg
Maximum value of SAR (measured) = 8.24 W/kg



0 dB = 8.65 W/kg

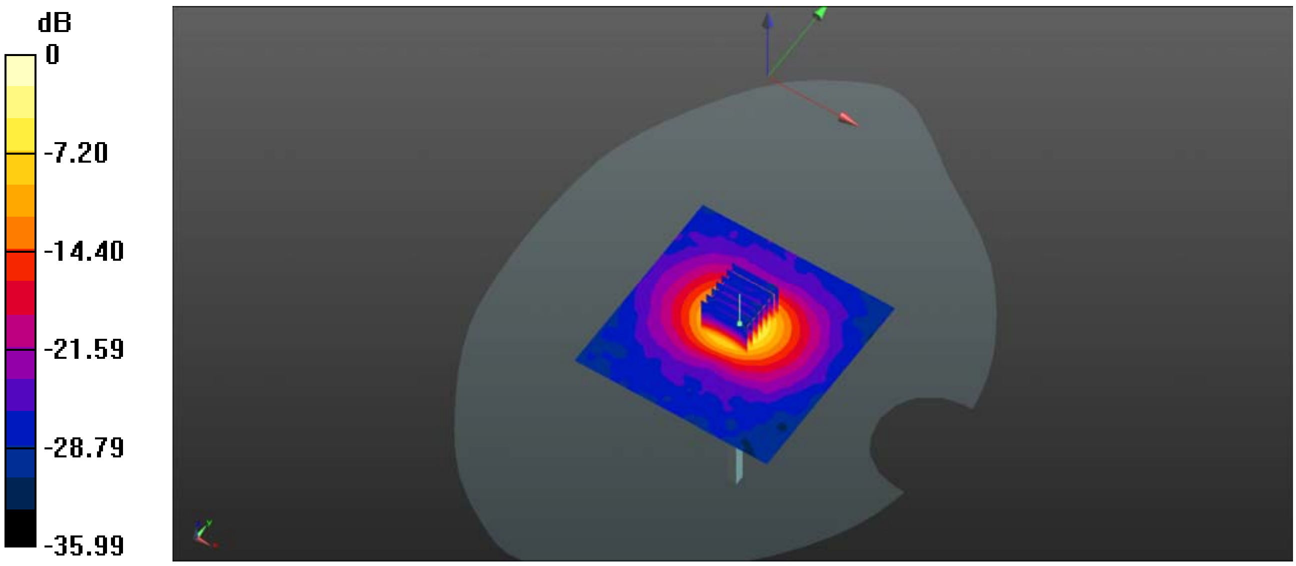
System Check_5600MHz_Head_190727

Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: HSL_5600 Medium parameters used: f = 5600 MHz; σ = 5.097 S/m; ε_r = 36.169; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7445; ConvF(4.32, 4.32, 4.32); Calibrated: 2018.09.04;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1516; Calibrated: 2018.07.14
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1471
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 5600/Area Scan (201x201x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Maximum value of SAR (interpolated) = 9.18 W/kg

CW 5600/Zoom Scan (7x7x13)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 33.65 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 42.3 W/kg
SAR(1 g) = 7.95 W/kg; SAR(10 g) = 2.30 W/kg
Maximum value of SAR (measured) = 18.5 W/kg



0 dB = 9.18 W/kg

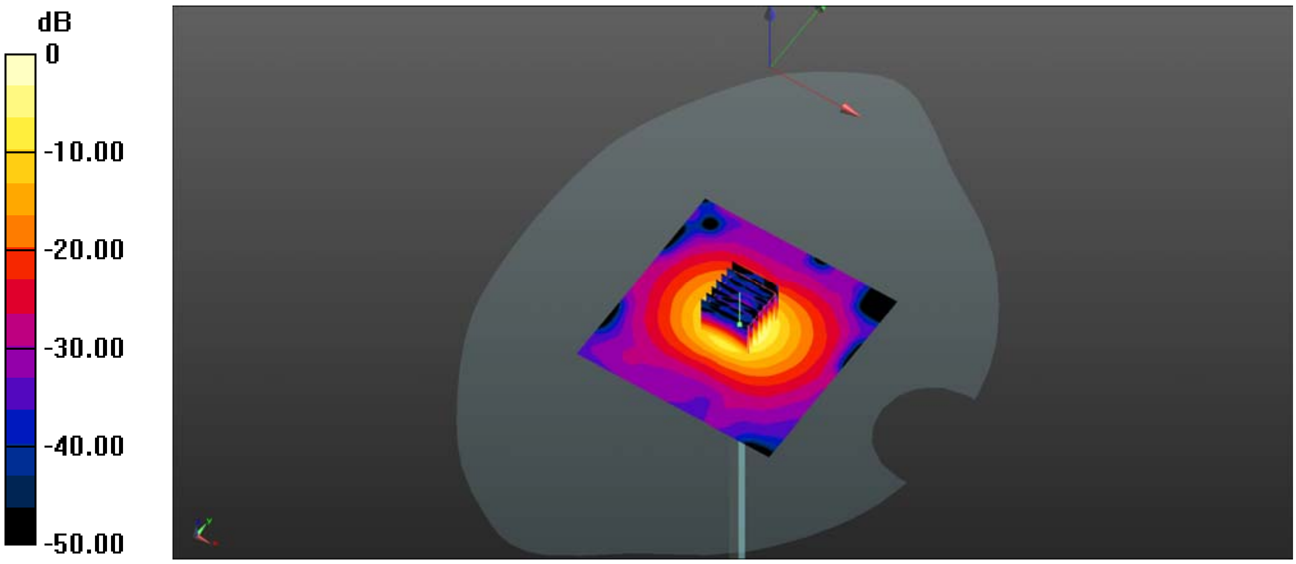
System Check_5750MHz_Head_190727

Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium: HSL_5750 Medium parameters used: f = 5750 MHz; σ = 5.298 S/m; ε_r = 35.258; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 -
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1516; Calibrated: 2018.07.14
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1471
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 5750/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.8 W/kg

CW 5750/Zoom Scan (7x7x13)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 37.69 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 41.8 W/kg
SAR(1 g) = 8.02 W/kg; SAR(10 g) = 2.25 W/kg
Maximum value of SAR (measured) = 16.8 W/kg



0 dB = 16.8 W/kg

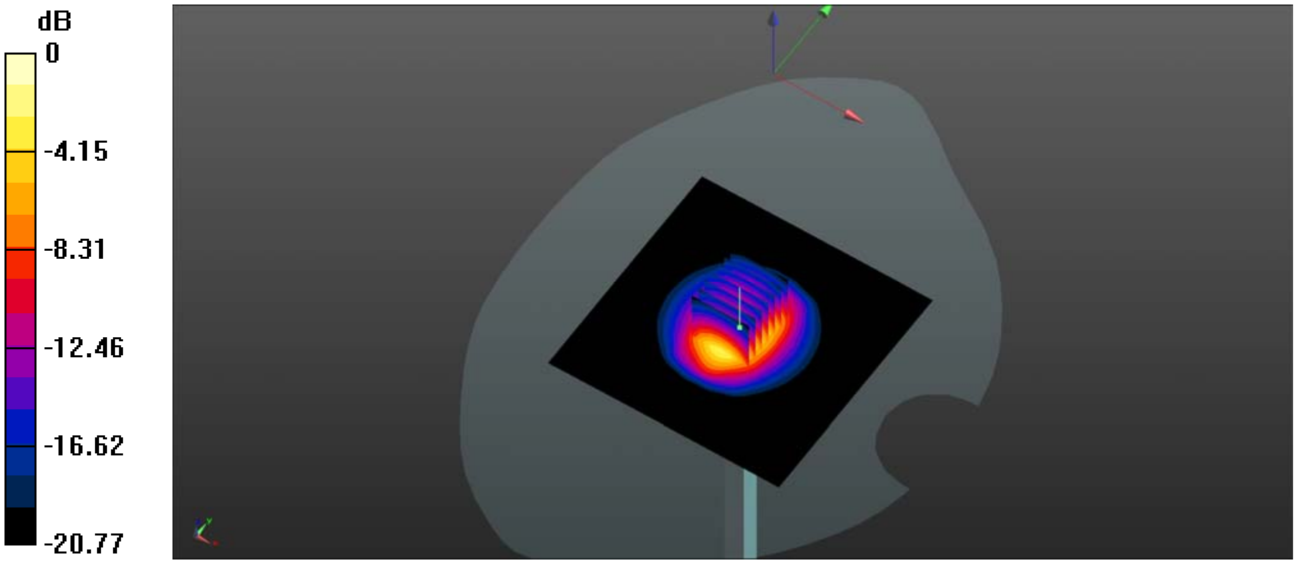
System Check_2450MHz_Body_190724

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450 Medium parameters used: f = 2450 MHz; σ = 1.898 S/m; ε_r = 53.560; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3823; ConvF(7.15, 7.15, 7.15); Calibrated: 2018.11.12;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2019.04.11
- Phantom: SAM 2; Type: QD000P40CC; Serial: TP:1464
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 2450/Area Scan (101x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 14.3 W/kg

CW 2450/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.03 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 24.5 W/kg
SAR(1 g) = 12.3 W/kg; SAR(10 g) = 5.77 W/kg
Maximum value of SAR (measured) = 14.2 W/kg



0 dB = 14.3 W/kg

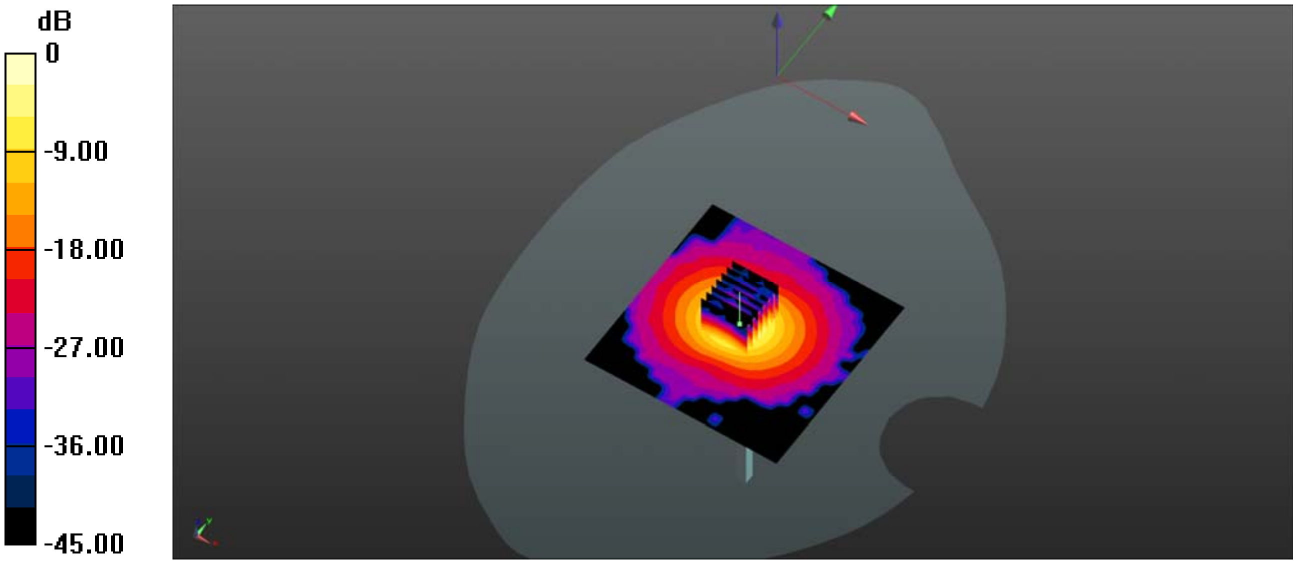
System Check_5250MHz_Body_190725

Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium: MSL_5250 Medium parameters used: f = 5250 MHz; σ = 5.42 S/m; ε_r = 48.366; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3823; ConvF(4.73, 4.73, 4.73); Calibrated: 2018.11.12;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2019.04.11
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1471
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 5250/Area Scan (201x201x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Maximum value of SAR (interpolated) = 11.0 W/kg

CW 5250/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=4mm
Reference Value = 37.26 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 58.8 W/kg
SAR(1 g) = 7.43 W/kg; SAR(10 g) = 2.14 W/kg
Maximum value of SAR (measured) = 10.5 W/kg



0 dB = 11.0 W/kg = 10.41 dBW/kg

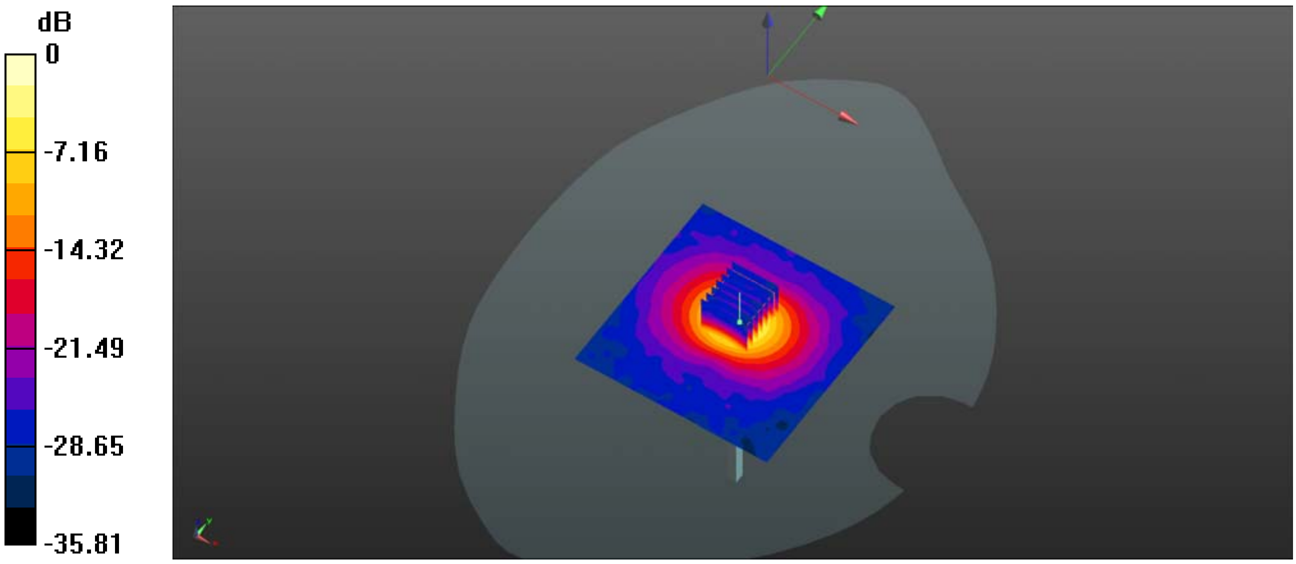
System Check_5600MHz_Body_190725

Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: MSL_5600 Medium parameters used: f = 5600 MHz; σ = 5.788 S/m; ε_r = 47.939; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3823; ConvF(3.98, 3.98, 3.98); Calibrated: 2018.11.12;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2019.04.11
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1471
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 5600/Area Scan (201x201x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 11.5 W/kg

CW 5600/Zoom Scan (7x7x13)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 35.84 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 47.8 W/kg
SAR(1 g) = 7.85 W/kg; SAR(10 g) = 2.15 W/kg
Maximum value of SAR (measured) = 11.4 W/kg



0 dB = 11.5 W/kg

Test Laboratory: SAR Lab. of Shenzhen Morlab Communications Technology Co., Ltd. Date: 2018.07.25

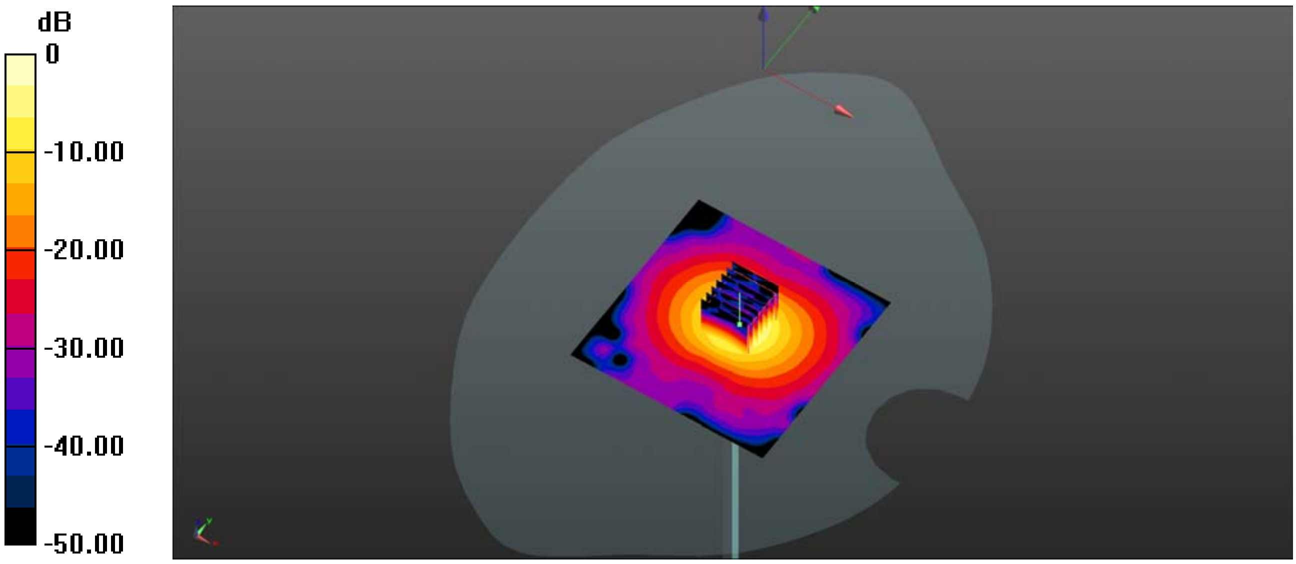
System Check_5750MHz_Body_190725

Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium: HSL_5750 Medium parameters used: f = 5750 MHz; σ = 6.058 S/m; ε_r = 47.482; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3823; ConvF(3.98, 3.98, 3.98); Calibrated: 2018.11.12;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2019.04.11
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:xxxx
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 5750/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 10.8 W/kg

CW 5750/Zoom Scan (7x7x13)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 37.15 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 47.2 W/kg
SAR(1 g) = 7.66 W/kg; SAR(10 g) = 2.09 W/kg
Maximum value of SAR (measured) = 10.8 W/kg



0 dB = 10.8 W/kg

Annex D Plots of Maximum SAR Test Results

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China
Tel: 86-755-36698555 Fax: 86-755-36698525
Http://www.morlab.cn E-mail: service@morlab.cn

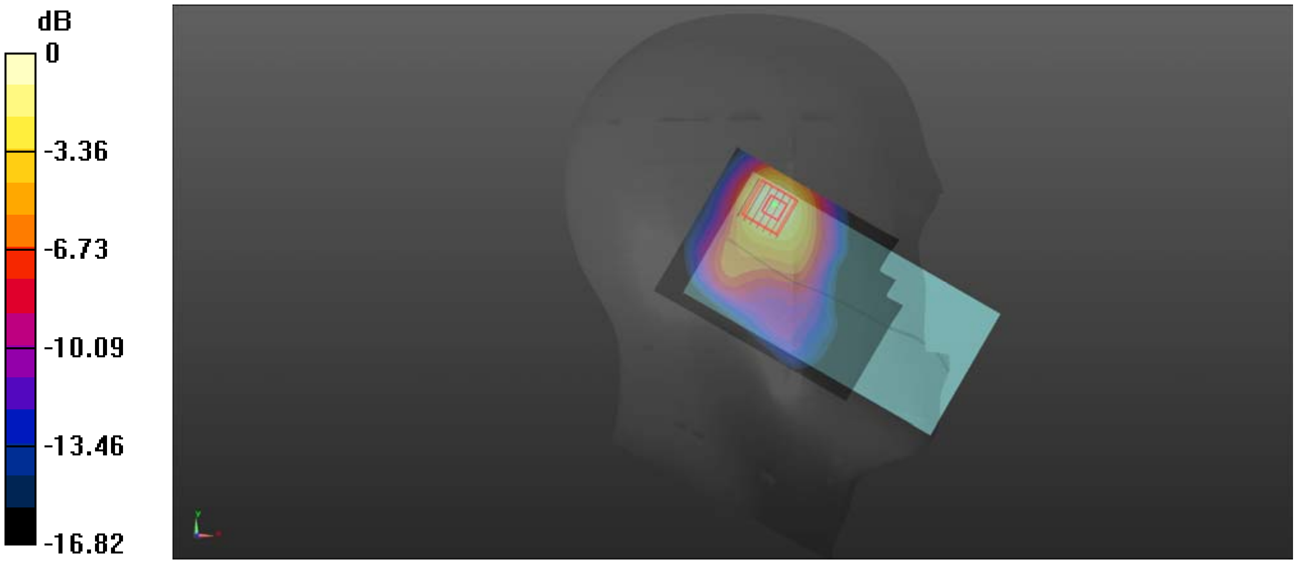
WLAN 2.4GHz_802.11b 1Mbps_Left Cheek_Ch1

Communication System: UID 0, WiFi (0); Frequency: 2412 MHz;Duty Cycle: 1:1.008
Medium: HSL_2412 Medium parameters used: f = 2500 MHz; σ = 1.919 S/m; ε_r = 37.141; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7445; ConvF(7.4, 7.4, 7.4); Calibrated: 2018.09.04;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1516; Calibrated: 2018.07.14
- Phantom: SAM 2 ; Type: QD 000 P41 AA; Serial: 1464
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.10 (7331)

Ch1/Area Scan (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.861 W/kg

Ch1/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 8.525 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.648 W/kg; SAR(10 g) = 0.376 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.836 W/kg



0 dB = 0.836 W/kg

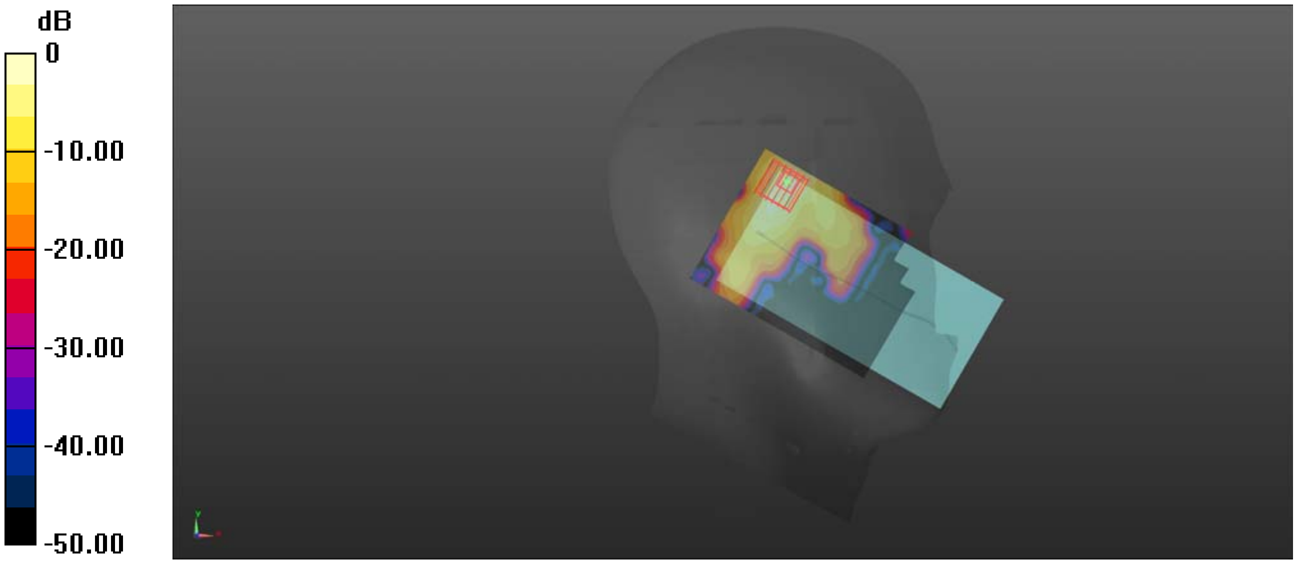
WLAN 5GHz_Band 1_802.11a 6Mbps_Left Cheek_Ch48

Communication System: UID 0, 5G WIFI (0); Frequency: 5240 MHz;Duty Cycle: 1:1.109
Medium: HSL_5250 Medium parameters used: f = 5240 MHz; σ = 4.68 S/m; ε_r = 34.688; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7445; ConvF(4.98, 4.98, 4.98); Calibrated: 2018.09.04;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1516; Calibrated: 2018.07.14
- Phantom: SAM 1 ; Type: QD 000 P41 AA; Serial: 1471
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.10 (7331)

Ch48/Area Scan (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.935 W/kg

Ch48/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 5.383 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.85 W/kg
SAR(1 g) = 0.442 W/kg; SAR(10 g) = 0.140 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.938 W/kg



0 dB = 0.938 W/kg

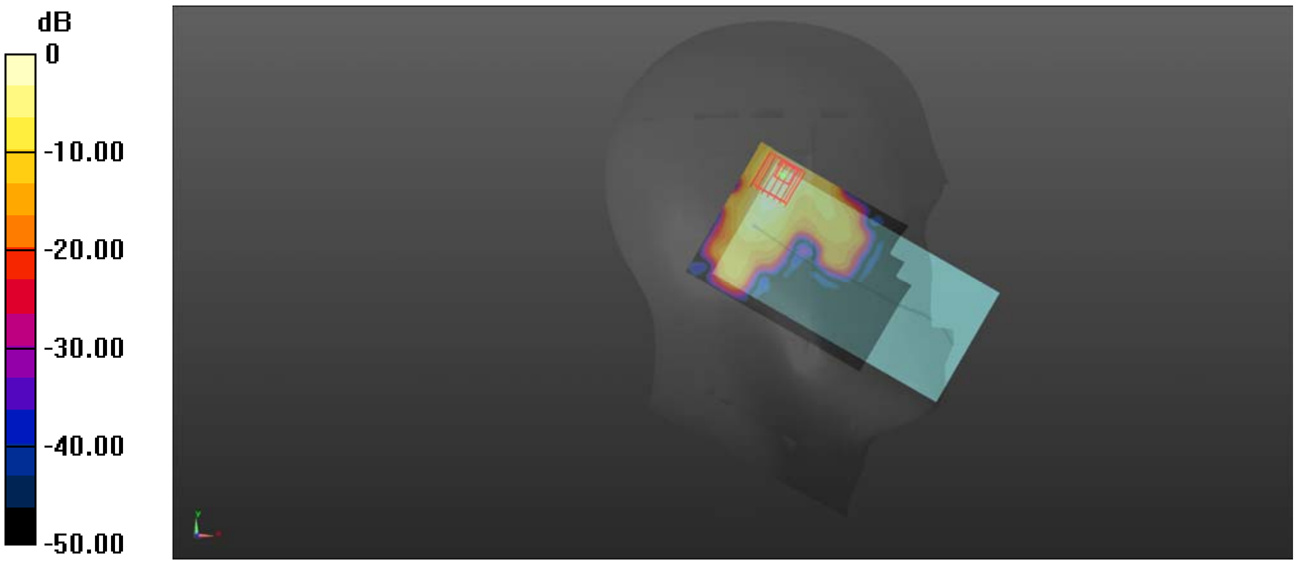
WLAN 5GHz_Band 2_802.11a 6Mbps_Left Cheek_Ch52

Communication System: UID 0, 5G WIFI (0); Frequency: 5260 MHz;Duty Cycle: 1:1.109
Medium: HSL_5250 Medium parameters used: f = 5260 MHz; σ = 4.74 S/m; ε_r = 34.487; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7445; ConvF(4.98, 4.98, 4.98); Calibrated: 2018.09.04;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1516; Calibrated: 2018.07.14
- Phantom: SAM 1 ; Type: QD 000 P41 AA; Serial: 1471
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.10 (7331)

Ch52/Area Scan (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.732 W/kg

Ch52/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 4.719 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 1.55 W/kg
SAR(1 g) = 0.362 W/kg; SAR(10 g) = 0.116 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.747 W/kg



0 dB = 0.747 W/kg

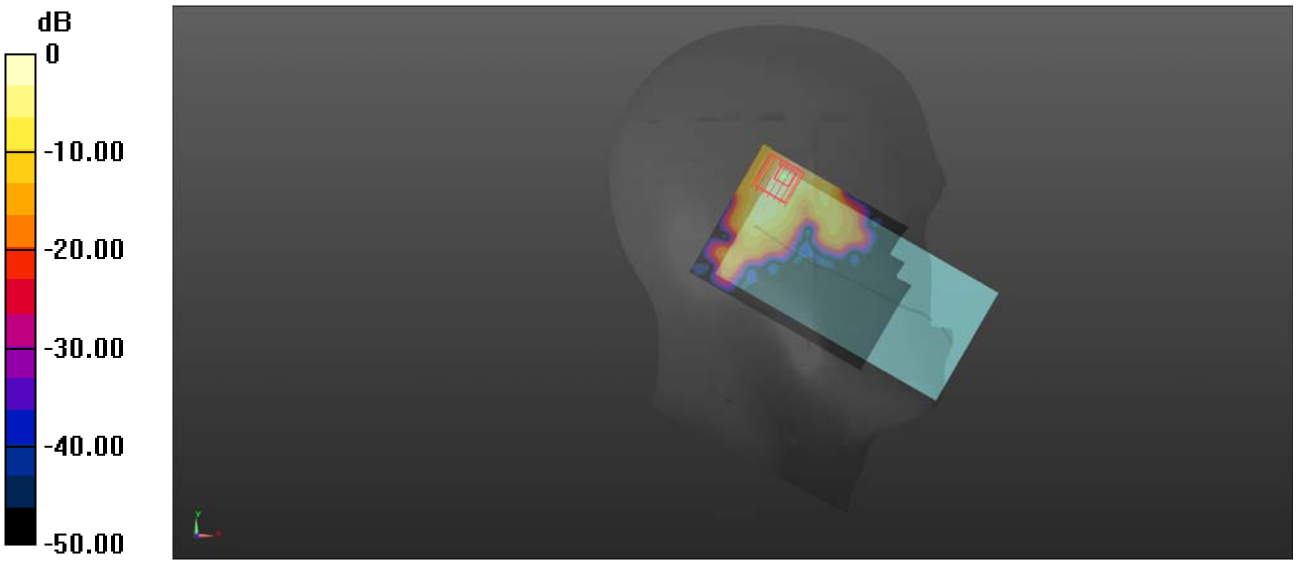
WLAN 5GHz_Band 3_802.11a 6Mbps_Left Cheek_Ch120

Communication System: UID 0, 5G WIFI (0); Frequency: 5600 MHz;Duty Cycle: 1:1.109
Medium: HSL_5600 Medium parameters used: f = 5600 MHz; σ = 5.06 S/m; ε_r = 34.266; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7445; ConvF(4.32, 4.32, 4.32); Calibrated: 2018.09.04;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1516; Calibrated: 2018.07.14
- Phantom: SAM 1 ; Type: QD 000 P41 AA; Serial: 1471
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.10 (7331)

Ch120/Area Scan (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.835 W/kg

Ch120/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.924 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.86 W/kg
SAR(1 g) = 0.398 W/kg; SAR(10 g) = 0.122 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.837 W/kg



0 dB = 0.837 W/kg

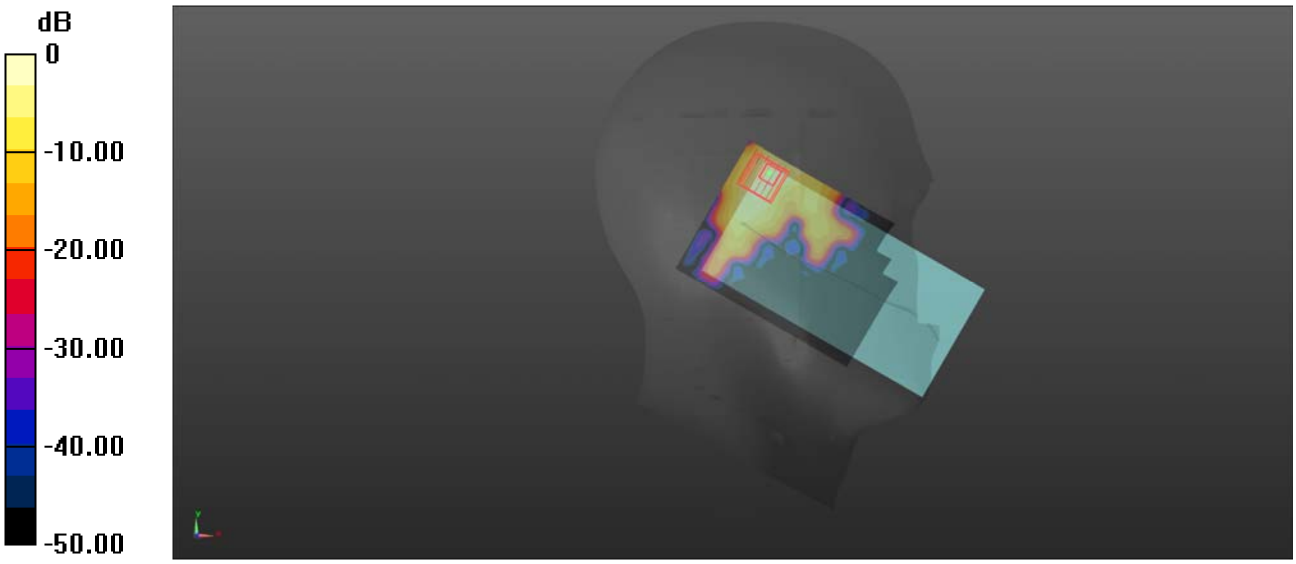
WLAN 5GHz_Band 4_802.11a 6Mbps_Left Cheek_Ch149

Communication System: UID 0, 5G WIFI (0); Frequency: 5745 MHz;Duty Cycle: 1:1.109
Medium: HSL_5750 Medium parameters used: f = 5745 MHz; σ = 5.036 S/m; ε_r = 35.458; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7445; ConvF(4.59, 4.59, 4.59); Calibrated: 2018.09.04;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1516; Calibrated: 2018.07.14
- Phantom: SAM 1 ; Type: QD 000 P41 AA; Serial: 1471
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.10 (7331)

Ch149/Area Scan (91x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.764 W/kg

Ch149/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.083 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.76 W/kg
SAR(1 g) = 0.368 W/kg; SAR(10 g) = 0.111 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.769 W/kg



0 dB = 0.769 W/kg

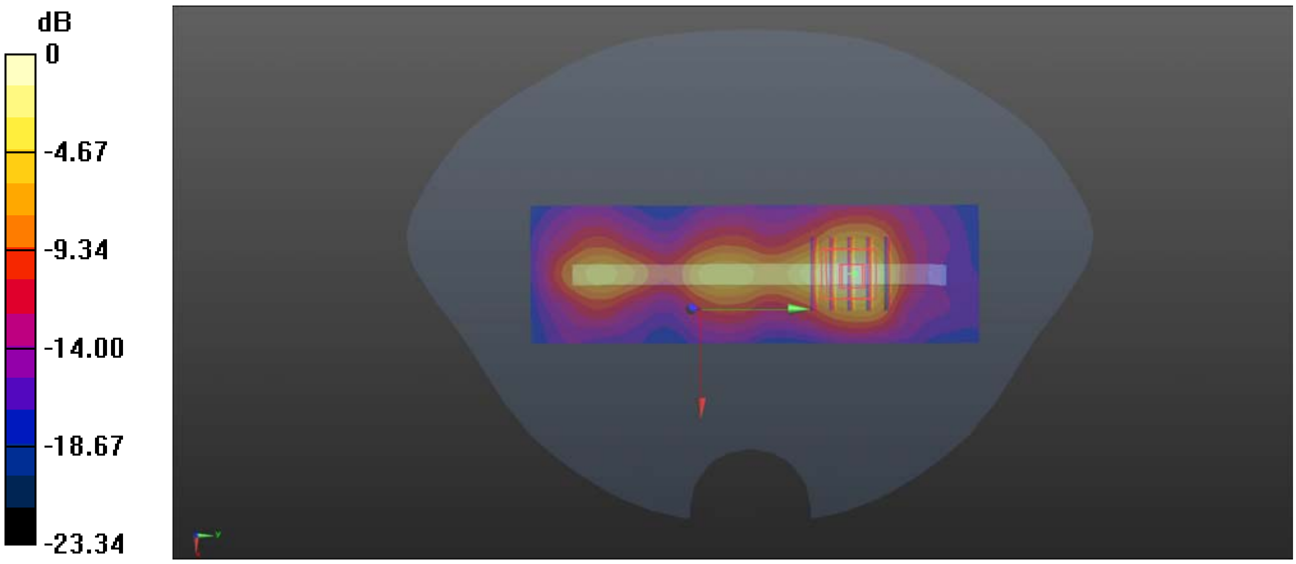
WLAN 2.4GHz_802.11b 1Mbps_Right Side_5mm_Ch1

Communication System: UID 0, WLAN 2.4GHz 802.11b (0); Frequency: 2412 MHz;Duty Cycle: 1:1.008
Medium: MSL_2450 Medium parameters used: f = 2412 MHz; σ = 1.988 S/m; ε_r = 50.888; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3823; ConvF(7.15, 7.15, 7.15); Calibrated: 2018.11.12;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2019.04.11
- Phantom: SAM 2; Type: QD000P40CC; Serial: TP:1464
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1/Area Scan (41x131x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.453 W/kg

Ch1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.693 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.810 W/kg
SAR(1 g) = 0.388 W/kg; SAR(10 g) = 0.179 W/kg
Maximum value of SAR (measured) = 0.446 W/kg



0 dB = 0.453 W/kg

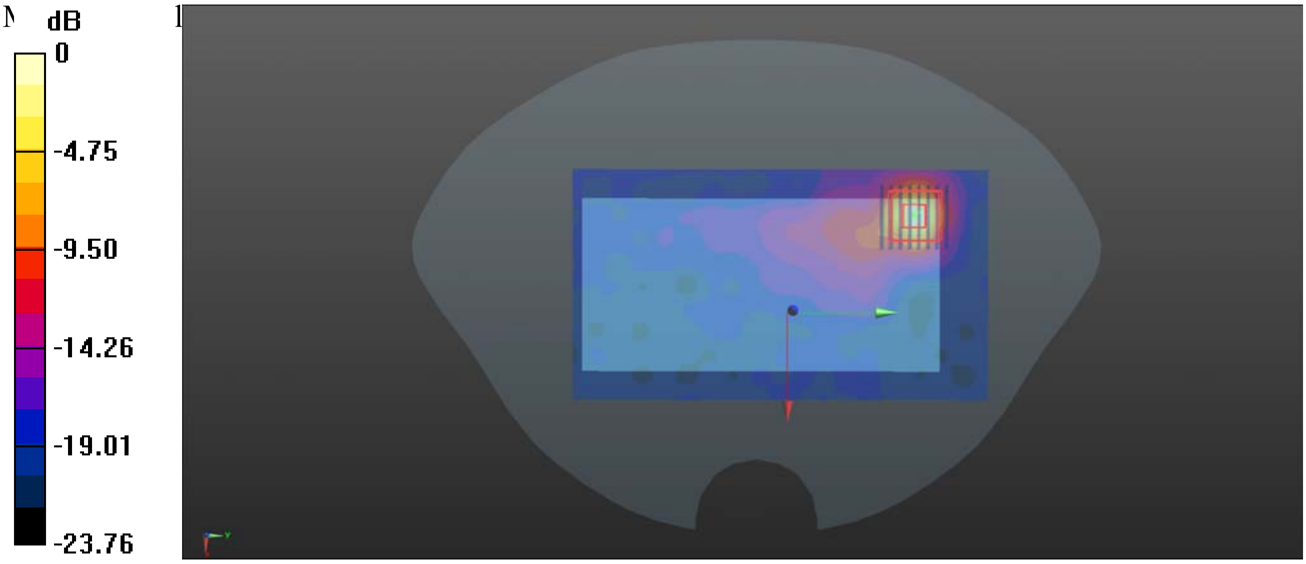
WLAN 5GHz Band 1_802.11a 6Mbps_Back Side_5mm _Ch36

Communication System: UID 0, WLAN 5GHz (0); Frequency: 5180 MHz;Duty Cycle: 1:1.109
Medium: MSL_5250 Medium parameters used: f = 5180 MHz; σ = 5.347 S/m; ε_r = 48.468; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3823; ConvF(4.73, 4.73, 4.73); Calibrated: 2018.11.12;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2019.04.11
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1471
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch36/Area Scan (101x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.878 W/kg

Ch36/Zoom Scan (8x8x15)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.832 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 5.02 W/kg
SAR(1 g) = 0.883 W/kg; SAR(10 g) = 0.208 W/kg



0 dB = 0.890 W/kg

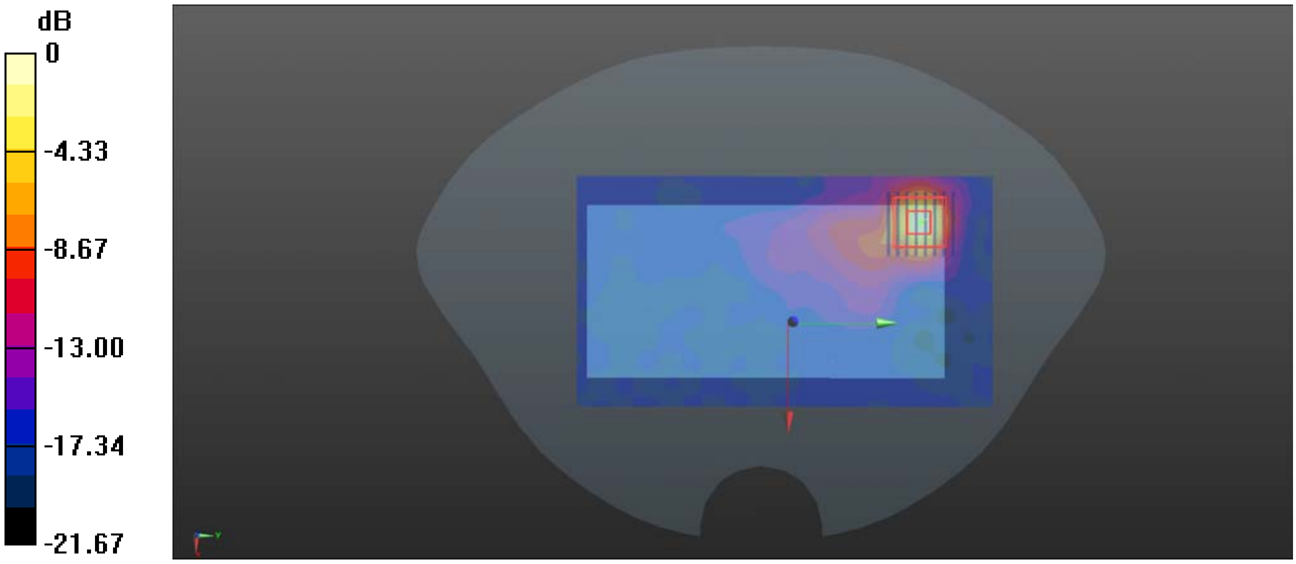
WLAN 5GHz Band 2_802.11a 6Mbps_Back Side_5mm _Ch64

Communication System: UID 0, WLAN 5GHz (0); Frequency: 5320 MHz;Duty Cycle: 1:1.109
Medium: MSL_5250 Medium parameters used: f = 5320 MHz; σ = 5.506 S/m; ε_r = 48.235; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3823; ConvF(4.73, 4.73, 4.73); Calibrated: 2018.11.12;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2019.04.11
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1471
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch64/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.873 W/kg

Ch64/Zoom Scan (8x8x15)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.656 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 4.85 W/kg
SAR(1 g) = 0.869 W/kg; SAR(10 g) = 0.202 W/kg
Maximum value of SAR (measured) = 0.865 W/kg



0 dB = 0.865 W/kg

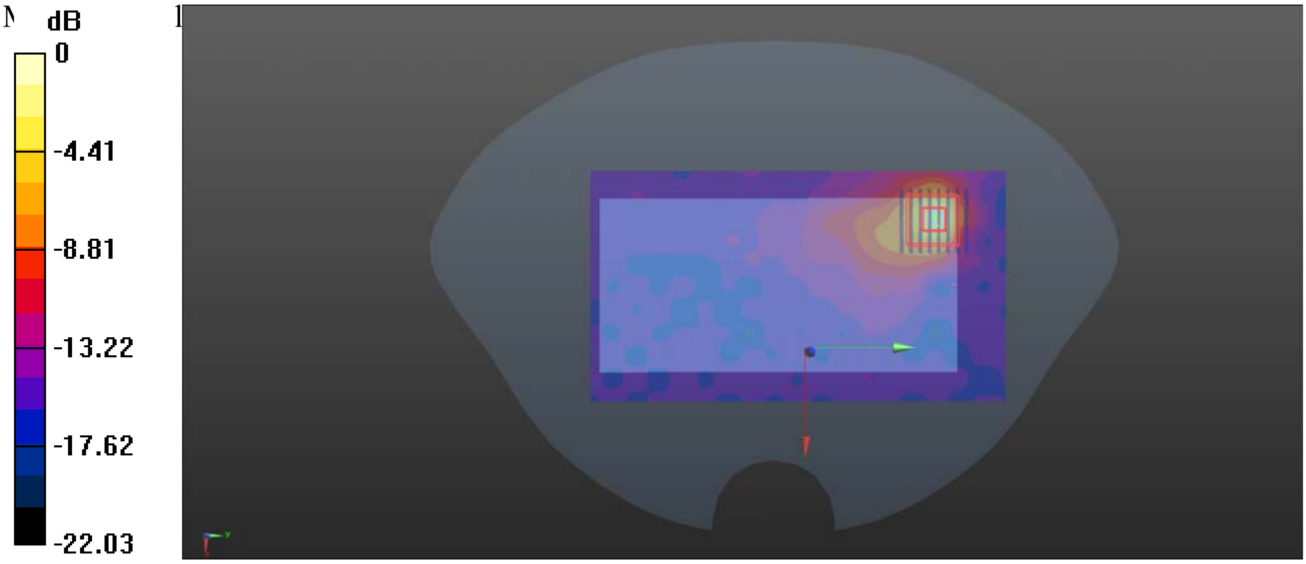
WLAN 5GHz Band 3_802.11a 6Mbps_Back Side_5mm _Ch120

Communication System: UID 0, WLAN 5GHz (0); Frequency: 5600 MHz;Duty Cycle: 1:1.109
Medium: MSL_5600 Medium parameters used: f = 5600 MHz; σ = 5.791 S/m; ε_r = 47.777; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3823; ConvF(3.96, 3.96, 3.96); Calibrated: 2018.11.12;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2019.04.11
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1471
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch120/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.798 W/kg

Ch120/Zoom Scan (8x8x15)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.705 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.94 W/kg
SAR(1 g) = 0.768 W/kg; SAR(10 g) = 0.187 W/kg



0 dB = 0.801 W/kg

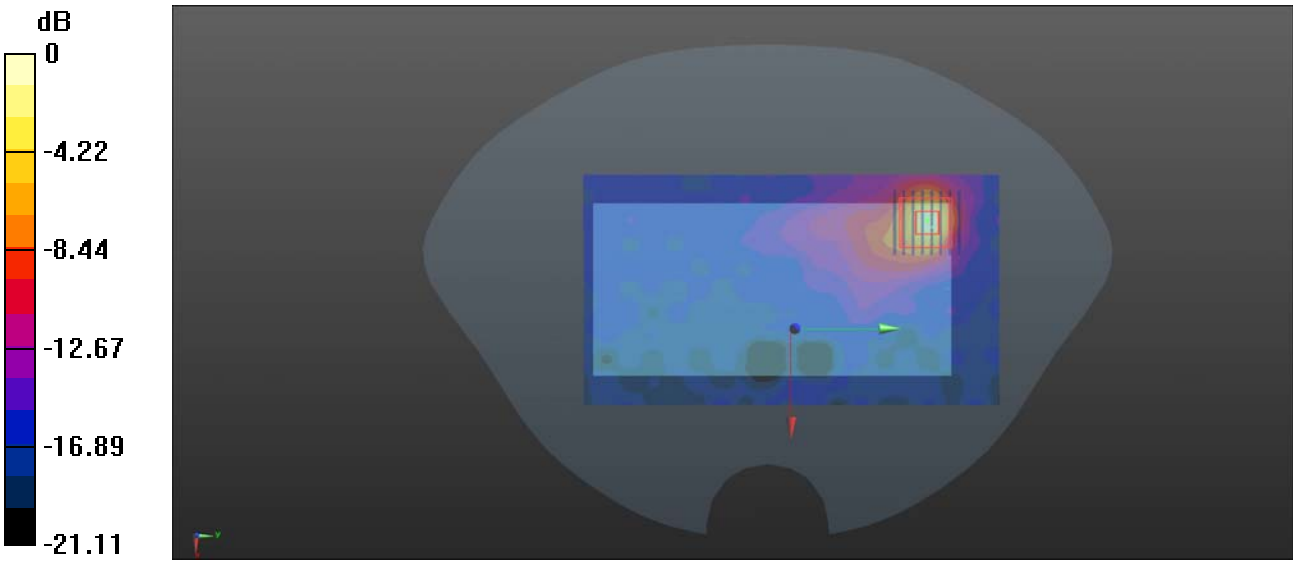
WLAN 5GHz Band 4_802.11a 6Mbps_Back Side_5mm _Ch149

Communication System: UID 0, WLAN 5GHz (0); Frequency: 5745 MHz;Duty Cycle: 1:1.109
Medium: MSL_5750 Medium parameters used: f = 5745 MHz; σ = 6.051 S/m; ε_r = 47.338; ρ = 1000 kg/m^3
Ambient Temperature：23.1 ℃; Liquid Temperature：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3823; ConvF(3.98, 3.98, 3.98); Calibrated: 2018.11.12;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn480; Calibrated: 2019.04.11
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1471
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch149/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.784 W/kg

Ch149/Zoom Scan (8x8x15)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.773 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 3.91 W/kg
SAR(1 g) = 0.766 W/kg; SAR(10 g) = 0.191 W/kg
Maximum value of SAR (measured) = 0.794 W/kg



0 dB = 0.794 W/kg