TCT 通测检测 TESTING CENTRE TECHNOLOGY

SAR Test Report

Test Report No. .....:	TCT240416E006	
Date of issue .....:	Jul. 26, 2024	
Testing laboratory.....:	Shenzhen TCT Testing Technology Co., Ltd.	
Testing location/ address:	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China	
Applicant's name .....:	Shenzhen Huafurui Technology Co., Ltd.	
Address .....:	Unit 601-03, 6/F, Block A, Building 1, Ganfeng Technology Building, No. 993 Jiaxian Road, Xiangjiaotang Community, Bantian Street, Longgang District, Shenzhen, P.R. China	
Manufacturer's name.....:	Shenzhen Huafurui Technology Co., Ltd.	
Address .....:	Unit 601-03, 6/F, Block A, Building 1, Ganfeng Technology Building, No. 993 Jiaxian Road, Xiangjiaotang Community, Bantian Street, Longgang District, Shenzhen, P.R. China	
Product Name .....:	Smartphone	
Trade Mark.....:	CUBOT	
Model/Type reference .....:	KINGKONG POWER 3	
SAR Max. Values.....:	**0.34/Kg (10g) for Head; 1.44/Kg (10g) for Body** **0.53Kg (10g) for Front-to-face; 1.76Kg (10g) for Limbs**	
Simultaneous Reported SAR.....:	**0.57/Kg (10g) for Head; 1.83Kg (10g) for Body** **0.63Kg (10g) for Front-to-face; 2.23g (10g) for Limbs**	
Date of receipt of test item .....:	Jun. 14, 2024	
Date (s) of performance of test .....:	Jun. 14, 2024 ~ Jul. 26, 2024	
Tested by (+signature)....:	Karl WANG	Karl Wang
Check by (+signature) ....:	Beryl Zhao	Beryl Zhao
Approved by (+signature):	Tomsin	Tomsin

SHENZHEN TCT TESTING TECHNOLOGY CO., LTD. TCT

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1. General Product Information

1.1. EUT description

Product Name.....:	Smartphone
Model/Type reference.....:	KINGKONG POWER 3
Hardware Version.....:	E388_MAIN_PCB_V1.1
Software Version.....:	CUBOT_E071C_KINGKONG POWER 3_V01
Rating(s).....:	Rechargeable Li-polymer Battery DC 3.87V
2G	
Operation Band.....:	GSM900, GSM1800
Supported type.....:	GSM/GPRS/EGPRS
Power Class.....:	GSM900:Power Class 5; GSM1800:Power Class 0
Modulation Type.....:	GMSK for GSM/GPRS; 8PSK for EGPRS
GSM Release Version.....:	R99
GPRS Multislot Class.....:	12
EGPRS Multislot Class.....:	12
3G	
Operation Band.....:	WCDMA Band I & Band VIII
Power Class.....:	Power Class 3
Modulation Type.....:	QPSK for WCDMA/HSDPA/HSUPA
WCDMA Release Version.....:	R99
HSDPA Release Version.....:	Release 5
HSUPA Release Version.....:	Release 6
DC-HSUPA Release Version.....:	Not Supported
LTE	
Operation Band.....:	LTE Band 1 & LTE Band 3 & LTE Band 7 & LTE Band 8 & LTE Band 20 & LTE Band 28& LTE Band 38 & LTE Band 40
Power Class.....:	Power Class 3
Modulation Type.....:	QPSK &16-QAM for LTE
WiFi 2.4G	
Supported type.....:	802.11b/802.11g/802.11n
Modulation Type.....:	802.11b: DSSS; 802.11g/802.11n:OFDM
Operation Frequency.....:	802.11b/802.11g/802.11n(HT20):2412MHz~2472MHz; 802.11n(HT40):2422MHz~2462MHz
Channel number.....:	802.11b/802.11g/802.11n(HT20):13; 802.11n(HT40):9
Channel separation.....:	5MHz

Bluetooth	
Bluetooth Version.....:	Supported BT5.0
Modulation.....:	GFSK(1Mbps) , π/4-DQPSK(2Mbps) , 8-DPSK(3Mbps)
Operation Frequency.....:	2402MHz~2480MHz
Channel number.....:	79/40
Channel separation.....:	1MHz/2MHz
Wi-Fi 5G	
Operation Frequency.....:	Band 1: 5150 MHz -5250 MHz Band 2A:5250 MHz -5350 MHz Band 2C:5470 MHz -5725 MHz Band 3: 5725 MHz -5875 MHz
Channel Bandwidth.....:	802.11a: 20MHz 802.11n: 20MHz, 40MHz 802.11ac: 20MHz, 40MHz, 80MHz
Modulation Technology.....:	Orthogonal Frequency Division Multiplexing(OFDM)
Modulation Type.....:	256QAM, 64QAM, 16QAM, BPSK, QPSK
NFC	
Operation Frequency.....:	13.56MHz
Antenna Type.....:	FPC Antenna

1.2. Model(s) list

None.

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2. Test standard

The tests were performed according to following standards:
EN 50566:2017+A1:2023
EN 50663:2017
EN IEC/IEEE 62209-1528:2021
EN 50360:2017+A1:2023
EN 62479:2010

3. Facilities and Accreditations

3.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098
  SHENZHEN TONGCE TESTING LAB
  Designation Number: CN1205
  The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.
- IC - Registration No.: 10668A-1
  SHENZHEN TONGCE TESTING LAB
  CAB identifier: CN0031
  The testing lab has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

3.2. Location

Shenzhen TCT Testing Technology Co., Ltd.
Address: 2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

3.3. Environment Condition

Temperature:	18°C ~25°C
Humidity:	35%~75% RH
Atmospheric Pressure:	1011 mbar

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4. Test Result Summary

The maximum results of Specific Absorption Rate (SAR) found during test as bellows:
<Highest Reported standalone SAR Summary>

Exposure Position	Frequency Band	Reported 10g SAR (W/kg)	Equipment Class	Highest Reported 10-g SAR (W/kg)
Head	GSM 900	0.12	PCE	**0.34**
	GSM 1800	0.14		
	WCDMA Band I	0.31		
	WCDMA Band VIII	0.13		
	LTE Band 1	0.17		
	LTE Band 3	0.24		
	LTE Band 7	**0.34**		
	LTE Band 8	0.16		
	LTE Band 20	0.12		
	LTE Band 28	0.16		
	LTE Band 38	0.32		
	LTE Band 40	0.16		
	5.2GWLAN	0.16	NII	
	5.3GWLAN	0.21		
	5.6GWLAN	0.15		
	5.8GWLAN	0.23		
	2.4GWLAN	0.16	DTS	
Body (5 mm Gap)	GSM900	0.60	PCE	**1.44**
	GSM1800	0.23		
	WCDMA Band I	0.31		
	WCDMA Band VIII	0.13		
	LTE Band 1	0.31		
	LTE Band 3	0.61		
	LTE Band 7	**1.44**		
	LTE Band 8	0.32		
	LTE Band 20	0.29		
	LTE Band 28	0.36		
	LTE Band 38	0.50		
	LTE Band 40	0.21		
	5.2GWLAN	0.23	NII	
	5.3GWLAN	0.23		
	5.6GWLAN	0.39		
	5.8GWLAN	0.35		
	2.4GWLAN	0.16	DTS	

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Exposure Position	Frequency Band	Reported 10g SAR (W/kg)	Equipment Class	Highest Reported 10-g SAR (W/kg)
Front-to-face (10 mm Gap)	GSM900	0.18	PCE	**0.53**
	GSM1800	0.07		
	WCDMA Band I	0.10		
	WCDMA Band VIII	0.05		
	LTE Band 1	0.06		
	LTE Band 3	0.14		
	LTE Band 7	**0.53**		
	LTE Band 8	0.10		
	LTE Band 20	0.13		
	LTE Band 28	0.13		
	LTE Band 38	0.21		
	LTE Band 40	0.04		
	5.2GWLAN	0.06	NII	
	5.3GWLAN	0.10		
	5.6GWLAN	0.10		
	5.8GWLAN	0.09		
	2.4GWLAN	0.04	DTS	
Wrist Worn (0 mm Gap)	GSM900	1.08	PCE	**1.76**
	GSM1800	0.82		
	WCDMA Band I	0.63		
	WCDMA Band VIII	0.39		
	LTE Band 1	0.49		
	LTE Band 3	0.93		
	LTE Band 7	**1.76**		
	LTE Band 8	0.61		
	LTE Band 20	0.50		
	LTE Band 28	0.45		
	LTE Band 38	0.71		
	LTE Band 40	0.38		
	5.2GWLAN	0.37	NII	
	5.3GWLAN	0.31		
	5.6GWLAN	0.47		
	5.8GWLAN	0.40		
	2.4GWLAN	0.25	DTS	

<Highest Reported simultaneous SAR Summary>

Exposure Position	Highest Reported Simultaneous Transmission SAR (W/kg)	Limit (W/Kg)
Head 10-g SAR	**0.57**	**2**
Body-worn 10-g SAR (5 mm Gap)	**1.83**	**2**
Front-to-face (10 mm Gap)	**0.63**	**4**
Wrist Worn (0 mm Gap)	**2.23**	**4**

The EUT battery must be fully charged and checked periodically during the test to ascertain inform power output
This EUT has two batteries, and we have pre-tested the two batteries; we record the results of the worst-case battery in this report.

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5. RF Exposure Limit

Type Exposure	AR (W kg)
	Uncontrolled Exposure Limit
Spatial Peak SAR (10g cube tissue for head and trunk)	2.00
Spatial Peak SAR (10g cube tissue for limbs)	4.00
Spatial Peak SAR (10g cube tissue for whole body)	0.08

Note:

1. *This limit is according to recommendation 1999/519/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)*

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6. SAR Measurement System Configuration

6.1. SAR Measurement Set-up

The OPENSAR system for performing compliance tests consist of the following items:

A standard high precision 6-axis robot (KUKA) with controller and software.

KUKA Control Panel (KCP)

A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with a Video Positioning System (VPS).

The stress sensor is composed with mechanical and electronic when the electronic part detects a change on the electro-mechanical switch; it sends an “Emergency signal” to the robot controller that to stop robot’s moves A computer operating Windows XP.

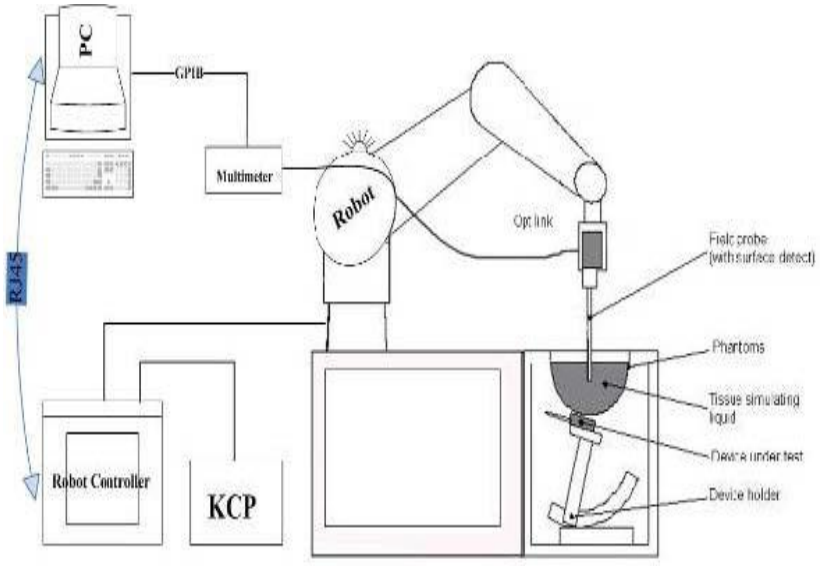
OPENSAR software Remote control with teaches pendant and additional circuitry for robot safety such as warning lamps, etc.

The SAM phantom enabling testing left-hand right-hand and body usage.

The Position device for handheld EUT

Tissue simulating liquid mixed according to the given recipes.

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



KUKA SAR Test Sysytem Configuration

6.2. E-field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by MVG).
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.

Probe Specification
Construction Symmetrical design with triangular core
Interleaved sensors
Built-in shielding against static charges
PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration ISO/IEC 17025 calibration service available.

Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	SN 25/22 EPGO375
Frequency Range of Probe	0.15 GHz-6GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.197 M Dipole 2: R2=0.230 M Dipole 3: R3=0.208 M

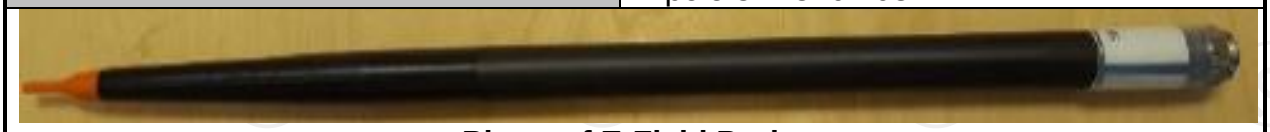
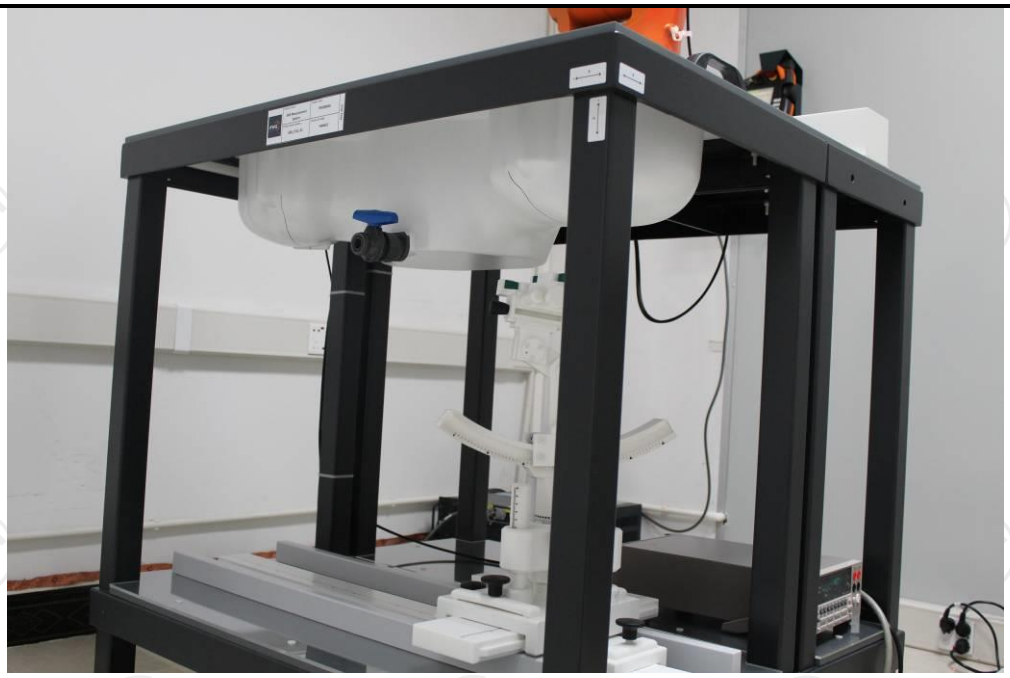


Photo of E-Field Probe

6.3. Phantom

The SAM Phantom SAM120 is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is in compliance with the specification set in IEEE P1528 and CENELEC EN IEC/IEEE 62209-1528:2021.
The phantom enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region.
A cover prevents the evaporation of the liquid.
Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot
System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections.
Body SAR testing also used the flat section between the head profiles.

Name: COMOSAR IEEE SAM PHANTOM
S/N: SN 19/15 SAM 120
Manufacture: MVG

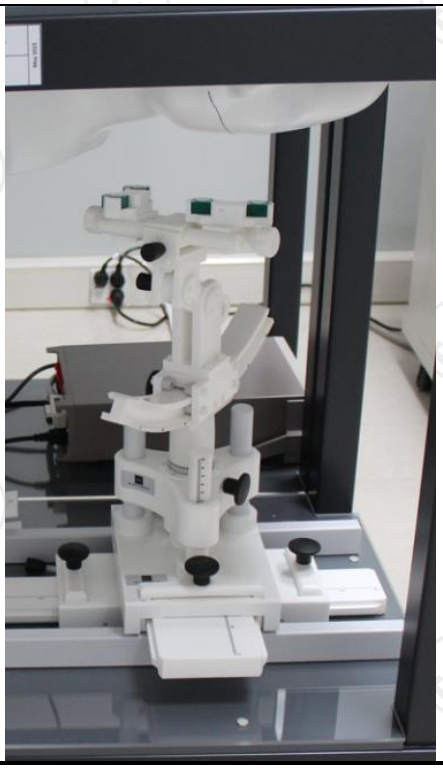


SAM Twin Phantom

6.4. Device Holder

In combination with the Generic Twin Phantom SAM120, the Mounting Device enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening.
The devices can be easily, accurately, and repeatedly positioned according to the FCC and CENELEC specifications.
The device holder can be locked at different phantom locations (left head, right head, flat phantom).

COMOSAR Mobile phone positioning system



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6.5. Data Storage and Evaluation

Data Storage

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

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

Data Evaluation

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

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

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the OPENSAR components. In the direct measuring mode of the millimetre 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:

$$\boldsymbol{Vi = Ui + Ui2 \cdot c\,f / d\,c\,pi}$$

With ***Vi*** *= compensated signal of channel i (i = x, y, z)*
Ui *= input signal of channel i (i = x, y, z)*
cf *= crest factor of exciting field (MVG parameter)*
dcpi *= diode compression point (MVG parameter)*

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

E-field probes: $\boldsymbol{Ei = (Vi / Normi \cdot ConvF)1/2}$

H-field probes: $\boldsymbol{Hi = (Vi)1/2 \cdot (ai0 + ai1\ f + ai2f2) / f}$

With ***Vi*** = *compensated signal of channel i* (*i = x, y, z*)
Normi = *sensor sensitivity of channel i* (*i = x, y, z*) *[mV/(V/m)2] for E-field Probes*
ConvF = *sensitivity enhancement in solution*
aij = *sensor sensitivity factors for H-field probes*
f = *carrier frequency [GHz]*
Ei = *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):

$$\boldsymbol{Etot = (Ex2+ EY2+ Ez2)1/2}$$

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

$$\boldsymbol{SAR = (Etot)\ 2 \cdot \ \sigma\ / (\rho \cdot 1000)}$$

with ***SAR*** = *local specific absorption rate in mW/g*
Etot = *total field strength in V/m*
σ = *conductivity in [mho/m] or [Siemens/m]*
ρ = *equivalent tissue density in g/cm3*

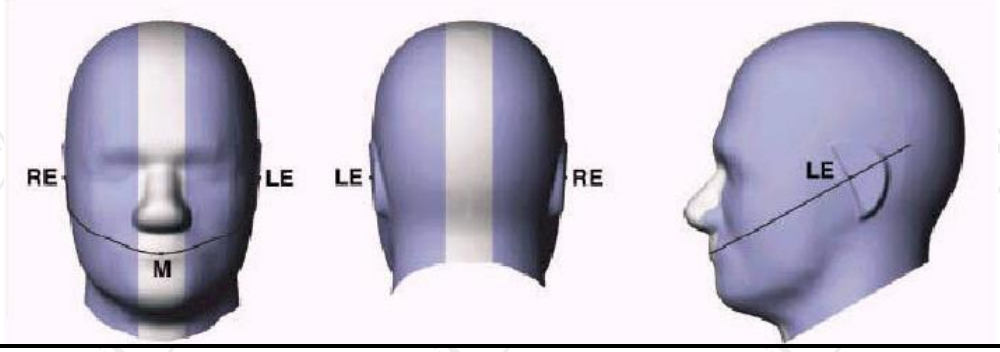
Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

6.6. Position of the wireless device in relation to the phantom

Handset Reference Points

$$P_{pwe} = E_{tot2} / 3770 \text{ or } \boldsymbol{P_{pwe} = H_{tot2} \cdot 37.7}$$

With ***Ppwe*** = *equivalent power density of a plane wave in mW/cm2*
Etot = *total electric field strength in V/m*
Htot = *total magnetic field strength in A/m*



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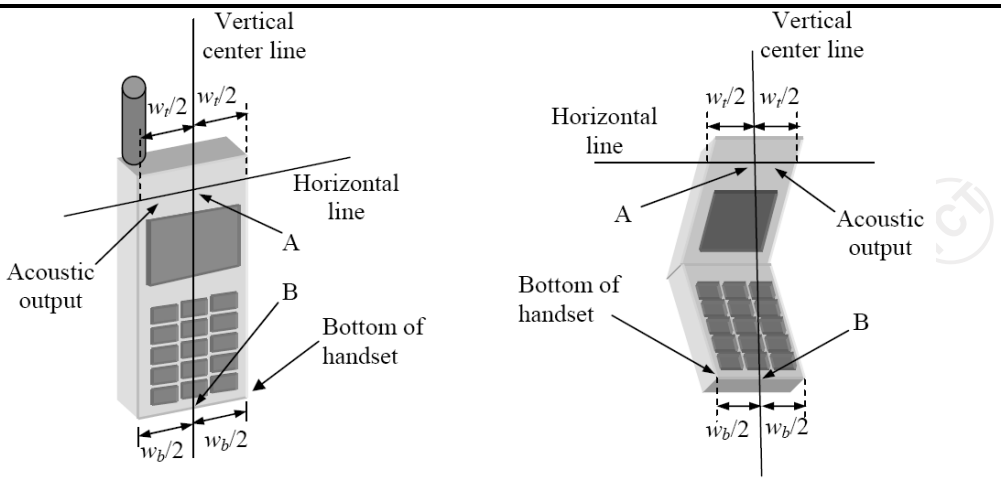
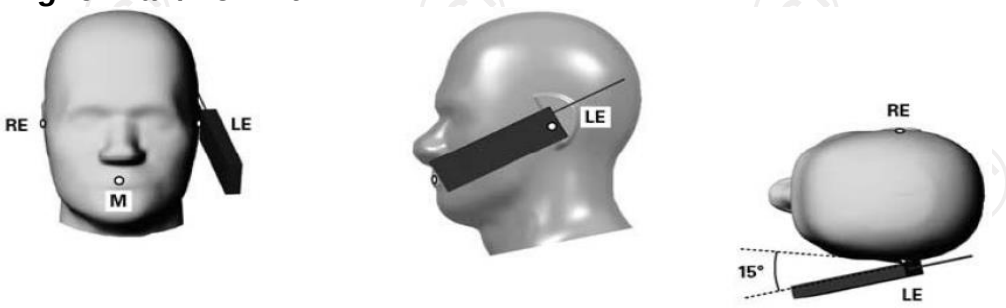


Wt Width of the handset at the level of the acoustic
Wb Width of the bottom of the handset
A Midpoint of the width wt of the handset at the level of the acoustic output
B Midpoint of the width wb of the bottom of the handset

Positioning for Cheek / Touch

Positioning for Ear / 15° Tilt



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 5mm or holster surface and the flat phantom to 0 mm.

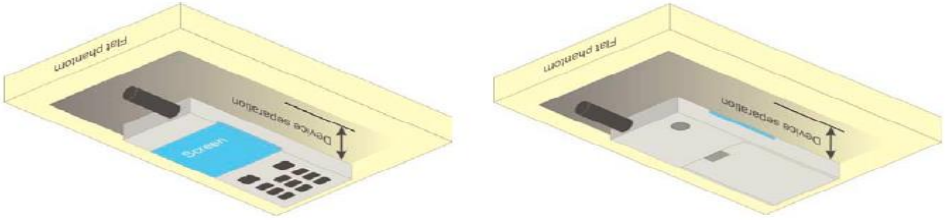


Illustration for Body Worn Position

6.7. Tissue Dielectric Parameters

According to EN IEC/IEEE 62209-1528:2021, the liquid parameters for head are the same as body requirements. For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid a depth of at least 15cm,For head SAR testing, the liquid height from the ear reference point(ERP) of the phantom to the liquid top surface is larger than 15cm, For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15cm.

Frequency (MHz)	Liquid Type	Liquid Type (σ)	± 5% Range	Permittivity (ε)	± 5% Range
300	Head	0.87	0.83~0.91	45.3	43.04~47.57
750	Head	0.87	0.83~0.91	43.5	41.33~45.68
835	Head	0.90	0.86~0.95	41.5	39.43~43.58
900	Head	0.97	0.92~1.02	41.5	39.43~43.58
1800-2000	Head	1.40	1.33~1.47	40.0	38.00~42.00
2450	Head	1.80	1.71~1.89	39.2	37.24~41.16
2600	Head	1.96	1.86~2.06	39.0	37.05~40.95
3000	Head	2.40	2.28~2.52	38.5	36.58~40.43
5800	Head	5.27	5.01~5.53	35.3	33.54~37.07

(εr = relative permittivity, σ = conductivity and ρ = 1000 kg/m3)

6.8. Tissue-equivalent Liquid Properties

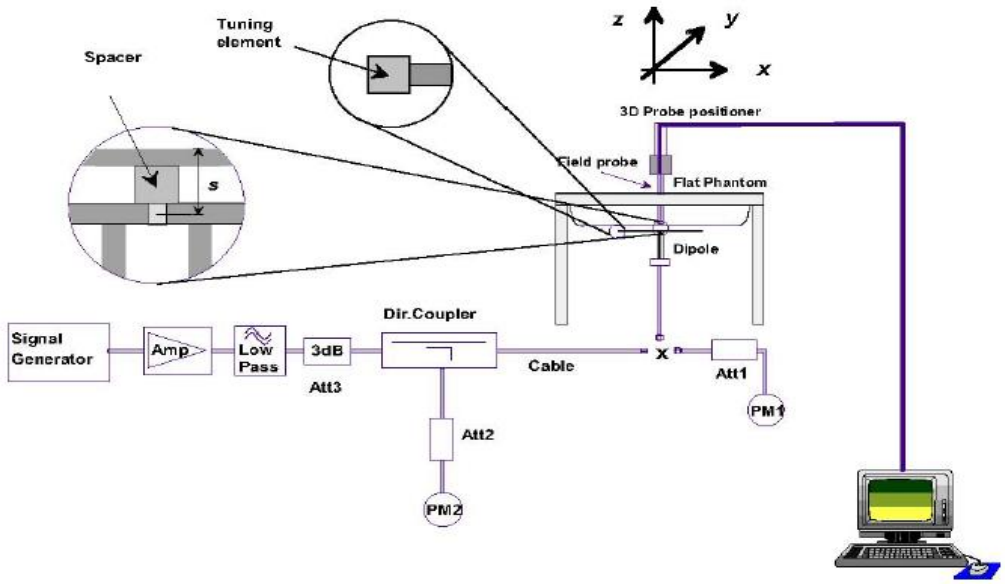
Frequency (MHz)	Test Date	Temp ℃	εr	σ(s/m)
900	06/17/2024	22	41.92	0.96
1800	06/19/2024	22	38.85	1.41
2000	06/20/2024	22	39.72	1.43
2450	06/25/2024	22	38.35	1.92
2600	06/28/2024	22	38.34	1.92
5200	07/03/2024	22	35.07	5.22
5300	07/04/2024	22	36.08	4.69
5600	07/04/2024	22	35.34	4.95
5800	07/05/2024	22	34.81	5.08

6.9. System Check

The SAR system must be validated against its performance specifications before it is deployed. When SAR probe and system component or software are changed, upgraded or recalibrated, these must be validated with the SAR system(s) that operates with such component. Reference dipoles are used with the required tissue-equivalent media for system validation.

System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10 %).

System check is performed regularly on all frequency bands where tests are performed with the OPENSAR system.



System Check Set-up

Verification Results：

Data	Frequency (MHz)	Measured Value in 31.6mW (W/kg)		Normalized to 1W (W/kg)		Target Value (W/kg)		Deviation (%)	
		1 g Average	10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average	10 g Average
06/17/2024	900	0.33	0.21	10.44	6.65	10.90	6.99	-4.19	-4.93
06/19/2024	1800	1.16	0.63	36.71	19.94	38.40	20.10	-4.40	-0.81
06/20/2024	2000	1.30	0.67	41.14	21.20	41.10	21.10	0.10	0.49
06/25/2024	2450	1.59	0.74	49.69	23.13	52.40	24.00	-5.17	-3.63
06/28/2024	2600	1.69	0.78	53.48	24.68	54.11	24.03	-1.16	2.72
07/03/2024	5200	5.01	1.81	158.7	57.2	163.88	56.90	-3.16	0.53
07/04/2024	5300	5.10	1.84	161.20	58.14	164.93	57.13	-2.31	1.74
07/04/2024	5600	5.16	2.02	163.06	63.83	165.10	59.89	-1.25	-0.62
07/05/2024	5800	5.25	2.04	165.90	64.46	165.27	60.10	0.38	6.76

Comparing to the original SAR value provided by MVG, 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 Section 10 of this report.

7. Measurement Procedure

7.1. Measurement Process Diagram

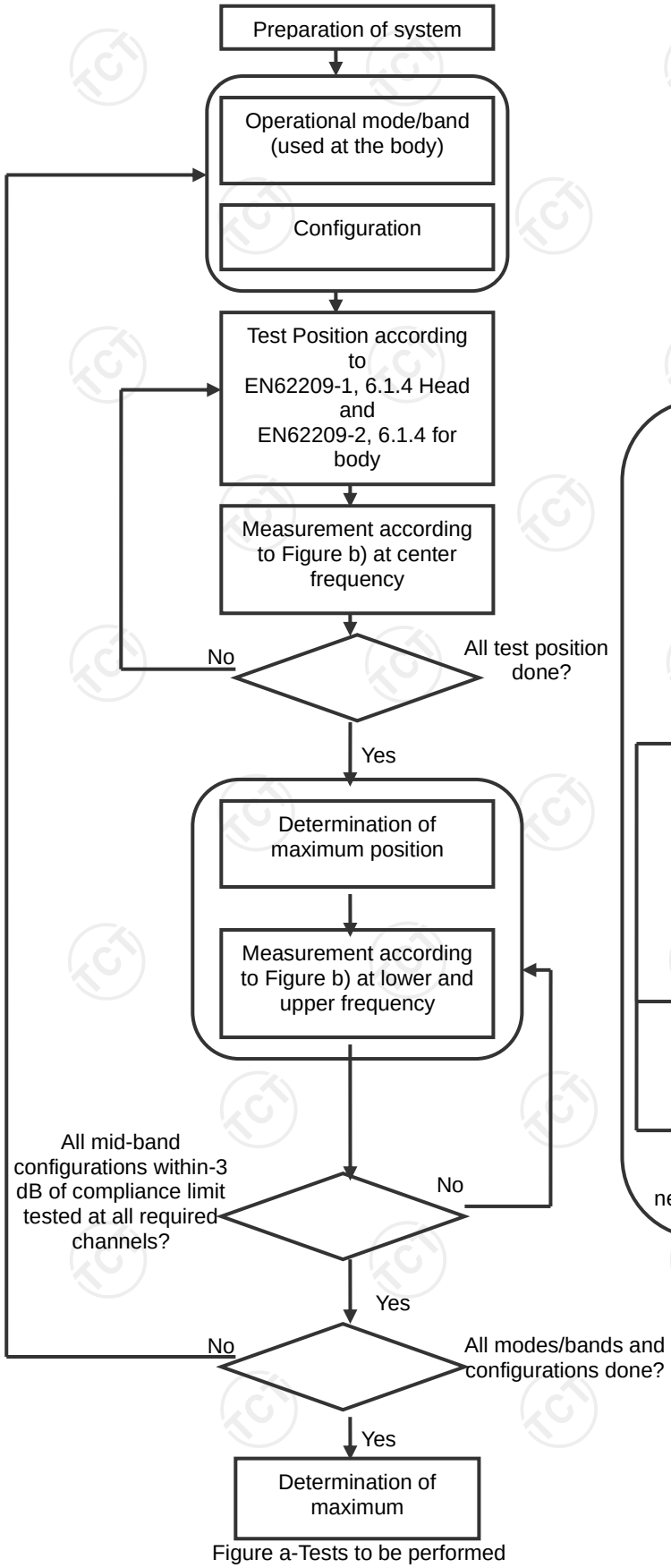


Figure a-Tests to be performed

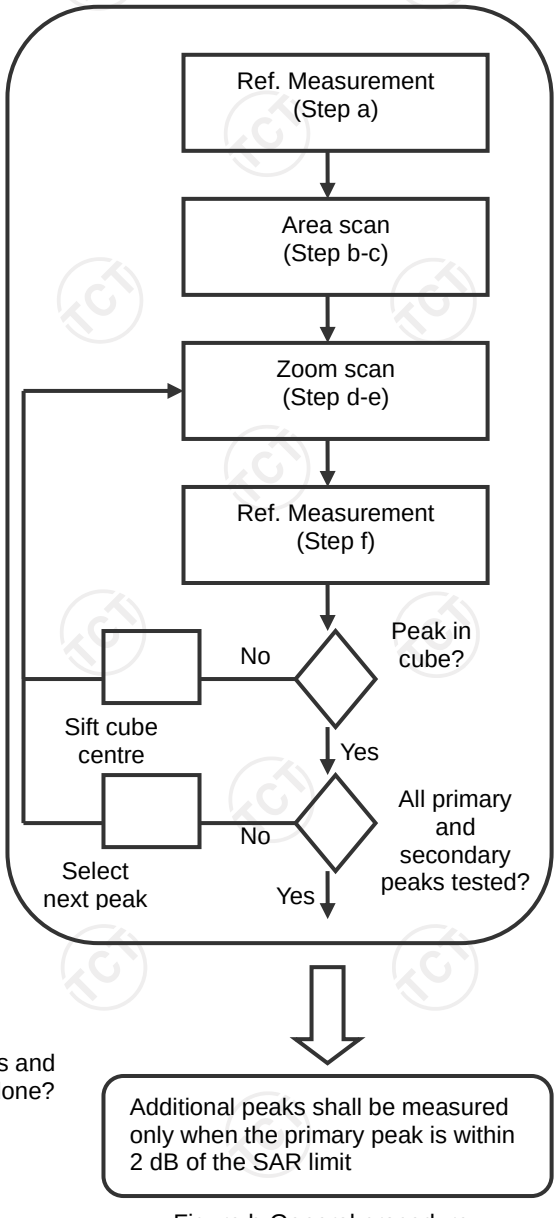


Figure b-General procedure

7.2. Measurement Procedure

Setup a Call Connection

Establish a call in handset at the maximum power level with a base station simulator via air interface, or make the EUT estimate by itself in testing band.

Power Reference Measurement

The reference and drift jobs are useful jobs for monitoring the power drift of the device under test in the batch process. Both jobs measure the field at a specified reference position, at a selectable distance from the phantom surface. The reference position can be either the selected section's grid reference point or a user point in this section. The reference job projects the selected point onto the phantom surface, orients the probe perpendicularly to the surface, and approaches the surface using the selected detection method.

Area Scan

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 a 10mm² 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 IEEE 1528-2003, EN 50361 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard.

Zoom Scan

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. The default zoom scan measures 5 x 5 x 4 points within a cube whose base faces are cantered around the maximum found in a preceding area scan job within the same procedure. If the preceding Area Scan job indicates more than one maximum, the number of Zoom Scans has to be enlarged accordingly (The default number inserted is 1).

Power Drift measurement

The drift job measures the field at the same location as the most recent reference job within the same procedure, and with the same settings. The drift measurement gives the field difference in dB from the reading conducted within the last reference measurement. Several drift measurements are possible for one reference measurement. This allows a user to monitor the power drift of the device under test within a batch process. In the properties of the Drift job, the user can specify a limit for the drift and have OPENSAR software stop the measurements if this limit is exceeded. If the power drifts more than 5%, the SAR will be retested.

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8. Conducted Output Power

Band: GSM 900	Measured Power (dBm)			Calculation (dB)	Averaged Power (dBm)		
Channel	975	60	124		975	60	124
Frequency	880.2	902	914.8		880.2	902	914.8
GSM (GMSK, Voice)	32.90	32.96	32.95	-9.03	23.87	**23.93**	23.92
GPRS (GMSK, 1-slot)	32.92	32.96	32.94	-9.03	23.89	23.93	23.91
GPRS (GMSK, 2-slot)	32.15	32.17	32.16	-6.02	26.13	**26.15**	26.14
GPRS (GMSK, 3-slot)	30.36	30.35	30.31	-4.26	26.10	26.09	26.05
GPRS (GMSK, 4-slot)	29.12	29.13	29.10	-3.01	26.11	26.12	26.09
EGPRS (GMSK, 1-slot)	27.31	27.20	27.03	-9.03	18.28	18.17	18.00
EGPRS (GMSK, 2-slot)	26.19	26.02	25.87	-6.02	20.17	20.00	19.85
EGPRS (GMSK, 3-slot)	23.88	23.76	23.72	-4.26	19.62	19.50	19.46
EGPRS (GMSK, 4-slot)	22.82	22.63	22.56	-3.01	19.81	19.62	19.55
Band: GSM 1800	Measured Power (dBm)			Calculation (dB)	Averaged Power (dBm)		
Channel	512	700	885		512	700	885
Frequency	1710.2	1747.8	1784.8		1710.2	1747.8	1784.8
GSM (GMSK, Voice)	30.73	30.27	30.05	-9.03	**21.70**	21.24	21.02
GPRS (GMSK, 1-slot)	30.74	30.26	30.06	-9.03	21.71	21.23	21.03
GPRS (GMSK, 2-slot)	29.93	29.35	29.13	-6.02	**23.91**	23.33	23.11
GPRS (GMSK, 3-slot)	27.98	27.47	27.29	-4.26	23.72	23.21	23.03
GPRS (GMSK, 4-slot)	26.94	26.31	26.22	-3.01	23.93	23.30	23.21
EGPRS (GMSK, 1-slot)	26.40	26.01	25.58	-9.03	17.37	16.98	16.55
EGPRS (GMSK, 2-slot)	25.43	24.98	24.62	-6.02	19.41	18.96	18.60
EGPRS (GMSK, 3-slot)	23.51	23.03	22.63	-4.26	19.25	18.77	18.37
EGPRS (GMSK, 4-slot)	22.29	21.82	21.13	-3.01	19.28	18.81	18.12

Note:

1. Division Factors
   To average the power, the division factor is as follows:
   1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB
   2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB
   3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB
   4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB
2. According to the conducted power as above, the body measurements are performed with 4Txslots for 900MHz and 1800 MHz for GPRS.

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Band	WCDMA Band I			WCDMA Band VIII		
Channel	9612	9750	9888	2712	2788	2863
Frequency	1922.4	1950	1977.6	882.4	897.6	912.6
RMC 12.2Kbps	**22.37**	22.05	22.15	**23.10**	22.98	22.96
HSDPA Subtest-1	21.32	20.99	21.13	22.12	21.96	21.96
HSDPA Subtest-2	21.27	20.82	21.10	21.78	21.97	21.88
HSDPA Subtest-3	21.22	20.79	20.81	21.56	21.65	21.57
HSDPA Subtest-4	21.16	20.52	20.63	21.34	21.42	21.46
HSUPA Subtest-1	21.29	20.96	21.12	22.08	21.96	21.95
HSUPA Subtest-2	21.16	20.73	21.06	22.06	21.84	21.93
HSUPA Subtest-3	21.03	20.76	20.92	21.79	21.50	21.76
HSUPA Subtest-4	20.85	20.34	20.77	21.55	21.27	21.42
HSUPA Subtest-5	20.63	20.22	20.53	21.46	21.19	21.28

Note:
1. According to the power listed above, the HSDPA and HSUPA were not determined for SAR testing.
2. The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2kbps RMC(reference measurement channel) configuration in test loop mode

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WLAN 2.4G						
Mode	802.11b			802.11g		
Channel	1	7	13	1	7	13
Frequency	2412	2442	2472	2412	2442	2472
Average Power (dBm)	16.29	**16.48**	16.05	14.30	14.45	13.80
Mode	802.11n(HT20)			802.11n(HT40)		
Channel	1	7	13	3	7	11
Frequency	2412	2442	2472	2422	2442	2462
Average Power (dBm)	14.02	14.34	13.76	13.40	13.40	13.41
BDR+EDR						
Mode	GFSK		Pi/4DQPSK		8DPSK	
Average Power (dBm)	3.91		**0.40**		0.40	
Mode	BLE(1M)					
Frequency	2402		2440		2480	
Average Power (dBm)	-4.44		-3.83		-3.50	
Mode	BLE(2M)					
Frequency	2402		2440		2480	
Average Power (dBm)	/		/		/	

Note:

1. Because the output power(eirp) of Bluetooth of the EUT is less than 20mW(13dBm), so standalone SAR are exempt according to EN62479.

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WLAN 5.2G		
Mode	IEEE 802.11a	IEEE 802.11n HT20
Channel	36	36
Frequency	5180	5180
Average Power (dBm)	10.67	10.65
Mode	IEEE 802.11n HT40	IEEE 802.11ac VHT20
Channel	38	36
Frequency	5190	5180
Average Power (dBm)	**11.02**	10.60
Mode	EEE 802.11ac VHT40	IEEE 802.11ac VHT80
Channel	38	42
Frequency	5190	5210
Average Power (dBm)	10.61	10.17
WLAN 5.3G		
Mode	IEEE 802.11a	IEEE 802.11n HT20
Channel	64	64
Frequency	5320	5320
Average Power (dBm)	**9.87**	9.24
Mode	IEEE 802.11n HT40	IEEE 802.11ac VHT20
Channel	62	64
Frequency	5310	5320
Average Power (dBm)	9.50	9.38
Mode	EEE 802.11ac VHT40	IEEE 802.11ac VHT80
Channel	62	58
Frequency	5310	5290
Average Power (dBm)	9.52	9.84

WLAN 5.6G						
Mode	IEEE 802.11a			IEEE 802.11n HT20		
Channel	100	140		100	140	
Frequency	5500	5700		5500	5700	
Average Power (dBm)	10.21	**10.71**		9.58	10.11	
Mode	IEEE 802.11n HT40			IEEE 802.11ac VHT20		
Channel	102	134		100	140	
Frequency	5510	5670		5500	5700	
Average Power (dBm)	9.78	9.47		9.60	10.06	
Mode	EEE 802.11ac VHT40			IEEE 802.11ac VHT80		
Channel	102	134		106		
Frequency	5510	5670		5530	5610	
Average Power (dBm)	9.84	9.54		9.59	9.72	
WLAN 5.8G						
Mode	IEEE 802.11a6m			IEEE 802.11n HT20		
Channel	149	157	165	149	157	165
Frequency	5745	5785	5825	5745	5785	5825
Average Power (dBm)	**10.17**	9.58	10.10	10.02	9.50	9.79
Mode	IEEE 802.11n HT40			IEEE 802.11ac VHT20		
Channel	151	159		149	157	165
Frequency	5755	5795		5745	5785	5825
Average Power (dBm)	9.41	9.55		10.12	9.58	9.86
Mode	EEE 802.11ac VHT40			IEEE 802.11ac VHT80		
Channel	151	159		155		
Frequency	5755	5795		5775		
Average Power (dBm)	9.40	9.61		9.07		

NFC

About NFC reference to Reference levels for electric, magnetic and electromagnetic fields (OHz to 300GHz,unperturbed ms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (uT)	Equivalent plane wave power density Seq(W/m2)
0-1Hz	--	3.2×104	4×104	--
1-8Hz	10000	3.2×104/f2	4×104/f2	--
8-25Hz	10000	4000/f	5000/f	--
0.025-0.8KHz	250/f	4/f	5/f	--
0.8-3KHz	250/f	5	6.25	--
3-150KHz	87	5	6.25	--
0.15-1MHz	87	0.73/f	0.92/f	--
1-10MHz	87/f1/2	0.73/f	0.92/f	--
10-400MHz	28	0.073	0.092	2
400-2000MHz	1.375f1/2	0.0037f1/2	0.0046f1/2	f/200
2-300GHz	61	0.16	0.20	10

Reference to TCT240614E025 en 62311

H-Filed Strength at 10 cm from the edges surrounding the EUT (A/m)

Frequency Range (MHz)	Test Position A (A/m)	Test Position B (A/m)	Test Position C (A/m)	Result (A/m)	Limits Test (A/m)
13.56	0.02	0.04	0.03	0.054	0.073

H = $\sqrt{A^2 + B^2 + C^2}$= $\sqrt{0.02^2 + 0.04^2 + 0.03^2}$ A/m= 0.054A/m
Limit =0.073A/m

So the SAR measurement for the of NFC is not necessary

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The conducted power measurement results for LTE

LTE-BAND 1

Condition	Channel Bandwidth	Channel	RB allocation		Average Power (dBm) QPSK	Average Power (dBm) 16-QAM
			RB Size	RB Offset		
Normal	5MHz	Low range	1	0	22.11	21.93
				max	22.03	21.85
			Partial	0	22.08	21.90
				max	22.02	21.84
		Mid range	1	0	21.90	21.72
				max	21.90	21.72
			Partial	0	21.83	21.65
				max	21.83	21.65
		High range	1	0	22.05	21.87
				max	22.17	21.99
			Partial	0	22.00	21.82
				max	22.10	21.91
	20MHz	Low range	1	0	**22.53**	22.34
				max	22.44	22.26
			Partial	0	22.43	22.25
				max	22.28	22.10
		Mid range	1	0	22.30	22.12
				max	22.30	22.12
			Partial	0	22.13	21.95
				max	22.27	22.09
		High range	1	0	22.15	21.97
				max	22.47	22.29
			Partial	0	22.16	21.98
				max	22.47	22.29

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LTE-BAND 3

Condition	Channel Bandwidth	Channel	RB allocation		Average Power (dBm) QPSK	Average Power (dBm) 16-QAM
			RB Size	RB Offset		
Normal	1.4MHz	Low range	1	0	23.39	23.21
				max	23.35	23.17
			Partial	0	23.58	23.40
				max	23.56	23.38
		Mid range	1	0	23.55	23.37
				max	23.54	23.36
			Partial	0	23.78	23.60
				max	23.79	23.61
		High range	1	0	23.91	23.73
				max	23.89	23.71
			Partial	0	24.15	23.97
				max	23.66	23.47
	5 MHz	Low range	1	0	23.52	23.33
				max	23.51	23.33
			Partial	0	23.54	23.36
				max	23.53	23.35
		Mid range	1	0	23.65	23.47
				max	23.72	23.54
			Partial	0	23.71	23.53
				max	23.78	23.60
		High range	1	0	24.00	23.82
				max	24.00	23.82
			Partial	0	23.95	23.77
				max	24.02	23.84
	20 MHz	Low range	1	0	23.41	23.23
				max	23.49	23.31
			Partial	0	23.34	23.16
				max	23.36	23.18
		Mid range	1	0	23.59	23.41
				max	23.78	23.61
			Partial	0	23.47	23.28
				max	23.65	23.48
		High range	1	0	**24.16**	23.98
				max	23.81	23.63
			Partial	0	23.70	23.58
				max	23.85	23.73

LTE-BAND 7

Condition	Channel Bandwidth	Channel	RB allocation		Average Power (dBm) QPSK	Average Power (dBm) 16-QAM
			RB Size	RB Offset		
Normal	5MHz	Low range	1	0	21.63	21.45
				max	21.71	21.53
			Partial	0	21.74	21.56
				max	21.70	21.52
		Mid range	1	0	22.35	22.17
				max	22.46	22.28
			Partial	0	22.36	22.18
				max	22.45	22.27
		High range	1	0	22.98	22.80
				max	23.04	22.86
			Partial	0	23.06	22.88
				max	22.58	22.39
	20MHz	Low range	1	0	21.94	21.76
				max	21.57	21.38
			Partial	0	21.49	21.31
				max	21.80	21.62
		Mid range	1	0	22.57	22.39
				max	22.16	21.98
			Partial	0	22.06	21.88
				max	22.42	22.24
		High range	1	0	**23.16**	22.98
				max	22.94	22.76
			Partial	0	22.63	22.45
				max	22.85	22.67

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LTE-BAND 8

Condition	Channel Bandwidth	Channel	RB allocation		Average Power (dBm) QPSK	Average Power (dBm) 16-QAM
			RB Size	RB Offset		
Normal	1.4MHz	Low range	1	0	23.99	23.81
				max	23.98	23.80
			Partial	0	24.15	23.97
				max	24.13	23.95
		Mid range	1	0	23.87	23.69
				max	23.85	23.67
			Partial	0	24.04	23.86
				max	24.04	23.86
		High range	1	0	23.74	23.56
				max	23.67	23.49
			Partial	0	23.98	23.80
				max	23.95	23.76
	5 MHz	Low range	1	0	24.15	23.96
				max	24.05	23.87
			Partial	0	24.12	23.94
				max	24.18	24.00
		Mid range	1	0	24.14	23.96
				max	23.99	23.81
			Partial	0	24.04	23.86
				max	23.98	23.80
		High range	1	0	23.93	23.75
				max	23.87	23.69
			Partial	0	23.87	23.69
				max	23.81	23.63
	10 MHz	Low range	1	0	**24.19**	24.01
				max	24.07	23.89
			Partial	0	24.08	23.90
				max	24.03	23.85
		Mid range	1	0	24.07	23.89
				max	23.97	23.80
			Partial	0	23.98	23.79
				max	23.90	23.73
		High range	1	0	23.95	23.77
				max	23.86	23.68
			Partial	0	23.84	23.72
				max	23.76	23.64

LTE-BAND 20

Condition	Channel Bandwidth	Channel	RB allocation		Average Power (dBm) QPSK	Average Power (dBm) 16-QAM
			RB Size	RB Offset		
Normal	5MHz	Low range	1	0	24.22	24.04
				max	24.26	24.08
			Partial	0	24.27	24.09
				max	24.25	24.07
		Mid range	1	0	24.40	24.22
				max	24.34	24.16
			Partial	0	24.21	24.03
				max	24.30	24.12
		High range	1	0	24.33	24.15
				max	24.25	24.07
			Partial	0	24.41	24.23
				max	24.31	24.12
	20MHz	Low range	1	0	**24.42**	24.23
				max	24.32	24.14
			Partial	0	24.10	23.92
				max	24.16	23.98
		Mid range	1	0	24.20	24.02
				max	24.25	24.07
			Partial	0	24.13	23.95
				max	24.37	24.19
		High range	1	0	24.11	23.93
				max	24.13	23.95
			Partial	0	24.17	23.99
				max	24.04	23.86

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LTE-BAND 28

Condition	Channel Bandwidth	Channel	RB allocation		Average Power (dBm) QPSK	Average Power (dBm) 16-QAM
			RB Size	RB Offset		
Normal	3MHz	Low range	1	0	22.81	22.63
				max	22.90	22.72
			Partial	0	22.84	22.66
				max	22.84	22.66
		Mid range	1	0	22.96	22.78
				max	22.98	22.80
			Partial	0	22.90	22.72
				max	22.94	22.76
		High range	1	0	23.13	22.95
				max	23.07	22.89
			Partial	0	23.12	22.94
				max	23.21	23.02
	5MHz	Low range	1	0	23.11	22.92
				max	23.16	22.98
			Partial	0	23.09	22.91
				max	23.12	22.94
		Mid range	1	0	23.20	23.02
				max	23.28	23.10
			Partial	0	23.18	23.00
				max	23.20	23.02
		High range	1	0	23.43	23.25
				max	23.47	23.29
			Partial	0	23.30	23.12
				max	23.11	22.93
	20MHz	Low range	1	0	**23.51**	23.33
				max	23.26	23.08
			Partial	0	22.98	22.80
				max	23.10	22.92
		Mid range	1	0	23.11	22.93
				max	23.29	23.12
			Partial	0	23.11	22.92
				max	23.20	23.03
		High range	1	0	23.07	22.89
				max	23.24	23.06
			Partial	0	23.09	22.97
				max	23.32	23.20

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LTE-BAND 38

Condition	Channel Bandwidth	Channel	RB allocation		Average Power (dBm) QPSK	Average Power (dBm) 16-QAM
			RB Size	RB Offset		
Normal	5MHz	Low range	1	0	23.18	23.00
				max	23.22	23.04
			Partial	0	23.25	23.07
				max	23.28	23.10
		Mid range	1	0	23.34	23.16
				max	23.38	23.20
			Partial	0	22.24	22.06
				max	23.37	23.19
		High range	1	0	23.31	23.13
				max	23.29	23.11
			Partial	0	23.36	23.18
				max	23.33	23.14
	20MHz	Low range	1	0	22.13	21.94
				max	23.26	23.08
			Partial	0	23.06	22.88
				max	23.19	23.01
		Mid range	1	0	22.19	22.01
				max	23.28	23.10
			Partial	0	23.16	22.98
				max	23.16	22.98
		High range	1	0	**23.39**	23.21
				max	23.26	23.08
			Partial	0	23.15	22.97
				max	23.06	22.88

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LTE-BAND 40

Condition	Channel Bandwidth	Channel	RB allocation		Average Power (dBm) QPSK	Average Power (dBm) 16-QAM
			RB Size	RB Offset		
Normal	5MHz	Low range	1	0	23.91	23.73
				max	24.53	24.35
			Partial	0	23.98	23.80
				max	24.47	24.29
		Mid range	1	0	24.59	24.41
				max	24.46	24.28
			Partial	0	24.61	24.43
				max	24.44	24.26
		High range	1	0	23.63	23.45
				max	23.38	23.20
			Partial	0	23.62	23.44
				max	23.30	23.11
	20MHz	Low range	1	0	24.00	23.81
				max	23.76	23.58
			Partial	0	24.19	24.01
				max	24.52	24.34
		Mid range	1	0	**24.65**	24.47
				max	24.25	24.07
			Partial	0	24.33	24.15
				max	23.95	23.77
		High range	1	0	23.70	23.52
				max	23.42	23.24
			Partial	0	23.44	23.26
				max	23.07	22.89

9. SAR Test Results Summary

9.1. Head SAR 10g Value

Band	Mode	Position	CH.	Freq. (MHz)	Meas. Power (dBm)	Max. Tune-Up Power (dBm)	Power Drift (%)	Meas. SAR10g (W/kg)	Scaling Factor	Reported SAR10g (W/kg)	Limit (W/Kg)
GSM900	voice	Right Cheek	60	902	32.96	33.00	-3.51	0.11	1.009	0.11	2.00
		Right Tilt	60	902	32.96	33.00	1.30	0.09	1.009	0.09	
		Left Cheek	60	902	32.96	33.00	-1.86	0.12	1.009	**0.12**	
		Left Tilt	60	902	32.96	33.00	-0.37	0.06	1.009	0.06	
GSM1800	voice	Right Cheek	512	1710.2	30.73	31.00	-1.15	0.10	1.064	0.11	
		Right Tilt	512	1710.2	30.73	31.00	0.62	0.06	1.064	0.06	
		Left Cheek	512	1710.2	30.73	31.00	-1.56	0.13	1.064	**0.14**	
		Left Tilt	512	1710.2	30.73	31.00	-2.96	0.08	1.064	0.09	
WCDMA Band I	RMC	Right Cheek	9612	1922.4	22.37	22.50	2.74	0.24	1.030	0.25	
		Right Tilt	9612	1922.4	22.37	22.50	1.69	0.16	1.030	0.16	
		Left Cheek	9612	1922.4	22.37	22.50	0.90	0.30	1.030	**0.31**	
		Left Tilt	9612	1922.4	22.37	22.50	-2.51	0.16	1.030	0.16	
WCDMA Band VIII	RMC	Right Cheek	2712	882.4	23.10	23.50	-1.89	0.11	1.096	0.12	
		Right Tilt	2712	882.4	23.10	23.50	0.69	0.08	1.096	0.09	
		Left Cheek	2712	882.4	23.10	23.50	-1.86	0.12	1.096	0.13	
		Left Tilt	2712	882.4	23.10	23.50	2.52	0.09	1.096	0.10	
802.11b	DATA	Right Cheek	7	2442	16.48	16.50	-1.96	0.12	1.005	0.12	
		Right Tilt	7	2442	16.48	16.50	2.63	0.07	1.005	0.07	
		Left Cheek	7	2442	16.48	16.50	-0.30	0.16	1.005	**0.16**	
		Left Tilt	7	2442	16.48	16.50	0.77	0.09	1.005	0.09	
802.11n	DATA	Right Cheek	38	5190	11.02	11.50	-1.85	0.16	1.117	0.18	
		Right Tilt	38	5190	11.02	11.50	2.68	0.12	1.117	0.13	
		Left Cheek	38	5190	11.02	11.50	-1.26	0.19	1.117	**0.21**	
		Left Tilt	38	5190	11.02	11.50	0.99	0.10	1.117	0.11	

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802.11a	DATA	Right Cheek	64	5320	9.87	10.00	-1.48	0.12	1.030	0.12	2.00
		Right Tilt	64	5320	9.87	10.00	0.62	0.06	1.030	0.06	
		Left Cheek	64	5320	9.87	10.00	-1.56	0.15	1.030	**0.15**	
		Left Tilt	64	5320	9.87	10.00	2.60	0.09	1.030	0.09	
802.11a	DATA	Right Cheek	140	5700	10.70	11.00	2.81	0.20	1.072	0.21	
		Right Tilt	140	5700	10.70	11.00	0.62	0.12	1.072	0.13	
		Left Cheek	140	5700	10.70	11.00	0.60	0.21	1.072	**0.23**	
		Left Tilt	140	5700	10.70	11.00	-1.95	0.13	1.072	0.14	
802.11a6m	DATA	Right Cheek	149	5745	10.17	10.50	-2.96	0.12	1.079	0.13	
		Right Tilt	149	5745	10.17	10.50	1.85	0.08	1.079	0.09	
		Left Cheek	149	5745	10.17	10.50	-1.90	0.15	1.079	**0.16**	
		Left Tilt	149	5745	10.17	10.50	0.64	0.05	1.079	0.05	

Band	Mode	Test Position	CH.	Freq. (MHz)	RB allocation	RB offset	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR10g (W/kg)	Scaling Factor	Reported SAR10g (W/kg)
LTE Band 1	QPSK (20MHz)	Right Cheek	18100	1930	1	0	22.53	23.00	1.52	0.13	1.114	0.14
		Right Tilt	18100	1930	1	0	22.53	23.00	0.68	0.10	1.114	0.11
		Left Cheek	18100	1930	1	0	22.53	23.00	0.15	0.15	1.114	**0.17**
		Left Tilt	18100	1930	1	0	22.53	23.00	-1.57	0.09	1.114	0.10
LTE Band 3	QPSK (20MHz)	Right Cheek	19850	1775	1	0	24.16	24.50	2.41	0.18	1.081	0.19
		Right Tilt	19850	1775	1	0	24.16	24.50	0.86	0.12	1.081	0.13
		Left Cheek	19850	1775	1	0	24.16	24.50	0.61	0.22	1.081	**0.24**
		Left Tilt	19850	1775	1	0	24.16	24.50	-1.62	0.13	1.081	0.14
LTE Band 7	QPSK (20MHz)	Right Cheek	21350	2560	1	0	23.16	23.50	-1.85	0.29	1.081	0.31
		Right Tilt	21350	2560	1	0	23.16	23.50	-1.23	0.17	1.081	0.18
		Left Cheek	21350	2560	1	0	23.16	23.50	1.35	0.31	1.081	**0.34**
		Left Tilt	21350	2560	1	0	23.16	23.50	0.20	0.15	1.081	0.16
LTE Band 8	QPSK (10MHz)	Right Cheek	21500	885	1	0	24.19	24.50	3.49	0.14	1.074	0.15
		Right Tilt	21500	885	1	0	24.19	24.50	0.58	0.09	1.074	0.10
		Left Cheek	21500	885	1	0	24.19	24.50	1.96	0.15	1.074	**0.16**
		Left Tilt	21500	885	1	0	24.19	24.50	-1.75	0.11	1.074	0.12
LTE Band 20	QPSK (20MHz)	Right Cheek	24250	842	1	0	24.42	24.50	-1.78	0.11	1.019	0.11
		Right Tilt	24250	842	1	0	24.42	24.50	2.68	0.06	1.019	0.06
		Left Cheek	24250	842	1	0	24.42	24.50	0.20	0.12	1.019	**0.12**
		Left Tilt	24250	842	1	0	24.42	24.50	1.79	0.06	1.019	0.06

LTE Band 28	QPSK (20MHz)	Right Cheek	27310	713	1	0	23.51	24.00	1.52	0.13	1.119	0.15
		Right Tilt	27310	713	1	0	23.51	24.00	2.61	0.08	1.119	0.09
		Left Cheek	27310	713	1	0	23.51	24.00	1.59	0.14	1.119	**0.16**
		Left Tilt	27310	713	1	0	23.51	24.00	0.89	0.06	1.119	0.07
LTE Band 38	QPSK (20MHz)	Right Cheek	38150	2610	1	0	23.39	23.50	2.89	0.28	1.026	0.29
		Right Tilt	38150	2610	1	0	23.39	23.50	1.61	0.14	1.026	0.14
		Left Cheek	38150	2610	1	0	23.39	23.50	-1.26	0.31	1.026	**0.32**
		Left Tilt	38150	2610	1	0	23.39	23.50	-1.55	0.17	1.026	0.17
LTE Band 40	QPSK (20MHz)	Right Cheek	39150	2350	1	0	24.65	25.00	2.94	0.11	1.084	0.12
		Right Tilt	39150	2350	1	0	24.65	25.00	0.75	0.07	1.084	0.08
		Left Cheek	39150	2350	1	0	24.65	25.00	-2.50	0.15	1.084	**0.16**
		Left Tilt	39150	2350	1	0	24.65	25.00	0.23	0.06	1.084	0.07

9.2. Body-Worn 10g SAR Value

Band	Mode	Test Position with 5mm	CH.	Freq. (MHz)	Meas. Power (dBm)	Max. Tune-Up Power (dBm)	Power Drift (%)	Meas. SAR10g (W/kg)	Scaling Factor	Reported SAR10g (W/kg)	Limit (W/Kg)
GSM900	voice	Back	60	902	32.96	33.00	1.12	0.55	1.009	0.56	2.00
		Front	60	902	32.96	33.00	1.85	0.38	1.009	0.38	
	GPRS 2 slots	Back	60	902	32.17	32.50	-4.42	0.56	1.079	**0.60**	
		Front	60	902	32.17	32.50	2.89	0.30	1.079	0.32	
		Left	60	902	32.17	32.50	1.51	0.07	1.079	0.08	
		Right	60	902	32.17	32.50	-1.68	0.04	1.079	0.04	
		Top	60	902	32.17	32.50	0.51	0.03	1.079	0.03	
		Bottom	60	902	32.17	32.50	1.17	0.03	1.079	0.03	
GSM1800	voice	Back	512	1710.2	30.73	31.00	-3.63	0.22	1.064	**0.23**	
		Front	512	1710.2	30.73	31.00	-0.62	0.16	1.064	0.17	
	GPRS 2 slots	Back	512	1710.2	29.93	30.00	-4.66	0.21	1.016	0.21	
		Front	512	1710.2	29.93	30.00	-2.89	0.12	1.016	0.12	
		Left	512	1710.2	29.93	30.00	0.62	0.03	1.016	0.03	
		Right	512	1710.2	29.93	30.00	1.74	0.03	1.016	0.03	
		Top	512	1710.2	29.93	30.00	0.50	0.02	1.016	0.02	
		Bottom	512	1710.2	29.93	30.00	-0.60	0.05	1.016	0.05	
WCDMA Band I	RMC	Back	9612	1922.4	22.37	22.50	0.90	0.30	1.030	**0.31**	
		Front	9612	1922.4	22.37	22.50	1.92	0.21	1.030	0.22	
		Left	9612	1922.4	22.37	22.50	2.62	0.02	1.030	0.02	
		Right	9612	1922.4	22.37	22.50	0.52	0.03	1.030	0.03	
		Top	9612	1922.4	22.37	22.50	1.63	0.01	1.030	0.01	
		Bottom	9612	1922.4	22.37	22.50	-2.22	0.02	1.030	0.02	

WCDMA Band VIII	RMC	Back	2712	882.4	23.10	23.50	-1.86	0.12	1.096	**0.13**	
		Front	2712	882.4	23.10	23.50	-1.52	0.08	1.096	0.09	
		Left	2712	882.4	23.10	23.50	0.86	0.02	1.096	0.02	
		Right	2712	882.4	23.10	23.50	-1.62	0.01	1.096	0.01	
		Top	2712	882.4	23.10	23.50	0.29	0.01	1.096	0.01	
		Bottom	2712	882.4	23.10	23.50	1.84	0.02	1.096	0.02	
802.11b	DATA	Back	7	2442	16.48	16.50	-0.30	0.16	1.005	**0.16**	**2.00**
		Front	7	2442	16.48	16.50	0.89	0.09	1.005	0.09	
		Left	7	2442	16.48	16.50	1.52	0.02	1.005	0.02	
		Right	7	2442	16.48	16.50	-0.30	0.02	1.005	0.02	
		Top	7	2442	16.48	16.50	1.95	0.02	1.005	0.02	
		Bottom	7	2442	16.48	16.50	1.75	0.02	1.005	0.02	
802.11n	DATA	Back	38	5190	11.02	11.50	-1.52	0.21	1.117	**0.23**	
		Front	38	5190	11.02	11.50	-2.62	0.12	1.117	0.13	
		Left	38	5190	11.02	11.50	0.75	0.02	1.117	0.02	
		Right	38	5190	11.02	11.50	-1.63	0.03	1.117	0.03	
		Top	38	5190	11.02	11.50	0.85	0.02	1.117	0.02	
		Bottom	38	5190	11.02	11.50	0.95	0.04	1.117	0.04	
802.11a	DATA	Back	64	5320	9.87	10.00	0.95	0.22	1.030	**0.23**	
		Front	64	5320	9.87	10.00	-1.45	0.14	1.030	0.14	
		Left	64	5320	9.87	10.00	0.62	0.02	1.030	0.02	
		Right	64	5320	9.87	10.00	-2.91	0.01	1.030	0.01	
		Top	64	5320	9.87	10.00	0.85	0.01	1.030	0.01	
		Bottom	64	5320	9.87	10.00	1.67	0.03	1.030	0.03	

802.11a	DATA	Back	140	5700	10.70	11.00	1.62	0.36	1.072	**0.39**	**2.00**
		Front	140	5700	10.70	11.00	-3.15	0.17	1.072	0.18	
		Left	140	5700	10.70	11.00	0.52	0.03	1.072	0.03	
		Right	140	5700	10.70	11.00	-2.91	0.02	1.072	0.02	
		Top	140	5700	10.70	11.00	0.57	0.02	1.072	0.02	
		Bottom	140	5700	10.70	11.00	0.23	0.05	1.072	0.05	
802.11a6 m	DATA	Back	149	5745	10.17	10.50	0.32	0.32	1.079	**0.35**	
		Front	149	5745	10.17	10.50	-1.79	0.14	1.079	0.15	
		Left	149	5745	10.17	10.50	0.52	0.03	1.079	0.03	
		Right	149	5745	10.17	10.50	2.63	0.03	1.079	0.03	
		Top	149	5745	10.17	10.50	-1.75	0.02	1.079	0.02	
		Bottom	149	5745	10.17	10.50	2.60	0.04	1.079	0.04	

Band	Mode	Test Position with 5mm	CH.	Freq. (MHz)	RB allocation	RB offset	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR10g (W/kg)	Scaling Factor	Reported SAR10g (W/kg)
LTE Band 1	QPSK (20MHz)	Back	18100	1930	1	0	22.53	23.00	-3.77	0.28	1.114	**0.31**
		Front	18100	1930	1	0	22.53	23.00	1.85	0.15	1.114	0.17
		Left	18100	1930	1	0	22.53	23.00	0.62	0.03	1.114	0.03
		Right	18100	1930	1	0	22.53	23.00	-1.95	0.03	1.114	0.03
		Top	18100	1930	1	0	22.53	23.00	-2.75	0.01	1.114	0.01
		Bottom	18100	1930	1	0	22.53	23.00	0.62	0.01	1.114	0.01
LTE Band 3	QPSK (20MHz)	Back	19850	1775	1	0	24.16	24.50	-4.84	0.56	1.081	**0.61**
		Front	19850	1775	1	0	24.16	24.50	-3.75	0.36	1.081	0.39
		Left	19850	1775	1	0	24.16	24.50	0.52	0.08	1.081	0.09
		Right	19850	1775	1	0	24.16	24.50	0.89	0.10	1.081	0.11
		Top	19850	1775	1	0	24.16	24.50	-1.26	0.03	1.081	0.03
		Bottom	19850	1775	1	0	24.16	24.50	0.51	0.08	1.081	0.09

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LTE Band 7	QPSK (20MHz)	Back	20850	2510	1	0	21.94	23.50	-2.60	0.90	1.432	1.29
			21100	2535	1	0	22.57	23.50	1.59	0.97	1.239	1.20
			21350	2560	1	0	23.16	23.50	-1.30	1.33	1.081	**1.44**
		Front	21350	2560	1	0	23.16	23.50	-2.96	0.92	1.081	0.99
		Left	21350	2560	1	0	23.16	23.50	0.84	0.18	1.081	0.19
		Right	21350	2560	1	0	23.16	23.50	-1.08	0.13	1.081	0.14
		Top	21350	2560	1	0	23.16	23.50	2.34	0.04	1.081	0.04
		Bottom	21350	2560	1	0	23.16	23.50	0.91	0.12	1.081	0.13
LTE Band 8	QPSK (10MHz)	Back	21500	885	1	0	24.19	24.50	0.28	0.30	1.074	**0.32**
		Front	21500	885	1	0	24.19	24.50	2.95	0.15	1.074	0.16
		Left	21500	885	1	0	24.19	24.50	0.89	0.02	1.074	0.02
		Right	21500	885	1	0	24.19	24.50	0.78	0.02	1.074	0.02
		Top	21500	885	1	0	24.19	24.50	-1.26	0.01	1.074	0.01
		Bottom	21500	885	1	0	24.19	24.50	-1.75	0.01	1.074	0.01
LTE Band 20	QPSK (20MHz)	Back	24250	842	1	0	24.42	24.50	-1.51	0.28	1.019	**0.29**
		Front	24250	842	1	0	24.42	24.50	-2.81	0.18	1.019	0.18
		Left	24250	842	1	0	24.42	24.50	0.62	0.03	1.019	0.03
		Right	24250	842	1	0	24.42	24.50	1.85	0.01	1.019	0.01
		Top	24250	842	1	0	24.42	24.50	-0.95	0.01	1.019	0.01
		Bottom	24250	842	1	0	24.42	24.50	0.95	0.01	1.019	0.01
LTE Band 28	QPSK (20MHz)	Back	27310	713	1	0	23.51	24.00	-3.44	0.32	1.119	**0.36**
		Front	27310	713	1	0	23.51	24.00	-2.81	0.14	1.119	0.16
		Left	27310	713	1	0	23.51	24.00	0.52	0.01	1.119	0.01
		Right	27310	713	1	0	23.51	24.00	1.26	0.01	1.119	0.01
		Top	27310	713	1	0	23.51	24.00	-3.17	0.01	1.119	0.01
		Bottom	27310	713	1	0	23.51	24.00	-0.85	0.01	1.119	0.01

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LTE Band 38	QPSK (20MHz)	Back	38150	2610	1	0	23.39	23.50	-4.07	0.49	1.026	**0.50**
		Front	38150	2610	1	0	23.39	23.50	-1.85	0.30	1.026	0.31
		Left	38150	2610	1	0	23.39	23.50	0.62	0.06	1.026	0.06
		Right	38150	2610	1	0	23.39	23.50	2.74	0.06	1.026	0.06
		Top	38150	2610	1	0	23.39	23.50	0.90	0.02	1.026	0.02
		Bottom	38150	2610	1	0	23.39	23.50	-1.51	0.09	1.026	0.09
LTE Band 40	QPSK (20MHz)	Back	39150	2350	1	0	24.65	25.00	-1.67	0.19	1.084	**0.21**
		Front	39150	2350	1	0	24.65	25.00	0.75	0.11	1.084	0.12
		Left	39150	2350	1	0	24.65	25.00	2.68	0.03	1.084	0.03
		Right	39150	2350	1	0	24.65	25.00	0.62	0.01	1.084	0.01
		Top	39150	2350	1	0	24.65	25.00	-2.49	0.02	1.084	0.02
		Bottom	39150	2350	1	0	24.65	25.00	0.95	0.01	1.084	0.01

Note:

1. *Body-worn SAR testing was performed at 0mm separation, and this distance is determined by the handset manufacturer that there will be body-worn accessories that users may acquire at the time of equipment certification, to enable users to purchase aftermarket body-worn accessories with the required minimum separation.*
2. *Determination of the worst-case configuration and all configurations with less than 3 dB of applicable limits.*
3. *When 10g SAR ≤ 1.0 W/kg, testing for low and high channel is optional.*

9.3. Front-to-face 10g SAR

Band	Mode	Test Position with 10mm	CH.	Freq. (MHz)	Meas. Power (dBm)	Max. Tune-Up Power (dBm)	Power Drift (%)	Meas. SAR10g (W/kg)	Scaling Factor	Reported SAR10g (W/kg)	Limit (W/Kg)
GSM900	voice	Front	60	902	32.96	33.00	1.50	0.18	1.009	0.18	
GSM1800	voice	Front	512	1710.2	30.73	31.00	2.72	0.07	1.064	0.07	
WCDMA Band I	RMC	Front	9612	1922.4	22.37	22.50	-3.51	0.10	1.030	0.10	
WCDMA Band VIII	RMC	Front	2712	882.4	23.10	23.50	0.94	0.05	1.096	0.05	
802.11b	DATA	Front	7	2442	16.48	16.50	-1.62	0.04	1.005	0.04	**4.00**
802.11n	DATA	Front	38	5190	11.02	11.50	-2.60	0.05	1.117	0.06	
802.11a	DATA	Front	64	5320	9.87	10.00	-1.76	0.10	1.030	0.10	
802.11a	DATA	Front	140	5700	10.70	11.00	0.85	0.09	1.072	0.10	
802.11a6m	DATA	Front	149	5745	10.17	10.50	-1.96	0.08	1.079	0.09	

Band	Mode	Test Position with 10mm	CH.	Freq. (MHz)	RB allocation	RB offset	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR10g (W/kg)	Scaling Factor	Reported SAR10g (W/kg)
LTE Band 1	QPSK (20MHz)	Front	18100	1930	1	0	22.53	23.00	-2.42	0.05	1.114	0.06
LTE Band 3	QPSK (20MHz)	Front	19850	1775	1	0	24.16	24.50	0.94	0.13	1.081	0.14
LTE Band 7	QPSK (20MHz)	Front	21350	2560	1	0	23.16	23.50	1.53	0.49	1.081	**0.53**
LTE Band 8	QPSK (10MHz)	Front	21500	885	1	0	24.19	24.50	-0.72	0.09	1.074	0.10
LTE Band 20	QPSK (20MHz)	Front	24250	842	1	0	24.42	24.50	-1.95	0.13	1.019	0.13
LTE Band 28	QPSK (20MHz)	Front	27310	713	1	0	23.51	24.00	0.62	0.12	1.119	0.13
LTE Band 38	QPSK (20MHz)	Front	38150	2610	1	0	23.39	23.50	-2.99	0.20	1.026	0.21
LTE Band 40	QPSK (20MHz)	Front	39150	2350	1	0	24.65	25.00	-1.63	0.04	1.084	0.04

Note:

1. *Front-to-face SAR testing was performed at 10mm separation.*
2. *Determination of the worst-case configuration and all configurations with less than 3 dB of applicable limits.*
3. *When 10g SAR ≤ 2.0 W/kg for front-to-face, testing for low and high channel is optional.*

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9.4. Wrist Worn 10g SAR

Band	Mode	Test Position with 0mm	CH.	Freq. (MHz)	Meas. Power (dBm)	Max. Tune-Up Power (dBm)	Power Drift (%)	Meas. SAR10g (W/kg)	Scaling Factor	Reported SAR10g (W/kg)	Limit (W/Kg)
GSM900	voice	Back	60	902	32.96	33.00	-0.72	1.07	1.009	1.08	**4.00**
	GPRS 2 slots	Back	60	902	32.17	32.50	0.69	0.96	1.079	1.04	
GSM1800	voice	Back	512	1710.2	30.73	31.00	-3.58	0.77	1.064	0.82	
	GPRS 2 slots	Back	512	1710.2	29.93	30.00	-3.04	0.80	1.016	0.81	
WCDMA Band I	RMC	Back	9612	1922.4	22.37	22.50	-2.66	0.61	1.030	0.63	
WCDMA Band VIII	RMC	Back	2712	882.4	23.10	23.50	-1.26	0.36	1.096	0.39	
802.11b	DATA	Back	7	2442	16.48	16.50	0.32	0.25	1.005	0.25	
802.11n	DATA	Back	38	5190	11.02	11.50	0.14	0.33	1.117	0.37	
802.11a	DATA	Back	64	5320	9.87	10.00	1.63	0.30	1.030	0.31	
802.11a	DATA	Back	140	5700	10.70	11.00	1.59	0.44	1.072	0.47	
802.11a	DATA	Back	149	5745	10.17	10.50	0.32	0.37	1.079	0.40	

Band	Mode	Test Position with 0mm	CH.	Freq. (MHz)	RB allocation	RB offset	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR10g (W/kg)	Scaling Factor	Reported SAR10g (W/kg)
LTE Band 1	QPSK (20MHz)	Back	18100	1930	1	0	22.53	23.00	-4.70	0.44	1.114	0.49
LTE Band 3	QPSK (20MHz)	Back	19850	1775	1	0	24.16	24.50	-4.24	0.86	1.081	0.93
LTE Band 7	QPSK (20MHz)	Back	21350	2560	1	0	23.16	23.50	-2.62	1.63	1.081	**1.76**
LTE Band 8	QPSK (20MHz)	Back	21500	885	1	0	24.19	24.50	-1.75	0.57	1.074	0.61
LTE Band 20	QPSK (20MHz)	Back	24250	842	1	0	24.42	24.50	-1.88	0.49	1.019	0.50
LTE Band 28	QPSK (20MHz)	Back	27310	713	1	0	23.51	24.00	1.78	0.40	1.119	0.45
LTE Band 38	QPSK (20MHz)	Back	38150	2610	1	0	23.39	23.50	-2.84	0.69	1.026	0.71
LTE Band 40	QPSK (20MHz)	Back	39150	2350	1	0	24.65	25.00	-2.24	0.35	1.084	0.38

Note:

1. *Wrist Worn SAR testing was performed at 0mm separation, and this distance is determined by the handset manufacturer that there will be body-worn accessories that users may acquire at the time of equipment certification, to enable users to purchase aftermarket body-worn accessories with the required minimum separation.*
2. *Determination of the worst-case configuration and all configurations with less than 3 dB of applicable limits.*
3. *When 10g SAR ≤2.0 W/kg for wrist worn, testing for low and high channel is optional.*

9.5. Simultaneous Transmission Considerations

The device contain transmitters (GSM & WIFI, GPRS & WIFI, RMC & WIFI, HSDPA & WIFI, HSUPA & WIFI, LTE & WIFI, GSM & Bluetooth, LTE & Bluetooth, GPRS & Bluetooth, RMC & Bluetooth, HSDPA & Bluetooth, HSUPA & Bluetooth) can transmit multiple transmission modes at the same time, determining the threshold power level available to the secondary transmitter ($P_{available}$) is to calculate it from the measured peak spatial-average SAR of the primary transmitter (SAR_1) according to the equation:

$$P_{available} = \boldsymbol{P}_{th,m} \cdot (SAR_{lim} - SAR1) / SAR_{lim}$$

where $\boldsymbol{P}_{th,m}$ is the threshold exclusion power level taken from Annex B of IEC 62479 for the frequency of the secondary transmitter at the separation distance used in the testing.

The maximum SAR_1 of head is **0.34** W/Kg, so

$P_{available}$ =20mW x (2.0 - 0.34)/2.0=16.40mW
The maximum power of 2.4GWIFI is 16.48 dBm =44.46mw > $Pavailable_1$
So the SAR measurement for the secondary transmitter of 2.4Gwifi is necessary
The maximum power of 5GWIFI is 11.03 dBm =12.65mw > $Pavailable_1$
So the SAR measurement for the secondary transmitter of 5Gwifi is necessary
The maximum power of BT is 3.91 dBm=2.46mw < $Pavailable_1$
So the SAR measurement for the secondary transmitter of BT is not necessary
NFC power is less than $pavailable_1$ and can be exempted from evaluation

The maximum SAR_2 of body-worn is **1.44**W/Kg, so

$P_{available}$ =20mW x (2.0 -1.44)/2.0=5.60mW
T The maximum power of 2.4GWIFI is 16.48 dBm =44.46mw > $Pavailable_1$
So the SAR measurement for the secondary transmitter of 2.4Gwifi is necessary
The maximum power of 5GWIFI is 11.03 dBm =12.65mw > $Pavailable_1$
So the SAR measurement for the secondary transmitter of 5Gwifi is necessary
The maximum power of BT is3.91 dBm=2.46mw < $Pavailable_2$
So the SAR measurement for the secondary transmitter of BT is not necessary
NFC power is less than $pavailable_1$ and can be exempted from evaluation

The maximum SAR_3 of Front-to-face is **0.53**W/Kg, so

$P_{available}$ =20mW x (4.0 – 0.53)/4.0=17.35mW
The maximum power of 2.4GWIFI is 16.48 dBm =44.46mw > $Pavailable_1$
So the SAR measurement for the secondary transmitter of 2.4Gwifi is necessary
The maximum power of 5GWIFI is 11.03 dBm =12.65mw > $Pavailable_1$
So the SAR measurement for the secondary transmitter of 5Gwifi is necessary
The maximum power of BT is 3.91 dBm=2.46mw < $Pavailable_3$
So the SAR measurement for the secondary transmitter of BT is not necessary
NFC power is less than $pavailable_1$ and can be exempted from evaluation

The maximum SAR_4 of Wrist Worn is **1.76**W/Kg, so

$P_{available}$ =20mW x (4.0 – 1.76)/4.0=11.20mW
The maximum power of 2.4GWIFI is 16.48 dBm =44.46mw > $Pavailable_1$
So the SAR measurement for the secondary transmitter of 2.4Gwifi is necessary
The maximum power of 5GWIFI is 11.03 dBm =12.65mw > $Pavailable_1$
So the SAR measurement for the secondary transmitter of 5Gwifi is necessary
The maximum power of BT is 3.91 dBm=2.46mw < $Pavailable_4$
So the SAR measurement for the secondary transmitter of BT is not necessary
NFC power is less than $pavailable_1$ and can be exempted from evaluation

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So highest simultaneous Transmission Procedures as below:

Head Mode	Position WWAN SAR10g (W/kg)		Position WLAN-2.4G SAR10g (W/kg)		Position WLAN -5G SAR10g (W/kg)		ΣSAR1 (W/kg)	Limit (W/Kg)
	Right Cheek	Left Cheek	Right Cheek	Left Cheek	Right Cheek	Left Cheek		
GSM 900	0.11	0.12	0.12	0.16	0.21	0.23	0.35	2.00
GSM1800	0.11	0.14	0.12	0.16	0.21	0.23	0.37	
WCDMA Band I	0.25	0.31	0.12	0.16	0.21	0.23	0.54	
WCDMA Band VIII	0.12	0.13	0.12	0.16	0.21	0.23	0.36	
LTE Band 1	0.14	0.17	0.12	0.16	0.21	0.23	0.40	
LTE Band 3	0.19	0.24	0.12	0.16	0.21	0.23	0.47	
LTE Band 7	0.31	0.34	0.12	0.16	0.21	0.23	**0.57**	
LTE Band 8	0.15	0.16	0.12	0.16	0.21	0.23	0.39	
LTE Band 20	0.11	0.12	0.12	0.16	0.21	0.23	0.35	
LTE Band 28	0.15	0.16	0.12	0.16	0.21	0.23	0.39	
LTE Band 38	0.29	0.32	0.12	0.16	0.21	0.23	0.55	
LTE Band 40	0.12	0.16	0.12	0.16	0.21	0.23	0.39	

Note：Σ SAR1 is equal to the maximum value of the sum of Right Cheek or Left Cheek

Body Mode	Position	WWAN SAR10g (W/kg)	WLAN -2.4G SAR10g (W/kg)	WLAN -5G SAR10g (W/kg)	Σ SAR_2 (W/kg)	Limit (W/Kg)
GSM 900 (Voice)	Back	0.60	0.16	0.39	0.99	2.00
GSM1800(GPRS)	Back	0.23	0.16	0.39	0.62	
WCDMA Band I	Back	0.31	0.16	0.39	0.70	
WCDMA Band VIII	Back	0.13	0.16	0.39	0.52	
LTE Band 1	Back	0.31	0.16	0.39	0.70	
LTE Band 3	Back	0.61	0.16	0.39	1.00	
LTE Band 7	Back	1.44	0.16	0.39	**1.83**	
LTE Band 8	Back	0.32	0.16	0.39	0.71	
LTE Band 20	Back	0.29	0.16	0.39	0.68	
LTE Band 28	Back	0.36	0.16	0.39	0.75	
LTE Band 38	Back	0.50	0.16	0.39	0.89	
LTE Band 40	Back	0.21	0.16	0.39	0.60	

Front-to-face	Position	WWAN SAR10g (W/kg)	WLAN -2.4G SAR10g (W/kg)	WLAN -5G SAR10g (W/kg)	Σ SAR_2 (W/kg)	Limit (W/Kg)
GSM 900 (voice)	Front	0.18	0.04	0.10	0.28	4.00
GSM1800(voice)	Front	0.07	0.04	0.10	0.17	
WCDMA Band I	Front	0.10	0.04	0.10	0.20	
WCDMA Band VIII	Front	0.05	0.04	0.10	0.15	
LTE Band 1	Front	0.06	0.04	0.10	0.16	
LTE Band 3	Front	0.14	0.04	0.10	0.24	
LTE Band 7	Front	0.53	0.04	0.10	**0.63**	
LTE Band 8	Front	0.10	0.04	0.10	0.20	
LTE Band 20	Front	0.13	0.04	0.10	0.23	
LTE Band 28	Front	0.13	0.04	0.10	0.23	
LTE Band 38	Front	0.21	0.04	0.10	0.31	
LTE Band 40	Front	0.04	0.04	0.10	0.14	

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Wrist Worn	Position	WWAN SAR10g (W/kg)	WLAN -2.4G SAR10g (W/kg)	WLAN -5G SAR10g (W/kg)	Σ SAR_2 (W/kg)	Limit (W/Kg)
GSM 900 (Voice)	Back	1.08	0.25	0.47	1.55	4.00
GSM1800(Voice)	Back	0.82	0.25	0.47	1.29	
WCDMA Band I	Back	0.63	0.25	0.47	1.10	
WCDMA Band VIII	Back	0.39	0.25	0.47	0.86	
LTE Band 1	Back	0.49	0.25	0.47	0.96	
LTE Band 3	Back	0.93	0.25	0.47	1.40	
LTE Band 7	Back	1.76	0.25	0.47	**2.23**	
LTE Band 8	Back	0.61	0.25	0.47	1.08	
LTE Band 20	Back	0.50	0.25	0.47	0.97	
LTE Band 28	Back	0.45	0.25	0.47	0.92	
LTE Band 38	Back	0.71	0.25	0.47	1.18	
LTE Band 40	Back	0.38	0.25	0.47	0.85	

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9.6. Measurement Uncertainty (450MHz-3GHz)

UNCERTAINTY EVALUATION FOR HEADSET SAR									
Uncertainty Component	Description	Uncertainty Value(%)	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. 1g(%)	Std. Unc. 10g(%)	v
Measurement system									
Probe calibration	7.2.1	5.8	N	1	1	1	5.8	5.8	∞
Axial isotropy	7.2.1.1	3.5	R	$\sqrt{3}$	$(1\text{-}C_p)^{1/2}$	$(1\text{-}C_p)^{1/2}$	1.43	1.43	∞
Hemispherical isotropy	7.2.1.1	5.9	R	$\sqrt{3}$	$\sqrt{C_p}$	$\sqrt{C_p}$	2.41	2.41	∞
Boundary Effects	7.2.1.4	1.00	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	7.2.1.2	4.70	R	$\sqrt{3}$	1	1	2.71	2.71	∞
System detection limits	7.2.1.2	1	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation Response	7.2.1.3	3	N	1	1	1	3.00	3.00	∞
Readout Electronics	7.2.1.5	0.5	N	1	1	1	0.50	0.50	∞
Response Time	7.2.1.6	0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Integration Time	7.2.1.7	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF Ambient Conditions-Noise	7.2.3.7	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF Ambient Conditions-Reflection	7.2.3.7	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioned mechanical Tolerance	7.2.2.1	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to phantom shell	7.2.2.3	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation interpolation and integration algorithms for Max. SAR evaluation	7.2.4	2.3	R	1	1	1	1.33	1.33	∞
Test sample related									
Test sample positioning	7.2.2.4.4	2.6	N	1	1	1	2.60	2.60	∞
Device holder uncertainty	7.2.2.4.2 7.2.2.4.3	3	N	1	1	1	3.00	3.00	∞
output power variation-SAR drift measurement	7.2.3.6	5	R	$\sqrt{3}$	1	1	2.89	2.89	∞
SAR scaling	7.2.5	2	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Phantom and tissue parameters									
Phantom uncertainty (shape and thickness tolerances)	7.2.2.2	4	R	$\sqrt{3}$	1	1	2.31	2.31	∞
uncertainty in SAR correction for deviation (in permittivity and conductivity)	7.2.6	2	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity (temperature uncertainty)	7.2.3.5	2.5	N	1	0.78	0.71	1.95	1.78	∞
Liquid conductivity -measurement uncertainty	7.2.3.3	4	N	1	0.23	0.26	0.92	1.04	∞
Liquid permittivity (temperature uncertainty)	7.2.3.5	2.5	N	1	0.78	0.71	1.95	1.78	∞
Liquid permittivity measurement uncertainty	7.2.3.4	5	N	1	0.23	0.26	1.15	1.30	∞
Combined standard uncertainty			RSS				10.83	10.54	
Expanded uncertainty (95%CONFIDENCEINTERVAL			k				21.26	21.08	

UNCERTAINTY FOR PERFORMANCE CHECK									
Uncertainty Component	Description	Uncertainty Value(%)	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. 1g(%)	Std. Unc. 10g(%)	v
Measurement system									
Probe calibration	7.2.1	5.8	N	1	1	1	5.8	5.8	∞
Axial isotropy	7.2.1.1	3.5	R	$\sqrt{3}$	$(1\text{-}C_p)^{1/2}$	$(1\text{-}C_p)^{1/2}$	1.43	1.43	∞
Hemispherical isotropy	7.2.1.1	5.9	R	$\sqrt{3}$	$\sqrt{C_p}$	$\sqrt{C_p}$	2.41	2.41	∞
Boundary Effects	7.2.1.4	1.00	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	7.2.1.2	4.70	R	$\sqrt{3}$	1	1	2.71	2.71	∞
System detection limits	7.2.1.2	1	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation Response	7.2.1.3	3	N	1	1	1	0.00	0.00	∞
Readout Electronics	7.2.1.5	0.5	N	1	1	1	0.50	0.50	∞
Response Time	7.2.1.6	0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Integration Time	7.2.1.7	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF Ambient Conditions-Noise	7.2.3.7	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF Ambient Conditions-Reflection	7.2.3.7	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioned mechanical Tolerance	7.2.2.1	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to phantom shell	7.2.2.3	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation interpolation and integration algorithms for Max.SAR evaluation	7.2.4	2.3	R	1	1	1	1.33	1.33	∞
Dipole									
Deviation of experimental source from numerical source		4	N	1	1	1	4.00	4.00	∞
Input power and SAR drift measurement	7.2.3.6	5	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Dipole axis to liquid distance		2	R	$\sqrt{3}$	1	1			∞
Phantom and tissue parameters									
Phantom uncertainty (shape and thickness tolerances)	7.2.2.2	4	R	$\sqrt{3}$	1	1	2.31	2.31	∞
uncertainty in SAR correction for deviation (in permittivity and conductivity)	7.2.6	2	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity (temperature uncertainty)	7.2.3.5	2.5	N	1	0.78	0.71	1.95	1.78	∞
Liquid conductivity -measurement uncertainty	7.2.3.3	4	N	1	0.23	0.26	0.92	1.04	∞
Liquid permittivity (temperature uncertainty)	7.2.3.5	2.5	N	1	0.78	0.71	1.95	1.78	∞
Liquid permittivity measurement uncertainty	7.2.3.4	5	N	1	0.23	0.26	1.15	1.30	∞
Combined standard uncertainty			RSS				10.15	10.05	
Expanded uncertainty (95%CONFIDENCEINTERVAL			k				20.29	20.10	

9.7. Test Equipment List

Test Equipment	Manufacturer	Model	Serial Number	Calibration	
				Calibration Date	Calibration Due
PC	Lenovo	H3050	N/A	N/A	N/A
Signal Generator	Agilent	N5182A	MY47070282	Jun. 27, 2024	Jun. 26, 2025
Multimeter	Keithley	Multimeter 2000	4078275	Jun. 27, 2024	Jun. 26, 2025
Network Analyzer	Agilent	8753E	US38432457	Jun. 27, 2024	Jun. 26, 2025
Wideband Radio Communication Tester	R & S	CMW500	114220	Jun. 27, 2024	Jun. 26, 2025
Power Meter	Agilent	E4418B	GB43312526	Jun. 27, 2024	Jun. 26, 2025
Power Meter	Agilent	E4416A	MY45101555	Jun. 27, 2024	Jun. 26, 2025
Power Meter	Agilent	N1912A	MY50001018	Jun. 27, 2024	Jun. 26, 2025
Power Sensor	Agilent	E9301A	MY41497725	Jun. 27, 2024	Jun. 26, 2025
Power Sensor	Agilent	E9327A	MY44421198	Jun. 27, 2024	Jun. 26, 2025
Power Sensor	Agilent	E9323A	MY53070005	Jun. 27, 2024	Jun. 26, 2025
Power Amplifier	PE	PE15A4019	112342	N/A	N/A
Directional Coupler	Agilent	722D	MY52180104	N/A	N/A
Attenuator	Chensheng	FF779	134251	N/A	N/A
E-Field PROBE	MVG	SSE2	SN 25/22 EPGO375	Jun. 28, 2024	Jun. 28, 2025
DIPOLE 750	MVG	SID 750	SN 16/15 DIP 0G750-368	Jun. 05, 2024	Jun. 04, 2027
DIPOLE 900	MVG	SID 900	SN 16/15 DIP 0G900-370	Jun. 05, 2024	Jun. 04, 2027
DIPOLE 1800	MVG	SID 1800	SN 16/15 DIP 1G800-371	Jun. 05, 2024	Jun. 04, 2027
DIPOLE 2000	MVG	SID 2000	SN 16/15 DIP 2G000-373	Jun. 05, 2024	Jun. 04, 2027
DIPOLE 2450	MVG	SID2450	SN 16/15 DIP 2G450-374	Jun. 05, 2024	Jun. 04, 2027
DIPOLE 2600	MVG	SID2600	SN 16/15 DIP 2G600-375	Jun. 05, 2024	Jun. 04, 2027
DIPOLE 5G	MVG	SID 5G	SN 13/14 WGA32	May 15, 2024	May 14, 2025
Communication Antenna	MVG	ANTA59	SN 39/14 ANTA59	N/A	N/A
Mobile Phone Position Device	MVG	MSH101	SN 19/15 MSH101	N/A	N/A
SAM PHANTOM	MVG	SAM120	SN 19/15 SAM120	N/A	N/A
PHANTOM TABLE	MVG	TABP101	SN 19/15 TABP101	N/A	N/A
Robot TABLE	MVG	TABP61	SN 19/15 TABP61	N/A	N/A
6 AXIS ROBOT	KUKA	KR6-R900	501822	N/A	N/A

Note:
1.N/A means this equipment no need to calibrate
2.Each Time means this device need to calibrate every use time

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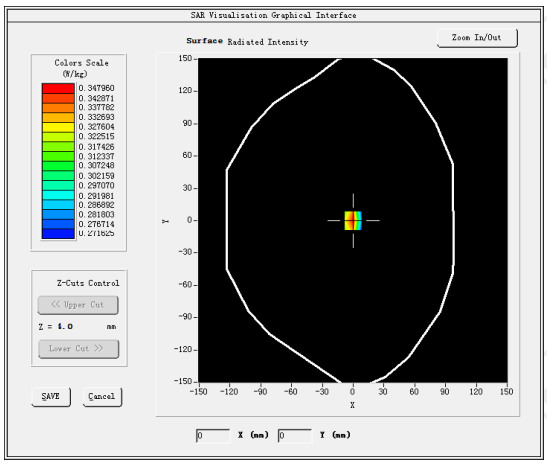
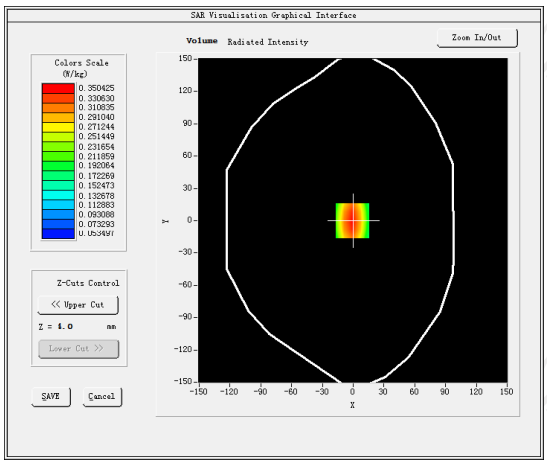
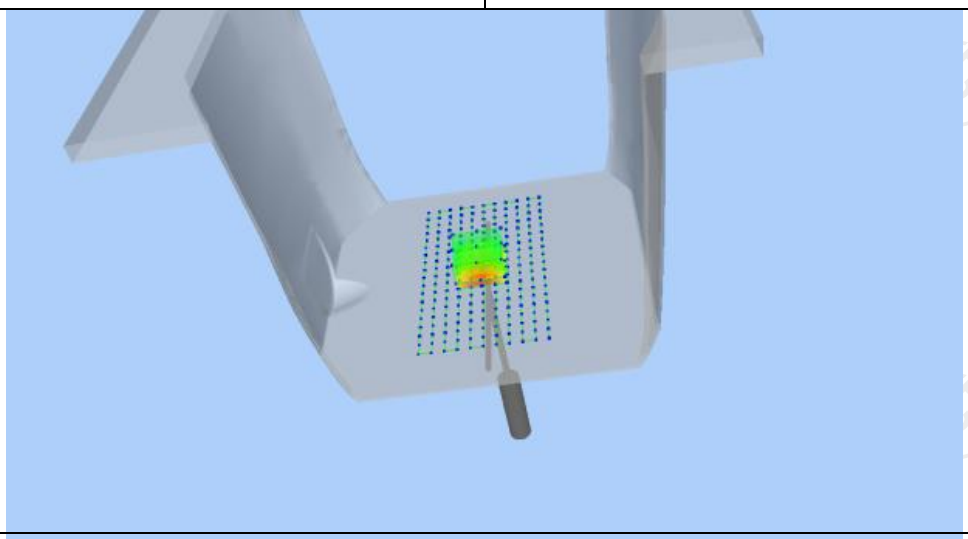
10. System Check Results

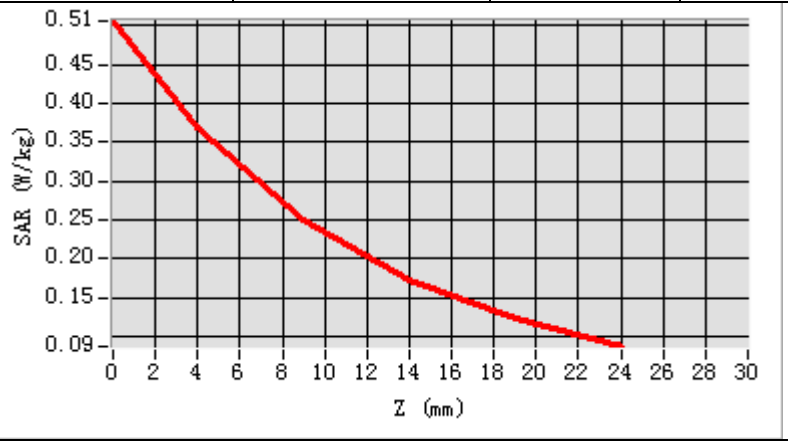
Date of measurement: 06/17/2024 Test mode: 900MHz (Head)
Product Description: Validation
Dipole Model: SID900
E-Field Probe: SSE2 (SN 25/22 EPGO375)

Phantom	Validation plane
Input Power	31.6mW
Frequency (MHz)	900.000000
Relative permittivity (real part)	41.923440
Relative permittivity (imaginary part)	18.359541
Conductivity (S/m)	0.960017
Variation (%)	-0.040000
SAR 10g (W/Kg)	**0.212972**
SAR 1g (W/Kg)	**0.332613**

SURFACE SAR	VOLUME SAR
	



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.5056	0.3693	0.2494	0.1719	0.1225

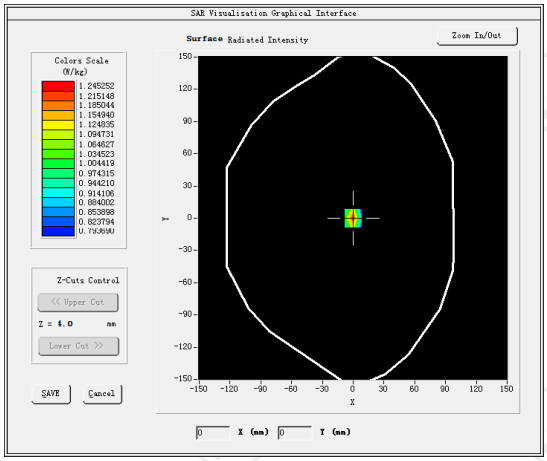
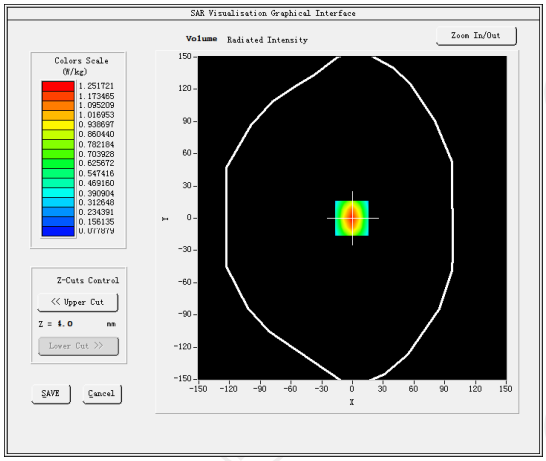


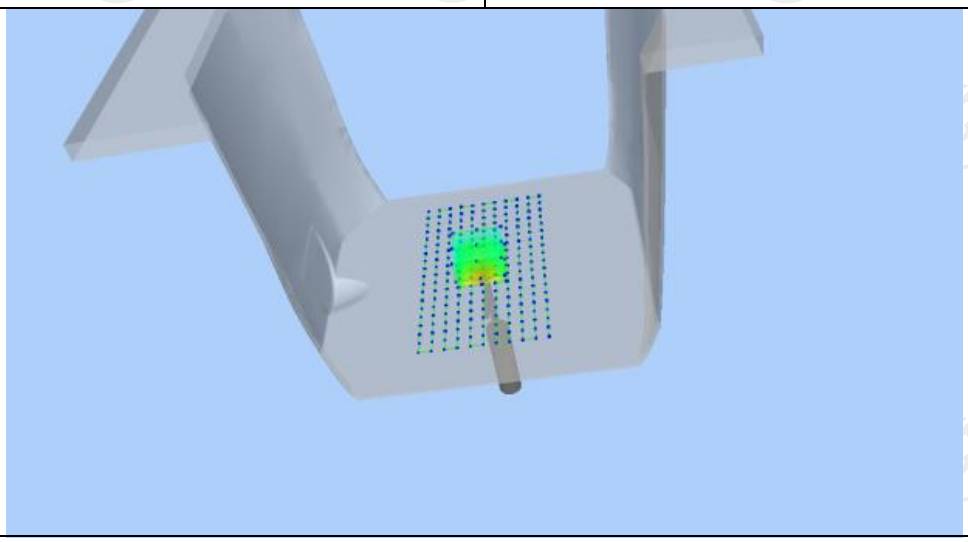
Hot spot position

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

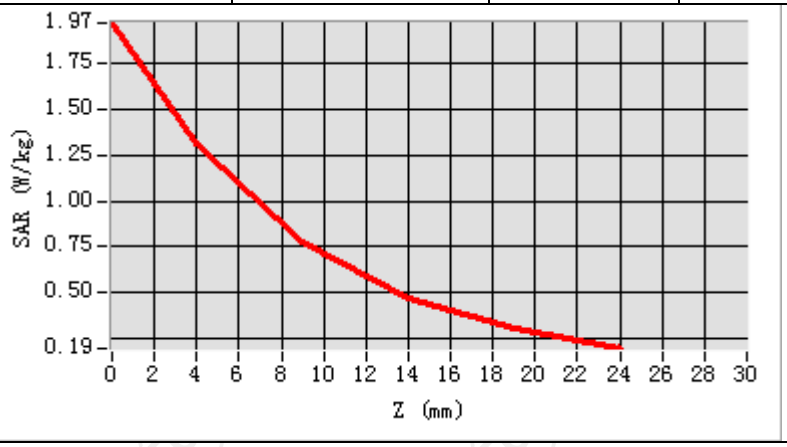
Date of measurement: 06/19/2024 Test mode: 1800MHz (Head)
Product Description: Validation
Dipole Model: SID1800
E-Field Probe: SSE2 (SN 25/22 EPGO375)

Phantom	Validation plane
Input Power	31.6mW
Frequency (MHz)	1800.000000
Relative permittivity (real part)	38.854207
Relative permittivity (imaginary part)	13.770436
Conductivity (S/m)	1.412109
Variation (%)	-0.010000
SAR 10g (W/Kg)	**0.633056**
SAR 1g (W/Kg)	**1.156185**

SURFACE SAR	**VOLUME SAR**
	



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.9743	1.3143	0.7807	0.4734	0.3027

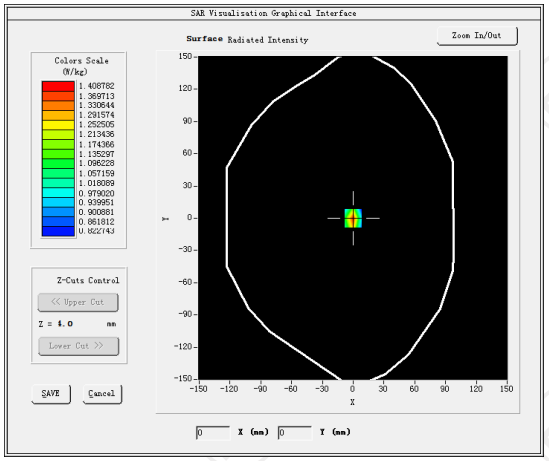
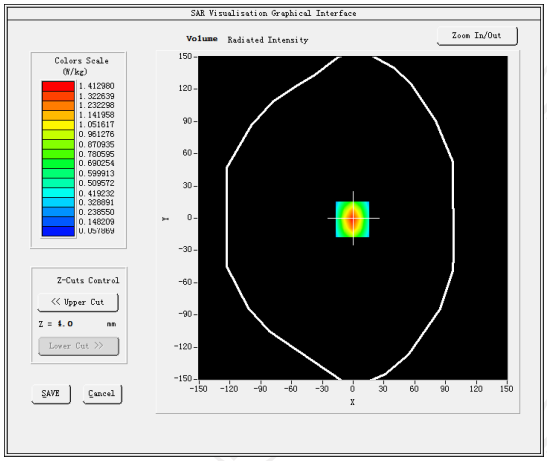


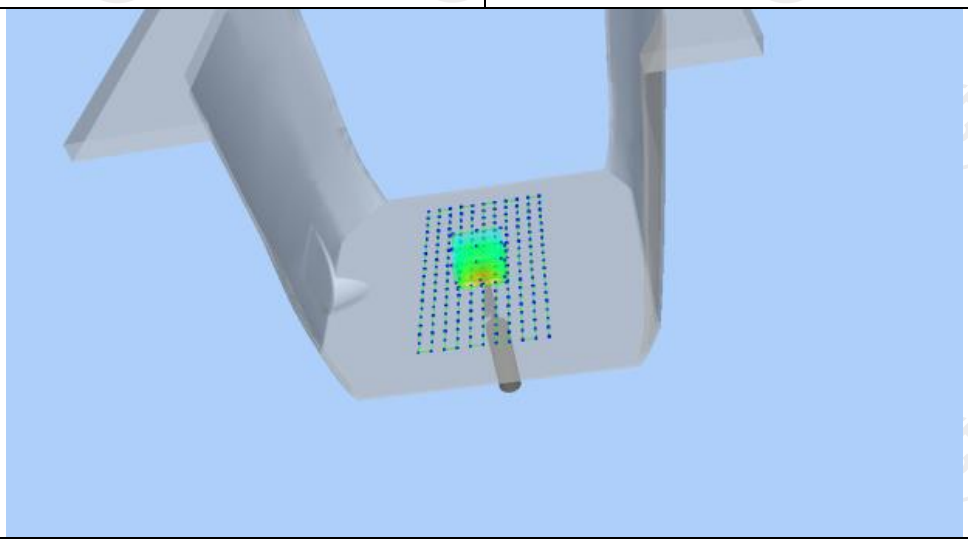
Hot spot position

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

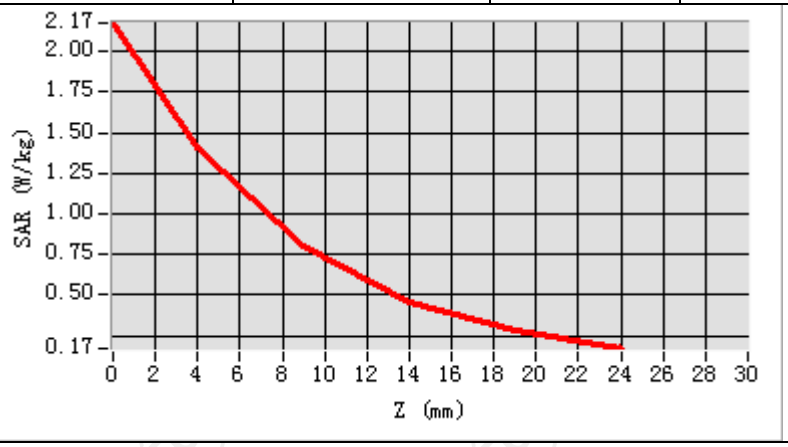
Date of measurement: 06/20/2024 Test mode: 2000MHz (Head)
Product Description: Validation
Dipole Model: SID2000
E-Field Probe:SSE (SN 25/22 EPGO375)

Phantom	Validation plane
Input Power	31.6mW
Frequency (MHz)	2000.000000
Relative permittivity (real part)	39.721249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.430792
Variation (%)	-0.450000
SAR 10g (W/Kg)	**0.673813**
SAR 1g (W/Kg)	**1.298495**

SURFACE SAR	**VOLUME SAR**
	



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.1749	1.4043	0.7969	0.4595	0.2803



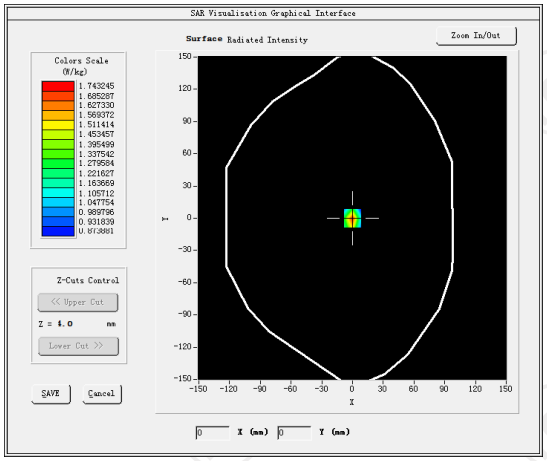
Hot spot position

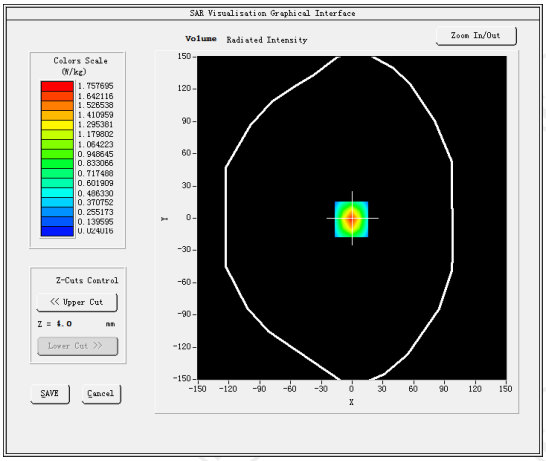
Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

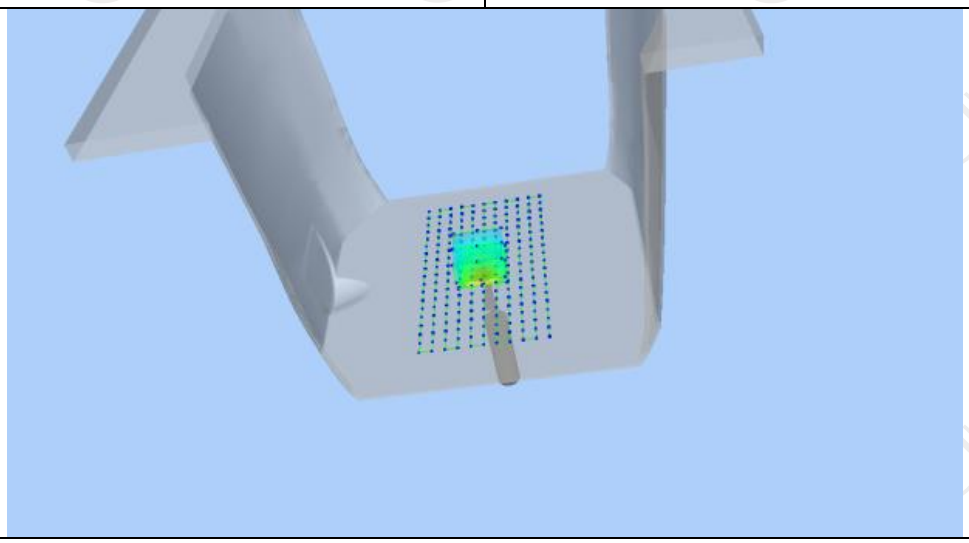
Date of measurement: 06/25/2024 Test mode: 2450MHz (Head)
Product Description: Validation
Dipole Model: SID2450
E-Field Probe: SSE (SN 25/22 EPGO375)

Phantom	Validation plane
Input Power	31.6mW
Frequency (MHz)	2450.000000
Relative permittivity (real part)	38.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	1.925428
Variation (%)	-0.510000
SAR 10g (W/Kg)	**0.740967**
SAR 1g (W/Kg)	**1.590162**

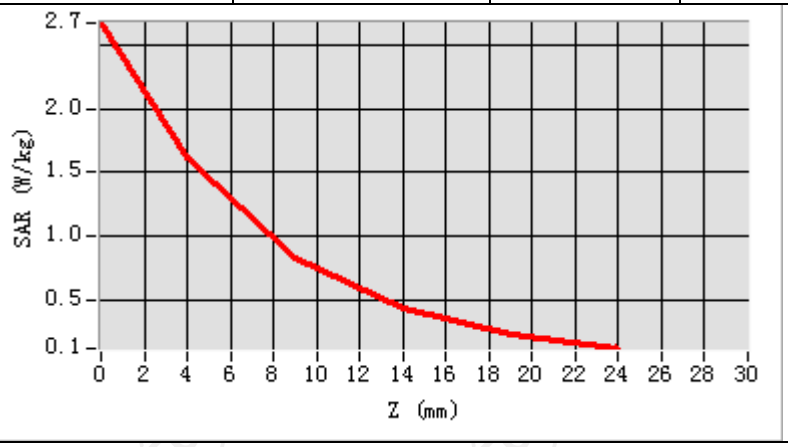
SURFACE SAR	**VOLUME SAR**







Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.6697	1.6242	0.8388	0.4321	0.2349

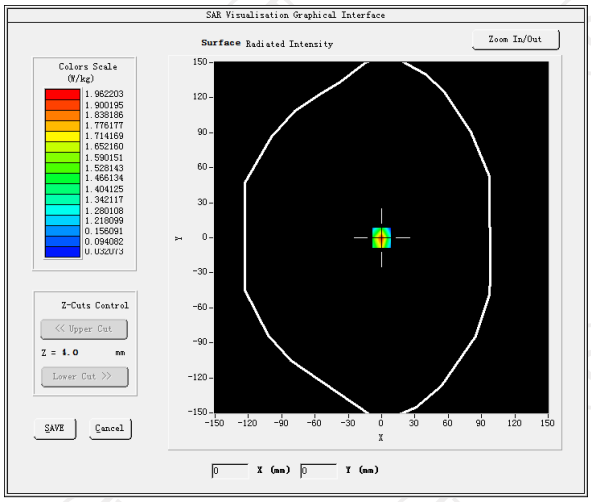
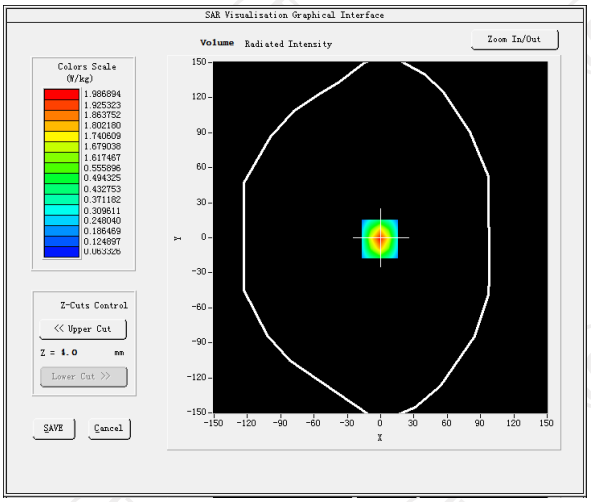


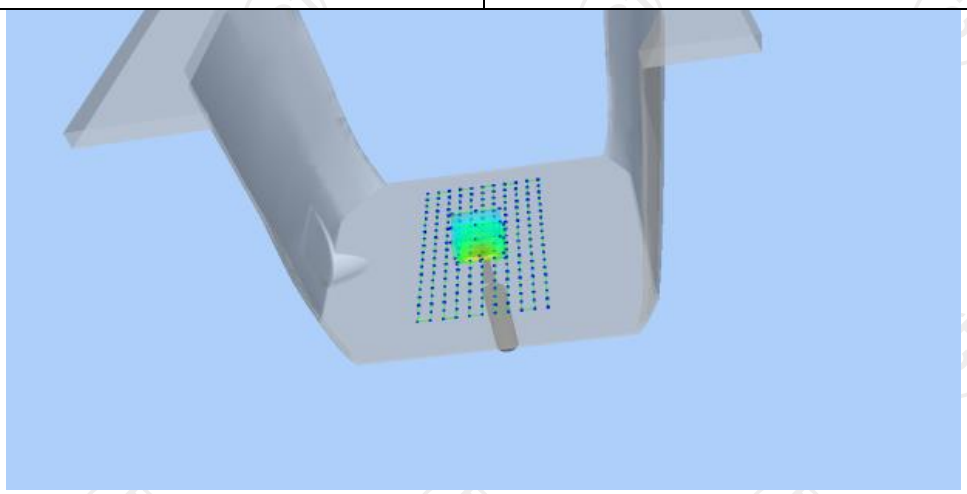
Hot spot position

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

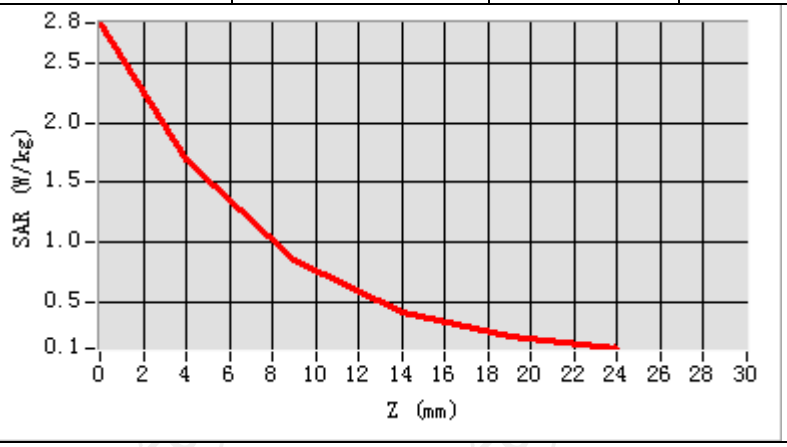
Date of measurement: 06/28/2024 Test mode: 2600MHz (Head)
Product Description: Validation
Dipole Model: SID2600
E-Field Probe: SSE (SN 25/22 EPGO375)

Phantom	Validation plane
Input Power	31.6mW
Frequency (MHz)	2600.000000
Relative permittivity (real part)	38.342158
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	1.921254
Variation (%)	-0.470000
SAR 10g (W/Kg)	**0.782541**
SAR 1g (W/Kg)	**1.690254**

SURFACE SAR	**VOLUME SAR**
	



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.8357	1.6928	0.8472	0.4195	0.2184



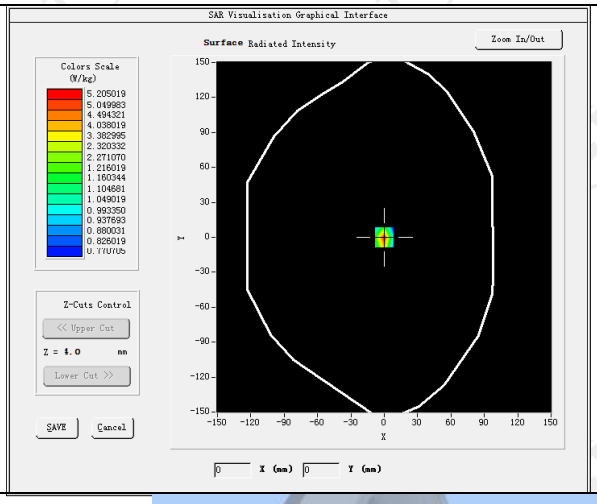
Hot spot position

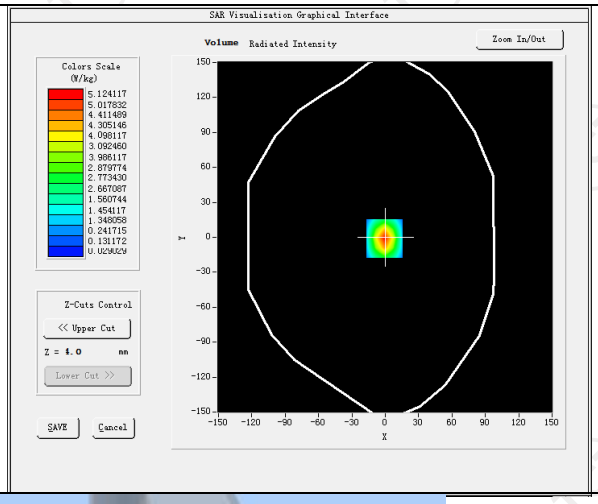
Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

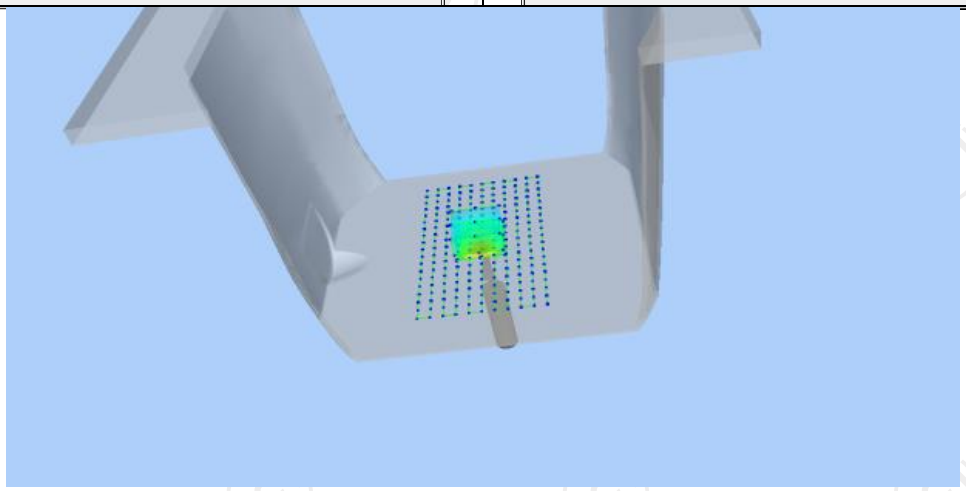
Date of measurement: 07/03/2024 Test mode: 5200MHz (Head)
Product Description: Validation
Dipole Model: SID5200
E-Field Probe: SSE (SN 25/22 EPGO375)

Phantom	Validation plane
Input Power	31.6mW
Frequency (MHz)	5200.000000
Relative permittivity (real part)	35.068832
Relative permittivity (imaginary part)	13.679428
Conductivity (S/m)	5.220788
Variation (%)	-0.820000
SAR 10g (W/Kg)	**1.807521**
SAR 1g (W/Kg)	**5.012481**

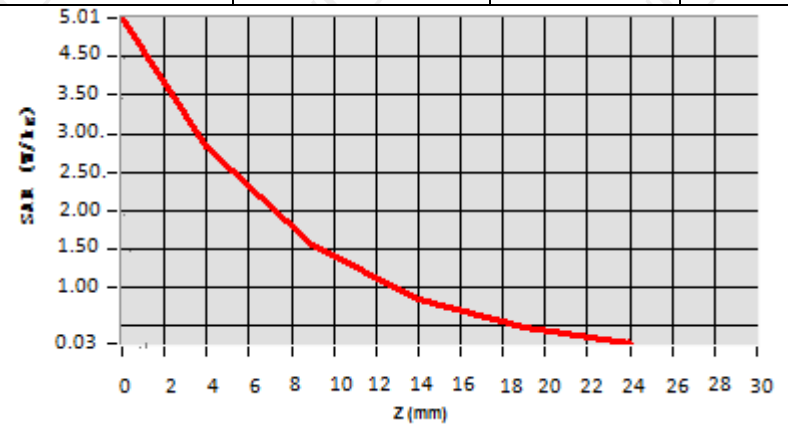
SURFACE SAR	**VOLUME SAR**







Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	5.0132	2.7584	1.5026	0.8252	0.4125



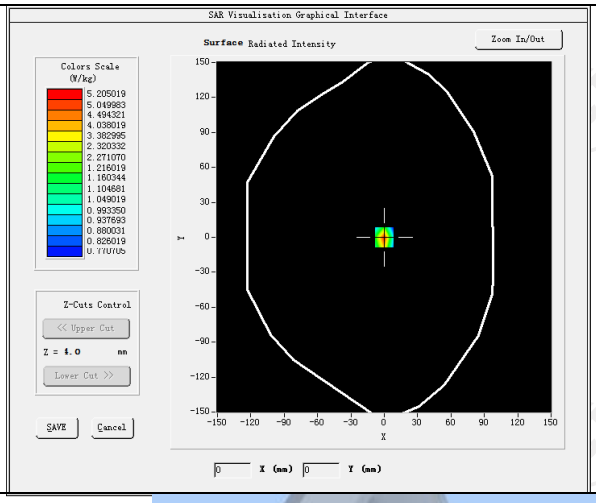
Hot spot position

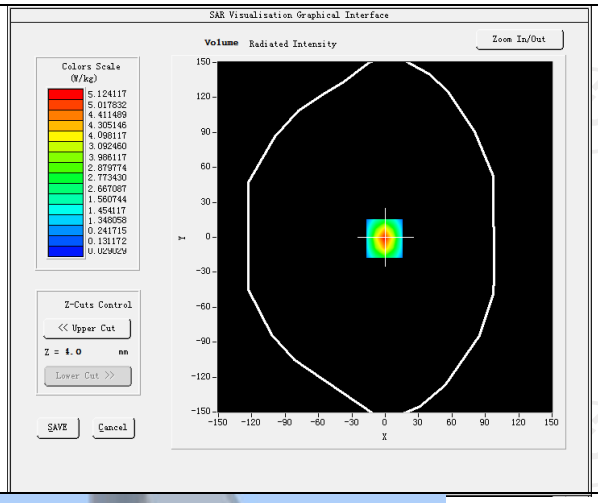
Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

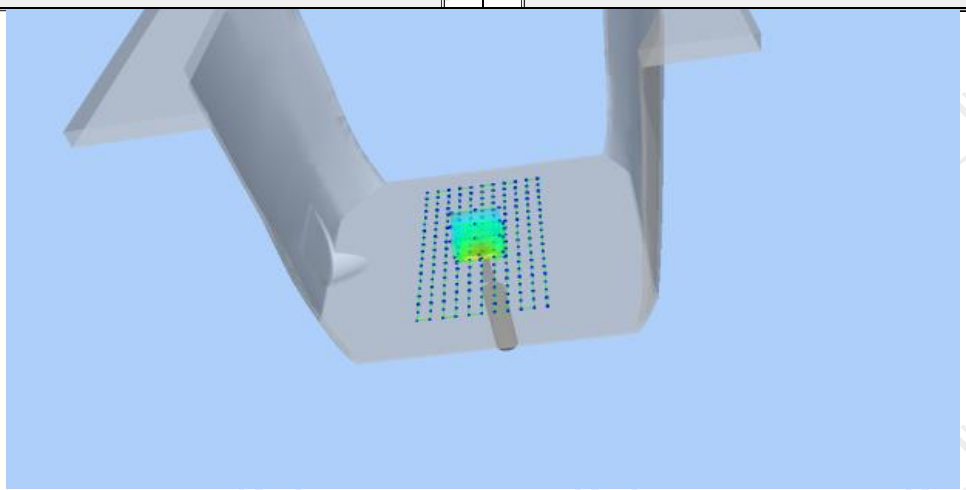
Date of measurement: 07/04/2024 Test mode: 5300MHz (Head)
Product Description: Validation
Dipole Model: SID5300
E-Field Probe: SSE2 (SN 25/22 EPGO375)

Phantom	Validation plane
Input Power	31.6mW
Frequency (MHz)	5300.000000
Relative permittivity (real part)	36.068832
Relative permittivity (imaginary part)	13.680430
Conductivity (S/m)	4.690788
Variation (%)	-0.820000
SAR 10g (W/Kg)	**17.217521**
SAR 1g (W/Kg)	**5.922481**

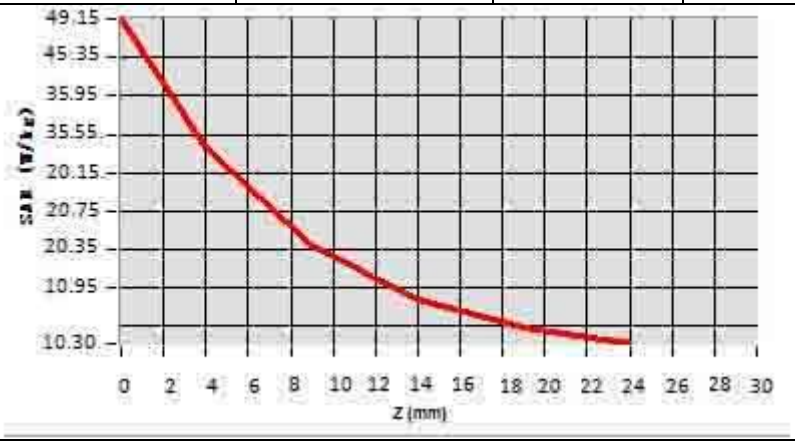
SURFACE SAR	**VOLUME SAR**







Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	49.15	27.584	20.346	11.252	5.4125

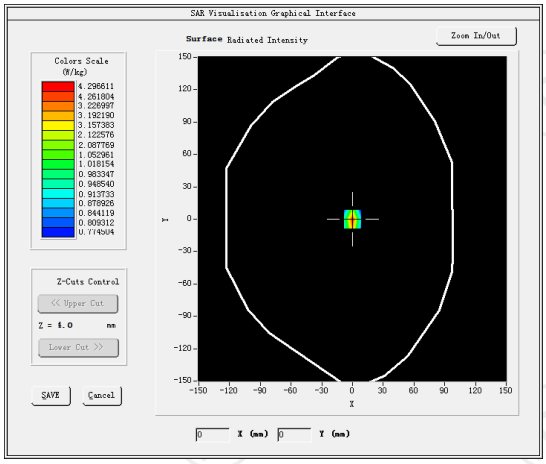
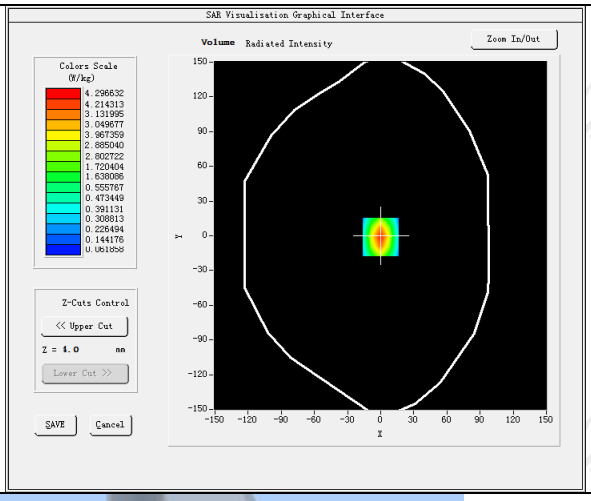


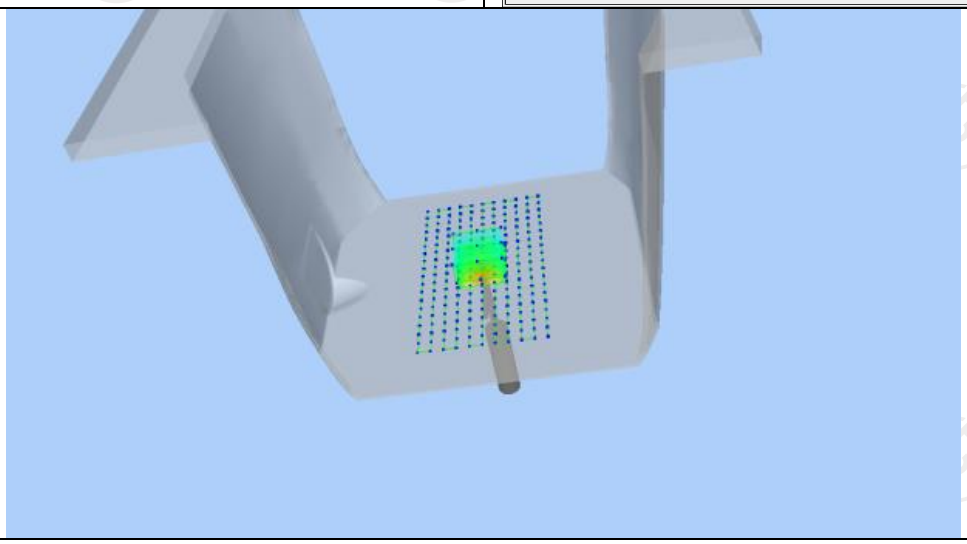
Hot spot position

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

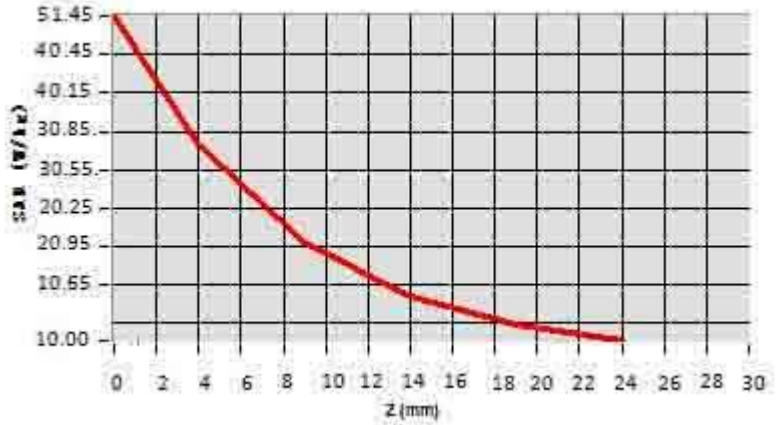
Date of measurement: 07/04/2024 Test mode: 5600MHz (Head)
Product Description: Validation
Dipole Model: SID5600
E-Field Probe: SSE2 (SN 25/22 EPGO375)

Phantom	Validation plane
Input Power	31.6mW
Frequency (MHz)	5600.000000
Relative permittivity (real part)	47.599999
Relative permittivity (imaginary part)	13.329440
Conductivity (S/m)	5.770354
Variation (%)	1.410000
SAR 10g (W/Kg)	**5.994255**
SAR 1g (W/Kg)	**18.066112**

SURFACE SAR	**VOLUME SAR**
	



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	51.4532	30.7154	20.9525	10.5194	10.3514



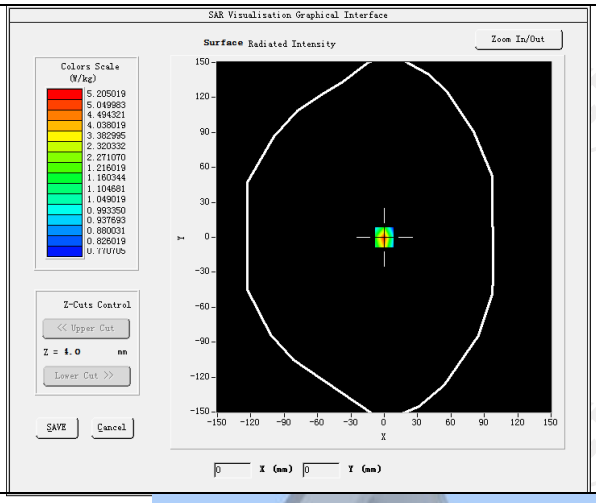
Hot spot position

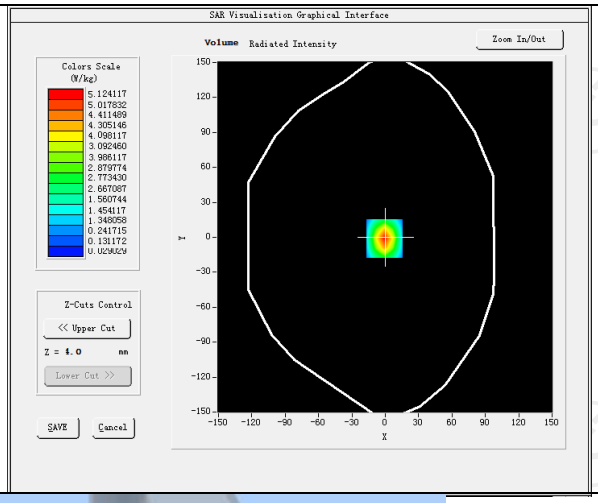
Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

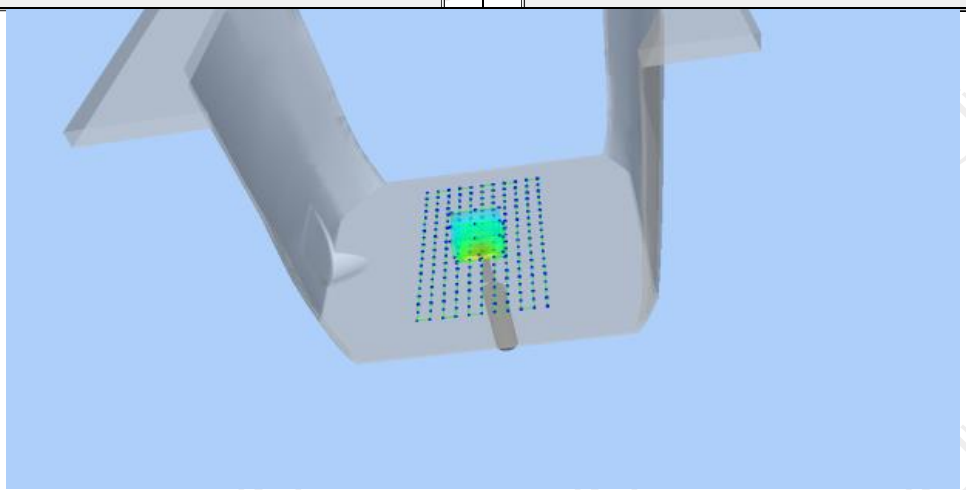
Date of measurement: 07/05/2024 Test mode: 5800MHz (Head)
Product Description: Validation
Dipole Model: SID5800
E-Field Probe: SSE2 (SN 25/22 EPGO375)

Phantom	Validation plane
Input Power	31.6mW
Frequency (MHz)	5800.000000
Relative permittivity (real part)	38.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	5.430828
Variation (%)	-2.800000
SAR 10g (W/Kg)	**2.005121**
SAR 1g (W/Kg)	**5.063573**

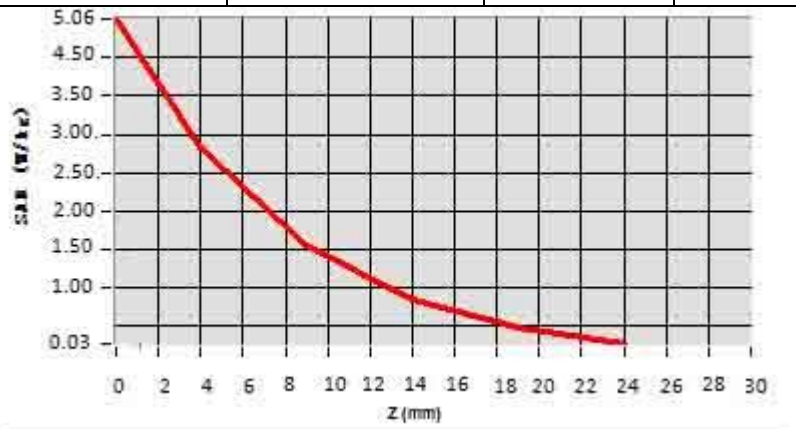
SURFACE SAR	**VOLUME SAR**







Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	5.0622	2.8054	1.5421	0.8321	0.4130

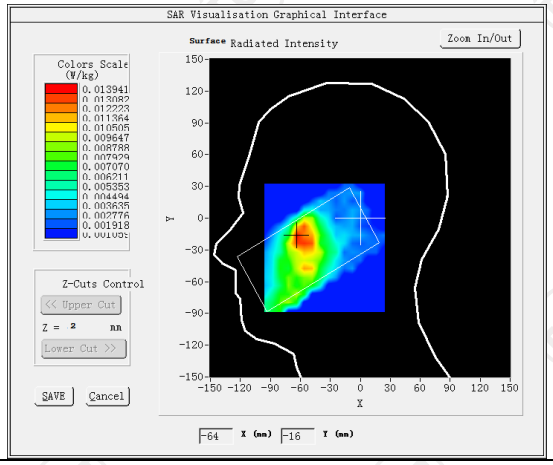
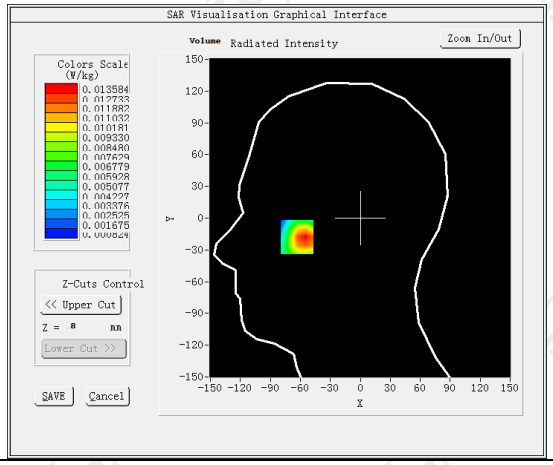
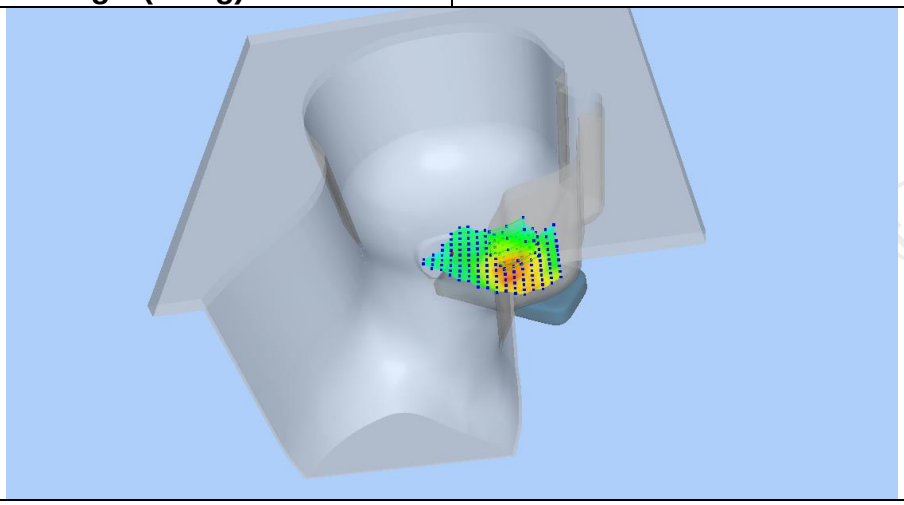


Hot spot position

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

11. SAR Test Data

GSM900

MEASUREMENT 1	
Middle Band SAR (Channel 60):	Date: 06/17/2024
Frequency (MHz)	902.000000
Relative permittivity (real part)	41.923440
Relative permittivity (imaginary part)	18.359541
Conductivity (S/m)	0.960017
Variation (%)	-1.860000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	GSM900
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-48.00, Y=-24.00 SAR Peak: 0.16 W/kg	
SAR 10g (W/Kg)	0.116218
SAR 1g (W/Kg)	0.156120
	

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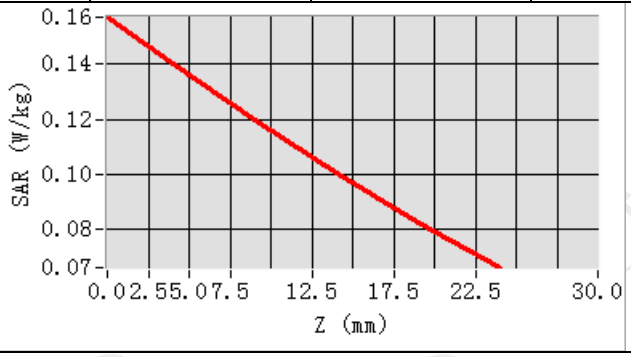
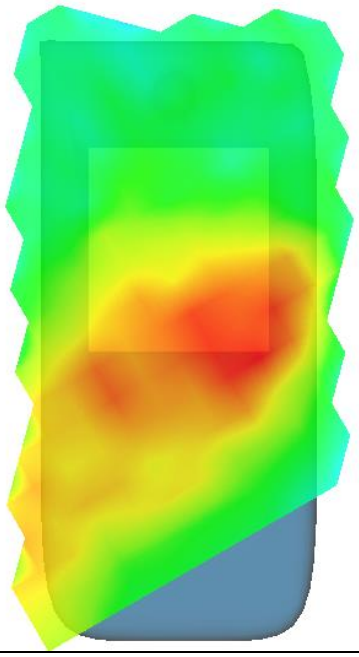
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1572	0.1401	0.1196	0.1003	0.0824



Hot spot position



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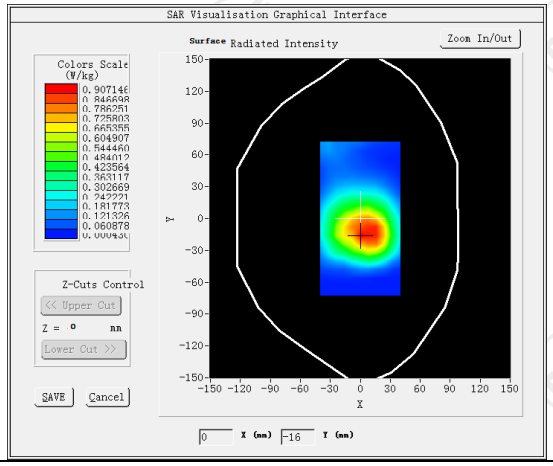
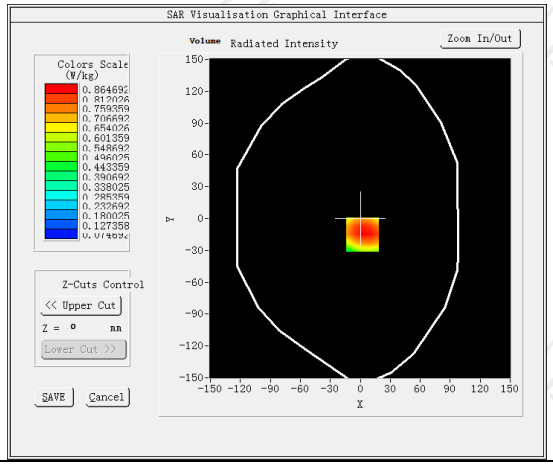
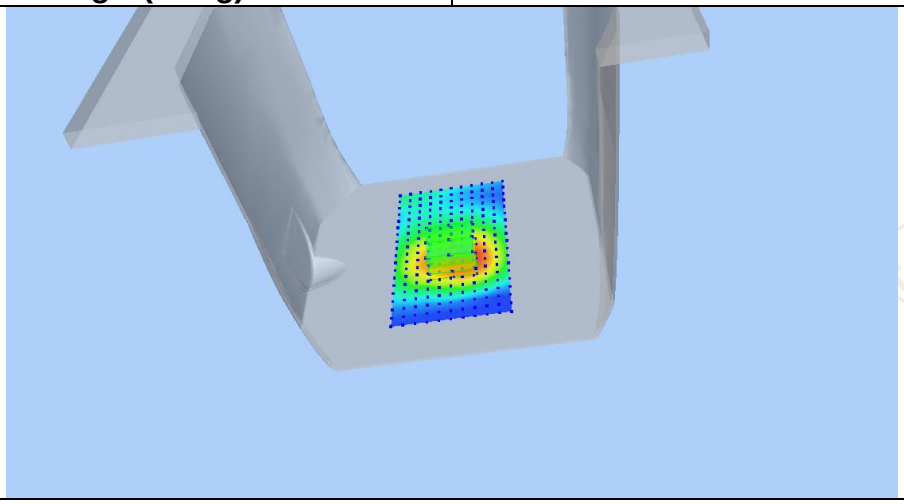
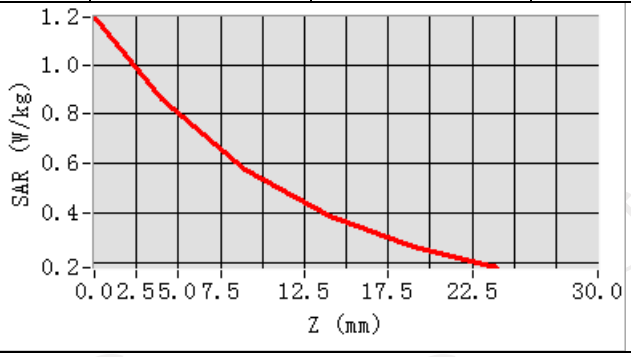
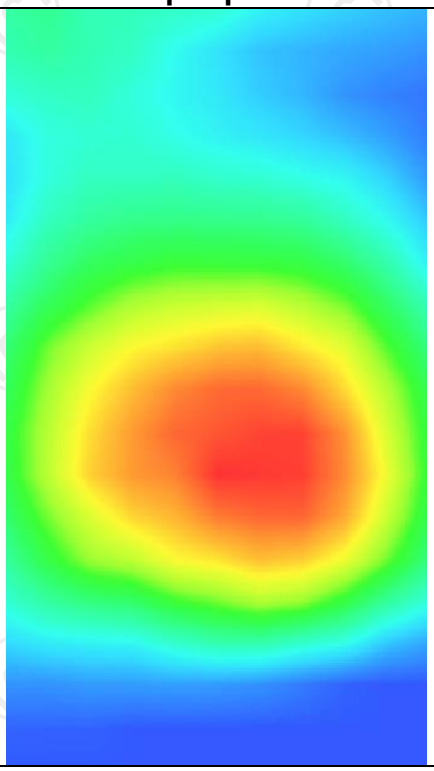
MEASUREMENT 2	
Middle Band SAR (Channel 60):	Date: 06/17/2024
Frequency (MHz)	902.000000
Relative permittivity (real part)	41.923440
Relative permittivity (imaginary part)	18.359541
Conductivity (S/m)	0.960017
Variation (%)	1.120000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	GSM900(voice)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=2.00, Y=-15.00 SAR Peak: 1.21 W/kg	
SAR 10g (W/Kg)	0.545699
SAR 1g (W/Kg)	0.833860
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.1929	0.8647	0.5751	0.3867	0.2654



Hot spot position



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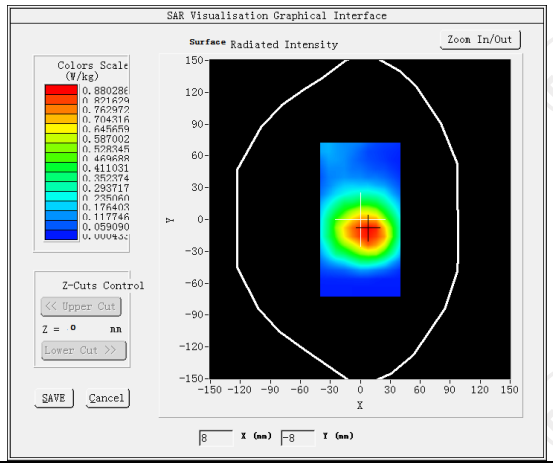
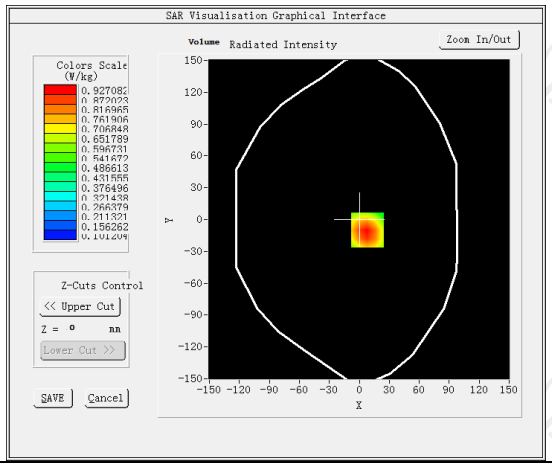
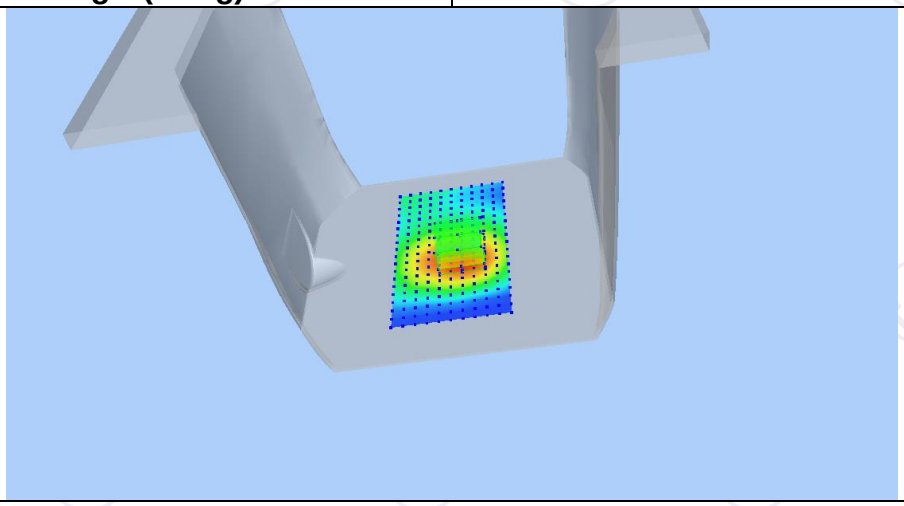
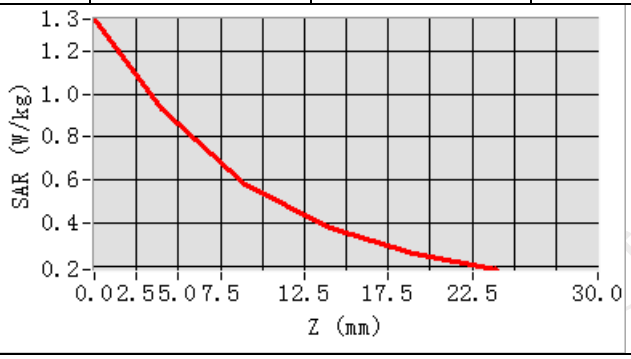
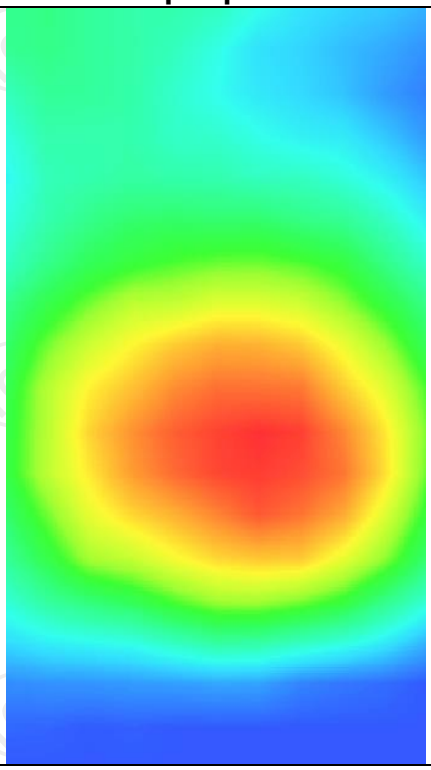
MEASUREMENT 3	
Middle Band SAR (Channel 60):	Date: 06/17/2024
Frequency (MHz)	880.200000
Relative permittivity (real part)	41.923440
Relative permittivity (imaginary part)	18.359541
Conductivity (S/m)	0.960017
Variation (%)	-4.420000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	GSM900(GPRS 2slot)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=8.00, Y=-10.00 SAR Peak: 1.36 W/kg	
SAR 10g (W/Kg)	0.560346
SAR 1g (W/Kg)	0.887277
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.3481	0.9271	0.5802	0.3759	0.2596



Hot spot position



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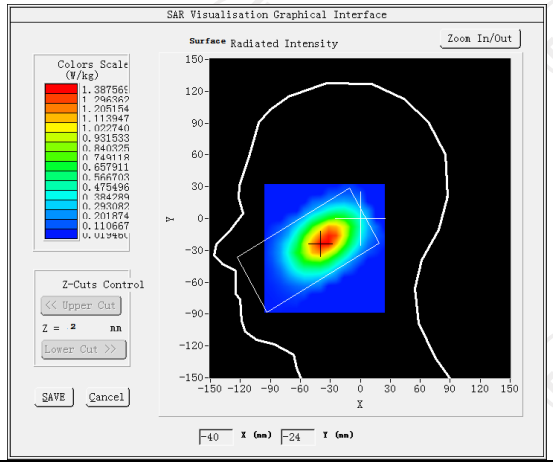
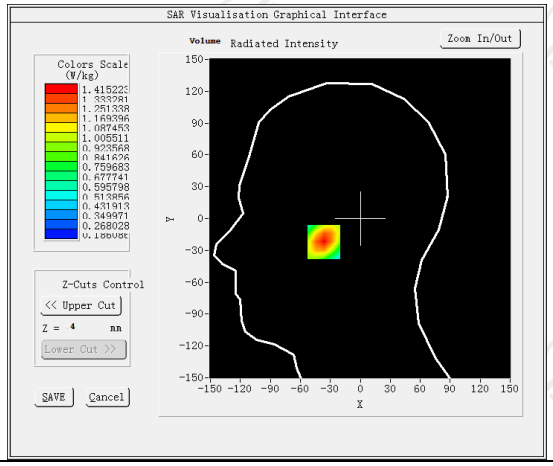
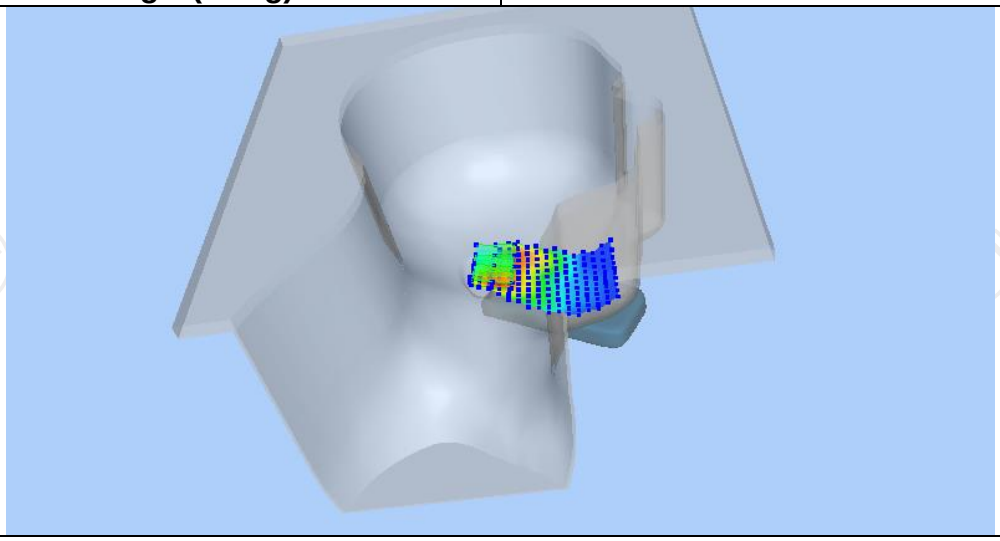
GSM1800

MEASUREMENT 1	
Low Band SAR (Channel 512):	Date: 06/19/2024
Frequency (MHz)	1710.200049
Relative permittivity (real part)	37.987465
Relative permittivity (imaginary part)	13.772388
Conductivity (S/m)	1.336993
Variation (%)	-1.560000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	GSM1800
SURFACE SAR	**VOLUME SAR**

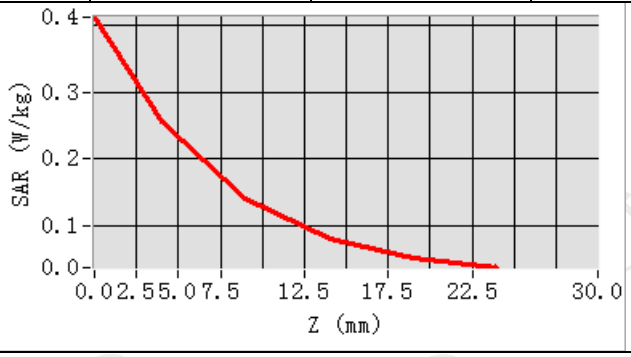




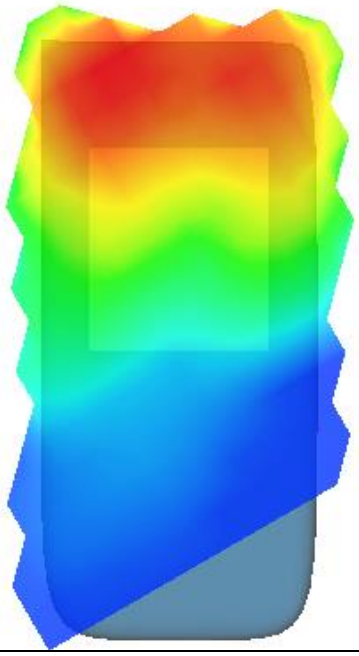
Maximum location: X=-34.00, Y=-22.00 SAR Peak: 0.42 W/kg	
SAR 10g (W/Kg)	0.131899
SAR 1g (W/Kg)	0.191283



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4111	0.2565	0.1407	0.0816	0.0540



Hot spot position



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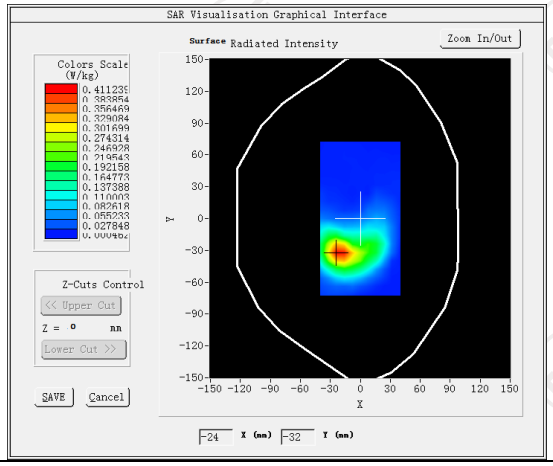
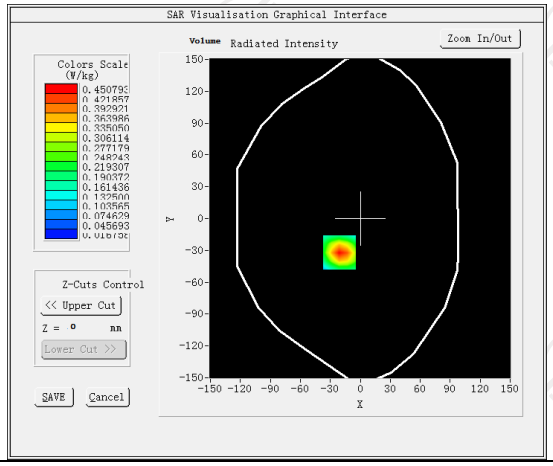
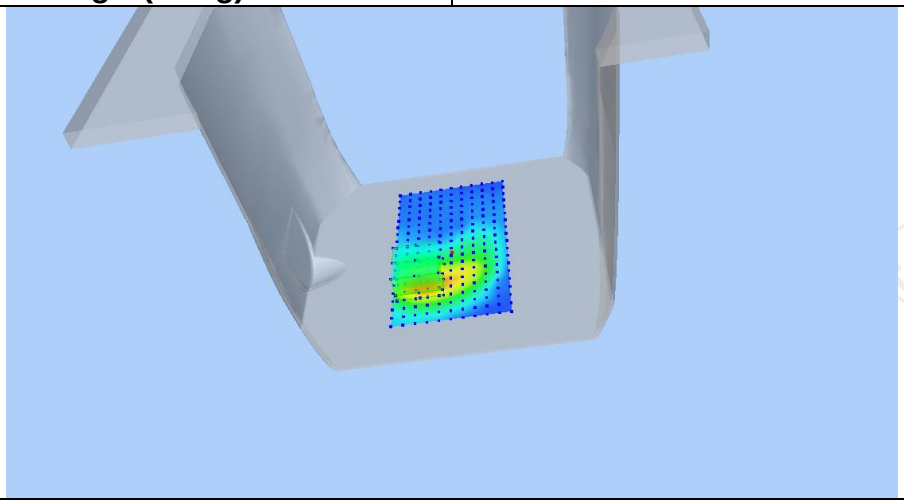
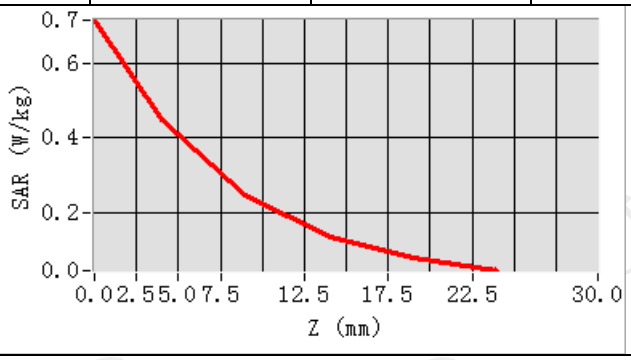
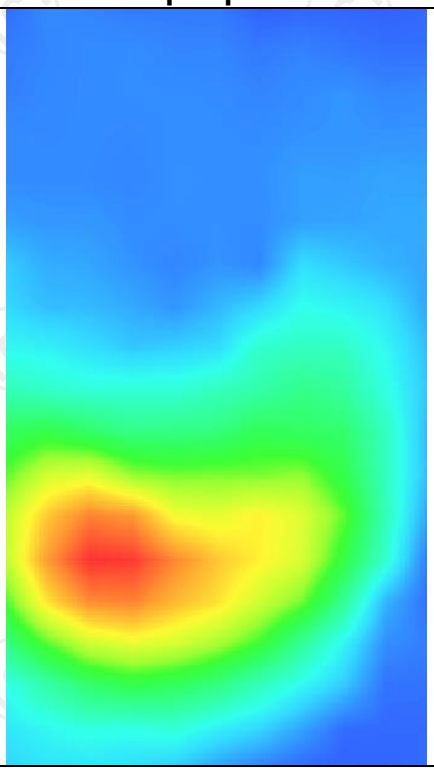
MEASUREMENT 2	
Low Band SAR (Channel 512):	Date: 06/19/2024
Frequency (MHz)	1710.200049
Relative permittivity (real part)	37.987465
Relative permittivity (imaginary part)	13.772388
Conductivity (S/m)	1.336993
Variation (%)	-3.630000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	GSM1800(voice)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-21.00, Y=-32.00 SAR Peak: 0.72 W/kg	
SAR 10g (W/Kg)	0.219983
SAR 1g (W/Kg)	0.418651
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7174	0.4508	0.2448	0.1335	0.0765



Hot spot position



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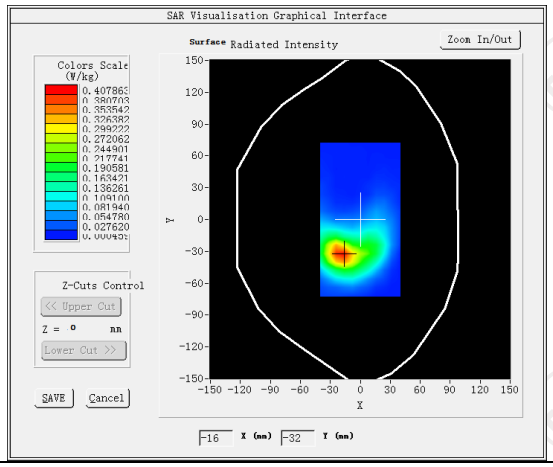
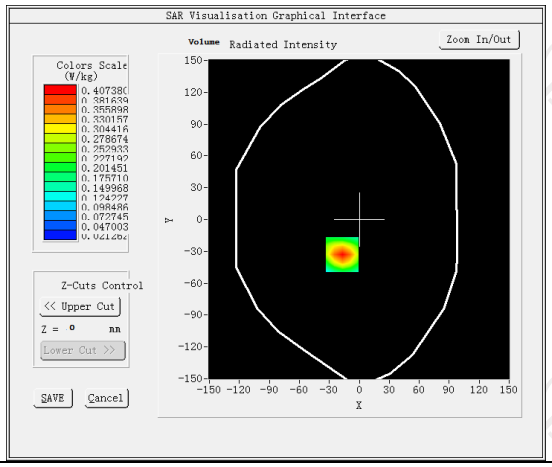
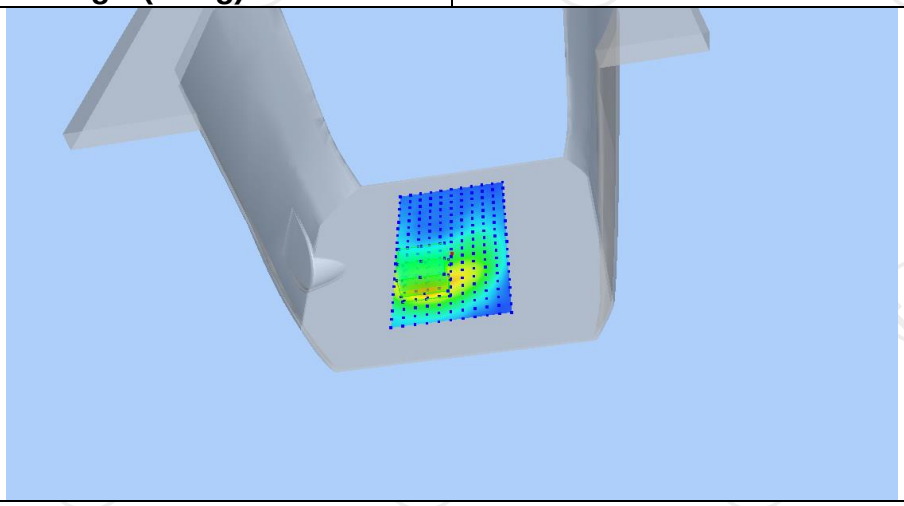
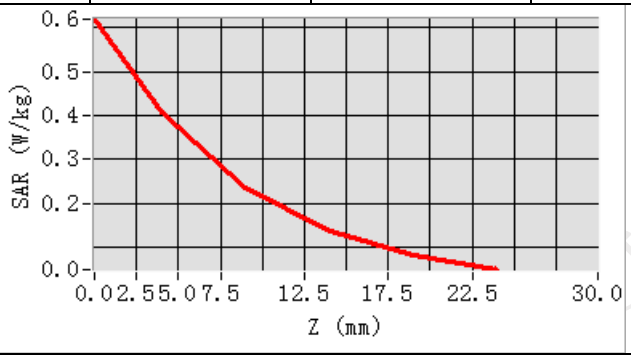
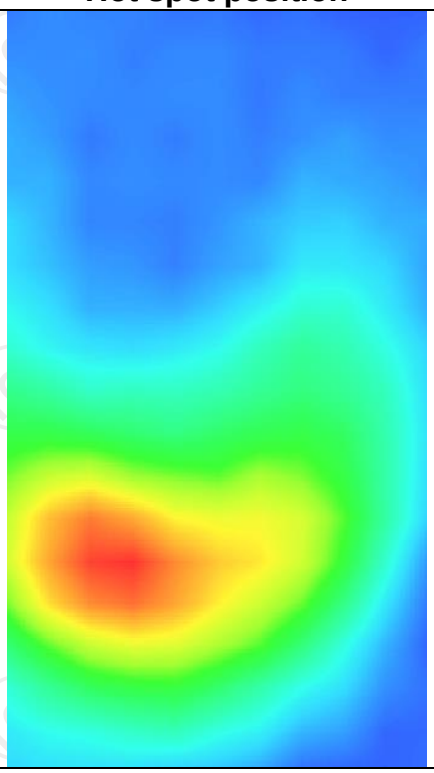
MEASUREMENT 3	
Low Band SAR (Channel 512):	Date: 06/19/2024
Frequency (MHz)	1710.200049
Relative permittivity (real part)	37.987465
Relative permittivity (imaginary part)	13.772388
Conductivity (S/m)	1.336993
Variation (%)	-4.660000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	GSM1800(GPRS 2slot)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-17.00, Y=-33.00 SAR Peak: 0.62 W/kg	
SAR 10g (W/Kg)	0.209132
SAR 1g (W/Kg)	0.378905
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6199	0.4074	0.2360	0.1375	0.0829



Hot spot position



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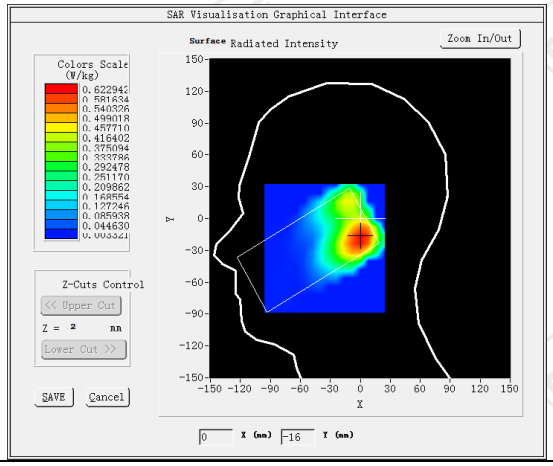
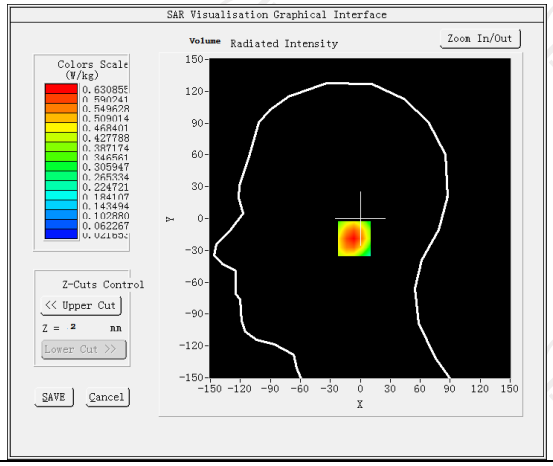
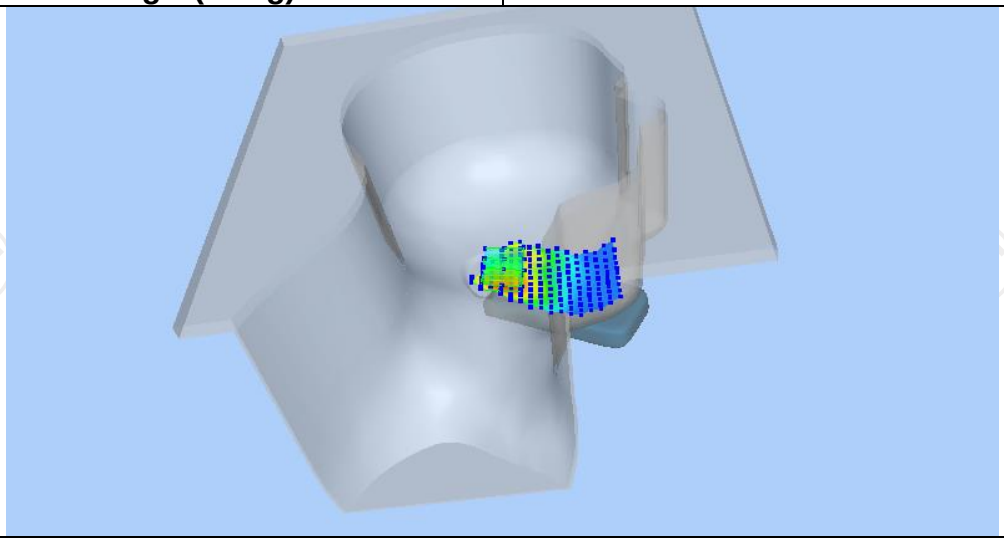
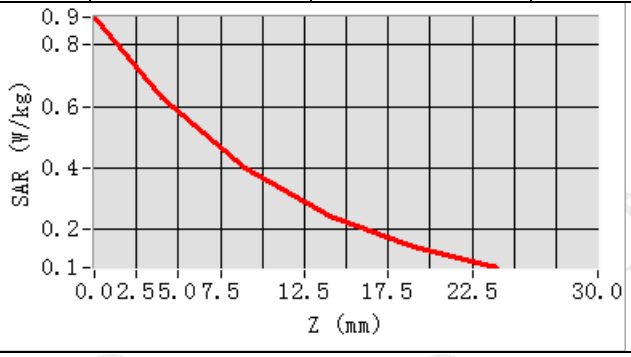
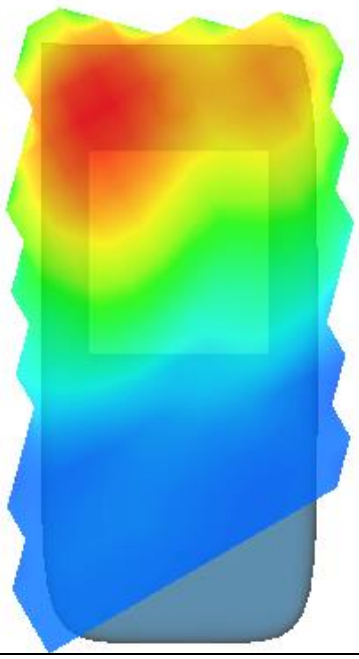
WCDMA Band I

MEASUREMENT 1	
Low Band SAR (Channel 9612):	Date: 06/20/2024
Frequency (MHz)	1922.400000
Relative permittivity (real part)	38.991249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.350792
Variation (%)	0.900000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	Band1_UMTS
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=0.00, Y=-19.00 **SAR Peak: 0.90 W/kg**	
SAR 10g (W/Kg)	0.303287
SAR 1g (W/Kg)	0.549512
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8909	0.6309	0.3981	0.2434	0.1427



Hot spot position



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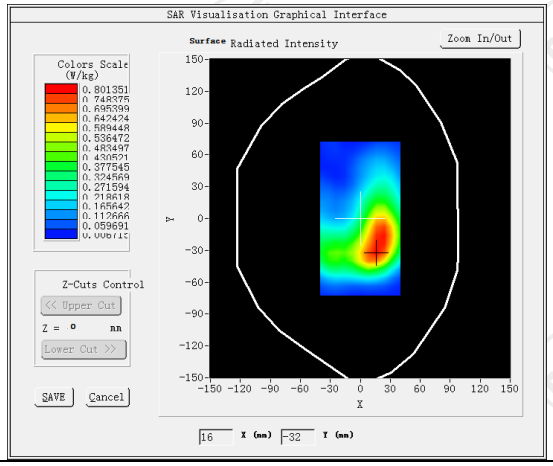
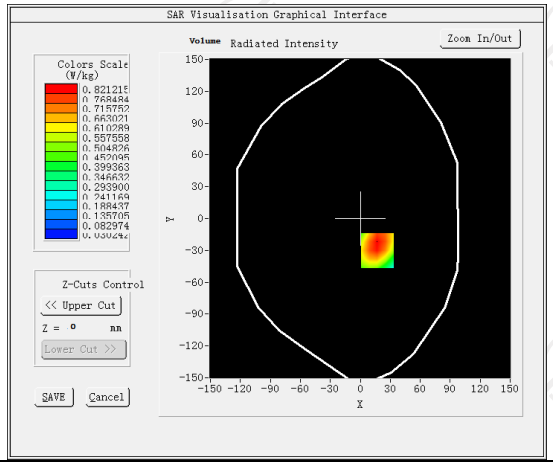
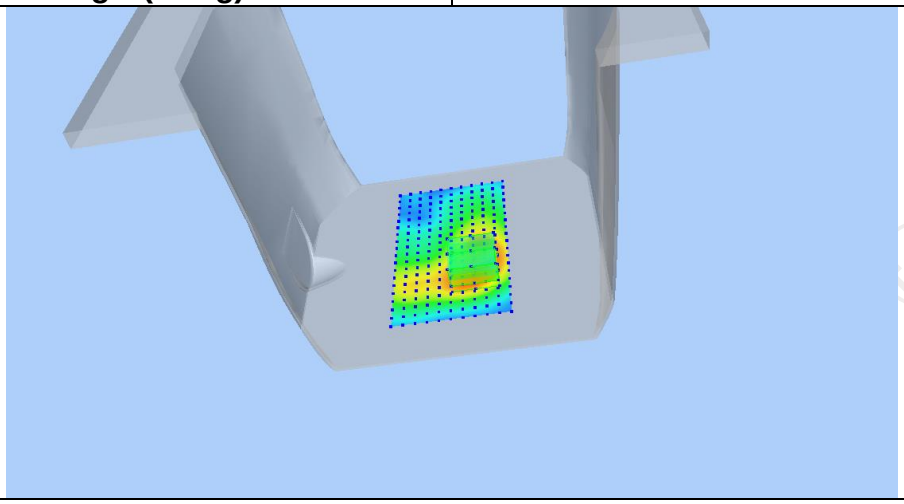
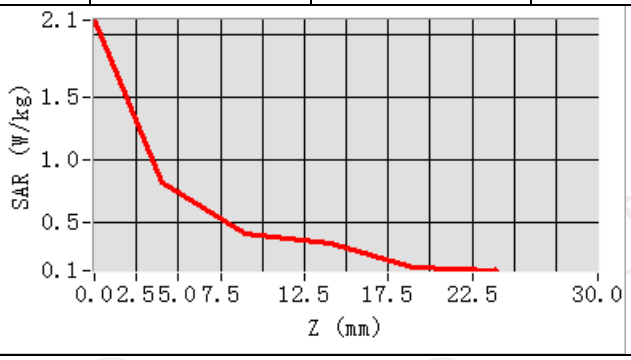
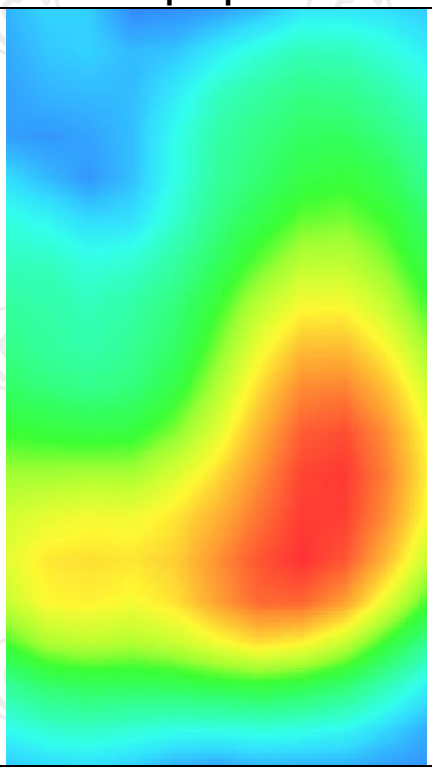
MEASUREMENT 2	
Low Band SAR (Channel 9612):	Date: 06/20/2024
Frequency (MHz)	1922.400000
Relative permittivity (real part)	38.991249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.350792
Variation (%)	-1.960000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body Back
Band	BAND1_WCDMA2100
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=17.00, Y=-30.00 SAR Peak: 1.19 W/kg	
SAR 10g (W/Kg)	0.475877
SAR 1g (W/Kg)	0.783444
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.1183	0.8212	0.4057	0.3229	0.1410



Hot spot position



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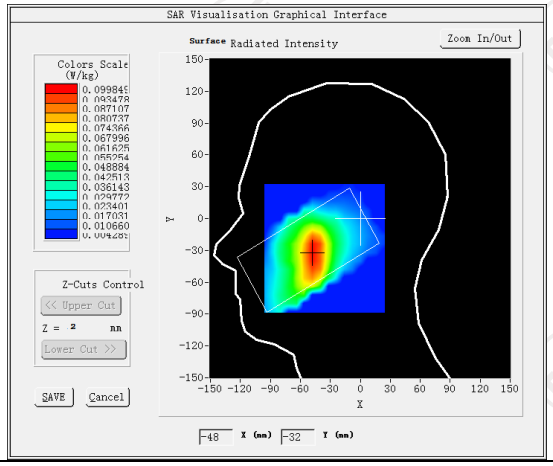
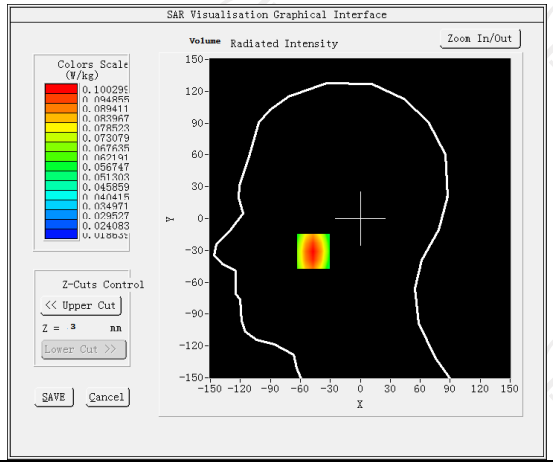
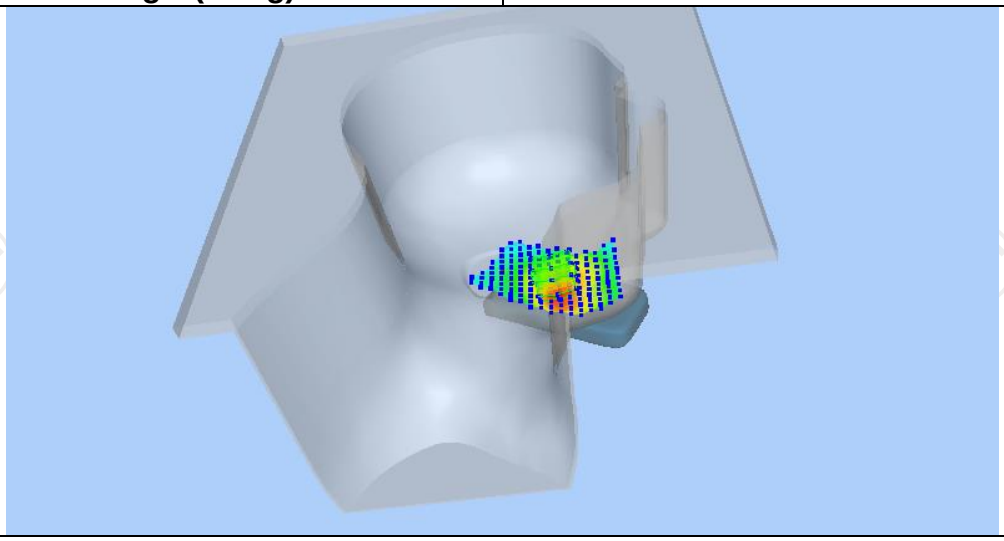
WCDMA Band VIII

MEASUREMENT 1	
Low Band SAR (Channel 2712):	Date: 06/17/2024
Frequency (MHz)	882.400000
Relative permittivity (real part)	41.923440
Relative permittivity (imaginary part)	18.359541
Conductivity (S/m)	0.960017
Variation (%)	-1.860000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	BAND8_WCDMA900
SURFACE SAR	**VOLUME SAR**





Maximum location: X=-31.00, Y=-15.00 SAR Peak: 0.29 W/kg	
SAR 10g (W/Kg)	0.123846
SAR 1g (W/Kg)	0.198513



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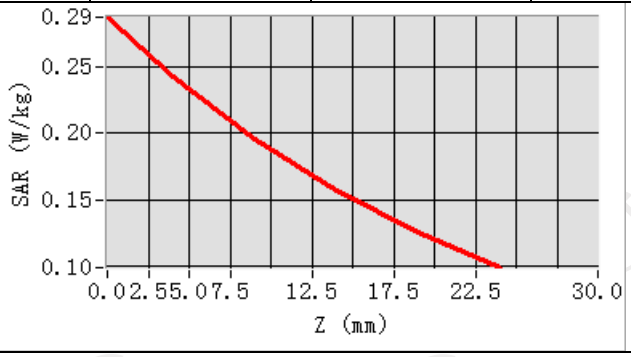
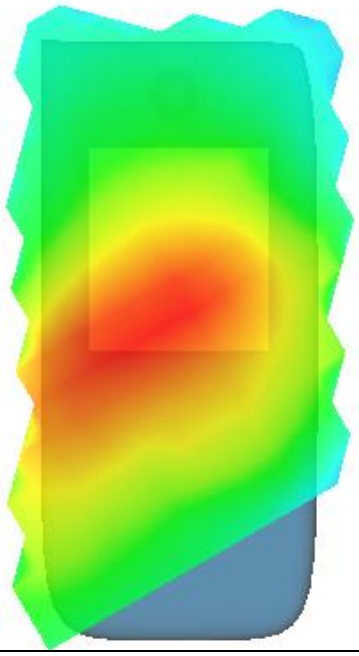
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2870	0.2421	0.1950	0.1568	0.1256



Hot spot position



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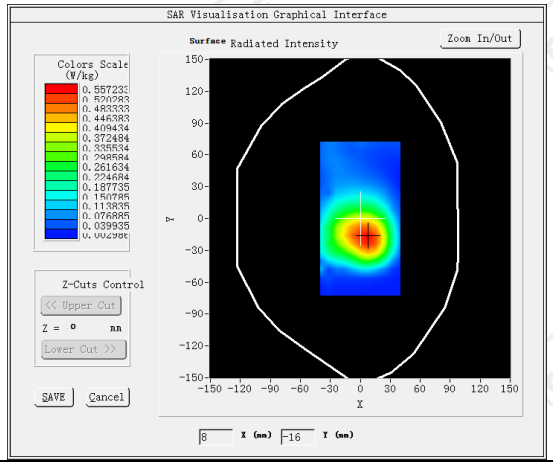
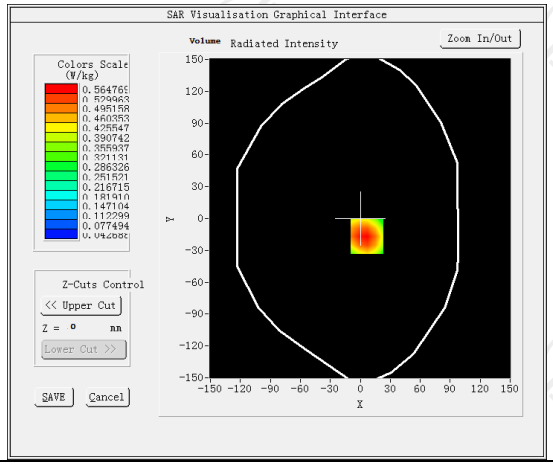
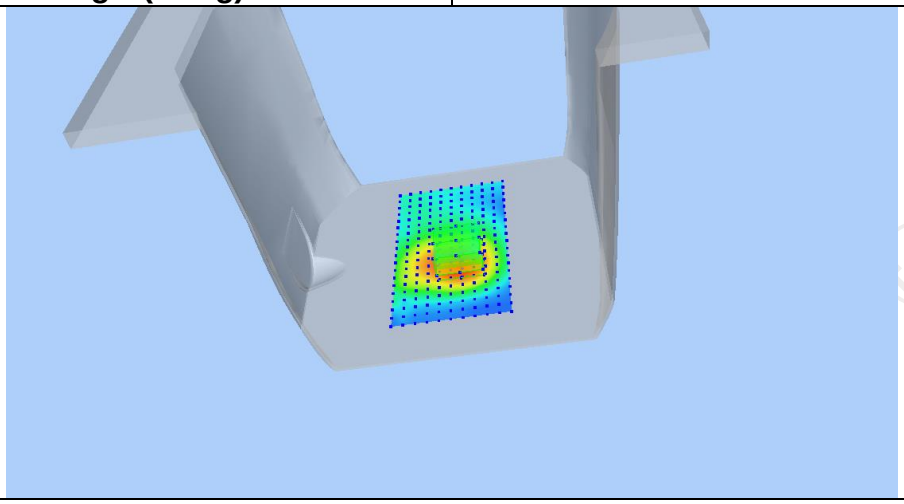
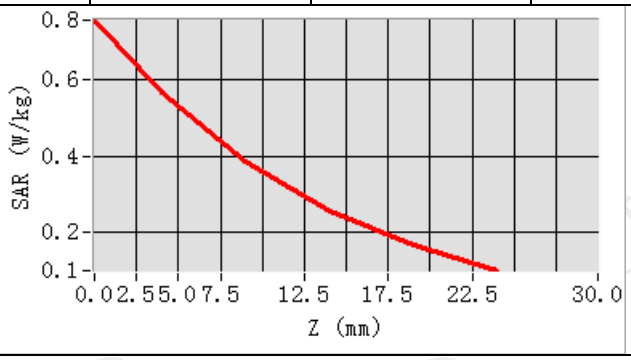
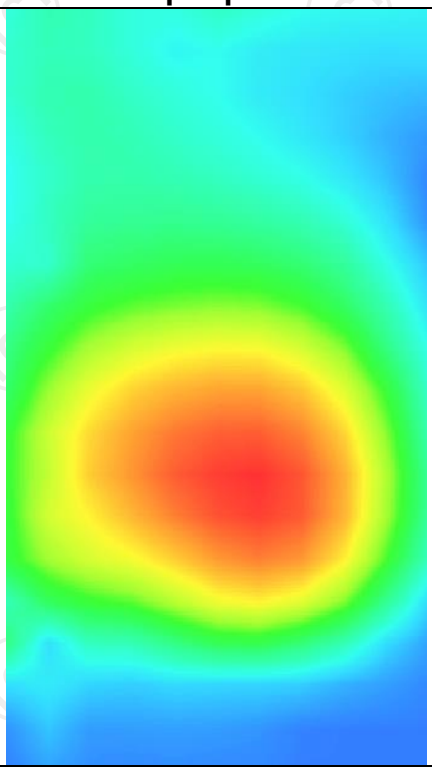
MEASUREMENT 2	
Low Band SAR (Channel 2712):	Date: 06/17/2024
Frequency (MHz)	882.400000
Relative permittivity (real part)	39.861938
Relative permittivity (imaginary part)	18.538490
Conductivity (S/m)	0.923835
Variation (%)	0.600000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	BAND8_WCDMA900
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=7.00, Y=-17.00 SAR Peak: 0.76 W/kg	
SAR 10g (W/Kg)	0.347835
SAR 1g (W/Kg)	0.539777
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7563	0.5648	0.3841	0.2555	0.1650



Hot spot position



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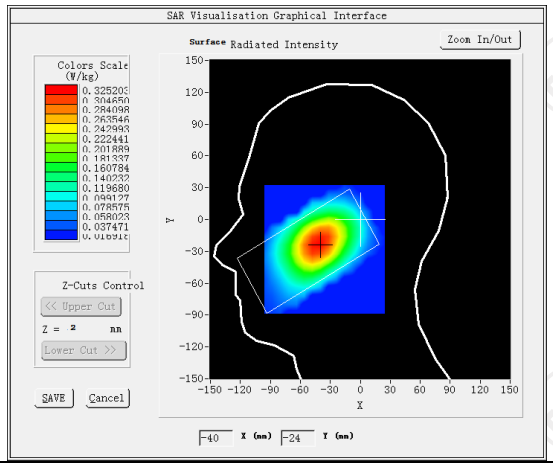
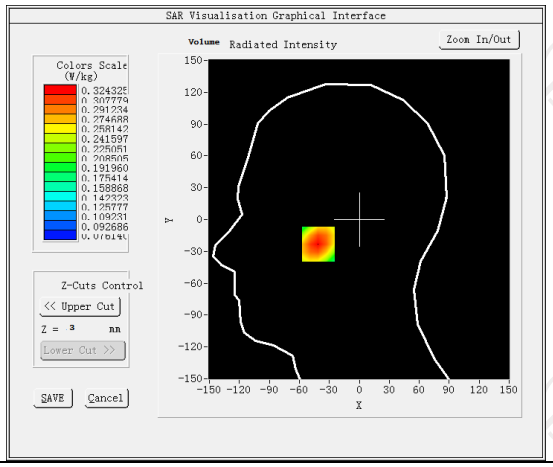
LTE Band I

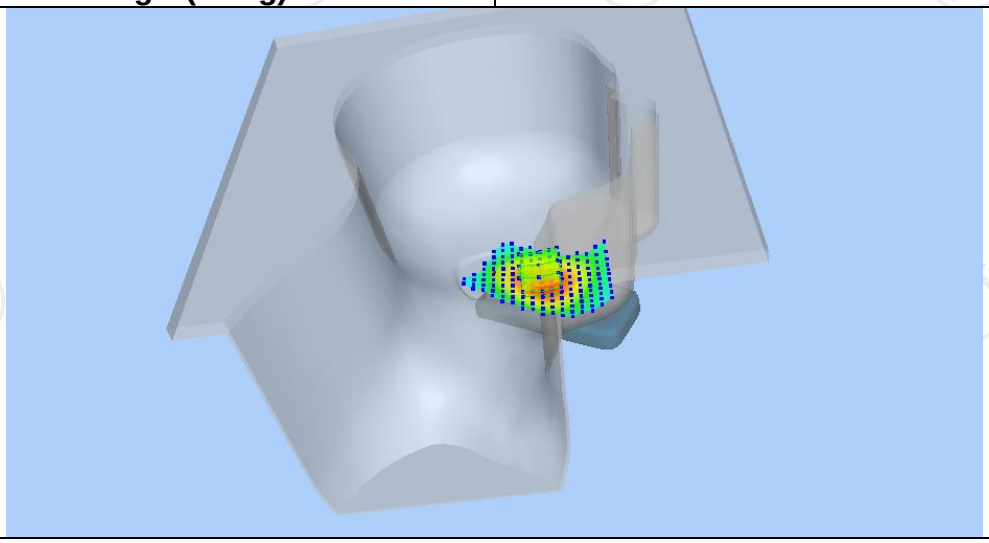
MEASUREMENT 1	
Low Band SAR (Channel 18100):	Date: 06/20/2024
Frequency (MHz)	1930.000000
Relative permittivity (real part)	38.991249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.350792
Variation (%)	0.150000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 1
SURFACE SAR	**VOLUME SAR**



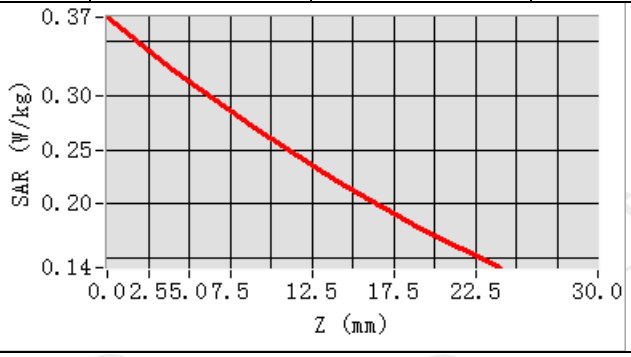


Maximum location: X=-41.00, Y=-23.00
SAR Peak: 0.37 W/kg

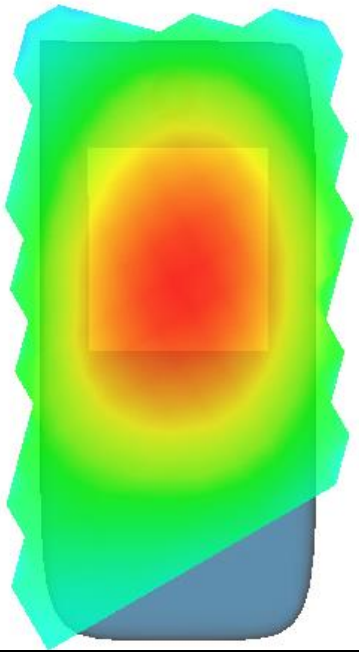
SAR 10g (W/Kg)	0.150167
SAR 1g (W/Kg)	0.281523



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3730	0.3243	0.2695	0.2210	0.1783



Hot spot position



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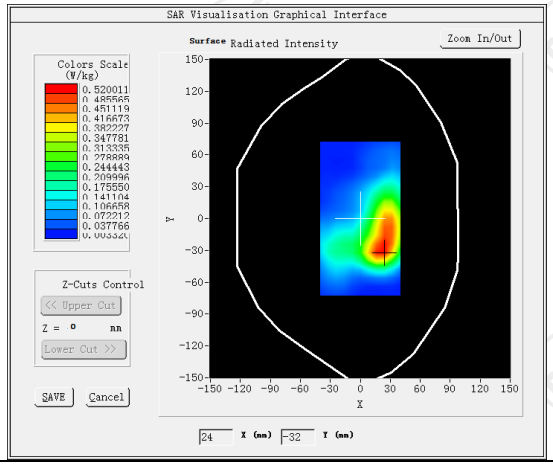
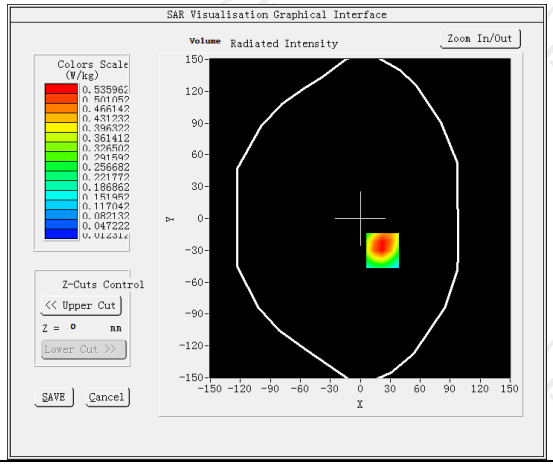
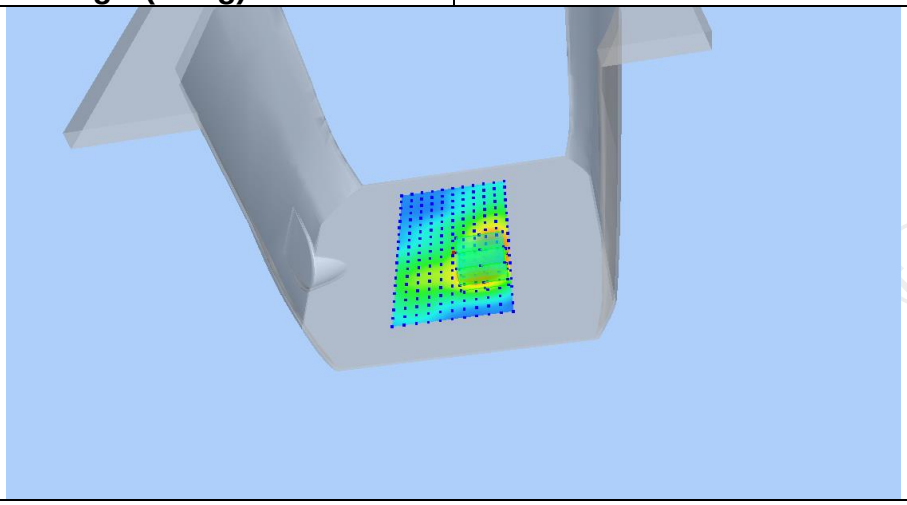
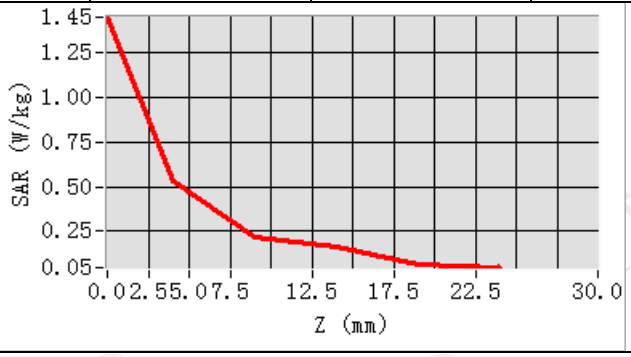
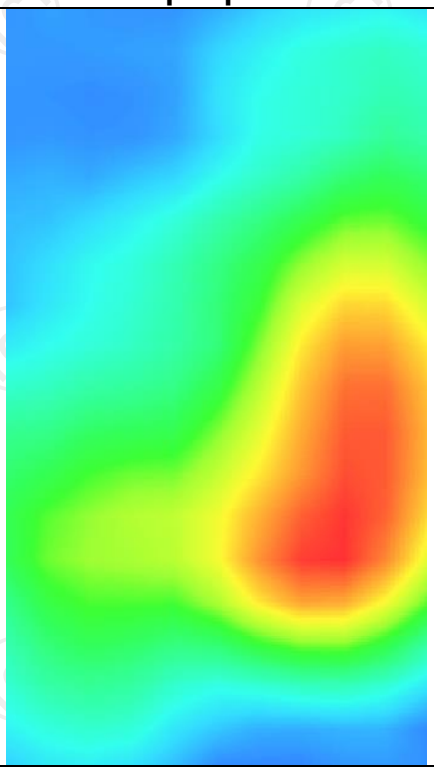
MEASUREMENT 2	
Low Band SAR (Channel 18100):	Date: 06/20/2024
Frequency (MHz)	1930.000000
Relative permittivity (real part)	38.991249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.350792
Variation (%)	-3.770000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 1
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=22.00, Y=-30.00 SAR Peak: 0.88 W/kg	
SAR 10g (W/Kg)	0.282913
SAR 1g (W/Kg)	0.518030
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.4525	0.5360	0.2200	0.1651	0.0671



Hot spot position



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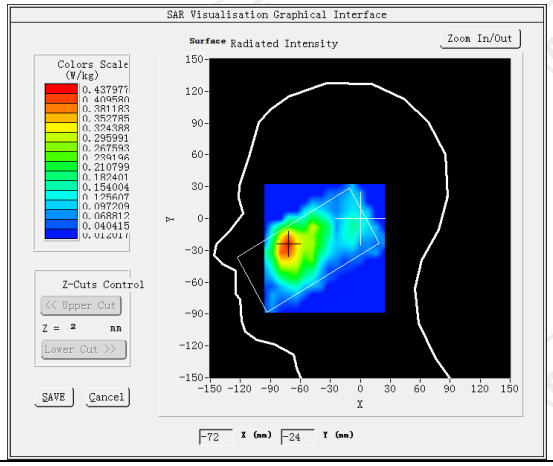
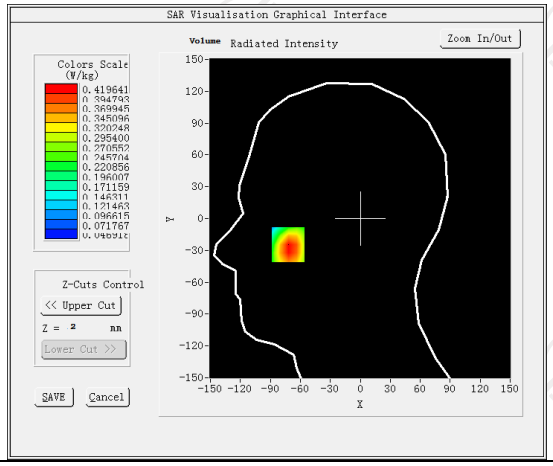
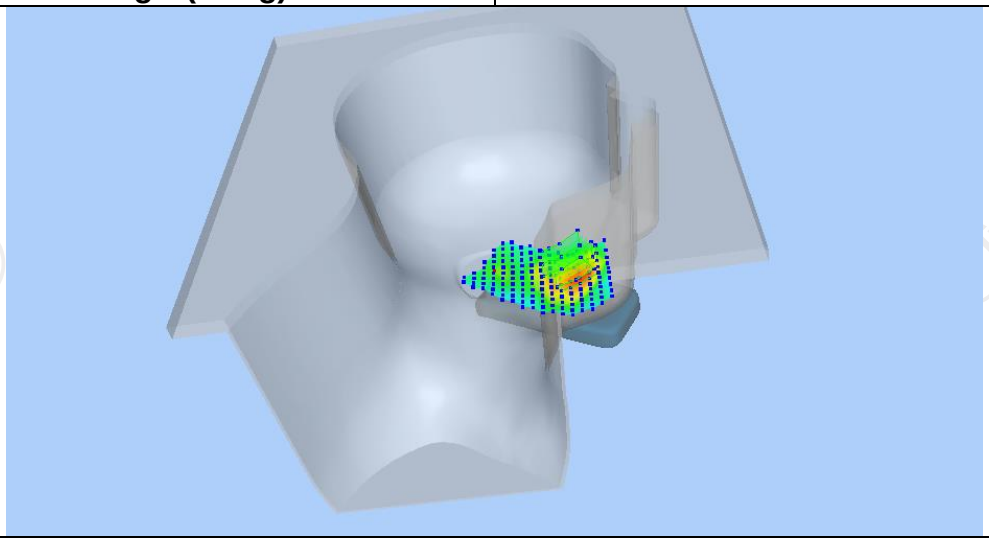
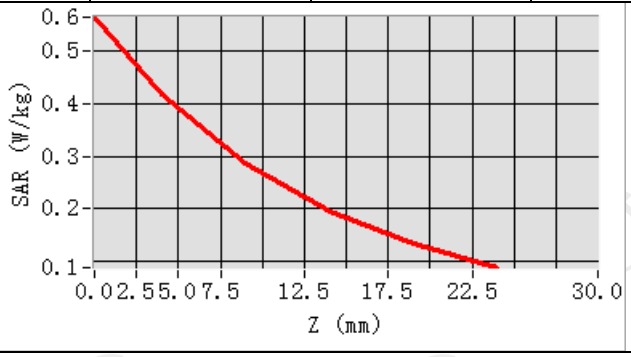
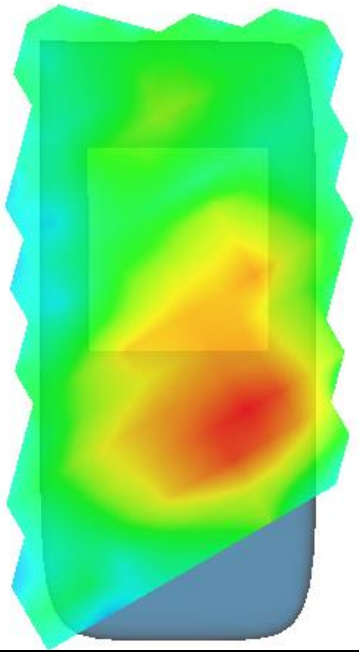
LTE Band III

MEASUREMENT 1	
High Band SAR (Channel 19850):	Date: 06/19/2024
Frequency (MHz)	1775.000000
Relative permittivity (real part)	37.989719
Relative permittivity (imaginary part)	13.774340
Conductivity (S/m)	1.336876
Variation (%)	0.610000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 3
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-72.00, Y=-24.00 SAR Peak: 0.57 W/kg	
SAR 10g (W/Kg)	0.220571
SAR 1g (W/Kg)	0.348916
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.5654	0.4196	0.2863	0.1949	0.1329



Hot spot position



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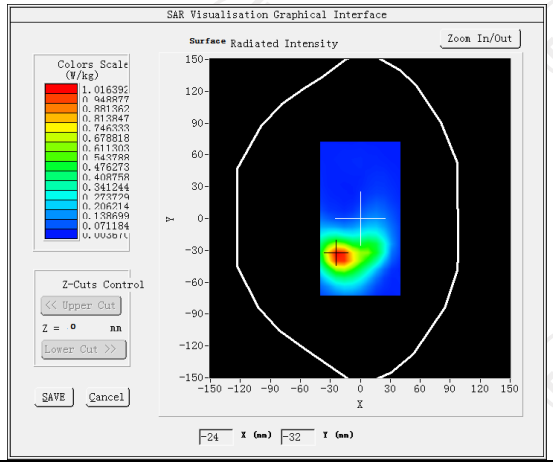
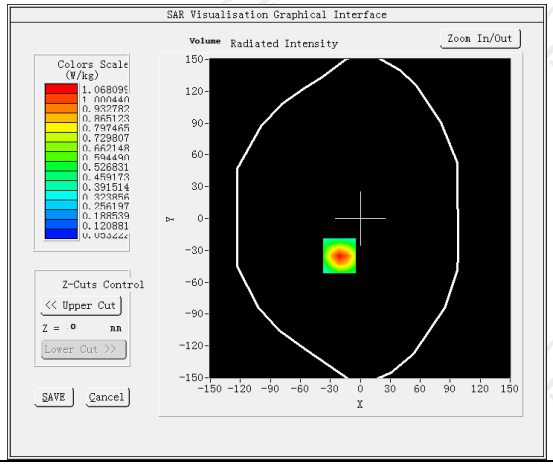
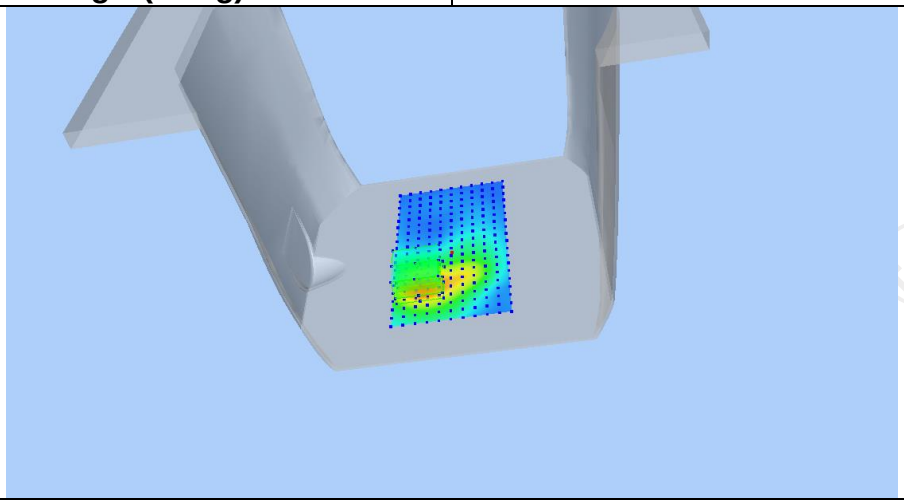
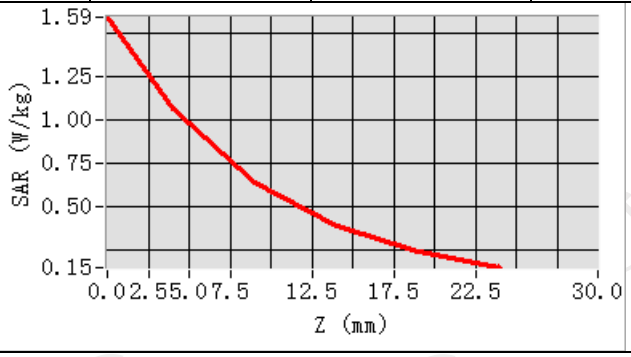
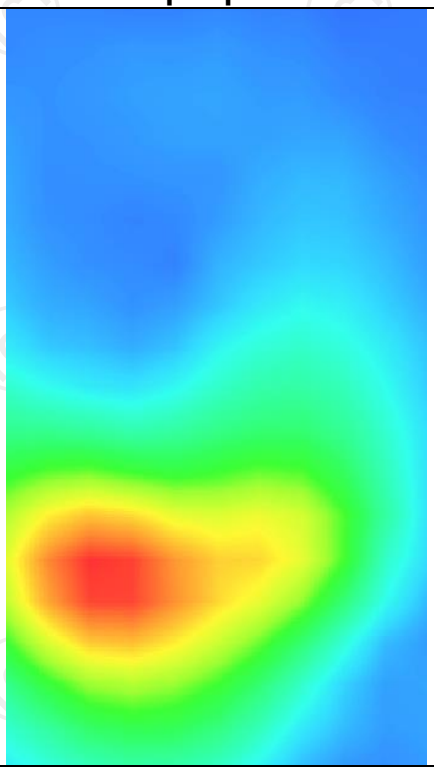
MEASUREMENT 2	
High Band SAR (Channel 19850):	Date: 06/19/2024
Frequency (MHz)	1775.000000
Relative permittivity (real part)	37.989719
Relative permittivity (imaginary part)	13.774340
Conductivity (S/m)	1.336876
Variation (%)	-4.840000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 3
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-21.00, Y=-35.00 SAR Peak: 1.60 W/kg	
SAR 10g (W/Kg)	0.557211
SAR 1g (W/Kg)	0.995559
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.5929	1.0681	0.6381	0.3851	0.2409



Hot spot position



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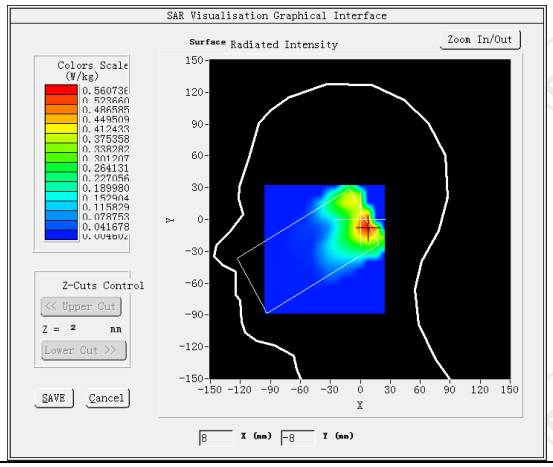
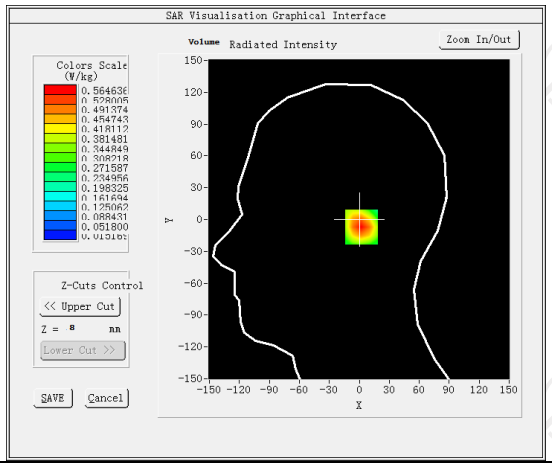
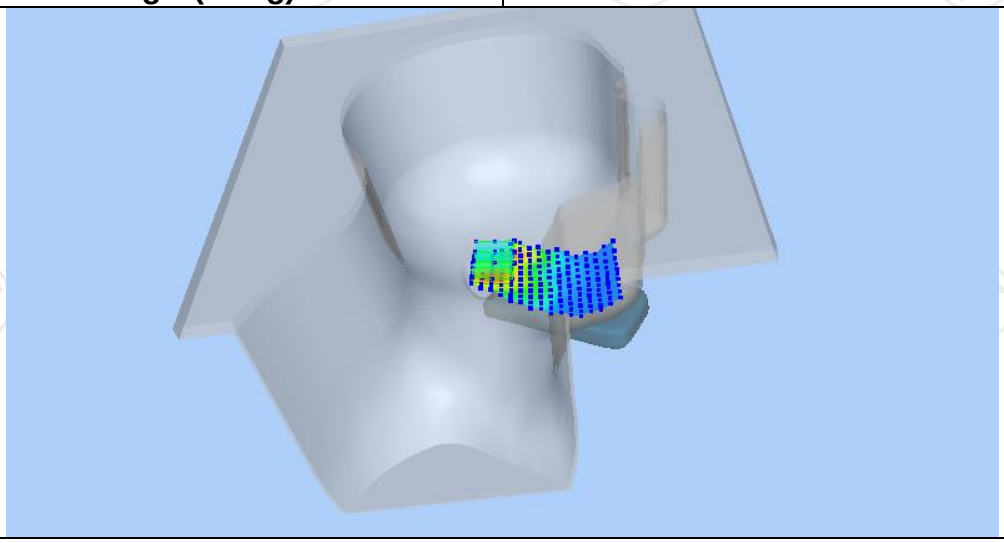
LTE Band 7

MEASUREMENT 1	
High Band SAR (Channel 21350):	Date: 06/28/2024
Frequency (MHz)	2560.000000
Relative permittivity (real part)	37.432823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	1.925428
Variation (%)	1.350000
Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	5x5x7,dx=5mm dy=5mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 7
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=8.00, Y=-7.00 SAR Peak:0.92 W/kg	
SAR 10g (W/Kg)	0.306812
SAR 1g (W/Kg)	0.469745
	

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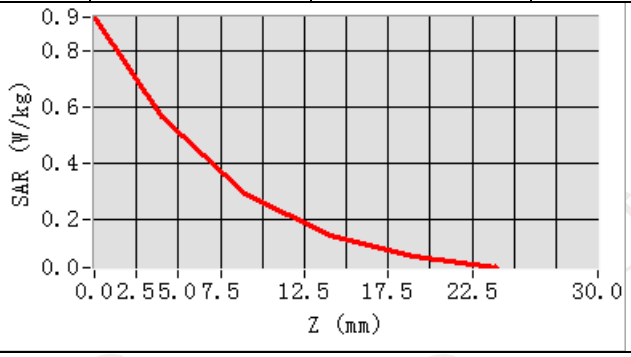
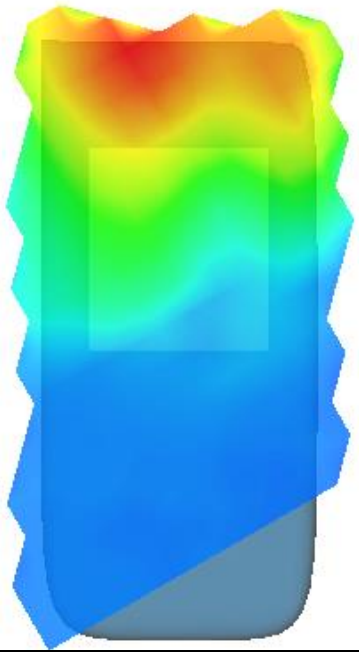
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.9193	0.5646	0.2913	0.1441	0.0694



Hot spot position



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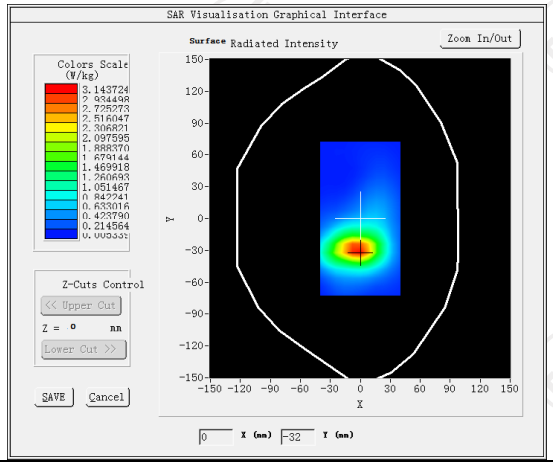
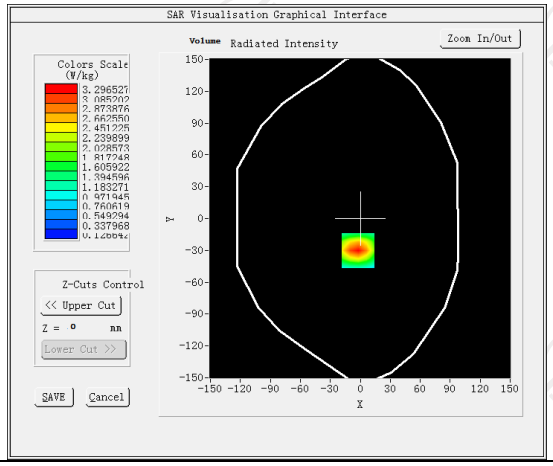
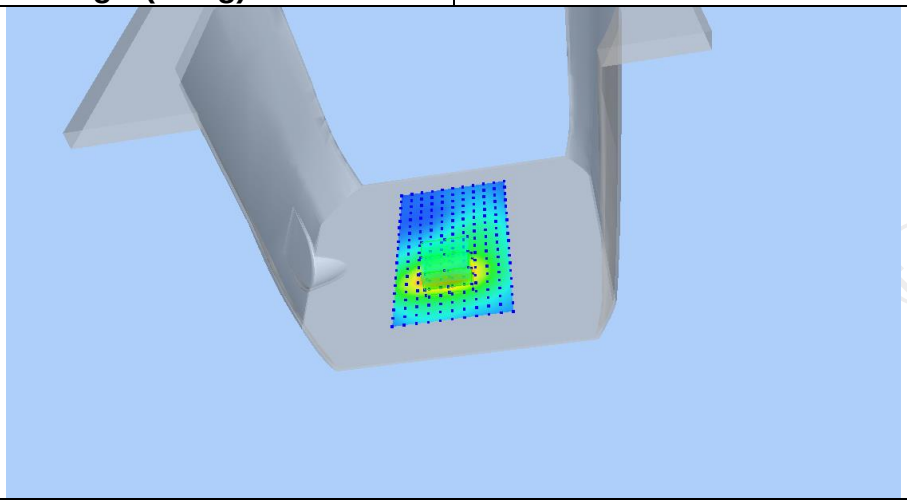
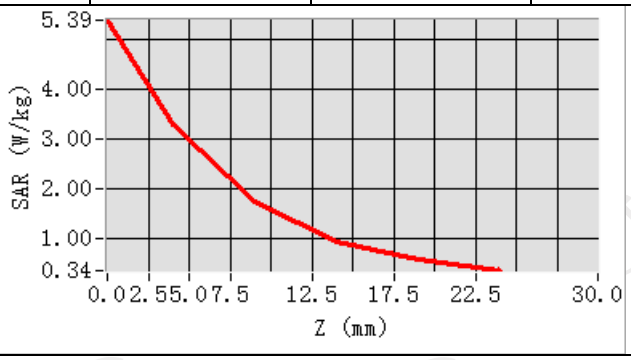
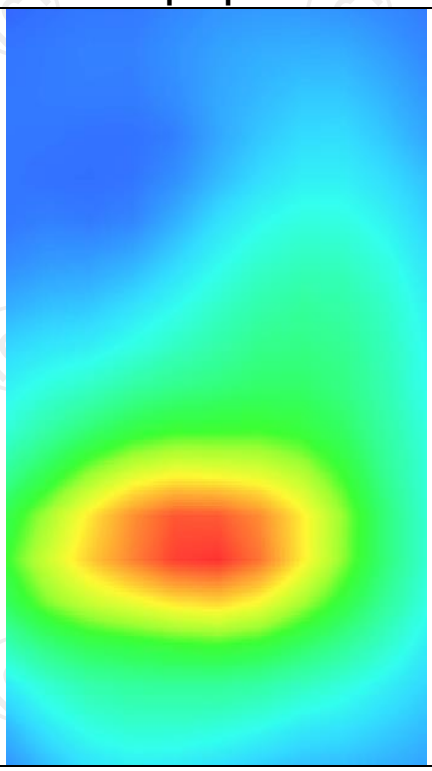
MEASUREMENT 2	
High Band SAR (Channel 21350):	Date: 06/28/2024
Frequency (MHz)	2560.000000
Relative permittivity (real part)	37.432823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	1.925428
Variation (%)	-1.300000
Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	5x5x7,dx=5mm dy=5mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 7
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-2.00, Y=-30.00 SAR Peak: 5.40 W/kg	
SAR 10g (W/Kg)	1.326837
SAR 1g (W/Kg)	3.120834
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	5.3927	3.2965	1.7316	0.9315	0.5507



Hot spot position



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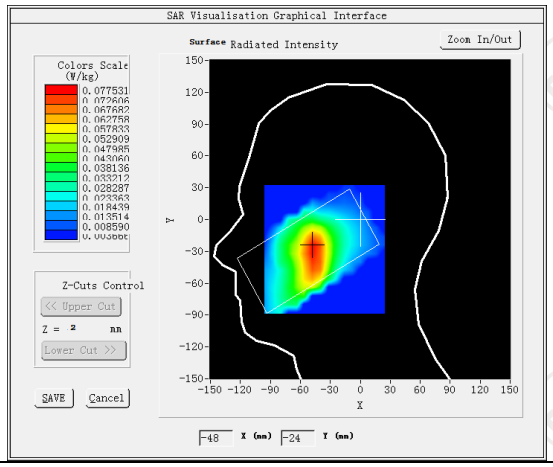
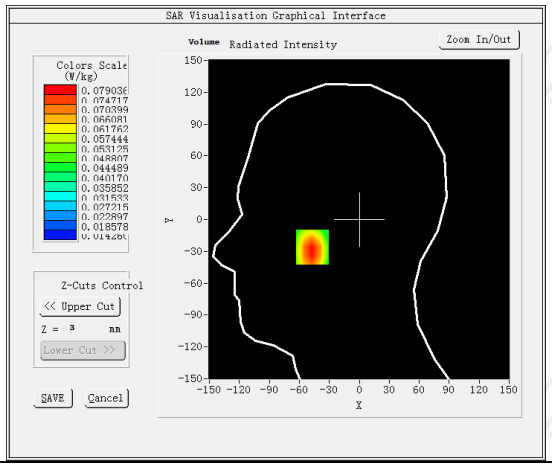
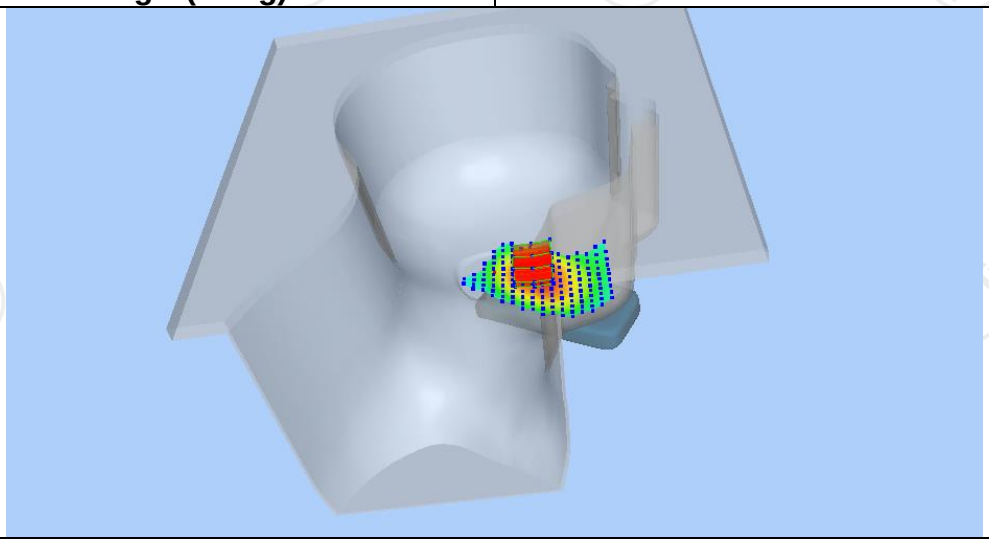
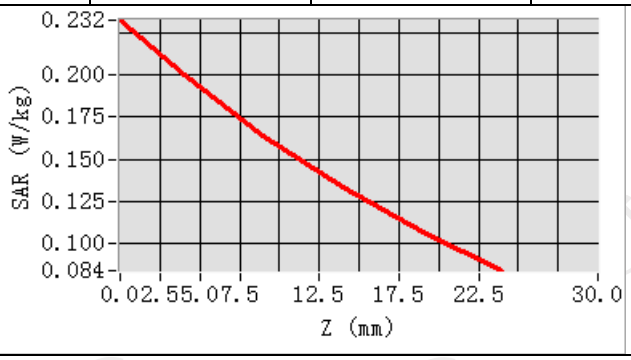
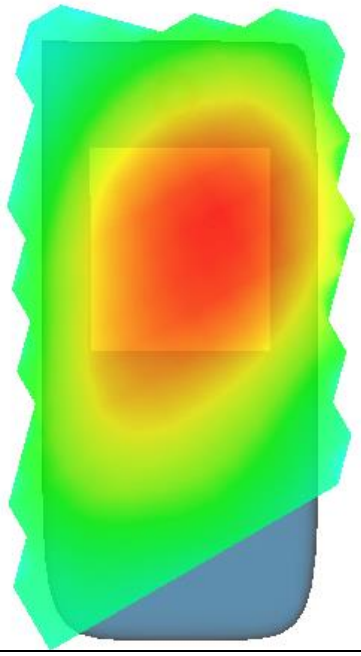
LTE Band 8

MEASUREMENT 1	
Low Band SAR (Channel 21500):	Date: 06/17/2024
Frequency (MHz)	885.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.966767
Variation (%)	1.960000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 8
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-34.00, Y=-10.00 SAR Peak: 0.23 W/kg	
SAR 10g (W/Kg)	0.151213
SAR 1g (W/Kg)	0.204328
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2324	0.2000	0.1643	0.1336	0.1071



Hot spot position



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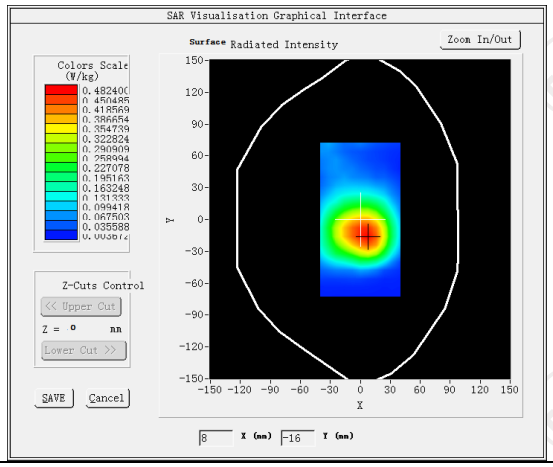
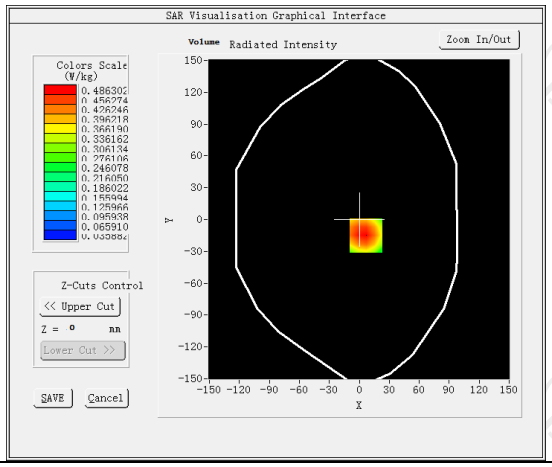
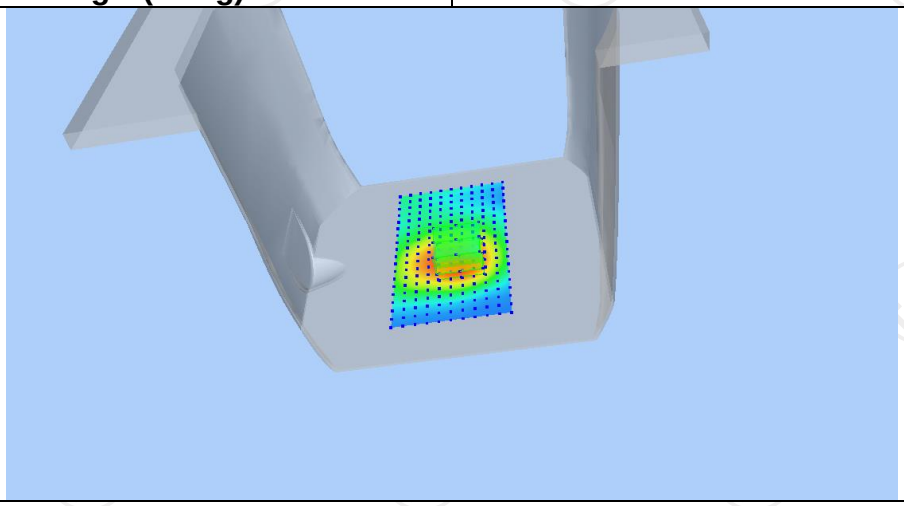
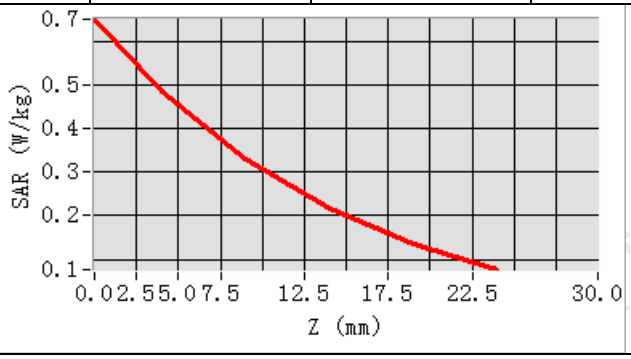
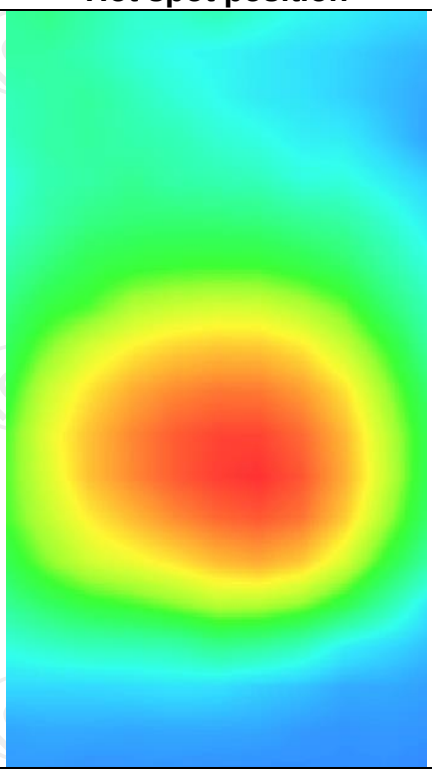
MEASUREMENT 2	
Low Band SAR (Channel 21500):	Date: 06/17/2024
Frequency (MHz)	885.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.966767
Variation (%)	0.280000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 8
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=7.00, Y=-15.00 SAR Peak: 0.65 W/kg	
SAR 10g (W/Kg)	0.299691
SAR 1g (W/Kg)	0.465349
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6504	0.4863	0.3295	0.2160	0.1352



Hot spot position



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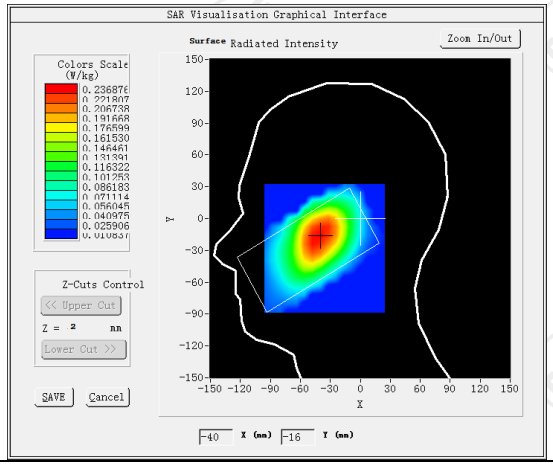
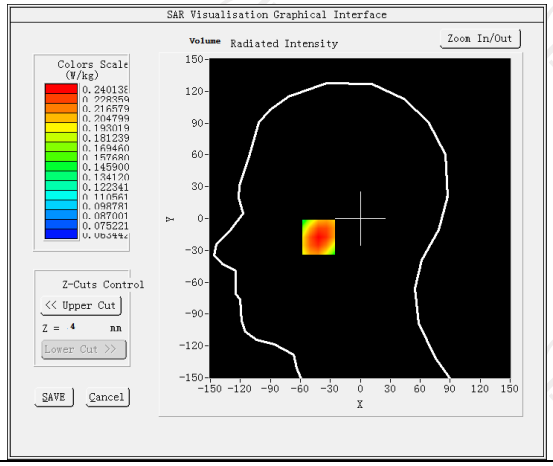
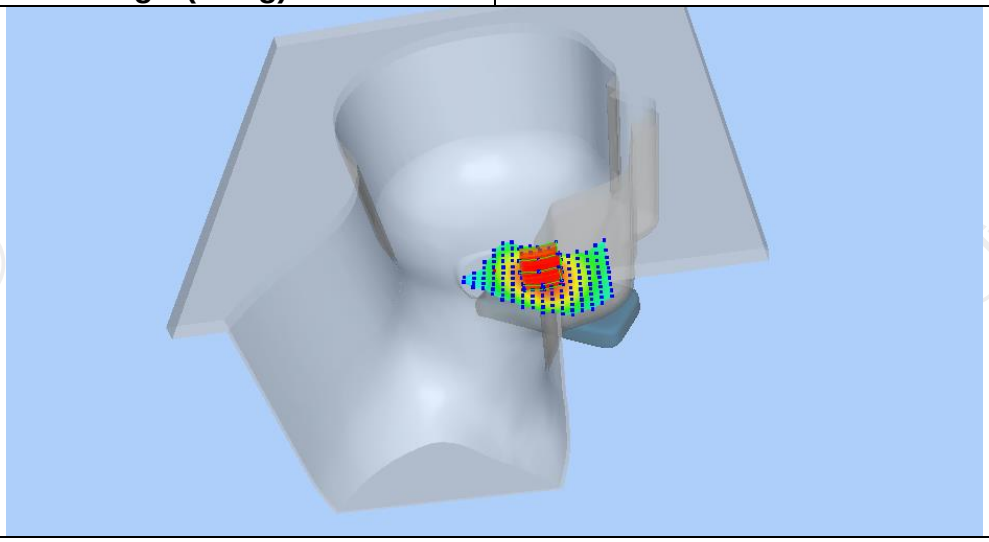
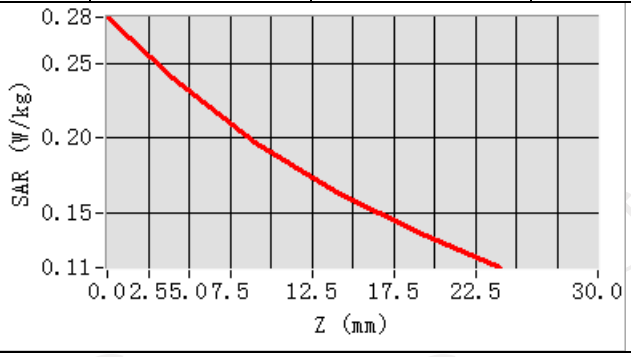
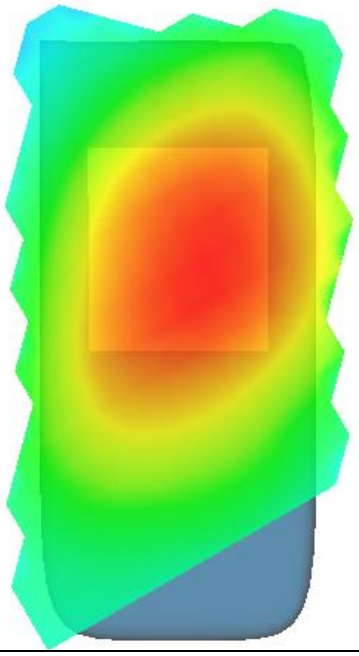
LTE Band 20

MEASUREMENT 1	
Low Band SAR (Channel 24250):	Date: 06/17/2024
Frequency (MHz)	842.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.912878
Variation (%)	0.200000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 20
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-42.00, Y=-17.00 SAR Peak: 0.28 W/kg	
SAR 10g (W/Kg)	0.123057
SAR 1g (W/Kg)	0.170513
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2805	0.2441	0.1989	0.1691	0.1361



Hot spot position



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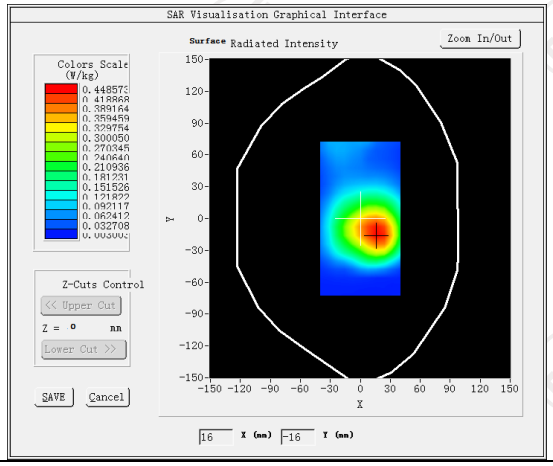
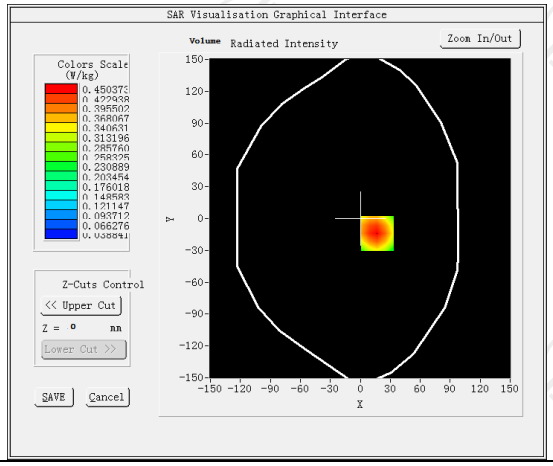
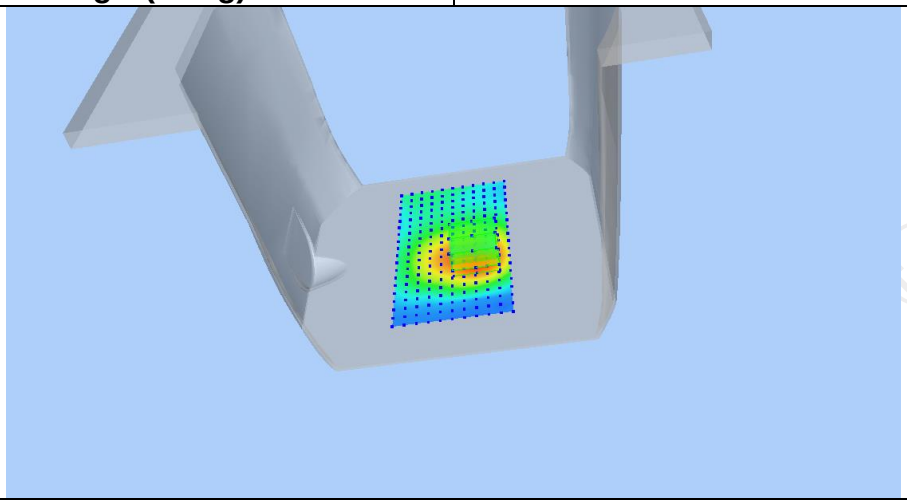
MEASUREMENT 2	
Low Band SAR (Channel 24250):	Date: 06/17/2024
Frequency (MHz)	842.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.912878
Variation (%)	-1.510000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 20
SURFACE SAR	**VOLUME SAR**



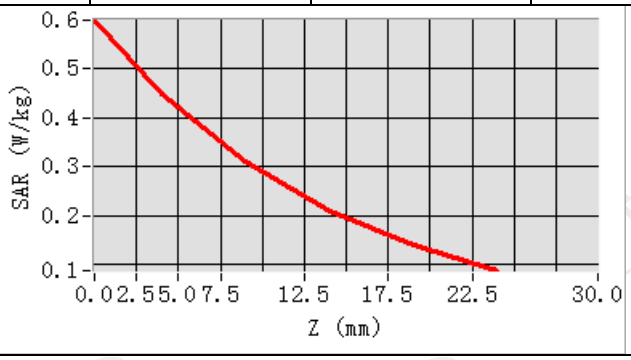


Maximum location: X=17.00, Y=-14.00
SAR Peak: 0.60 W/kg

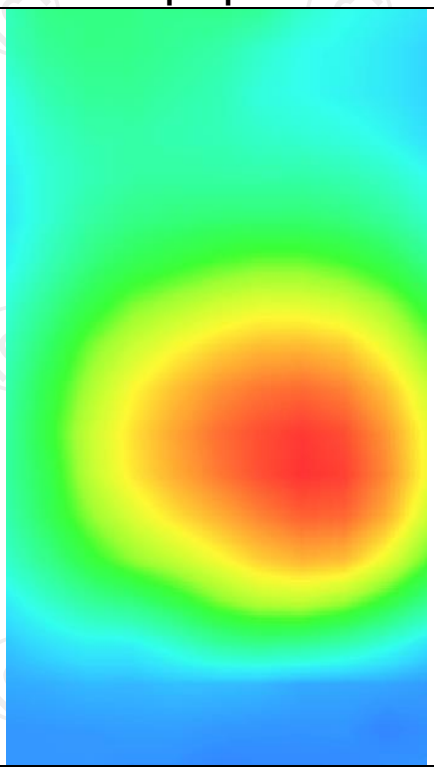
SAR 10g (W/Kg)	0.281867
SAR 1g (W/Kg)	0.430153



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6002	0.4504	0.3094	0.2093	0.1388



Hot spot position



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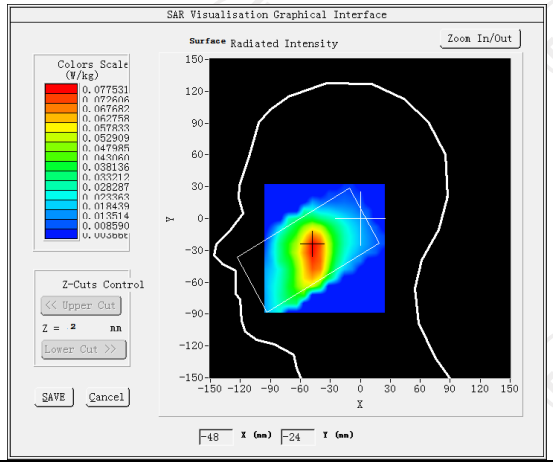
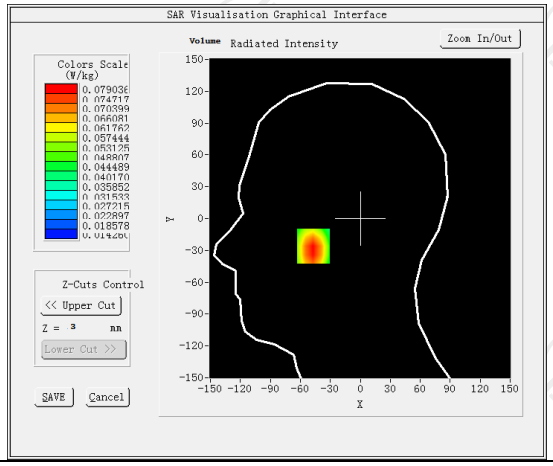
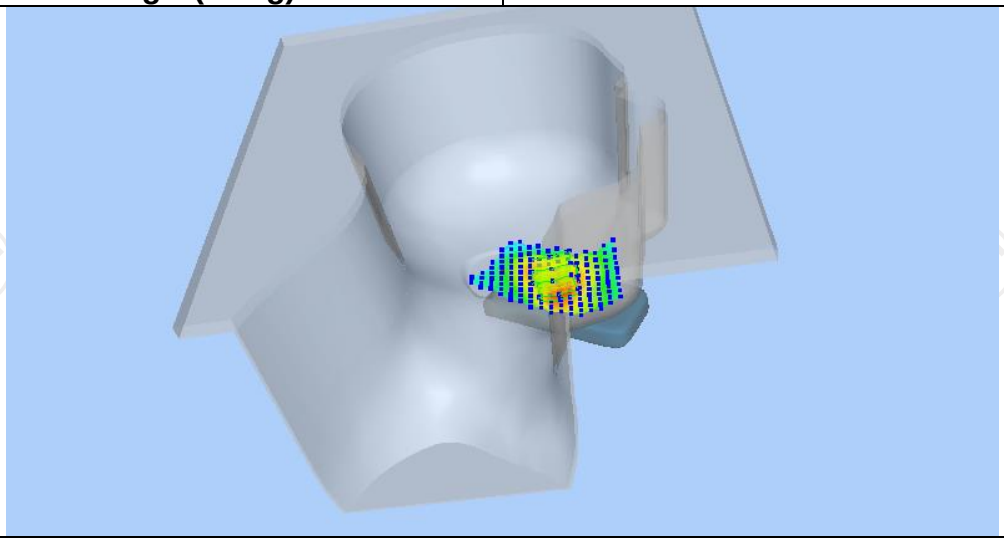
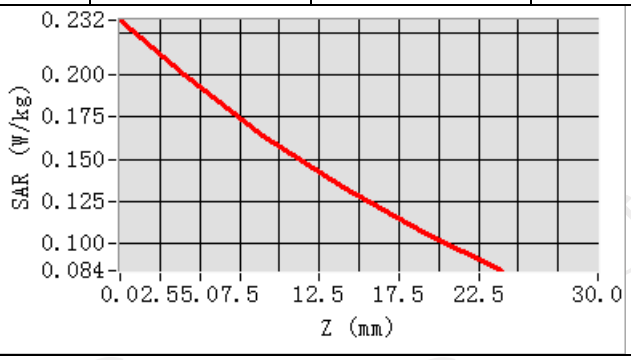
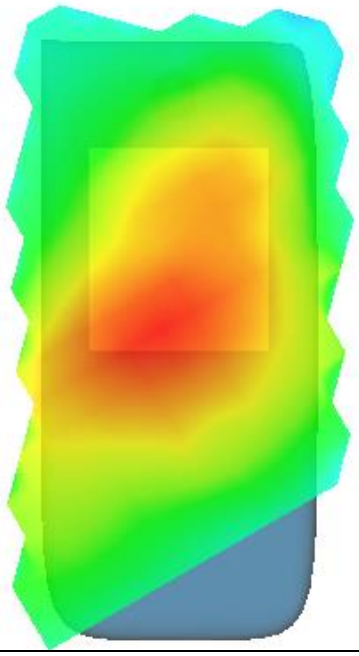
LTE Band 28

MEASUREMENT 1	
Low Band SAR (Channel 21310):	Date: 06/17/2024
Frequency (MHz)	713.000000
Relative permittivity (real part)	39.500000
Relative permittivity (imaginary part)	18.400000
Conductivity (S/m)	0.966767
Variation (%)	1.590000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 8
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-48.00, Y=-32.00 SAR Peak: 0.28 W/kg	
SAR 10g (W/Kg)	0.140647
SAR 1g (W/Kg)	0.189120
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2324	0.2000	0.1643	0.1336	0.1071



Hot spot position



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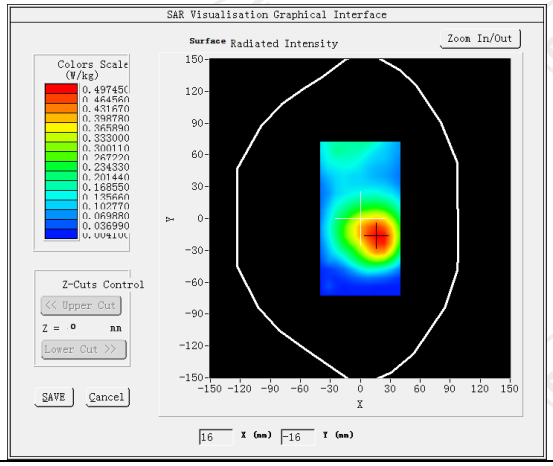
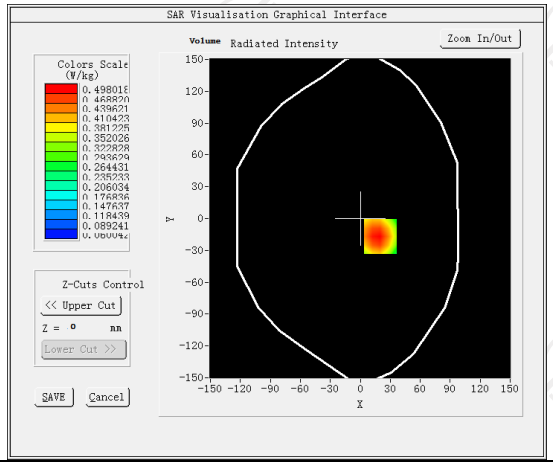
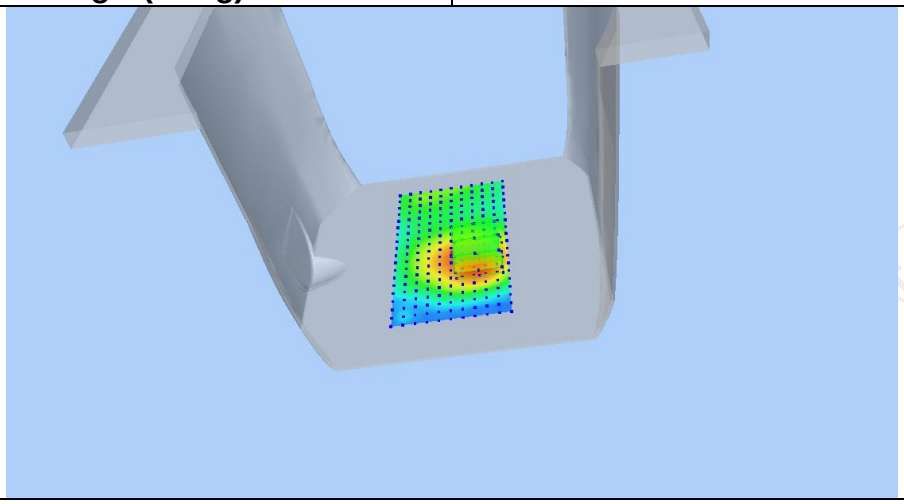
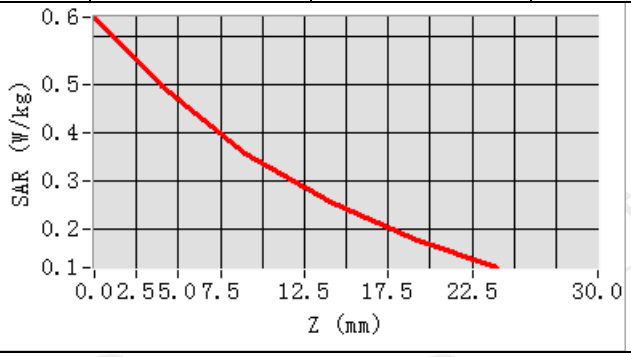
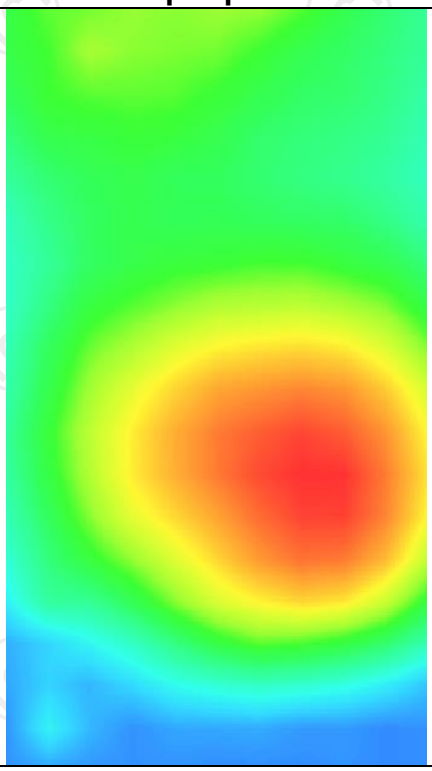
MEASUREMENT 2	
Low Band SAR (Channel 27310):	Date: 06/17/2024
Frequency (MHz)	713.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.912878
Variation (%)	-3.440000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 28
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=20.00, Y=-17.00 SAR Peak: 0.65 W/kg	
SAR 10g (W/Kg)	0.324403
SAR 1g (W/Kg)	0.478585
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6418	0.4980	0.3580	0.2541	0.1773



Hot spot position



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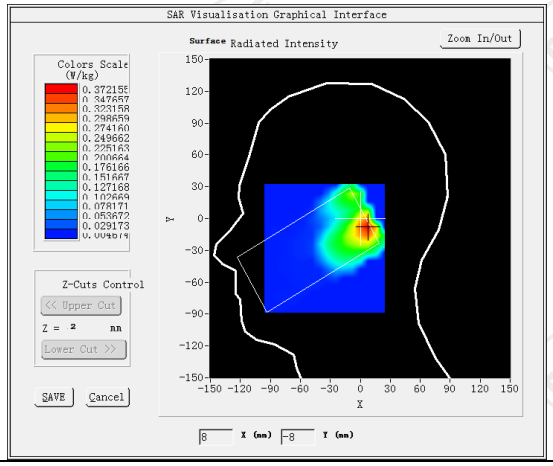
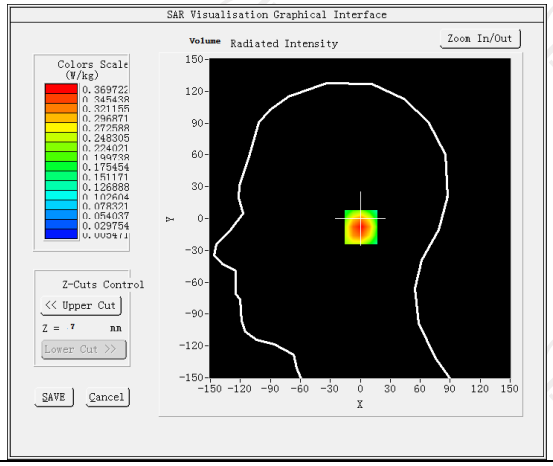
LTE Band 38

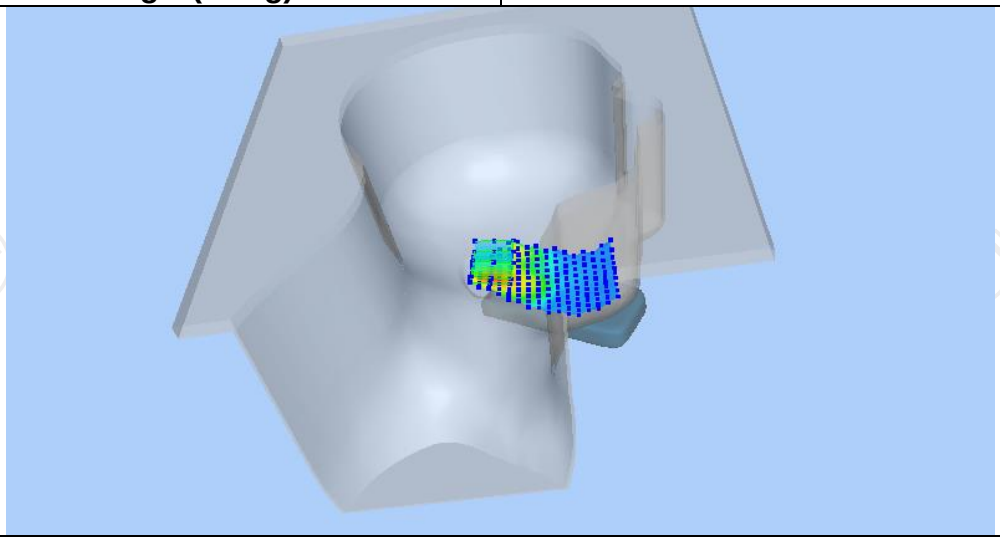
MEASUREMENT 1	
High Band SAR (Channel 38150)	Date: 06/28/2024
Frequency (MHz)	2610.000000
Relative permittivity (real part)	39.006668
Relative permittivity (imaginary part)	13.558333
Conductivity (S/m)	1.954660
Variation (%)	-1.260000
Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	5x5x7,dx=5mm dy=5mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 38
SURFACE SAR	**VOLUME SAR**





Maximum location: X=7.00, Y=-8.00
SAR Peak: 0.63 W/kg

SAR 10g (W/Kg)	0.306715
SAR 1g (W/Kg)	0.495194



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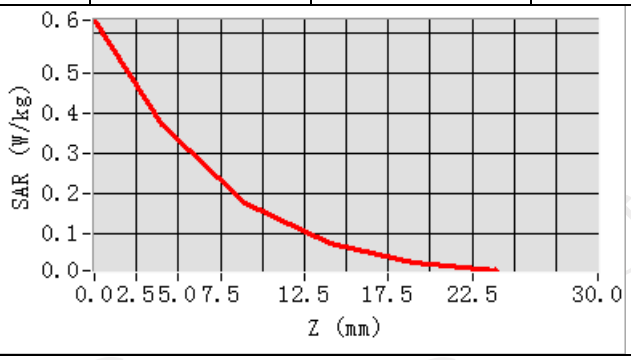
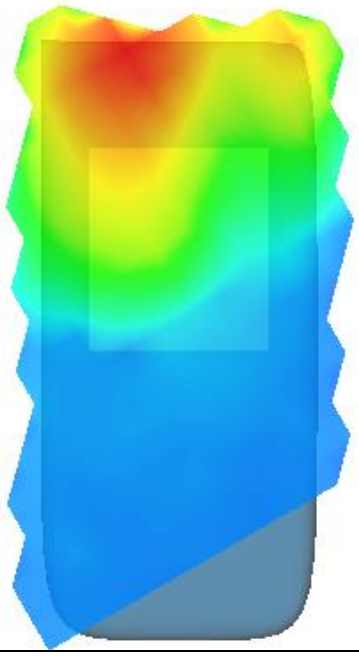
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6108	0.3957	0.1752	0.0758	0.0296



Hot spot position



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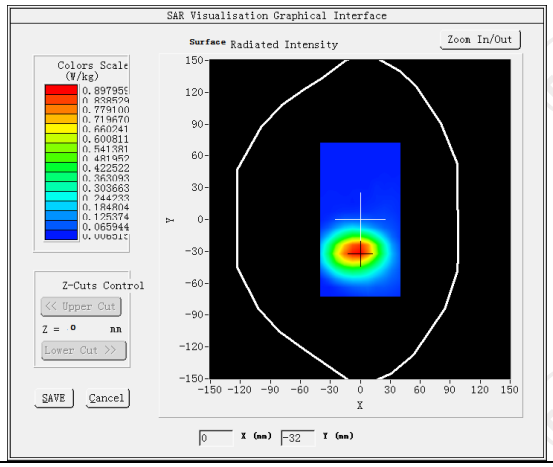
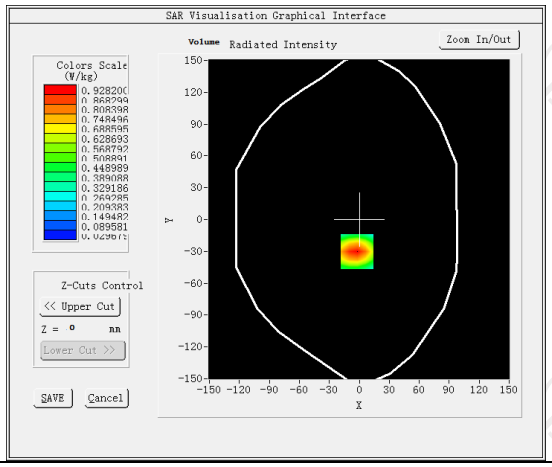
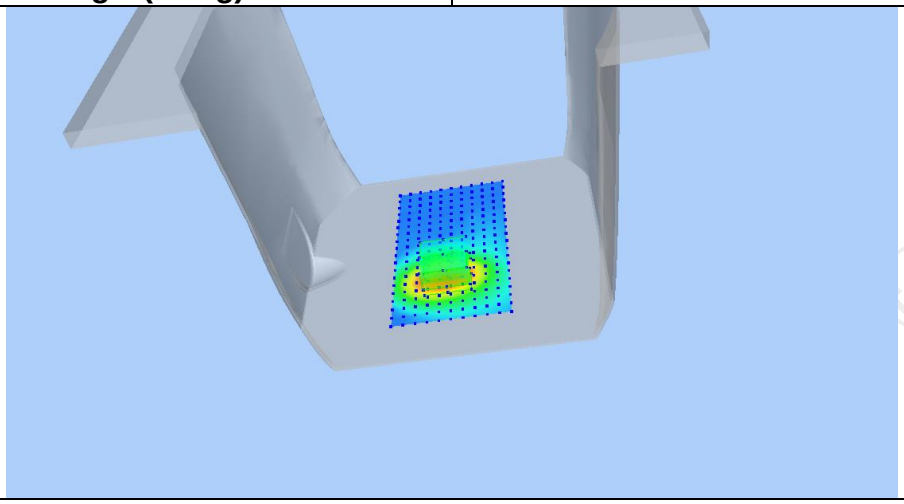
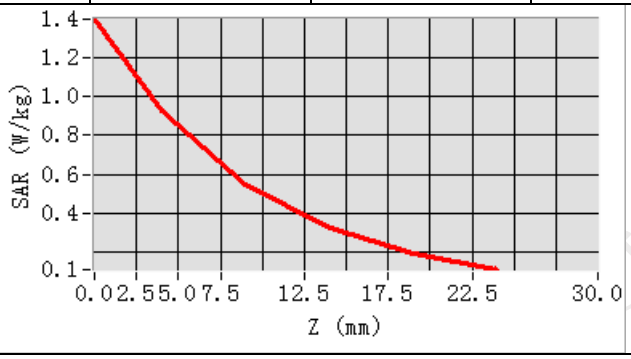
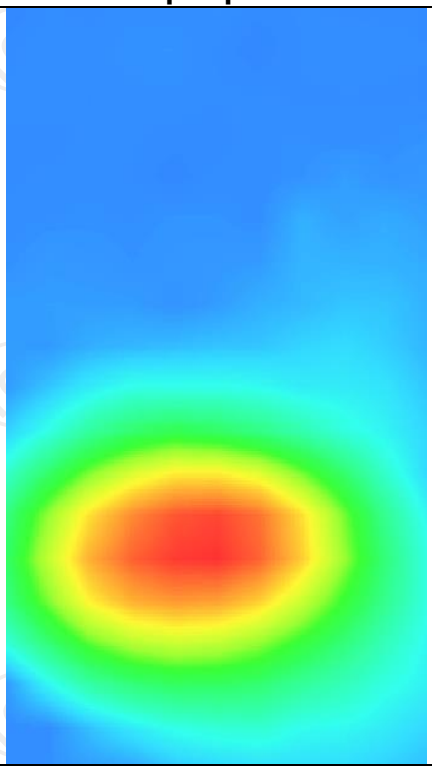
MEASUREMENT 2	
High Band SAR (Channel 38150)	Date: 06/28/2024
Frequency (MHz)	2610.000000
Relative permittivity (real part)	39.006668
Relative permittivity (imaginary part)	13.558333
Conductivity (S/m)	1.954660
Variation (%)	-4.070000
Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	5x5x7,dx=5mm dy=5mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 38
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-2.00, Y=-30.00 SAR Peak:1.40 W/kg	
SAR 10g (W/Kg)	0.489647
SAR 1g (W/Kg)	0.870006
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.3953	0.9282	0.5455	0.3200	0.1914



Hot spot position



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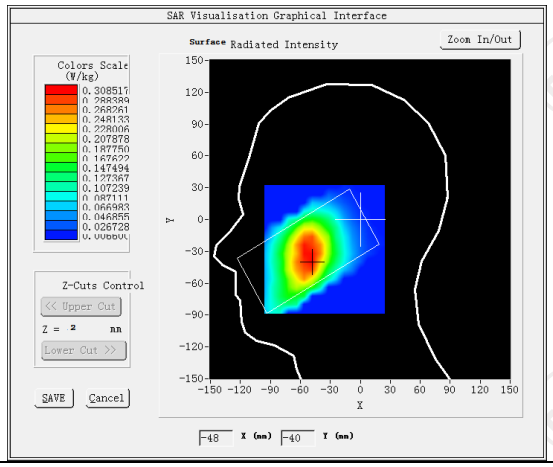
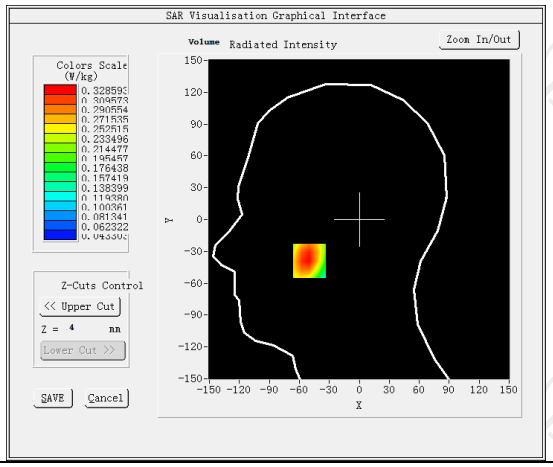
LTE Band 40

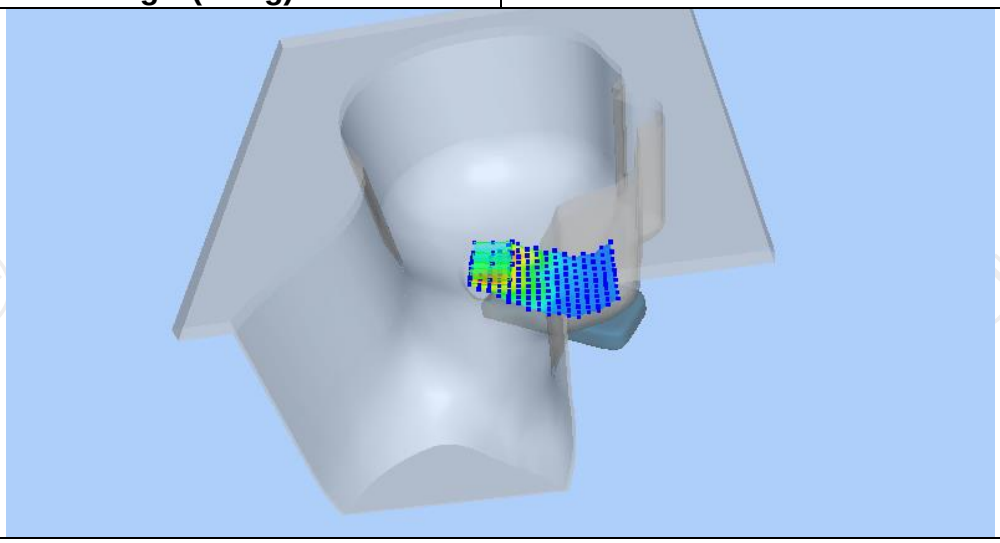
MEASUREMENT 1	
Middle Band SAR (Channel 39150)	Date: 06/25/2024
Frequency (MHz)	2350.000000
Relative permittivity (real part)	39.400002
Relative permittivity (imaginary part)	13.120000
Conductivity (S/m)	1.712889
Variation (%)	-2.500000
Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	5x5x7,dx=5mm dy=5mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 40
SURFACE SAR	**VOLUME SAR**



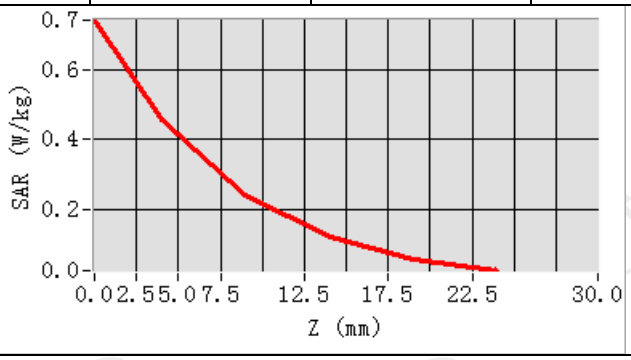


Maximum location: X=-52.00, Y=-40.00
SAR Peak: 0.43 W/kg

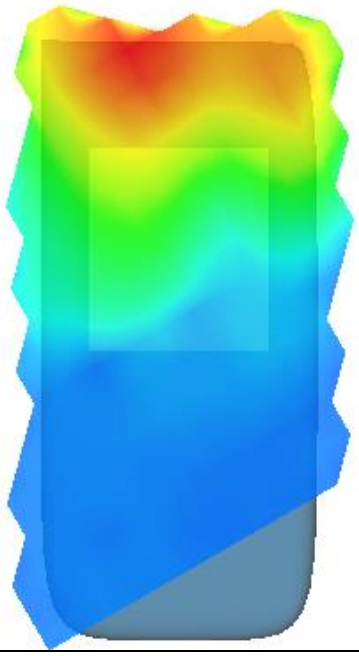
SAR 10g (W/Kg)	0.154166
SAR 1g (W/Kg)	0.341576



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7438	0.4590	0.2383	0.1183	0.0569



Hot spot position



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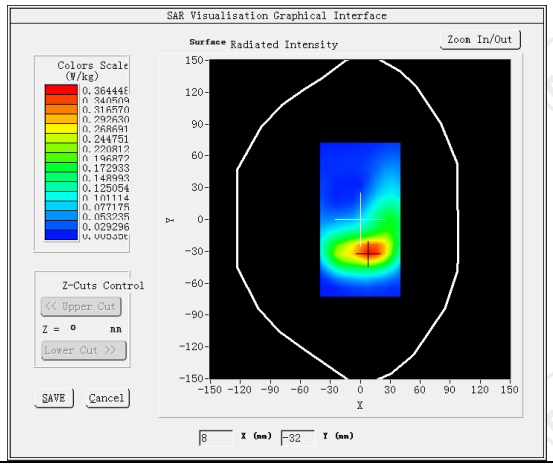
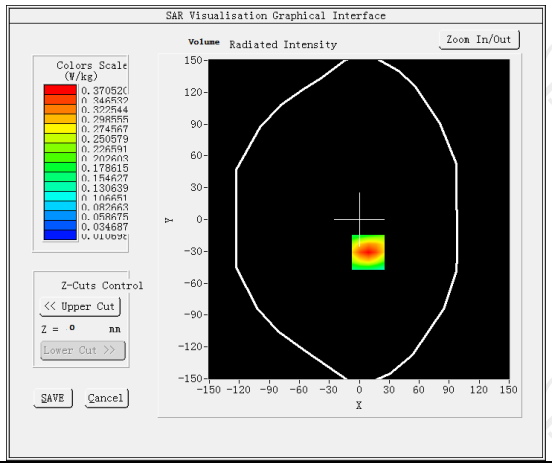
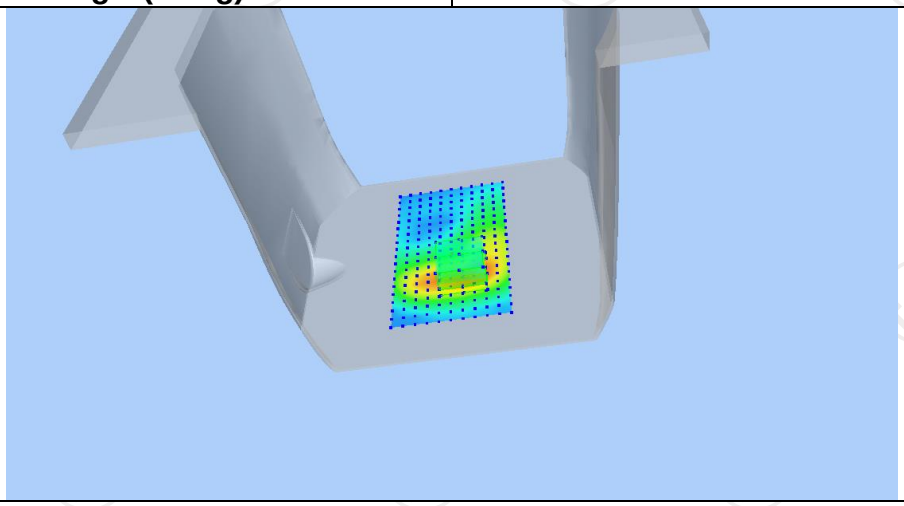
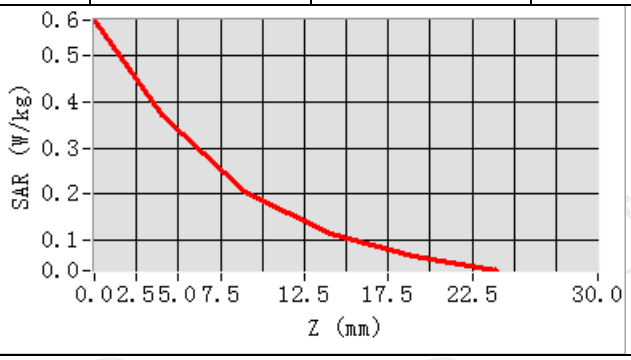
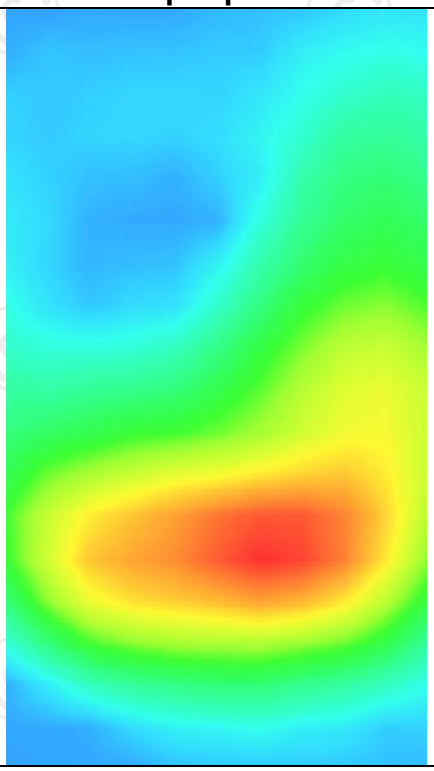
MEASUREMENT 2	
Middle Band SAR (Channel 39150)	Date: 06/25/2024
Frequency (MHz)	2350.000000
Relative permittivity (real part)	39.400002
Relative permittivity (imaginary part)	13.120000
Conductivity (S/m)	1.712889
Variation (%)	-1.670000
Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	5x5x7,dx=5mm dy=5mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 40
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=9.00, Y=-31.00 SAR Peak:0.58 W/kg	
SAR 10g (W/Kg)	0.191155
SAR 1g (W/Kg)	0.346950
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.5769	0.3705	0.2067	0.1146	0.0648



Hot spot position



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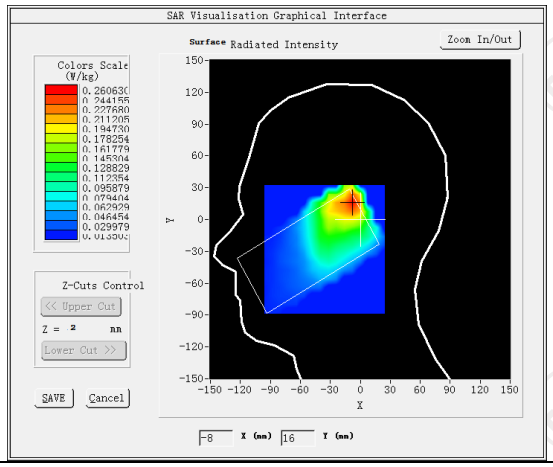
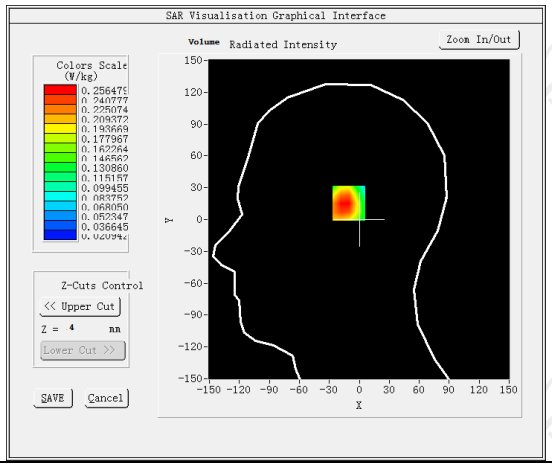
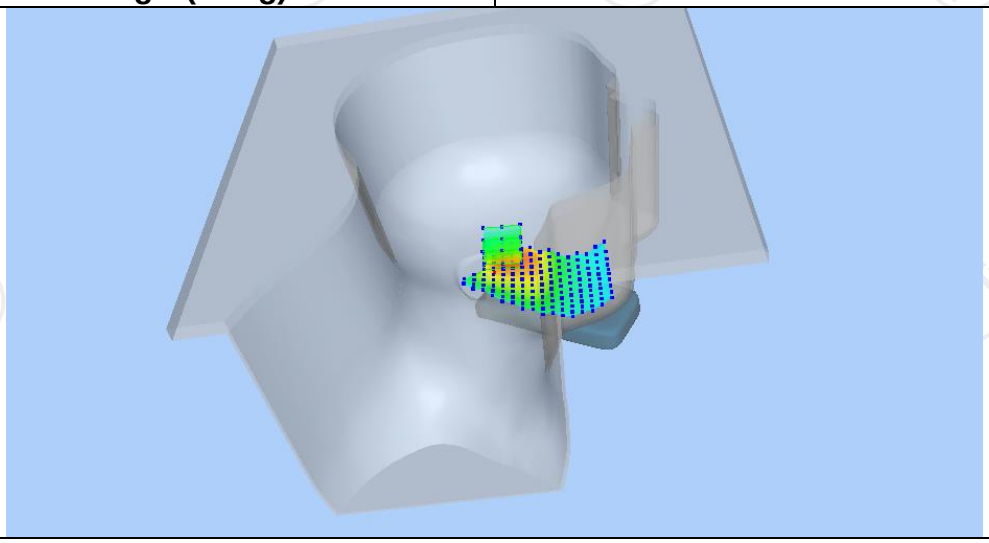
2.4G WLAN

MEASUREMENT 1	
Middle Band SAR (Channel 7):	Date: 06/25/2024
Frequency (MHz)	2442.000000
Relative permittivity (real part)	38.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	1.925428
Variation (%)	-0.300000
Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	5x5x7,dx=5mm dy=5mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	IEEE 802.11b ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-8.00, Y=16.00 SAR Peak: 0.42 W/kg	
SAR 10g (W/Kg)	0.159334
SAR 1g (W/Kg)	0.250856
	

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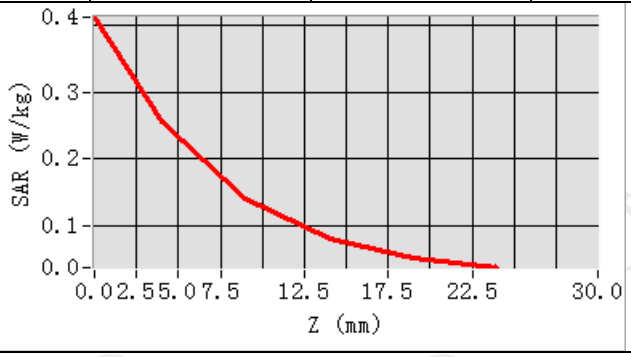
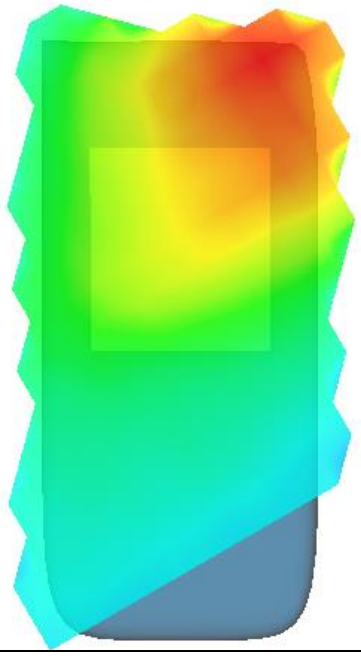
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4111	0.2565	0.1407	0.0816	0.0540



Hot spot position



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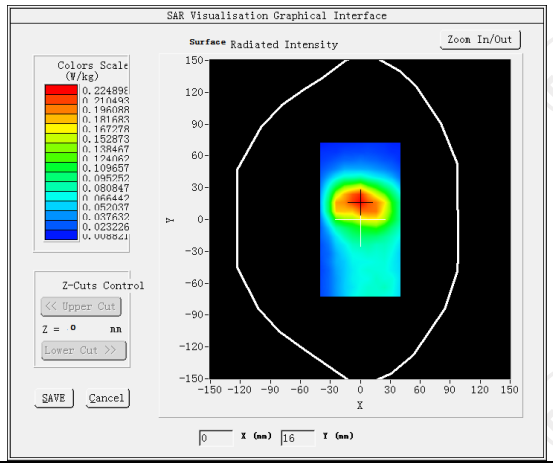
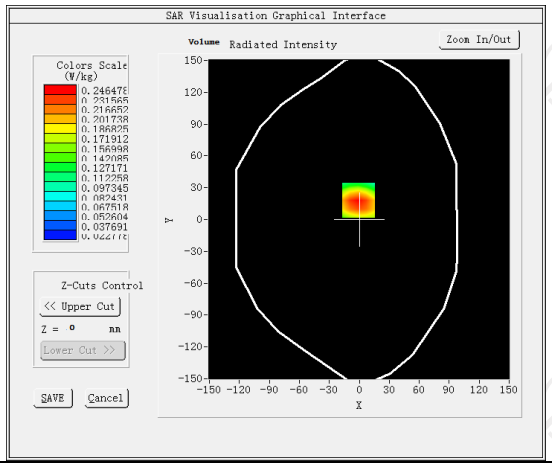
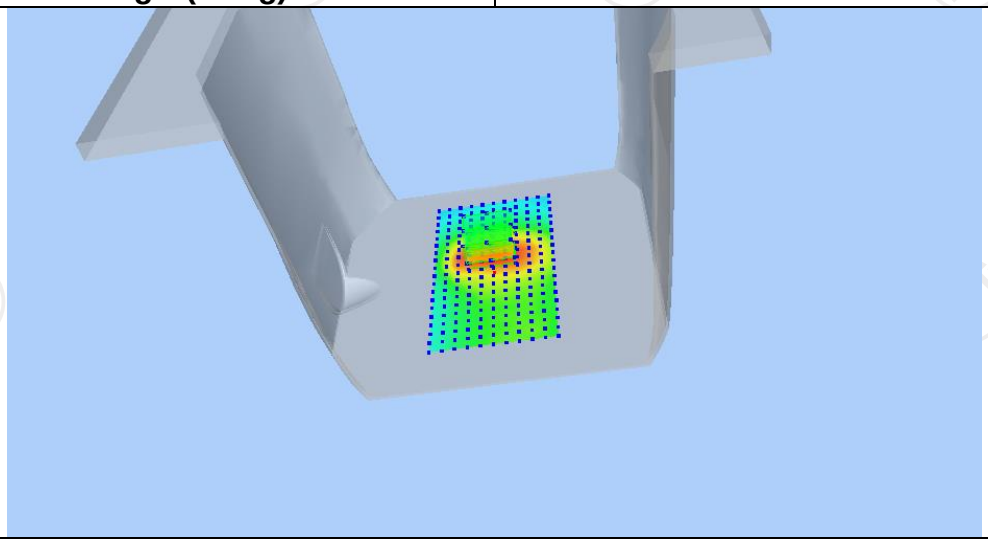
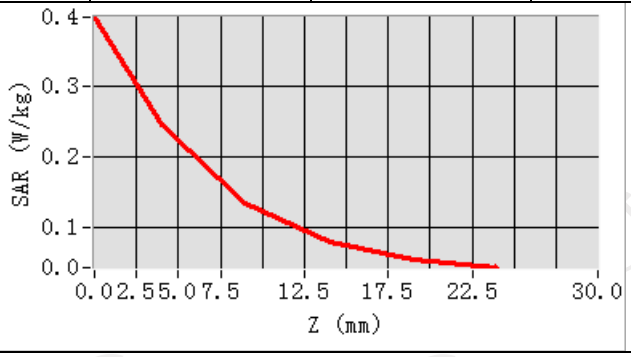
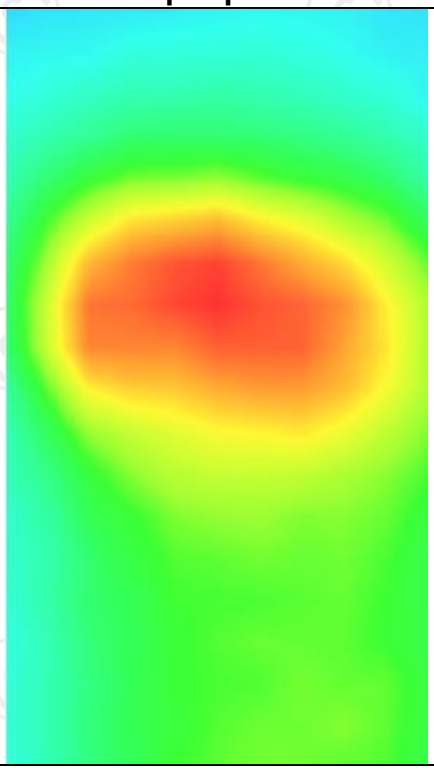
MEASUREMENT 2	
Middle Band SAR (Channel 7):	Date: 06/25/2024
Frequency (MHz)	2442.000000
Relative permittivity (real part)	38.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	1.925428
Variation (%)	-1.100000
Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	5x5x7,dx=5mm dy=5mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	IEEE 802.11b ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-1.00, Y=18.00 SAR Peak: 0.40 W/kg	
SAR 10g (W/Kg)	0.140416
SAR 1g (W/Kg)	0.236400
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3993	0.2465	0.1341	0.0788	0.0546



Hot spot position



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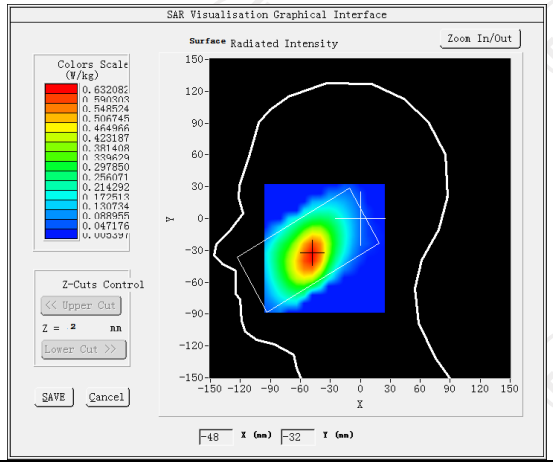
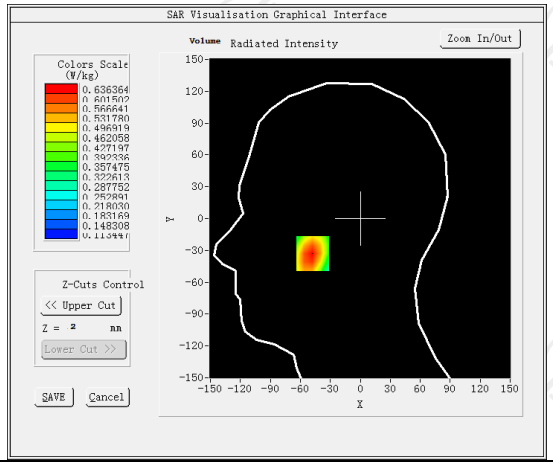
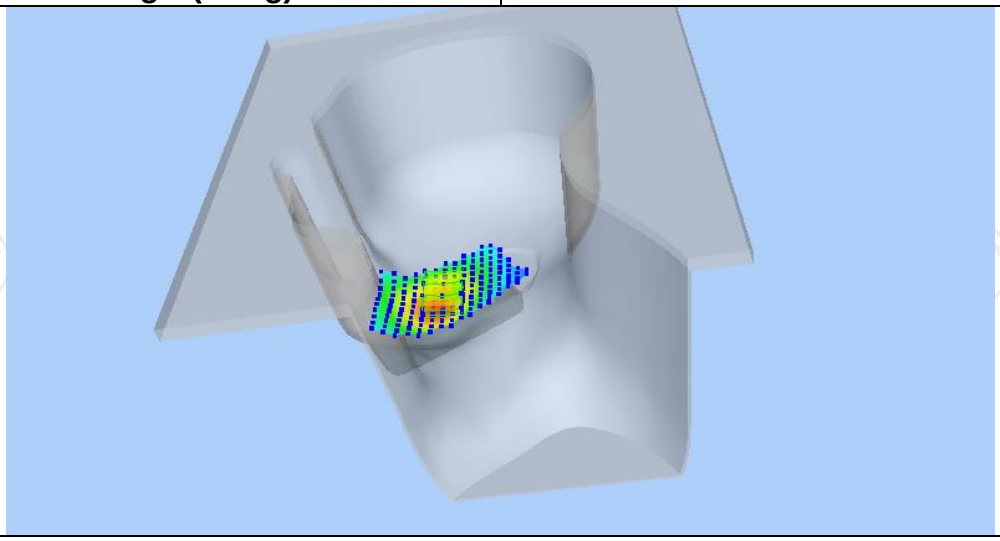
5.2G WLAN

MEASUREMENT 1	
SAR(Channel 38):	Date: 07/03/2024
Frequency (MHz)	5190.000000
Relative permittivity (real part)	35.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	5.215428
Variation (%)	-1.260000
Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	5x5x7,dx=4mm dy=4mm dz=2mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Right head
Device Position	Cheek
Band	IEEE 802.11n ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-40.00, Y=-30.00 SAR Peak: 0.50 W/kg	
SAR 10g (W/Kg)	0.186201
SAR 1g (W/Kg)	0.275160
	

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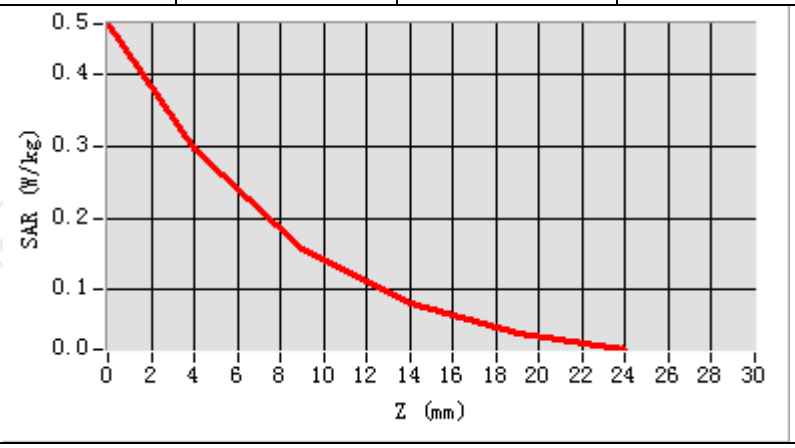
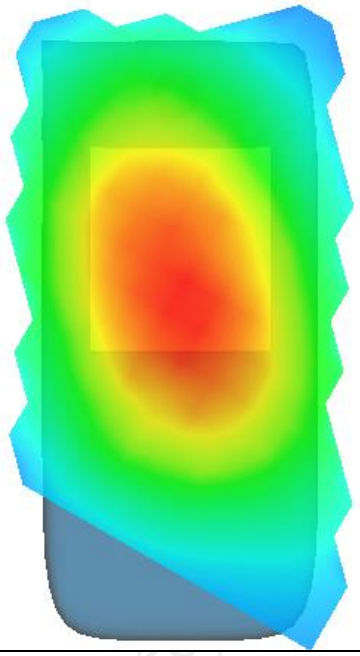
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4690	0.2950	0.1577	0.0810	0.0405



Hot spot position



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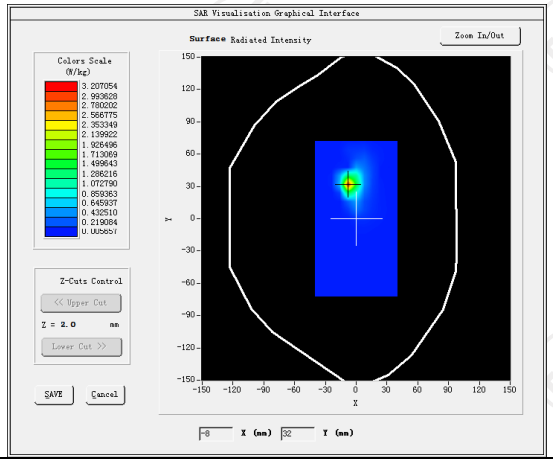
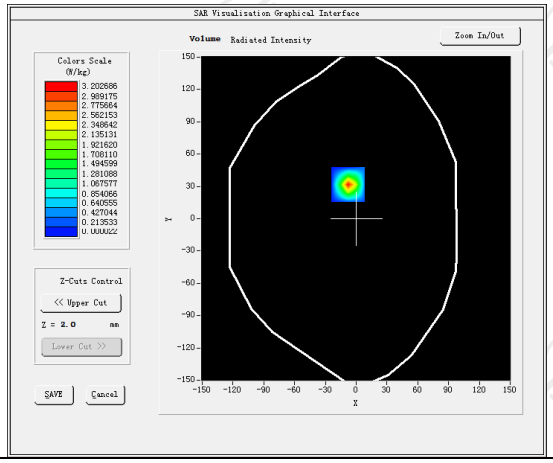
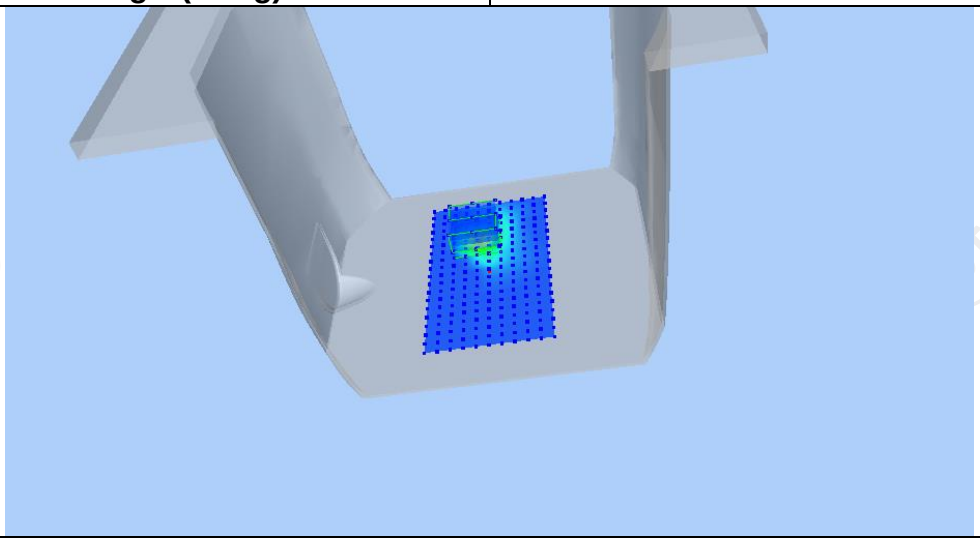
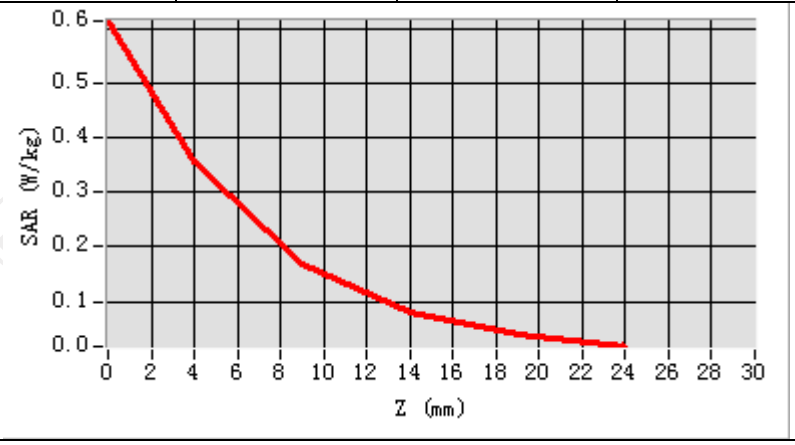
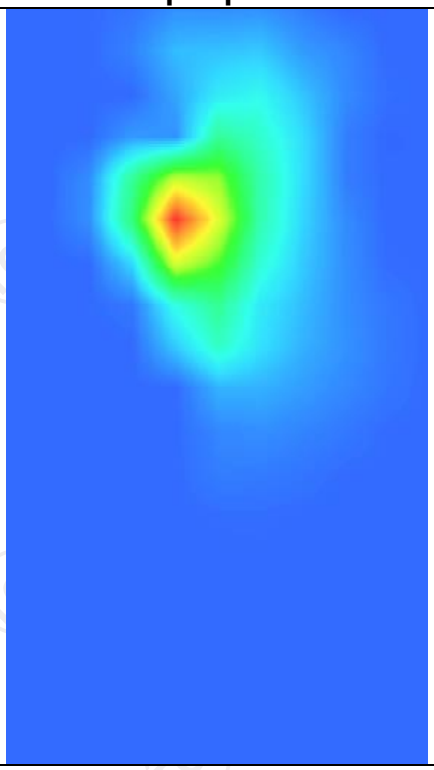
MEASUREMENT 2	
SAR(Channel 38):	Date: 07/03/2024
Frequency (MHz)	5190.000000
Relative permittivity (real part)	35.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	5.215428
Variation (%)	-1.520000
Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	5x5x7,dx=4mm dy=4mm dz=2mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	IEEE 802.11a ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-18.00, Y=22.00 SAR Peak: 0.60 W/kg	
SAR 10g (W/Kg)	0.210687
SAR 1g (W/Kg)	0.395120
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6133	0.3552	0.1689	0.0782	0.0378



Hot spot position



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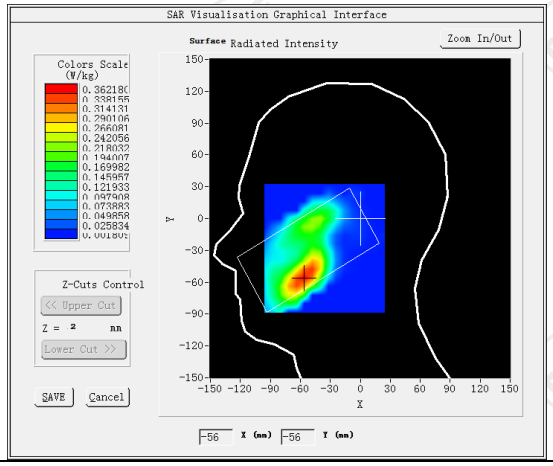
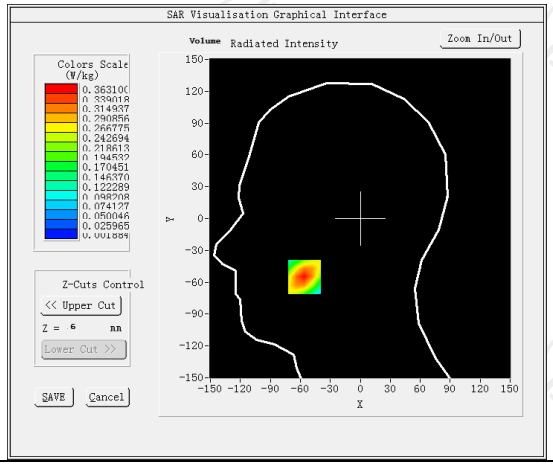
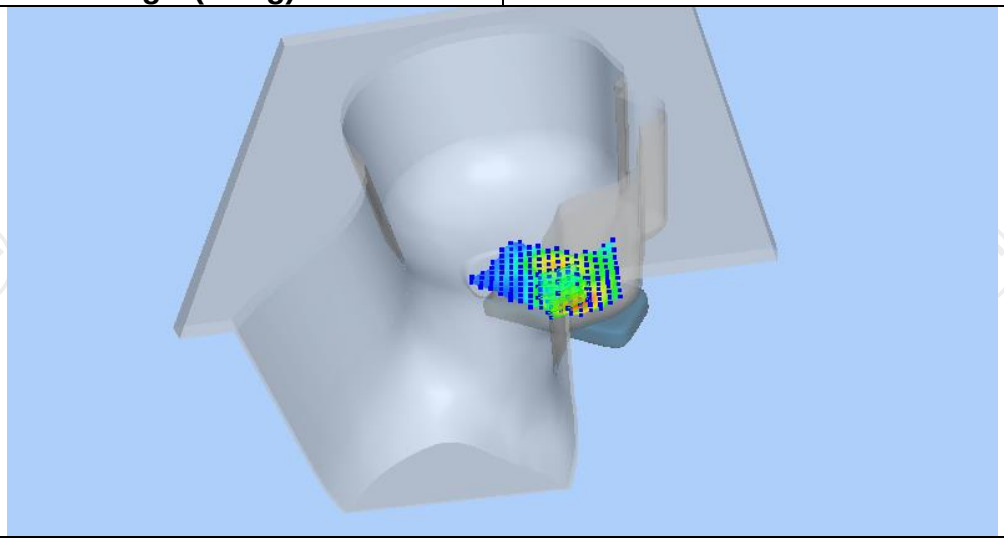
5.3G WLAN

MEASUREMENT 1	
SAR (Channel 64):	Date: 07/04/2024
Frequency (MHz)	5320.000000
Relative permittivity (real part)	36.052823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	4.625428
Variation (%)	-1.560000
Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	5x5x7,dx=4mm dy=4mm dz=2mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	IEEE 802.11a ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-44.00, Y=-41.00 SAR Peak: 0.44 W/kg	
SAR 10g (W/Kg)	0.146215
SAR 1g (W/Kg)	0.226304
	

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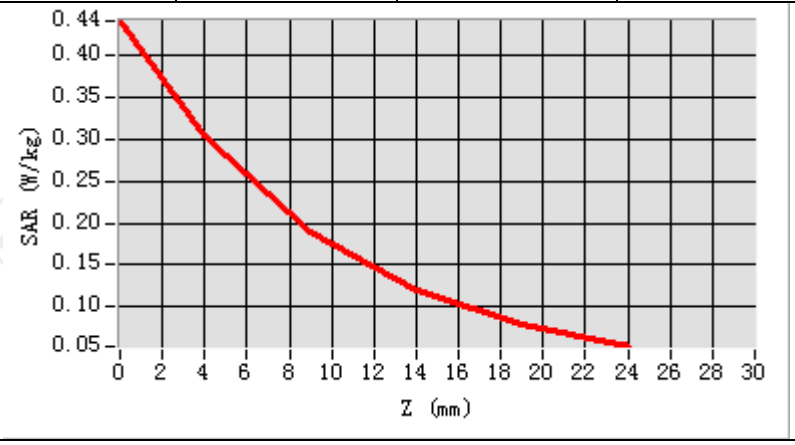
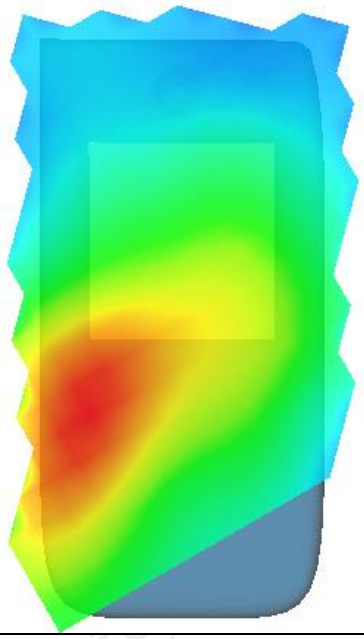
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4389	0.3003	0.1916	0.1211	0.0810



Hot spot position



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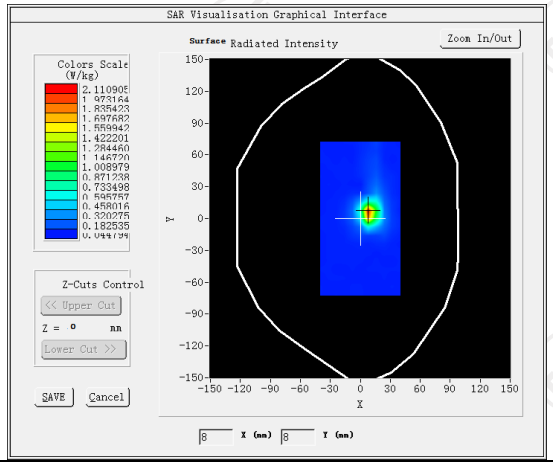
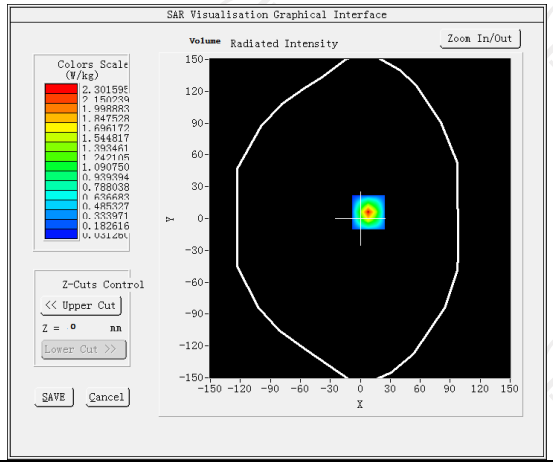
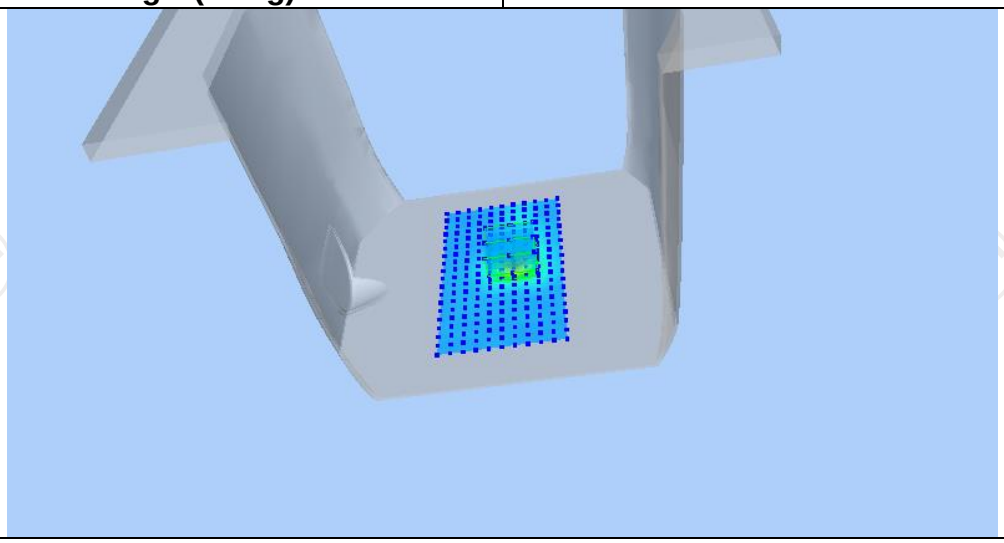
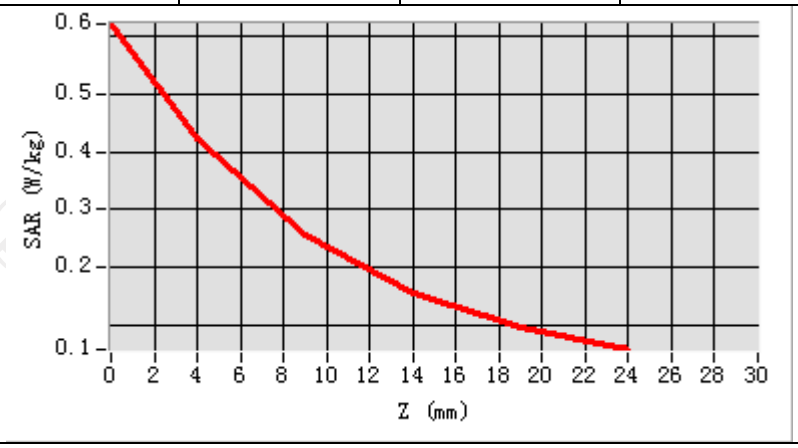
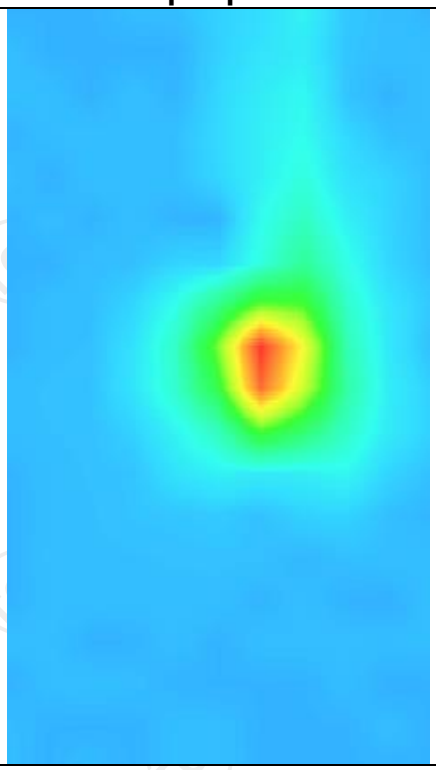
MEASUREMENT 2	
SAR (Channel 64):	Date: 07/04/2024
Frequency (MHz)	5320.000000
Relative permittivity (real part)	36.052823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	4.625428
Variation (%)	0.950000
Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	5x5x7,dx=4mm dy=4mm dz=2mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body Back
Band	IEEE 802.11a ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=5.00, Y=8.00 SAR Peak: 0.60 W/kg	
SAR 10g (W/Kg)	0.216585
SAR 1g (W/Kg)	0.297451
	

Z (mm)	0.00	2.00	7.00	12.00	17.00
SAR (W/Kg)	0.6021	0.4220	0.2562	0.1560	0.0972



Hot spot position



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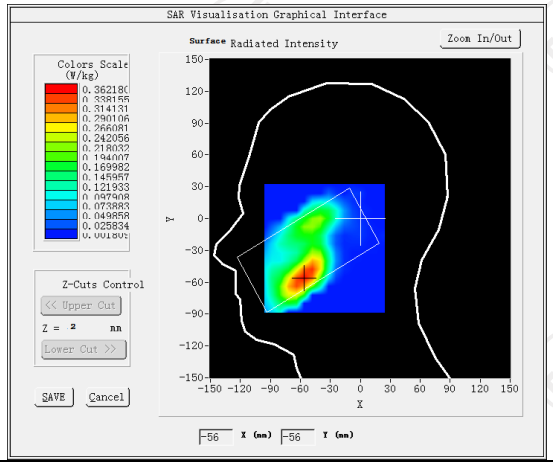
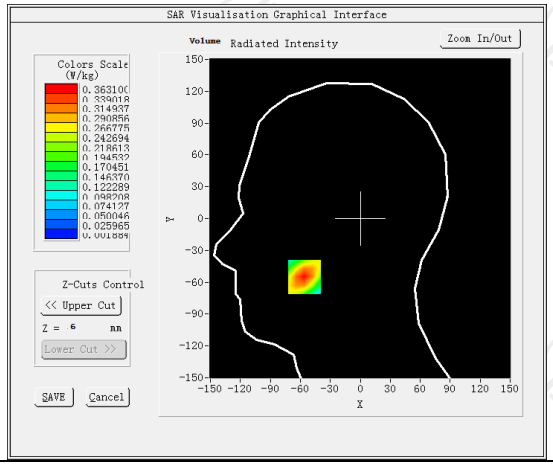
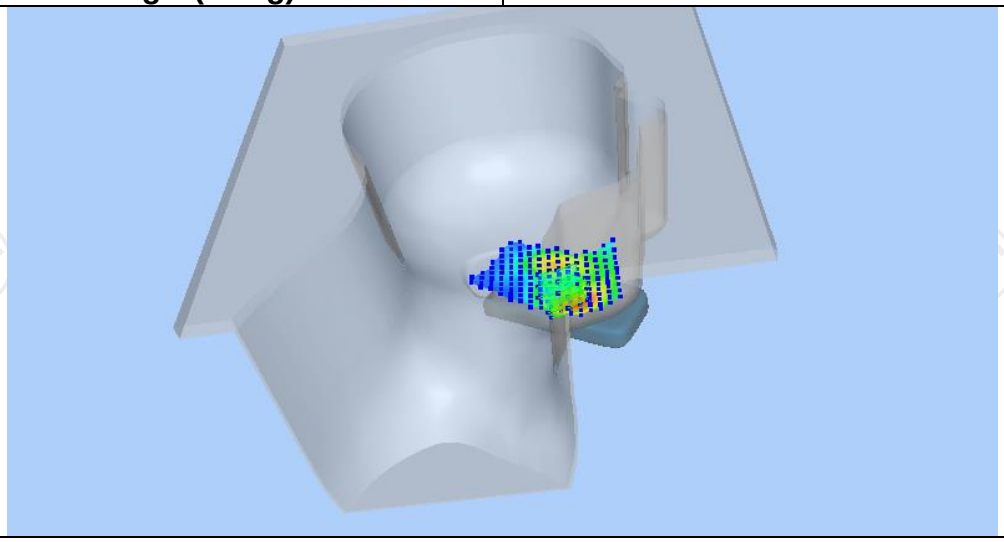
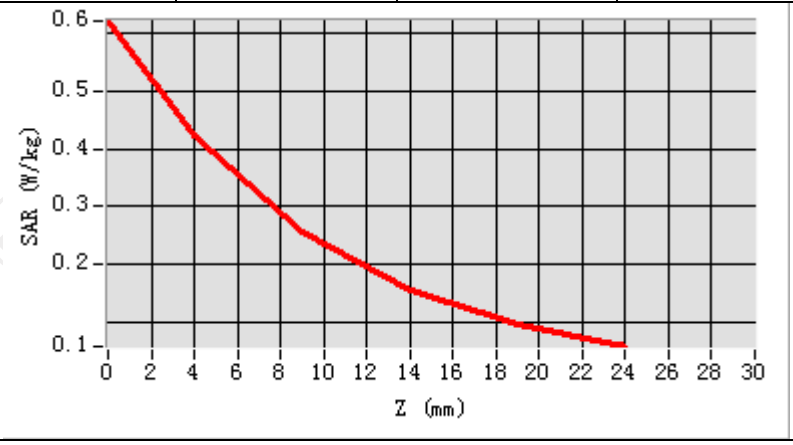
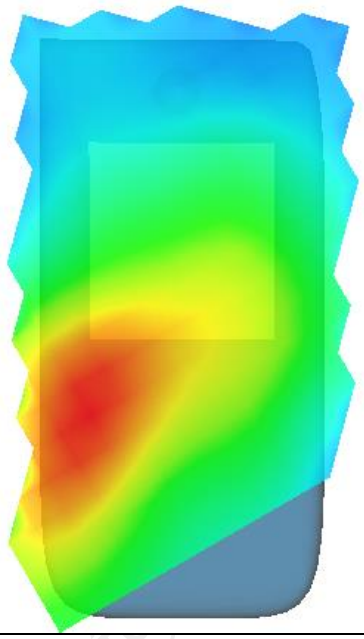
5.6G WLAN

MEASUREMENT 1	
SAR (Channel 140):	Date: 07/04/2024
Frequency (MHz)	5700.000000
Relative permittivity (real part)	35.068832
Relative permittivity (imaginary part)	13.679428
Conductivity (S/m)	5.220788
Variation (%)	0.600000
Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	5x5x7,dx=4mm dy=4mm dz=2mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	IEEE 802.11a ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-56.00, Y=-55.00 SAR Peak: 0.54 W/kg	
SAR 10g (W/Kg)	0.209371
SAR 1g (W/Kg)	0.312054
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6201	0.4219	0.2564	0.1563	0.0974



Hot spot position



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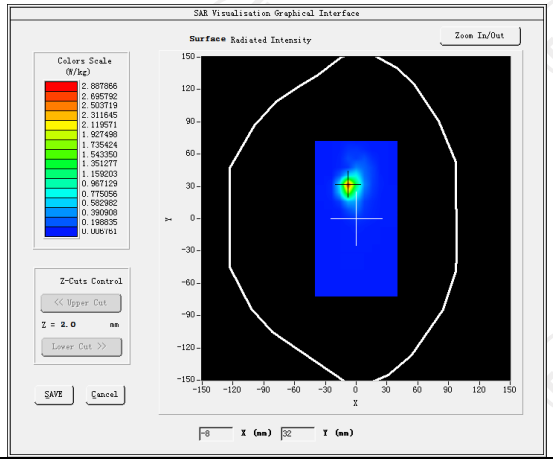
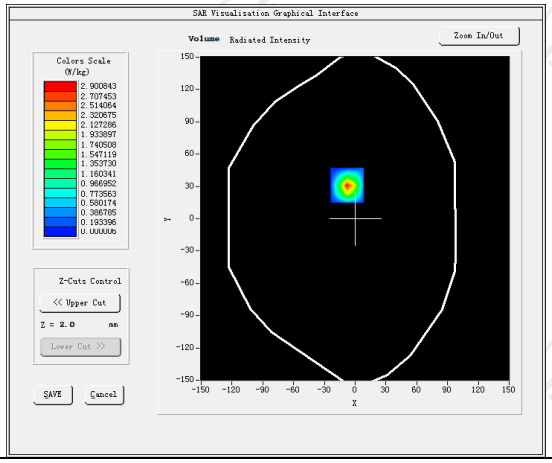
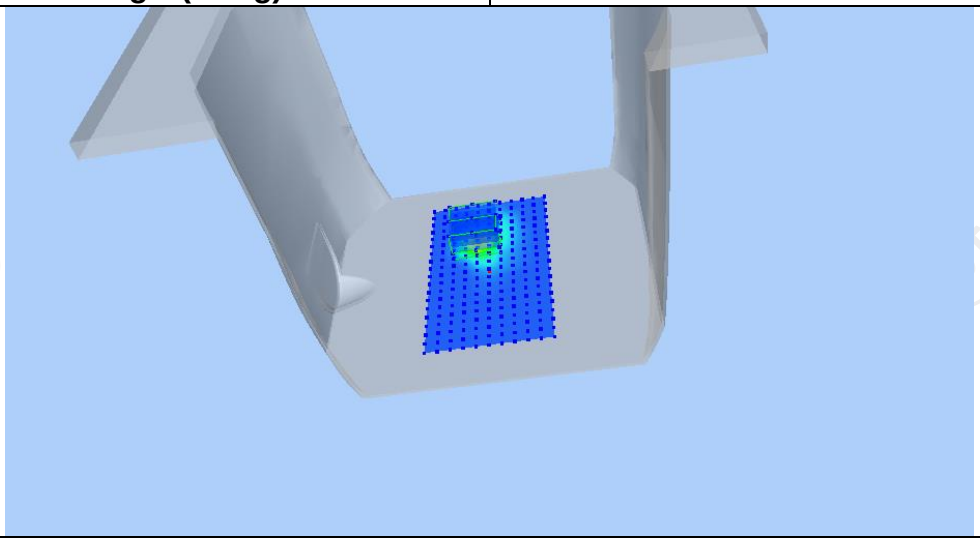
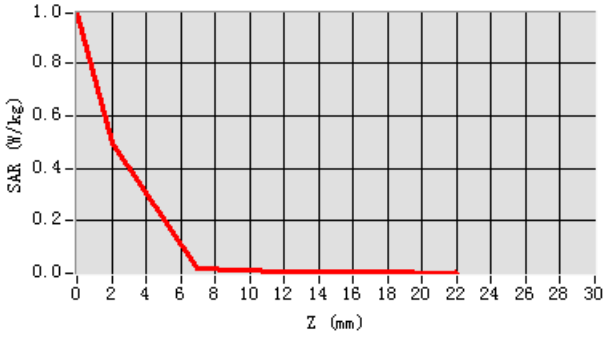
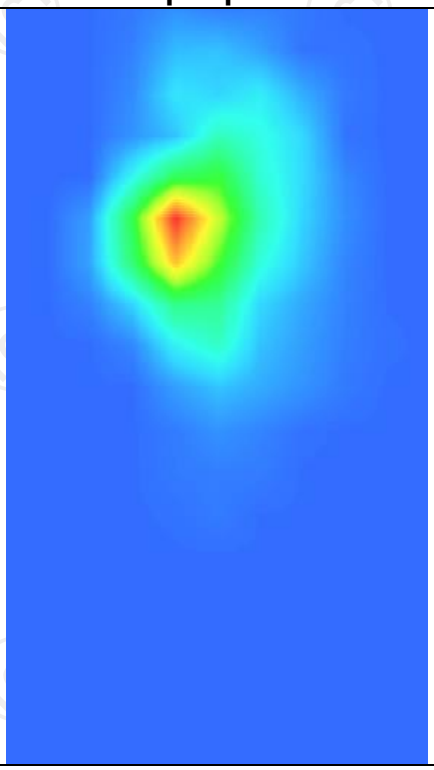
MEASUREMENT 2	
SAR (Channel 140):	Date: 07/04/2024
Frequency (MHz)	5700.000000
Relative permittivity (real part)	35.068832
Relative permittivity (imaginary part)	13.679428
Conductivity (S/m)	5.220788
Variation (%)	1.620000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body Back
Band	IEEE 802.11a ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-8.00, Y=31.00 SAR Peak: 1.12 W/kg	
SAR 10g (W/Kg)	0.363024
SAR 1g (W/Kg)	0.823154
	

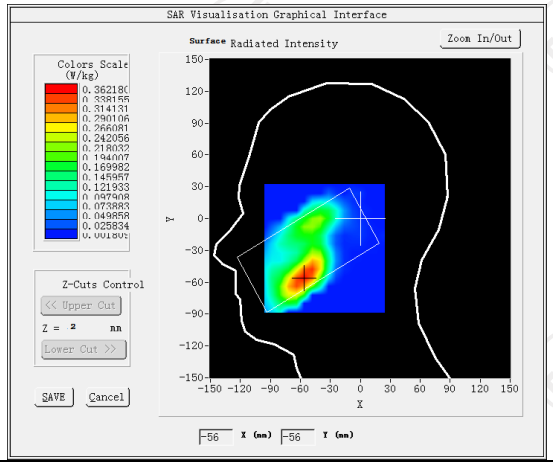
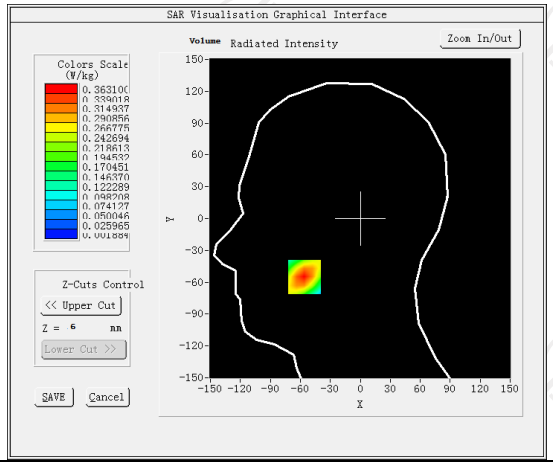
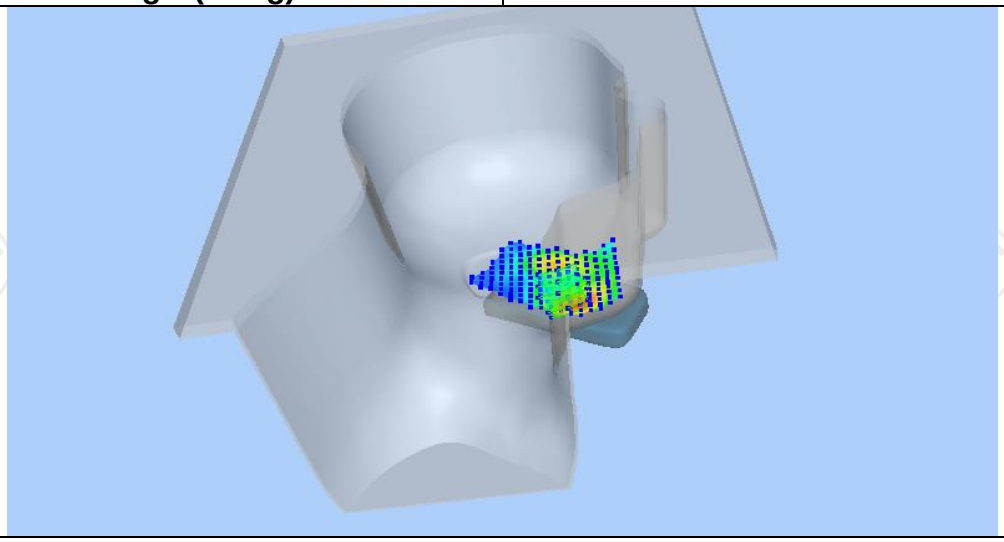
Z (mm)	0.00	2.00	7.00	12.00	17.00
SAR (W/Kg)	0.9906	0.4950	0.0195	0.0034	0.0068



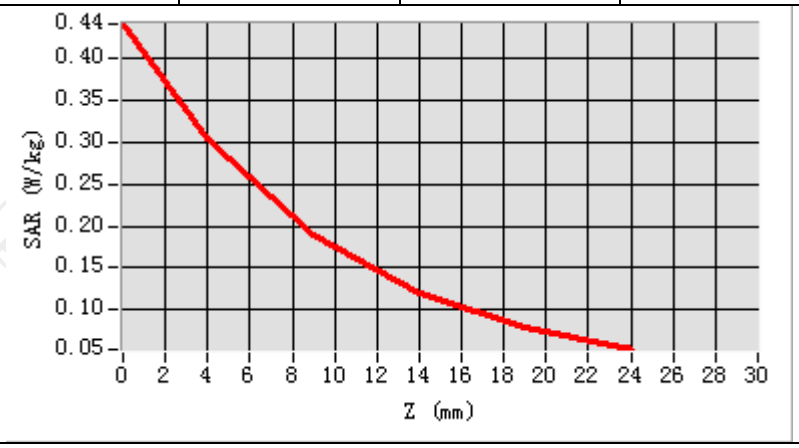
Hot spot position



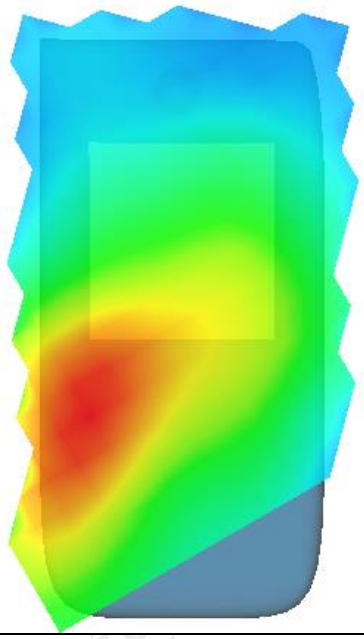
5.8G WLAN

MEASUREMENT 1	
SAR (Channel 149):	Date: 07/05/2024
Frequency (MHz)	5745.000000
Relative permittivity (real part)	34.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	5.025428
Variation (%)	-1.900000
Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	5x5x7,dx=4mm dy=4mm dz=2mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	IEEE 802.11a6m ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-46.00, Y=-42.00 SAR Peak: 0.44 W/kg	
SAR 10g (W/Kg)	0.146898
SAR 1g (W/Kg)	0.256027
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4420	0.3045	0.1897	0.1204	0.0797



Hot spot position



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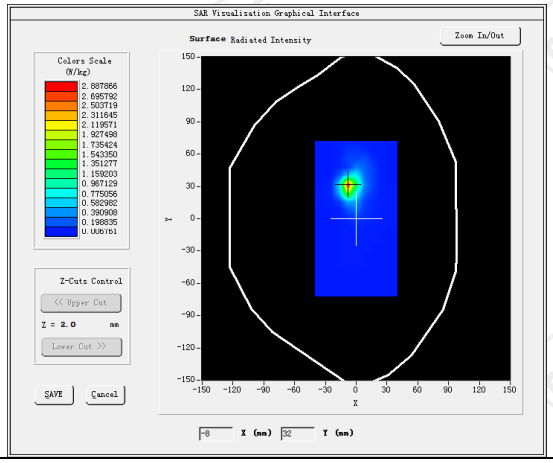
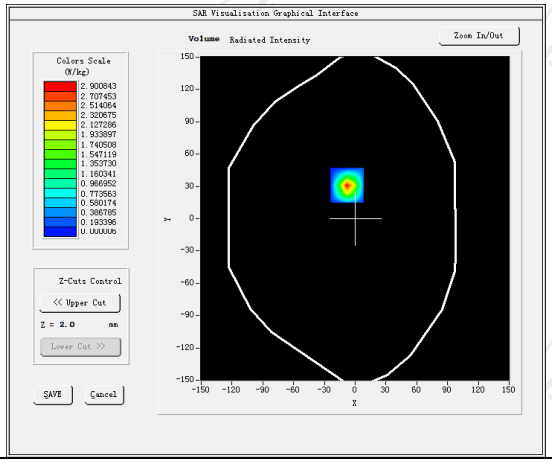
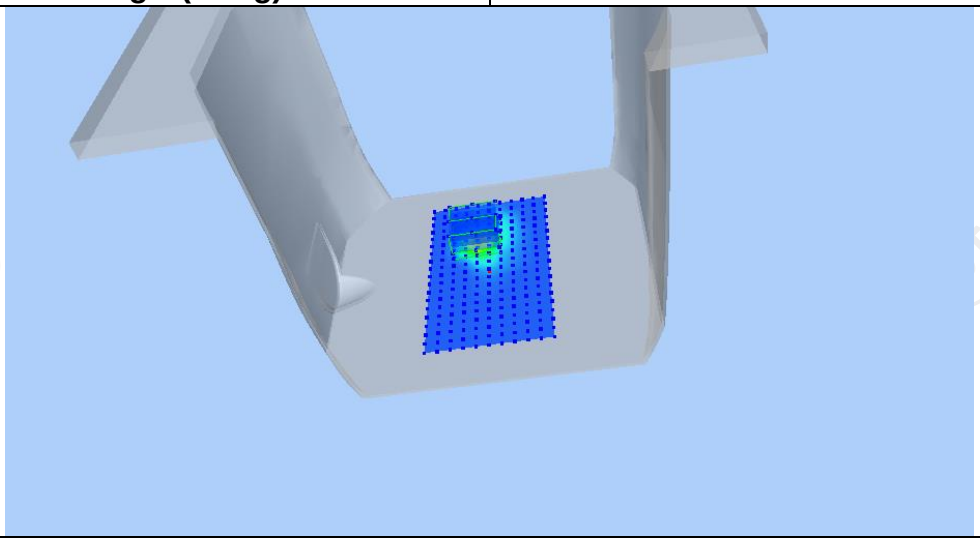
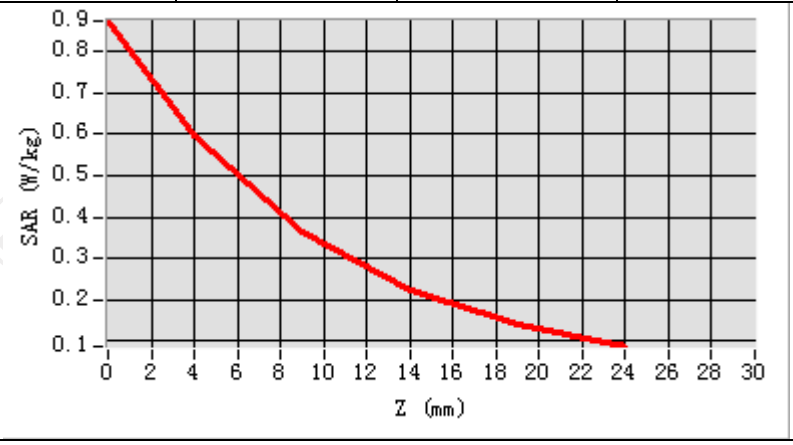
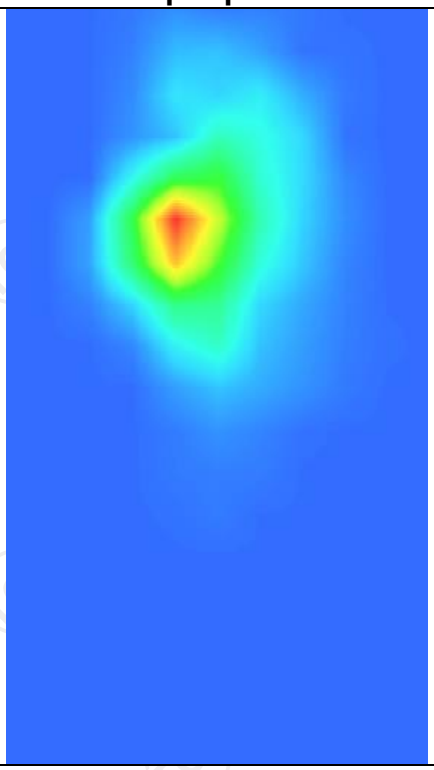
MEASUREMENT 2	
SAR (Channel 149):	Date: 07/05/2024
Frequency (MHz)	5745.000000
Relative permittivity (real part)	34.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	5.025428
Variation (%)	0.320000
Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	5x5x7,dx=4mm dy=4mm dz=2mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	IEEE 802.11a6m ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-31.00, Y=33.00 SAR Peak: 0.90 W/kg	
SAR 10g (W/Kg)	0.315971
SAR 1g (W/Kg)	0.495206
	

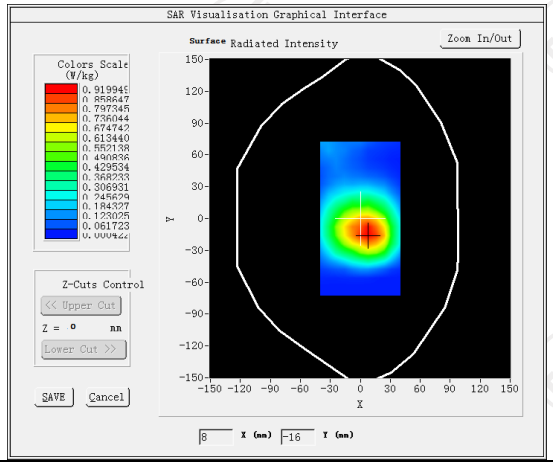
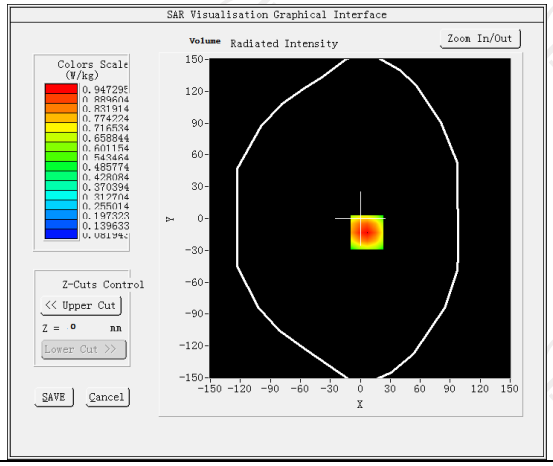
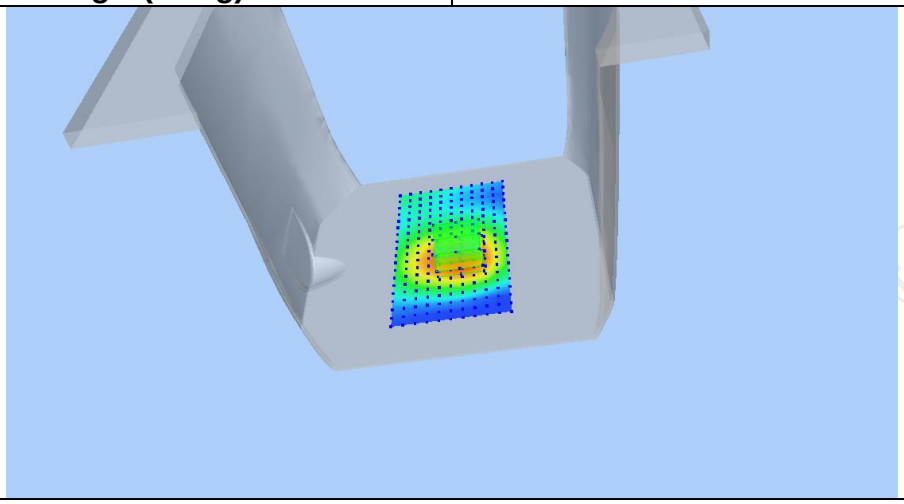
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8740	0.5955	0.3633	0.2234	0.1411



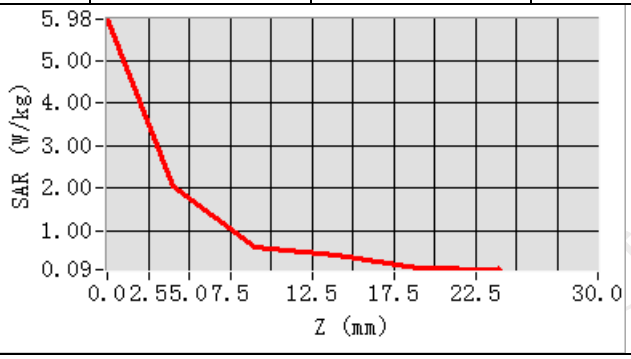
Hot spot position



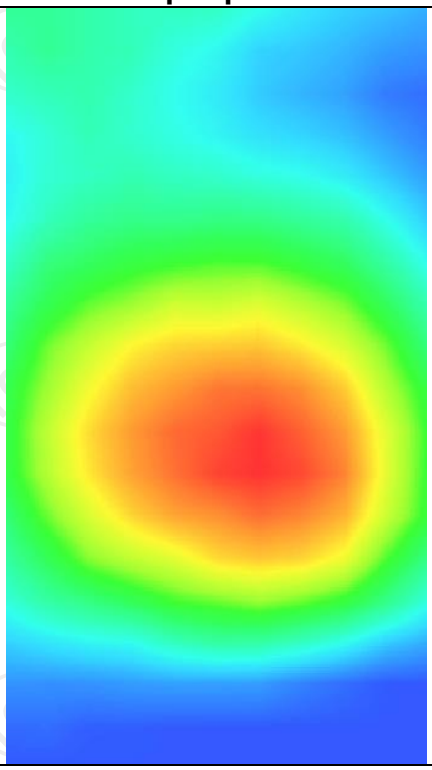
Body wearing equipment
GSM900

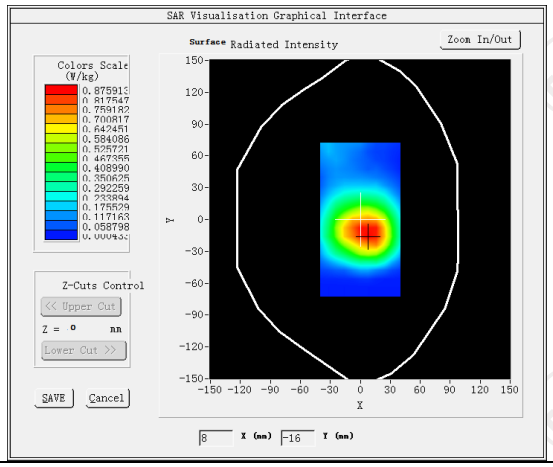
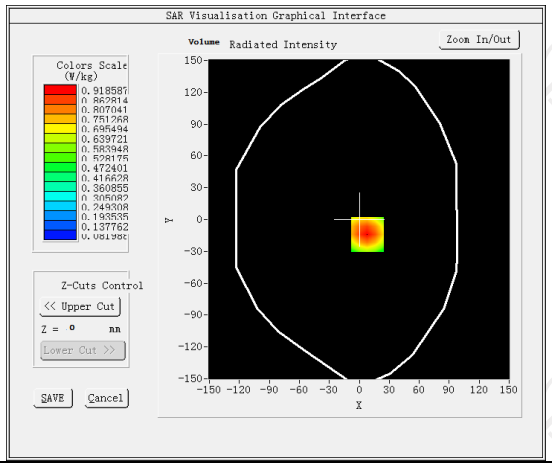
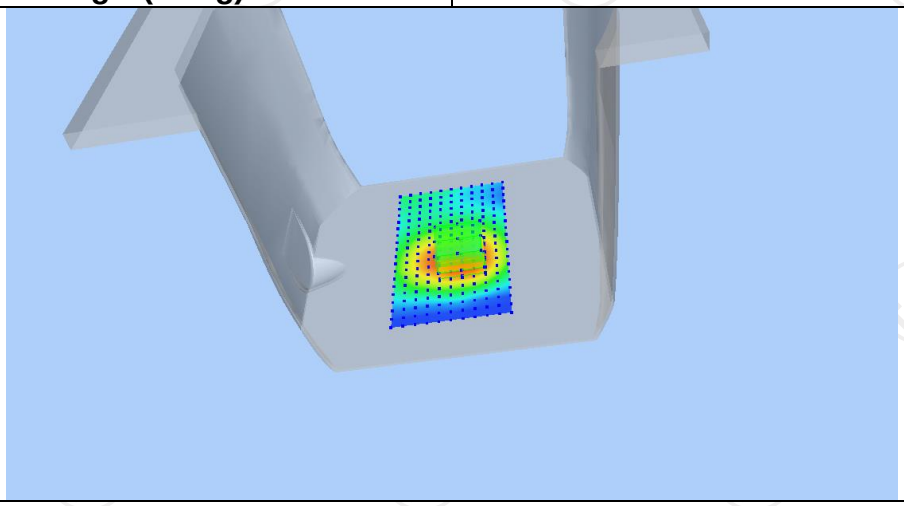
MEASUREMENT 1	
Middle Band SAR (Channel 60):	Date: 06/17/2024
Frequency (MHz)	902.000000
Relative permittivity (real part)	41.923440
Relative permittivity (imaginary part)	18.359541
Conductivity (S/m)	0.960017
Variation (%)	-0.720000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	GSM900(voice)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=7.00, Y=-13.00 **SAR Peak: 3.60 W/kg**	
SAR 10g (W/Kg)	1.074053
SAR 1g (W/Kg)	2.901895
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	5.9750	2.0381	0.6294	0.4325	0.1375

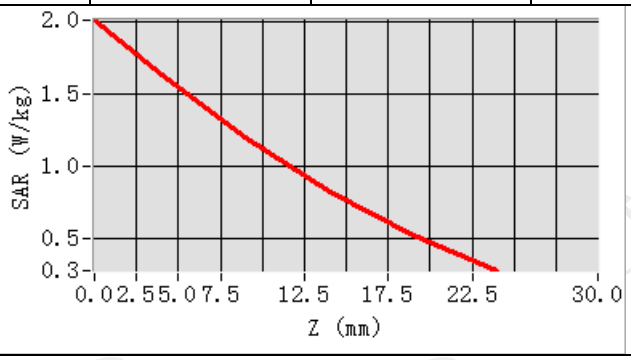


Hot spot position

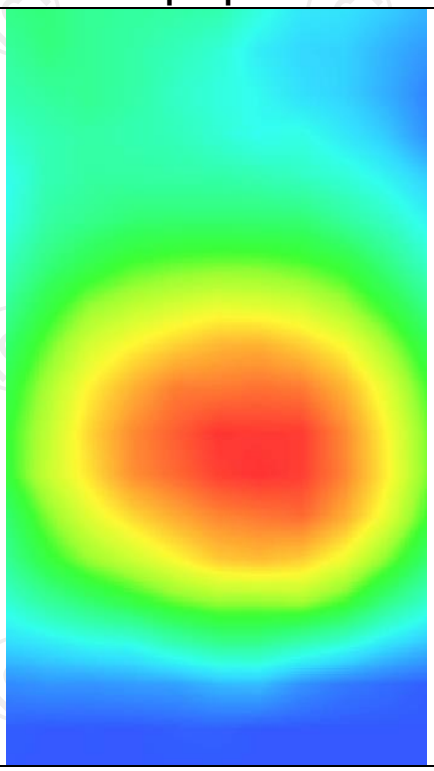


MEASUREMENT 2	
Middle Band SAR (Channel 60):	Date: 06/17/2024
Frequency (MHz)	902.000000
Relative permittivity (real part)	41.923440
Relative permittivity (imaginary part)	18.359541
Conductivity (S/m)	0.960017
Variation (%)	0.690000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	GSM900(GPRS 2slot)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=8.00, Y=-14.00 SAR Peak: 2.13 W/kg	
SAR 10g (W/Kg)	0.958158
SAR 1g (W/Kg)	1.476699
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.0150	1.6340	1.2045	0.8321	0.5228



Hot spot position



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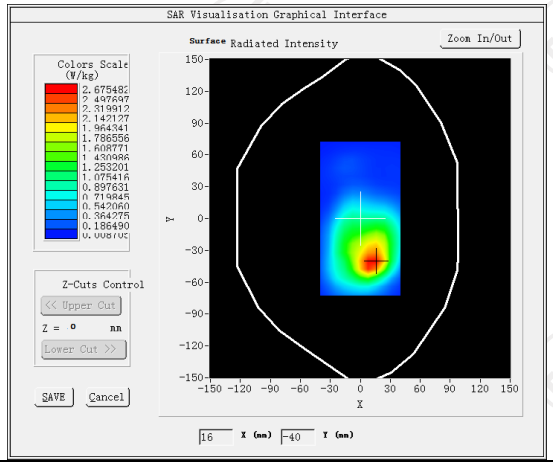
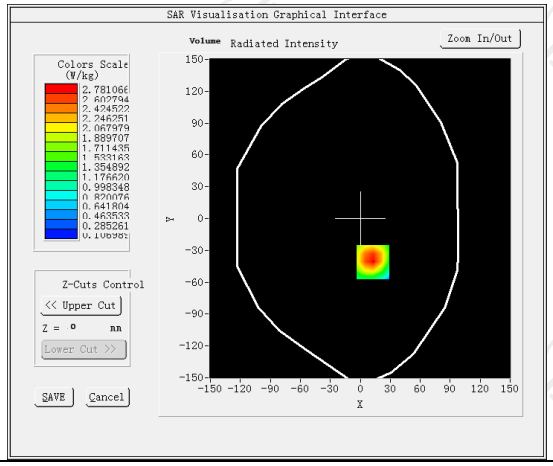
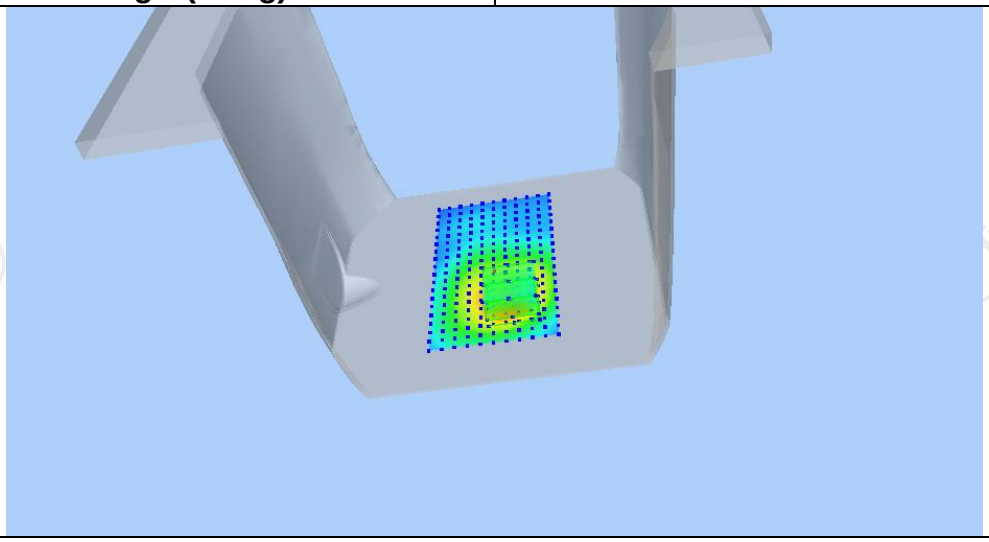
GSM1800

MEASUREMENT 1	
Low Band SAR (Channel 512):	Date: 06/19/2024
Frequency (MHz)	1710.200049
Relative permittivity (real part)	37.987465
Relative permittivity (imaginary part)	13.772388
Conductivity (S/m)	1.336993
Variation (%)	-3.580000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	GSM1800(voice)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=13.00, Y=-41.00 SAR Peak: 1.98 W/kg	
SAR 10g (W/Kg)	0.766060
SAR 1g (W/Kg)	1.719417
	

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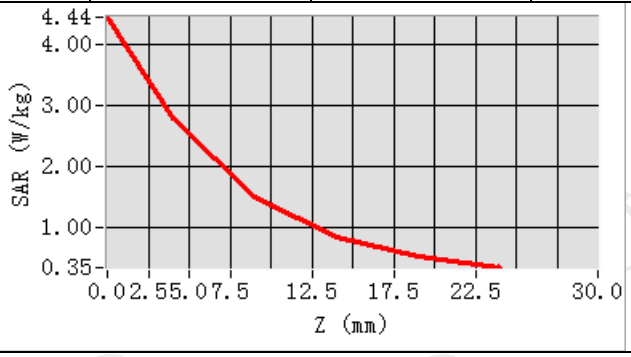
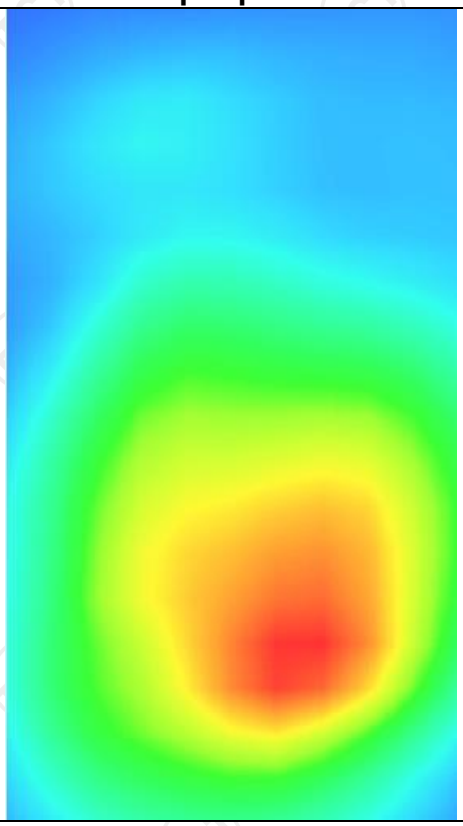
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	4.4446	2.7811	1.5196	0.8604	0.5384



Hot spot position



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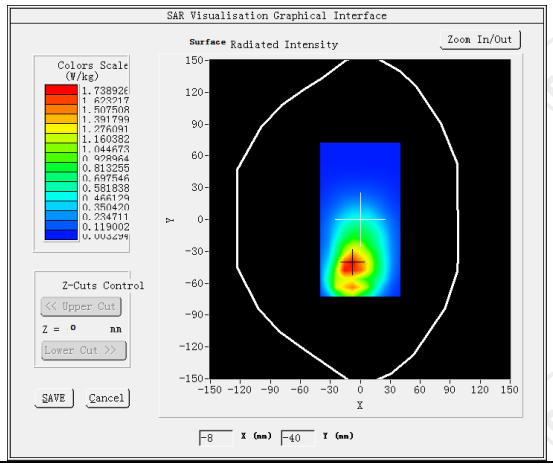
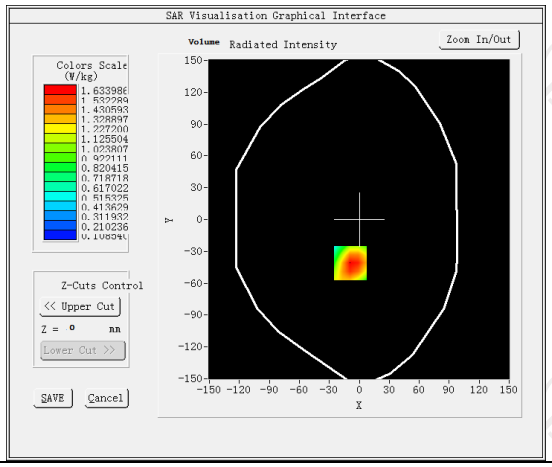
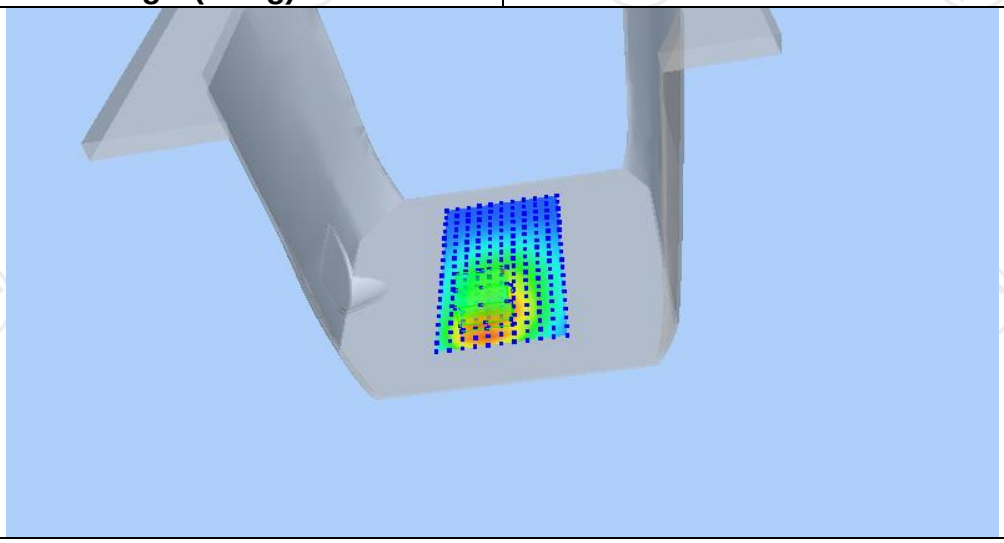
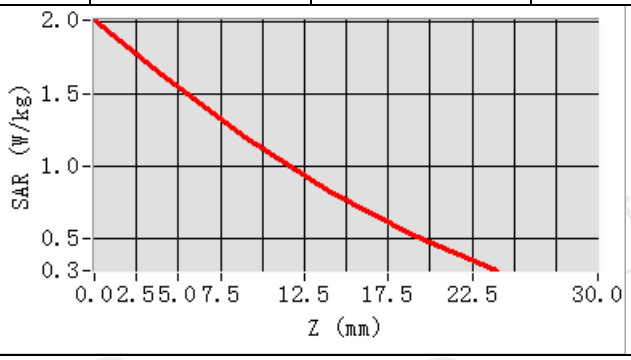
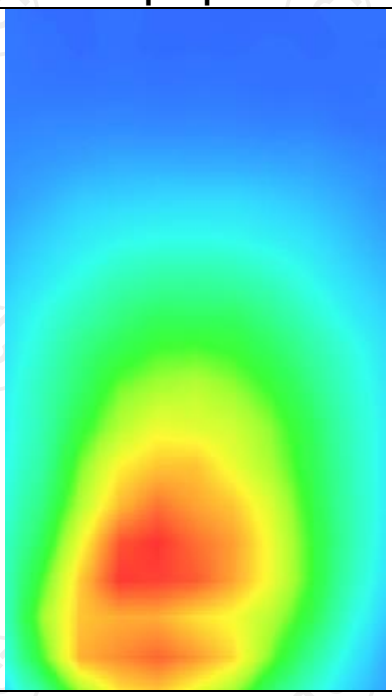
MEASUREMENT 2	
Low Band SAR (Channel 512):	Date: 06/19/2024
Frequency (MHz)	1710.200049
Relative permittivity (real part)	37.987465
Relative permittivity (imaginary part)	13.772388
Conductivity (S/m)	1.336993
Variation (%)	-3.040000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	GSM1800(GPRS 2slot)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-9.00, Y=-41.00 SAR Peak: 2.13 W/kg	
SAR 10g (W/Kg)	0.795954
SAR 1g (W/Kg)	1.575258
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.0150	1.6340	1.2045	0.8321	0.5228



Hot spot position



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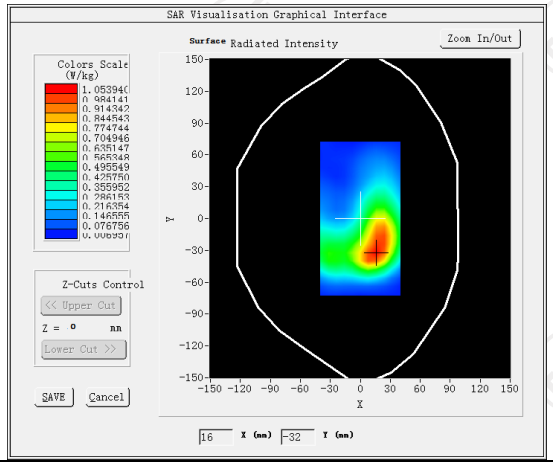
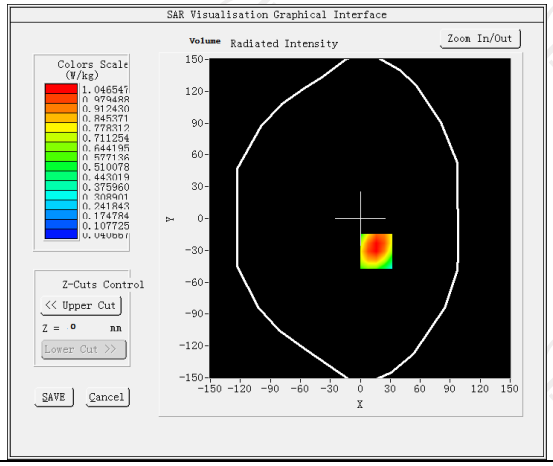
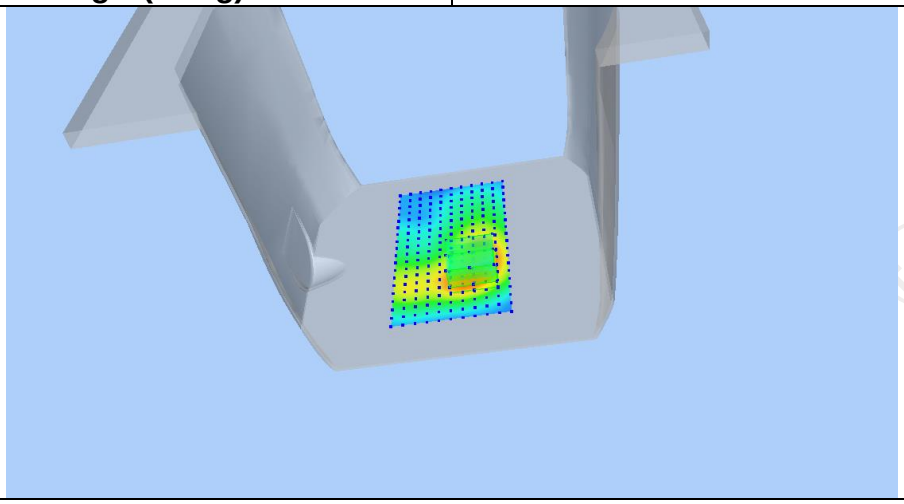
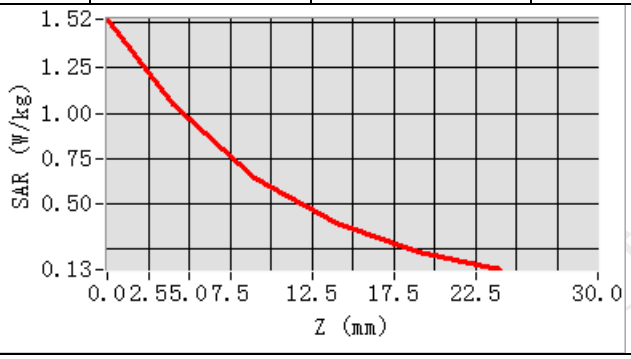
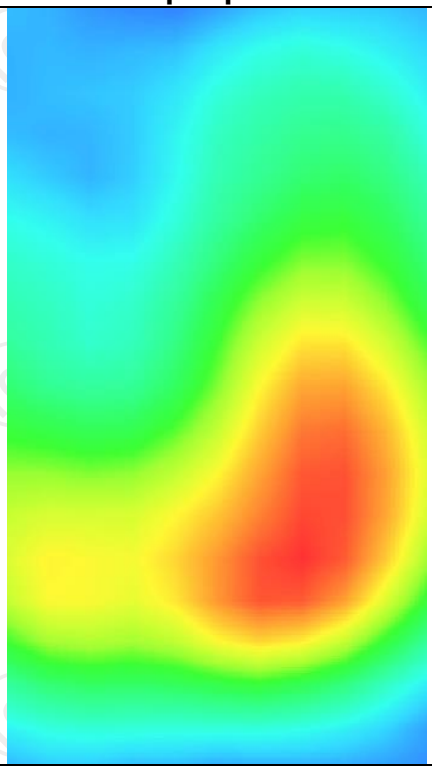
WCDMA Band I

MEASUREMENT 1	
Low Band SAR (Channel 9612):	Date: 06/20/2024
Frequency (MHz)	1922.400000
Relative permittivity (real part)	38.991249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.350792
Variation (%)	-2.660000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	BAND1_WCDMA2100
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=16.00, Y=-31.00 SAR Peak: 1.54 W/kg	
SAR 10g (W/Kg)	0.607659
SAR 1g (W/Kg)	1.007904
	

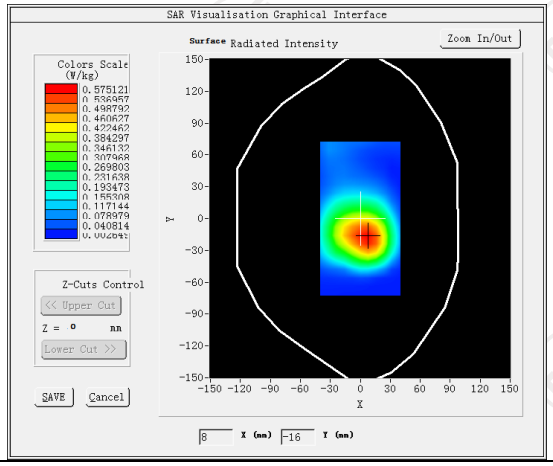
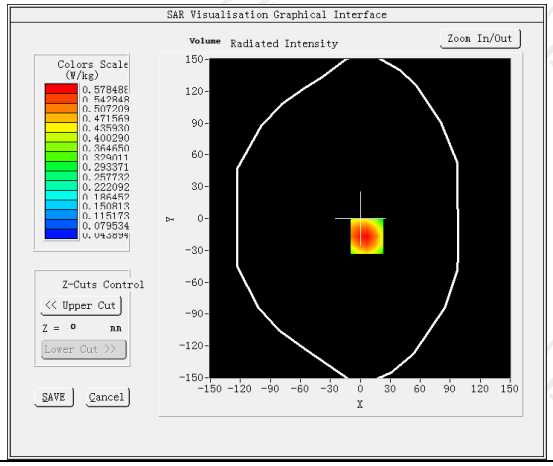
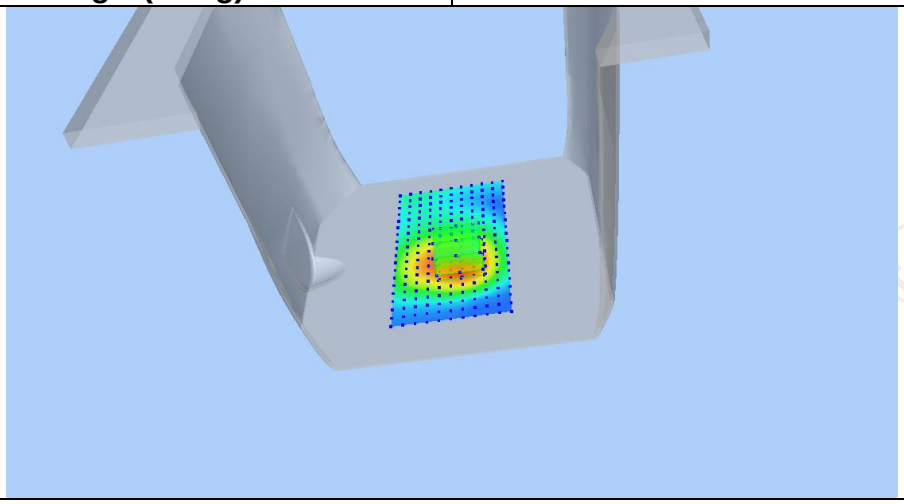
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.5207	1.0465	0.6417	0.3890	0.2347



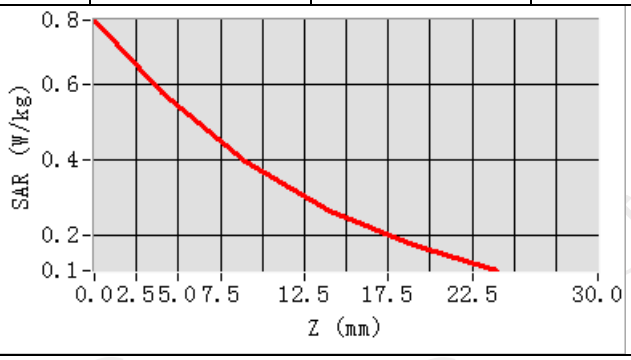
Hot spot position



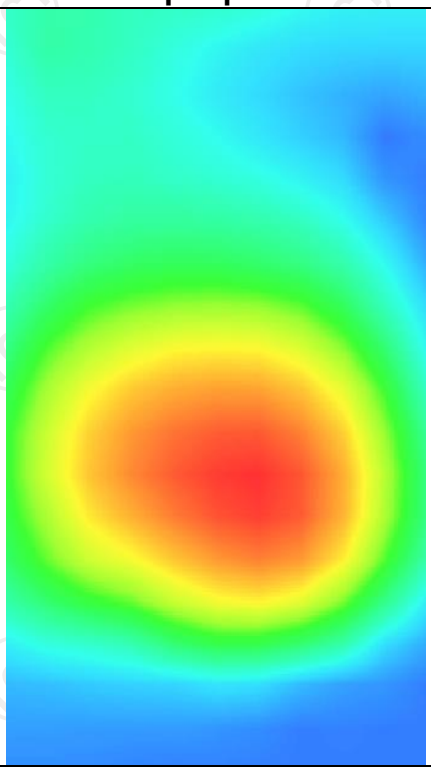
WCDMA Band VIII

MEASUREMENT 1	
Low Band SAR (Channel 2712):	Date: 06/19/2024
Frequency (MHz)	882.400000
Relative permittivity (real part)	39.861938
Relative permittivity (imaginary part)	18.538490
Conductivity (S/m)	0.923835
Variation (%)	-1.260000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	BAND8_WCDMA900
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=7.00, Y=-17.00 **SAR Peak: 0.78 W/kg**	
SAR 10g (W/Kg)	0.358612
SAR 1g (W/Kg)	0.553058
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7724	0.5785	0.3956	0.2653	0.1734



Hot spot position



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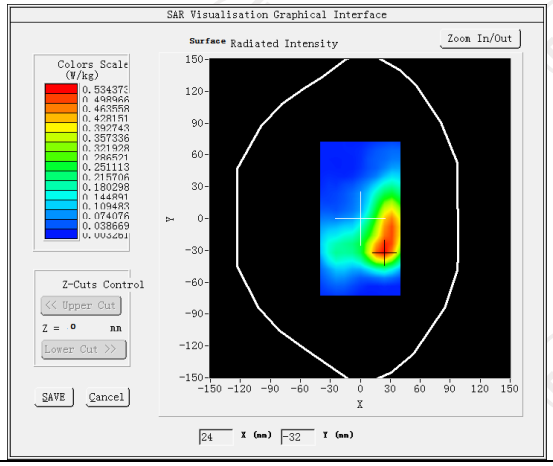
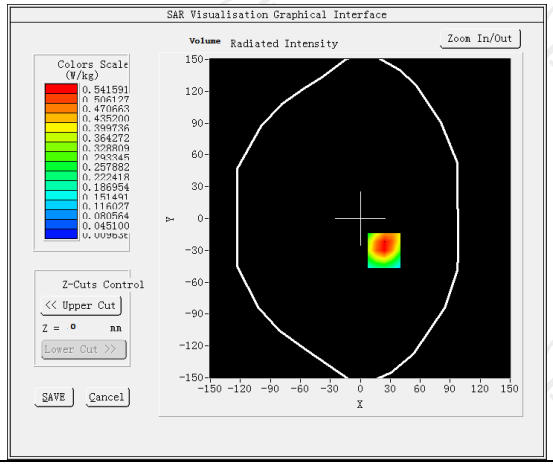
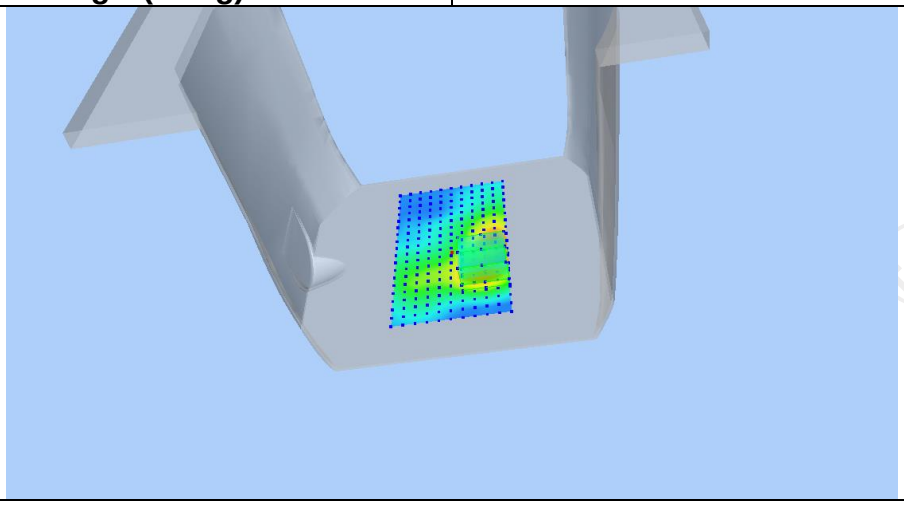
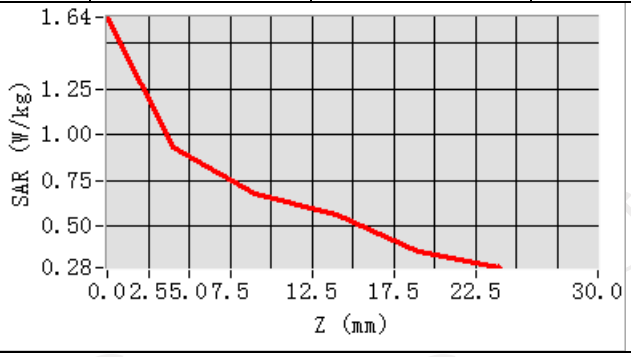
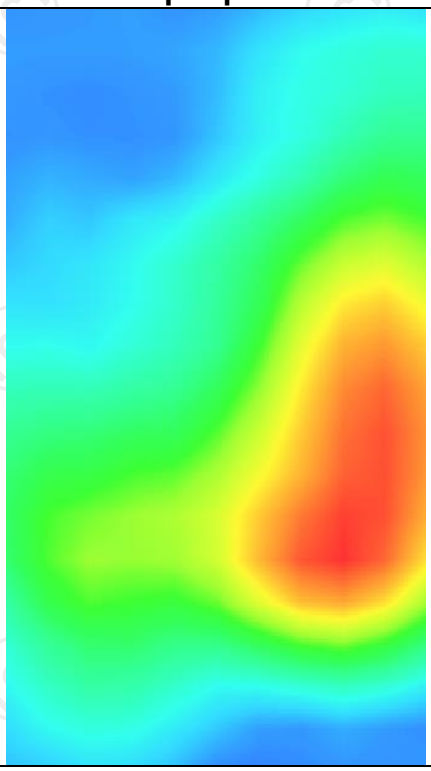
LTE Band I

MEASUREMENT 1	
Low Band SAR (Channel 18100):	Date: 06/20/2024
Frequency (MHz)	1930.000000
Relative permittivity (real part)	38.991249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.350792
Variation (%)	-4.700000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 1
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=24.00, Y=-30.00 SAR Peak: 1.14 W/kg	
SAR 10g (W/Kg)	0.438292
SAR 1g (W/Kg)	0.723789
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.6387	0.9325	0.6816	0.5635	0.3623



Hot spot position



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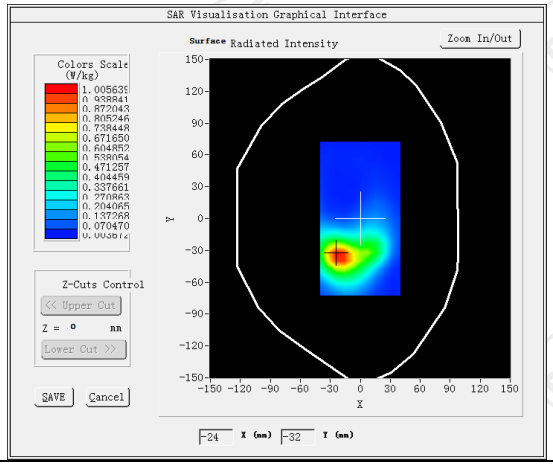
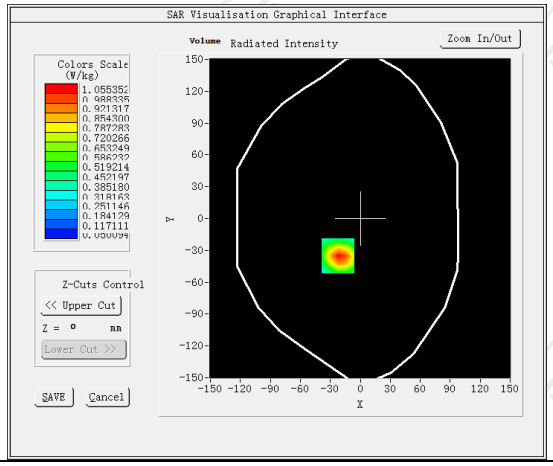
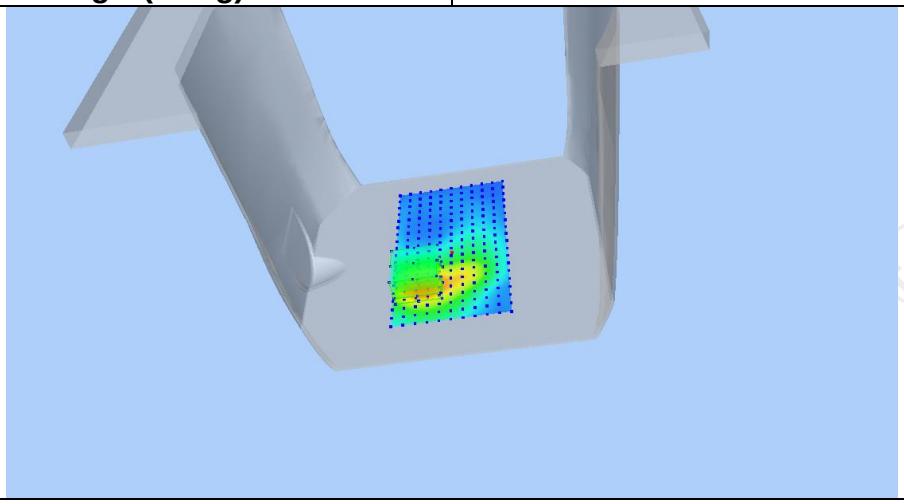
LTE Band III

MEASUREMENT 1	
Middle Band SAR (Channel 193575):	Date: 06/19/2024
Frequency (MHz)	1747.50000
Relative permittivity (real part)	37.989719
Relative permittivity (imaginary part)	13.774340
Conductivity (S/m)	1.336876
Variation (%)	-4.240000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 3
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-22.00, Y=-35.00 SAR Peak: 1.90 W/kg	
SAR 10g (W/Kg)	0.856218
SAR 1g (W/Kg)	1.185219
	

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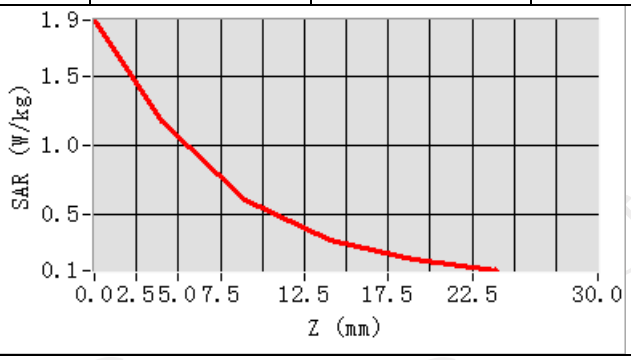
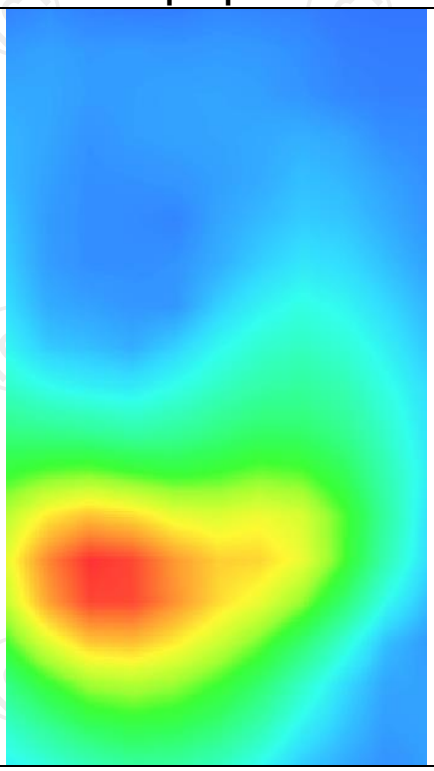
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.8991	1.1670	0.6128	0.3227	0.1799



Hot spot position



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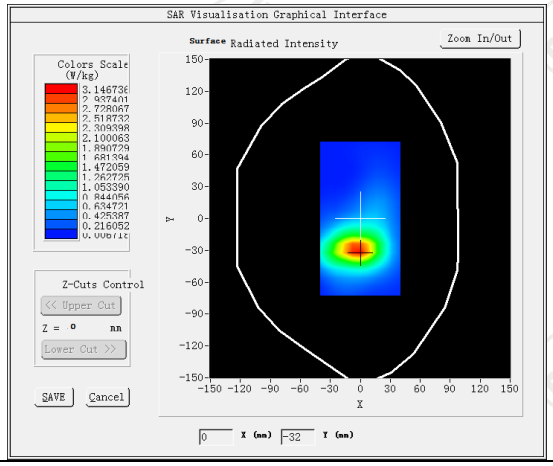
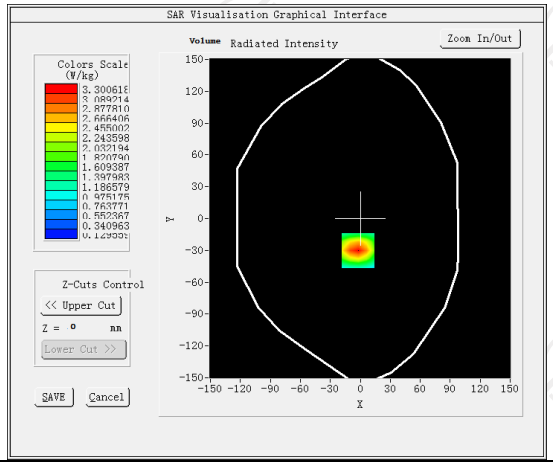
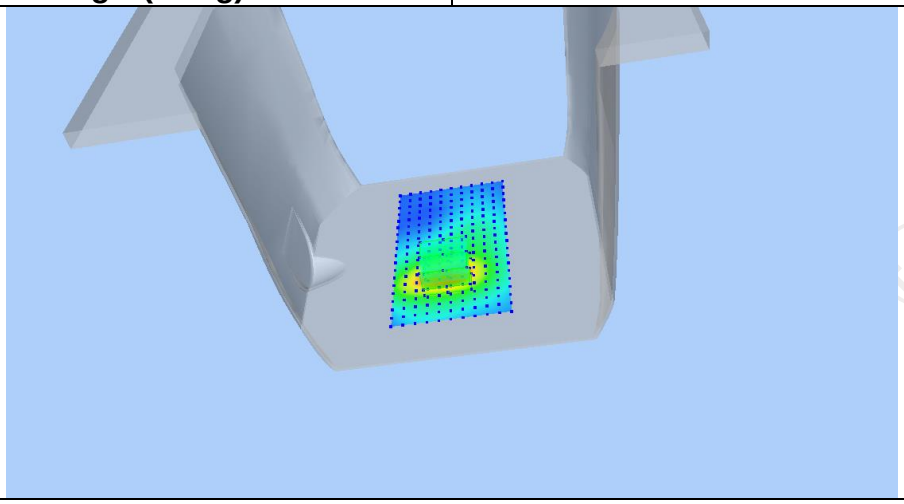
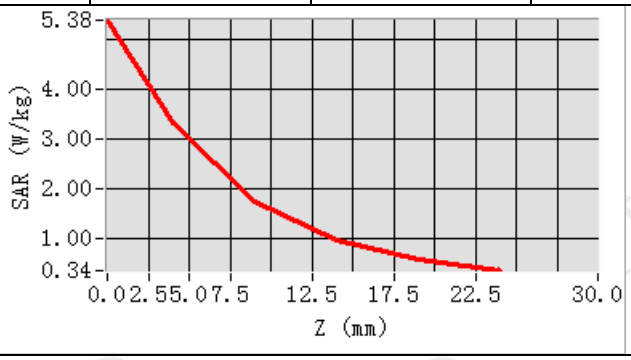
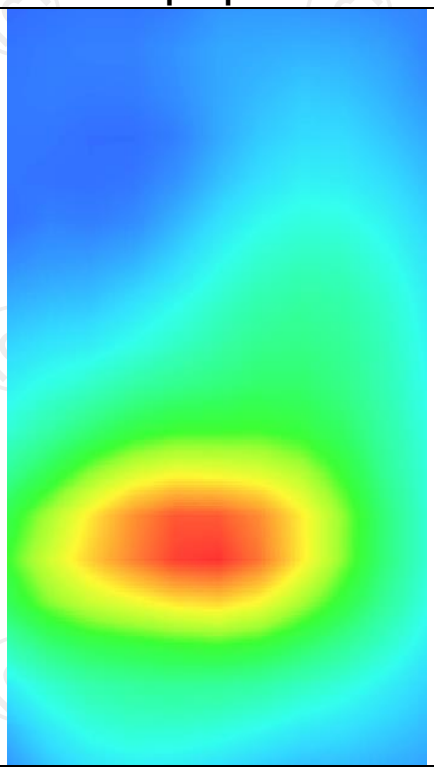
LTE Band 7

MEASUREMENT 1	
High Band SAR (Channel 21350):	Date: 06/28/2024
Frequency (MHz)	2560.000000
Relative permittivity (real part)	37.432823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	1.925428
Variation (%)	-2.820000
Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	5x5x7,dx=5mm dy=5mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 7
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-2.00, Y=-30.00 SAR Peak: 5.39 W/kg	
SAR 10g (W/Kg)	1.630559
SAR 1g (W/Kg)	3.124094
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	5.3802	3.3006	1.7420	0.9400	0.5549



Hot spot position



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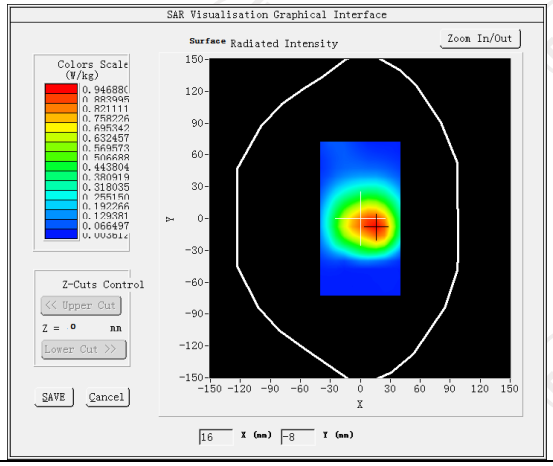
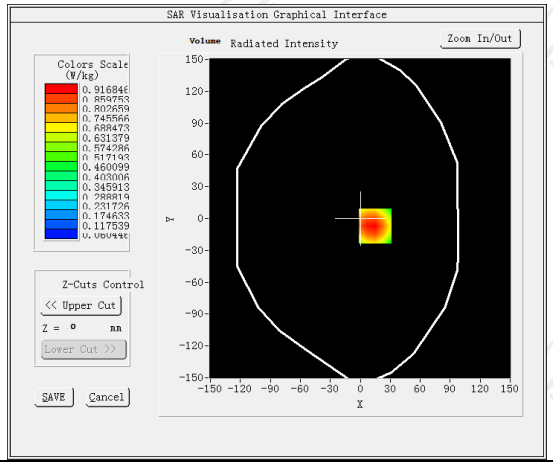
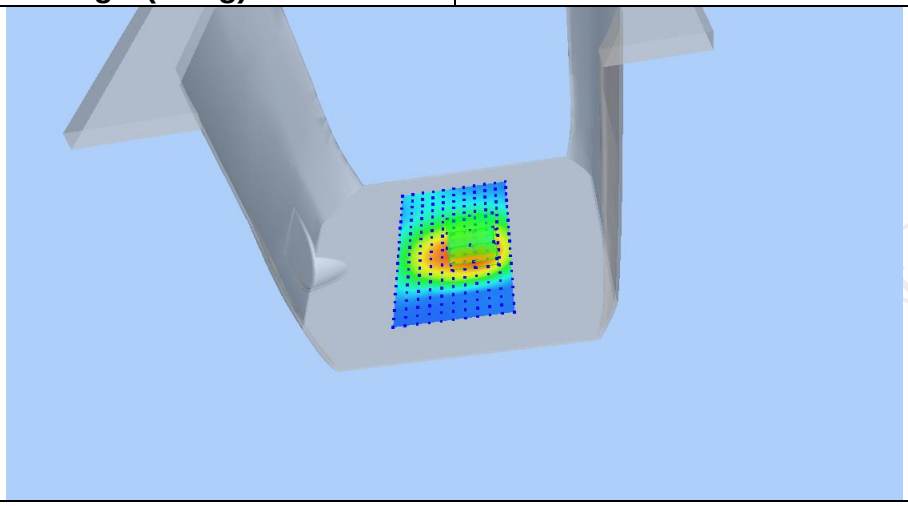
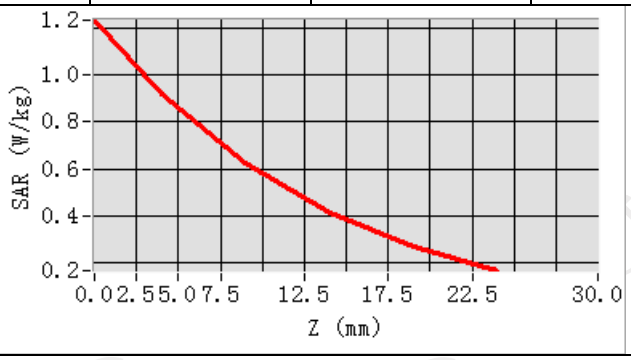
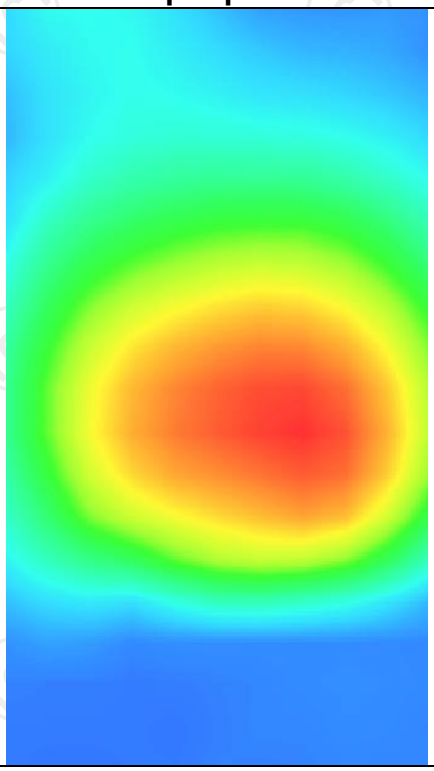
LTE Band 8

MEASUREMENT 1	
Low Band SAR (Channel 21500):	Date: 06/17/2024
Frequency (MHz)	885.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.966767
Variation (%)	-1.750000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 8
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=15.00, Y=-7.00 SAR Peak: 1.25W/kg	
SAR 10g (W/Kg)	0.572430
SAR 1g (W/Kg)	0.879751
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.2323	0.9168	0.6223	0.4153	0.2711



Hot spot position



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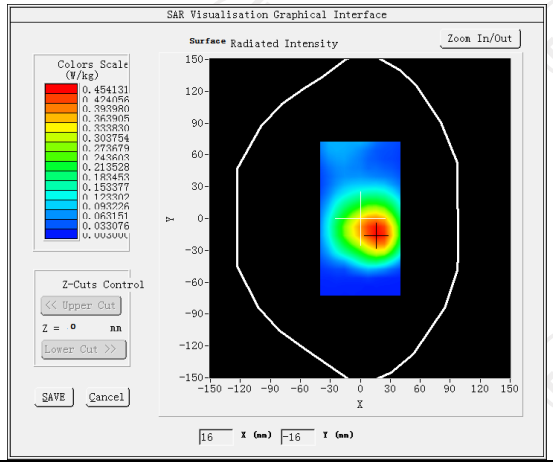
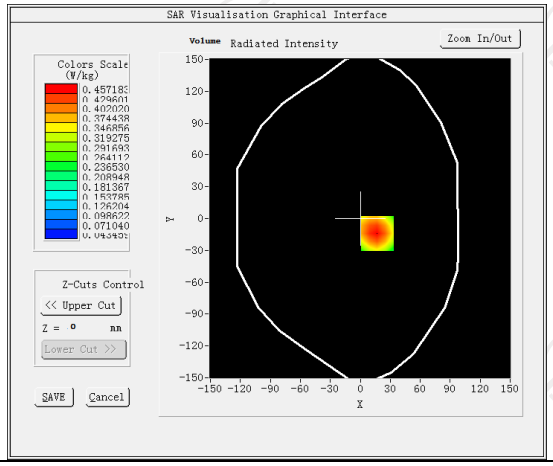
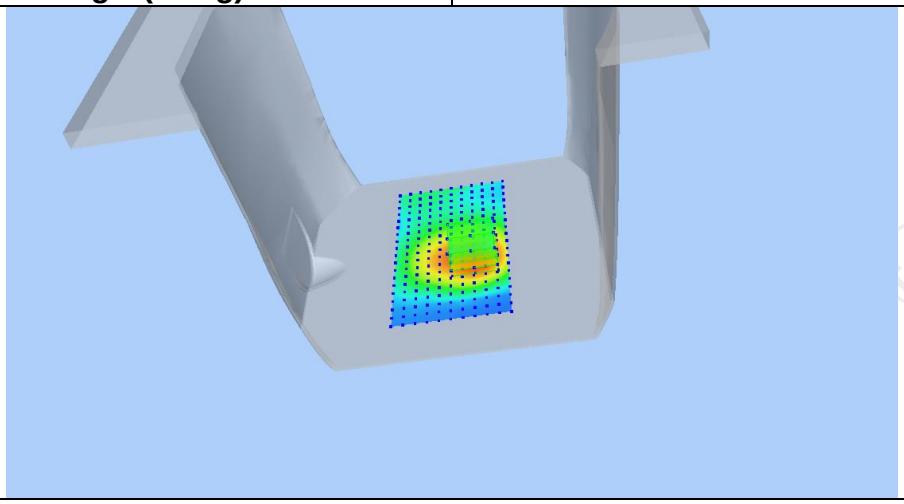
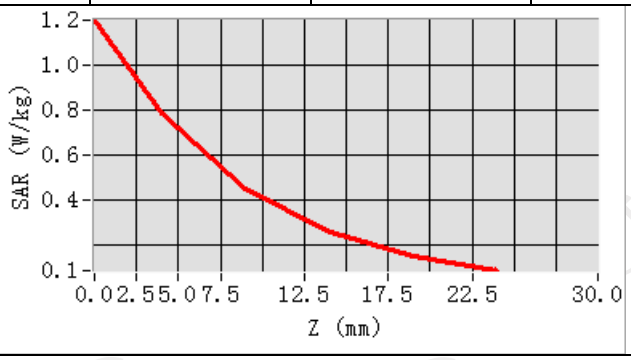
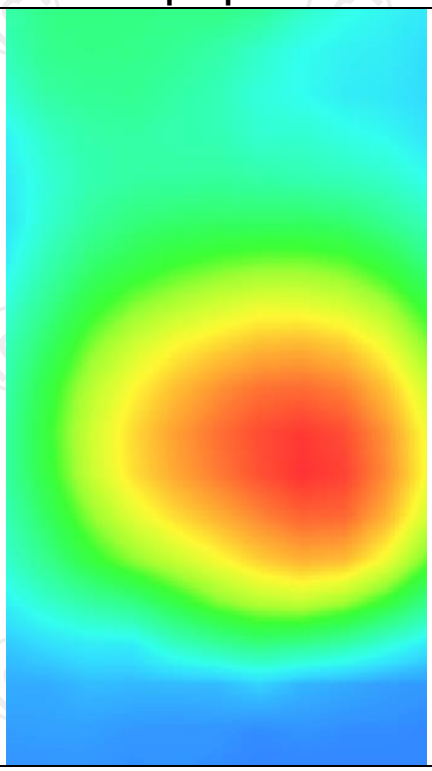
LTE Band 20

MEASUREMENT 1	
Low Band SAR (Channel 24250):	Date: 06/17/2024
Frequency (MHz)	842.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.912878
Variation (%)	-1.880000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 20
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=17.00, Y=-25.00 SAR Peak: 1.22 W/kg	
SAR 10g (W/Kg)	0.486107
SAR 1g (W/Kg)	0.736053
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.2033	0.7895	0.4550	0.2617	0.1540



Hot spot position



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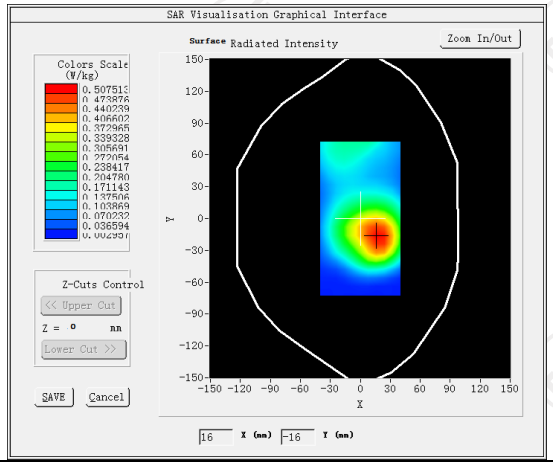
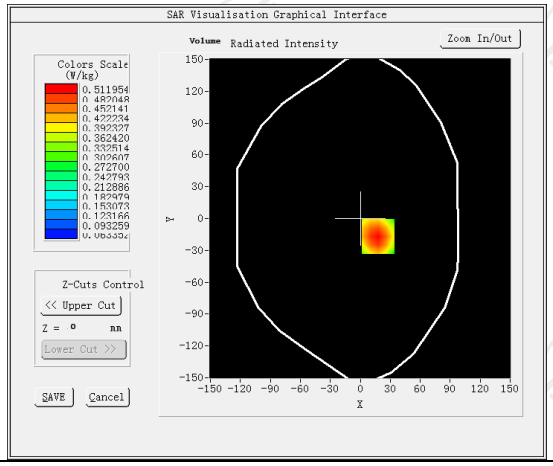
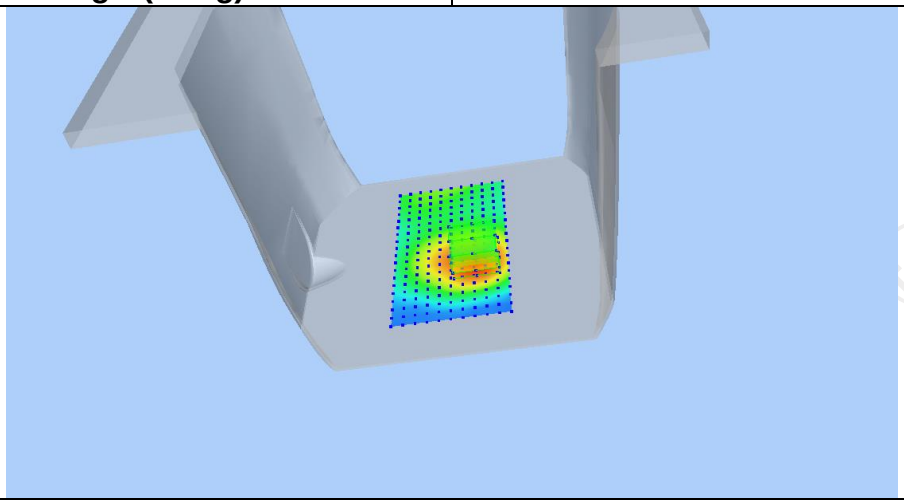
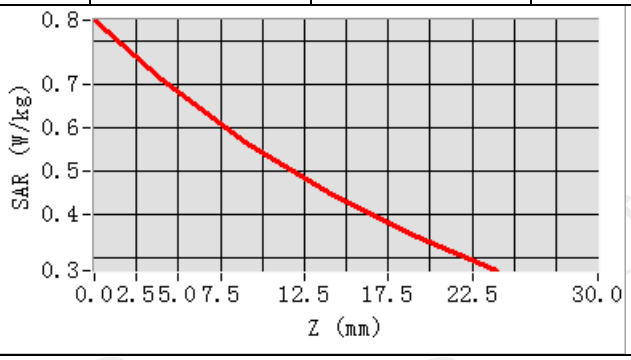
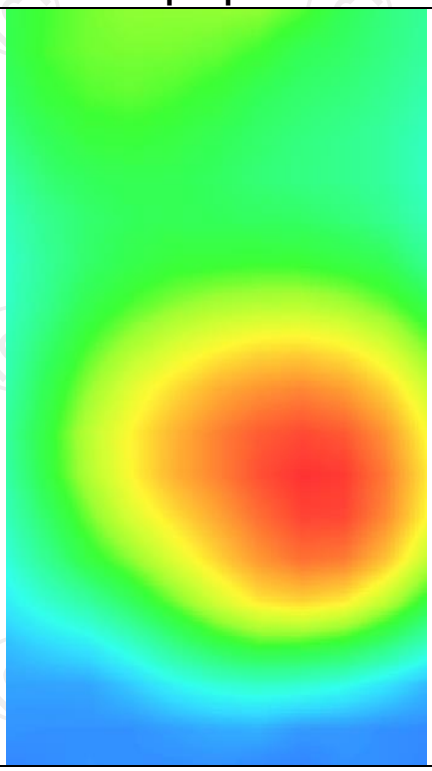
LTE Band 28

MEASUREMENT 1	
Low Band SAR (Channel 21310):	Date: 06/17/2024
Frequency (MHz)	713.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.966767
Variation (%)	-1.780000
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 28
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=18.00, Y=-17.00 SAR Peak: 0.85W/kg	
SAR 10g (W/Kg)	0.403073
SAR 1g (W/Kg)	0.589376
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8491	0.7111	0.5663	0.4484	0.3523



Hot spot position



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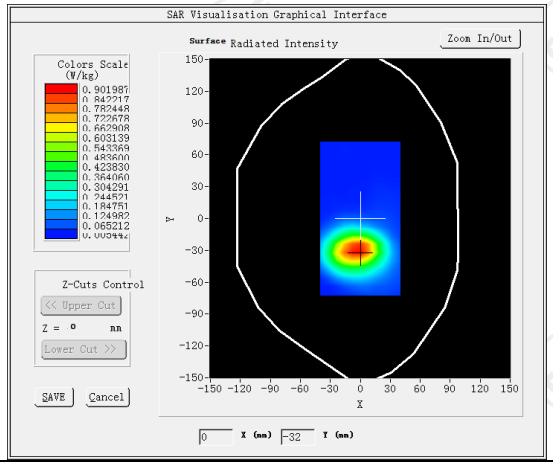
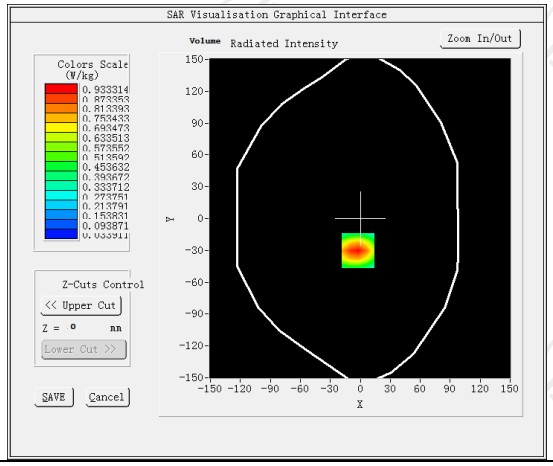
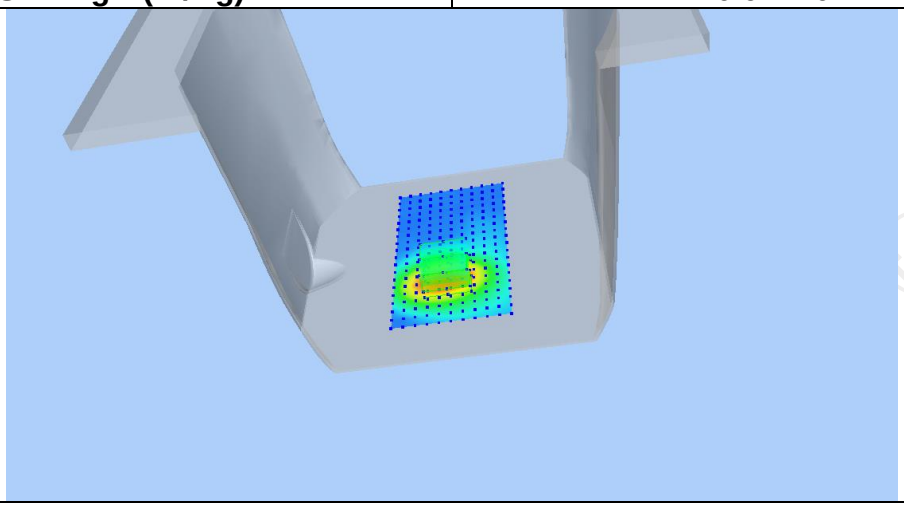
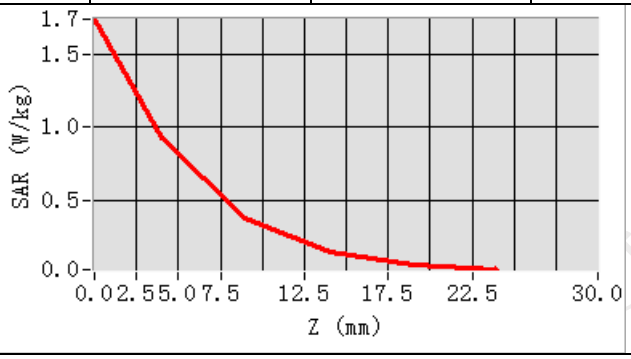
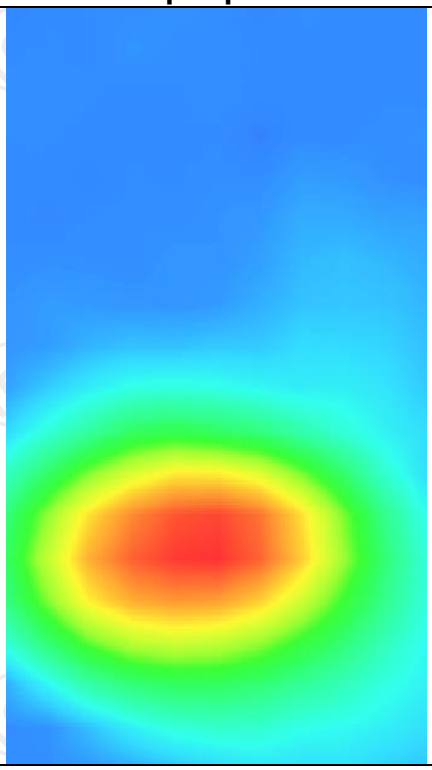
LTE Band 38

MEASUREMENT 1	
High Band SAR (Channel 38150)	Date: 06/28/2024
Frequency (MHz)	2610.000000
Relative permittivity (real part)	39.006668
Relative permittivity (imaginary part)	13.558333
Conductivity (S/m)	1.954660
Variation (%)	-2.840000
Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	5x5x7,dx=5mm dy=5mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 38
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-2.00, Y=-30.00 SAR Peak:1.76 W/kg	
SAR 10g (W/Kg)	0.692773
SAR 1g (W/Kg)	0.974704
	

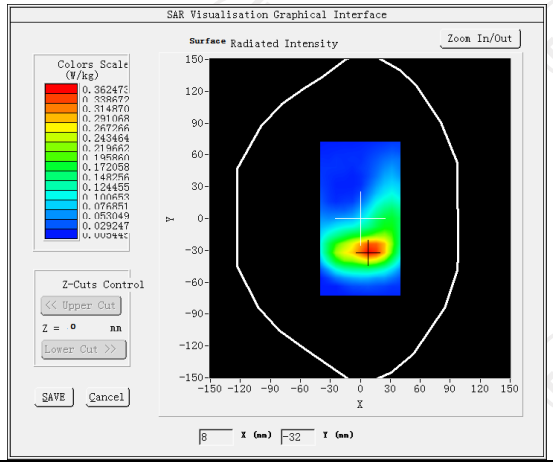
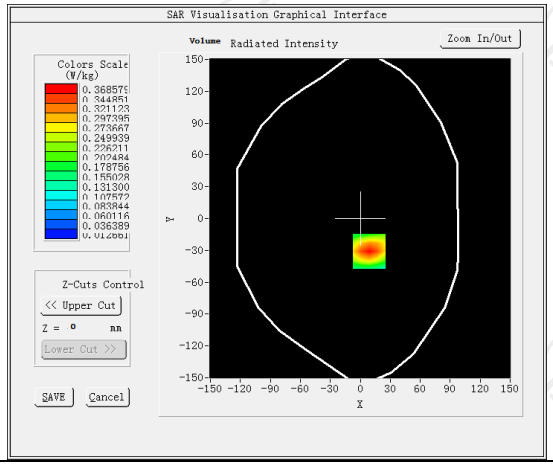
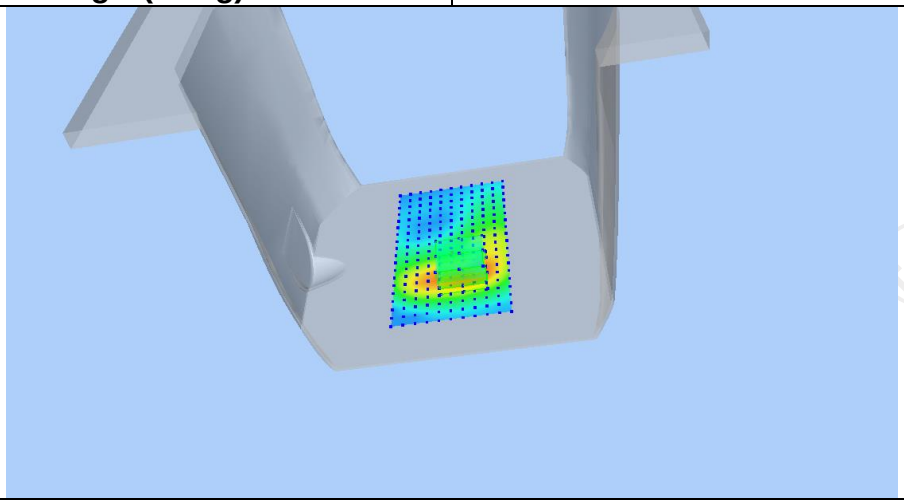
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.7455	0.9241	0.3763	0.1431	0.0574



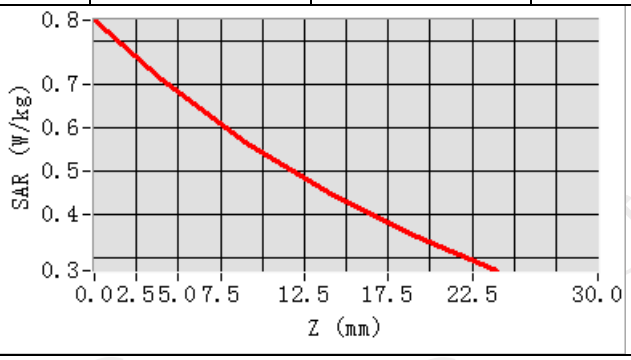
Hot spot position



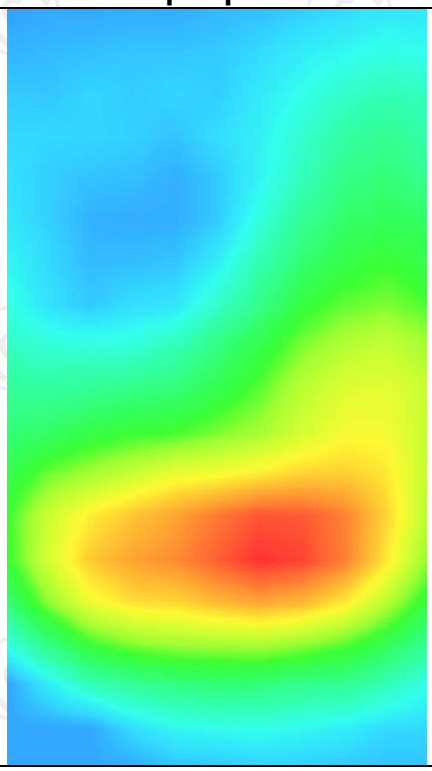
LTE Band 40

MEASUREMENT 1	
Middle Band SAR (Channel 39150)	Date: 06/25/2024
Frequency (MHz)	2350.000000
Relative permittivity (real part)	39.400002
Relative permittivity (imaginary part)	13.120000
Conductivity (S/m)	1.712889
Variation (%)	-2.240000
Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	5x5x7,dx=5mm dy=5mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	LTE band 40
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=9.00, Y=-31.00 SAR Peak: 0.85 W/kg	
SAR 10g (W/Kg)	0.350996
SAR 1g (W/Kg)	0.445478
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8491	0.7111	0.5663	0.4484	0.3523



Hot spot position



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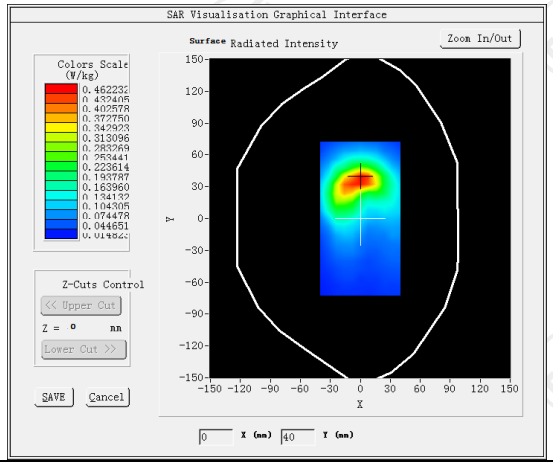
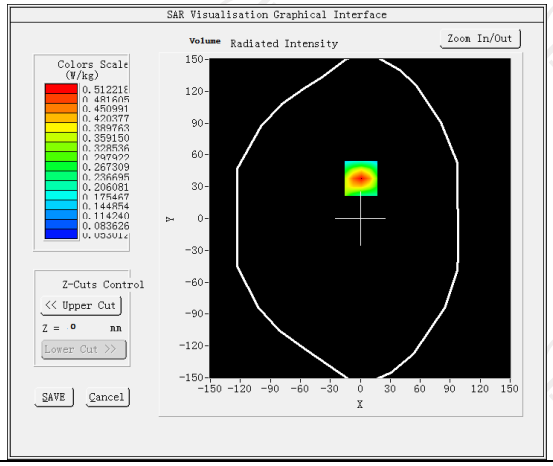
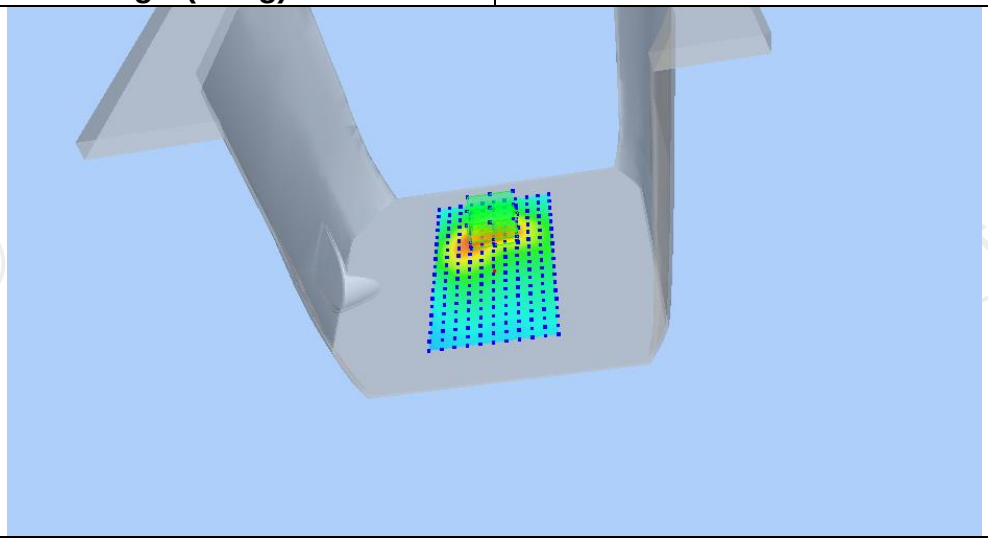
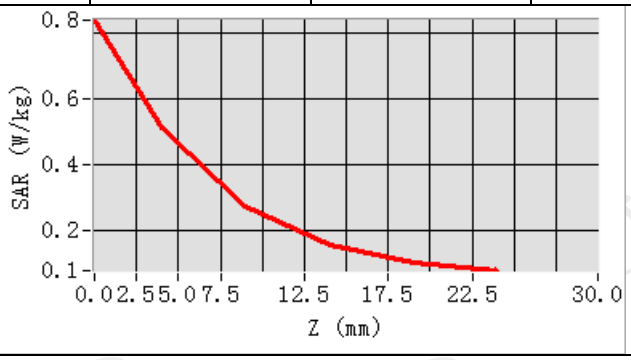
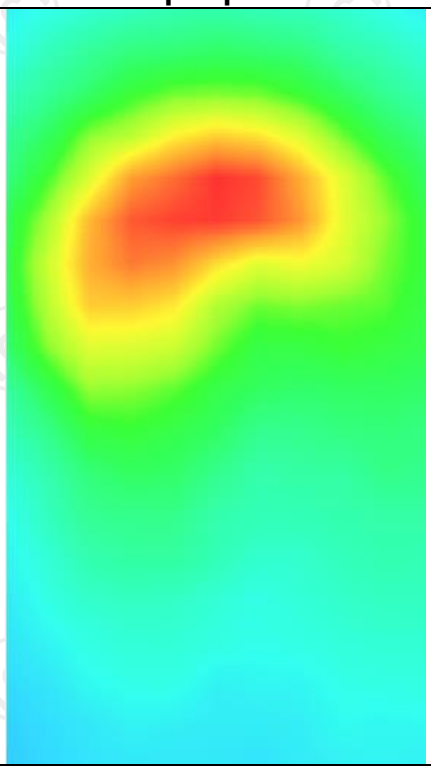
2.4G WLAN

MEASUREMENT 2	
Middle Band SAR (Channel 7):	Date: 06/25/2024
Frequency (MHz)	2442.000000
Relative permittivity (real part)	38.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	1.925428
Variation (%)	0.320000
Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	5x5x7,dx=5mm dy=5mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body Back
Band	IEEE 802.11b ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=1.00, Y=38.00 SAR Peak: 0.84 W/kg	
SAR 10g (W/Kg)	0.250013
SAR 1g (W/Kg)	0.462387
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8381	0.5122	0.2738	0.1570	0.1058



Hot spot position



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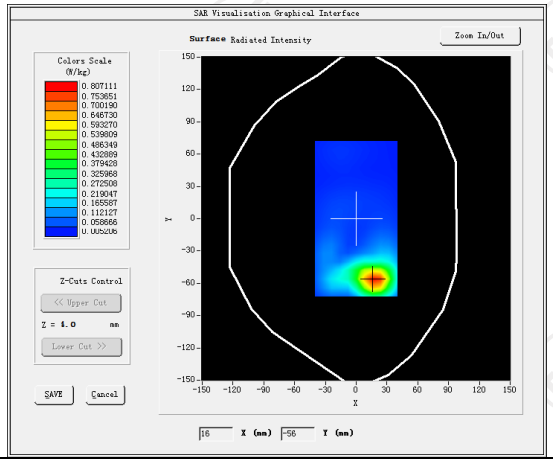
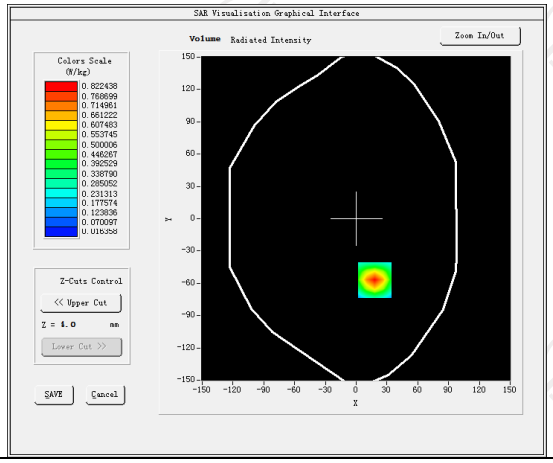
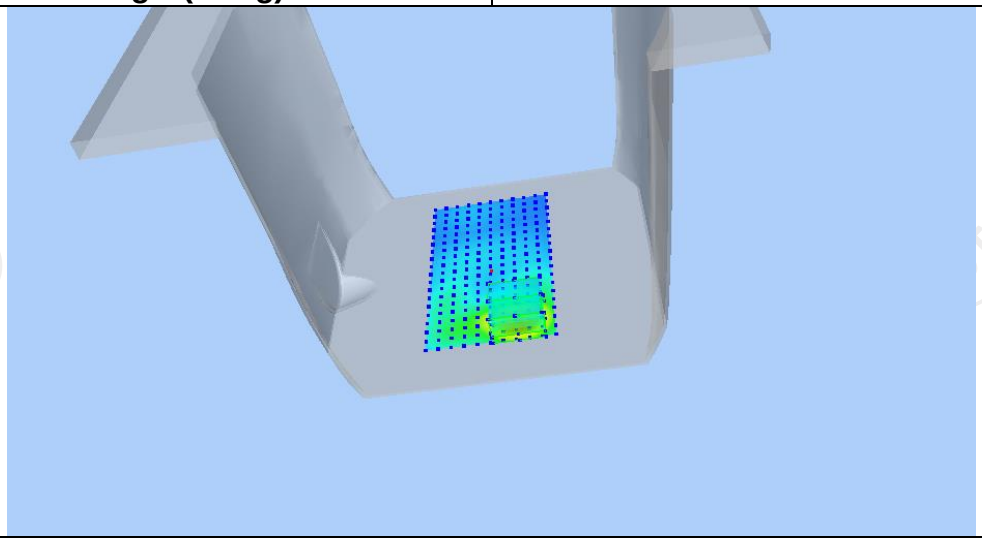
5.2G WLAN

MEASUREMENT 1	
SAR(Channel 38):	Date: 07/03/2024
Frequency (MHz)	5190.000000
Relative permittivity (real part)	35.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	5.215428
Variation (%)	0.140000
Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	5x5x7,dx=4mm dy=4mm dz=2mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	IEEE 802.11n ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=14.00, Y=-16.00 SAR Peak: 0.90 W/kg	
SAR 10g (W/Kg)	0.333051
SAR 1g (W/Kg)	0.535203
	

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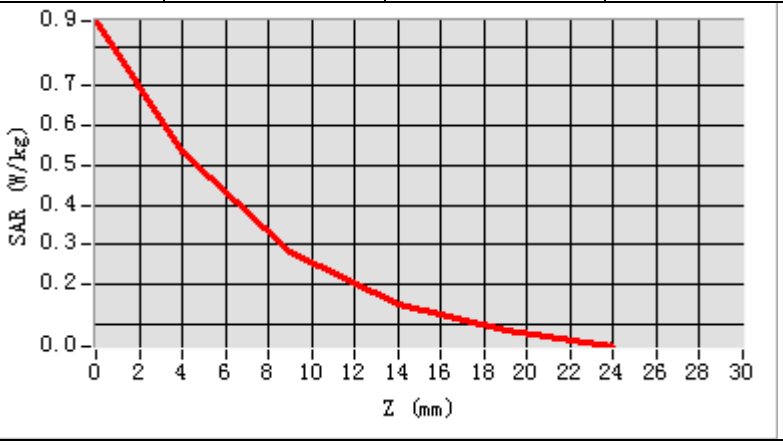
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8634	0.5339	0.2824	0.1489	0.0820



Hot spot position

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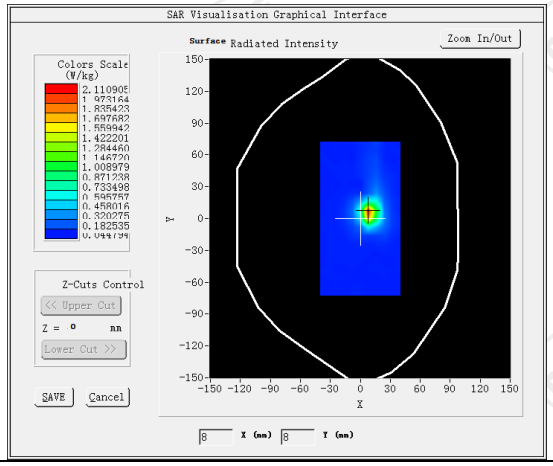
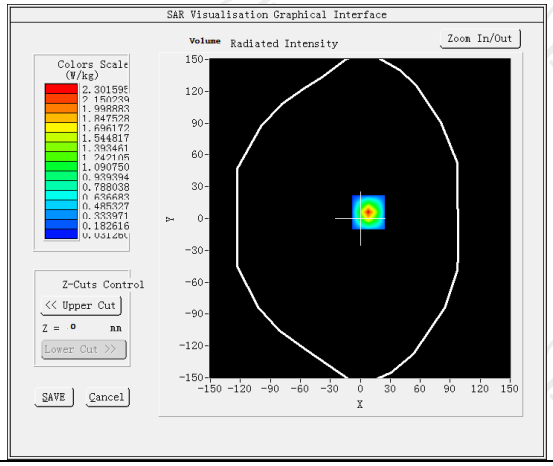
5.3G WLAN

MEASUREMENT 1	

SAR (Channel 64): Date: 07/04/2024

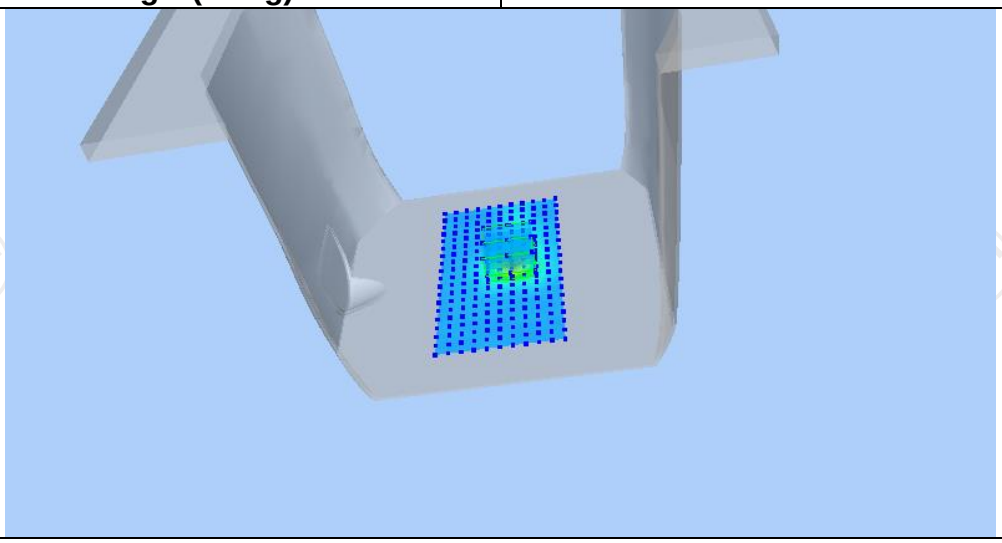
Frequency (MHz)	5320.000000
Relative permittivity (real part)	36.052823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	4.625428
Variation (%)	1.630000
Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	5x5x7,dx=4mm dy=4mm dz=2mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body Back
Band	IEEE 802.11a ISM
SURFACE SAR	**VOLUME SAR**



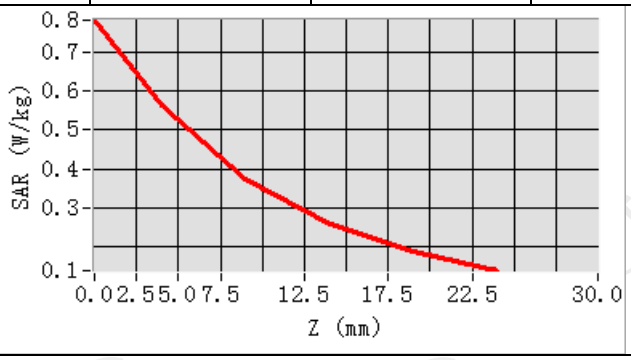


Maximum location: X=5.00, Y=8.00
SAR Peak: 0.78 W/kg

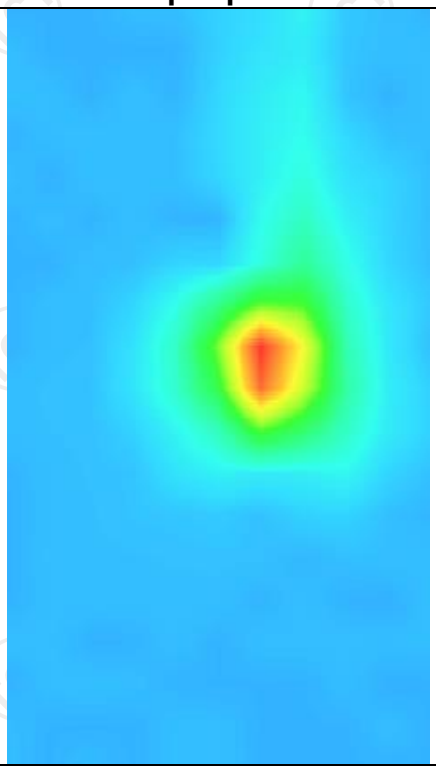
SAR 10g (W/Kg)	0.296104
SAR 1g (W/Kg)	0.466272



Z (mm)	0.00	2.00	7.00	12.00	17.00
SAR (W/Kg)	0.7816	0.5623	0.3747	0.2585	0.1883



Hot spot position



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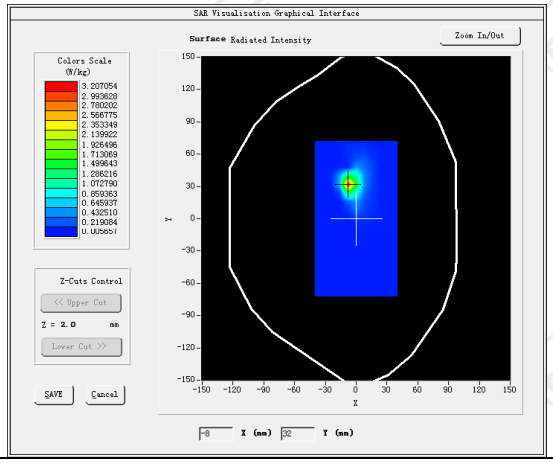
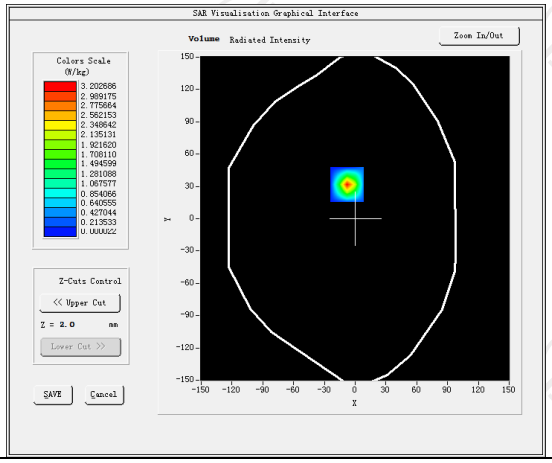
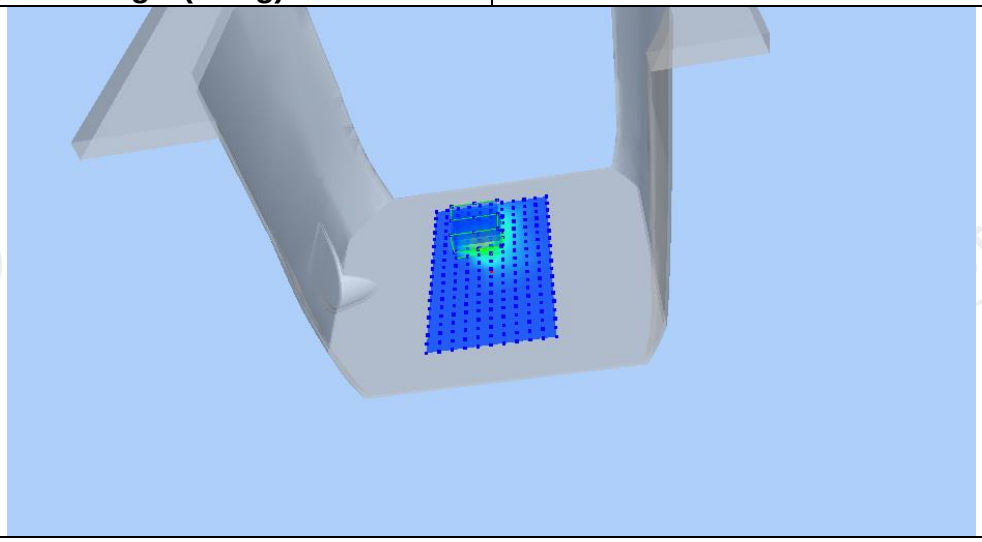
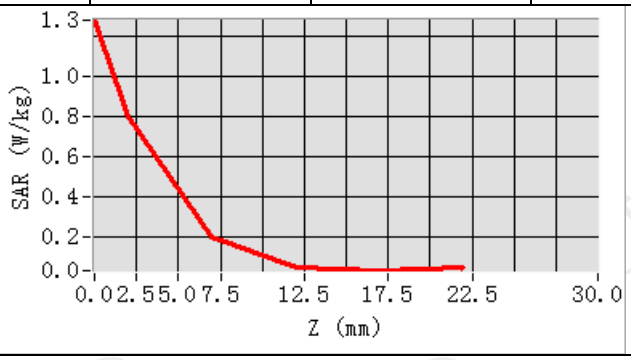
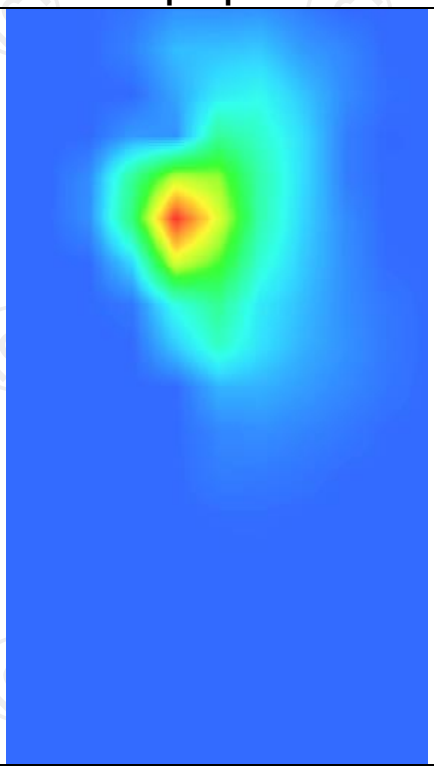
5.6G WLAN

MEASUREMENT 1	
SAR (Channel 140):	Date: 07/04/2024
Frequency (MHz)	5700.000000
Relative permittivity (real part)	35.068832
Relative permittivity (imaginary part)	13.679428
Conductivity (S/m)	5.220788
Variation (%)	1.590000
Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	5x5x7,dx=4mm dy=4mm dz=2mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body Back
Band	IEEE 802.11a ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-6.00, Y=30.00 **SAR Peak: 1.32 W/kg**	
SAR 10g (W/Kg)	0.439213
SAR 1g (W/Kg)	0.981571
	

Z (mm)	0.00	2.00	7.00	12.00	17.00
SAR (W/Kg)	1.2820	0.8022	0.1980	0.0451	0.0278



Hot spot position



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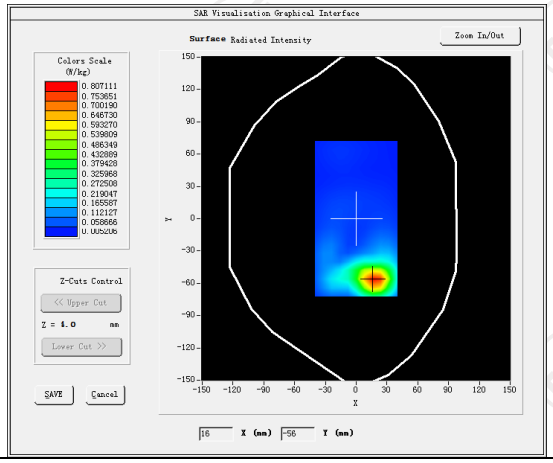
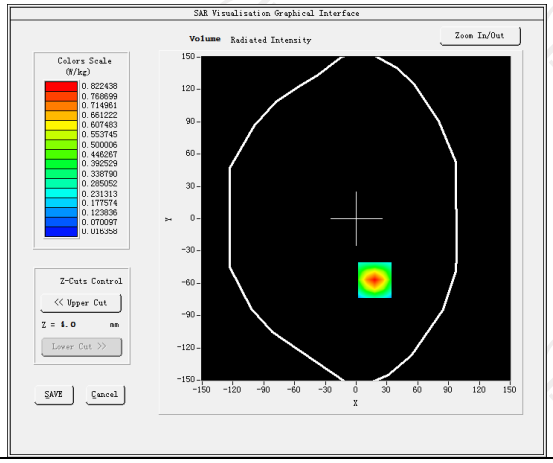
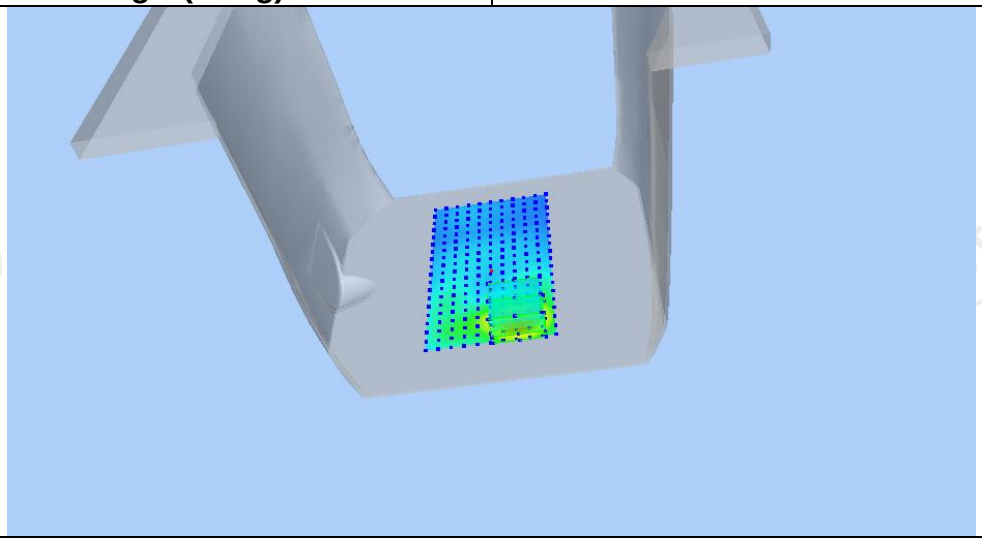
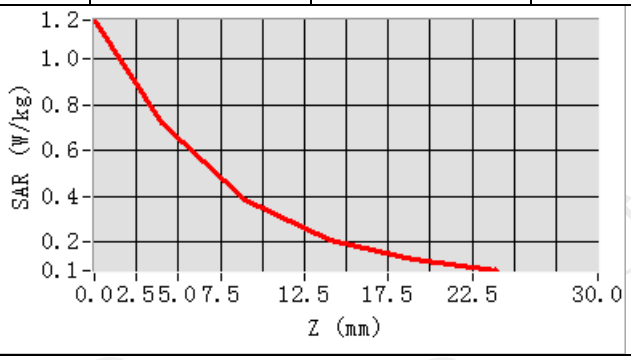
5.8G WLAN

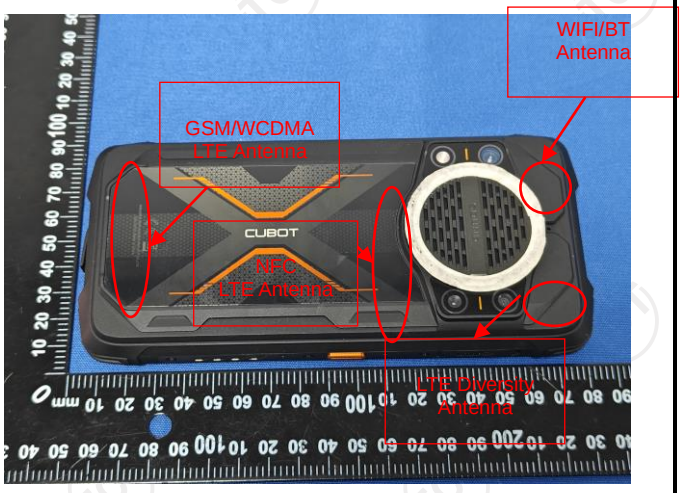
MEASUREMENT 1	
SAR (Channel 149):	Date: 07/05/2024
Frequency (MHz)	5745.000000
Relative permittivity (real part)	34.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	5.025428
Variation (%)	0.320000
Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	5x5x7,dx=4mm dy=4mm dz=2mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back
Band	IEEE 802.11a ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=11.00, Y=-49.00 **SAR Peak: 1.18 W/kg**	
SAR 10g (W/Kg)	0.372015
SAR 1g (W/Kg)	0.768412
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.1701	0.7248	0.3877	0.2116	0.1253



Hot spot position

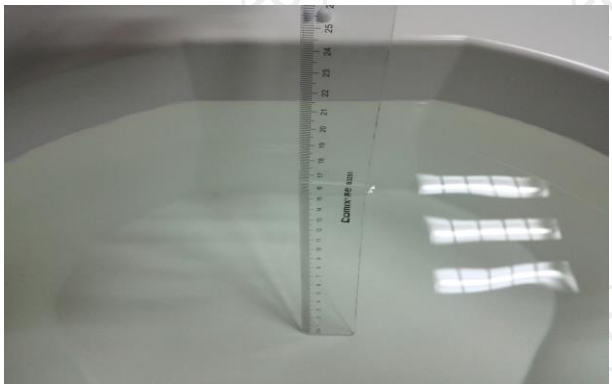
Appendix A: EUT Photos



Note:

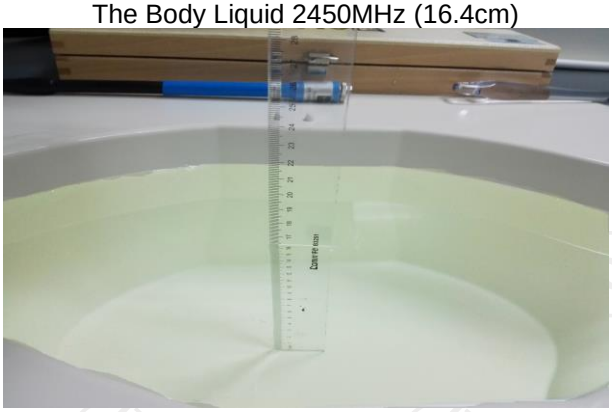
1. Diversity antenna is used to improve the acceptance of the main antenna. It does not have a transmitter function.

Liquid Setup Photos

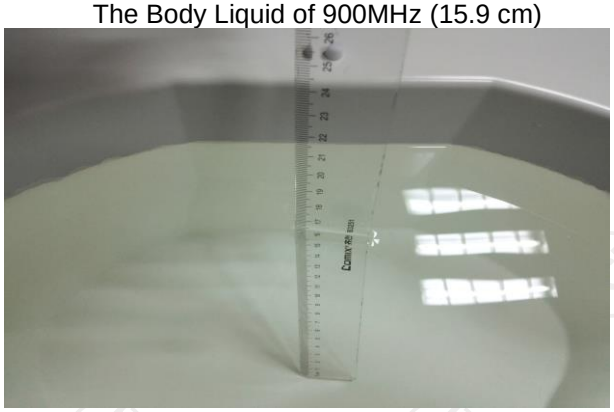


The Body Liquid 2450MHz (16.4cm)

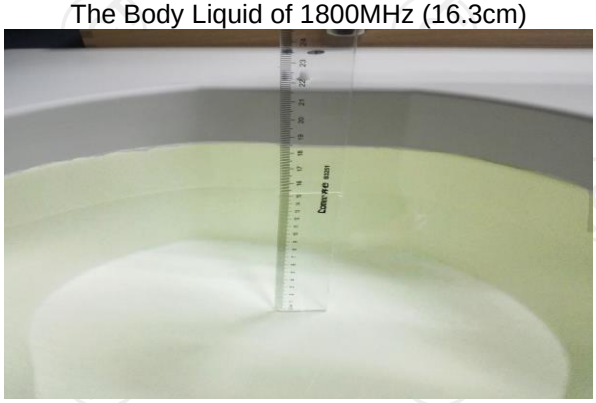
The Body Liquid of 900MHz (15.9 cm)



The Body Liquid of 1800MHz (16.3cm)



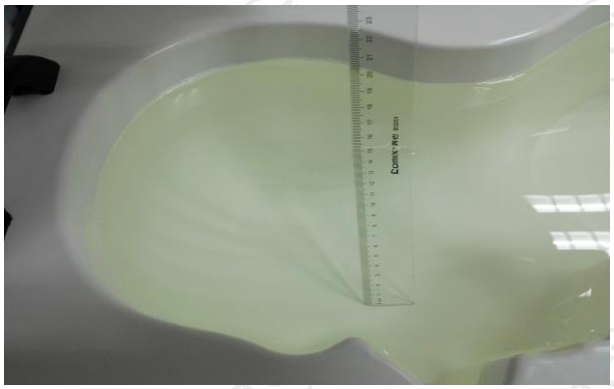
The Body Liquid of 2000MHz (16.5cm)

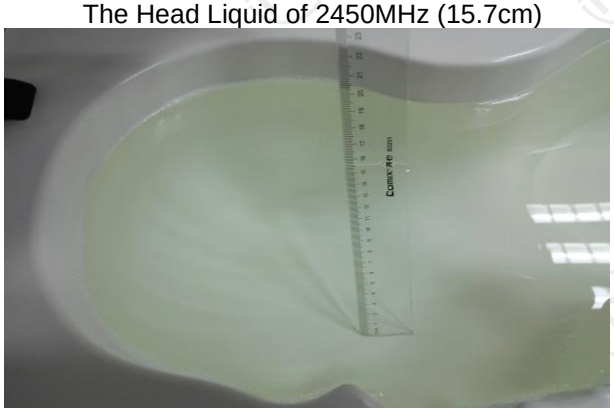


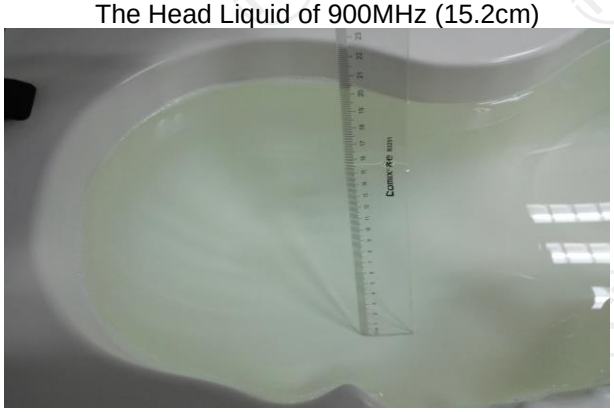
The Body Liquid of 5000-6000MHz (15.2 cm)

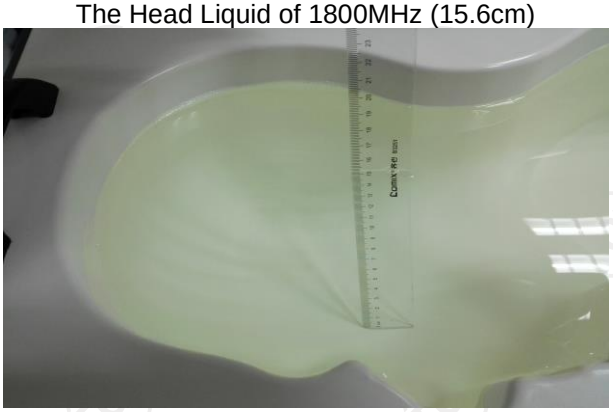
The Body Liquid of 2600MHz (16.6cm)

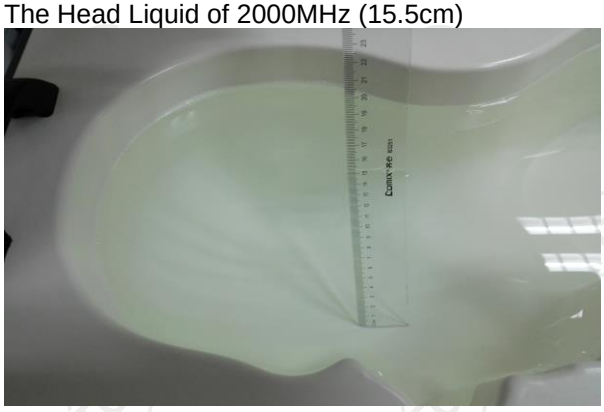

The Head Liquid of 2450MHz (15.7cm)


The Head Liquid of 900MHz (15.2cm)

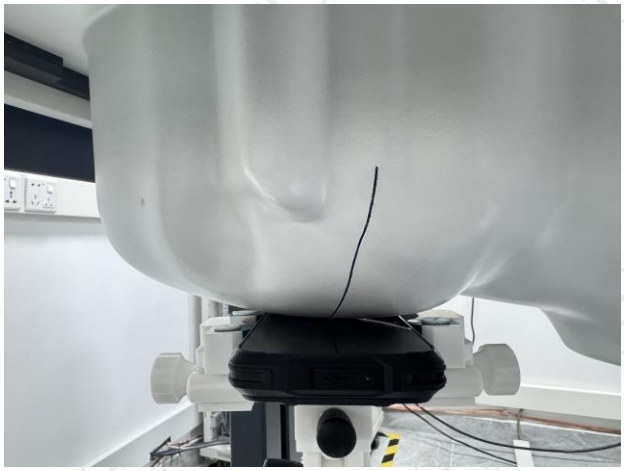

The Head Liquid of 1800MHz (15.6cm)


The Head Liquid of 2000MHz (15.5cm)

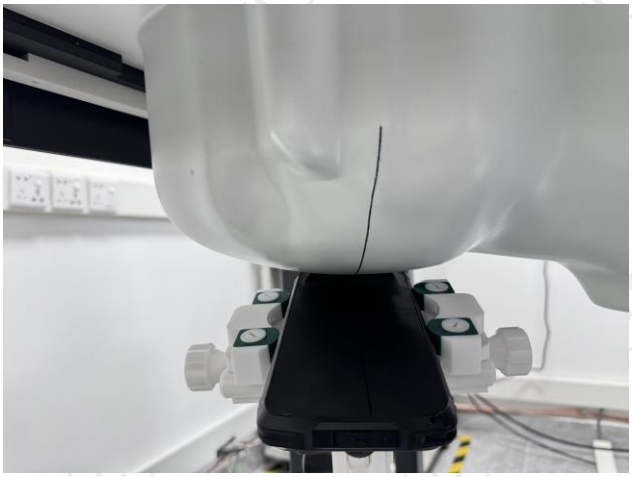

The Head Liquid of 5000-6000MHz (15.3cm)


The Head Liquid of 2600MHz (15.1cm)

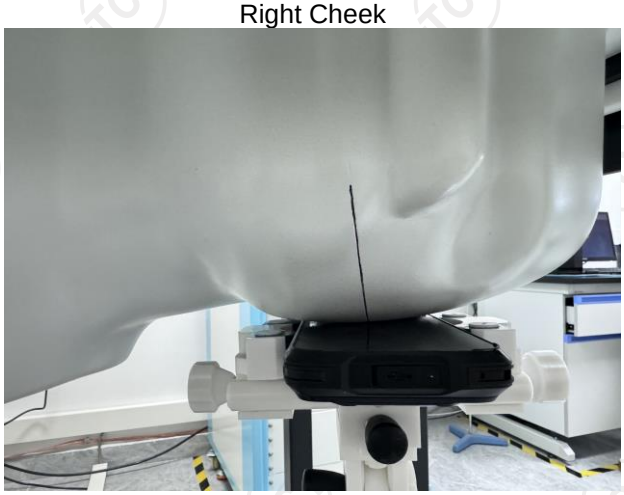
Appendix B: Test Setup Photos



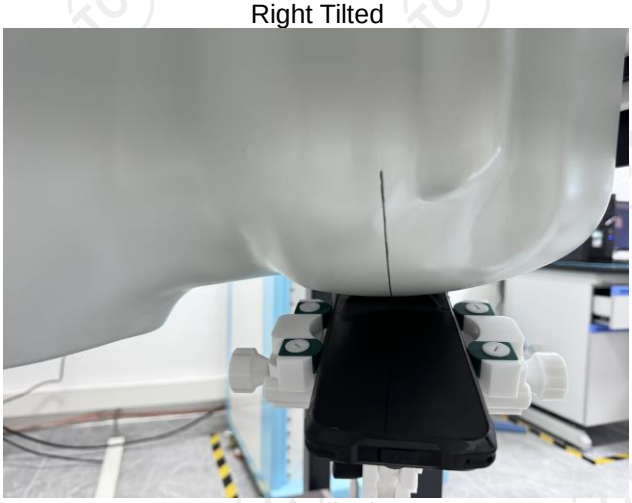
Right Cheek



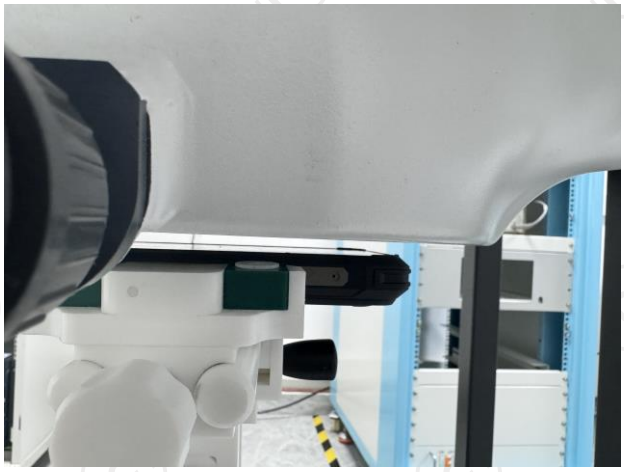
Right Tilted



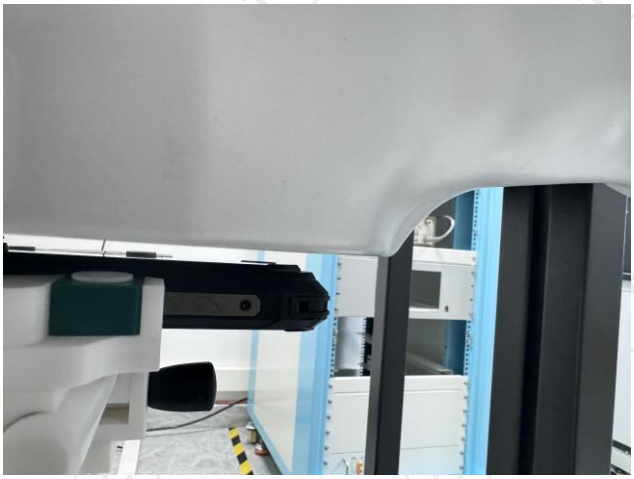
Left Cheek



Left Tilted



Body worn – Front(5 mm)



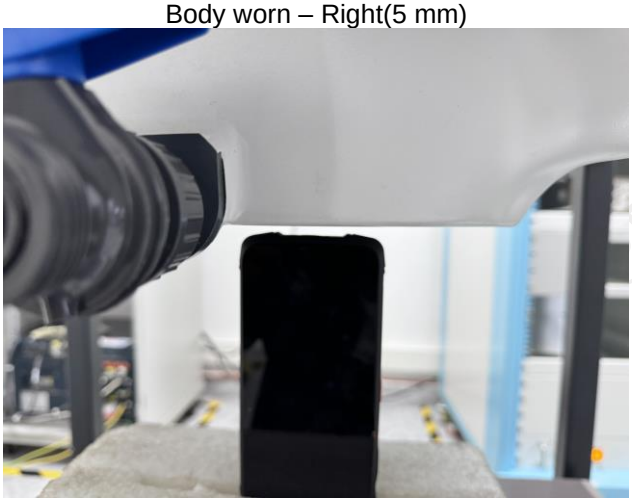
Body worn – Back(5 mm)

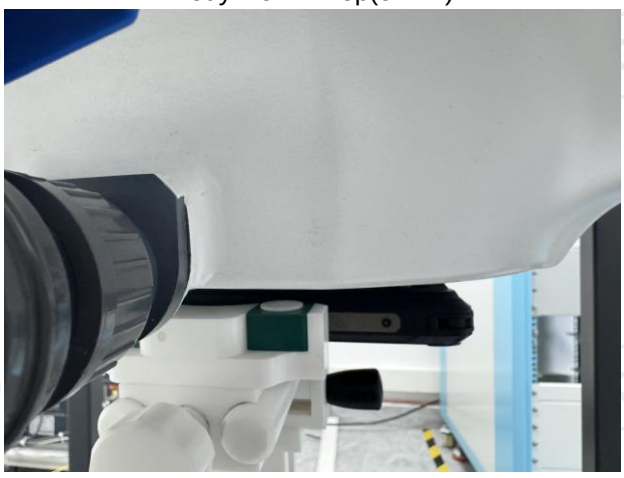
Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

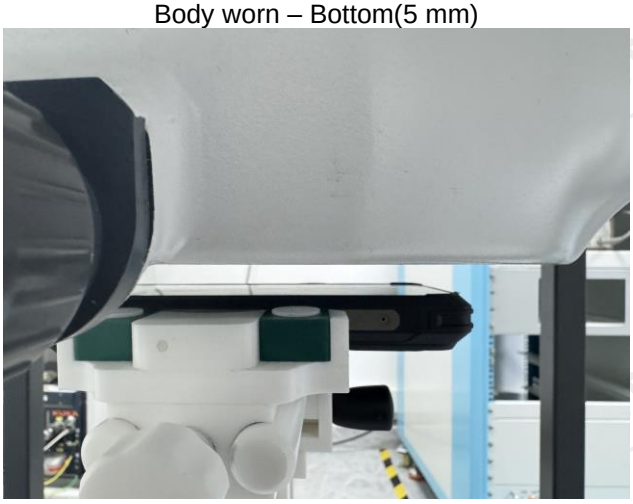

Body worn – Left(5 mm)


Body worn – Right(5 mm)


Body worn – Top(5 mm)


Body worn – Bottom(5 mm)


Wrist Worn –Back (0 mm)


Front to face–Front (10mm)

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

Appendix C: Probe Calibration Certificate

COMOSAR E-Field Probe Calibration Report

Ref : ACR.180.7.22.BES.B

SHENZHEN TCT TESTING TECHNOLOGY CO.,LTD
2101 & 2201, ZHENCHANG FACTORY RENSHAN INDUSTRIAL ZONE, FUHAI SUBDISTRICT, BAO'AN DISTRICT SHENZHEN, GUANGDONG, CHINA

MVG COMOSAR DOSIMETRIC E-FIELD PROBE
SERIAL NO.: SN 25/22 EPGO375

Calibrated at MVG
Z.I. de la pointe du diable
Technopôle Brest Iroise – 295 avenue Alexis de Rochon
29280 PLOUZANE - FRANCE

Calibration date: 06/29/2024

Accreditations #2-6789
Scope available on www.cofrac.fr

Summary:

This document presents the method and results from an accredited COMOSAR Dosimetric E-Field Probe calibration performed at MVG, using the CALIPROBE test bench, for use with a MVG COMOSAR system only. The test results covered by accreditation are traceable to the International System of Units (SI).

COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.180.7.22.BES.B

	Name	Function	Date	Signature
Prepared by :	Jérôme Le Gall	Measurement Responsible	6/30/2024	
Checked & approved by:	Jérôme Luc	Technical Manager	6/30/2024	
Authorized by:	Yann Toutain	Laboratory Director	6/30/2024	

	Customer Name
Distribution :	Shenzhen TCT Testing Technology Co.,Ltd

Issue	Name	Date	Modifications
A	Jérôme Le Gall	6/30/2024	Initial release

TABLE OF CONTENTS

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	SN 25/22 EPGO375
Product Condition (new / used)	New
Frequency Range of Probe	0.15 GHz-6GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.197 MΩ Dipole 2: R2=0.230 MΩ Dipole 3: R3=0.208 MΩ

2 PRODUCT DESCRIPTION

2.1 GENERAL INFORMATION

MVG's COMOSAR E field Probes are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards.

Figure 1 – *MVG COMOSAR Dosimetric E field Probe*

Probe Length	330 mm
Length of Individual Dipoles	2 mm
Maximum external diameter	8 mm
Probe Tip External Diameter	2.5 mm
Distance between dipoles / probe extremity	1 mm

3 MEASUREMENT METHOD

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards provide recommended practices for the probe calibrations, including the performance characteristics of interest and methods by which to assess their affect. All calibrations / measurements performed meet the fore mentioned standards.

3.1 LINEARITY

The evaluation of the linearity was done in free space using the waveguide, performing a power sweep to cover the SAR range 0.01W/kg to 100W/kg.

3.2 SENSITIVITY

The sensitivity factors of the three dipoles were determined using a two step calibration method (air and tissue simulating liquid) using waveguides as outlined in the standards.

3.3 LOWER DETECTION LIMIT

The lower detection limit was assessed using the same measurement set up as used for the linearity measurement. The required lower detection limit is 10 mW/kg.

3.4 ISOTROPY

The axial isotropy was evaluated by exposing the probe to a reference wave from a standard dipole with the dipole mounted under the flat phantom in the test configuration suggested for system validations and checks. The probe was rotated along its main axis from 0 to 360 degrees in 15-degree steps. The hemispherical isotropy is determined by inserting the probe in a thin plastic box filled with tissue-equivalent liquid, with the plastic box illuminated with the fields from a half wave dipole. The dipole is rotated about its axis (0°–180°) in 15° increments. At each step the probe is rotated about its axis (0°–360°).

3.1 BOUNDARY EFFECT

The boundary effect is defined as the deviation between the SAR measured data and the expected exponential decay in the liquid when the probe is oriented normal to the interface. To evaluate this effect, the liquid filled flat phantom is exposed to fields from either a reference dipole or waveguide. With the probe normal to the phantom surface, the peak spatial average SAR is measured and compared to the analytical value at the surface.

The boundary effect uncertainty can be estimated according to the following uncertainty approximation formula based on linear and exponential extrapolations between the surface and $d_{be} + d_{step}$ along lines that are approximately normal to the surface:

$$\mathrm{SAR}_{\mathrm{uncertainty}}[\%] = \delta\mathrm{SAR}_{be}\,\frac{(d_{be}+d_{step})^2}{2d_{step}}\,\frac{\left(e^{-d_{be}/(\delta\rho)}\right)}{\delta/2} \quad \text{for } (d_{be}+d_{step}) < 10\ \mathrm{mm}$$

where

$\mathrm{SAR}_{\mathrm{uncertainty}}$	is the uncertainty in percent of the probe boundary effect
d_{be}	is the distance between the surface and the closest *zoom-scan* measurement point, in millimetre
Δ_{step}	is the separation distance between the first and second measurement points that are closest to the phantom surface, in millimetre, assuming the boundary effect at the second location is negligible
δ	is the minimum penetration depth in millimetres of the head tissue-equivalent liquids defined in this standard, i.e., $\delta \approx 14$ mm at 3 GHz;
$\Delta\mathrm{SAR}_{be}$	in percent of SAR is the deviation between the measured SAR value, at the distance d_{be} from the boundary, and the analytical SAR value.

The measured worst case boundary effect SAR uncertainty[%] for scanning distances larger than 4mm is 1.0% Limit ,2%).

4 MEASUREMENT UNCERTAINTY

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty associated with an E-field probe calibration using the waveguide technique. All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

Uncertainty analysis of the probe calibration in waveguide					
ERROR SOURCES	**Uncertainty value (%)**	**Probability Distribution**	**Divisor**	**ci**	**Standard Uncertainty (%)**
Expanded uncertainty 95 % confidence level k = 2					14 %

5 CALIBRATION MEASUREMENT RESULTS

Calibration Parameters	
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

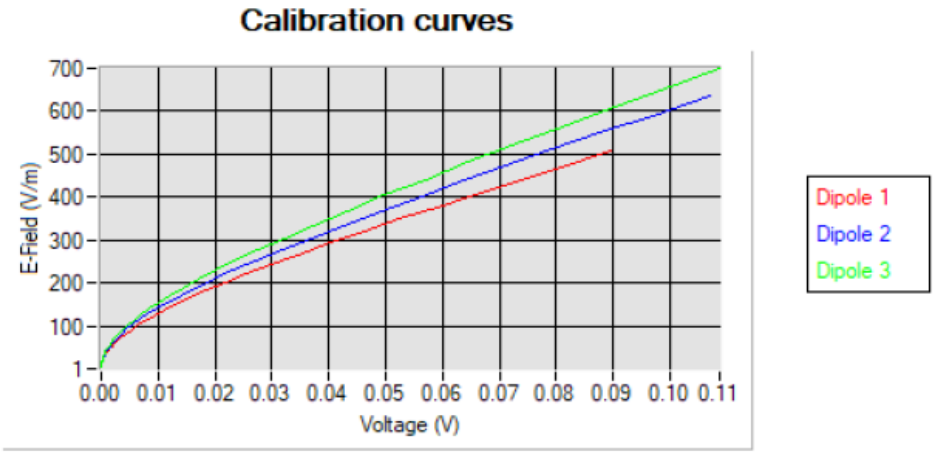
5.1 SENSITIVITY IN AIR

Normx dipole 1 ($\mu V/(V/m)^2$)	Normy dipole 2 ($\mu V/(V/m)^2$)	Normz dipole 3 ($\mu V/(V/m)^2$)
0.64	0.53	0.44

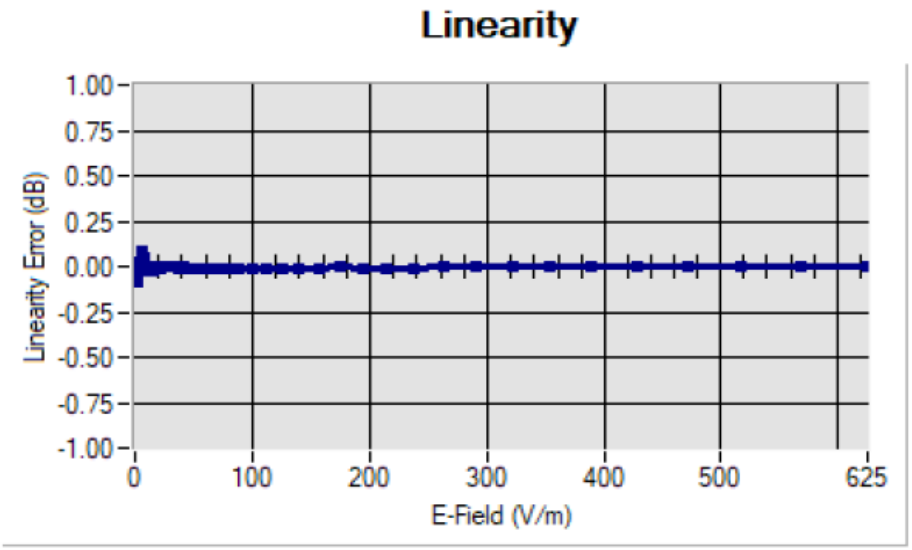
DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
106	108	109

Calibration curves ei=f(V) (i=1,2,3) allow to obtain E-field value using the formula:

$$E = \sqrt{E_1^2 + E_2^2 + E_3^2}$$



5.2 LINEARITY



Linearity:+/-1.94% (+/-0.09dB)

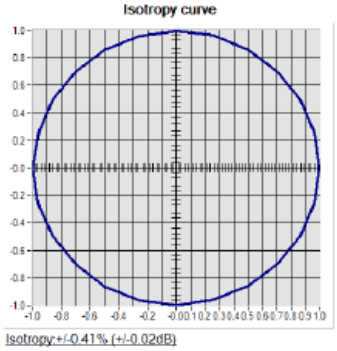
5.3 SENSITIVITY IN LIQUID

Liquid	Frequency (MHz +/- 100MHz)	ConvF
HL750	750	1.71
BL750	750	1.78
HL900	900	1.91
BL900	900	1.96
HL1800	1800	2.08
BL1800	1800	2.16
HL2000	2000	2.03
BL2000	2000	2.10
HL2450	2450	2.31
BL2450	2450	2.37
HL2600	2600	2.16
BL2600	2600	2.23
HL3500	3500	2.21
BL3500	3500	2.28
HL3700	3700	3.45
BL3700	3700	3.15
HL4600	4600	3.30
BL4600	4600	3.70
HL5200	5200	2.01
BL5200	5200	2.08
HL5600	5600	2.07
BL5600	5600	2.12
HL5800	5800	2.06
BL5800	5800	2.13

LOWER DETECTION LIMIT: 7mW/kg

5.4 ISOTROPY

HL1800 MHz



6 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
CALIPROBE Test Bench	Version 2	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rohde & Schwarz ZVM	100203	08/2021	08/2024
Network Analyzer	Agilent 8753ES	MY40003210	10/2023	10/2026
Network Analyzer – Calibration kit	HP 85033D	3423A08186	06/2021	06/2027
Multimeter	Keithley 2000	1160271	02/2023	02/2026
Signal Generator	Rohde & Schwarz SMB	106589	03/2022	03/2025
Amplifier	MVG	MODU-023-C-0002	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	NI-USB 5680	170100013	06/2024	06/2027
Power Meter	Rohde & Schwarz NRVD	832839-056	11/2023	11/2026
Directional Coupler	Krytar 158020	131467	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Waveguide	MVG	SN 32/16 WG4_1	Validated. No cal required.	Validated. No cal required.
Liquid transition	MVG	SN 32/16 WGLIQ_0G900_1	Validated. No cal required.	Validated. No cal required.
Waveguide	MVG	SN 32/16 WG6_1	Validated. No cal required.	Validated. No cal required.
Liquid transition	MVG	SN 32/16 WGLIQ_1G500_1	Validated. No cal required.	Validated. No cal required.
Waveguide	MVG	SN 32/16 WG8_1	Validated. No cal required.	Validated. No cal required.
Liquid transition	MVG	SN 32/16 WGLIQ_1G800B_1	Validated. No cal required.	Validated. No cal required.
Liquid transition	MVG	SN 32/16 WGLIQ_1G800H_1	Validated. No cal required.	Validated. No cal required.
Waveguide	MVG	SN 32/16 WG10_1	Validated. No cal required.	Validated. No cal required.
Liquid transition	MVG	SN 32/16 WGLIQ_3G500_1	Validated. No cal required.	Validated. No cal required.
Waveguide	MVG	SN 32/16 WG12_1	Validated. No cal required.	Validated. No cal required.

Liquid transition	MVG	SN 32/16 WGLIQ_5G000_1	Validated. No cal required.	Validated. No cal required.
Temperature / Humidity Sensor	Testo 184 H1	44225320	06/2024	06/2027

Appendix D: Dipole Calibration Report

SID900

SAR Reference Dipole Calibration Report

Ref : ACR.156.5.15.SATU.A

SHENZHEN TCT TESTING TECHNOLOGY CO., LTD

2101&2201, ZHENCHANG FACTORY, RENSHAN INDUSTRIAL ZONE,

FUHAI SUBDISTRICT, BAOAN DISTRICT, SHENZHEN, GUANGDONG, CHINA

MVG COMOSAR REFERENCE DIPOLE

FREQUENCY: 900 MHZ

SERIAL NO.: SN 16/15 DIP 0G900-370

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144

ACCREDITED Calibration CERT #2246-02

Calibration Date: 06/05/2024

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.156.5.15.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	06/05/2024	
Checked by :	Jérôme LUC	Product Manager	06/05/2024	
Approved by :	Kim RUTKOWSKI	Quality Manager	06/05/2024	

	Customer Name
Distribution :	SHENZHEN TCT TESTING TECHNOLOGY CO., LTD

Issue	Date	Modifications
A	06/05/2024	Initial release

TABLE OF CONTENTS

1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 900 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID900
Serial Number	SN 16/15 DIP 0G900-370
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards. The product is designed for use with the COMOSAR test bench only.

Figure 1 – *MVG COMOSAR Validation Dipole*

4 MEASUREMENT METHOD

The IEEE 1528, FCC KDBs and CEI/IEC 62209 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom, with the phantom constucted as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE Std. 1528 and CEI/IEC 62209 standards specify the mechanical components and dimensions of the validation dipoles, with the dimensions frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness.

5 MEASUREMENT UNCERTAINTY

All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

5.3 VALIDATION MEASUREMENT

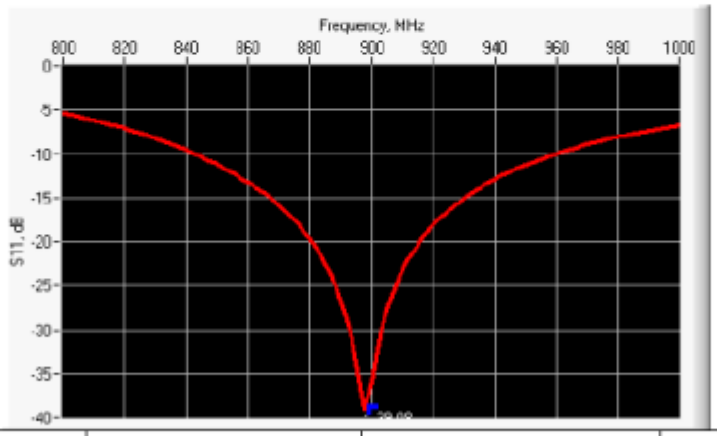
The guidelines outlined in the IEEE 1528, FCC KDBs, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Scan Volume	Expanded Uncertainty
1 g	20.3 %

10 g	20.1 %

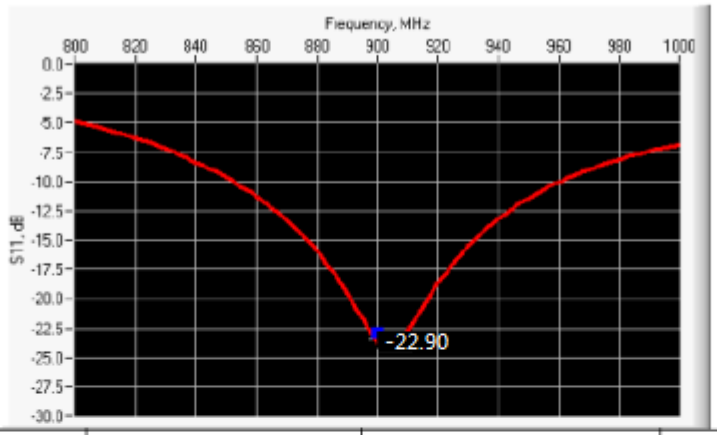
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
900	-38.86	-20	51.3 Ω + 0.7 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
900	-22.90	-20	53.5 Ω + 6.1 jΩ

6.3 MECHANICAL DIMENSIONS

Frequency MHz	L mm		h mm		d mm	
	required	measured	required	measured	required	measured
300	420.0 ±1 %.		250.0 ±1 %.		6.35 ±1 %.	

1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 42.1 sigma : 0.98
Distance between dipole center and liquid	15.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8mm/dz=5mm
Frequency	900 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9	10.63 (1.14)	6.99	6.81 (0.64)
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	

1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

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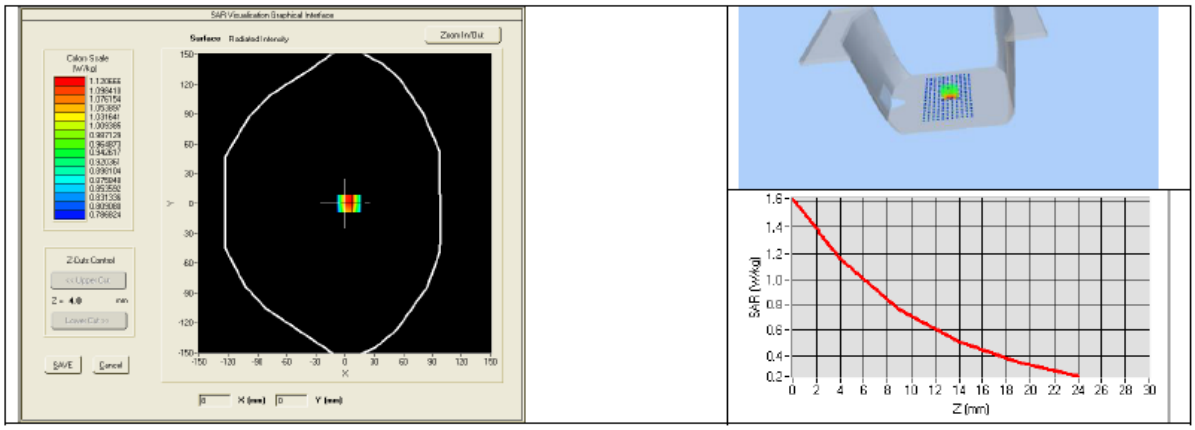
Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 42.1 sigma : 0.98
Distance between dipole center and liquid	15.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8mm/dz=5mm
Frequency	900 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9	10.61 (0.97)	6.99	6.91 (1.20)
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	

1900	39.7		20.5	
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4		24	
2600	55.3		24.6	
3000	63.8		25.7	
3500	67.1		25	



7.3 BODY LIQUID MEASUREMENT

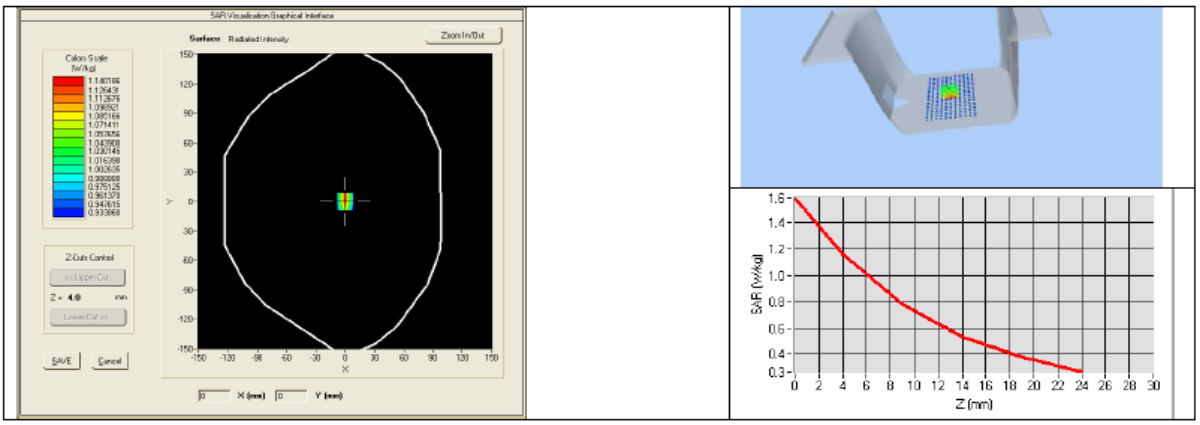
Frequency MHz	Relative permittivity (εr')		Conductivity (σ) S/m	
	required	measured	required	measured
150	61.9 ±5 %		0.80 ±5 %	
300	58.2 ±5 %		0.92 ±5 %	
450	56.7 ±5 %		0.94 ±5 %	
750	55.5 ±5 %		0.96 ±5 %	
835	55.2 ±5 %		0.97 ±5 %	
900	55.0 ±5 %	PASS	1.05 ±5 %	PASS
915	55.0 ±5 %		1.06 ±5 %	
1450	54.0 ±5 %		1.30 ±5 %	
1610	53.8 ±5 %		1.40 ±5 %	
1800	53.3 ±5 %		1.52 ±5 %	
1900	53.3 ±5 %		1.52 ±5 %	
2000	53.3 ±5 %		1.52 ±5 %	
2100	53.2 ±5 %		1.62 ±5 %	
2450	52.7 ±5 %		1.95 ±5 %	

2600	52.5 ±5 %		2.16 ±5 %	
3000	52.0 ±5 %		2.73 ±5 %	
3500	51.3 ±5 %		3.31 ±5 %	
5200	49.0 ±10 %		5.30 ±10 %	
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %		5.53 ±10 %	
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %		5.77 ±10 %	
5800	48.2 ±10 %		6.00 ±10 %	

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values: eps' : 56.4 sigma : 1.08
Distance between dipole center and liquid	15.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8mm/dz=5mm
Frequency	900 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)	10 g SAR (W/kg/W)
	measured	measured
900	10.84(1.16)	6.86 (0.73)



8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
SAM Phantom	MVG	SN-20/09-SAM71	Validated. No cal required.	Validated. No cal required.
COMOSAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rhode & Schwarz ZVA	SN100132	02/2024	02/2027
Calipers	Carrera	CALIPER-01	02/2024	02/2027
Reference Probe	MVG	EPG122 SN 18/11	02/2024	02/2025
Multimeter	Keithley 2000	1188656	02/2024	02/2027
Signal Generator	Agilent E4438C	MY49070581	02/2024	02/2027
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	02/2024	02/2027
Power Sensor	HP ECP-E26A	US37181460	02/2024	02/2027
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	02/2024	02/2027

SAR Reference Dipole Calibration Report

Ref : ACR.156.6.15.SATU.A

SHENZHEN TCT TESTING TECHNOLOGY CO., LTD

2101&2201, ZHENCHANG FACTORY, RENSHAN INDUSTRIAL ZONE, FUHAI SUBDISTRICT, BAOAN DISTRICT, SHENZHEN, GUANGDONG, CHINA

MVG COMOSAR REFERENCE DIPOLE

FREQUENCY: 1800 MHZ

SERIAL NO.: SN 16/15 DIP 1G800-371

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144

ACCREDITED Calibration CERT #2246-02

Calibration Date: 06/05/2024

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.156.6.15.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	06/05/2024	
Checked by :	Jérôme LUC	Product Manager	06/05/2024	
Approved by :	Kim RUTKOWSKI	Quality Manager	06/05/2024	

	Customer Name
Distribution :	SSHENZHEN TCT TESTING TECHNOLOGY CO., LTD

Issue	Date	Modifications
A	06/05/2024	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 1800 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID1800
Serial Number	SN 16/15 DIP 1G800-371
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards. The product is designed for use with the COMOSAR test bench only.

Figure 1 – *MVG COMOSAR Validation Dipole*

4 MEASUREMENT METHOD

The IEEE 1528, FCC KDBs and CEI/IEC 62209 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom, with the phantom constucted as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE Std. 1528 and CEI/IEC 62209 standards specify the mechanical components and dimensions of the validation dipoles, with the dimensions frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness.

5 MEASUREMENT UNCERTAINTY

All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

5.3 VALIDATION MEASUREMENT

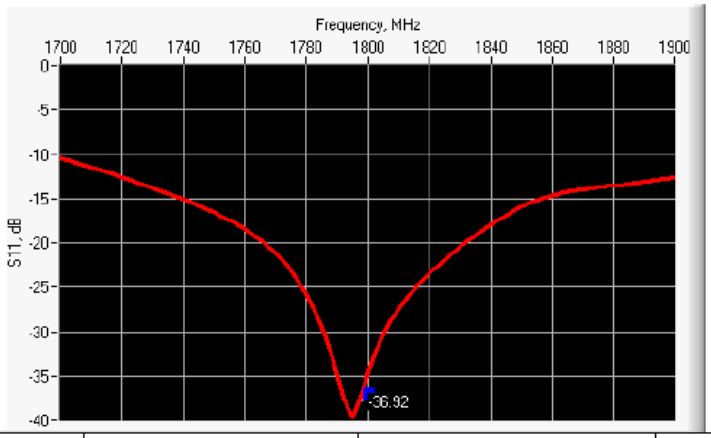
The guidelines outlined in the IEEE 1528, FCC KDBs, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Scan Volume	Expanded Uncertainty
1 g	20.3 %

10 g	20.1 %

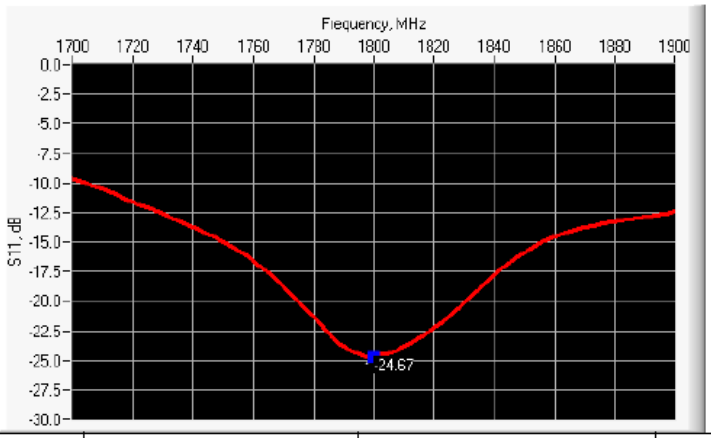
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
1800	-36.92	-20	48.1 Ω - 0.5 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
1800	-24.67	-20	47.4 Ω - 5.1 jΩ

6.3 MECHANICAL DIMENSIONS

Frequency MHz	L mm		h mm		d mm	
	required	measured	required	measured	required	measured
300	420.0 ±1 %.		250.0 ±1 %.		6.35 ±1 %.	

450	290.0 ±1 %.		166.7 ±1 %.		6.35 ±1 %.	
750	176.0 ±1 %.		100.0 ±1 %.		6.35 ±1 %.	
835	161.0 ±1 %.		89.8 ±1 %.		3.6 ±1 %.	
900	149.0 ±1 %.		83.3 ±1 %.		3.6 ±1 %.	
1450	89.1 ±1 %.		51.7 ±1 %.		3.6 ±1 %.	
1500	80.5 ±1 %.		50.0 ±1 %.		3.6 ±1 %.	
1640	79.0 ±1 %.		45.7 ±1 %.		3.6 ±1 %.	
1750	75.2 ±1 %.		42.9 ±1 %.		3.6 ±1 %.	
1800	72.0 ±1 %.	PASS	41.7 ±1 %.	PASS	3.6 ±1 %.	PASS
1900	68.0 ±1 %.		39.5 ±1 %.		3.6 ±1 %.	
1950	66.3 ±1 %.		38.5 ±1 %.		3.6 ±1 %.	
2000	64.5 ±1 %.		37.5 ±1 %.		3.6 ±1 %.	
2100	61.0 ±1 %.		35.7 ±1 %.		3.6 ±1 %.	
2300	55.5 ±1 %.		32.6 ±1 %.		3.6 ±1 %.	
2450	51.5 ±1 %.		30.4 ±1 %.		3.6 ±1 %.	
2600	48.5 ±1 %.		28.8 ±1 %.		3.6 ±1 %.	
3000	41.5 ±1 %.		25.0 ±1 %.		3.6 ±1 %.	
3500	37.0±1 %.		26.4 ±1 %.		3.6 ±1 %.	
3700	34.7±1 %.		26.4 ±1 %.		3.6 ±1 %.	

7 VALIDATION MEASUREMENT

The IEEE Std. 1528, FCC KDBs and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

7.1 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε,')		Conductivity (σ) S/m	
	required	measured	required	measured
300	45.3 ±5 %		0.87 ±5 %	
450	43.5 ±5 %		0.87 ±5 %	
750	41.9 ±5 %		0.89 ±5 %	
835	41.5 ±5 %		0.90 ±5 %	
900	41.5 ±5 %		0.97 ±5 %	
1450	40.5 ±5 %		1.20 ±5 %	
1500	40.4 ±5 %		1.23 ±5 %	
1640	40.2 ±5 %		1.31 ±5 %	
1750	40.1 ±5 %		1.37 ±5 %	

1800	40.0 ±5 %	PASS	1.40 ±5 %	PASS
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

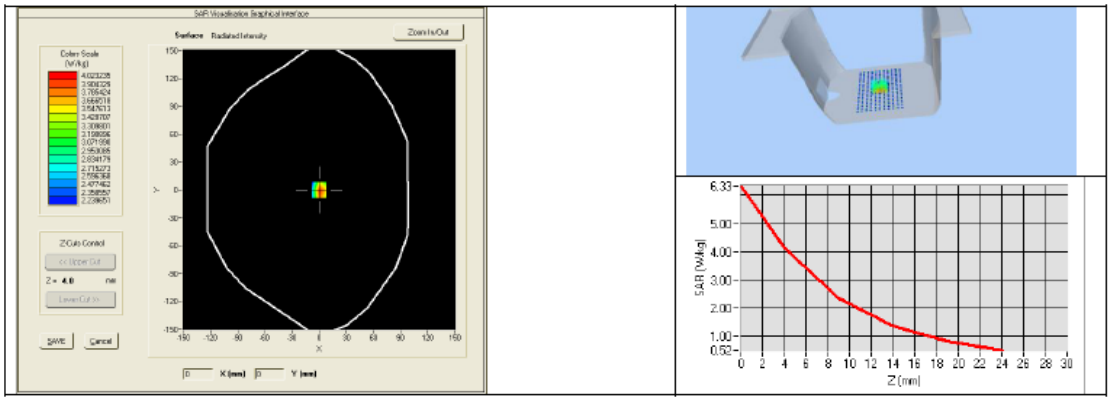
7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 41.8 sigma : 1.38
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8mm/dz=5mm
Frequency	1800 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9		6.99	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4	37.64 (3.16)	20.1	20.26 (2.18)

1900	39.7		20.5	
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4		24	
2600	55.3		24.6	
3000	63.8		25.7	
3500	67.1		25	



7.3 BODY LIQUID MEASUREMENT

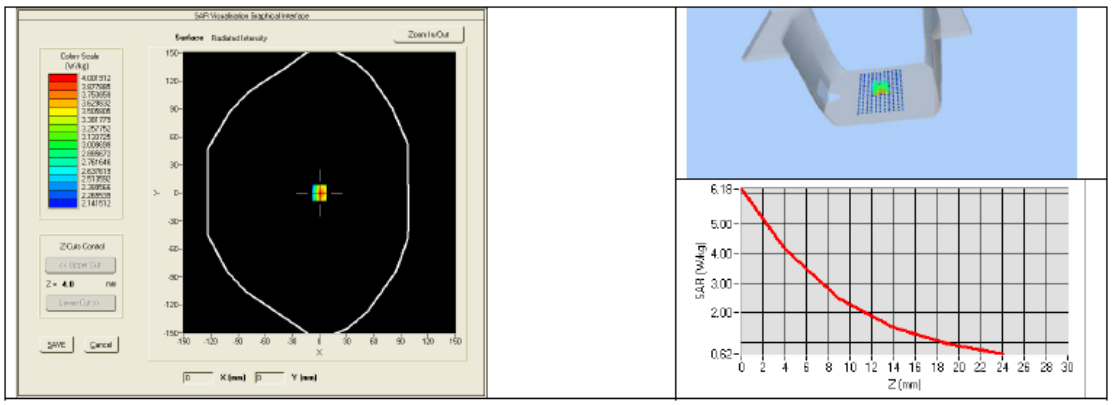
Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
150	61.9 ±5 %		0.80 ±5 %	
300	58.2 ±5 %		0.92 ±5 %	
450	56.7 ±5 %		0.94 ±5 %	
750	55.5 ±5 %		0.96 ±5 %	
835	55.2 ±5 %		0.97 ±5 %	
900	55.0 ±5 %		1.05 ±5 %	
915	55.0 ±5 %		1.06 ±5 %	
1450	54.0 ±5 %		1.30 ±5 %	
1610	53.8 ±5 %		1.40 ±5 %	
1800	53.3 ±5 %	PASS	1.52 ±5 %	PASS
1900	53.3 ±5 %		1.52 ±5 %	
2000	53.3 ±5 %		1.52 ±5 %	
2100	53.2 ±5 %		1.62 ±5 %	
2450	52.7 ±5 %		1.95 ±5 %	

2600	52.5 ±5 %		2.16 ±5 %	
3000	52.0 ±5 %		2.73 ±5 %	
3500	51.3 ±5 %		3.31 ±5 %	
5200	49.0 ±10 %		5.30 ±10 %	
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %		5.53 ±10 %	
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %		5.77 ±10 %	
5800	48.2 ±10 %		6.00 ±10 %	

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values: eps' : 53.0 sigma : 1.52
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8mm/dz=5mm
Frequency	1800 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)	10 g SAR (W/kg/W)
	measured	measured
1800	37.60 (3.24)	20.59 (2.20)



8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
SAM Phantom	MVG	SN-20/09-SAM71	Validated. No cal required.	Validated. No cal required.
COMOSAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rhode & Schwarz ZVA	SN100132	02/2024	02/2027
Calipers	Carrera	CALIPER-01	02/2024	02/2027
Reference Probe	MVG	EPG122 SN 18/11	02/2024	02/2025
Multimeter	Keithley 2000	1188656	02/2024	02/2027
Signal Generator	Agilent E4438C	MY49070581	02/2024	02/2027
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	02/2024	02/2027
Power Sensor	HP ECP-E26A	US37181460	02/2024	02/2027
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	02/2024	02/2027

SAR Reference Dipole Calibration Report

Ref : ACR.156.8.15.SATU.A

SHENZHEN TCT TESTING TECHNOLOGY CO., LTD

2101&2201, ZHENCHANG FACTORY, RENSHAN INDUSTRIAL FUHAI SUBDISTRICT, BAOAN DISTRICT, SHENZHEN, GUANGDONG, CHINA

MVG COMOSAR REFERENCE DIPOLE

FREQUENCY: 2000 MHZ

SERIAL NO.: SN 16/15 DIP 2G000-373

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144

ACCREDITED Calibration CERT #2246-02

Calibration Date: 06/05/2024

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.156.8.15.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	06/05/2024	
Checked by :	Jérôme LUC	Product Manager	06/05/2024	
Approved by :	Kim RUTKOWSKI	Quality Manager	06/05/2024	

	Customer Name
Distribution :	SHENZHEN TCT TESTING TECHNOLOGY CO., LTD

Issue	Date	Modifications
A	06/05/2024	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 2000 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID2000
Serial Number	SN 16/15 DIP 2G000-373
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards. The product is designed for use with the COMOSAR test bench only.

Figure 1 – *MVG COMOSAR Validation Dipole*

4 MEASUREMENT METHOD

The IEEE 1528, FCC KDBs and CEI/IEC 62209 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom, with the phantom constucted as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE Std. 1528 and CEI/IEC 62209 standards specify the mechanical components and dimensions of the validation dipoles, with the dimensions frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness.

5 MEASUREMENT UNCERTAINTY

All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

5.3 VALIDATION MEASUREMENT

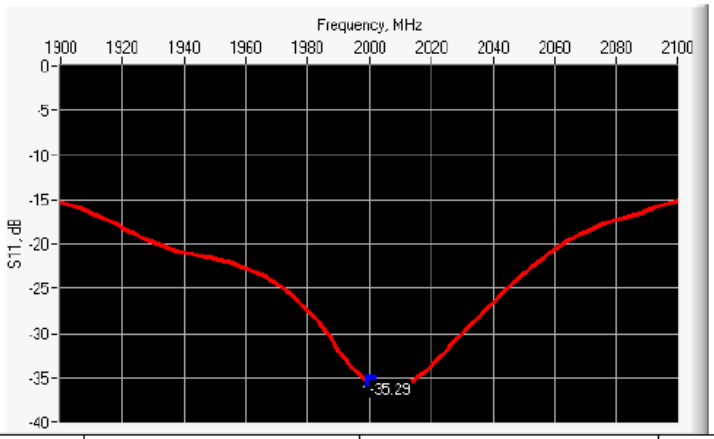
The guidelines outlined in the IEEE 1528, FCC KDBs, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Scan Volume	Expanded Uncertainty
1 g	20.3 %

10 g	20.1 %

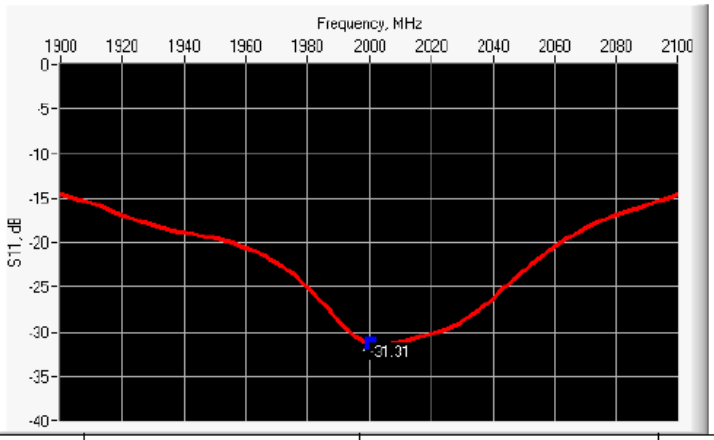
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
2000	-35.20	-20	48.1 Ω - 0.6 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
2000	-31.11	-20	51.5 Ω + 2.0 jΩ

6.3 MECHANICAL DIMENSIONS

Frequency MHz	L mm		h mm		d mm	
	required	measured	required	measured	required	measured
300	420.0 ±1 %.		250.0 ±1 %.		6.35 ±1 %.	

450	290.0 ±1 %.		166.7 ±1 %.		6.35 ±1 %.	
750	176.0 ±1 %.		100.0 ±1 %.		6.35 ±1 %.	
835	161.0 ±1 %.		89.8 ±1 %.		3.6 ±1 %.	
900	149.0 ±1 %.		83.3 ±1 %.		3.6 ±1 %.	
1450	89.1 ±1 %.		51.7 ±1 %.		3.6 ±1 %.	
1500	80.5 ±1 %.		50.0 ±1 %.		3.6 ±1 %.	
1640	79.0 ±1 %.		45.7 ±1 %.		3.6 ±1 %.	
1750	75.2 ±1 %.		42.9 ±1 %.		3.6 ±1 %.	
1800	72.0 ±1 %.		41.7 ±1 %.		3.6 ±1 %.	
1900	68.0 ±1 %.		39.5 ±1 %.		3.6 ±1 %.	
1950	66.3 ±1 %.		38.5 ±1 %.		3.6 ±1 %.	
2000	64.5 ±1 %.	PASS	37.5 ±1 %.	PASS	3.6 ±1 %.	PASS
2100	61.0 ±1 %.		35.7 ±1 %.		3.6 ±1 %.	
2300	55.5 ±1 %.		32.6 ±1 %.		3.6 ±1 %.	
2450	51.5 ±1 %.		30.4 ±1 %.		3.6 ±1 %.	
2600	48.5 ±1 %.		28.8 ±1 %.		3.6 ±1 %.	
3000	41.5 ±1 %.		25.0 ±1 %.		3.6 ±1 %.	
3500	37.0±1 %.		26.4 ±1 %.		3.6 ±1 %.	
3700	34.7±1 %.		26.4 ±1 %.		3.6 ±1 %.	

7 VALIDATION MEASUREMENT

The IEEE Std. 1528, FCC KDBs and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

7.1 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε_r')		Conductivity (σ) S/m	
	required	measured	required	measured
300	45.3 ±5 %		0.87 ±5 %	
450	43.5 ±5 %		0.87 ±5 %	
750	41.9 ±5 %		0.89 ±5 %	
835	41.5 ±5 %		0.90 ±5 %	
900	41.5 ±5 %		0.97 ±5 %	
1450	40.5 ±5 %		1.20 ±5 %	
1500	40.4 ±5 %		1.23 ±5 %	
1640	40.2 ±5 %		1.31 ±5 %	
1750	40.1 ±5 %		1.37 ±5 %	

1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %	PASS	1.40 ±5 %	PASS
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

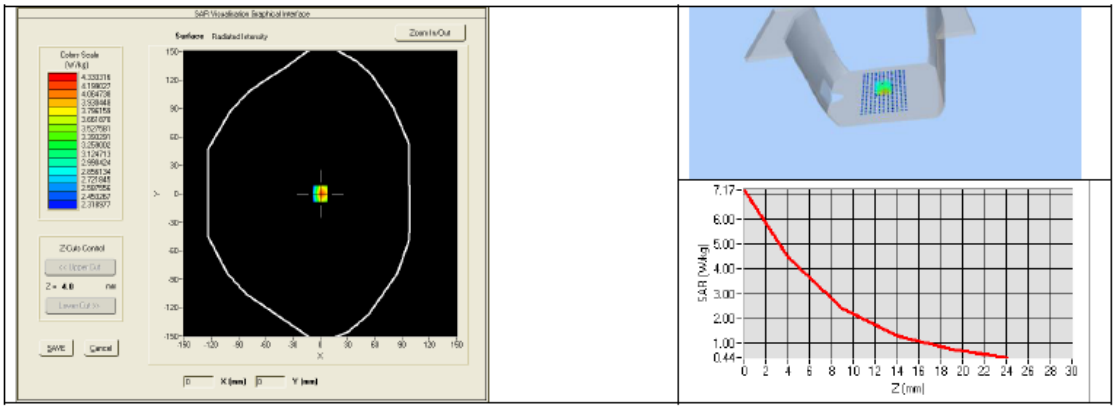
7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 40.1 sigma : 1.43
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	2000 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9		6.99	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	

1900	39.7		20.5	
1950	40.5		20.9	
2000	41.1	42.15 (2.35)	21.1	21.17 (0.34)
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4		24	
2600	55.3		24.6	
3000	63.8		25.7	
3500	67.1		25	



7.3 BODY LIQUID MEASUREMENT

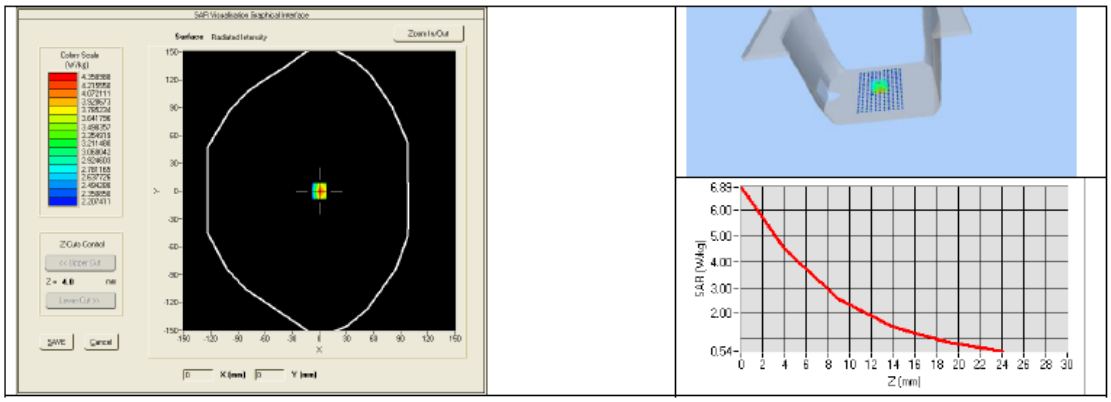
Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
150	61.9 ±5 %		0.80 ±5 %	
300	58.2 ±5 %		0.92 ±5 %	
450	56.7 ±5 %		0.94 ±5 %	
750	55.5 ±5 %		0.96 ±5 %	
835	55.2 ±5 %		0.97 ±5 %	
900	55.0 ±5 %		1.05 ±5 %	
915	55.0 ±5 %		1.06 ±5 %	
1450	54.0 ±5 %		1.30 ±5 %	
1610	53.8 ±5 %		1.40 ±5 %	
1800	53.3 ±5 %		1.52 ±5 %	
1900	53.3 ±5 %		1.52 ±5 %	
2000	53.3 ±5 %	PASS	1.52 ±5 %	PASS
2100	53.2 ±5 %		1.62 ±5 %	
2450	52.7 ±5 %		1.95 ±5 %	

2600	52.5 ±5 %		2.16 ±5 %	
3000	52.0 ±5 %		2.73 ±5 %	
3500	51.3 ±5 %		3.31 ±5 %	
5200	49.0 ±10 %		5.30 ±10 %	
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %		5.53 ±10 %	
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %		5.77 ±10 %	
5800	48.2 ±10 %		6.00 ±10 %	

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values: eps' : 53.6 sigma : 1.54
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	2000 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)	10 g SAR (W/kg/W)
	measured	measured
2000	41.60 (1.36)	21.26 (1.92)



8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
SAM Phantom	MVG	SN-20/09-SAM71	Validated. No cal required.	Validated. No cal required.
COMOSAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rhode & Schwarz ZVA	SN100132	02/2024	02/2027
Calipers	Carrera	CALIPER-01	02/2024	02/2027
Reference Probe	MVG	EPG122 SN 18/11	02/2024	02/2025
Multimeter	Keithley 2000	1188656	02/2024	02/2027
Signal Generator	Agilent E4438C	MY49070581	02/2024	02/2027
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	02/2024	02/2027
Power Sensor	HP ECP-E26A	US37181460	02/2024	02/2027
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	02/2024	02/2027

SAR Reference Dipole Calibration Report

Ref : ACR.156.9.15.SATU.A

SHENZHEN TCT TESTING TECHNOLOGY CO., LTD

2101&2201, ZHENCHANG FACTORY, RENSHAN INDUSTRIAL
FUHAI SUBDISTRICT, BAOAN DISTRICT, SHENZHEN,
GUANGDONG, CHINA

MVG COMOSAR REFERENCE DIPOLE

FREQUENCY: 2450 MHZ
SERIAL NO.: SN 16/15 DIP 2G450-374

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144

ACCREDITED
Calibration CERT #2246-02

Calibration Date: 06/05/2024

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.156.9.15.SATU.A

	Name	*Function*	*Date*	*Signature*
Prepared by :	Jérôme LUC	Product Manager	06/05/2024	
Checked by :	Jérôme LUC	Product Manager	06/05/2024	
Approved by :	Kim RUTKOWSKI	Quality Manager	06/05/2024	

	Customer Name
Distribution :	SHENZHEN TCT TESTING TECHNOLOGY CO., LTD

Issue	*Date*	*Modifications*
A	06/05/2024	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 2450 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID2450
Serial Number	SN 16/15 DIP 2G450-374
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards. The product is designed for use with the COMOSAR test bench only.

Figure 1 – *MVG COMOSAR Validation Dipole*

4 MEASUREMENT METHOD

The IEEE 1528, FCC KDBs and CEI/IEC 62209 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom, with the phantom constucted as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE Std. 1528 and CEI/IEC 62209 standards specify the mechanical components and dimensions of the validation dipoles, with the dimensions frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness.

5 MEASUREMENT UNCERTAINTY

All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

5.3 VALIDATION MEASUREMENT

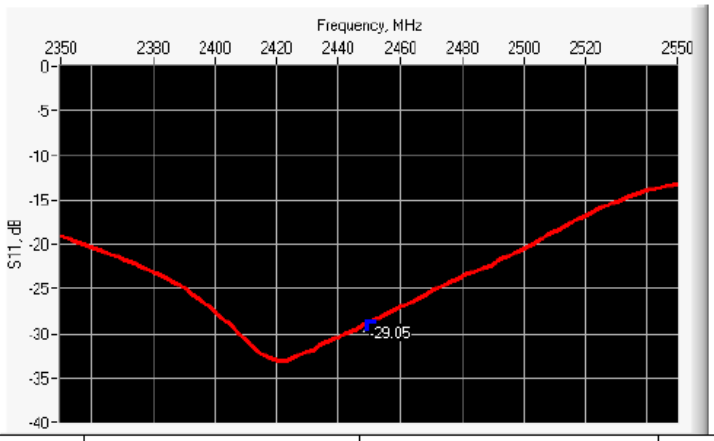
The guidelines outlined in the IEEE 1528, FCC KDBs, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Scan Volume	Expanded Uncertainty
1 g	20.3 %

10 g	20.1 %

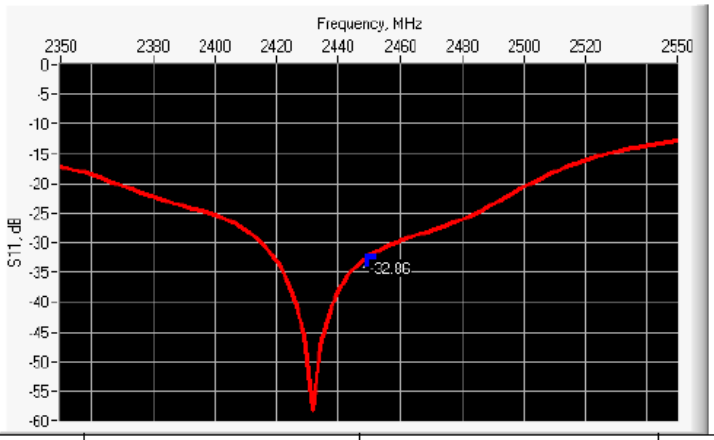
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
2450	-28.97	-20	46.3 Ω - 0.2 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
2450	-32.77	-20	48.5 Ω - 1.8 jΩ

6.3 MECHANICAL DIMENSIONS

Frequency MHz	L mm		h mm		d mm	
	required	measured	required	measured	required	measured
300	420.0 ±1 %.		250.0 ±1 %.		6.35 ±1 %.	

450	290.0 ±1 %.		166.7 ±1 %.		6.35 ±1 %.	
750	176.0 ±1 %.		100.0 ±1 %.		6.35 ±1 %.	
835	161.0 ±1 %.		89.8 ±1 %.		3.6 ±1 %.	
900	149.0 ±1 %.		83.3 ±1 %.		3.6 ±1 %.	
1450	89.1 ±1 %.		51.7 ±1 %.		3.6 ±1 %.	
1500	80.5 ±1 %.		50.0 ±1 %.		3.6 ±1 %.	
1640	79.0 ±1 %.		45.7 ±1 %.		3.6 ±1 %.	
1750	75.2 ±1 %.		42.9 ±1 %.		3.6 ±1 %.	
1800	72.0 ±1 %.		41.7 ±1 %.		3.6 ±1 %.	
1900	68.0 ±1 %.		39.5 ±1 %.		3.6 ±1 %.	
1950	66.3 ±1 %.		38.5 ±1 %.		3.6 ±1 %.	
2000	64.5 ±1 %.		37.5 ±1 %.		3.6 ±1 %.	
2100	61.0 ±1 %.		35.7 ±1 %.		3.6 ±1 %.	
2300	55.5 ±1 %.		32.6 ±1 %.		3.6 ±1 %.	
2450	51.5 ±1 %.	PASS	30.4 ±1 %.	PASS	3.6 ±1 %.	PASS
2600	48.5 ±1 %.		28.8 ±1 %.		3.6 ±1 %.	
3000	41.5 ±1 %.		25.0 ±1 %.		3.6 ±1 %.	
3500	37.0±1 %.		26.4 ±1 %.		3.6 ±1 %.	
3700	34.7±1 %.		26.4 ±1 %.		3.6 ±1 %.	

7 VALIDATION MEASUREMENT

The IEEE Std. 1528, FCC KDBs and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

7.1 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
300	45.3 ±5 %		0.87 ±5 %	
450	43.5 ±5 %		0.87 ±5 %	
750	41.9 ±5 %		0.89 ±5 %	
835	41.5 ±5 %		0.90 ±5 %	
900	41.5 ±5 %		0.97 ±5 %	
1450	40.5 ±5 %		1.20 ±5 %	
1500	40.4 ±5 %		1.23 ±5 %	
1640	40.2 ±5 %		1.31 ±5 %	
1750	40.1 ±5 %		1.37 ±5 %	

1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %	PASS	1.80 ±5 %	PASS
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

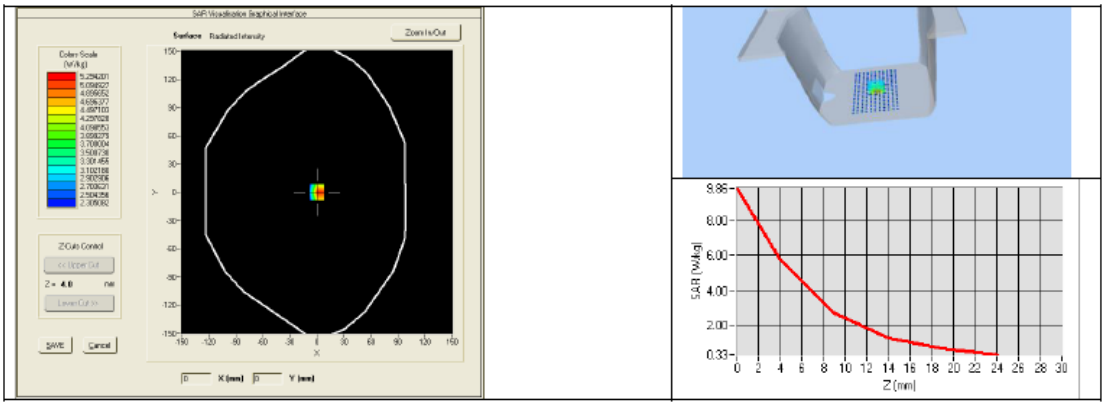
7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 38.3 sigma : 1.80
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	2450 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9		6.99	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	

1900	39.7		20.5	
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4	52.89 (3.14)	24	24.21 (2.02)
2600	55.3		24.6	
3000	63.8		25.7	
3500	67.1		25	



7.3 BODY LIQUID MEASUREMENT

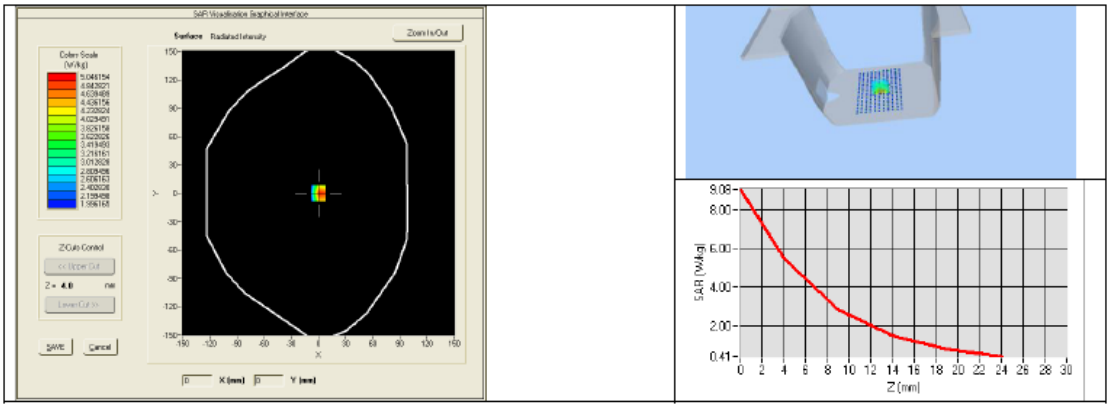
Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
150	61.9 ±5 %		0.80 ±5 %	
300	58.2 ±5 %		0.92 ±5 %	
450	56.7 ±5 %		0.94 ±5 %	
750	55.5 ±5 %		0.96 ±5 %	
835	55.2 ±5 %		0.97 ±5 %	
900	55.0 ±5 %		1.05 ±5 %	
915	55.0 ±5 %		1.06 ±5 %	
1450	54.0 ±5 %		1.30 ±5 %	
1610	53.8 ±5 %		1.40 ±5 %	
1800	53.3 ±5 %		1.52 ±5 %	
1900	53.3 ±5 %		1.52 ±5 %	
2000	53.3 ±5 %		1.52 ±5 %	
2100	53.2 ±5 %		1.62 ±5 %	
2450	52.7 ±5 %	PASS	1.95 ±5 %	PASS

2600	52.5 ±5 %		2.16 ±5 %	
3000	52.0 ±5 %		2.73 ±5 %	
3500	51.3 ±5 %		3.31 ±5 %	
5200	49.0 ±10 %		5.30 ±10 %	
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %		5.53 ±10 %	
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %		5.77 ±10 %	
5800	48.2 ±10 %		6.00 ±10 %	

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values: eps' : 52.7 sigma : 1.94
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	2450 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)	10 g SAR (W/kg/W)
	measured	measured
2450	50.65 (4.50)	23.40 (2.11)



8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
SAM Phantom	MVG	SN-20/09-SAM71	Validated. No cal required.	Validated. No cal required.
COMOSAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rhode & Schwarz ZVA	SN100132	02/2024	02/2027
Calipers	Carrera	CALIPER-01	02/2024	02/2027
Reference Probe	MVG	EPG122 SN 18/11	02/2024	02/2025
Multimeter	Keithley 2000	1188656	02/2024	02/2027
Signal Generator	Agilent E4438C	MY49070581	02/2024	02/2027
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	02/2024	02/2027
Power Sensor	HP ECP-E26A	US37181460	02/2024	02/2027
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	02/2024	02/2027

SAR Reference Dipole Calibration Report

Ref : ACR.156.10.15.SATU.A

SHENZHEN TCT TESTING TECHNOLOGY CO., LTD

2101&2201, ZHENCHANG FACTORY, RENSHAN INDUSTRIAL ZONE, FUHAI SUBDISTRICT, BAOAN DISTRICT, SHENZHEN, GUANGDONG, CHINA

MVG COMOSAR REFERENCE DIPOLE

FREQUENCY: 2600 MHZ

SERIAL NO.: SN 16/15 DIP 2G600-375

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144

ACCREDITED Calibration CERT #2246-02

Calibration Date: 06/05/2024

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.156.10.15.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	06/05/2024	
Checked by :	Jérôme LUC	Product Manager	06/05/2024	
Approved by :	Kim RUTKOWSKI	Quality Manager	06/05/2024	

	Customer Name
Distribution :	SHENZHEN TCT TESTING TECHNOLOGY CO., LTD

Issue	Date	Modifications
A	06/05/2024	Initial release

TABLE OF CONTENTS

1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 2600 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID2600
Serial Number	SN 16/15 DIP 2G600-375
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards. The product is designed for use with the COMOSAR test bench only.

Figure 1 – *MVG COMOSAR Validation Dipole*

4 MEASUREMENT METHOD

The IEEE 1528, FCC KDBs and CEI/IEC 62209 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom, with the phantom constucted as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE Std. 1528 and CEI/IEC 62209 standards specify the mechanical components and dimensions of the validation dipoles, with the dimensions frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness.

5 MEASUREMENT UNCERTAINTY

All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

5.3 VALIDATION MEASUREMENT

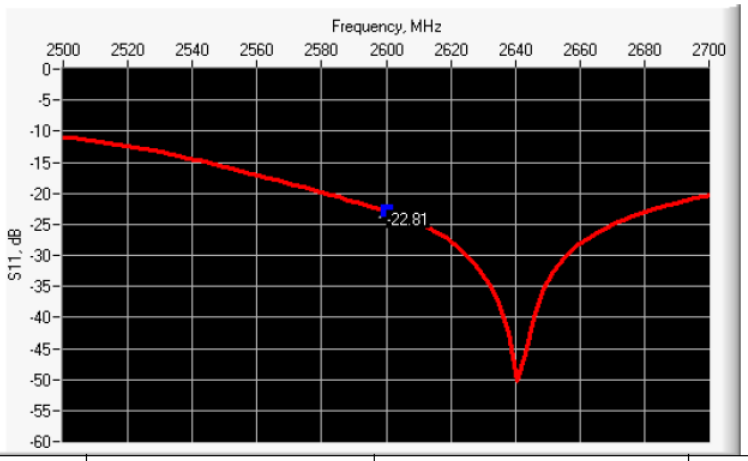
The guidelines outlined in the IEEE 1528, FCC KDBs, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Scan Volume	Expanded Uncertainty
1 g	20.3 %

10 g	20.1 %

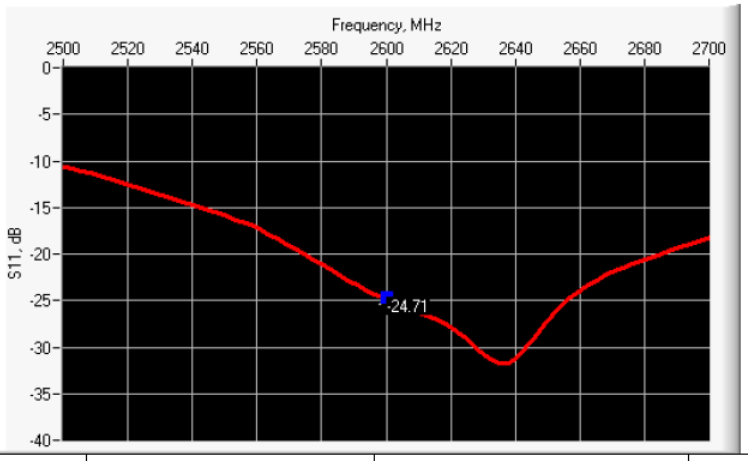
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
2600	-22.81	-20	55.3 Ω - 5.1 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
2600	-24.71	-20	51.5 Ω - 5.5 jΩ

6.3 MECHANICAL DIMENSIONS

Frequency MHz	L mm		h mm		d mm	
	required	measured	required	measured	required	measured
300	420.0 ±1 %.		250.0 ±1 %.		6.35 ±1 %.	

450	290.0 ±1 %.		166.7 ±1 %.		6.35 ±1 %.	
750	176.0 ±1 %.		100.0 ±1 %.		6.35 ±1 %.	
835	161.0 ±1 %.		89.8 ±1 %.		3.6 ±1 %.	
900	149.0 ±1 %.		83.3 ±1 %.		3.6 ±1 %.	
1450	89.1 ±1 %.		51.7 ±1 %.		3.6 ±1 %.	
1500	80.5 ±1 %.		50.0 ±1 %.		3.6 ±1 %.	
1640	79.0 ±1 %.		45.7 ±1 %.		3.6 ±1 %.	
1750	75.2 ±1 %.		42.9 ±1 %.		3.6 ±1 %.	
1800	72.0 ±1 %.		41.7 ±1 %.		3.6 ±1 %.	
1900	68.0 ±1 %.		39.5 ±1 %.		3.6 ±1 %.	
1950	66.3 ±1 %.		38.5 ±1 %.		3.6 ±1 %.	
2000	64.5 ±1 %.		37.5 ±1 %.		3.6 ±1 %.	
2100	61.0 ±1 %.		35.7 ±1 %.		3.6 ±1 %.	
2300	55.5 ±1 %.		32.6 ±1 %.		3.6 ±1 %.	
2450	51.5 ±1 %.		30.4 ±1 %.		3.6 ±1 %.	
2600	48.5 ±1 %.	PASS	28.8 ±1 %.	PASS	3.6 ±1 %.	PASS
3000	41.5 ±1 %.		25.0 ±1 %.		3.6 ±1 %.	
3500	37.0±1 %.		26.4 ±1 %.		3.6 ±1 %.	
3700	34.7±1 %.		26.4 ±1 %.		3.6 ±1 %.	

7 VALIDATION MEASUREMENT

The IEEE Std. 1528, FCC KDBs and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

7.1 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε_r')		Conductivity (σ) S/m	
	required	measured	required	measured
300	45.3 ±5 %		0.87 ±5 %	
450	43.5 ±5 %		0.87 ±5 %	
750	41.9 ±5 %		0.89 ±5 %	
835	41.5 ±5 %		0.90 ±5 %	
900	41.5 ±5 %		0.97 ±5 %	
1450	40.5 ±5 %		1.20 ±5 %	
1500	40.4 ±5 %		1.23 ±5 %	
1640	40.2 ±5 %		1.31 ±5 %	
1750	40.1 ±5 %		1.37 ±5 %	

1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %	PASS	1.96 ±5 %	PASS
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

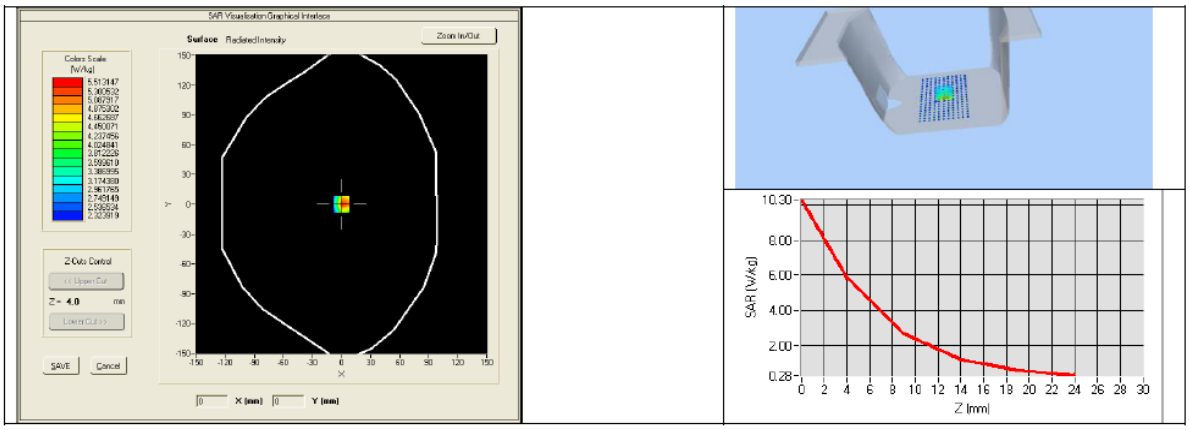
7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 38.2 sigma : 1.93
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	2600 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9		6.99	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	

1900	39.7		20.5	
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4		24	
2600	55.3	54.31 (5.36)	24.6	24.14 (2.42)
3000	63.8		25.7	
3500	67.1		25	



7.3 BODY LIQUID MEASUREMENT

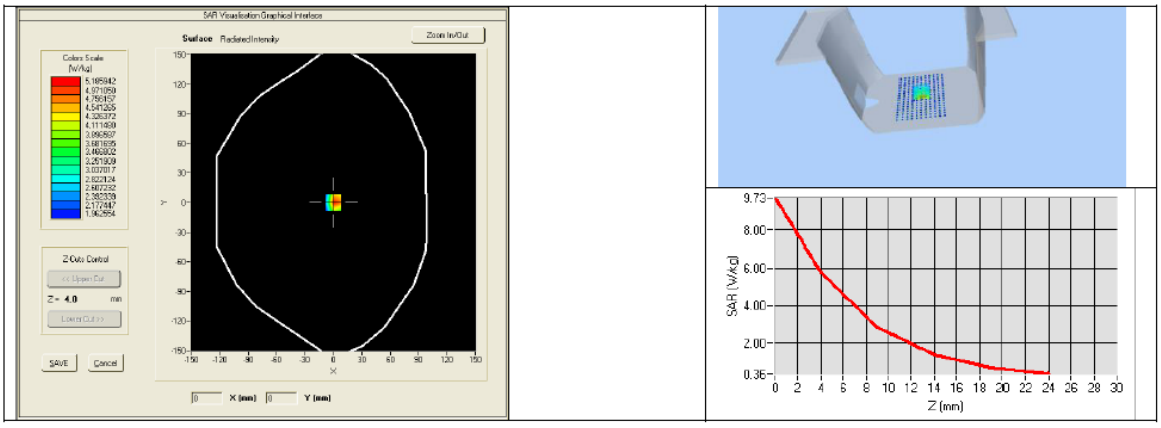
Frequency MHz	Relative permittivity (ε_r')		Conductivity (σ) S/m	
	required	measured	required	measured
150	61.9 ±5 %		0.80 ±5 %	
300	58.2 ±5 %		0.92 ±5 %	
450	56.7 ±5 %		0.94 ±5 %	
750	55.5 ±5 %		0.96 ±5 %	
835	55.2 ±5 %		0.97 ±5 %	
900	55.0 ±5 %		1.05 ±5 %	
915	55.0 ±5 %		1.06 ±5 %	
1450	54.0 ±5 %		1.30 ±5 %	
1610	53.8 ±5 %		1.40 ±5 %	
1800	53.3 ±5 %		1.52 ±5 %	
1900	53.3 ±5 %		1.52 ±5 %	
2000	53.3 ±5 %		1.52 ±5 %	
2100	53.2 ±5 %		1.62 ±5 %	
2450	52.7 ±5 %		1.95 ±5 %	

2600	52.5 ±5 %	PASS	2.16 ±5 %	PASS
3000	52.0 ±5 %		2.73 ±5 %	
3500	51.3 ±5 %		3.31 ±5 %	
5200	49.0 ±10 %		5.30 ±10 %	
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %		5.53 ±10 %	
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %		5.77 ±10 %	
5800	48.2 ±10 %		6.00 ±10 %	

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values: eps' : 51.6 sigma : 2.21
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	2600 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)	10 g SAR (W/kg/W)
	measured	measured
2600	53.26 (5.12)	23.89 (2.30)



8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
SAM Phantom	MVG	SN-20/09-SAM71	Validated. No cal required.	Validated. No cal required.
COMOSAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rhode & Schwarz ZVA	SN100132	02/2024	02/2027
Calipers	Carrera	CALIPER-01	02/2024	02/2027
Reference Probe	MVG	EPG122 SN 18/11	02/2024	02/2025
Multimeter	Keithley 2000	1188656	02/2024	02/2027
Signal Generator	Agilent E4438C	MY49070581	02/2024	02/2027
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	02/2024	02/2027
Power Sensor	HP ECP-E26A	US37181460	02/2024	02/2027
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	09/2024	09/2025

SAR Reference Waveguide Calibration Report

Ref : ACR.256.12.15.SATU.A

SHENZHEN TCT TESTING TECHNOLOGY CO., LTD
2101&2201, ZHENCHANG FACTORY, RENSHAN INDUSTRIAL ZONE, FUHAI SUBDISTRICT, BAOAN DISTRICT, SHENZHEN, GUANGDONG, CHINA

MVG COMOSAR REFERENCE WAVEGUIDE

FREQUENCY: 5000-6000 MHZ
SERIAL NO.: SN 13/14 WGA32

Calibrated at MVG US
2105 Barrett Park Dr. - Kennesaw, GA 30144

ACCREDITED Calibration CERT #2246-02

Calibration Date: 05/15/2024

Summary:

This document presents the method and results from an accredited SAR reference waveguide calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

SAR REFERENCE WAVEGUIDE CALIBRATION REPORT

Ref: ACR.256.12.15.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	5/15/2024	
Checked by :	Jérôme LUC	Product Manager	5/15/2024	
Approved by :	Kim RUTKOWSKI	Quality Manager	5/15/2024	

	Customer Name
Distribution :	SHENZHEN TCT TESTING TECHNOLOGY CO., LTD

Issue	Date	Modifications
A	5/15/2024	Initial release

TABLE OF CONTENTS

1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEEE 1528 and CEI/IEC 62209 standards for reference waveguides used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 5000-6000 MHz REFERENCE WAVEGUIDE
Manufacturer	MVG
Model	SWG5500
Serial Number	SN 13/14 WGA32
Product Condition (new / used)	New

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Waveguides are built in accordance to the IEEE 1528 and CEI/IEC 62209 standards.

4 MEASUREMENT METHOD

The IEEE 1528 and CEI/IEC 62209 standards provide requirements for reference waveguides used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 RETURN LOSS REQUIREMENTS

The waveguide used for SAR system validation measurements and checks must have a return loss of -8 dB or better. The return loss measurement shall be performed with matching layer placed in the open end of the waveguide, with the waveguide and matching layer in direct contact with the phantom shell as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE 1528 and CEI/IEC 62209 standards specify the mechanical dimensions of the validation waveguide, the specified dimensions are as shown in Section 6.2. Figure 1 shows how the dimensions relate to the physical construction of the waveguide.

5 MEASUREMENT UNCERTAINTY

All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

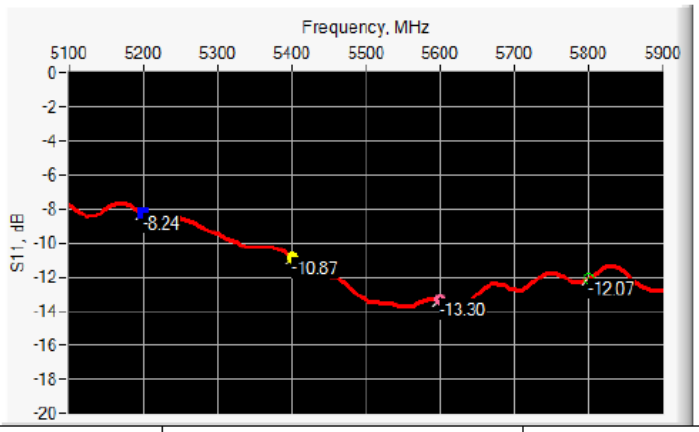
5.3 VALIDATION MEASUREMENT

The guidelines outlined in the IEEE 1528 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Scan Volume	Expanded Uncertainty
1 g	20.3 %
10 g	20.1 %

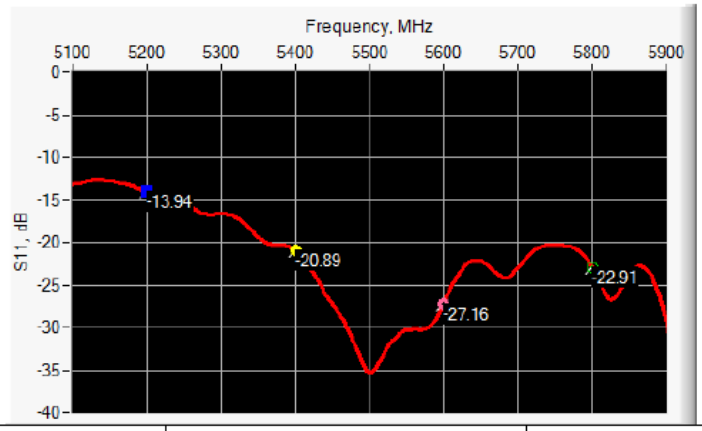
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)
5000-6000	< -8.24	-8

6.2 RETURN LOSS IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)
5000-6000	< -13.94	-8

6.3 MECHANICAL DIMENSIONS

Frequency (MHz)	L (mm)		W (mm)		L_f (mm)		W_f (mm)		T (mm)	
	Required	Measured	Required	Measured	Required	Measured	Required	Measured	Required	Measured
5200	40.39 ± 0.13	PASS	20.19 ± 0.13	PASS	81.03 ± 0.13	PASS	61.98 ± 0.13	PASS	5.3*	PASS
5800	40.39 ± 0.13	PASS	20.19 ± 0.13	PASS	81.03 ± 0.13	PASS	61.98 ± 0.13	PASS	4.3*	PASS

* The tolerance for the matching layer is included in the return loss measurement.

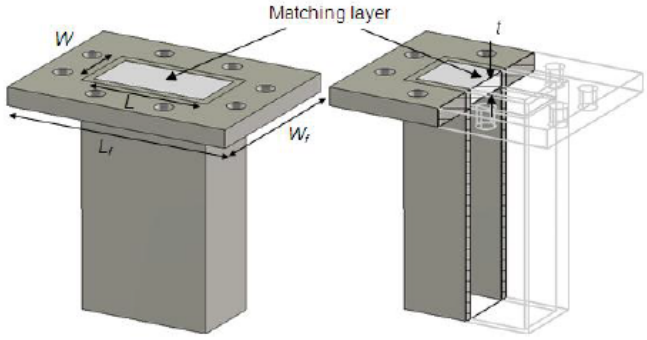


Figure 1: Validation Waveguide Dimensions

7 VALIDATION MEASUREMENT

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference waveguide meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed with the matching layer placed in the open end of the waveguide, with the waveguide and matching layer in direct contact with the phantom shell.

7.1 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε_r')		Conductivity (σ) S/m	
	required	measured	required	measured
5000	36.2 ±10 %		4.45 ±10 %	
5100	36.1 ±10 %		4.56 ±10 %	
5200	36.0 ±10 %	PASS	4.66 ±10 %	PASS
5300	35.9 ±10 %		4.76 ±10 %	
5400	35.8 ±10 %	PASS	4.86 ±10 %	PASS
5500	35.6 ±10 %		4.97 ±10 %	
5600	35.5 ±10 %	PASS	5.07 ±10 %	PASS
5700	35.4 ±10 %		5.17 ±10 %	
5800	35.3 ±10 %	PASS	5.27 ±10 %	PASS
5900	35.2 ±10 %		5.38 ±10 %	
6000	35.1 ±10 %		5.48 ±10 %	

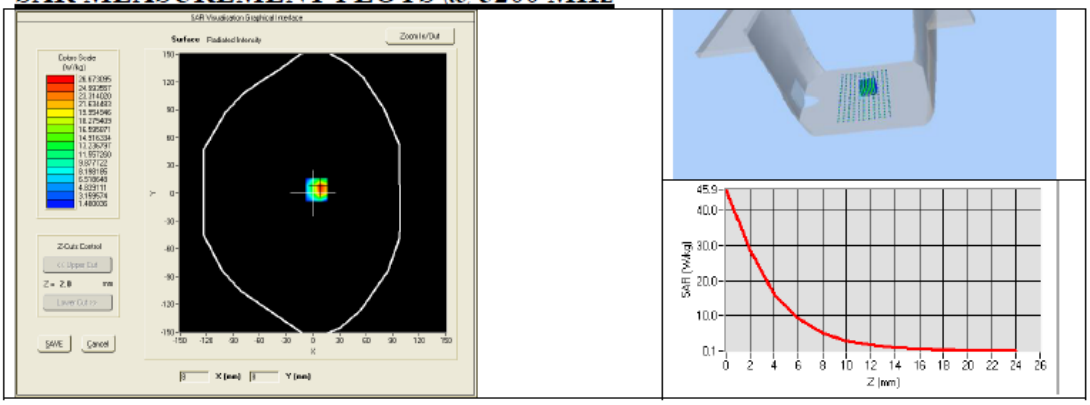
7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

At those frequencies, the target SAR value can not be generic. Hereunder is the target SAR value defined by MVG, within the uncertainty for the system validation. All SAR values are normalized to 1 W net power. In bracket, the measured SAR is given with the used input power.

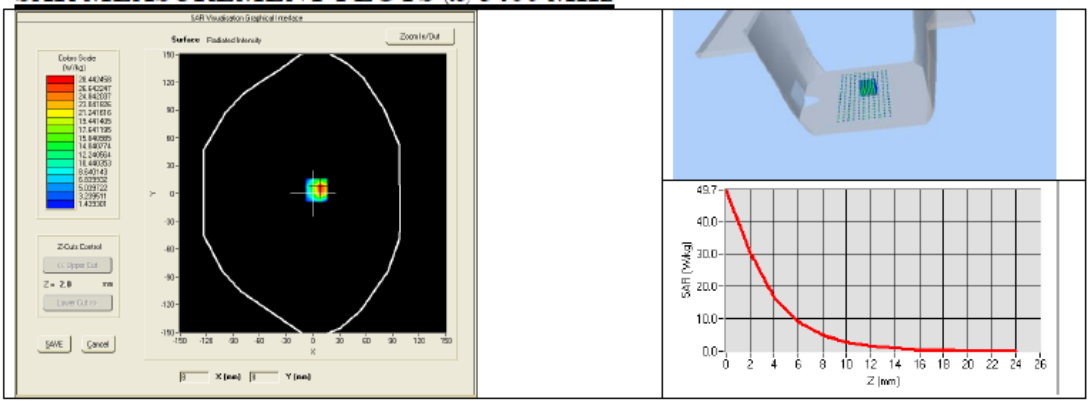
Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values 5200 MHz: eps' :36.62 sigma : 4.93 Head Liquid Values 5400 MHz: eps' :35.95 sigma : 5.18 Head Liquid Values 5600 MHz: eps' :36.08 sigma : 5.60 Head Liquid Values 5800 MHz: eps' :34.73 sigma : 5.74
Distance between dipole waveguide and liquid	0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=4mm/dy=4m/dz=2mm
Frequency	5200 MHz 5400 MHz 5600 MHz 5800 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency (MHz)	1 g SAR (W/kg)		10 g SAR (W/kg)	
	required	measured	required	measured
5200	159.00	163.88 (16.39)	56.90	57.29 (5.73)
5400	166.40	172.23 (17.22)	58.43	59.16 (5.92)
5600	173.80	181.28 (18.13)	59.97	61.57 (6.16)
5800	181.20	188.95 (18.90)	61.50	63.45 (6.35)

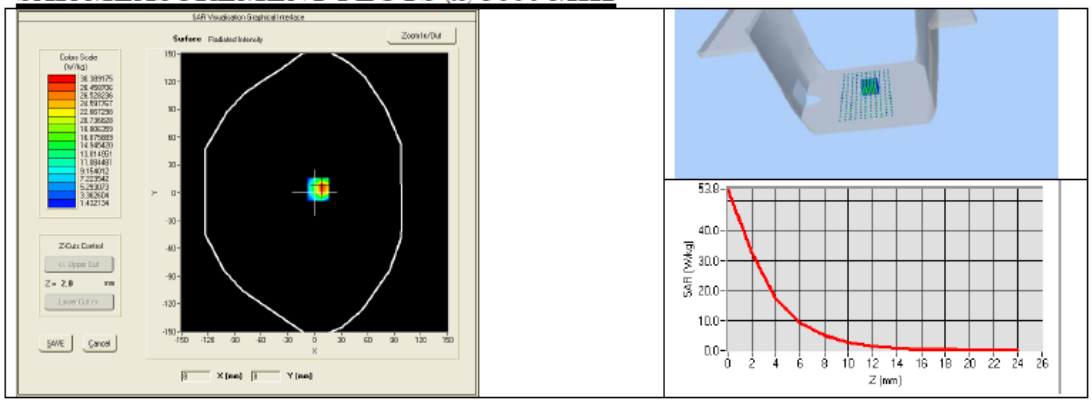
SAR MEASUREMENT PLOTS @ 5200 MHz



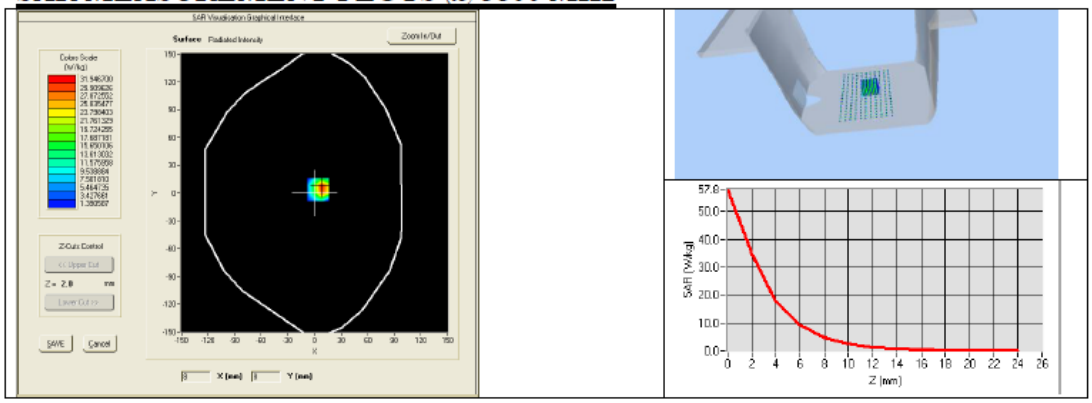
SAR MEASUREMENT PLOTS @ 5400 MHz



SAR MEASUREMENT PLOTS @ 5600 MHz



SAR MEASUREMENT PLOTS @ 5800 MHz



7.3 BODY LIQUID MEASUREMENT

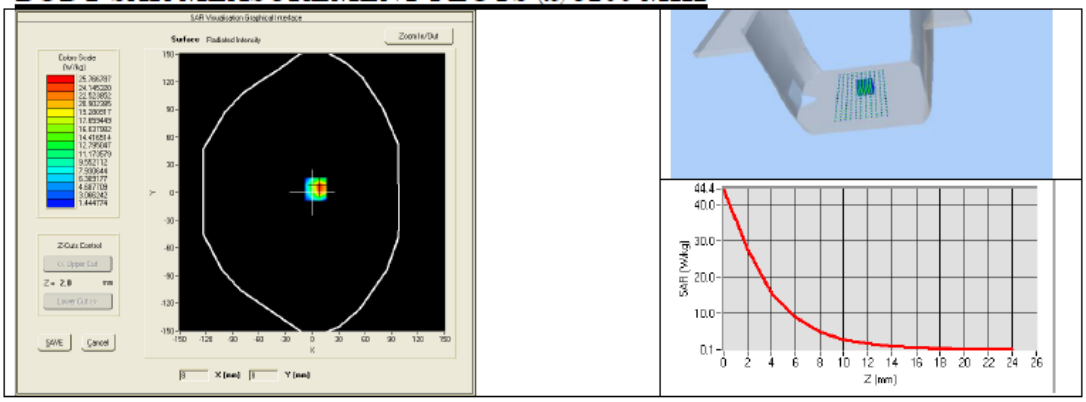
Frequency MHz	Relative permittivity (ε,')		Conductivity (σ) S/m	
	required	measured	required	measured
5200	49.0 ±10 %	PASS	5.30 ±10 %	PASS
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %	PASS	5.53 ±10 %	PASS
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %	PASS	5.77 ±10 %	PASS
5800	48.2 ±10 %	PASS	6.00 ±10 %	PASS

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

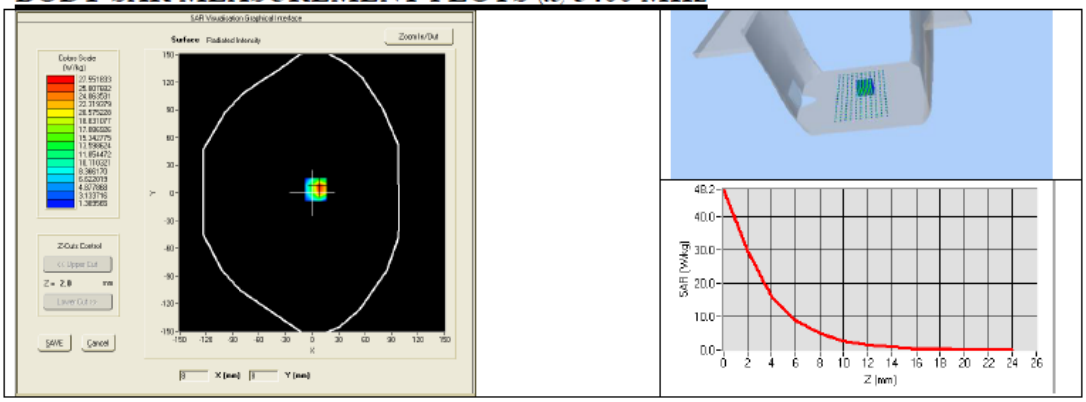
Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values 5200 MHz: eps' :50.69 sigma : 4.98 Body Liquid Values 5400 MHz: eps' :48.45 sigma : 5.82 Body Liquid Values 5600 MHz: eps' :50.57 sigma : 6.37 Body Liquid Values 5800 MHz: eps' :48.19 sigma : 6.45
Distance between dipole waveguide and liquid	0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=4mm/dy=4m/dz=2mm
Frequency	5200 MHz 5400 MHz 5600 MHz 5800 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency (MHz)	1 g SAR (W/kg)	10 g SAR (W/kg)
	measured	measured
5200	158.49 (15.85)	55.40 (5.54)
5400	167.20 (16.72)	57.39 (5.74)
5600	175.65 (17.57)	59.48 (5.95)
5800	183.06 (18.31)	61.62 (6.16)

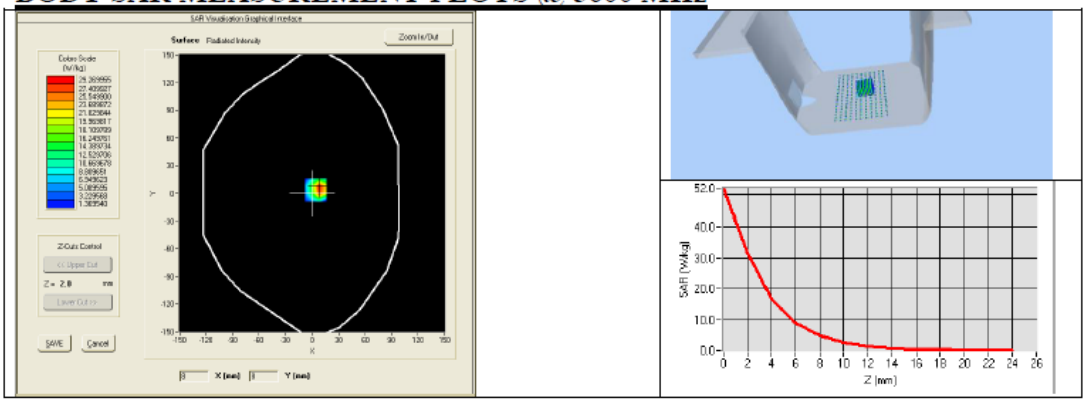
BODY SAR MEASUREMENT PLOTS @ 5200 MHz



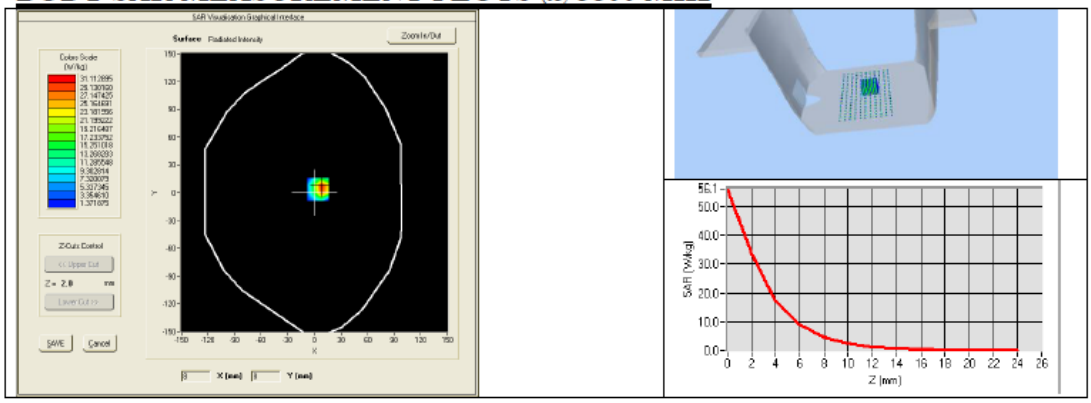
BODY SAR MEASUREMENT PLOTS @ 5400 MHz



BODY SAR MEASUREMENT PLOTS @ 5600 MHz



BODY SAR MEASUREMENT PLOTS @ 5800 MHz



8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
Flat Phantom	MVG	SN-20/09-SAM71	Validated. No cal required.	Validated. No cal required.
COMOSAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rhode & Schwarz ZVA	SN100132	02/2024	02/2025
Calipers	Carrera	CALIPER-01	01/2024	01/2025
Reference Probe	MVG	EPG122 SN 18/11	10/2023	10/2024
Multimeter	Keithley 2000	1188656	01/2024	01/2025
Signal Generator	Agilent E4438C	MY49070581	01/2024	01/2025
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	01/2024	01/2025
Power Sensor	HP ECP-E26A	US37181460	01/2024	01/2025
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	150798832	10/2023	10/2024

********END OF REPORT********