FCC SAR EVALUATION REPORT

In accordance with the requirements of
FCC 47 CFR Part 2(2.1093), ANSI/IEEE C95.1-1992 and
IEEE Std 1528-2013

Product Name : mobile phone

Brand Name : EUDORA

Model Name : E65 Pro

Family Model : N/A

Report No. : S24010505205001

FCC ID : 2BD9H-E65PRO

Prepared for

Eudora Mobile Inc

2610 Columbia ST A, Torrance, CA 90503

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name ..... Eudora Mobile Inc

Address..... 2610 Columbia ST A, Torrance, CA 90503

Manufacturer's Name . Eudora Mobile Inc

Address..... 2610 Columbia ST A, Torrance, CA 90503

Product description

Product name ..... mobile phone

Brand Name ..... EUDORA

Model and/or type reference ..... E65 Pro

Family Model ..... N/A

Standards ..... FCC 47 CFR Part 2(2.1093)
ANSI/IEEE C95.1-1992
IEEE Std 1528-2013
Published RF exposure KDB procedures

This device described above has been tested by Shenzhen NTEK. In accordance with the measurement methods and procedures specified in IEEE Std 1528-2013 and KDB 865664 D01. Testing has shown that this device is capable of compliance with localized specific absorption rate (SAR) specified in FCC 47 CFR Part 2(2.1093) and ANSI/IEEE C95.1-1992. The test results in this report apply only to the tested sample of the stated device/equipment. Other similar device/equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

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Test Sample Number S240105052006

Date of Test

Date (s) of performance of tests... Jan. 10, 2024 ~ Jan. 27, 2024

Date of Issue ..... Feb. 28, 2024

Test Result ..... **Pass**

Prepared By :	Reviewed By :	Approved By :
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Jack Li (Project Engineer)	Aaron Cheng (Supervisor)	Alex Li (Manager)

※ ※ Revision History ※ ※

REV.	DESCRIPTION	ISSUED DATE	REMARK
Rev.1.0	Initial Test Report Release	Feb. 28, 2024	Jack Li

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1. General Information

1.1. RF exposure limits

(A).Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

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

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

NOTE: ***Whole-Body SAR*** is averaged over the entire body, ***partial-body SAR*** is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. ***SAR for hands, wrists, feet and ankles*** is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

Occupational/Controlled Environments:

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

General Population/Uncontrolled Environments:

Are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

NOTE

HEAD AND TRUNK LIMIT

1.6 W/kg

APPLIED TO THIS EUT

1.2. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for E65 Pro are as follows.

RF Exposure Conditions		Max Reported SAR Value(W/kg)
1-g Head		0.375
1-g Body-Worn (Separation distance of 10mm)		1.156
1-g Hotspot (Separation distance of 10mm)		1.156
Max Simultaneous Tx	Head	0.637
	Body-Worn	1.426
	Hotspot	1.426

Note: The Max Simultaneous Tx is calculated based on the same configuration and test position.

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR Part 2(2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE Std 1528-2013 & KDB 865664 D01.

1.3. EUT Description

Device Information			
Product Name	mobile phone		
Brand Name	EUDORA		
Model Name	E65 Pro		
Family Model	N/A		
Model Difference	N/A		
FCC ID	2BD9H-E65PRO		
Device Phase	Identical Prototype		
Exposure Category	General population / Uncontrolled environment		
Antenna Type	PIFA Antenna		
Battery Information	DC 3.8V, 4000mAh, 15.2Wh		
HW Version	2277WQ_HDI_V15		
SW Version	Eudora_E65Pro_V2.0		
Device Operating Configurations			
Supporting Mode(s)	GSM850/1900,WCDMABand2/4/5,LTEBand2/4/5/12/17/41/66/71, WLAN 2.4G/5G, Bluetooth		
Test Modulation	GSM(GMSK/8PSK), WCDMA(QPSK), LTE(QPSK/16QAM), WLAN(DSSS/OFDM), Bluetooth(GFSK, π/4-DQPSK, 8DPSK)		
Device Class	B		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)

	GSM 850	824-849	869-894
	GSM 1900	1850-1910	1930-1990
	WCDMA Band 2	1850-1910	1930-1990
	WCDMA Band 4	1710-1755	2110-2155
	WCDMA Band 5	824-849	869-894
	LTE Band 2	1850-1910	1930-1990
	LTE Band 4	1710-1755	2110-2155
	LTE Band 5	824-849	869-894
	LTE Band 12	699-716	729-746
	LTE Band 17	704-716	734-746
	LTE Band 41	2496-2690	
	LTE Band 66	1710-1780	2110-2200
	LTE Band 71	663-698	617-652
	WLAN 2.4G	2412-2462	
	WLAN 5.2G	5180-5240	
	WLAN 5.8G	5745-5825	
	Bluetooth	2402-2480	
GPRS Multislot Class(12)	Max Number of Timeslots in Uplink		4
	Max Number of Timeslots in Downlink		4
	Max Total Timeslot		5
EGPRS Multislot Class(12)	Max Number of Timeslots in Uplink		4
	Max Number of Timeslots in Downlink		4
	Max Total Timeslot		5
Power Class	4, tested with power level 5(GSM 850)		
	1, tested with power level 0(GSM 1900)		
	3, tested with power control —all"(WCDMA Band 2)		
	3, tested with power control —all"(WCDMA Band 4)		
	3, tested with power control —all"(WCDMA Band 5)		
	3, tested with power control all Max.(LTE Band 2)		
	3, tested with power control all Max.(LTE Band 4)		
	3, tested with power control all Max.(LTE Band 5)		
	3, tested with power control all Max.(LTE Band 12)		
	3, tested with power control all Max.(LTE Band 17)		
	3, tested with power control all Max.(LTE Band 41)		
	3, tested with power control all Max.(LTE Band 66)		
	3, tested with power control all Max.(LTE Band 71)		

1.4. Test specification(s)

FCC 47 CFR Part 2(2.1093)
ANSI/IEEE C95.1-1992

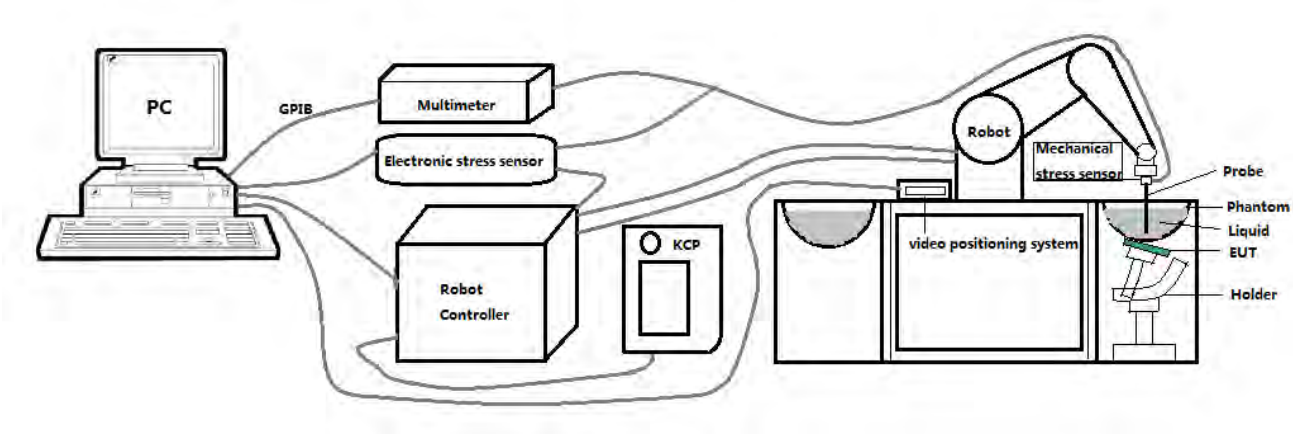
IEEE Std 1528-2013
KDB 865664 D01 SAR measurement 100 MHz to 6 GHz
KDB 865664 D02 RF Exposure Reporting
KDB 447498 D01 General RF Exposure Guidance
KDB 248227 D01 802.11 Wi-Fi SAR
KDB 941225 D01 3G SAR Procedures
KDB 941225 D05 SAR for LTE Devices
KDB 941225 D06 Hotspot SAR
KDB 648474 D04 Handset SAR

1.5. Ambient Condition

Ambient temperature	20°C – 24℃
Relative Humidity	30% – 70%

2. SAR Measurement System

2.1. SATIMO SAR Measurement Set-up Diagram



These measurements were performed with the automated near-field scanning system OPENSAR from SATIMO. The system is based on a high precision robot (working range: 901 mm), which positions the probes with a positional repeatability of better than ±0.03 mm. The SAR measurements were conducted with dosimetric probe (manufactured by SATIMO), designed in the classical triangular configuration and optimized for dosimetric evaluation.

The first step of the field measurement is the evaluation of the voltages induced on the probe by the device under test. Probe diode detectors are nonlinear. Below the diode compression point, the output voltage is proportional to the square of the applied E-field; above the diode compression point, it is linear to the applied E-field. The compression point depends on the diode, and a calibration procedure is necessary for each sensor of the probe.

The Keithley multimeter reads the voltage of each sensor and send these three values to the PC. The corresponding E field value is calculated using the probe calibration factors, which are stored in the working directory. This evaluation includes linearization of the diode characteristics. The field calculation is done separately for each sensor. Each component of the E field is displayed on the "Dipole Area Scan Interface" and the total E field is displayed on the "3D Interface"

2.2. Robot

The SATIMO SAR system uses the high precision robots from KUKA. For the 6-axis controller system, the robot controller version (KUKA) from KUKA is used. The KUKA robot series have many features that are important for our application:

- High precision (repeatability ±0.03 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

2.3. E-Field Probe

This E-field detection probe is composed of three orthogonal dipoles linked to special Schottky diodes with low detection thresholds. The probe allows the measurement of electric fields in liquids such as the one defined in the IEEE and CENELEC standards.

For the measurements the Specific Dosimetric E-Field Probe 3423-EPGO-426 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter : 2.5 mm
- Distance between probe tip and sensor center: 1 mm
- Distance between sensor center and the inner phantom surface: 2 mm (repeatability better than ±1 mm).
- Probe linearity: ±0.06 dB
- Axial isotropy: ±0.01 dB
- Hemispherical Isotropy: ±0.01 dB
- Calibration range: 650MHz to 5900MHz for head & body simulating liquid.
- Lower detection limit: 8mW/kg

Angle between probe axis (evaluation axis) and surface normal line: less than 30°.

2.3.1. E-Field Probe Calibration

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

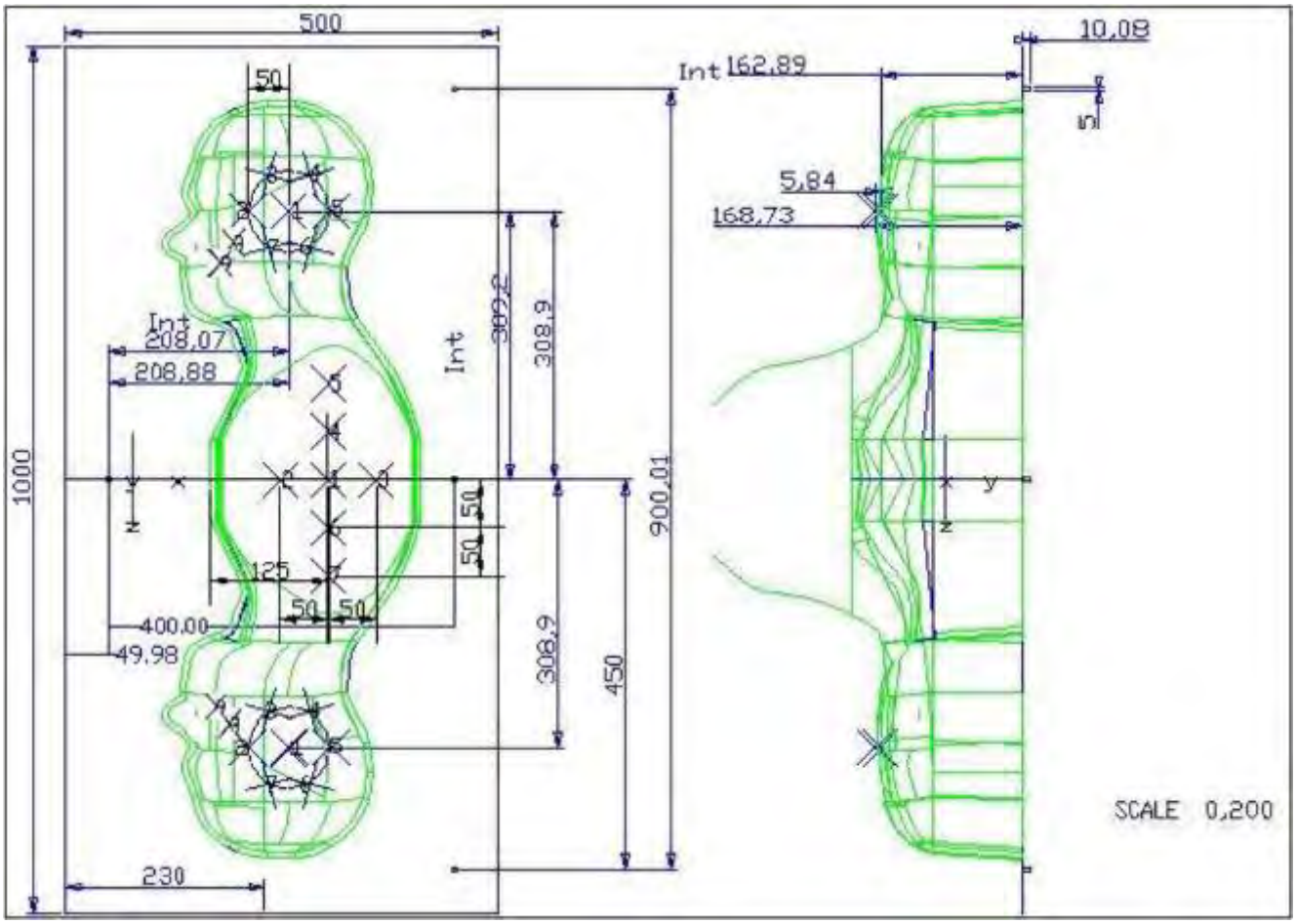
2.4. SAM phantoms

Photo of SAM phantom SN 16/15 SAM119

The SAM phantom is used to measure the SAR relative to people exposed to electro-magnetic field radiated by Smart Phones.

2.4.1. Technical Data

Serial Number	Shell thickness	Filling volume	Dimensions	Positionner Material	Permittivity	Loss Tangent
SN 16/15 SAM119	2 mm ±0.2 mm	27 liters	Length:1000 mm Width:500 mm Height:200 mm	Gelcoat with fiberglass	3.4	0.02

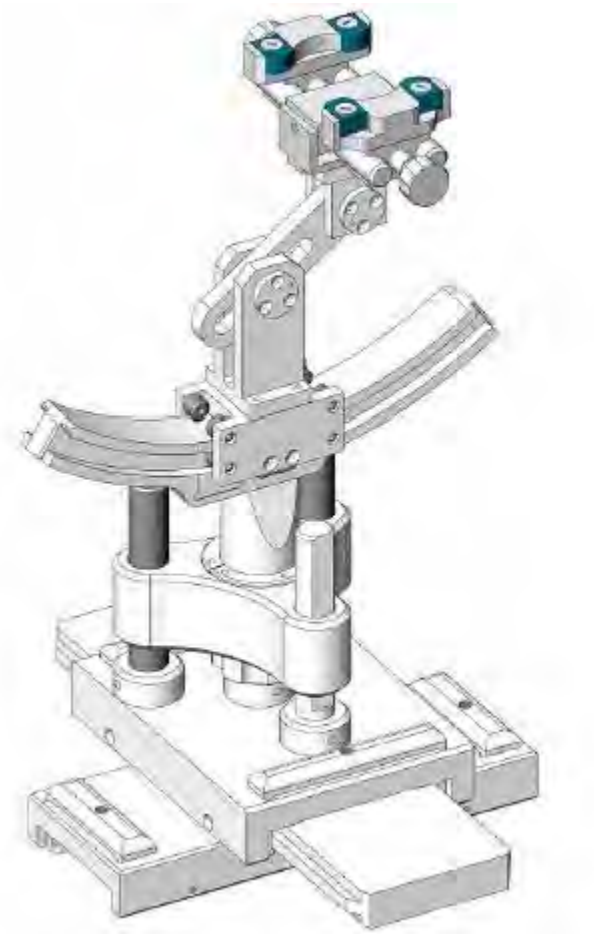


Serial Number	Left Head(mm)		Right Head(mm)		Flat Part(mm)	
SN 16/15 SAM119	2	2.02	2	2.08	1	2.09
	3	2.05	3	2.06	2	2.06
	4	2.07	4	2.07	3	2.08
	5	2.08	5	2.08	4	2.10
	6	2.05	6	2.07	5	2.10
	7	2.05	7	2.05	6	2.07
	8	2.07	8	2.06	7	2.07
	9	2.08	9	2.06	-	-

The test, based on ultrasonic system, allows measuring the thickness with an accuracy of 10 µm.

2.5. Device Holder

The positioning system allows obtaining cheek and tilting position with a very good accuracy. In compliance with CENELEC, the tilt angle uncertainty is lower than 1 degree.



Serial Number	Holder Material	Permittivity	Loss Tangent
SN 16/15 MSH100	Delrin	3.7	0.005

2.6. Test Equipment List

This table gives a complete overview of the SAR measurement equipment.
Devices used during the test described are marked ☒

	Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
					Last Cal.	Due Date
☒	MVG	E FIELD PROBE	SSE2	3423-EPGO-426	Sep. 18, 2023	Sep. 17, 2024
☒	MVG	750 MHz Dipole	SID750	SN 03/15 DIP 0G750-355	Mar. 01, 2021	Feb. 28, 2024
☒	MVG	835 MHz Dipole	SID835	SN 03/15 DIP 0G835-347	Mar. 01, 2021	Feb. 28, 2024
☐	MVG	900 MHz Dipole	SID900	SN 03/15 DIP 0G900-348	Mar. 01, 2021	Feb. 28, 2024
☒	MVG	1800 MHz Dipole	SID1800	SN 03/15 DIP 1G800-349	Mar. 01, 2021	Feb. 28, 2024
☒	MVG	1900 MHz Dipole	SID1900	SN 03/15 DIP 1G900-350	Mar. 01, 2021	Feb. 28, 2024
☐	MVG	2000 MHz Dipole	SID2000	SN 03/15 DIP 2G000-351	Mar. 01, 2021	Feb. 28, 2024
☐	MVG	2300 MHz Dipole	SID2300	SN 03/16 DIP 2G300-358	Mar. 01, 2021	Feb. 28, 2024
☒	MVG	2450 MHz Dipole	SID2450	SN 03/15 DIP 2G450-352	Mar. 01, 2021	Feb. 28, 2024
☒	MVG	2600 MHz Dipole	SID2600	SN 03/15 DIP 2G600-356	Mar. 01, 2021	Feb. 28, 2024
☐	MVG	3500 MHz Dipole	SID3500	SN 09/12 DIP 3G500-360	Oct. 15, 2022	Oct. 14, 2025
☒	MVG	5000 MHz Dipole	SWG5500	SN 13/14 WGA 33	Mar. 01, 2021	Feb. 28, 2024
☒	MVG	Liquid measurement Kit	SCLMP	SN 21/15 OCPG 72	NCR	NCR
☒	MVG	Power Amplifier	N.A	AMPLISAR_28/14_003	NCR	NCR
☒	KEITHLEY	Millivoltmeter	2000	4072790	NCR	NCR
☒	R&S	Universal radio communication tester	CMU200	117858	May 29, 2023	May 28, 2024
☒	R&S	Wideband radio communication	CMW500	103917	May 29, 2023	May 28, 2024

		tester				
☒	HP	Network Analyzer	8753D	3410J01136	May 29, 2023	May 28, 2024
☒	Agilent	MXG Vector Signal Generator	N5182A	MY47070317	May 29, 2023	May 28, 2024
☒	Agilent	Power meter	E4419B	MY45102538	May 29, 2023	May 28, 2024
☒	Agilent	Power sensor	E9301A	MY41495644	May 29, 2023	May 28, 2024
☒	Agilent	Power sensor	E9301A	US39212148	May 29, 2023	May 28, 2024
☒	MCLI/USA	Directional Coupler	CB11-20	0D2L51502	Jul. 04, 2023	Jul. 03, 2024
☒	N/A	Thermometer	N/A	LES-085	Mar. 27, 2023	Mar. 26, 2026
☒	MVG	SAM Phantom	SSM2	SN 16/15 SAM119	NCR	NCR
☒	MVG	Device Holder	SMPPD	SN 16/15 MSH100	NCR	NCR
☒	Shenzhen Tianxu Communication Technology Co., Ltd.	Human Simulating Liquid	Head 750	Head 750	NCR	NCR
☒	Shenzhen Tianxu Communication Technology Co., Ltd.	Human Simulating Liquid	Head 835	Head 835	NCR	NCR
☒	Shenzhen Tianxu Communication Technology Co., Ltd.	Human Simulating Liquid	Head 1800	Head 1800	NCR	NCR
☒	Shenzhen Tianxu Communication Technology Co., Ltd.	Human Simulating Liquid	Head 1900	Head 1900	NCR	NCR
☒	Shenzhen Tianxu Communication	Human Simulating Liquid	Head 2450	Head 2450	NCR	NCR

	Technology Co., Ltd.					
☒	Shenzhen Tianxu Communication Technology Co., Ltd.	Human Simulating Liquid	Head 2600	Head 2600	NCR	NCR
☒	Shenzhen Tianxu Communication Technology Co., Ltd.	Human Simulating Liquid	Head 5200	Head 5200	NCR	NCR
☒	Shenzhen Tianxu Communication Technology Co., Ltd.	Human Simulating Liquid	Head 5800	Head 5800	NCR	NCR

3. SAR Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.

(b) Read the WWAN RF power level from the base station simulator.

(c) For Wi-Fi/BT power measurement, use engineering software to configure EUT Wi-Fi/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band.

(d) Connect EUT RF port through RF cable to the power meter, and measure Wi-Fi/BT output power.

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT Wi-Fi/BT continuously transmission, at maximum RF power, in the highest power channel.

(b) Place the EUT in the positions as Appendix A demonstrates.

(c) Set scan area, grid size and other setting on the OPENSAR software.

(d) Measure SAR results for the highest power channel on each testing position.

(e) Find out the largest SAR result on these testing positions of each band.

(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg.

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement

(b) Area scan

(c) Zoom scan

(d) Power drift measurement

3.1. Power Reference

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

3.2. Area scan & Zoom scan

The area scan is a 2D scan to find the hot spot location on the DUT. The zoom scan is a 3D scan

above the hot spot to calculate the 1g and 10g SAR value.

Measurement of the SAR distribution with a grid of 8 to 16 mm * 8 to 16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme. Around this point, a cube of 30 * 30 *30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8 * 4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

From the scanned SAR distribution, identify the position of the maximum SAR value, in addition identify the positions of any local maxima with SAR values within 2 dB of the maximum value that will not be within the zoom scan of other peaks; additional peaks shall be measured only when the primary peak is within 2 dB of the SAR compliance limit (e.g., 1 W/kg for 1,6 W/kg 1 g limit, or 1,26 W/kg for 2 W/kg, 10 g limit).

Area scan & Zoom scan scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

3.3. Description of interpolation/extrapolation scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimise measurements errors, but the highest local SAR will occur at the surface of the phantom.
An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1 mm step.
The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1 gram requires a very fine resolution in the three dimensional scanned data array.

3.4. Volumetric Scan

The volumetric scan consists to a full 3D scan over a specific area. This 3D scan is useful form multi Tx SAR measurement. Indeed, it is possible with OpenSAR to add, point by point, several volumetric scan to calculate the SAR value of the combined measurement as it is define in the standard IEEE1528 and IEC62209.

3.5. Power Drift

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In OpenSAR measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in V/m. If the power drifts more than ±5%, the SAR will be retested.

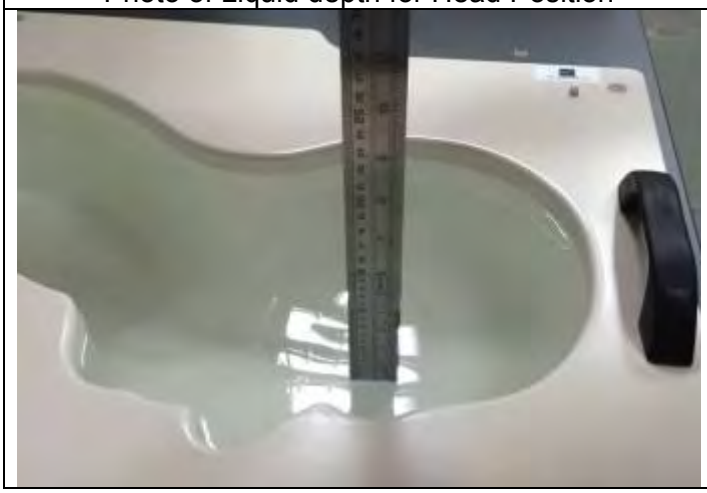
4. System Verification Procedure

4.1. Tissue Verification

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

Ingredients (% of weight)	Head Tissue									
Frequency Band (MHz)	750	835	900	1800	1900	2000	2450	2600	5200	5800
Water	34.40	34.40	34.40	55.36	55.36	57.87	57.87	57.87	65.53	65.53
NaCl	0.79	0.79	0.79	0.35	0.35	0.16	0.16	0.16	0.00	0.00
1,2-Propanediol	64.81	64.81	64.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Triton X-100	0.00	0.00	0.00	30.45	30.45	19.97	19.97	19.97	24.24	24.24
DGBE	0.00	0.00	0.00	13.84	13.84	22.00	22.00	22.00	10.23	10.23

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. For head SAR testing, the liquid depth from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm.

Photo of Liquid depth for Head Position	Photo of Liquid depth for Body Position
	

4.1.1. Tissue Dielectric Parameter Check Results

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine of the dielectric parameter are within the tolerances of the specified target values. The measured conductivity and relative permittivity should be within ±5% of the target values.

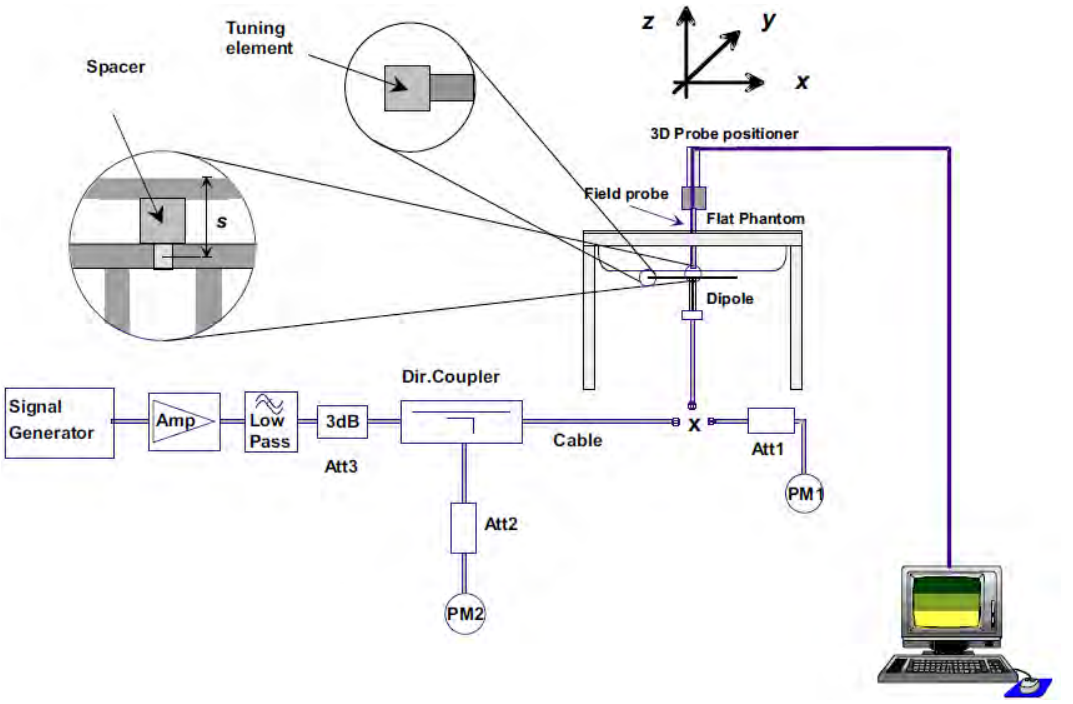
Tissue Type	Measured Frequency (MHz)	Target Tissue		Measured Tissue		Liquid Temp.	Test Date
		εr (±5%)	σ (S/m) (±5%)	εr	σ (S/m)		
Head 750	750	41.96 (39.86~44.06)	0.89 (0.85~0.93)	41.55	0.91	21.6 °C	Jan. 19, 2024
Head 850	835	41.50 (39.43~43.58)	0.90 (0.86~0.95)	41.26	0.89	21.7 °C	Jan. 10, 2024
Head 1800	1800	40.00 (38.00~42.00)	1.40 (1.33~1.47)	39.39	1.38	21.7 °C	Jan. 20, 2024
Head 1900	1900	40.00 (38.00~42.00)	1.40 (1.33~1.47)	39.13	1.46	21.5 °C	Jan. 11, 2024
Head 2450	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	38.02	1.75	21.9 °C	Jan. 27, 2024
Head 2600	2600	39.01 (37.06~40.96)	1.96 (1.86~2.06)	38.67	1.94	21.1 °C	Jan. 18, 2024
Head 5200	5200	36.00 (34.20~37.80)	4.66 (4.43~4.89)	35.07	4.47	21.5 °C	Jan. 23, 2024
Head 5800	5800	35.30 (33.54~37.07)	5.27 (5.01~5.53)	34.50	5.16	21.4 °C	Jan. 26, 2024

NOTE: The dielectric parameters of the tissue-equivalent liquid should be measured under similar ambient conditions and within 2 °C of the conditions expected during the SAR evaluation to satisfy protocol requirements.

4.2. System Verification Procedure

The system verification is performed for verifying the accuracy of the complete measurement system and performance of the software. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. It is fed with a power of 100mW (below 5GHz) or 100mW (above 5GHz). To adjust this power a power meter is used. The power sensor is connected to the cable before the system verification to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the system verification to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test (result on plot).

The system verification is shown as below picture:



4.2.1. System Verification Results

Comparing to the original SAR value provided by SATIMO, the verification data should be within its specification of ±10%. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance verification can meet the variation criterion and the plots can be referred to Appendix B of this report.

System Verification	Target SAR (1W) (±10%)		Measured SAR (Normalized to 1W)		Liquid Temp.	Delta (%)		Test Date
	1-g (W/Kg)	10-g (W/Kg)	1-g (W/Kg)	10-g (W/Kg)		1-g (±10%)	10-g (±10%)	
750MHz	8.53	5.56	8.95	5.85	21.6 °C	4.92%	5.22%	Jan. 19, 2024
	(7.68~9.38)	(5.01~6.11)						
835MHz	9.84	6.22	9.62	5.99	21.7 °C	-2.24%	-3.70%	Jan. 10, 2024
	(8.86~10.82)	(5.60~6.84)						
1800MHz	37.96	19.81	39.82	18.23	21.7 °C	4.90%	-7.98%	Jan. 20, 2024
	(34.17~41.75)	(17.83~21.79)						
1900MHz	40.37	20.48	39.53	21.32	21.5 °C	-2.08%	4.10%	Jan. 11, 2024
	(36.34~44.40)	(18.44~22.52)						
2450MHz	53.69	23.94	52.46	22.55	21.9 °C	-2.29%	-4.25%	Jan. 27, 2024
	(48.33~59.05)	(21.55~26.33)						
2600MHz	55.83	24.19	59.44	25.24	21.1 °C	6.47%	4.34%	Jan. 18, 2024
	(50.25~61.41)	(21.78~26.60)						
5200MHz	162.34	55.42	173.77	58.47	21.5 °C	7.04%	5.50%	Jan. 23, 2024
	(146.11~178.57)	(49.88~60.96)						
5800MHz	178.89	59.32	184.97	56.91	21.4 °C	3.40%	-4.06%	Jan. 26, 2024
	(161.01~196.77)	(53.39~65.25)						

5. SAR Measurement variability and uncertainty

5.1. SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

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

5.2. SAR measurement uncertainty

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

6. RF Exposure Positions

6.1. Ear and handset reference point

Figure 6.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M”, the left ear reference point (ERP) is marked “LE”, and the right ERP is marked —RE

Fig 6.1.1 Front, back, and side views of SAM phantom

6.2. Definition of the cheek position

1. Define two imaginary lines on the handset, the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset: the midpoint of the width w_t of the handset at the level of the acoustic output (point A in Figure 6.2.1 and Figure 6.2.2), and the midpoint of the width w_b of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 6.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 6.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
2. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 6.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
3. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP
4. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
5. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.

6. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 6.2.3. The actual rotation angles should be documented in the test report.

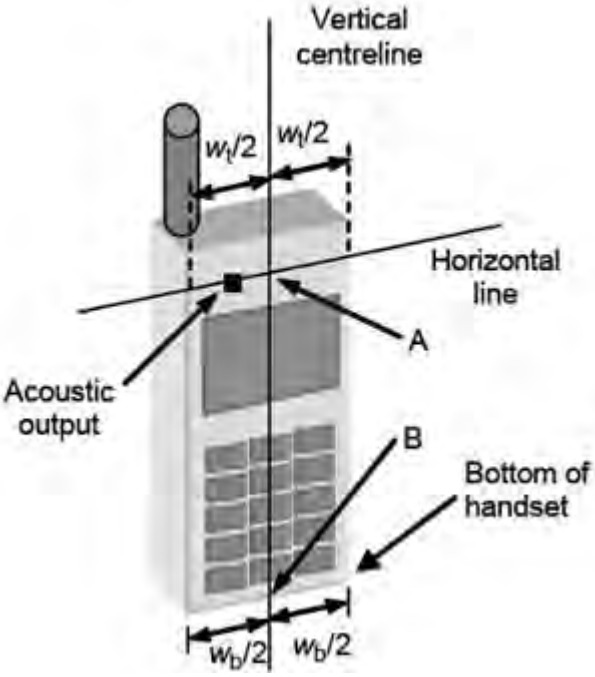


Fig 6.2.1 Handset vertical and horizontal reference lines——fixed case

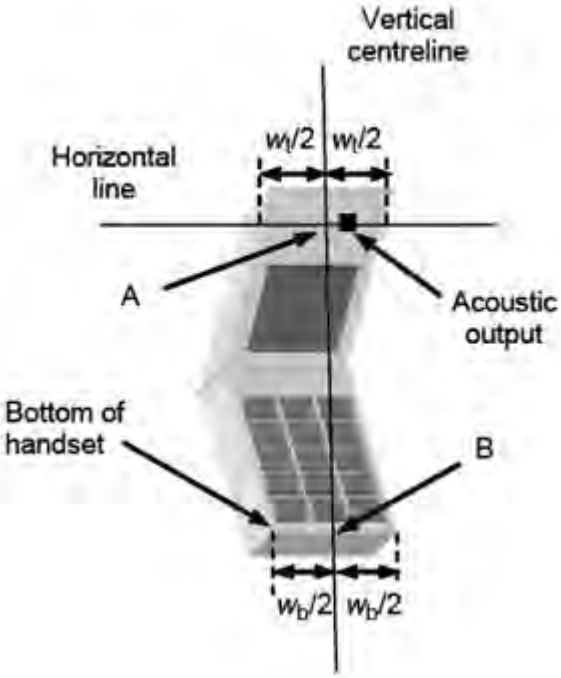


Fig 6.2.2 Handset vertical and horizontal reference lines— “clam-shell case”

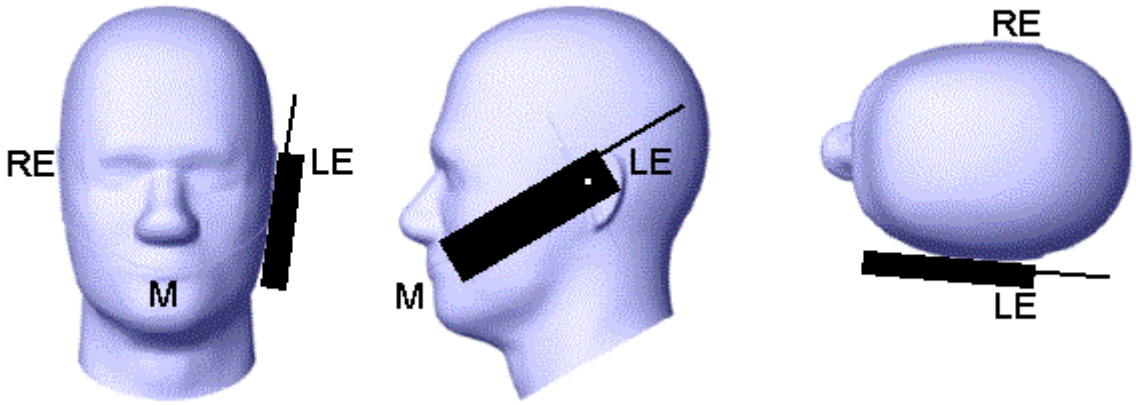


Fig 6.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

6.3. Definition of the tilt position

1. While maintaining the orientation of the handset, retract the handset parallel to the reference plane far enough away from the phantom to enable a rotation of the device by 15 degree.
2. Rotate the Handset around the horizontal line by 15 degree (see Figure 6.3.1).
3. While maintaining the orientation of the handset, move the handset towards the phantom on a line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact is on the pinna. If the contact is at any location other than the pinna, e.g., the antenna with the back of the phantom head, the angle of the handset shall be reduced. In this case, the tilt position is obtained if any part of the handset is in contact with the pinna as well as a second part of the handset is in contact with the phantom, e.g., the antenna with the back of the head.

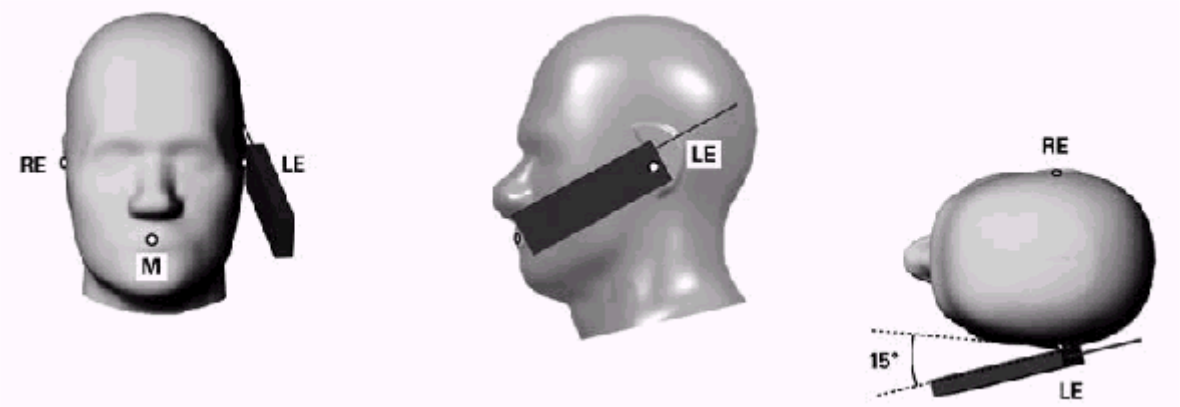


Figure 6.3.1 – Tilt position of the wireless device on the left side of SAM

6.4. Body Worn Accessory

1. Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 6.4.1). Per KDB 648474 D04, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is < 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.
2. Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest

spacing to the body. Then multiple accessories that contain metallic components are test with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

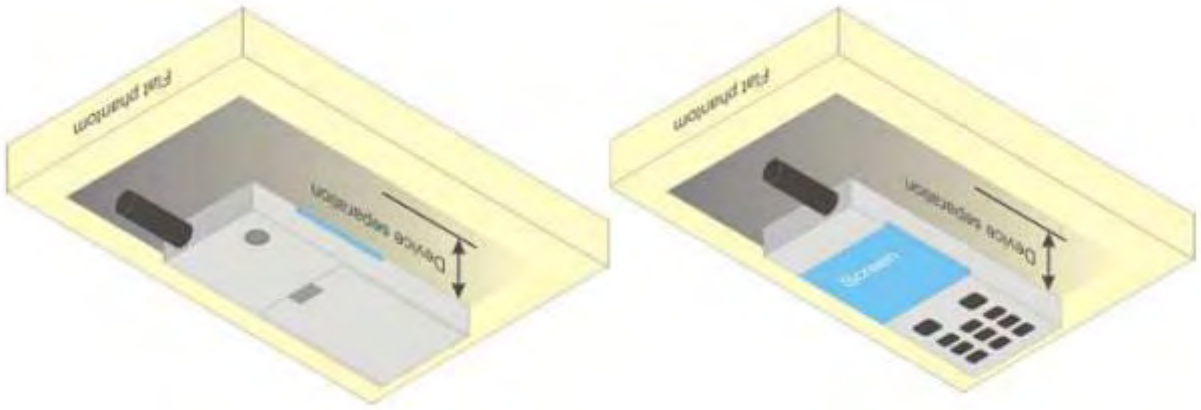


Figure 6.4.1 – Test positions for body-worn devices

6.5. Wireless Router Devices

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WLAN simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined form general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WLAN transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WLAN transmitter according to FCC KDB Publication 447498 D01 publication procedures. The —Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

7. RF Output Power

7.1. GSM Conducted Power

Band GSM850	Burst-Averaged output Power (dBm)				Frame-Averaged output Power (dBm)			
Tx Channel	Tune-up	128	189	251	Tune-up	128	189	251
Frequency (MHz)	(dBm)	824.2	836.4	848.8	(dBm)	824.2	836.4	848.8
GSM (GMSK)	33.00	32.70	32.86	32.85	23.97	23.67	23.83	23.82
GPRS(GMSK,1 Tx slot)	33.00	32.75	32.87	32.89	23.97	23.72	23.84	23.86
GPRS(GMSK,2 Tx slot)	32.00	31.83	31.91	31.95	25.98	25.81	25.89	25.93
GPRS(GMSK,3 Tx slot)	30.50	29.96	29.98	30.10	26.24	25.70	25.72	25.84
GPRS(GMSK,4 Tx slot)	29.50	28.90	28.97	29.06	26.49	25.89	25.96	26.05
EGPRS(8PSK,1 Tx slot)	27.00	26.48	26.90	26.83	17.97	17.45	17.87	17.80
EGPRS(8PSK,2 Tx slot)	26.00	25.91	25.50	25.83	19.98	19.89	19.48	19.81
EGPRS(8PSK,3 Tx slot)	24.00	23.85	23.50	23.92	19.74	19.59	19.24	19.66
EGPRS(8PSK,4 Tx slot)	23.00	22.12	22.50	22.71	19.99	19.11	19.49	19.70
Band GSM1900	Burst-Averaged output Power (dBm)				Frame-Averaged output Power (dBm)			
Tx Channel	Tune-up	512	661	810	Tune-up	512	661	810
Frequency (MHz)	(dBm)	1850.2	1880	1909.8	(dBm)	1850.2	1880	1909.8
GSM (GMSK)	30.50	29.75	30.10	29.98	21.47	20.72	21.07	20.95
GPRS(GMSK,1 Tx slot)	30.00	29.62	29.87	29.94	20.97	20.59	20.84	20.91
GPRS(GMSK,2 Tx slot)	29.00	28.31	28.54	28.75	22.98	22.29	22.52	22.73
GPRS(GMSK,3 Tx slot)	27.00	26.18	26.37	26.65	22.74	21.92	22.11	22.39
GPRS(GMSK,4 Tx slot)	26.00	25.05	25.24	25.54	22.99	22.04	22.23	22.53
EGPRS(8PSK,1 Tx slot)	25.50	24.93	25.12	25.33	16.47	15.90	16.09	16.30
EGPRS(8PSK,2 Tx slot)	24.50	23.93	24.02	23.97	18.48	17.91	18.00	17.95
EGPRS(8PSK,3 Tx slot)	22.00	21.23	21.17	21.78	17.74	16.97	16.91	17.52
EGPRS(8PSK,4 Tx slot)	21.00	20.40	20.66	20.66	17.99	17.39	17.65	17.65

7.2. WCDMA Conducted Power

WCDMA Band 2	Burst-Averaged output Power (dBm)			
Tx Channel	Tune-up	9262	9400	9538
Frequency (MHz)	(dBm)	1852.4	1880	1907.6
RMC12.2K	24.00	23.40	23.48	23.52
HSDPA Sub 1	23.00	22.50	22.52	22.62
HSDPA Sub 2	22.50	21.98	22.09	22.24

HSDPA Sub 3	21.50	21.11	21.08	20.95
HSDPA Sub 4	21.50	21.04	21.05	21.17
HSUPA Sub 1	22.50	21.69	22.37	22.36
HSUPA Sub 2	22.50	22.30	22.31	22.47
HSUPA Sub 3	21.50	20.64	21.18	21.35
HSUPA Sub 4	23.00	22.42	22.46	22.58
HSUPA Sub 5	22.00	21.03	21.63	21.91
WCDMA Band 4	Burst-Averaged output Power (dBm)			
Tx Channel	Tune-up	1312	1413	1513
Frequency (MHz)	(dBm)	1712.4	1732.6	1752.6
RMC12.2K	23.50	23.40	23.32	23.47
HSDPA Sub 1	23.00	22.46	22.48	22.54
HSDPA Sub 2	22.50	21.95	21.83	22.07
HSDPA Sub 3	21.50	21.03	20.73	20.67
HSDPA Sub 4	21.50	20.91	21.13	20.90
HSUPA Sub 1	22.50	21.30	22.23	22.33
HSUPA Sub 2	22.50	22.41	22.31	22.40
HSUPA Sub 3	21.50	20.74	21.18	21.17
HSUPA Sub 4	23.00	22.45	22.43	22.51
HSUPA Sub 5	22.00	20.81	21.67	21.93
WCDMA Band 5	Burst-Averaged output Power (dBm)			
Tx Channel	Tune-up	4132	4182	4233
Frequency (MHz)	(dBm)	826.4	836.4	846.6
RMC12.2K	23.00	22.88	22.84	22.94
HSDPA Sub 1	22.00	21.90	21.85	21.98
HSDPA Sub 2	21.50	21.45	21.38	21.46
HSDPA Sub 3	20.50	20.49	20.36	20.48
HSDPA Sub 4	21.00	20.66	20.50	20.60
HSUPA Sub 1	22.00	20.68	21.80	21.81
HSUPA Sub 2	22.00	21.84	21.73	21.88
HSUPA Sub 3	21.00	20.07	20.81	20.48
HSUPA Sub 4	22.50	21.94	21.87	22.01
HSUPA Sub 5	21.50	20.48	20.95	21.35

7.3. LTE Conducted Power

Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		18607/1850.7	18900/1880	19193/1909.3
LTE Band 2	1.4MHz	QPSK	1	0	23.50	23.03	23.04	23.01
			1	2	23.50	23.20	23.19	23.10
			1	5	23.50	23.07	23.05	22.98
			3	0	23.50	23.16	23.18	23.11
			3	1	23.50	23.20	23.19	23.12
			3	2	23.50	23.16	23.16	23.09
			6	0	22.50	22.15	22.19	22.17
		16QAM	1	0	22.50	22.24	22.32	22.14
			1	2	22.50	22.37	22.44	22.29
			1	5	22.50	22.31	22.32	22.13
			3	0	22.50	22.08	22.08	22.03
			3	1	22.50	22.19	22.17	22.04
			3	2	22.50	22.14	22.14	21.97
			6	0	21.50	21.20	21.27	21.17
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		18615/1851.5	18900/1880	19185/1908.5
LTE Band 2	3MHz	QPSK	1	0	23.50	23.06	23.09	23.06
			1	7	23.50	23.11	23.07	23.06
			1	14	23.50	23.06	23.06	23.01
			8	0	22.50	22.13	22.13	22.14
			8	4	22.50	22.10	22.15	22.16
			8	7	22.50	22.10	22.13	22.10
			15	0	22.50	22.10	22.14	22.14
		16QAM	1	0	22.50	22.21	22.26	22.21
			1	7	22.50	22.32	22.25	22.27
			1	14	22.50	22.24	22.26	22.12
			8	0	21.50	21.16	21.17	21.16
			8	4	21.50	21.12	21.18	21.17
			8	7	21.50	21.09	21.18	21.11
			15	0	21.50	21.08	21.12	21.09
Band	Band	Modulation	RB		Tune-up	Channel/Frequency(MHz)		

	Width		Configuration		(dBm)			
			RB Size	RB Offset		18625/1852.5	18900/1880	19175/1907.5
LTE Band 2	5MHz	QPSK	1	0	23.50	22.98	23.02	23.05
			1	12	23.50	23.09	23.11	23.10
			1	24	23.50	22.99	22.98	22.94
			12	0	22.50	22.13	22.12	22.15
			12	6	22.50	22.18	22.18	22.21
			12	11	22.50	22.11	22.14	22.14
			25	0	22.50	22.13	22.17	22.20
		16QAM	1	0	22.50	22.23	22.30	22.34
			1	12	22.50	22.26	22.31	22.33
			1	24	22.50	22.24	22.10	22.05
			12	0	21.50	21.08	21.09	21.10
			12	6	21.50	21.10	21.11	21.16
			12	11	21.50	21.06	21.11	21.10
			25	0	21.50	21.12	21.13	21.17
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		18650/1855	18900/1880	19150/1905
LTE Band 2	10MHz	QPSK	1	0	23.50	23.10	23.20	23.27
			1	24	23.50	23.23	23.23	23.24
			1	49	23.50	23.20	23.10	23.04
			25	0	22.50	22.27	22.15	22.33
			25	12	22.50	22.22	22.21	22.28
			25	24	22.50	22.25	22.16	22.31
			50	0	22.50	22.27	22.18	22.32
		16QAM	1	0	23.00	22.36	22.39	22.44
			1	24	23.00	22.43	22.49	22.52
			1	49	23.00	22.47	22.31	22.27
			25	0	21.50	21.26	21.13	21.31
			25	12	21.50	21.22	21.17	21.26
			25	24	21.50	21.23	21.13	21.29
			50	0	21.50	21.25	21.12	21.30
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		18675/1857.5	18900/1880	19125/1902.5
LTE	15MHz	QPSK	1	0	23.50	23.01	23.09	23.25

Band 2			1	37	23.50	23.18	23.14	23.25
			1	74	23.50	23.23	23.03	22.96
			36	0	22.50	22.23	22.18	22.40
			36	18	22.50	22.25	22.20	22.34
			36	37	22.50	22.32	22.14	22.31
			75	0	22.50	22.29	22.15	22.36
		16QAM	1	0	23.00	22.16	22.39	22.47
			1	37	23.00	22.41	22.24	22.53
			1	74	23.00	22.46	22.18	22.04
			36	0	21.50	21.20	21.14	21.37
			36	18	21.50	21.19	21.14	21.30
			36	37	21.50	21.28	21.07	21.25
			75	0	21.50	21.28	21.13	21.33
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		18700/1860	18900/1880	19100/1900
LTE Band 2	20MHz	QPSK	1	0	23.50	22.88	23.01	23.10
			1	49	23.50	23.37	23.17	23.40
			1	99	23.50	23.02	22.90	22.85
			50	0	23.00	22.32	22.13	22.54
			50	24	23.00	22.32	22.22	22.38
			50	49	23.00	22.42	22.15	22.40
			100	0	22.50	22.37	22.13	22.49
		16QAM	1	0	23.00	22.13	22.20	22.32
			1	49	23.00	22.50	22.38	22.63
			1	99	23.00	22.18	22.15	22.03
			50	0	22.00	21.28	21.13	21.53
			50	24	22.00	21.30	21.20	21.37
			50	49	22.00	21.39	21.12	21.38
			100	0	21.50	21.35	21.12	21.48

Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		19957/1710.7	20175/1732.5	20393/1754.3
LTE Band 4	1.4MHz	QPSK	1	0	23.00	22.86	22.57	22.43
			1	2	23.00	22.70	22.69	22.54
			1	5	23.00	22.40	22.56	22.46
			3	0	23.00	22.50	22.65	22.55

			3	1	23.00	22.53	22.66	22.59
			3	2	23.00	22.49	22.64	22.57
			6	0	22.00	21.50	21.66	21.60
		16QAM	1	0	22.00	21.57	21.79	21.62
			1	2	22.00	21.73	21.91	21.75
			1	5	22.00	21.48	21.93	21.61
			3	0	22.00	21.40	21.64	21.52
			3	1	22.00	21.46	21.71	21.53
			3	2	22.00	21.35	21.69	21.48
			6	0	21.00	20.58	20.72	20.65
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		19965/1711.5	20175/1732.5	20385/1753.5
LTE Band 4	3MHz	QPSK	1	0	23.00	22.43	22.65	22.48
			1	7	23.00	22.43	22.61	22.47
			1	14	23.00	22.46	22.62	22.50
			8	0	22.00	21.46	21.63	21.54
			8	4	22.00	21.50	21.65	21.62
			8	7	22.00	21.46	21.64	21.58
			15	0	22.00	21.49	21.64	21.56
		16QAM	1	0	22.00	21.66	21.92	21.69
			1	7	22.00	21.60	21.89	21.61
			1	14	22.00	21.61	21.86	21.63
			8	0	21.00	20.53	20.72	20.58
			8	4	21.00	20.56	20.75	20.66
			8	7	21.00	20.56	20.72	20.64
			15	0	21.00	20.52	20.66	20.58
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		19975/1712.5	20175/1732.5	20375/1752.5
LTE Band 4	5MHz	QPSK	1	0	23.00	22.33	22.56	22.39
			1	12	23.00	22.48	22.62	22.49
			1	24	23.00	22.40	22.54	22.41
			12	0	22.00	21.46	21.64	21.53
			12	6	22.00	21.53	21.68	21.60
			12	11	22.00	21.52	21.63	21.57
			25	0	22.00	21.50	21.64	21.57
		16QAM	1	0	22.00	21.55	21.74	21.64

			1	12	22.00	21.68	21.81	21.67
			1	24	22.00	21.50	21.74	21.66
			12	0	21.00	20.44	20.64	20.55
			12	6	21.00	20.53	20.70	20.58
			12	11	21.00	20.52	20.66	20.57
			25	0	21.00	20.52	20.71	20.60
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		20000/1715	20175/1732.5	20350/1750
LTE Band 4	10MHz	QPSK	1	0	23.00	22.44	22.66	22.58
			1	24	23.00	22.61	22.76	22.62
			1	49	23.00	22.61	22.61	22.49
			25	0	22.00	21.54	21.75	21.64
			25	12	22.00	21.64	21.71	21.68
			25	24	22.00	21.58	21.75	21.64
			50	0	22.00	21.59	21.77	21.64
		16QAM	1	0	22.00	21.68	21.97	21.80
			1	24	22.00	21.84	21.95	21.87
			1	49	22.00	21.89	21.92	21.65
			25	0	21.00	20.54	20.79	20.65
			25	12	21.00	20.65	20.75	20.70
			25	24	21.00	20.61	20.79	20.66
			50	0	21.00	20.61	20.80	20.66
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		20025/1717.5	20175/1732.5	20325/1747.5
LTE Band 4	15MHz	QPSK	1	0	23.00	22.38	22.58	22.58
			1	37	23.00	22.60	22.66	22.61
			1	74	23.00	22.63	22.60	22.51
			36	0	22.00	21.61	21.75	21.65
			36	18	22.00	21.68	21.73	21.69
			36	37	22.00	21.67	21.76	21.66
			75	0	22.00	21.63	21.74	21.65
		16QAM	1	0	22.00	21.56	21.86	21.82
			1	37	22.00	21.84	21.86	21.81
			1	74	22.00	21.93	21.81	21.72
			36	0	21.00	20.60	20.73	20.64
			36	18	21.00	20.69	20.71	20.70

			36	37	21.00	20.67	20.77	20.64
			75	0	21.00	20.64	20.76	20.66
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		20050/1720	20175/1732.5	20300/1745
LTE Band 4	20MHz	QPSK	1	0	23.00	22.21	22.44	22.39
			1	49	23.00	22.73	22.73	22.70
			1	99	23.00	22.47	22.46	22.31
			50	0	22.00	21.73	21.76	21.63
			50	24	22.00	21.76	21.72	21.73
			50	49	22.00	21.72	21.82	21.73
			100	0	22.00	21.71	21.77	21.69
		16QAM	1	0	22.00	21.43	21.70	21.72
			1	49	22.00	21.96	21.94	21.99
			1	99	22.00	21.79	21.73	21.57
			50	0	21.00	20.77	20.79	20.65
			50	24	21.00	20.77	20.76	20.74
			50	49	21.00	20.75	20.85	20.76
			100	0	21.00	20.72	20.79	20.73

Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		20407/824.7	20525/836.5	20643/848.3
LTE Band 5	1.4MHz	QPSK	1	0	22.50	21.99	22.20	22.07
			1	2	22.50	22.14	22.31	22.16
			1	5	22.50	22.02	22.17	22.05
			3	0	22.50	22.08	22.26	22.18
			3	1	22.50	22.14	22.29	22.14
			3	2	22.50	22.11	22.26	22.16
			6	0	21.50	21.07	21.28	21.14
		16QAM	1	0	22.00	21.20	21.52	21.28
			1	2	22.00	21.49	21.57	21.50
			1	5	22.00	21.26	21.39	21.34
			3	0	21.50	21.02	21.20	21.12
			3	1	21.50	21.08	21.28	21.17
			3	2	21.50	21.09	21.31	21.10
			6	0	20.50	20.14	20.34	20.20
Band	Band	Modulation	RB		Tune-up	Channel/Frequency(MHz)		

	Width		Configuration		(dBm)			
			RB Size	RB Offset		20415/825.5	20525/836.5	20635/847.5
LTE Band 5	3MHz	QPSK	1	0	22.50	22.07	22.28	22.20
			1	7	22.50	22.13	22.31	22.16
			1	14	22.50	22.17	22.27	22.14
			8	0	21.50	21.10	21.30	21.23
			8	4	21.50	21.17	21.36	21.22
			8	7	21.50	21.15	21.30	21.18
			15	0	21.50	21.09	21.33	21.18
		16QAM	1	0	22.00	21.42	21.52	21.44
			1	7	22.00	21.43	21.61	21.50
			1	14	22.00	21.43	21.51	21.43
			8	0	20.50	20.17	20.35	20.29
			8	4	20.50	20.22	20.42	20.29
			8	7	20.50	20.22	20.40	20.26
			15	0	20.50	20.12	20.34	20.20
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		20425/826.5	20525/836.5	20625/846.5
LTE Band 5	5MHz	QPSK	1	0	22.50	22.00	22.18	22.08
			1	12	22.50	22.19	22.32	22.22
			1	24	22.50	22.06	22.17	22.04
			12	0	21.50	21.09	21.32	21.23
			12	6	21.50	21.20	21.38	21.24
			12	11	21.50	21.19	21.32	21.22
			25	0	21.50	21.16	21.31	21.22
		16QAM	1	0	22.00	21.16	21.46	21.42
			1	12	22.00	21.55	21.59	21.45
			1	24	22.00	21.41	21.49	21.29
			12	0	20.50	20.08	20.29	20.20
			12	6	20.50	20.20	20.37	20.24
			12	11	20.50	20.20	20.27	20.17
			25	0	20.50	20.16	20.31	20.24
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		20450/829	20525/836.5	20600/844
LTE	10MHz	QPSK	1	0	22.50	22.05	22.30	22.26

Band 5			1	24	22.50	22.31	22.38	22.27
			1	49	22.50	22.28	22.23	22.09
			25	0	21.50	21.12	21.38	21.45
			25	12	21.50	21.26	21.37	21.29
			25	24	21.50	21.30	21.24	21.22
			50	0	21.50	21.23	21.32	21.34
		16QAM	1	0	22.00	21.39	21.53	21.51
			1	24	22.00	21.46	21.72	21.59
			1	49	22.00	21.55	21.55	21.45
			25	0	20.50	20.14	20.34	20.44
			25	12	20.50	20.25	20.38	20.27
			25	24	20.50	20.32	20.25	20.22
			50	0	20.50	20.22	20.32	20.35

Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		23017/699.7	23095/707.5	23173/715.3
LTE Band 12	1.4MHz	QPSK	1	0	23.00	22.69	22.59	22.65
			1	2	23.00	22.82	22.67	22.80
			1	5	23.00	22.69	22.60	22.68
			3	0	23.00	22.79	22.67	22.78
			3	1	23.00	22.79	22.71	22.82
			3	2	23.00	22.79	22.67	22.78
			6	0	22.00	21.81	21.73	21.77
		16QAM	1	0	22.50	21.94	21.89	21.91
			1	2	22.50	22.06	22.00	21.68
			1	5	22.50	21.89	21.79	21.51
			3	0	22.00	21.78	21.60	21.31
			3	1	22.00	21.79	21.69	21.33
			3	2	22.00	21.74	21.67	21.28
			6	0	21.00	20.88	20.78	20.38
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		23025/700.5	23095/707.5	23165/714.5
LTE Band 12	3MHz	QPSK	1	0	22.50	22.29	22.12	22.21
			1	7	22.50	22.22	22.09	22.21
			1	14	22.50	22.16	22.11	22.22
			8	0	21.50	21.25	21.18	21.24

			8	4	21.50	21.28	21.21	21.33
			8	7	21.50	21.24	21.17	21.30
			15	0	21.50	21.25	21.18	21.26
		16QAM	1	0	22.00	21.49	21.34	21.48
			1	7	22.00	21.52	21.28	21.53
			1	14	22.00	21.33	21.45	21.50
			8	0	20.50	20.29	20.23	20.29
			8	4	20.50	20.33	20.26	20.36
			8	7	20.50	20.29	20.20	20.34
			15	0	20.50	20.23	20.17	20.24
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		23035/701.5	23095/707.5	23155/713.5
LTE Band 12	5MHz	QPSK	1	0	22.50	22.11	22.04	22.02
			1	12	22.50	22.16	22.12	22.21
			1	24	22.50	22.02	22.01	22.11
			12	0	21.50	21.20	21.23	21.17
			12	6	21.50	21.28	21.25	21.29
			12	11	21.50	21.22	21.14	21.33
			25	0	21.50	21.23	21.21	21.27
		16QAM	1	0	22.00	21.32	21.19	21.29
			1	12	22.00	21.50	21.36	21.41
			1	24	22.00	21.24	21.27	21.40
			12	0	20.50	20.16	20.16	20.14
			12	6	20.50	20.24	20.20	20.27
			12	11	20.50	20.15	20.12	20.28
			25	0	20.50	20.18	20.17	20.27
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		23060/704	23095/707.5	23130/711
LTE Band 12	10MHz	QPSK	1	0	22.50	22.19	22.12	22.11
			1	24	22.50	22.17	22.20	22.20
			1	49	22.50	22.01	22.11	22.18
			25	0	21.50	21.18	21.27	21.29
			25	12	21.50	21.20	21.21	21.25
			25	24	21.50	21.04	21.15	21.41
			50	0	21.50	21.13	21.26	21.37
		16QAM	1	0	22.00	21.52	21.37	21.30

			1	24	22.00	21.41	21.40	21.45
			1	49	22.00	21.32	21.36	21.54
			25	0	20.50	20.15	20.25	20.25
			25	12	20.50	20.18	20.19	20.23
			25	24	20.50	20.06	20.12	20.37
			50	0	20.50	20.09	20.25	20.34

Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		23755/706.5	23790/710	23825/713.5
LTE Band 17	5MHz	QPSK	1	0	22.50	22.03	22.03	22.04
			1	12	22.50	22.10	22.12	22.20
			1	24	22.50	22.03	22.04	22.10
			12	0	21.50	21.20	21.22	21.17
			12	6	21.50	21.18	21.21	21.29
			12	11	21.50	21.11	21.17	21.32
			25	0	21.50	21.16	21.20	21.27
		16QAM	1	0	21.50	21.28	21.37	21.22
			1	12	21.50	21.28	21.31	21.37
			1	24	21.50	21.24	21.40	21.37
			12	0	20.50	20.15	20.16	20.11
			12	6	20.50	20.12	20.16	20.23
			12	11	20.50	20.06	20.16	20.30
			25	0	20.50	20.14	20.17	20.25

Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		23780/709	23790/710	23800/711
LTE Band 17	10MHz	QPSK	1	0	22.50	22.11	22.12	22.09
			1	24	22.50	22.19	22.21	22.27
			1	49	22.50	22.14	22.17	22.14
			25	0	21.50	21.35	21.33	21.30
			25	12	21.50	21.22	21.24	21.29
			25	24	21.50	21.29	21.34	21.42
			50	0	21.50	21.32	21.37	21.38
		16QAM	1	0	22.00	21.40	21.34	21.35
			1	24	22.00	21.44	21.44	21.47
			1	49	22.00	21.39	21.52	21.44
			25	0	20.50	20.32	20.35	20.28

			25	12	20.50	20.19	20.23	20.25
			25	24	20.50	20.25	20.33	20.43
			50	0	20.50	20.29	20.34	20.37

Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		39675/2498.5	40620/2593	41565/2687.5
LTE Band 41	5MHz	QPSK	1	0	19.50	19.06	18.86	19.21
			1	12	19.50	19.21	18.92	19.30
			1	24	19.50	19.09	18.85	19.15
			12	0	18.50	18.15	17.86	18.27
			12	6	18.50	18.16	17.84	18.26
			12	11	18.50	18.15	17.88	18.21
			25	0	18.50	18.17	17.93	18.23
		16QAM	1	0	18.50	18.25	18.04	18.39
			1	12	18.50	18.42	18.14	18.48
			1	24	18.50	18.31	18.06	18.35
			12	0	17.50	17.17	16.90	17.28
			12	6	17.50	17.17	16.89	17.26
			12	11	17.50	17.17	16.91	17.23
			25	0	17.50	17.21	16.97	17.29

Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		39700/2501	40620/2593	41540/2685
LTE Band 41	10MHz	QPSK	1	0	19.50	19.21	19.03	19.30
			1	24	19.50	19.28	18.92	19.38
			1	49	19.50	19.20	18.98	19.25
			25	0	18.50	18.22	17.95	18.29
			25	12	18.50	18.25	17.96	18.33
			25	24	18.50	18.25	17.98	18.27
			50	0	18.50	18.23	17.97	18.29
		16QAM	1	0	19.00	18.42	18.25	18.54
			1	24	19.00	18.51	18.16	18.56
			1	49	19.00	18.42	18.20	18.49
			25	0	17.50	17.25	16.99	17.29
			25	12	17.50	17.24	17.00	17.35
			25	24	17.50	17.27	16.99	17.31
			50	0	17.50	17.26	16.99	17.34

Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		39725/2503.5	40620/2593	41515/2682.5
LTE Band 41	15MHz	QPSK	1	0	19.50	19.13	19.01	19.10
			1	37	19.50	19.22	18.81	19.17
			1	74	19.50	19.04	18.90	19.05
			36	0	18.50	18.16	17.92	18.16
			36	18	18.50	18.16	17.95	18.18
			36	37	18.50	18.10	17.89	18.10
			75	0	18.50	18.13	17.89	18.14
		16QAM	1	0	18.50	18.32	18.25	18.30
			1	37	18.50	18.43	18.15	18.37
			1	74	18.50	18.23	18.10	18.26
			36	0	17.50	17.12	16.89	17.12
			36	18	17.50	17.14	16.91	17.14
			36	37	17.50	17.09	16.86	17.08
			75	0	17.50	17.15	16.92	17.16

Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		39750/2506	40620/2593	41490/2680
LTE Band 41	20MHz	QPSK	1	0	19.50	19.00	18.94	18.97
			1	49	19.50	19.25	19.02	19.22
			1	99	19.50	18.88	18.76	18.88
			50	0	18.50	18.17	17.99	18.14
			50	24	18.50	18.14	17.91	18.16
			50	49	18.50	18.11	17.94	18.12
			100	0	18.50	18.16	17.99	18.16
		16QAM	1	0	18.50	18.19	18.13	18.20
			1	49	18.50	18.47	18.24	18.44
			1	99	18.50	18.08	18.00	18.10
			50	0	17.50	17.22	17.04	17.19
			50	24	17.50	17.18	16.96	17.21
			50	49	17.50	17.16	16.99	17.18
			100	0	17.50	17.18	17.02	17.19

Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB	RB		131979/1710.7	132322/1745	132665/177

			Size	Offset				9.3
LTE Band 66	1.4MHz	QPSK	1	0	23.50	22.92	22.91	22.42
			1	2	23.50	23.04	22.75	22.56
			1	5	23.50	22.92	22.57	22.42
			3	0	23.50	23.03	22.71	22.54
			3	1	23.50	23.04	22.69	22.55
			3	2	23.50	23.03	22.70	22.52
			6	0	22.50	22.03	21.68	21.57
		16QAM	1	0	22.50	22.07	21.89	21.63
			1	2	22.50	22.22	22.09	21.85
			1	5	22.50	22.01	21.92	21.66
			3	0	22.00	21.85	21.63	21.53
			3	1	22.00	21.76	21.77	21.58
			3	2	22.00	21.68	21.72	21.45
			6	0	21.00	20.84	20.79	20.67
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		131987/1711.5	132322/1745	132657/1778.5
LTE Band 66	3MHz	QPSK	1	0	23.00	22.52	22.69	22.50
			1	7	23.00	22.46	22.65	22.50
			1	14	23.00	22.52	22.64	22.51
			8	0	22.00	21.49	21.68	21.55
			8	4	22.00	21.54	21.70	21.58
			8	7	22.00	21.51	21.69	21.54
			15	0	22.00	21.51	21.69	21.58
		16QAM	1	0	22.00	21.81	21.98	21.65
			1	7	22.00	21.77	21.95	21.65
			1	14	22.00	21.74	21.87	21.75
			8	0	21.00	20.60	20.80	20.66
			8	4	21.00	20.63	20.82	20.66
			8	7	21.00	20.64	20.81	20.62
			15	0	21.00	20.56	20.71	20.60
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		131997/1712.5	132322/1745	132647/1777.5
LTE Band 66	5MHz	QPSK	1	0	23.00	22.37	22.57	22.42
			1	12	23.00	22.52	22.70	22.53
			1	24	23.00	22.47	22.54	22.42

			12	0	22.00	21.50	21.66	21.61
			12	6	22.00	21.58	21.72	21.63
			12	11	22.00	21.56	21.70	21.55
			25	0	22.00	21.54	21.70	21.59
		16QAM	1	0	22.00	21.69	21.88	21.56
			1	12	22.00	21.77	21.99	21.67
			1	24	22.00	21.71	21.73	21.61
			12	0	21.00	20.52	20.70	20.61
			12	6	21.00	20.60	20.77	20.63
			12	11	21.00	20.61	20.73	20.57
			25	0	21.00	20.58	20.76	20.60
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		132022/1715	132322/1745	132622/1775
LTE Band 66	10MHz	QPSK	1	0	23.00	22.45	22.62	22.52
			1	24	23.00	22.65	22.75	22.62
			1	49	23.00	22.60	22.62	22.47
			25	0	22.00	21.52	21.58	21.77
			25	12	22.00	21.63	21.73	21.65
			25	24	22.00	21.58	21.72	21.59
			50	0	22.00	21.58	21.66	21.69
		16QAM	1	0	22.50	21.75	21.86	21.72
			1	24	22.50	21.92	22.07	21.78
			1	49	22.50	21.83	21.91	21.75
			25	0	21.00	20.57	20.65	20.78
			25	12	21.00	20.70	20.77	20.67
			25	24	21.00	20.64	20.78	20.59
			50	0	21.00	20.60	20.70	20.71
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		132047/1717.5	132322/1745	132597/1772.5
LTE Band 66	15MHz	QPSK	1	0	23.00	22.42	22.59	22.41
			1	37	23.00	22.61	22.67	22.44
			1	74	23.00	22.63	22.53	22.34
			36	0	22.00	21.58	21.64	21.65
			36	18	22.00	21.68	21.72	21.57
			36	37	22.00	21.68	21.70	21.49
			75	0	22.00	21.61	21.68	21.61

		16QAM	1	0	22.00	21.60	21.85	21.62
			1	37	22.00	21.91	21.96	21.68
			1	74	22.00	21.88	21.68	21.59
			36	0	21.00	20.58	20.65	20.64
			36	18	21.00	20.69	20.72	20.56
			36	37	21.00	20.69	20.69	20.47
			75	0	21.00	20.65	20.71	20.59
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		132072/1720	132322/1745	132572/1770
LTE Band 66	20MHz	QPSK	1	0	23.00	22.22	22.40	22.29
			1	49	23.00	22.69	22.73	22.53
			1	99	23.00	22.48	22.33	22.22
			50	0	22.00	21.71	21.60	21.79
			50	24	22.00	21.70	21.67	21.63
			50	49	22.00	21.67	21.77	21.40
			100	0	22.00	21.63	21.67	21.63
		16QAM	1	0	22.00	21.55	21.64	21.45
			1	49	22.00	21.92	21.96	21.78
			1	99	22.00	21.72	21.63	21.42
			50	0	21.00	20.73	20.64	20.79
			50	24	21.00	20.74	20.72	20.62
			50	49	21.00	20.71	20.80	20.41
			100	0	21.00	20.67	20.70	20.62

Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		133147/665.5	133297/680.5	133447/695.5
LTE Band 71	5MHz	QPSK	1	0	22.00	21.94	21.63	21.87
			1	12	22.00	21.96	21.78	21.93
			1	24	22.00	21.79	21.73	21.76
			12	0	21.50	21.02	20.81	21.05
			12	6	21.50	20.99	20.85	21.01
			12	11	21.50	20.92	20.78	20.91
			25	0	21.00	20.95	20.84	21.00
		16QAM	1	0	21.50	21.26	20.94	21.16
			1	12	21.50	21.20	21.01	21.11
			1	24	21.50	20.90	21.04	21.08

			12	0	20.50	19.95	19.75	20.02
			12	6	20.50	19.96	19.81	19.98
			12	11	20.50	19.89	19.73	19.89
			25	0	20.00	19.93	19.79	19.99
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		133172/668	133297/680.5	133422/693
LTE Band 71	10MHz	QPSK	1	0	22.50	22.06	21.69	22.02
			1	24	22.50	21.98	21.86	22.01
			1	49	22.50	21.70	21.88	21.85
			25	0	21.50	21.04	20.90	21.10
			25	12	21.50	20.94	20.86	21.02
			25	24	21.50	20.98	20.87	20.87
			50	0	21.50	21.05	20.87	21.03
		16QAM	1	0	21.50	21.35	21.01	21.17
			1	24	21.50	21.15	21.17	21.26
			1	49	21.50	21.01	21.13	21.05
			25	0	20.50	20.01	19.89	20.09
			25	12	20.50	19.91	19.83	20.03
			25	24	20.50	19.97	19.84	19.86
			50	0	20.50	20.02	19.85	20.00
Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		133197/670.5	133297/680.5	133397/690.5
LTE Band 71	15MHz	QPSK	1	0	22.50	22.02	21.69	21.86
			1	37	22.50	21.81	21.79	22.05
			1	74	22.50	21.65	21.88	21.82
			36	0	21.50	20.97	20.85	20.98
			36	18	21.50	20.88	20.89	21.09
			36	37	21.50	20.80	20.94	20.95
			75	0	21.00	20.88	20.88	20.96
		16QAM	1	0	21.50	21.26	20.91	21.02
			1	37	21.50	20.99	21.07	21.21
			1	74	21.50	20.90	21.10	20.94
			36	0	20.50	19.91	19.77	19.93
			36	18	20.50	19.82	19.83	20.01
			36	37	20.50	19.76	19.88	19.88
			75	0	20.00	19.86	19.85	19.93

Band	Band Width	Modulation	RB Configuration		Tune-up (dBm)	Channel/Frequency(MHz)		
			RB Size	RB Offset		133222/673	133322/683	133372/688
LTE Band 71	20MHz	QPSK	1	0	22.50	21.84	21.58	21.59
			1	49	22.50	21.87	21.85	22.05
			1	99	22.50	21.57	21.77	21.63
			50	0	21.50	20.82	20.85	21.03
			50	24	21.50	20.82	20.88	21.05
			50	49	21.50	20.67	21.05	20.95
			100	0	21.00	20.69	20.91	20.96
		16QAM	1	0	21.50	21.08	20.83	20.75
			1	49	21.50	21.03	21.06	21.29
			1	99	21.50	20.76	21.01	20.96
			50	0	20.50	19.77	19.85	20.02
			50	24	20.50	19.77	19.85	20.01
			50	49	20.50	19.63	20.01	19.95
			100	0	20.00	19.67	19.90	19.94

7.4. WLAN & Bluetooth Output Power

Mode	Channel	Frequency (MHz)	Tune-up (dBm)	Output Power (dBm)
802.11b	1	2412	16.00	15.19
	6	2437	16.00	15.70
	11	2462	16.00	15.77
802.11g	1	2412	15.50	14.65
	6	2437	15.50	15.41
	11	2462	15.50	15.36
802.11n HT20	1	2412	13.00	12.00
	6	2437	14.00	13.60
	11	2462	14.00	13.55
802.11n HT40	3	2422	14.50	14.12
	6	2437	14.50	14.25
	9	2452	14.50	14.43

NOTE: Power measurement results of WLAN 2.4G.

Mode	Channel	Frequency (MHz)	Tune-up (dBm)	Output Power (dBm)

802.11a	36	5180	12.00	11.78
	40	5200	12.00	11.84
	48	5240	12.00	11.65
802.11n HT20	36	5180	11.50	11.24
	40	5200	11.50	11.44
	48	5240	11.50	11.42
802.11n HT40	38	5190	11.00	9.87
	46	5230	11.00	10.57
802.11ac VHT20	36	5180	11.50	11.09
	40	5200	11.50	11.24
	48	5240	11.50	11.48
802.11ac VHT40	38	5190	11.00	10.02
	46	5230	11.00	10.69
802.11ac VHT80	42	5210	9.50	9.15

NOTE: Power measurement results of WLAN 5.2G.

Mode	Channel	Frequency (MHz)	Tune-up (dBm)	Output Power (dBm)
802.11a	149	5745	11.50	10.33
	157	5785	11.50	11.27
	165	5825	11.50	11.32
802.11n HT20	149	5745	12.00	10.30
	157	5785	12.00	11.24
	165	5825	12.00	11.52
802.11n HT40	151	5755	11.50	10.57
	159	5795	11.50	11.32
802.11ac VHT20	149	5745	11.50	10.18
	157	5785	11.50	11.15
	165	5825	11.50	11.30
802.11ac VHT40	151	5755	11.50	10.40
	159	5795	11.50	11.31
802.11ac VHT80	155	5775	10.50	10.28

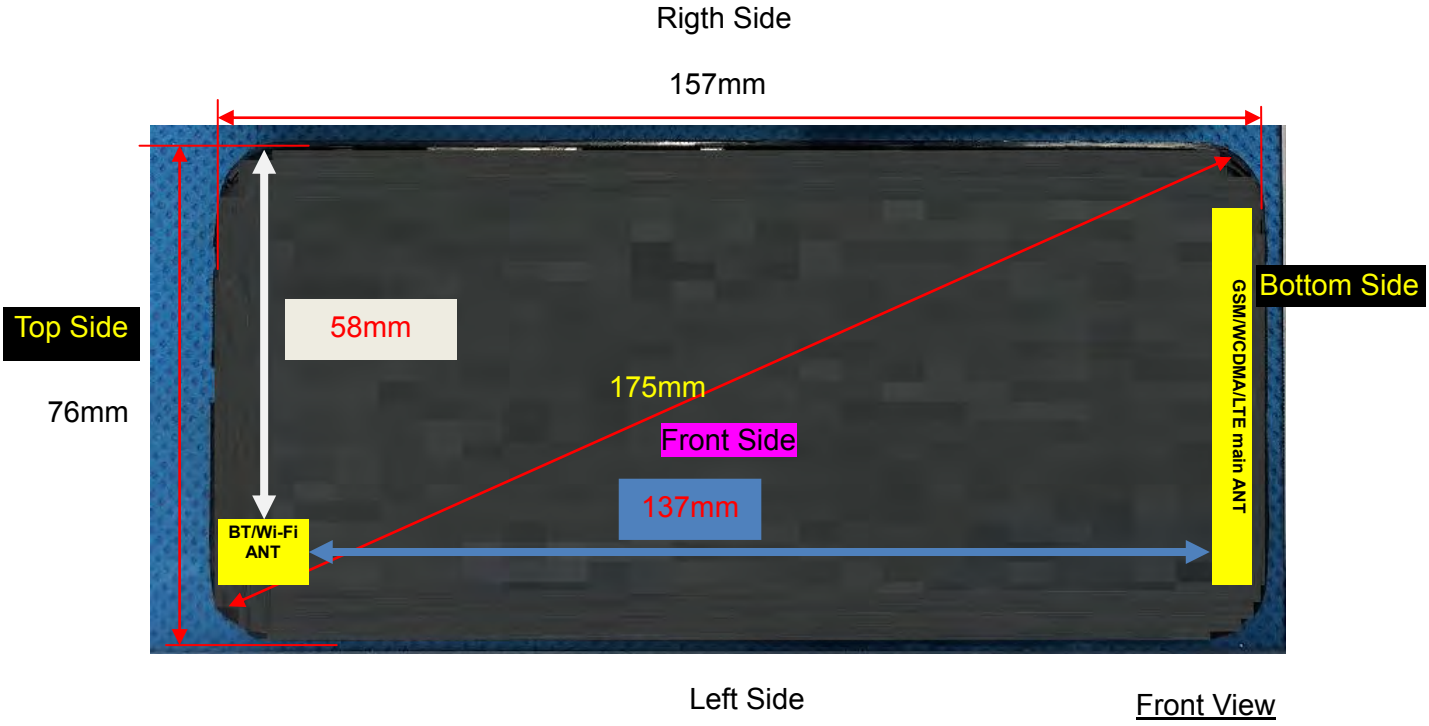
NOTE: Power measurement results of WLAN 5.8G.

	Output Power (dBm)				
	Channel	Tune-up (dBm)	Data Rates		
			1M	2M	3M
BR+EDR	0CH	4.00	3.87	3.04	3.01
	39CH	6.00	5.04	4.47	4.34
	78CH	9.50	9.38	8.56	8.43

	Channel	Tune-up (dBm)	Output Power (dBm)
BLE			1M
	0CH	3.00	2.63
	19CH	3.00	2.18
	39CH	2.00	1.11

NOTE: Power measurement results of Bluetooth.

8. Antenna Location



Note: Since the confidentiality request of EUT，the antenna location example diagram see as above.

Distance of the Antenna to the EUT surface/edge						
Antennas	Front Side	Back Side	Left Side	Right Side	Top Side	Bottom Side
WWAN Main ANT	≤ 25mm	≤ 25mm	≤ 25mm	≤ 25mm	> 25mm	≤ 25mm
WLAN & Bluetooth	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	>25mm
Positions for SAR tests						
Antennas	Front Side	Back Side	Left Side	Right Side	Top Side	Bottom Side
WWAN Main ANT	Yes	Yes	Yes	Yes	NO	Yes
WLAN & Bluetooth	Yes	Yes	Yes	NO	Yes	NO

9. Stand-alone SAR test exclusion

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

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[$\sqrt{f_{(GHZ)}}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where:

- $f_{(GHZ)}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Mode	P_{max}	P_{max}	Distance	f	Calculation	SAR Exclusion	SAR test

	(dBm)	(mW)	(mm)	(GHz)	Result	threshold	exclusion
Bluetooth	9.50	8.91	5	2.480	2.8	3	Yes

NOTE: Standalone SAR test exclusion for Bluetooth.

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] * [$\sqrt{f_{(GHZ)}}$/x] W/kg for test separation distances ≤ 50mm, where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Mode	Position	P_{max} (dBm)	P_{max} (mW)	Distance (mm)	f (GHz)	x	Estimated SAR (W/Kg)
Bluetooth	Head	9.50	8.91	5	2.48	7.5	0.373
Bluetooth	Body	9.50	8.91	10	2.48	7.5	0.187
Bluetooth	Hotspot	9.50	8.91	10	2.48	7.5	0.187

NOTE: Estimated SAR calculation for Bluetooth

10. SAR Results

10.1. SAR measurement Result

10.1.1. SAR measurement Result of GSM850

Test Position of Head	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Left Cheek	189/836.4	GPRS(GMSK 4TS)	0.227	0.170	1.74	28.97	29.50	0.256	2024/1/10	1#
Left Tilt 15 Degree	189/836.4	GPRS(GMSK 4TS)	0.126	0.090	-1.86	28.97	29.50	0.142	2024/1/10	
Right Cheek	189/836.4	GPRS(GMSK 4TS)	0.211	0.152	-3.03	28.97	29.50	0.238	2024/1/10	
Right Tilt 15 Degree	189/836.4	GPRS(GMSK 4TS)	0.113	0.081	1.60	28.97	29.50	0.128	2024/1/10	

NOTE: Head SAR test results of GSM850.

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date	Plot
			1g	10g						
Front Side	189/836.4	GPRS(GMSK 4TS)	0.162	0.108	-2.84	28.97	29.50	0.183	2024/1/10	
Back Side	189/836.4	GPRS(GMSK 4TS)	0.224	0.152	3.04	28.97	29.50	0.253	2024/1/10	2#

NOTE: Body-Worn SAR test results of GSM850

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	189/836.4	GPRS(GMSK 4TS)	0.162	0.108	-2.84	28.97	29.50	0.183	2024/1/10	
Back Side	189/836.4	GPRS(GMSK 4TS)	0.224	0.152	3.04	28.97	29.50	0.253	2024/1/10	2#
Left Side	189/836.4	GPRS(GMSK 4TS)	0.078	0.053	-0.23	28.97	29.50	0.088	2024/1/10	
Right Side	189/836.4	GPRS(GMSK 4TS)	0.069	0.046	0.50	28.97	29.50	0.078	2024/1/10	
Bottom Side	189/836.4	GPRS(GMSK 4TS)	0.125	0.081	0.39	28.97	29.50	0.141	2024/1/10	

NOTE: Hotspot SAR test results of GSM850

10.1.2. SAR measurement Result of GSM1900

Test Position of Head	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Left Cheek	661/1880	GPRS(GMSK 4TS)	0.121	0.077	-2.42	25.24	26.00	0.144	2024/1/11	3#
Left Tilt 15 Degree	661/1880	GPRS(GMSK 4TS)	0.068	0.043	3.49	25.24	26.00	0.081	2024/1/11	
Right Cheek	661/1880	GPRS(GMSK 4TS)	0.107	0.065	-0.47	25.24	26.00	0.127	2024/1/11	
Right Tilt 15 Degree	661/1880	GPRS(GMSK 4TS)	0.055	0.034	-2.44	25.24	26.00	0.066	2024/1/11	

NOTE: Head SAR test results of GSM1900

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date	Plot
			1g	10g						
Front Side	661/1880	GPRS(GMSK 4TS)	0.402	0.198	-0.68	25.24	26.00	0.479	2024/1/11	
Back Side	661/1880	GPRS(GMSK 4TS)	0.665	0.337	0.41	25.24	26.00	0.792	2024/1/11	4#

NOTE: Body-Worn SAR test results of GSM1900

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	661/1880	GPRS(GMSK 4TS)	0.402	0.198	-0.68	25.24	26.00	0.479	2024/1/11	
Back Side	661/1880	GPRS(GMSK 4TS)	0.665	0.337	0.41	25.24	26.00	0.792	2024/1/11	4#
Left Side	661/1880	GPRS(GMSK 4TS)	0.207	0.102	-0.87	25.24	26.00	0.247	2024/1/11	
Right Side	661/1880	GPRS(GMSK 4TS)	0.204	0.103	-2.81	25.24	26.00	0.243	2024/1/11	
Bottom Side	661/1880	GPRS(GMSK 4TS)	0.335	0.161	-3.37	25.24	26.00	0.399	2024/1/11	

NOTE: Hotspot SAR test results of GSM1900

10.1.3. SAR measurement Result of WCDMA Band 2

Test Position of Head	Test channel /Freq	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Left Cheek	9400/1880	RMC12.2K	0.096	0.063	-0.88	23.48	24.00	0.108	2024/1/11	5#
Left Tilt 15 Degree	9400/1880	RMC12.2K	0.049	0.032	-2.96	23.48	24.00	0.055	2024/1/11	
Right Cheek	9400/1880	RMC12.2K	0.083	0.053	0.02	23.48	24.00	0.094	2024/1/11	
Right Tilt 15 Degree	9400/1880	RMC12.2K	0.040	0.026	-1.51	23.48	24.00	0.045	2024/1/11	

NOTE: Head SAR test results of WCDMA Band 2

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date	Plot
			1g	10g						

Front Side	9400/1880	RMC12.2K	0.546	0.267	-3.09	23.48	24.00	0.615	2024/1/11	
Back Side	9400/1880	RMC12.2K	0.881	0.444	-0.51	23.48	24.00	0.993	2024/1/11	
Back Side	9262/1852.4	RMC12.2K	0.775	0.399	-0.37	23.40	24.00	0.890	2024/1/11	
Back Side	9538/1907.6	RMC12.2K	1.035	0.514	-0.61	23.52	24.00	1.156	2024/1/11	6#
BackSide Repeated	9538/1907.6	RMC12.2K	1.015	0.502	2.05	23.52	24.00	1.134	2024/1/11	

NOTE: Body-Worn SAR test results of WCDMA Band 2

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	9400/1880	RMC12.2K	0.546	0.267	-3.09	23.48	24.00	0.615	2024/1/11	
Back Side	9400/1880	RMC12.2K	0.881	0.444	-0.51	23.48	24.00	0.993	2024/1/11	
Left Side	9400/1880	RMC12.2K	0.276	0.136	1.97	23.48	24.00	0.311	2024/1/11	
Right Side	9400/1880	RMC12.2K	0.279	0.135	-3.32	23.48	24.00	0.314	2024/1/11	
Bottom Side	9400/1880	RMC12.2K	0.455	0.218	-3.78	23.48	24.00	0.513	2024/1/11	
Back Side	9262/1852.4	RMC12.2K	0.775	0.399	-0.37	23.40	24.00	0.890	2024/1/11	
Back Side	9538/1907.6	RMC12.2K	1.035	0.514	-0.61	23.52	24.00	1.156	2024/1/11	6#
BackSide Repeated	9538/1907.6	RMC12.2K	1.015	0.502	2.05	23.52	24.00	1.134	2024/1/11	

NOTE: Hotspot SAR test results of WCDMA Band 2

10.1.4. SAR measurement Result of WCDMA Band 4

Test Position of Head	Test channel /Freq	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Left Cheek	1413/1732.6	RMC12.2K	0.118	0.079	-0.11	23.32	23.50	0.123	2024/1/20	7#
Left Tilt 15 Degree	1413/1732.6	RMC12.2K	0.071	0.046	-2.59	23.32	23.50	0.074	2024/1/20	
Right Cheek	1413/1732.6	RMC12.2K	0.106	0.070	-0.06	23.32	23.50	0.110	2024/1/20	
Right Tilt 15	1413/1732.6	RMC12.2K	0.052	0.033	1.51	23.32	23.50	0.054	2024/1/20	

Degree										

NOTE: Head SAR test results of WCDMA Band 4

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date	Plot
			1g	10g						
Front Side	1413/1732.6	RMC12.2K	0.216	0.126	-0.46	23.32	23.50	0.225	2024/1/20	
Back Side	1413/1732.6	RMC12.2K	0.331	0.193	-0.61	23.32	23.50	0.345	2024/1/20	8#

NOTE: Body-Worn SAR test results of WCDMA Band 4

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	1413/1732.6	RMC12.2K	0.216	0.126	-0.46	23.32	23.50	0.225	2024/1/20	
Back Side	1413/1732.6	RMC12.2K	0.331	0.193	-0.61	23.32	23.50	0.345	2024/1/20	8#
Left Side	1413/1732.6	RMC12.2K	0.102	0.061	3.61	23.32	23.50	0.106	2024/1/20	
Right Side	1413/1732.6	RMC12.2K	0.111	0.064	-4.00	23.32	23.50	0.116	2024/1/20	
Bottom Side	1413/1732.6	RMC12.2K	0.175	0.099	-0.41	23.32	23.50	0.182	2024/1/20	

NOTE: Hotspot SAR test results of WCDMA Band 4

10.1.5. SAR measurement Result of WCDMA Band 5

Test Position of Head	Test channel /Freq	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Left Cheek	4182/836.4	RMC12.2K	0.164	0.126	0.59	22.84	23.00	0.170	2024/1/10	9#
Left Tilt 15 Degree	4182/836.4	RMC12.2K	0.083	0.062	-1.49	22.84	23.00	0.086	2024/1/10	
Right Cheek	4182/836.4	RMC12.2K	0.143	0.108	-3.21	22.84	23.00	0.148	2024/1/10	

Right Tilt 15 Degree	4182/836.4	RMC12.2K	0.077	0.057	-1.69	22.84	23.00	0.080	2024/1/10	

NOTE: Head SAR test results of WCDMA Band 5

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date	Plot
			1g	10g						
Front Side	4182/836.4	RMC12.2K	0.173	0.118	-1.43	22.84	23.00	0.179	2024/1/10	
Back Side	4182/836.4	RMC12.2K	0.175	0.130	-0.45	22.84	23.00	0.182	2024/1/10	10#

NOTE: Body-Worn SAR test results of WCDMA Band 5

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	4182/836.4	RMC12.2K	0.173	0.118	-1.43	22.84	23.00	0.179	2024/1/10	
Back Side	4182/836.4	RMC12.2K	0.175	0.130	-0.45	22.84	23.00	0.182	2024/1/10	10#
Left Side	4182/836.4	RMC12.2K	0.057	0.041	-1.33	22.84	23.00	0.059	2024/1/10	
Right Side	4182/836.4	RMC12.2K	0.054	0.040	-2.89	22.84	23.00	0.056	2024/1/10	
Bottom Side	4182/836.4	RMC12.2K	0.090	0.064	2.56	22.84	23.00	0.093	2024/1/10	

NOTE: Hotspot SAR test results of WCDMA Band 5

10.1.6. SAR measurement Result of LTE Band 2

Test Position of Head	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Left Cheek	18900/1880	20M QPSK(1,49)	0.138	0.087	-4.50	23.17	23.50	0.149	2024/1/11	17#

Left Tilt 15 Degree	18900/1880	20M QPSK(1,49)	0.078	0.048	0.23	23.17	23.50	0.084	2024/1/11	
Right Cheek	18900/1880	20M QPSK(1,49)	0.122	0.076	-2.94	23.17	23.50	0.132	2024/1/11	
Right Tilt 15 Degree	18900/1880	20M QPSK(1,49)	0.058	0.035	-0.72	23.17	23.50	0.063	2024/1/11	
50%RB										
Left Cheek	18900/1880	20M QPSK(50,0)	0.073	0.048	0.31	22.13	23.00	0.089	2024/1/11	
Left Tilt 15 Degree	18900/1880	20M QPSK(50,0)	0.041	0.027	0.98	22.13	23.00	0.050	2024/1/11	
Right Cheek	18900/1880	20M QPSK(50,0)	0.065	0.041	3.76	22.13	23.00	0.079	2024/1/11	
Right Tilt 15 Degree	18900/1880	20M QPSK(50,0)	0.029	0.020	-3.81	22.13	23.00	0.035	2024/1/11	

NOTE: Head SAR test results of LTE Band 2

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date	Plot
			1g	10g						
1RB										
Front Side	18900/1880	20M QPSK(1,49)	0.516	0.259	3.98	23.17	23.50	0.557	2024/1/11	
Back Side	18900/1880	20M QPSK(1,49)	0.825	0.414	-3.97	23.17	23.50	0.890	2024/1/11	
Back Side	18700/1860	20M QPSK(1,49)	0.722	0.373	-0.61	23.37	23.50	0.744	2024/1/11	
Back Side	19100/1900	20M QPSK(1,49)	0.943	0.472	0.15	23.40	23.50	0.965	2024/1/11	18#
BackSide Repeated	19100/1900	20M QPSK(1,49)	0.938	0.466	1.02	23.40	23.50	0.960	2024/1/11	
50%RB										
Front Side	18900/1880	20M QPSK(50,0)	0.275	0.136	0.96	22.13	23.00	0.336	2024/1/11	
Back Side	18900/1880	20M QPSK(50,0)	0.473	0.215	0.87	22.13	23.00	0.578	2024/1/11	

NOTE: Body-Worn SAR test results of LTE Band 2

Test	Test	Mode	SAR Value	Power	Conducte	Tune-u	Scaled	Date	Plot

Position of Hotspot with 10mm	channel /Freq.		(W/kg)		Drift(%)	d Power (dBm)	p Power (dBm)	SAR 1-g (W/Kg)		
			1-g	10-g						
1RB										
Front Side	18900/1880	20M QPSK(1,49)	0.516	0.259	3.98	23.17	23.50	0.557	2024/1/11	
Back Side	18900/1880	20M QPSK(1,49)	0.825	0.414	-3.97	23.17	23.50	0.890	2024/1/11	
Left Side	18900/1880	20M QPSK(1,49)	0.258	0.128	-2.00	23.17	23.50	0.278	2024/1/11	
Right Side	18900/1880	20M QPSK(1,49)	0.252	0.126	1.90	23.17	23.50	0.272	2024/1/11	
Bottom Side	18900/1880	20M QPSK(1,49)	0.430	0.214	-0.79	23.17	23.50	0.464	2024/1/11	
Back Side	18700/1860	20M QPSK(1,49)	0.722	0.373	-0.61	23.37	23.50	0.744	2024/1/11	
Back Side	19100/1900	20M QPSK(1,49)	0.943	0.472	0.15	23.40	23.50	0.965	2024/1/11	18#
BackSide Repeated	19100/1900	20M QPSK(1,49)	0.938	0.466	1.02	23.40	23.50	0.960	2024/1/11	
50%RB										
Front Side	18900/1880	20M QPSK(50,0)	0.275	0.136	0.96	22.13	23.00	0.336	2024/1/11	
Back Side	18900/1880	20M QPSK(50,0)	0.473	0.215	0.87	22.13	23.00	0.578	2024/1/11	
Left Side	18900/1880	20M QPSK(50,0)	0.133	0.072	-4.96	22.13	23.00	0.162	2024/1/11	
Right Side	18900/1880	20M QPSK(50,0)	0.144	0.069	3.36	22.13	23.00	0.176	2024/1/11	
Bottom Side	18900/1880	20M QPSK(50,0)	0.231	0.110	-4.95	22.13	23.00	0.282	2024/1/11	
100%RB										
Back Side	18900/1880	20M QPSK(100,0)	0.278	0.139	1.36	22.13	22.50	0.303	2024/1/11	

NOTE: Hotspot SAR test results of LTE Band 2

10.1.7. SAR measurement Result of LTE Band 4

Test Position of Head	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						

1RB										
Left Cheek	20175/1732.5	20M QPSK(1,49)	0.103	0.069	4.45	22.73	23.00	0.110	2024/1/20	19#
Left Tilt 15 Degree	20175/1732.5	20M QPSK(1,49)	0.061	0.040	-3.73	22.73	23.00	0.065	2024/1/20	
Right Cheek	20175/1732.5	20M QPSK(1,49)	0.095	0.064	-0.55	22.73	23.00	0.101	2024/1/20	
Right Tilt 15 Degree	20175/1732.5	20M QPSK(1,49)	0.051	0.033	2.02	22.73	23.00	0.054	2024/1/20	
50%RB										
Left Cheek	20175/1732.5	20M QPSK(50,49)	0.062	0.036	-1.91	21.82	22.00	0.065	2024/1/20	
Left Tilt 15 Degree	20175/1732.5	20M QPSK(50,49)	0.034	0.021	1.93	21.82	22.00	0.035	2024/1/20	
Right Cheek	20175/1732.5	20M QPSK(50,49)	0.053	0.038	0.22	21.82	22.00	0.055	2024/1/20	
Right Tilt 15 Degree	20175/1732.5	20M QPSK(50,49)	0.026	0.017	-1.42	21.82	22.00	0.027	2024/1/20	

NOTE: Head SAR test results of LTE Band 4

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date	Plot
			1g	10g						
1RB										
Front Side	20175/1732.5	20M QPSK(1,49)	0.174	0.099	-0.23	22.73	23.00	0.185	2024/1/20	
Back Side	20175/1732.5	20M QPSK(1,49)	0.272	0.159	1.96	22.73	23.00	0.289	2024/1/20	20#
50%RB										
Front Side	20175/1732.5	20M QPSK(50,49)	0.095	0.052	-1.10	21.82	22.00	0.099	2024/1/20	
Back Side	20175/1732.5	20M QPSK(50,49)	0.149	0.082	-4.03	21.82	22.00	0.155	2024/1/20	

NOTE: Body-Worn SAR test results of LTE Band 4

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Front Side	20175/1732.5	20M QPSK(1,49)	0.174	0.099	-0.23	22.73	23.00	0.185	2024/1/20	
Back Side	20175/1732.5	20M QPSK(1,49)	0.272	0.159	1.96	22.73	23.00	0.289	2024/1/20	20#
Left Side	20175/1732.5	20M QPSK(1,49)	0.093	0.053	3.87	22.73	23.00	0.099	2024/1/20	
Right Side	20175/1732.5	20M QPSK(1,49)	0.084	0.048	2.38	22.73	23.00	0.089	2024/1/20	
Bottom Side	20175/1732.5	20M QPSK(1,49)	0.155	0.086	1.38	22.73	23.00	0.165	2024/1/20	
50%RB										
Front Side	20175/1732.5	20M QPSK(50,49)	0.095	0.052	-1.10	21.82	22.00	0.099	2024/1/20	
Back Side	20175/1732.5	20M QPSK(50,49)	0.149	0.082	-4.03	21.82	22.00	0.155	2024/1/20	
Left Side	20175/1732.5	20M QPSK(50,49)	0.050	0.031	-0.03	21.82	22.00	0.052	2024/1/20	
Right Side	20175/1732.5	20M QPSK(50,49)	0.048	0.027	-3.56	21.82	22.00	0.050	2024/1/20	
Bottom Side	20175/1732.5	20M QPSK(50,49)	0.089	0.047	1.90	21.82	22.00	0.093	2024/1/20	

NOTE: Hotspot SAR test results of LTE Band 4

10.1.8. SAR measurement Result of LTE Band 5

Test Position of Head	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Left Cheek	20525/836.5	10M QPSK(1,24)	0.155	0.119	0.61	22.38	22.50	0.159	2024/1/10	21#

Left Tilt 15 Degree	20525/836.5	10M QPSK(1,24)	0.091	0.068	3.59	22.38	22.50	0.094	2024/1/10	
Right Cheek	20525/836.5	10M QPSK(1,24)	0.141	0.104	-3.72	22.38	22.50	0.145	2024/1/10	
Right Tilt 15 Degree	20525/836.5	10M QPSK(1,24)	0.071	0.052	-0.34	22.38	22.50	0.073	2024/1/10	
50%RB										
Left Cheek	20525/836.5	10M QPSK(25,0)	0.091	0.060	2.79	21.38	21.50	0.094	2024/1/10	
Left Tilt 15 Degree	20525/836.5	10M QPSK(25,0)	0.049	0.036	-2.24	21.38	21.50	0.050	2024/1/10	
Right Cheek	20525/836.5	10M QPSK(25,0)	0.077	0.056	2.62	21.38	21.50	0.079	2024/1/10	
Right Tilt 15 Degree	20525/836.5	10M QPSK(25,0)	0.041	0.026	-1.25	21.38	21.50	0.042	2024/1/10	

NOTE: Head SAR test results of LTE Band 5

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date	Plot
			1g	10g						
1RB										
Front Side	20525/836.5	10M QPSK(1,24)	0.177	0.131	-0.43	22.38	22.50	0.182	2024/1/10	
Back Side	20525/836.5	10M QPSK(1,24)	0.192	0.132	-1.40	22.38	22.50	0.197	2024/1/10	22#
50%RB										
Front Side	20525/836.5	10M QPSK(25,0)	0.114	0.074	1.44	21.38	21.50	0.117	2024/1/10	
Back Side	20525/836.5	10M QPSK(25,0)	0.094	0.078	0.45	21.38	21.50	0.097	2024/1/10	

NOTE: Body-Worn SAR test results of LTE Band 5

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Front Side	20525/836.5	10M QPSK(1,24)	0.177	0.131	-0.43	22.38	22.50	0.182	2024/1/10	
Back Side	20525/836.5	10M QPSK(1,24)	0.192	0.132	-1.40	22.38	22.50	0.197	2024/1/10	22#
Left Side	20525/836.5	10M QPSK(1,24)	0.057	0.042	1.69	22.38	22.50	0.059	2024/1/10	
Right Side	20525/836.5	10M QPSK(1,24)	0.052	0.036	-0.73	22.38	22.50	0.053	2024/1/10	
Bottom Side	20525/836.5	10M QPSK(1,24)	0.100	0.072	2.12	22.38	22.50	0.103	2024/1/10	
50%RB										
Front Side	20525/836.5	10M QPSK(25,0)	0.114	0.074	1.44	21.38	21.50	0.117	2024/1/10	
Back Side	20525/836.5	10M QPSK(25,0)	0.094	0.078	0.45	21.38	21.50	0.097	2024/1/10	
Left Side	20525/836.5	10M QPSK(25,0)	0.031	0.024	-0.58	21.38	21.50	0.032	2024/1/10	
Right Side	20525/836.5	10M QPSK(25,0)	0.027	0.020	1.43	21.38	21.50	0.028	2024/1/10	
Bottom Side	20525/836.5	10M QPSK(25,0)	0.055	0.039	1.64	21.38	21.50	0.057	2024/1/10	

NOTE: Hotspot SAR test results of LTE Band 5

10.1.9. SAR measurement Result of LTE Band 12

Test Position of Head	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Left Cheek	23095/707.5	10M QPSK(1,24)	0.172	0.139	0.46	22.20	22.50	0.184	2024/1/19	23#

Left Tilt 15 Degree	23095/707.5	10M QPSK(1,24)	0.088	0.068	2.55	22.20	22.50	0.094	2024/1/19	
Right Cheek	23095/707.5	10M QPSK(1,24)	0.147	0.113	2.41	22.20	22.50	0.158	2024/1/19	
Right Tilt 15 Degree	23095/707.5	10M QPSK(1,24)	0.075	0.059	2.32	22.20	22.50	0.080	2024/1/19	
50%RB										
Left Cheek	23095/707.5	10M QPSK(25,24)	0.091	0.083	-2.42	21.15	21.50	0.099	2024/1/19	
Left Tilt 15 Degree	23095/707.5	10M QPSK(25,24)	0.049	0.037	3.26	21.15	21.50	0.053	2024/1/19	
Right Cheek	23095/707.5	10M QPSK(25,24)	0.075	0.066	-1.10	21.15	21.50	0.081	2024/1/19	
Right Tilt 15 Degree	23095/707.5	10M QPSK(25,24)	0.042	0.034	-0.09	21.15	21.50	0.046	2024/1/19	

NOTE: Head SAR test results of LTE Band 12

Test Position of Body-Worn with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Front Side	23095/707.5	10M QPSK(1,24)	0.180	0.144	-0.62	22.20	22.50	0.193	2024/1/19	
Back Side	23095/707.5	10M QPSK(1,24)	0.319	0.251	-2.47	22.20	22.50	0.342	2024/1/19	24#
50%RB										
Front Side	23095/707.5	10M QPSK(25,24)	0.095	0.080	3.49	21.15	21.50	0.103	2024/1/19	
Back Side	23095/707.5	10M QPSK(25,24)	0.171	0.147	4.72	21.15	21.50	0.185	2024/1/19	

NOTE: Body-Worn SAR test results of LTE Band 12

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										

Front Side	23095/707.5	10M QPSK(1,24)	0.180	0.144	-0.62	22.20	22.50	0.193	2024/1/19	
Back Side	23095/707.5	10M QPSK(1,24)	0.319	0.251	-2.47	22.20	22.50	0.342	2024/1/19	24#
Left Side	23095/707.5	10M QPSK(1,24)	0.099	0.077	0.33	22.20	22.50	0.106	2024/1/19	
Right Side	23095/707.5	10M QPSK(1,24)	0.105	0.082	3.56	22.20	22.50	0.113	2024/1/19	
Bottom Side	23095/707.5	10M QPSK(1,24)	0.175	0.138	1.52	22.20	22.50	0.188	2024/1/19	
50%RB										
Front Side	23095/707.5	10M QPSK(25,24)	0.095	0.080	3.49	21.15	21.50	0.103	2024/1/19	
Back Side	23095/707.5	10M QPSK(25,24)	0.171	0.147	4.72	21.15	21.50	0.185	2024/1/19	
Left Side	23095/707.5	10M QPSK(25,24)	0.057	0.044	4.04	21.15	21.50	0.062	2024/1/19	
Right Side	23095/707.5	10M QPSK(25,24)	0.055	0.040	-4.98	21.15	21.50	0.060	2024/1/19	
Bottom Side	23095/707.5	10M QPSK(25,24)	0.091	0.077	1.71	21.15	21.50	0.099	2024/1/19	

NOTE: Hotspot SAR test results of LTE Band 12

10.1.10. SAR measurement Result of LTE Band 17

Test Position of Head	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Left Cheek	23790/710	10M QPSK(1,24)	0.179	0.144	0.89	22.21	22.50	0.191	2024/1/19	25#
Left Tilt 15 Degree	23790/710	10M QPSK(1,24)	0.101	0.079	3.86	22.21	22.50	0.108	2024/1/19	
Right Cheek	23790/710	10M QPSK(1,24)	0.169	0.131	-1.30	22.21	22.50	0.181	2024/1/19	
Right Tilt 15	23790/710	10M QPSK(1,24)	0.092	0.074	-0.88	22.21	22.50	0.098	2024/1/19	

Degree										
50%RB										
Left Cheek	23790/710	10M QPSK(25,24)	0.099	0.075	-4.85	21.34	21.50	0.103	2024/1/19	
Left Tilt 15 Degree	23790/710	10M QPSK(25,24)	0.056	0.040	4.83	21.34	21.50	0.058	2024/1/19	
Right Cheek	23790/710	10M QPSK(25,24)	0.087	0.071	-2.56	21.34	21.50	0.090	2024/1/19	
Right Tilt 15 Degree	23790/710	10M QPSK(25,24)	0.053	0.041	2.38	21.34	21.50	0.055	2024/1/19	

NOTE: Head SAR test results of LTE Band 17

Test Position of Body-Worn with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Front Side	23790/710	10M QPSK(1,24)	0.177	0.141	-2.99	22.21	22.50	0.189	2024/1/19	
Back Side	23790/710	10M QPSK(1,24)	0.315	0.248	-0.95	22.21	22.50	0.337	2024/1/19	26#
50%RB										
Front Side	23790/710	10M QPSK(25,24)	0.099	0.075	2.80	21.34	21.50	0.103	2024/1/19	
Back Side	23790/710	10M QPSK(25,24)	0.180	0.131	-2.50	21.34	21.50	0.187	2024/1/19	

NOTE: Body-Worn SAR test results of LTE Band 17

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Front Side	23790/710	10M QPSK(1,24)	0.177	0.141	-2.99	22.21	22.50	0.189	2024/1/19	
Back Side	23790/710	10M QPSK(1,24)	0.315	0.248	-0.95	22.21	22.50	0.337	2024/1/19	26#
Left Side	23790/710	10M QPSK(1,24)	0.105	0.083	2.53	22.21	22.50	0.112	2024/1/19	
Right	23790/710	10M	0.099	0.076	3.38	22.21	22.50	0.106	2024/1/19	

Side		QPSK(1,24)								
Bottom Side	23790/710	10M QPSK(1,24)	0.180	0.137	-2.17	22.21	22.50	0.192	2024/1/19	
50%RB										
Front Side	23790/710	10M QPSK(25,24)	0.099	0.075	2.80	21.34	21.50	0.103	2024/1/19	
Back Side	23790/710	10M QPSK(25,24)	0.180	0.131	-2.50	21.34	21.50	0.187	2024/1/19	
Left Side	23790/710	10M QPSK(25,24)	0.058	0.043	3.79	21.34	21.50	0.060	2024/1/19	
Right Side	23790/710	10M QPSK(25,24)	0.054	0.038	-3.81	21.34	21.50	0.056	2024/1/19	
Bottom Side	23790/710	10M QPSK(25,24)	0.093	0.075	-0.80	21.34	21.50	0.096	2024/1/19	

NOTE: Hotspot SAR test results of LTE Band 17

10.1.11. SAR measurement Result of LTE Band 41

Test Position of Head	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Left Cheek	40620/2593	20M QPSK(1,49)	0.235	0.132	2.10	19.02	19.50	0.262	2024/1/18	27#
Left Tilt 15 Degree	40620/2593	20M QPSK(1,49)	0.120	0.064	-0.57	19.02	19.50	0.134	2024/1/18	
Right Cheek	40620/2593	20M QPSK(1,49)	0.201	0.111	2.13	19.02	19.50	0.224	2024/1/18	
Right Tilt 15 Degree	40620/2593	20M QPSK(1,49)	0.096	0.053	3.81	19.02	19.50	0.107	2024/1/18	
50%RB										
Left Cheek	40620/2593	20M QPSK(50,0)	0.121	0.070	4.17	17.99	18.50	0.136	2024/1/18	
Left Tilt 15 Degree	40620/2593	20M QPSK(50,0)	0.061	0.037	-4.03	17.99	18.50	0.069	2024/1/18	
Right	40620/2593	20M QPSK(50,0)	0.110	0.066	2.29	17.99	18.50	0.124	2024/1/18	

Cheek										
Right Tilt 15 Degree	40620/2593	20M QPSK(50,0)	0.051	0.028	4.88	17.99	18.50	0.057	2024/1/18	

NOTE: Head SAR test results of LTE Band 41

Test Position of Body-Worn with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Front Side	40620/2593	20M QPSK(1,49)	0.354	0.172	-2.84	19.02	19.50	0.395	2024/1/18	
Back Side	40620/2593	20M QPSK(1,49)	0.543	0.275	-2.23	19.02	19.50	0.606	2024/1/18	28#
50%RB										
Front Side	40620/2593	20M QPSK(50,0)	0.185	0.098	-1.45	17.99	18.50	0.208	2024/1/18	
Back Side	40620/2593	20M QPSK(50,0)	0.311	0.155	3.97	17.99	18.50	0.350	2024/1/18	

NOTE: Body-Worn SAR test results of LTE Band 41

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Front Side	40620/2593	20M QPSK(1,49)	0.354	0.172	-2.84	19.02	19.50	0.395	2024/1/18	
Back Side	40620/2593	20M QPSK(1,49)	0.543	0.275	-2.23	19.02	19.50	0.606	2024/1/18	28#
Left Side	40620/2593	20M QPSK(1,49)	0.174	0.086	-3.44	19.02	19.50	0.194	2024/1/18	
Right Side	40620/2593	20M QPSK(1,49)	0.168	0.083	0.28	19.02	19.50	0.188	2024/1/18	
Bottom Side	40620/2593	20M QPSK(1,49)	0.295	0.148	0.18	19.02	19.50	0.329	2024/1/18	
50%RB										
Front Side	40620/2593	20M QPSK(50,0)	0.185	0.098	-1.45	17.99	18.50	0.208	2024/1/18	
Back Side	40620/2593	20M QPSK(50,0)	0.311	0.155	3.97	17.99	18.50	0.350	2024/1/18	

Left Side	40620/2593	20M QPSK(50,0)	0.097	0.046	3.36	17.99	18.50	0.109	2024/1/18	
Right Side	40620/2593	20M QPSK(50,0)	0.091	0.042	4.25	17.99	18.50	0.102	2024/1/18	
Bottom Side	40620/2593	20M QPSK(50,0)	0.174	0.084	1.93	17.99	18.50	0.196	2024/1/18	

NOTE: Hotspot SAR test results of LTE Band 41

10.1.12. SAR measurement Result of LTE Band 66

Test Position of Head	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Left Cheek	132322/1745	20M QPSK(1,49)	0.097	0.065	4.69	22.73	23.00	0.103	2024/1/20	31#
Left Tilt 15 Degree	132322/1745	20M QPSK(1,49)	0.058	0.039	-2.08	22.73	23.00	0.062	2024/1/20	
Right Cheek	132322/1745	20M QPSK(1,49)	0.083	0.053	1.06	22.73	23.00	0.088	2024/1/20	
Right Tilt 15 Degree	132322/1745	20M QPSK(1,49)	0.041	0.027	3.08	22.73	23.00	0.044	2024/1/20	
50%RB										
Left Cheek	132322/1745	20M QPSK(50,0)	0.055	0.037	-0.39	21.60	22.00	0.060	2024/1/20	
Left Tilt 15 Degree	132322/1745	20M QPSK(50,0)	0.033	0.022	4.17	21.60	22.00	0.036	2024/1/20	
Right Cheek	132322/1745	20M QPSK(50,0)	0.042	0.031	-3.15	21.60	22.00	0.046	2024/1/20	
Right Tilt 15 Degree	132322/1745	20M QPSK(50,0)	0.021	0.014	-3.29	21.60	22.00	0.023	2024/1/20	

NOTE: Head SAR test results of LTE Band 66

Test	Test channel	Mode	SAR Value	Power	Conducted	Tune-up	Scaled	Date	Plot

Position of Body-Worn with 10mm	/Freq.		(W/kg)		Drift(%)	Power (dBm)	Power (dBm)	SAR 1-g (W/Kg)		
			1-g	10-g						
1RB										
Front Side	132322/1745	20M QPSK(1,49)	0.204	0.119	-2.49	22.73	23.00	0.217	2024/1/20	
Back Side	132322/1745	20M QPSK(1,49)	0.307	0.179	-0.50	22.73	23.00	0.327	2024/1/20	32#
50%RB										
Front Side	132322/1745	20M QPSK(50,0)	0.121	0.071	1.91	21.60	22.00	0.133	2024/1/20	
Back Side	132322/1745	20M QPSK(50,0)	0.158	0.102	-4.18	21.60	22.00	0.173	2024/1/20	

NOTE: Body-Worn SAR test results of LTE Band 66

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Front Side	132322/1745	20M QPSK(1,49)	0.204	0.119	-2.49	22.73	23.00	0.217	2024/1/20	
Back Side	132322/1745	20M QPSK(1,49)	0.307	0.179	-0.50	22.73	23.00	0.327	2024/1/20	32#
Left Side	132322/1745	20M QPSK(1,49)	0.096	0.053	-1.31	22.73	23.00	0.102	2024/1/20	
Right Side	132322/1745	20M QPSK(1,49)	0.102	0.058	-3.70	22.73	23.00	0.109	2024/1/20	
Bottom Side	132322/1745	20M QPSK(1,49)	0.170	0.094	-1.47	22.73	23.00	0.181	2024/1/20	
50%RB										
Front Side	132322/1745	20M QPSK(50,0)	0.121	0.071	1.91	21.60	22.00	0.133	2024/1/20	
Back Side	132322/1745	20M QPSK(50,0)	0.158	0.102	-4.18	21.60	22.00	0.173	2024/1/20	
Left Side	132322/1745	20M QPSK(50,0)	0.050	0.026	0.96	21.60	22.00	0.055	2024/1/20	
Right Side	132322/1745	20M QPSK(50,0)	0.057	0.029	4.51	21.60	22.00	0.062	2024/1/20	
Bottom Side	132322/1745	20M QPSK(50,0)	0.098	0.047	-1.21	21.60	22.00	0.107	2024/1/20	

NOTE: Hotspot SAR test results of LTE Band 66

10.1.13. SAR measurement Result of LTE Band 71

Test Position of Head	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Left Cheek	133322/683	20M QPSK(1,49)	0.148	0.123	3.11	21.85	22.50	0.172	2024/1/19	29#
Left Tilt 15 Degree	133322/683	20M QPSK(1,49)	0.075	0.062	0.41	21.85	22.50	0.087	2024/1/19	
Right Cheek	133322/683	20M QPSK(1,49)	0.136	0.113	-2.96	21.85	22.50	0.158	2024/1/19	
Right Tilt 15 Degree	133322/683	20M QPSK(1,49)	0.063	0.051	-3.34	21.85	22.50	0.073	2024/1/19	
50%RB										
Left Cheek	133322/683	20M QPSK(50,24)	0.082	0.072	-1.88	20.88	21.50	0.095	2024/1/19	
Left Tilt 15 Degree	133322/683	20M QPSK(50,24)	0.044	0.033	-4.39	20.88	21.50	0.051	2024/1/19	
Right Cheek	133322/683	20M QPSK(50,24)	0.078	0.066	0.72	20.88	21.50	0.090	2024/1/19	
Right Tilt 15 Degree	133322/683	20M QPSK(50,24)	0.034	0.030	-4.22	20.88	21.50	0.039	2024/1/19	

NOTE: Head SAR test results of LTE Band 71

Test Position of Body-Worn with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Front Side	133322/683	20M QPSK(1,49)	0.169	0.135	-2.67	21.85	22.50	0.196	2024/1/19	
Back Side	133322/683	20M QPSK(1,49)	0.307	0.242	-1.69	21.85	22.50	0.357	2024/1/19	30#
50%RB										

Front Side	133322/683	20M QPSK(50,24)	0.090	0.080	1.73	20.88	21.50	0.104	2024/1/19	
Back Side	133322/683	20M QPSK(50,24)	0.164	0.125	-1.43	20.88	21.50	0.189	2024/1/19	

NOTE: Body-Worn SAR test results of LTE Band 71

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
1RB										
Front Side	133322/683	20M QPSK(1,49)	0.169	0.135	-2.67	21.85	22.50	0.196	2024/1/19	
Back Side	133322/683	20M QPSK(1,49)	0.307	0.242	-1.69	21.85	22.50	0.357	2024/1/19	30#
Left Side	133322/683	20M QPSK(1,49)	0.093	0.073	-3.05	21.85	22.50	0.108	2024/1/19	
Right Side	133322/683	20M QPSK(1,49)	0.102	0.078	2.10	21.85	22.50	0.118	2024/1/19	
Bottom Side	133322/683	20M QPSK(1,49)	0.175	0.134	1.36	21.85	22.50	0.203	2024/1/19	
50%RB										
Front Side	133322/683	20M QPSK(50,24)	0.090	0.080	1.73	20.88	21.50	0.104	2024/1/19	
Back Side	133322/683	20M QPSK(50,24)	0.164	0.125	-1.43	20.88	21.50	0.189	2024/1/19	
Left Side	133322/683	20M QPSK(50,24)	0.047	0.037	0.71	20.88	21.50	0.054	2024/1/19	
Right Side	133322/683	20M QPSK(50,24)	0.059	0.039	-0.24	20.88	21.50	0.068	2024/1/19	
Bottom Side	133322/683	20M QPSK(50,24)	0.088	0.067	2.72	20.88	21.50	0.102	2024/1/19	

NOTE: Hotspot SAR test results of LTE Band 71

10.1.14. SAR measurement Result of WLAN2.4G

Test Position of Head	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g	Date	Plot
			1-g	10-g						

								(W/Kg)		
Left Cheek	11/2462	802.11b	0.137	0.082	-2.72	15.77	16.00	0.144	2024/1/27	15#
Left Tilt 15 Degree	11/2462	802.11b	0.069	0.040	-1.06	15.77	16.00	0.073	2024/1/27	
Right Cheek	11/2462	802.11b	0.123	0.071	-2.41	15.77	16.00	0.130	2024/1/27	
Right Tilt 15 Degree	11/2462	802.11b	0.065	0.038	-3.98	15.77	16.00	0.069	2024/1/27	

NOTE: Head SAR test results of WLAN2.4G

Test Position of Body-Worn with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	11/2462	802.11b	0.081	0.054	1.47	15.77	16.00	0.085	2024/1/27	
Back Side	11/2462	802.11b	0.120	0.078	-0.34	15.77	16.00	0.127	2024/1/27	16#

NOTE: Body-worn SAR test results of WLAN2.4G

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	11/2462	802.11b	0.081	0.054	1.47	15.77	16.00	0.085	2024/1/27	
Back Side	11/2462	802.11b	0.120	0.078	-0.34	15.77	16.00	0.127	2024/1/27	16#
Left Side	11/2462	802.11b	0.039	0.024	-0.53	15.77	16.00	0.041	2024/1/27	
Top Side	11/2462	802.11b	0.036	0.022	-2.91	15.77	16.00	0.038	2024/1/27	

NOTE: Hotspot SAR test results of WLAN2.4G

10.1.15. SAR measurement Result of WLAN5.2G

Test Position of Head	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g	Date	Plot
			1-g	10-g						

								(W/Kg)		
Left Cheek	40/5200	802.11a	0.206	0.118	1.57	11.84	12.00	0.214	2024/1/23	11#
Left Tilt 15 Degree	40/5200	802.11a	0.119	0.065	2.53	11.84	12.00	0.123	2024/1/23	
Right Cheek	40/5200	802.11a	0.194	0.110	2.09	11.84	12.00	0.201	2024/1/23	
Right Tilt 15 Degree	40/5200	802.11a	0.098	0.054	1.08	11.84	12.00	0.102	2024/1/23	

NOTE: Head SAR test results of WLAN5.2G

Test Position of Body-Worn with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	40/5200	802.11a	0.168	0.093	1.35	11.84	12.00	0.174	2024/1/23	
Back Side	40/5200	802.11a	0.260	0.145	-0.25	11.84	12.00	0.270	2024/1/23	13#

NOTE: Body-worn SAR test results of WLAN5.2G

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	40/5200	802.11a	0.168	0.093	1.35	11.84	12.00	0.174	2024/1/23	
Back Side	40/5200	802.11a	0.260	0.145	-0.25	11.84	12.00	0.270	2024/1/23	13#
Left Side	40/5200	802.11a	0.090	0.049	1.89	11.84	12.00	0.093	2024/1/23	
Top Side	40/5200	802.11a	0.078	0.043	1.21	11.84	12.00	0.081	2024/1/23	

NOTE: Hotspot SAR test results of WLAN5.2G

10.1.16. SAR measurement Result of WLAN5.8G

Test Position of Head	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Left Cheek	165/5825	802.11n HT20	0.336	0.175	1.08	11.52	12.00	0.375	2024/1/26	12#
Left Tilt 15 Degree	165/5825	802.11n HT20	0.186	0.093	2.55	11.52	12.00	0.208	2024/1/26	
Right Cheek	165/5825	802.11n HT20	0.306	0.155	-1.35	11.52	12.00	0.342	2024/1/26	
Right Tilt 15 Degree	165/5825	802.11n HT20	0.150	0.077	-1.21	11.52	12.00	0.168	2024/1/26	

NOTE: Head SAR test results of WLAN5.8G

Test Position of Body-Worn with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	165/5825	802.11n HT20	0.162	0.086	-3.95	11.52	12.00	0.181	2024/1/26	
Back Side	165/5825	802.11n HT20	0.228	0.128	4.30	11.52	12.00	0.255	2024/1/26	14#

NOTE: Body-worn SAR test results of WLAN5.8G

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	165/5825	802.11n HT20	0.162	0.086	-3.95	11.52	12.00	0.181	2024/1/26	
Back Side	165/5825	802.11n HT20	0.228	0.128	4.30	11.52	12.00	0.255	2024/1/26	14#
Left Side	165/5825	802.11n HT20	0.069	0.038	-2.20	11.52	12.00	0.077	2024/1/26	
Top Side	165/5825	802.11n HT20	0.075	0.040	-3.55	11.52	12.00	0.084	2024/1/26	

NOTE: Hotspot SAR test results of WLAN5.8G

10.2. Simultaneous Transmission Analysis

Per KDB 447498 D01, simultaneous transmission SAR is compliant if,

1) Scalar SAR summation < 1.6W/kg.

2) SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (min. separation distance, mm), and the peak separation distance is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan. If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		WWAN	DTS			
Head	Left Cheek	0.262	0.144	0.406	N/A	N/A
	Left Tilt 15 Degree	0.142	0.073	0.215	N/A	N/A
	Right Cheek	0.238	0.130	0.368	N/A	N/A
	Right Tilt 15 Degree	0.128	0.069	0.197	N/A	N/A
Body-Worn	Front Side	0.615	0.085	0.700	N/A	N/A
	Back Side	1.156	0.127	1.283	N/A	N/A
Hotspot	Front Side	0.615	0.085	0.700	N/A	N/A
	Back Side	1.156	0.127	1.283	N/A	N/A
	Left Side	0.311	0.041	0.352	N/A	N/A
	Right Side	0.314	N/A	0.314	N/A	N/A
	Top Side	N/A	0.038	0.038	N/A	N/A
	Bottom Side	0.513	N/A	0.513	N/A	N/A

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		WWAN	NII			
Head	Left Cheek	0.262	0.375	0.637	N/A	N/A
	Left Tilt 15 Degree	0.142	0.208	0.350	N/A	N/A
	Right Cheek	0.238	0.342	0.580	N/A	N/A
	Right Tilt 15 Degree	0.128	0.168	0.296	N/A	N/A
Body-Worn	Front Side	0.615	0.181	0.796	N/A	N/A

	Back Side	1.156	0.270	1.426	N/A	N/A
Hotspot	Front Side	0.615	0.181	0.796	N/A	N/A
	Back Side	1.156	0.270	1.426	N/A	N/A
	Left Side	0.311	0.093	0.404	N/A	N/A
	Right Side	0.314	N/A	0.314	N/A	N/A
	Top Side	N/A	0.081	0.081	N/A	N/A
	Bottom Side	0.513	N/A	0.513	N/A	N/A

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		WWAN	DSS			
Head	Left Cheek	0.262	0.373	0.635	N/A	N/A
	Left Tilt 15 Degree	0.142	0.373	0.515	N/A	N/A
	Right Cheek	0.238	0.373	0.611	N/A	N/A
	Right Tilt 15 Degree	0.128	0.373	0.501	N/A	N/A
Body-Worn	Front Side	0.615	0.187	0.802	N/A	N/A
	Back Side	1.156	0.187	1.343	N/A	N/A
Hotspot	Front Side	0.615	0.187	0.802	N/A	N/A
	Back Side	1.156	0.187	1.343	N/A	N/A
	Left Side	0.311	0.187	0.498	N/A	N/A
	Right Side	0.314	N/A	0.314	N/A	N/A
	Top Side	N/A	0.187	0.187	N/A	N/A
	Bottom Side	0.513	N/A	0.513	N/A	N/A

1. Appendix A. Photo documentation

Refer to appendix Test Setup photo---SAR

2. Appendix B. System Check Plots

Table of contents
MEASUREMENT 1 System Performance Check - 750MHz
MEASUREMENT 2 System Performance Check - 835MHz
MEASUREMENT 3 System Performance Check - 1800MHz
MEASUREMENT 4 System Performance Check - 1900MHz
MEASUREMENT 5 System Performance Check - 2450MHz
MEASUREMENT 6 System Performance Check - 2600MHz
MEASUREMENT 7 System Performance Check - 5200MHz
MEASUREMENT 8 System Performance Check - 5800MHz

MEASUREMENT 1

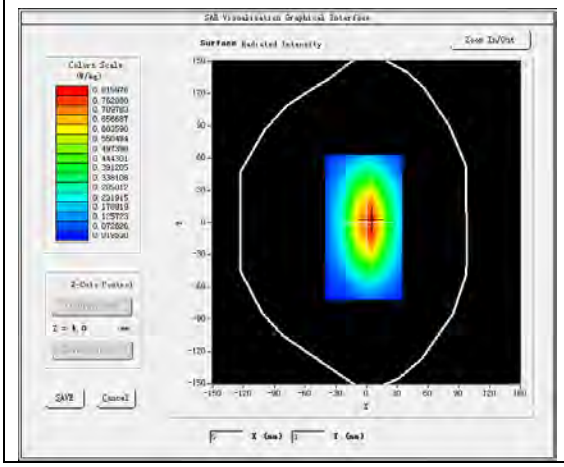
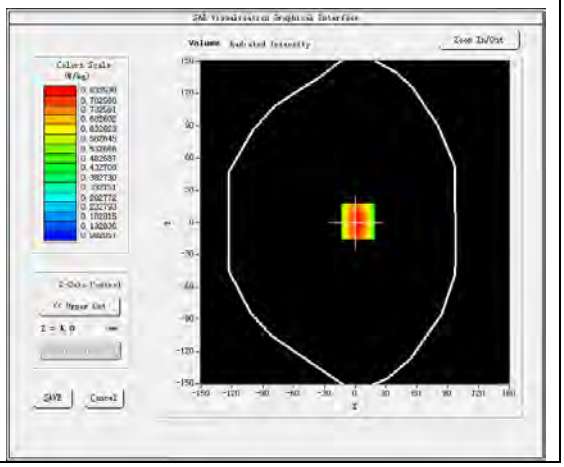
Date of measurement: 19/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW750
Channels	Middle
Signal	CW (Crest factor: 1.0)
ConvF	2.37

B. SAR Measurement Results

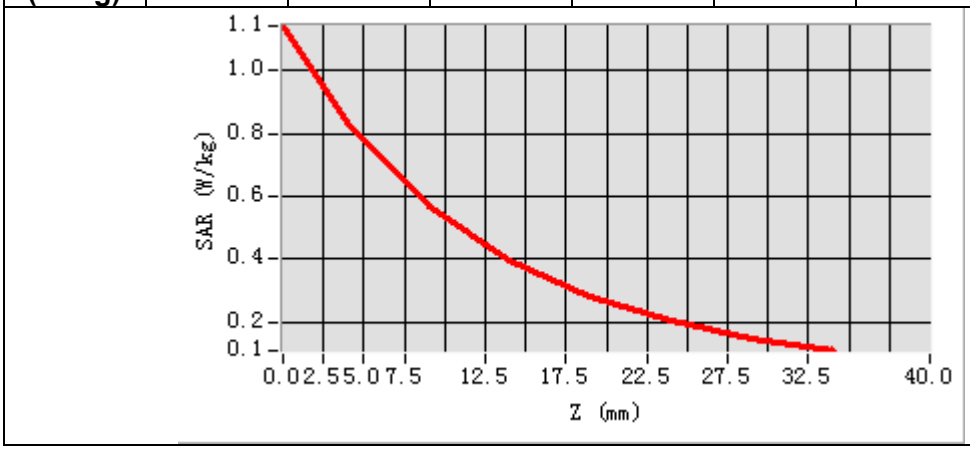
Frequency (MHz)	750.000000
Relative permittivity (real part)	41.549275
Relative permittivity (imaginary part)	21.785379
Conductivity (S/m)	0.907724
Variation (%)	2.730000

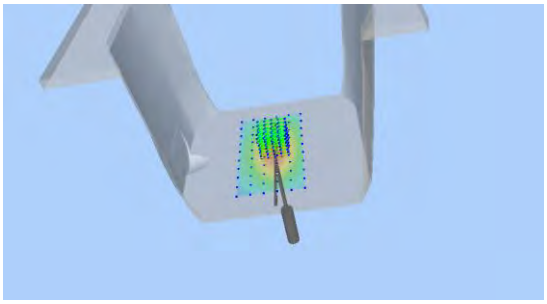
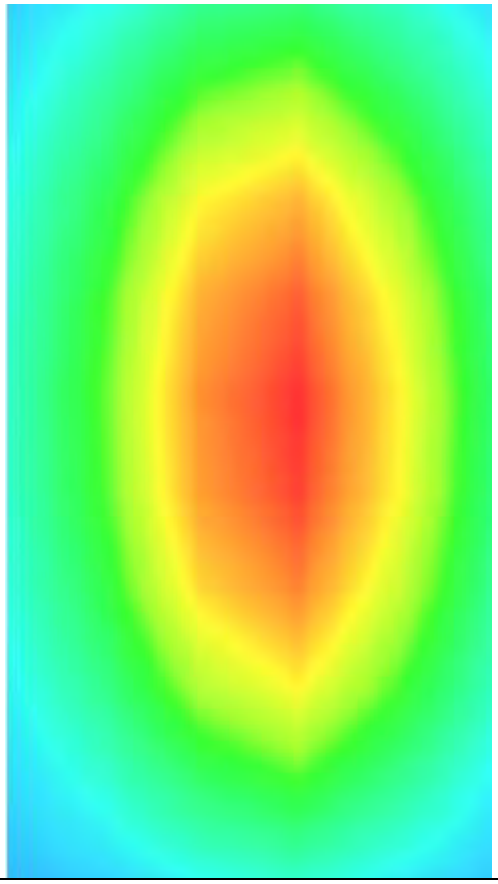
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=3.00, Y=1.00
SAR Peak: 1.14 W/kg

SAR 10g (W/Kg)	0.585332
SAR 1g (W/Kg)	0.895321

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.1492	0.8317	0.5683	0.3987	0.2835	0.2035	0.1445



3D screen shot	Hot spot position
	

MEASUREMENT 2

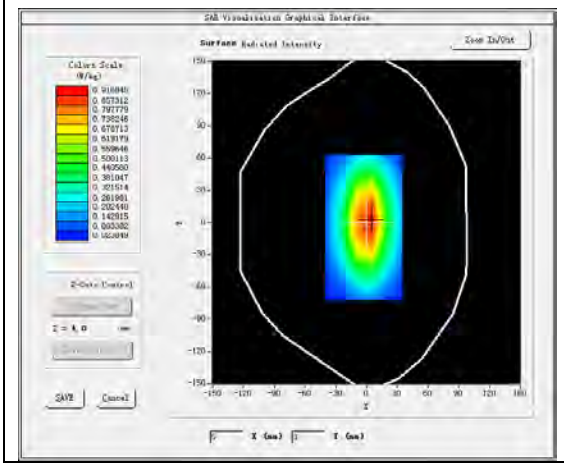
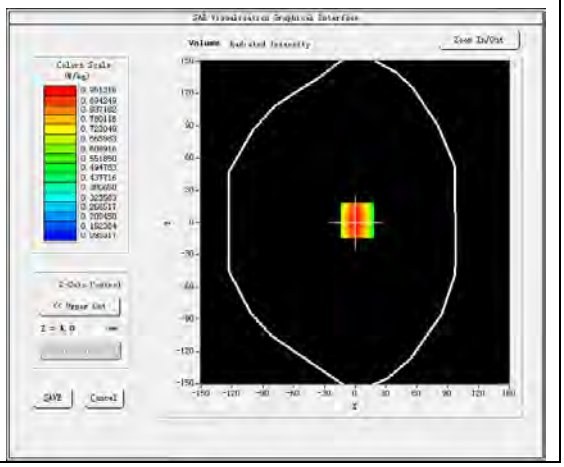
Date of measurement: 10/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW835
Channels	Middle
Signal	CW (Crest factor: 1.0)
ConvF	2.32

B. SAR Measurement Results

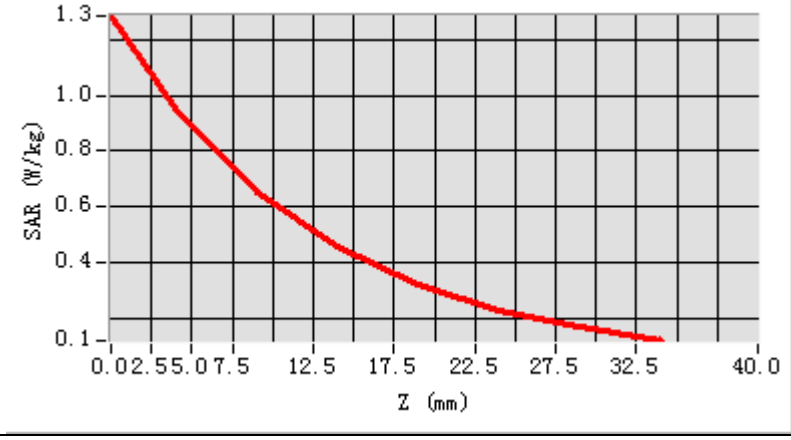
Frequency (MHz)	835.000000
Relative permittivity (real part)	41.258639
Relative permittivity (imaginary part)	19.199080
Conductivity (S/m)	0.890624
Variation (%)	-2.720000

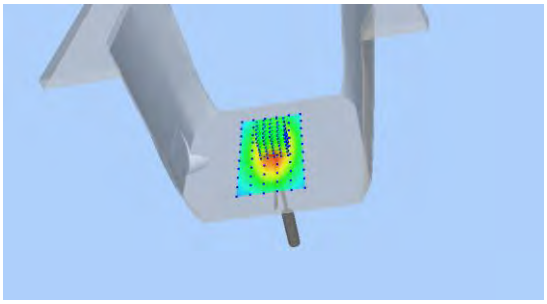
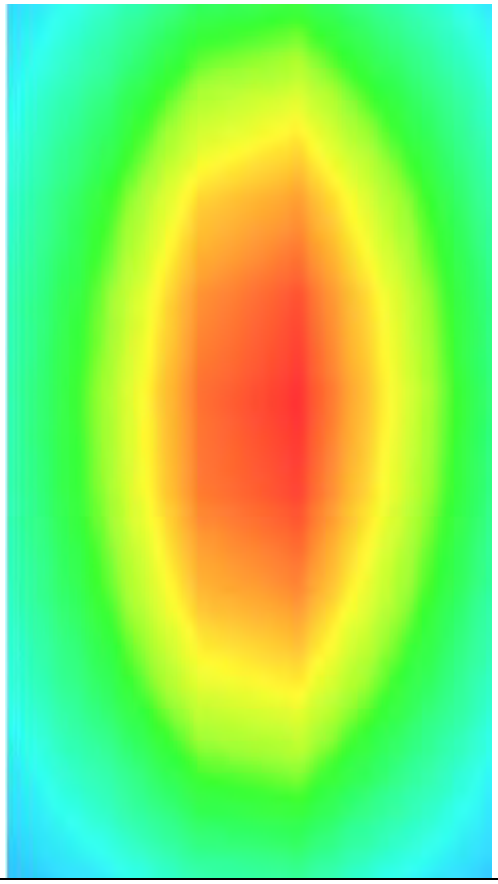
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=2.00, Y=2.00
SAR Peak: 1.29 W/kg

SAR 10g (W/Kg)	0.599333
SAR 1g (W/Kg)	0.962172

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.2821	0.9559	0.6532	0.4562	0.3263	0.2309	0.1726



3D screen shot	Hot spot position
	

MEASUREMENT 3

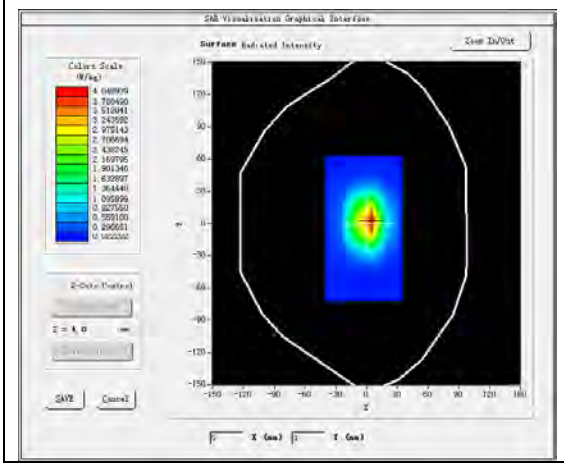
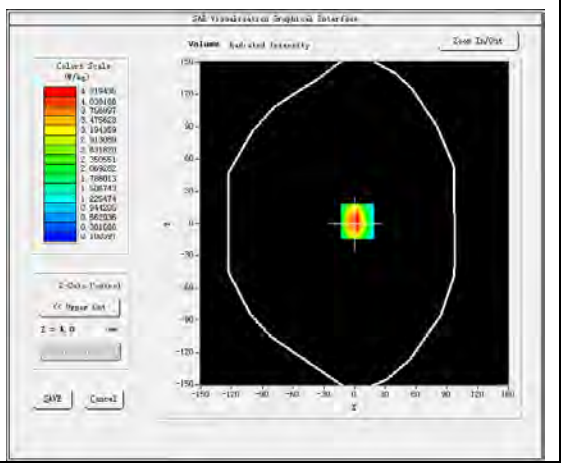
Date of measurement: 20/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW1800
Channels	Middle
Signal	CW (Crest factor: 1.0)
ConvF	2.45

B. SAR Measurement Results

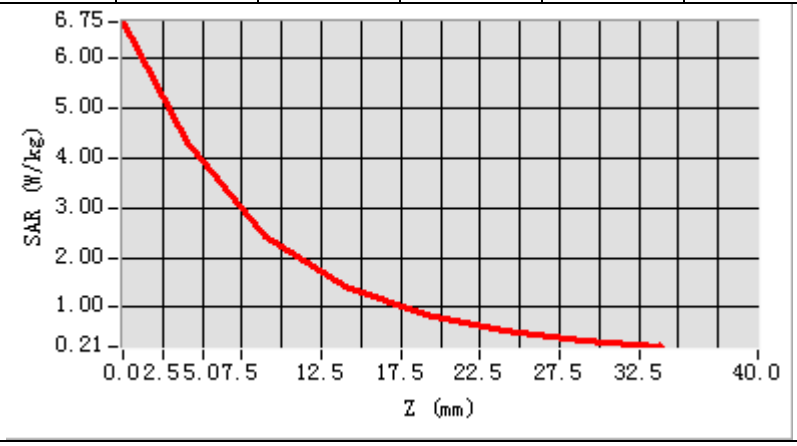
Frequency (MHz)	1800.000000
Relative permittivity (real part)	39.388104
Relative permittivity (imaginary part)	13.771047
Conductivity (S/m)	1.377105
Variation (%)	2.980000

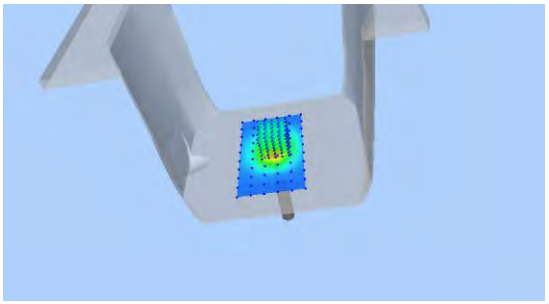
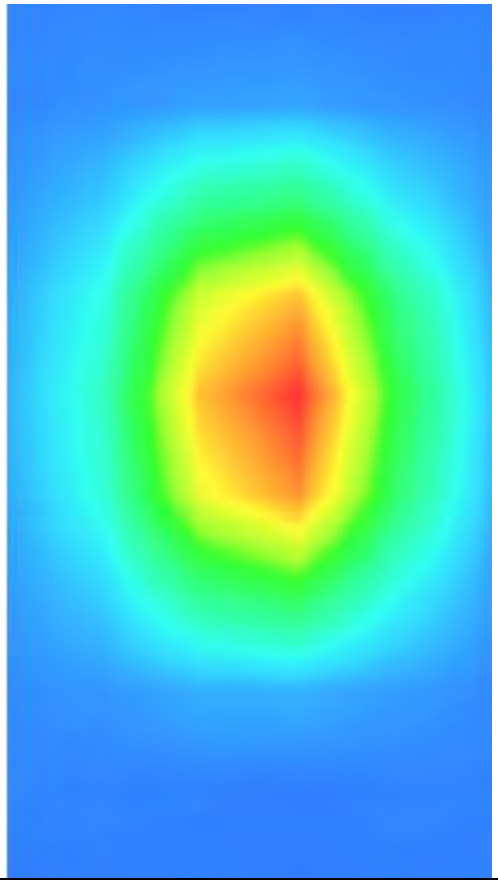
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=3.00, Y=2.00
SAR Peak: 6.82 W/kg

SAR 10g (W/Kg)	1.823307
SAR 1g (W/Kg)	3.982066

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.7474	4.3111	2.4329	1.4203	0.8572	0.5231	0.3234



3D screen shot	Hot spot position
	

MEASUREMENT 4

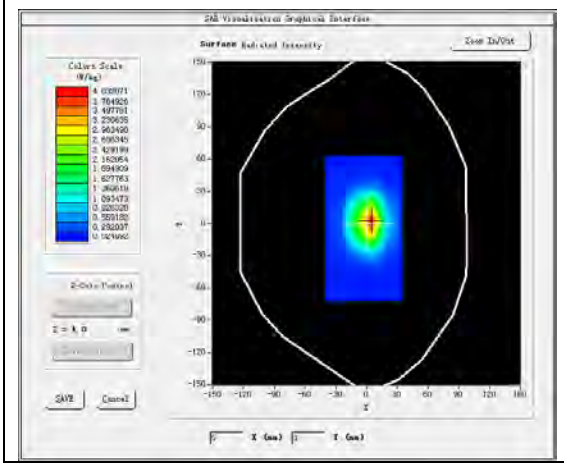
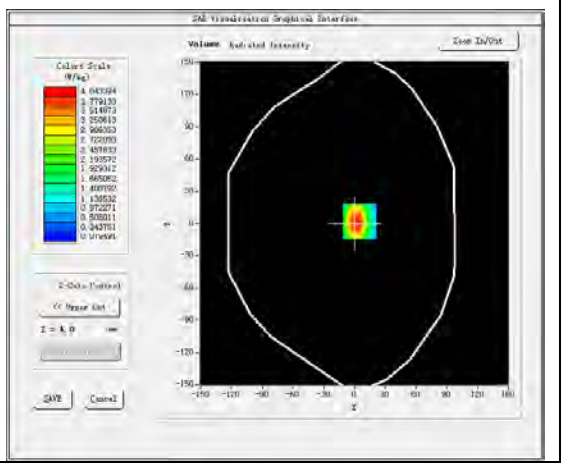
Date of measurement: 11/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW1900
Channels	Middle
Signal	CW (Crest factor: 1.0)
ConvF	2.63

B. SAR Measurement Results

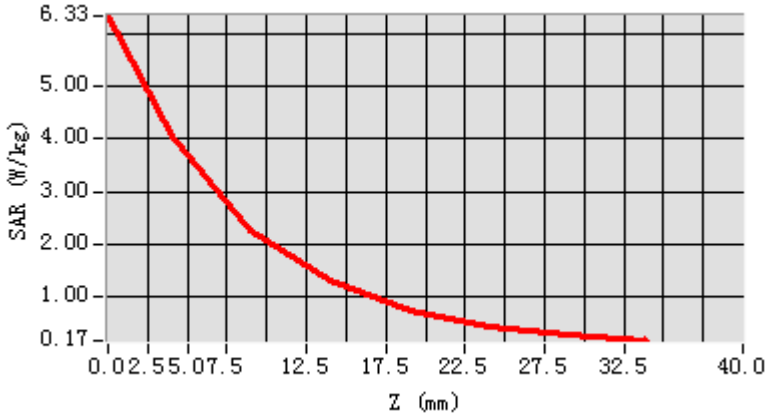
Frequency (MHz)	1900.000000
Relative permittivity (real part)	39.132044
Relative permittivity (imaginary part)	13.839950
Conductivity (S/m)	1.460884
Variation (%)	2.220000

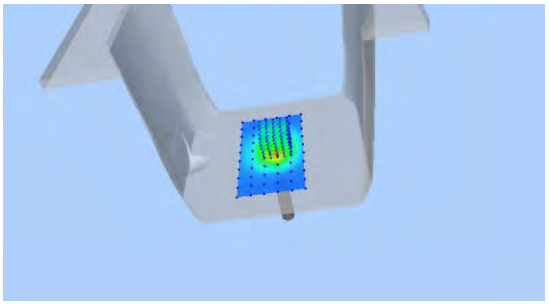
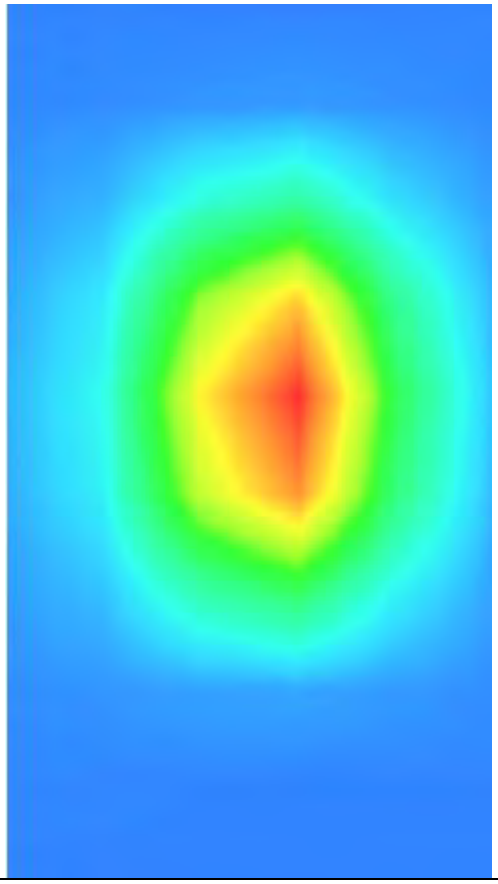
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=5.00, Y=2.00
SAR Peak: 6.70 W/kg

SAR 10g (W/Kg)	2.132347
SAR 1g (W/Kg)	3.953221

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.3247	4.0419	2.2630	1.3026	0.7618	0.4514	0.2794



3D screen shot	Hot spot position
	

MEASUREMENT 5

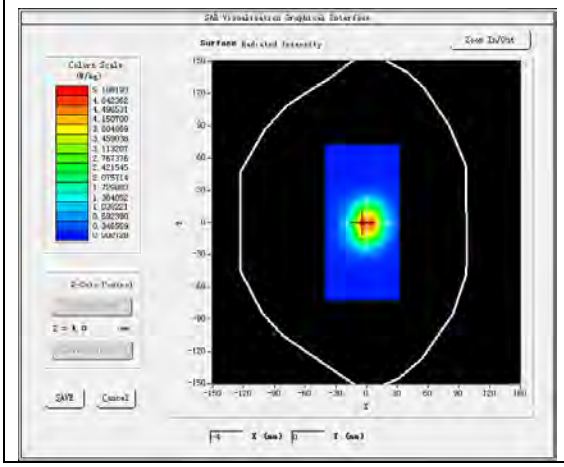
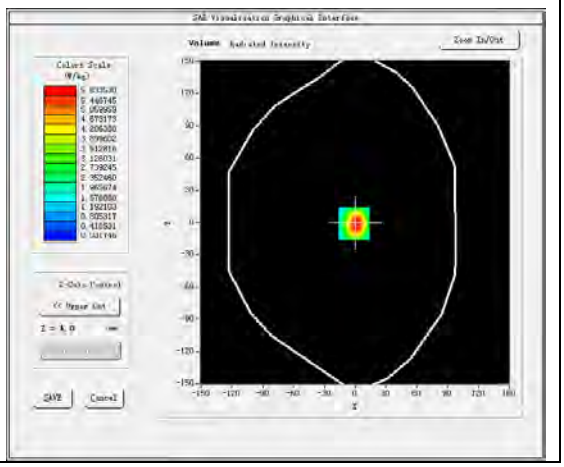
Date of measurement: 27/1/2024

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Channels	Middle
Signal	CW (Crest factor: 1.0)
ConvF	2.85

B. SAR Measurement Results

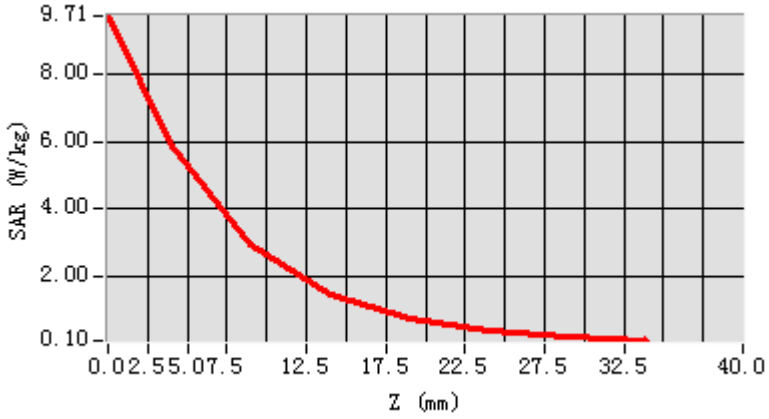
Frequency (MHz)	2450.000000
Relative permittivity (real part)	38.017198
Relative permittivity (imaginary part)	12.883236
Conductivity (S/m)	1.753552
Variation (%)	1.290000

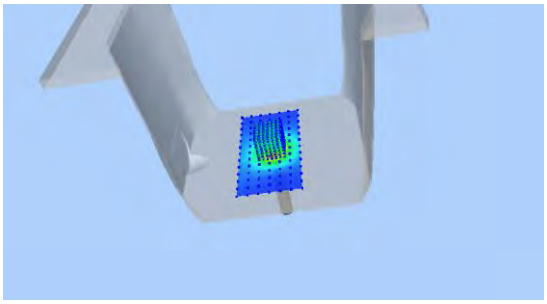
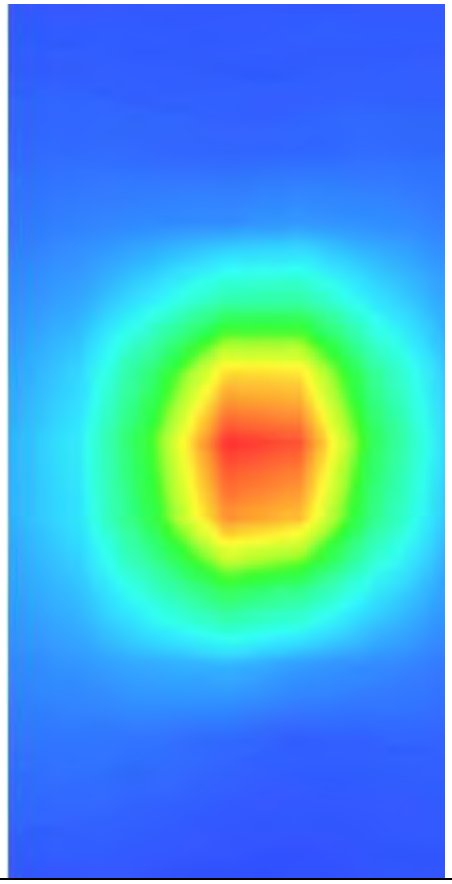
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-1.00, Y=-1.00
SAR Peak: 9.83 W/kg

SAR 10g (W/Kg)	2.255106
SAR 1g (W/Kg)	5.246340

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	9.7197	5.8353	2.9227	1.4626	0.7461	0.3798	0.1960



3D screen shot	Hot spot position
	

MEASUREMENT 6

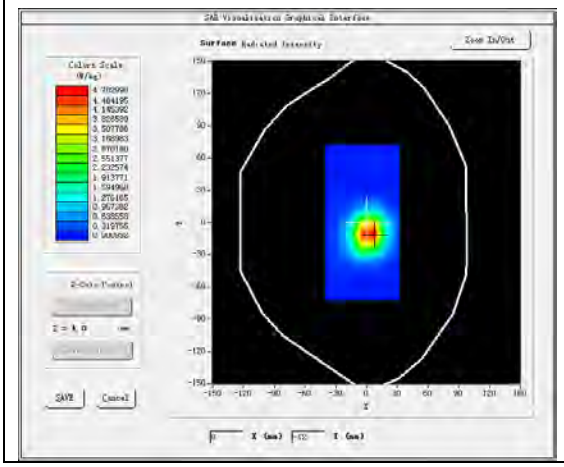
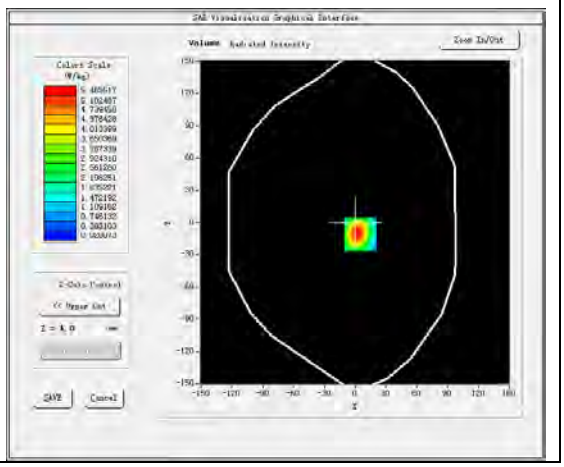
Date of measurement: 18/1/2024

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW2600
Channels	Middle
Signal	CW (Crest factor: 1.0)
ConvF	2.65

B. SAR Measurement Results

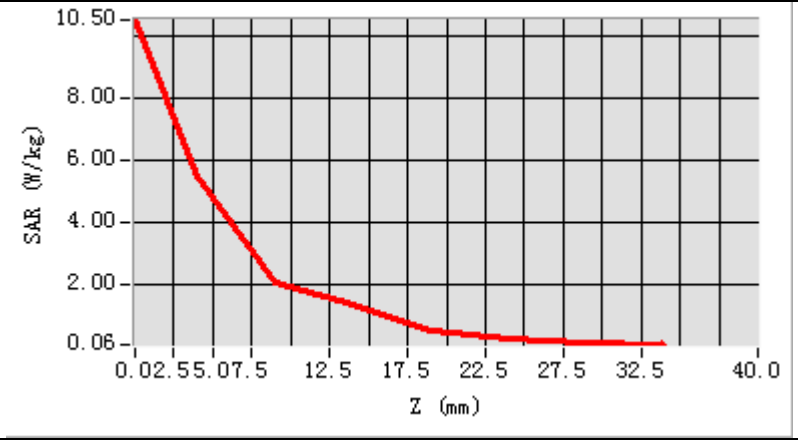
Frequency (MHz)	2600.000000
Relative permittivity (real part)	38.667421
Relative permittivity (imaginary part)	13.434174
Conductivity (S/m)	1.940492
Variation (%)	0.250000

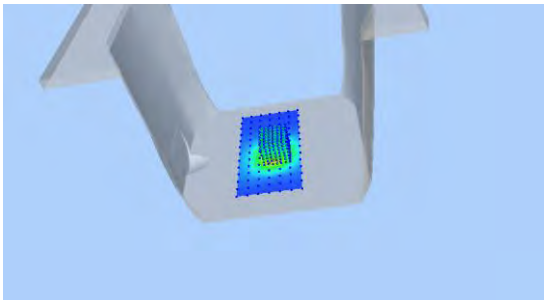
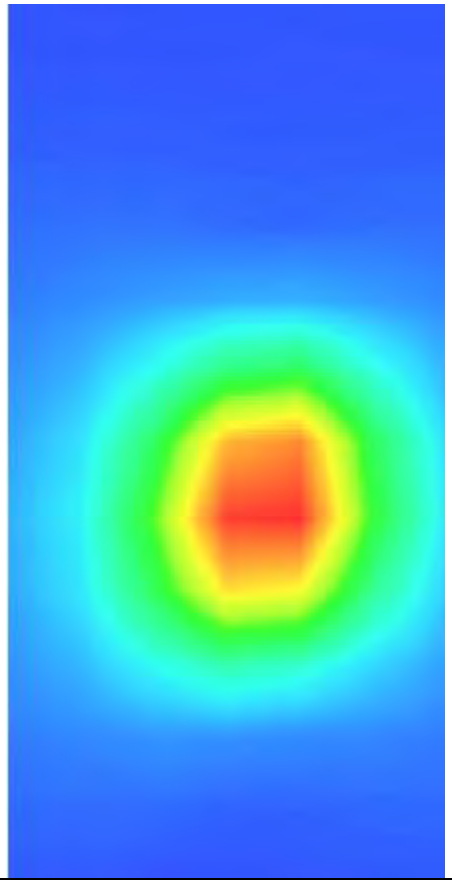
SURFACE SAR	VOLUME SAR
	

Maximum location: X=5.00, Y=-11.00
SAR Peak: 9.43 W/kg

SAR 10g (W/Kg)	2.524037
SAR 1g (W/Kg)	5.944199

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	10.568	5.4632	2.0863	1.3356	0.5061	0.2869	0.1279



3D screen shot	Hot spot position
	

MEASUREMENT 7

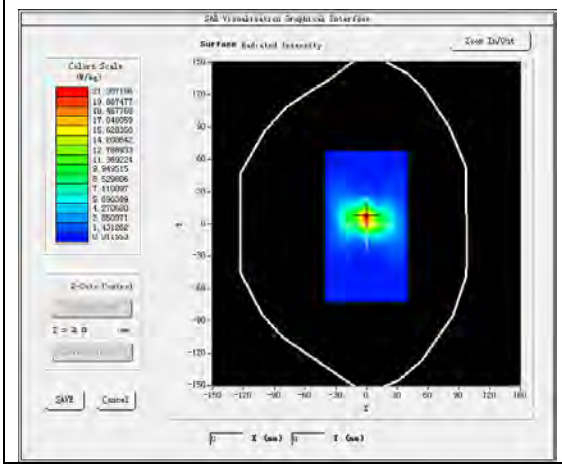
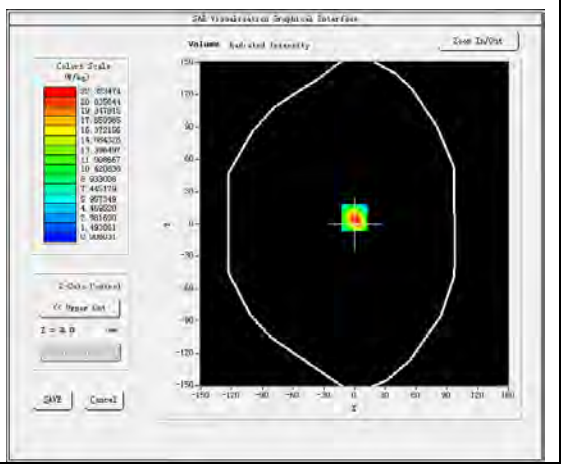
Date of measurement: 23/1/2024

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 2.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5200
Channels	Middle
Signal	CW (Crest factor: 1.0)
ConvF	2.07

B. SAR Measurement Results

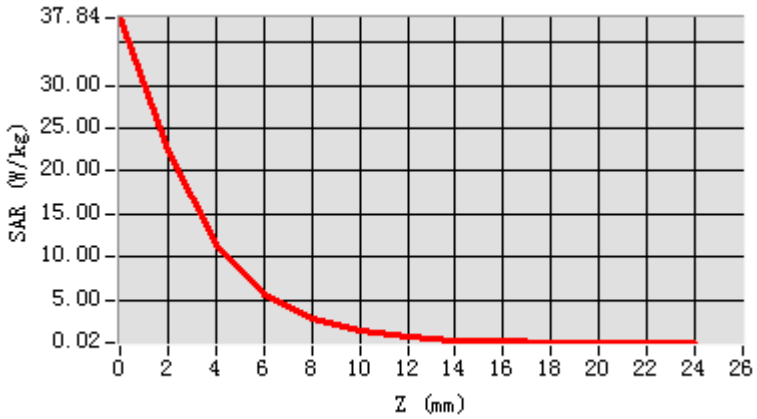
Frequency (MHz)	5200.000000
Relative permittivity (real part)	35.068469
Relative permittivity (imaginary part)	15.481054
Conductivity (S/m)	4.472304
Variation (%)	2.800000

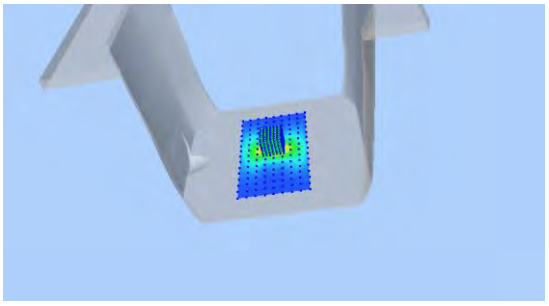
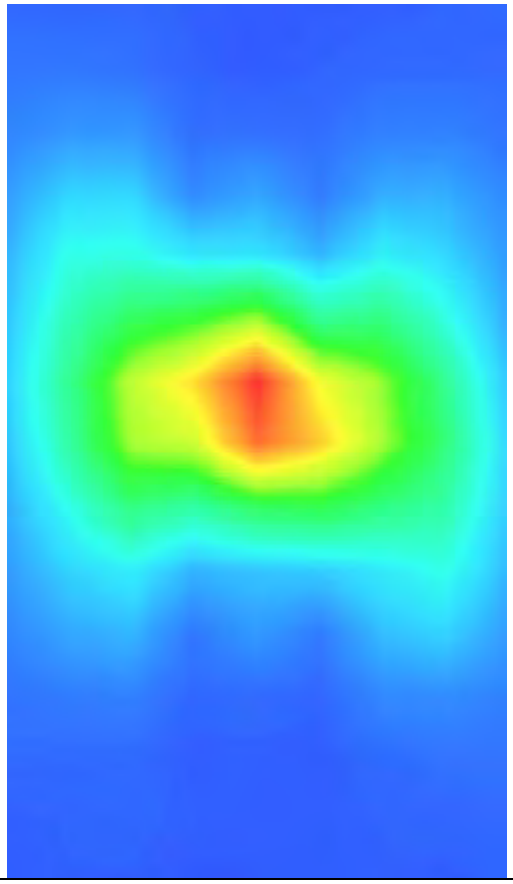
SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=6.00
SAR Peak: 40.06 W/kg

SAR 10g (W/Kg)	5.847162
SAR 1g (W/Kg)	17.377032

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	37.891	22.391	11.377	5.6694	2.8291	1.4043	0.7150	0.3637	0.1802	0.1008	0.0527	0.0397



3D screen shot	Hot spot position
	

MEASUREMENT 8

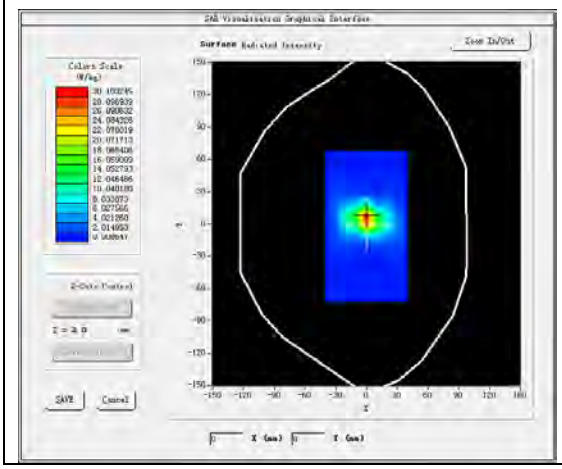
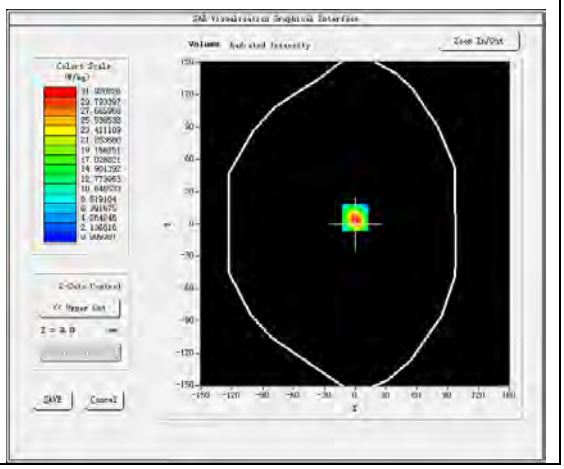
Date of measurement: 26/1/2024

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 2.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5800
Channels	Middle
Signal	CW (Crest factor: 1.0)
ConvF	2.04

B. SAR Measurement Results

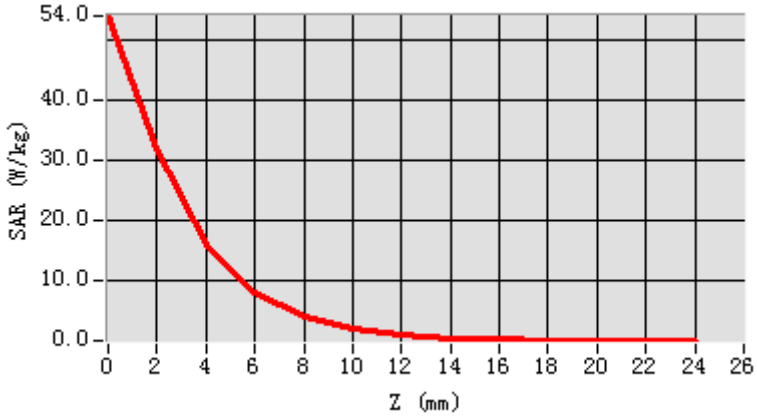
Frequency (MHz)	5800.000000
Relative permittivity (real part)	34.499619
Relative permittivity (imaginary part)	16.005283
Conductivity (S/m)	5.157258
Variation (%)	-0.500000

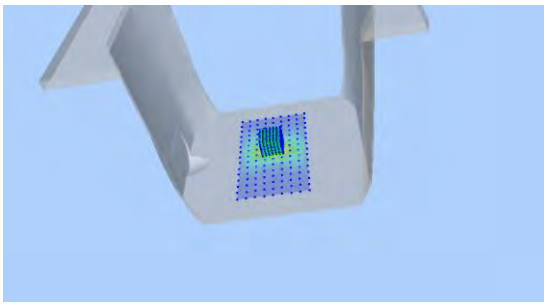
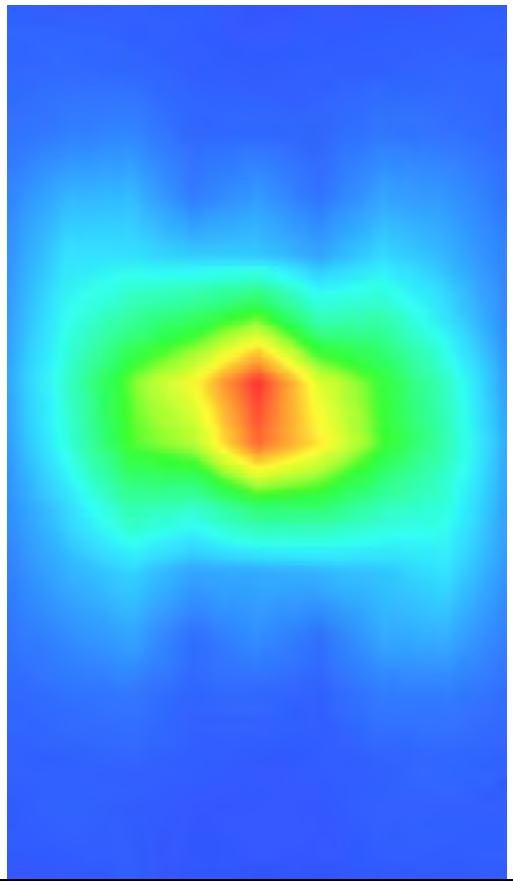
SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=6.00
SAR Peak: 57.37 W/kg

SAR 10g (W/Kg)	5.691228
SAR 1g (W/Kg)	18.497190

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	54.036	31.948	16.144	8.1766	4.0890	2.0550	1.0361	0.5144	0.2795	0.1572	0.0788	0.0438



3D screen shot	Hot spot position
	

1. Appendix C. Plots of High SAR Measurement

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MEASUREMENT 1

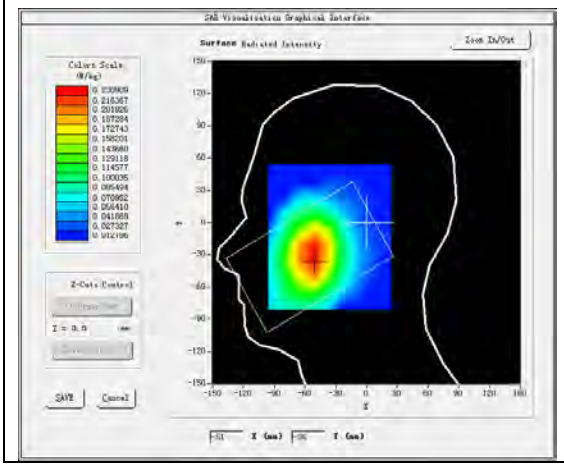
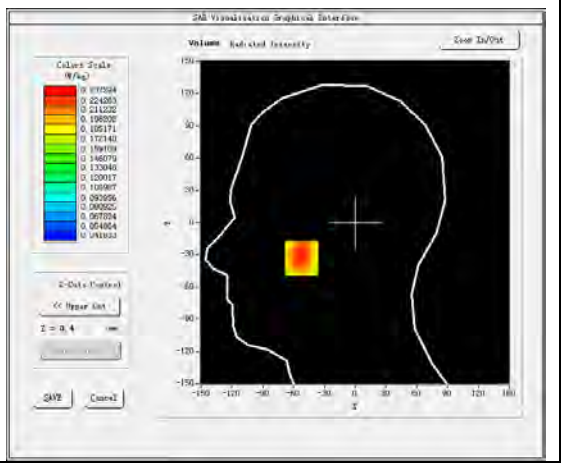
Date of measurement: 10/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	GSM850
Channels	Middle
Signal	TDMA (Crest factor: 2.0)
ConvF	2.32

B. SAR Measurement Results

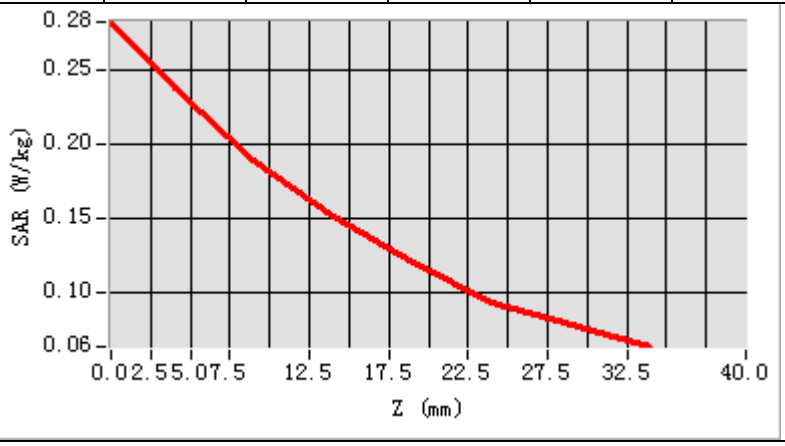
Frequency (MHz)	836.400000
Relative permittivity (real part)	41.267719
Relative permittivity (imaginary part)	19.206280
Conductivity (S/m)	0.892452
Variation (%)	1.740000

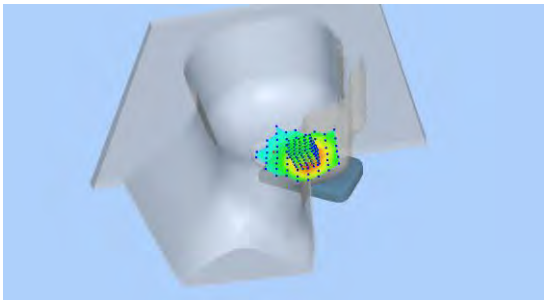
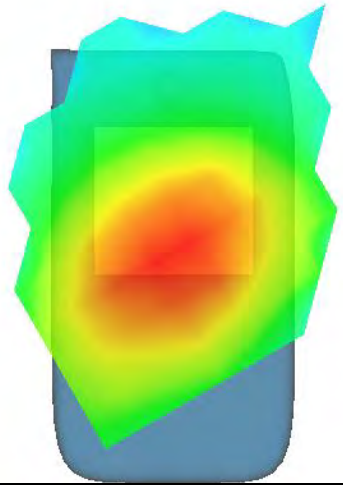
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-52.00, Y=-33.00
SAR Peak: 0.29 W/kg

SAR 10g (W/Kg)	0.170487
SAR 1g (W/Kg)	0.227138

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.2817	0.2373	0.1888	0.1506	0.1207	0.0935	0.0792



3D screen shot	Hot spot position
	

MEASUREMENT 2

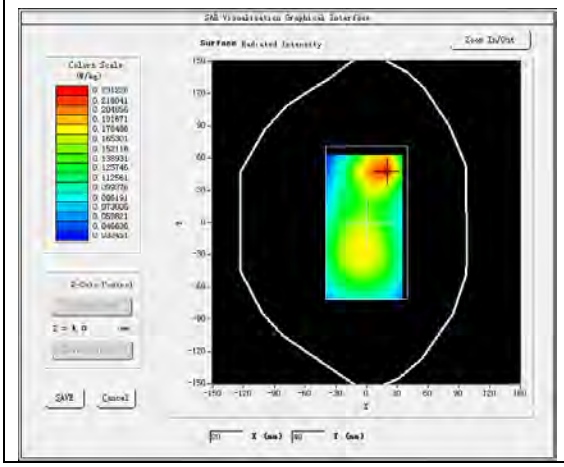
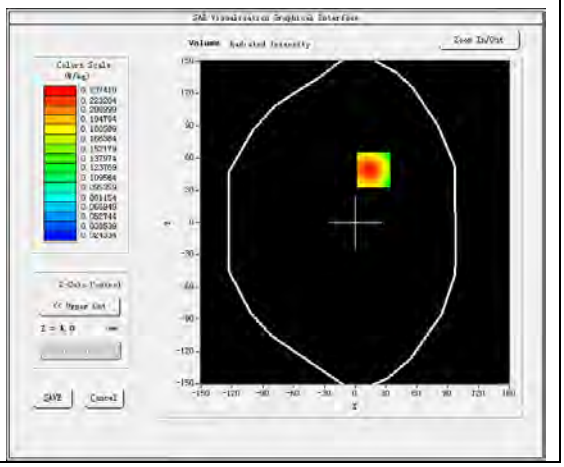
Date of measurement: 10/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	GSM850
Channels	Middle
Signal	TDMA (Crest factor: 2.0)
ConvF	2.32

B. SAR Measurement Results

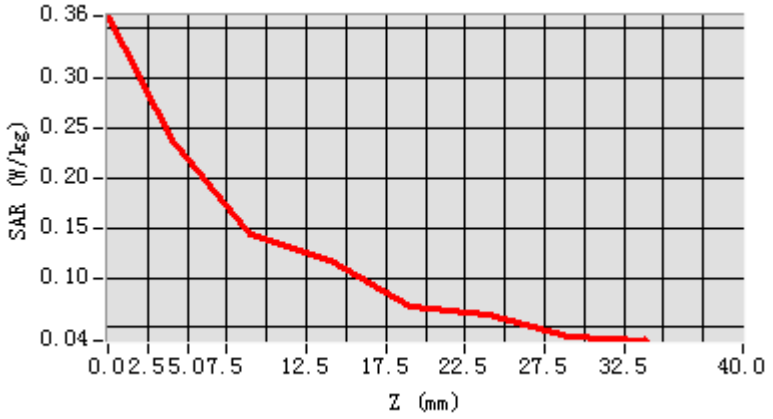
Frequency (MHz)	836.400000
Relative permittivity (real part)	41.267719
Relative permittivity (imaginary part)	19.206280
Conductivity (S/m)	0.892452
Variation (%)	3.040000

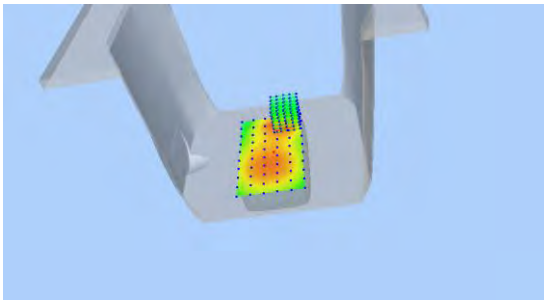
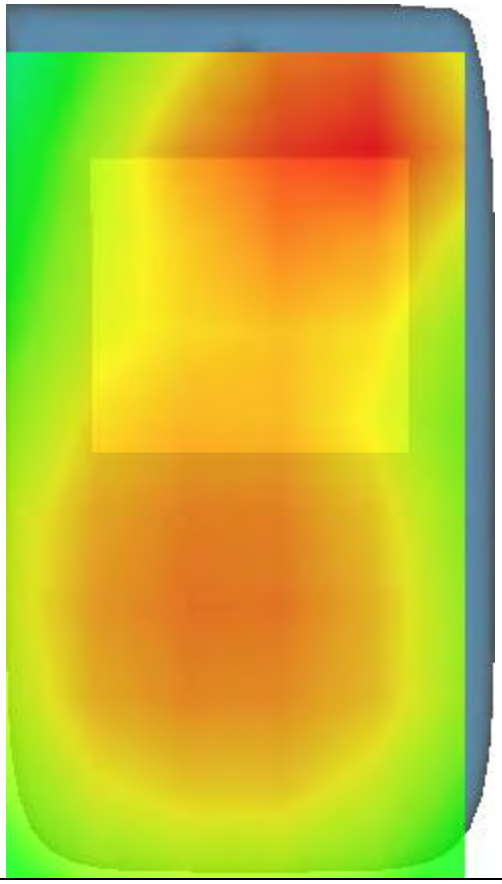
SURFACE SAR	VOLUME SAR
	

Maximum location: X=18.00, Y=49.00
SAR Peak: 0.31 W/kg

SAR 10g (W/Kg)	0.151849
SAR 1g (W/Kg)	0.224006

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.3620	0.2374	0.1432	0.1166	0.0702	0.0626	0.0412



3D screen shot	Hot spot position
	

MEASUREMENT 3

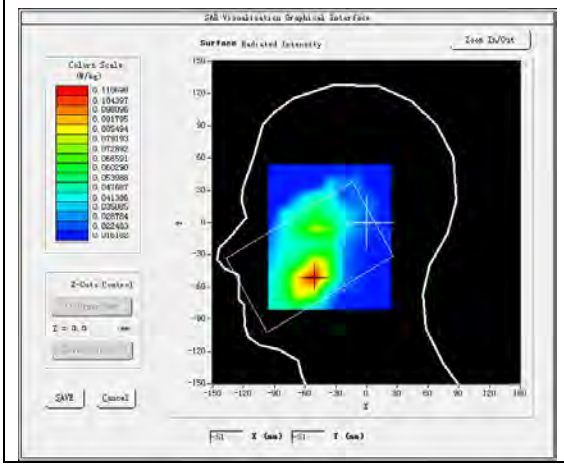
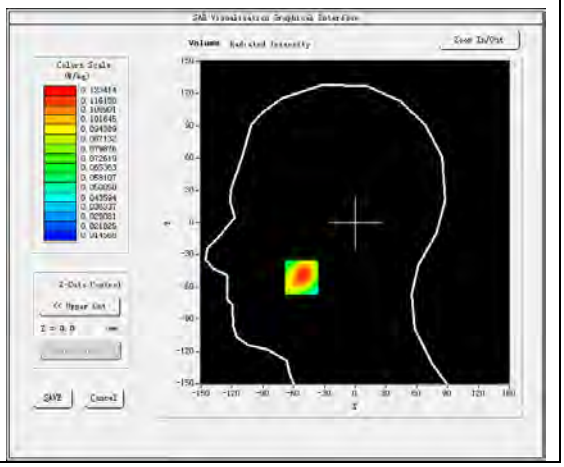
Date of measurement: 11/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	GSM1900
Channels	Middle
Signal	TDMA (Crest factor: 2.0)
ConvF	2.63

B. SAR Measurement Results

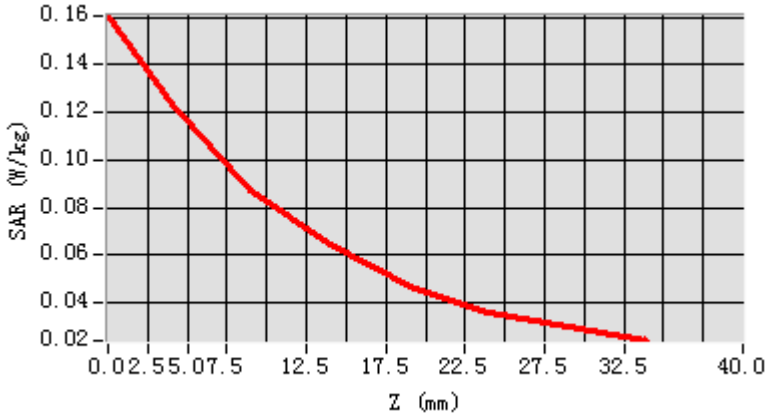
Frequency (MHz)	1880.000000
Relative permittivity (real part)	39.207344
Relative permittivity (imaginary part)	13.887850
Conductivity (S/m)	1.450509
Variation (%)	-2.420000

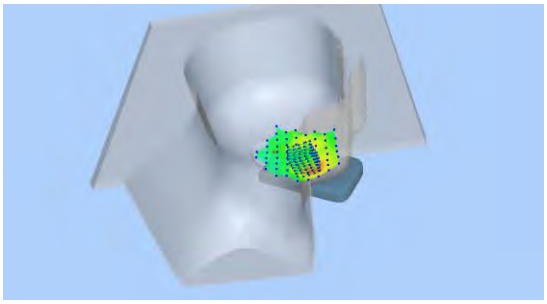
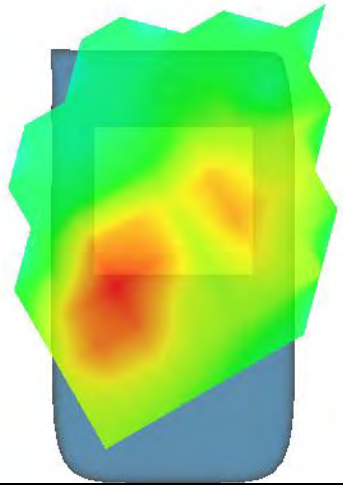
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-52.00, Y=-51.00
SAR Peak: 0.17 W/kg

SAR 10g (W/Kg)	0.076823
SAR 1g (W/Kg)	0.121087

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1606	0.1234	0.0877	0.0642	0.0466	0.0358	0.0296



3D screen shot	Hot spot position
	

MEASUREMENT 4

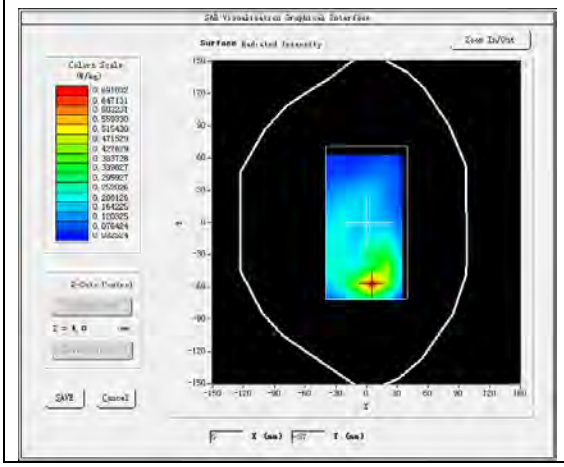
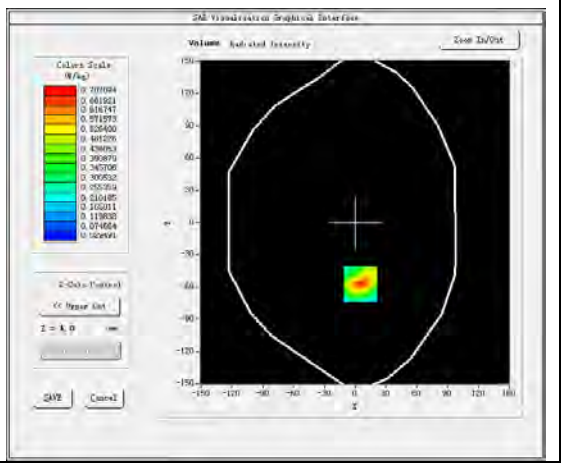
Date of measurement: 11/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	GSM1900
Channels	Middle
Signal	TDMA (Crest factor: 2.0)
ConvF	2.63

B. SAR Measurement Results

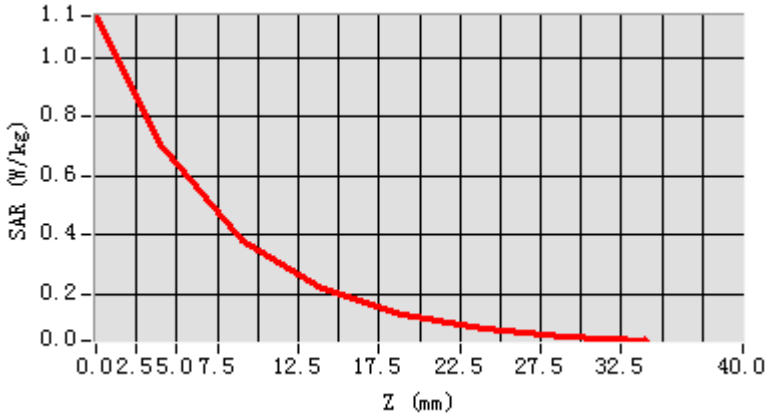
Frequency (MHz)	1880.000000
Relative permittivity (real part)	39.207344
Relative permittivity (imaginary part)	13.887850
Conductivity (S/m)	1.450509
Variation (%)	0.410000

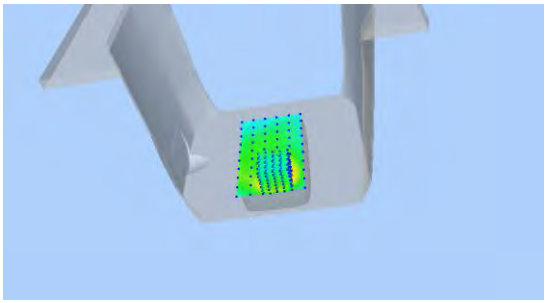
SURFACE SAR	VOLUME SAR
	

Maximum location: X=5.00, Y=-57.00
SAR Peak: 1.13 W/kg

SAR 10g (W/Kg)	0.336975
SAR 1g (W/Kg)	0.665079

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.1409	0.7071	0.3810	0.2159	0.1326	0.0821	0.0584



3D screen shot	Hot spot position
	

MEASUREMENT 5

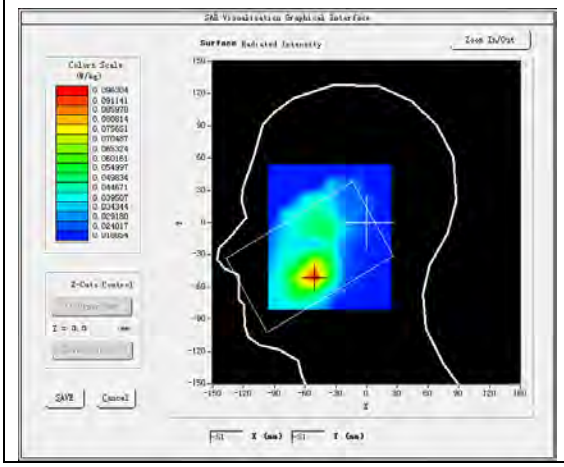
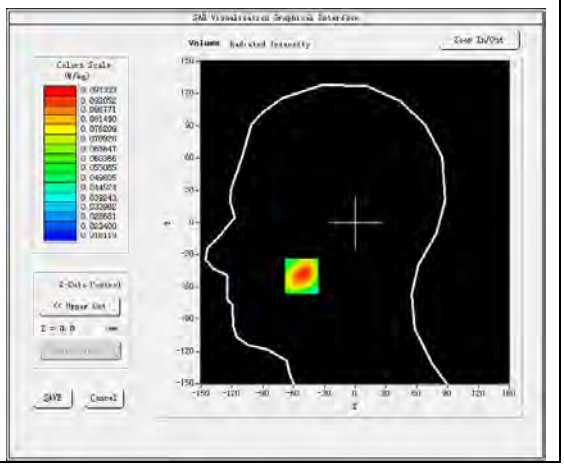
Date of measurement: 11/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	Band2_WCDMA1900
Channels	Middle
Signal	WCDMA (Crest factor: 1.0)
ConvF	2.63

B. SAR Measurement Results

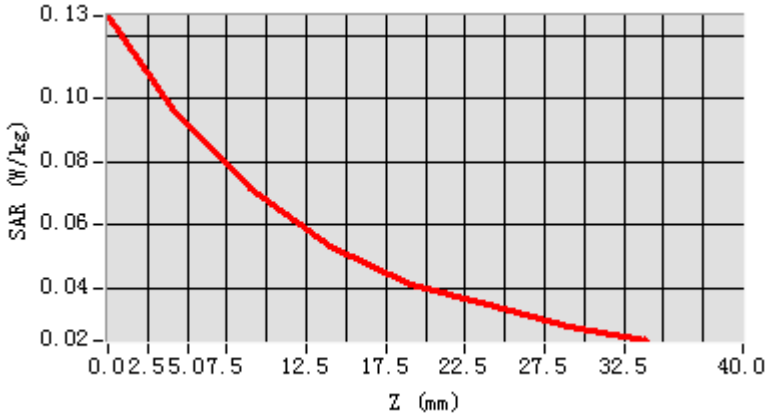
Frequency (MHz)	1880.000000
Relative permittivity (real part)	39.207344
Relative permittivity (imaginary part)	13.887850
Conductivity (S/m)	1.450509
Variation (%)	-0.880000

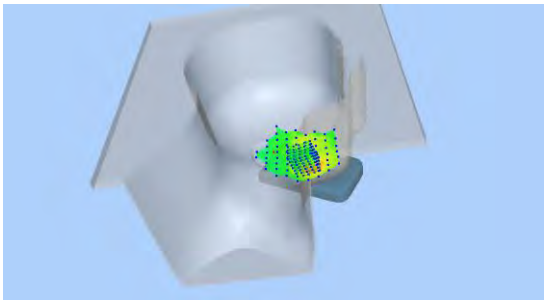
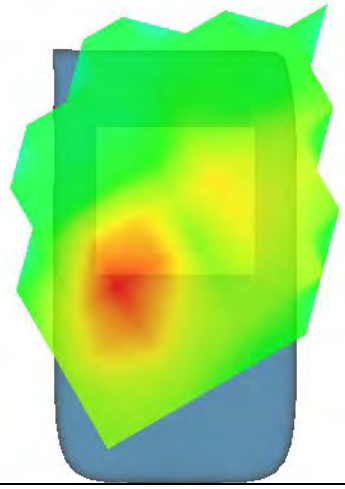
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-52.00, Y=-50.00
SAR Peak: 0.13 W/kg

SAR 10g (W/Kg)	0.063187
SAR 1g (W/Kg)	0.095775

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1263	0.0973	0.0716	0.0533	0.0414	0.0345	0.0275



3D screen shot	Hot spot position
	

MEASUREMENT 6

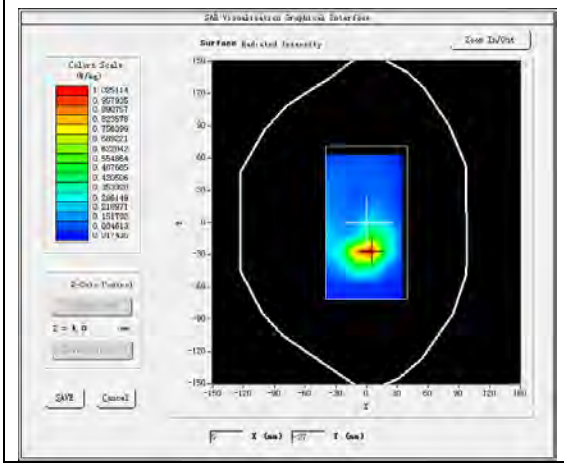
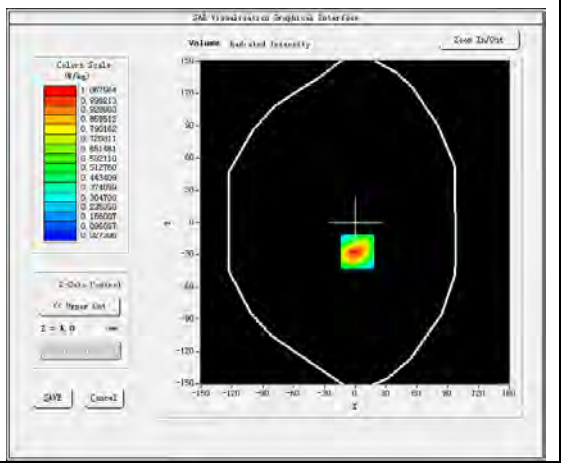
Date of measurement: 11/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	Band2_WCDMA1900
Channels	High
Signal	WCDMA (Crest factor: 1.0)
ConvF	2.63

B. SAR Measurement Results

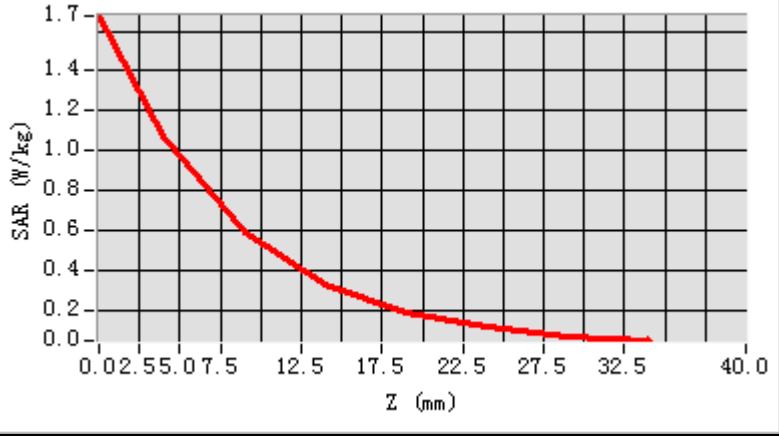
Frequency (MHz)	1907.600000
Relative permittivity (real part)	39.081825
Relative permittivity (imaginary part)	13.794810
Conductivity (S/m)	1.461943
Variation (%)	-0.610000

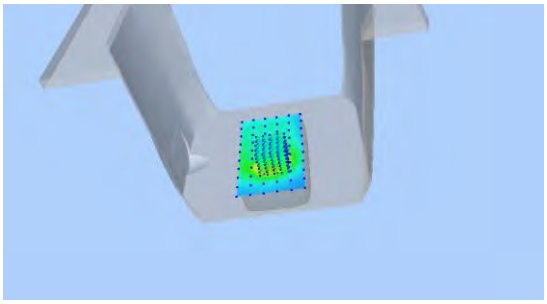
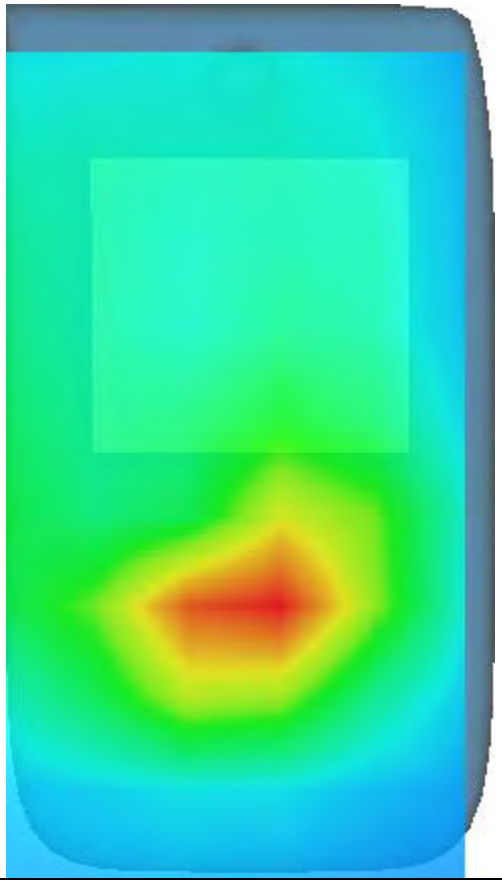
SURFACE SAR	VOLUME SAR
	

Maximum location: X=2.00, Y=-27.00
SAR Peak: 1.70 W/kg

SAR 10g (W/Kg)	0.514167
SAR 1g (W/Kg)	1.035196

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.6759	1.0676	0.5914	0.3305	0.1897	0.1114	0.0682



3D screen shot	Hot spot position
	

MEASUREMENT 7

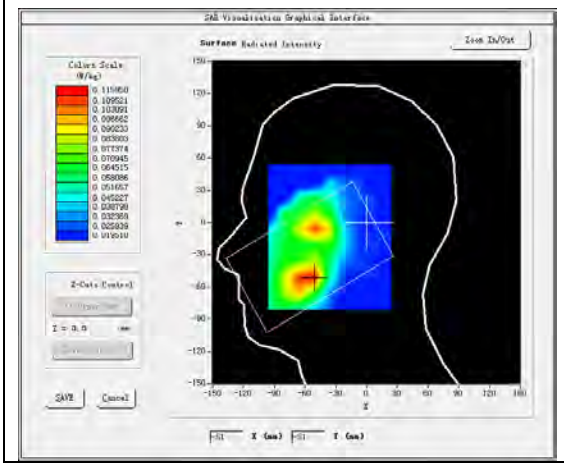
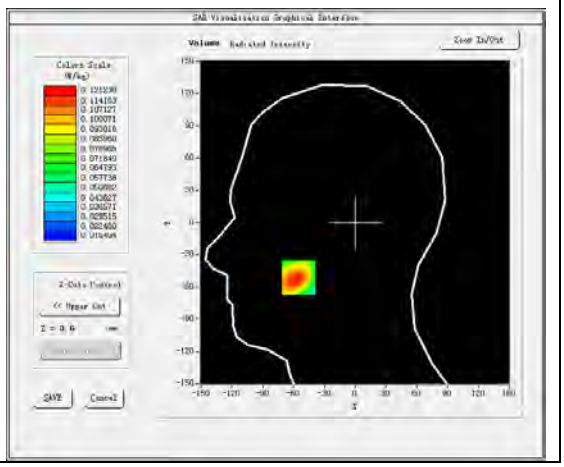
Date of measurement: 20/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	Band4_WCDMA1700
Channels	Middle
Signal	WCDMA (Crest factor: 1.0)
ConvF	2.45

B. SAR Measurement Results

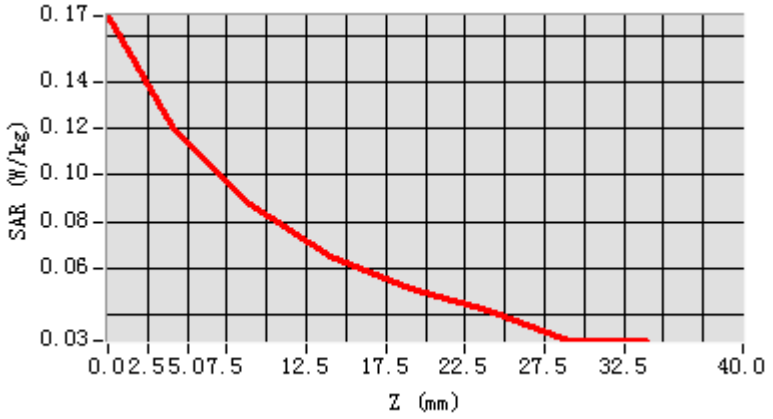
Frequency (MHz)	1732.600000
Relative permittivity (real part)	39.847805
Relative permittivity (imaginary part)	13.723347
Conductivity (S/m)	1.320491
Variation (%)	-0.110000

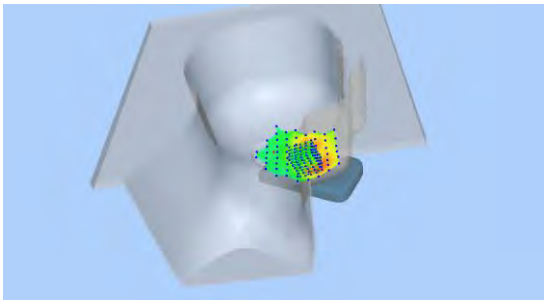
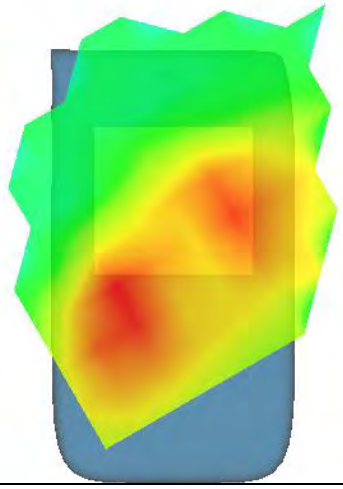
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-55.00, Y=-51.00
SAR Peak: 0.17 W/kg

SAR 10g (W/Kg)	0.078552
SAR 1g (W/Kg)	0.118390

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1684	0.1212	0.0877	0.0653	0.0516	0.0415	0.0290



3D screen shot	Hot spot position
	

MEASUREMENT 8

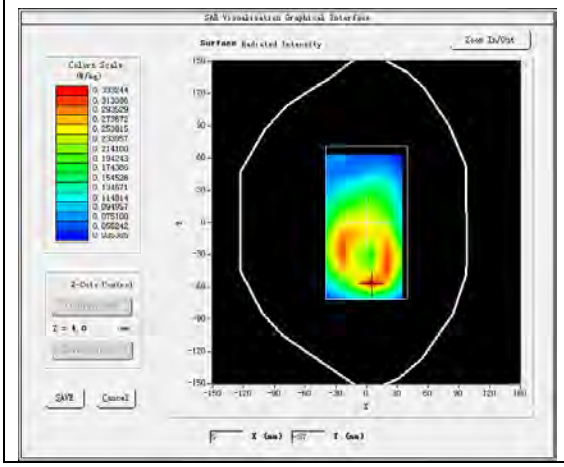
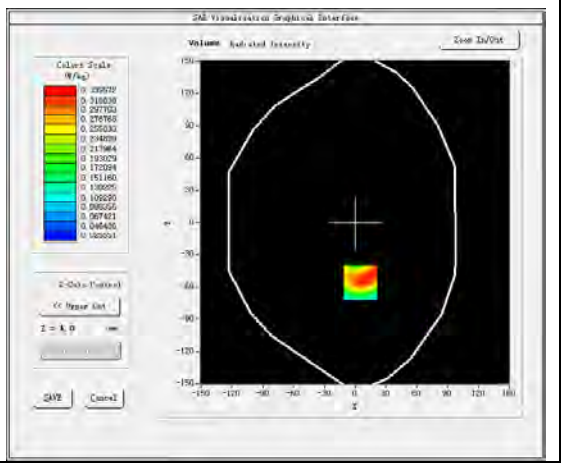
Date of measurement: 20/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	Band4_WCDMA1700
Channels	Middle
Signal	WCDMA (Crest factor: 1.0)
ConvF	2.45

B. SAR Measurement Results

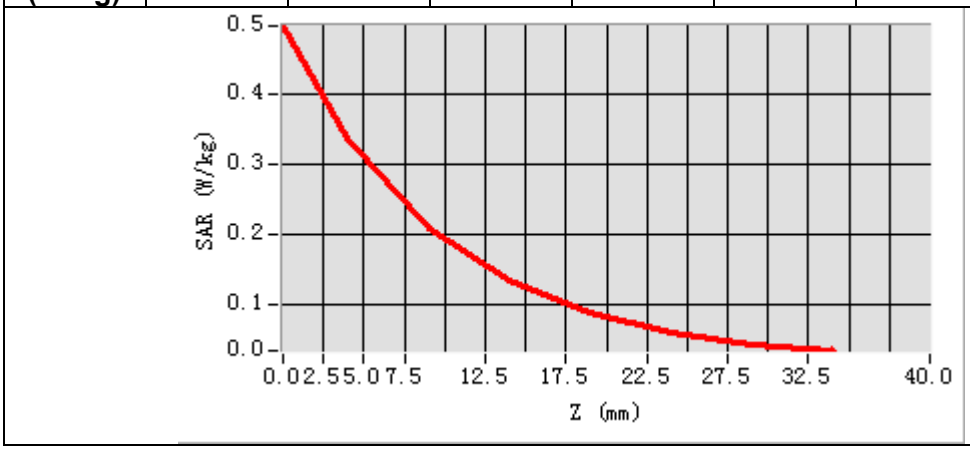
Frequency (MHz)	1732.600000
Relative permittivity (real part)	39.847805
Relative permittivity (imaginary part)	13.723347
Conductivity (S/m)	1.320491
Variation (%)	-0.610000

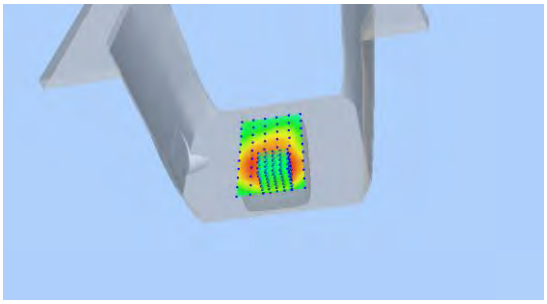
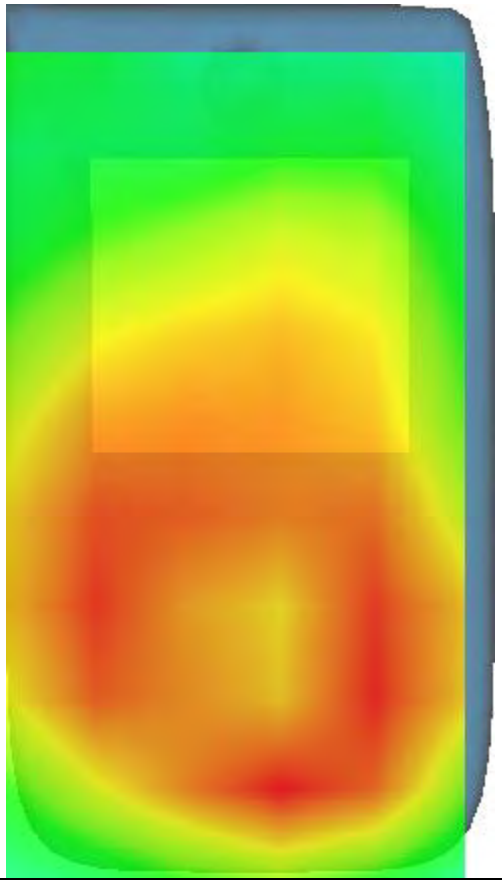
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=5.00, Y=-56.00
SAR Peak: 0.52 W/kg

SAR 10g (W/Kg)	0.193431
SAR 1g (W/Kg)	0.330713

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.4986	0.3396	0.2098	0.1357	0.0878	0.0608	0.0429



3D screen shot	Hot spot position
	

MEASUREMENT 9

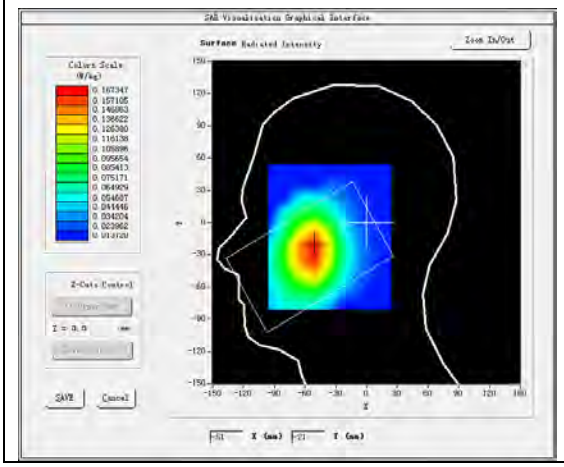
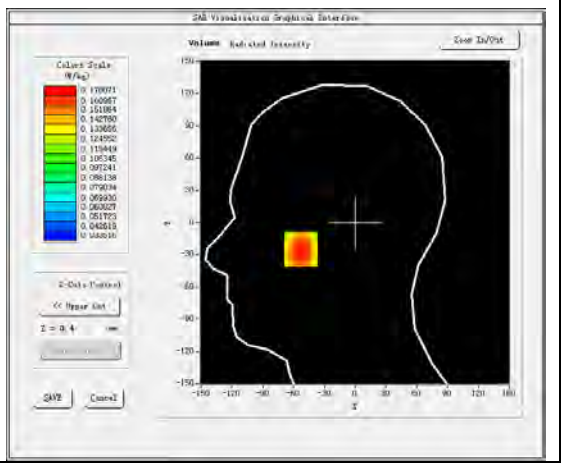
Date of measurement: 10/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	Band5_WCDMA850
Channels	Middle
Signal	WCDMA (Crest factor: 1.0)
ConvF	2.32

B. SAR Measurement Results

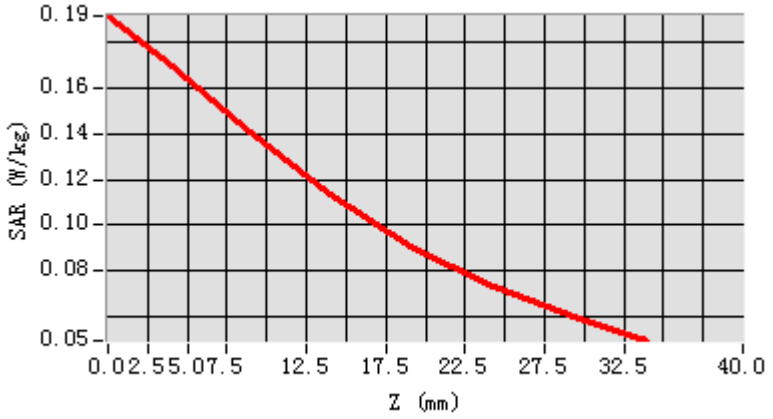
Frequency (MHz)	836.400000
Relative permittivity (real part)	41.267719
Relative permittivity (imaginary part)	19.206280
Conductivity (S/m)	0.892452
Variation (%)	0.590000

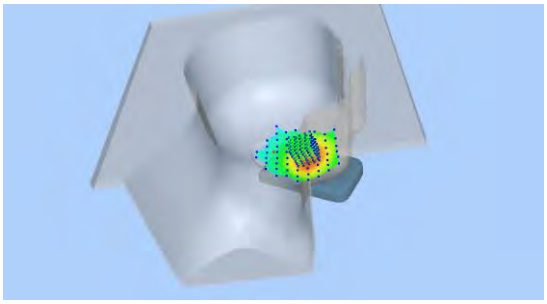
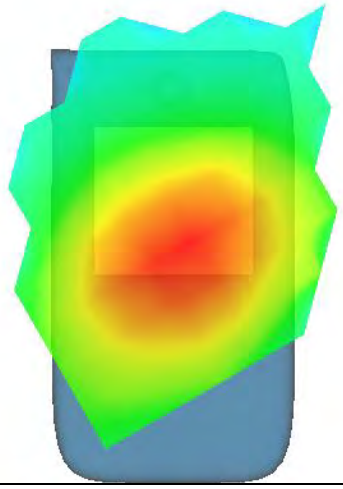
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-53.00, Y=-25.00
SAR Peak: 0.20 W/kg

SAR 10g (W/Kg)	0.125513
SAR 1g (W/Kg)	0.163691

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1916	0.1701	0.1411	0.1134	0.0907	0.0738	0.0605



3D screen shot	Hot spot position
	

MEASUREMENT 10

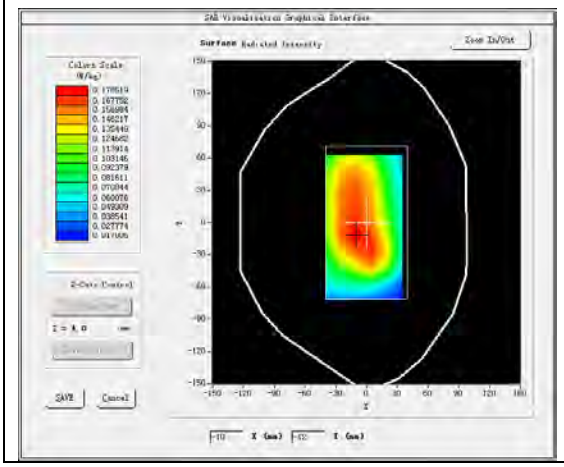
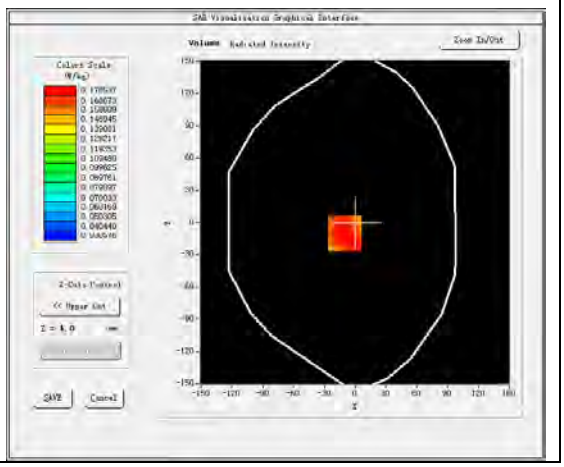
Date of measurement: 10/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	Band5_WCDMA850
Channels	Middle
Signal	WCDMA (Crest factor: 1.0)
ConvF	2.32

B. SAR Measurement Results

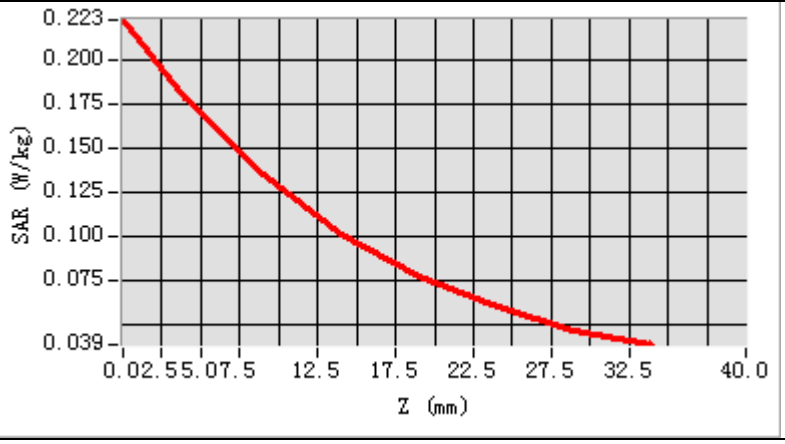
Frequency (MHz)	836.400000
Relative permittivity (real part)	41.267719
Relative permittivity (imaginary part)	19.206280
Conductivity (S/m)	0.892452
Variation (%)	-0.450000

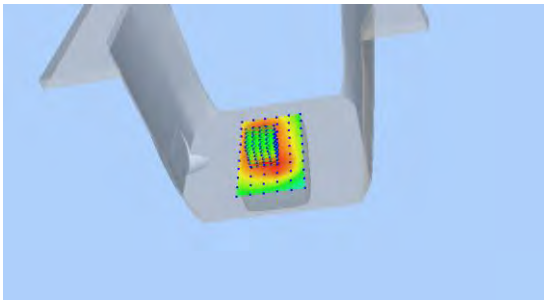
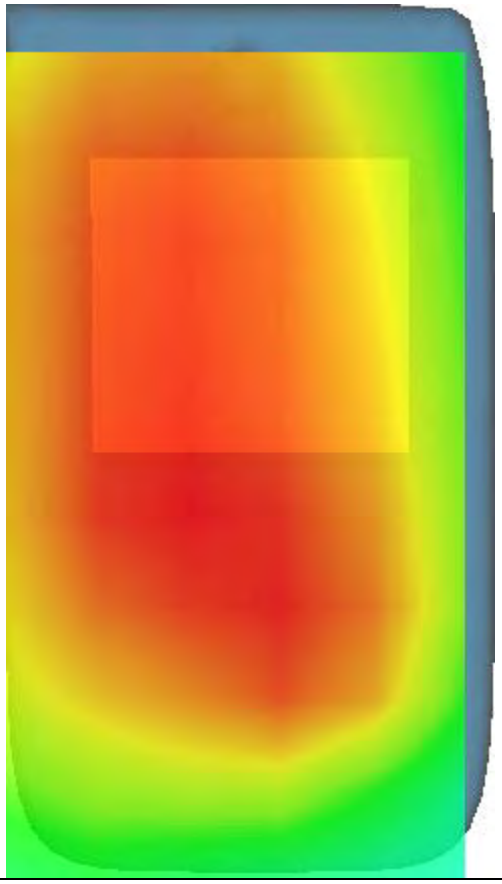
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-10.00, Y=-10.00
SAR Peak: 0.23 W/kg

SAR 10g (W/Kg)	0.129867
SAR 1g (W/Kg)	0.175339

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.2228	0.1785	0.1351	0.1016	0.0773	0.0598	0.0468



3D screen shot	Hot spot position
	

MEASUREMENT 11

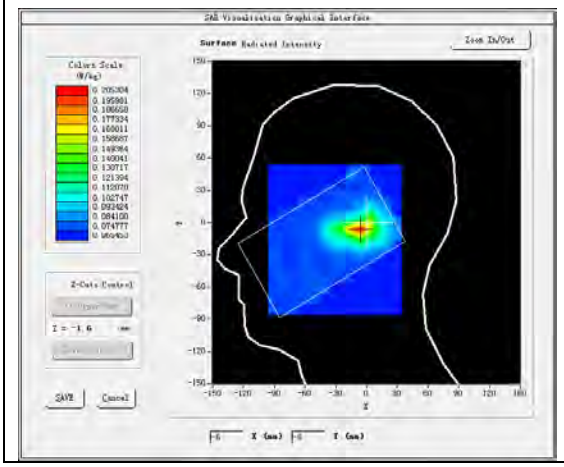
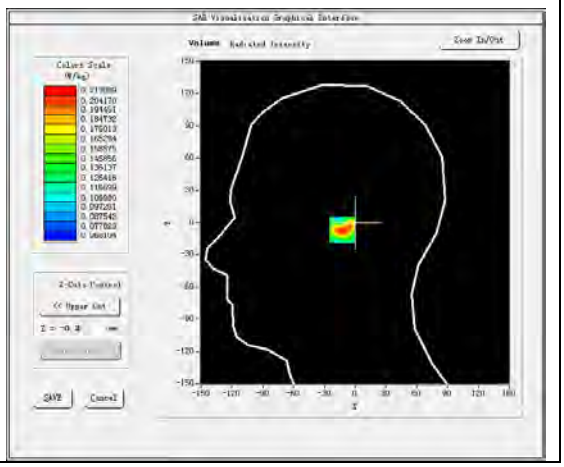
Date of measurement: 23/1/2024

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 2.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Left head
Device Position	Cheek
Band	IEEE 802.11a U-NII
Channels	Middle
Signal	IEEE802.11a (Crest factor: 1.0)
ConvF	2.07

B. SAR Measurement Results

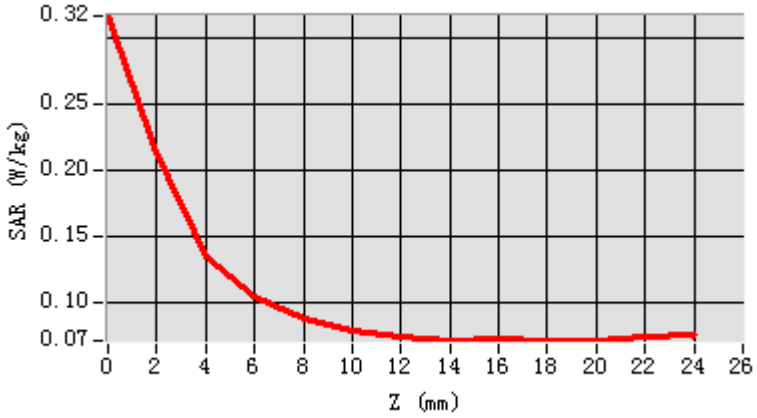
Frequency (MHz)	5200.000000
Relative permittivity (real part)	35.068470
Relative permittivity (imaginary part)	15.481054
Conductivity (S/m)	4.472304
Variation (%)	1.570000

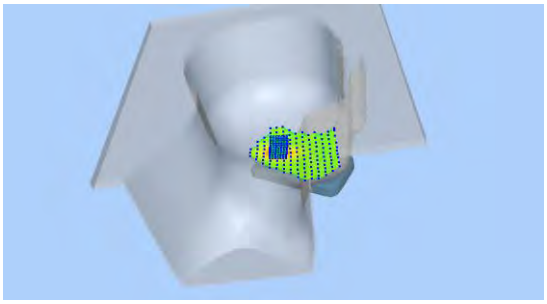
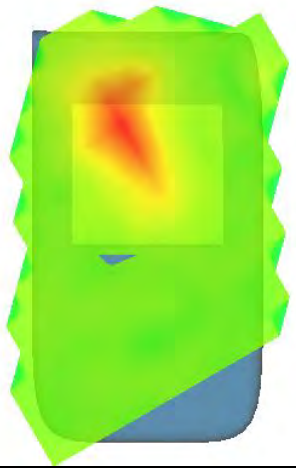
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-7.00, Y=-7.00
SAR Peak: 0.47 W/kg

SAR 10g (W/Kg)	0.117922
SAR 1g (W/Kg)	0.206384

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	0.3169	0.2139	0.1358	0.1048	0.0879	0.0799	0.0744	0.0721	0.0728	0.0718	0.0719	0.0748



3D screen shot	Hot spot position
	

MEASUREMENT 12

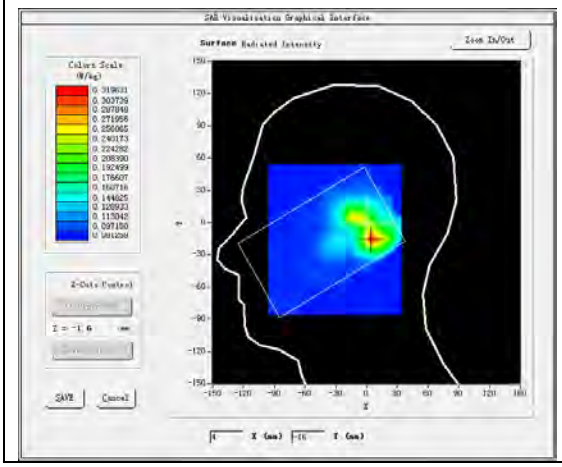
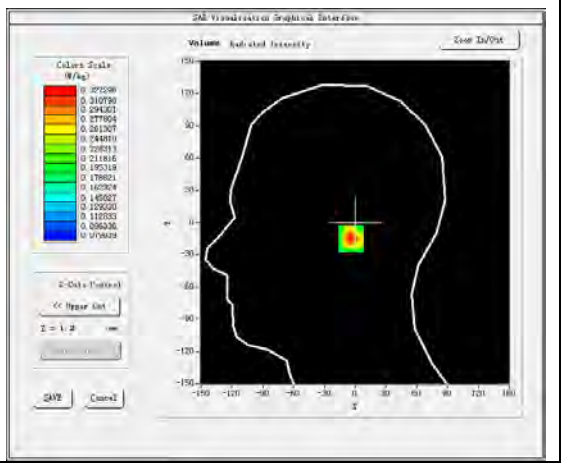
Date of measurement: 26/1/2024

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 2.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Left head
Device Position	Cheek
Band	IEEE 802.11n U-NII
Channels	High
Signal	IEEE802.11n (Crest factor: 1.0)
ConvF	2.04

B. SAR Measurement Results

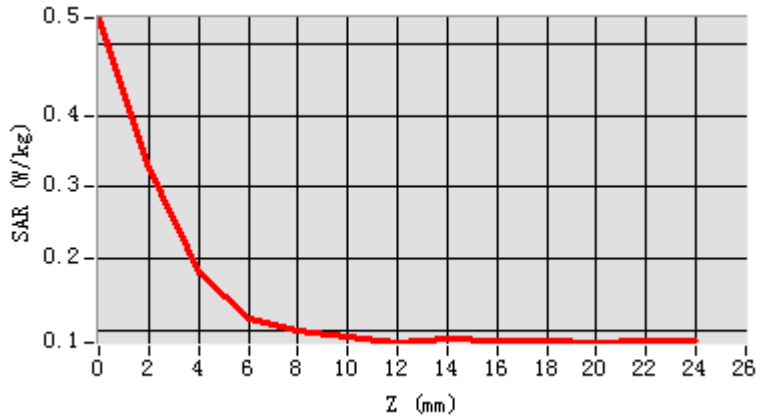
Frequency (MHz)	5825.000000
Relative permittivity (real part)	34.433530
Relative permittivity (imaginary part)	15.986214
Conductivity (S/m)	5.173316
Variation (%)	1.080000

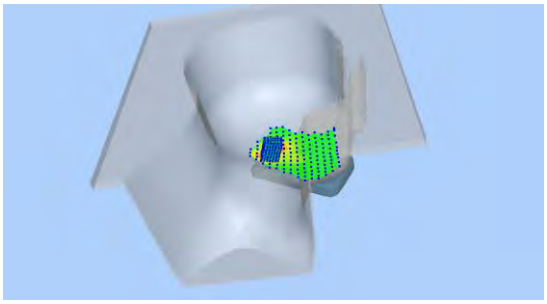
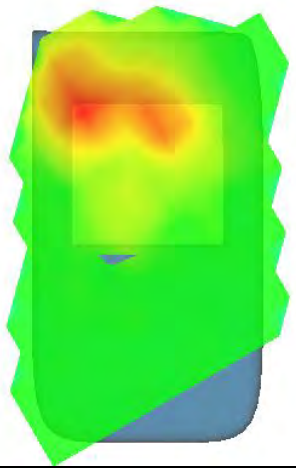
SURFACE SAR	VOLUME SAR
	

Maximum location: X=5.00, Y=-15.00
SAR Peak: 0.84 W/kg

SAR 10g (W/Kg)	0.174730
SAR 1g (W/Kg)	0.335612

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	0.5354	0.3273	0.1817	0.1170	0.1009	0.0927	0.0848	0.0889	0.0870	0.0872	0.0835	0.0868



3D screen shot	Hot spot position
	

MEASUREMENT 13

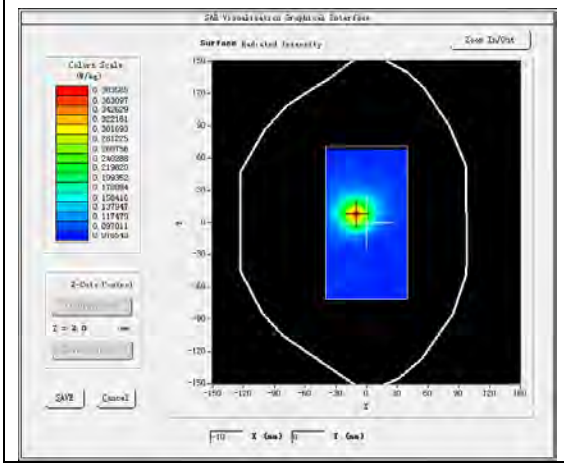
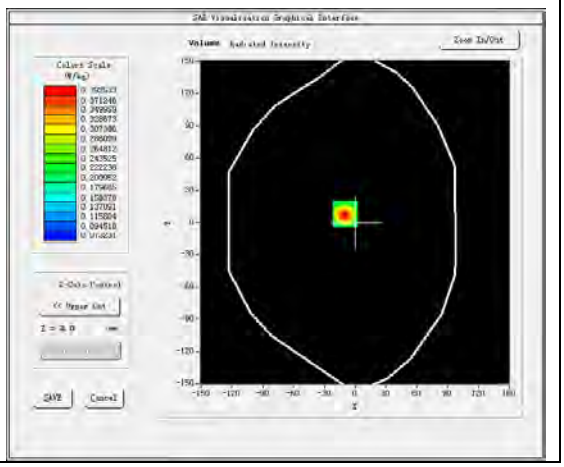
Date of measurement: 23/1/2024

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 2.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11a U-NII
Channels	Middle
Signal	IEEE802.11a (Crest factor: 1.0)
ConvF	2.07

B. SAR Measurement Results

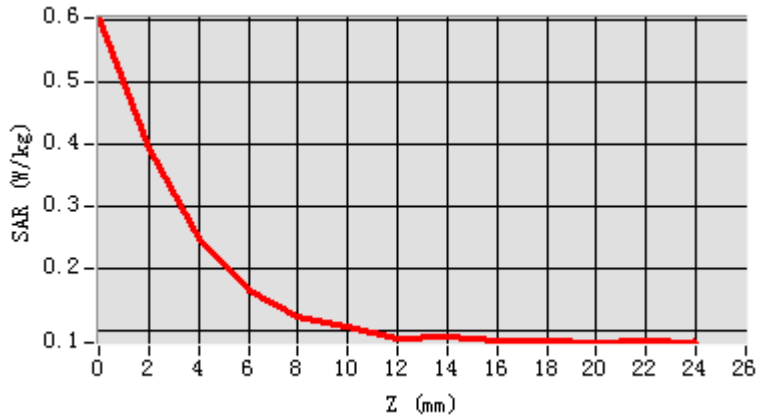
Frequency (MHz)	5200.000000
Relative permittivity (real part)	35.068470
Relative permittivity (imaginary part)	15.481054
Conductivity (S/m)	4.472304
Variation (%)	-0.250000

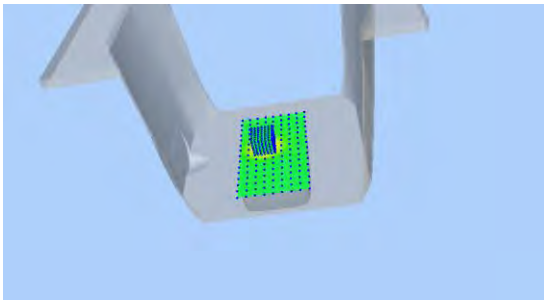
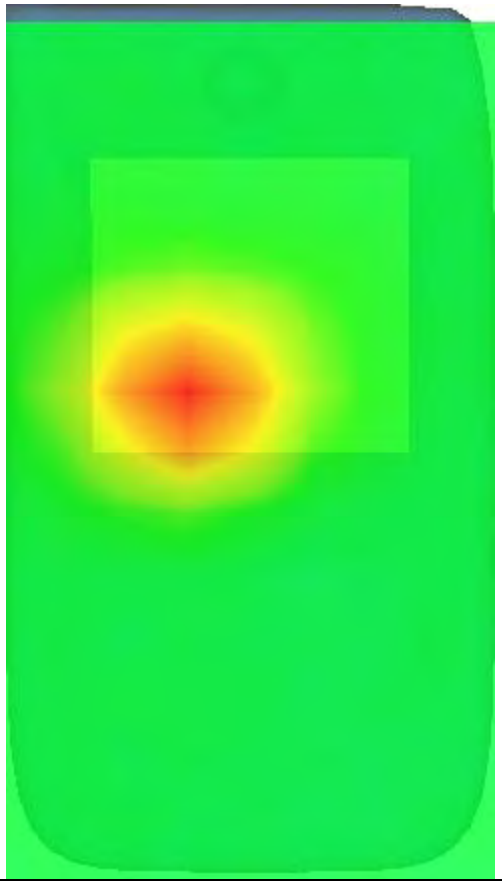
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-10.00, Y=8.00
SAR Peak: 0.63 W/kg

SAR 10g (W/Kg)	0.145044
SAR 1g (W/Kg)	0.260329

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	0.6028	0.3925	0.2467	0.1633	0.1231	0.1042	0.0874	0.0897	0.0828	0.0819	0.0796	0.0833



3D screen shot	Hot spot position
	

MEASUREMENT 14

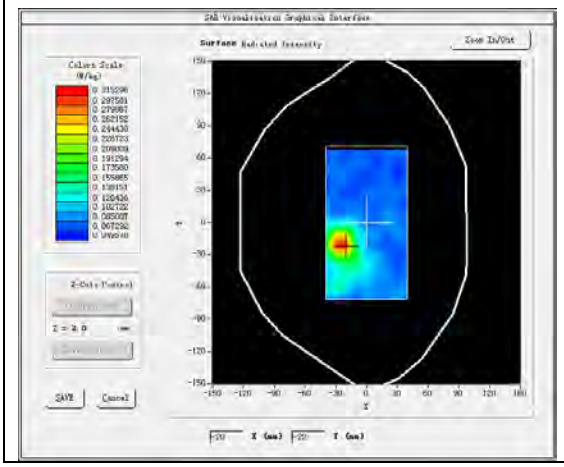
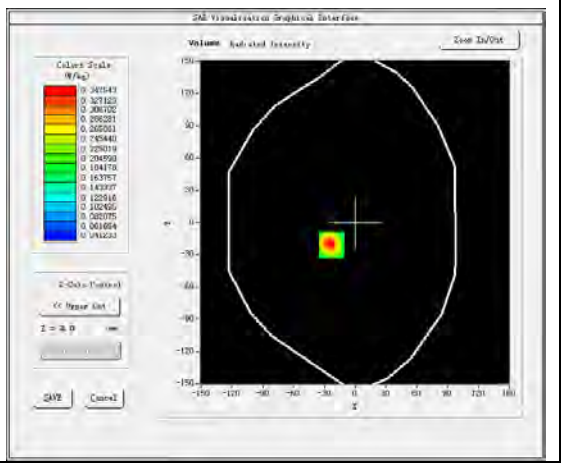
Date of measurement: 26/1/2024

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 2.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11n U-NII
Channels	High
Signal	IEEE802.11n (Crest factor: 1.0)
ConvF	2.04

B. SAR Measurement Results

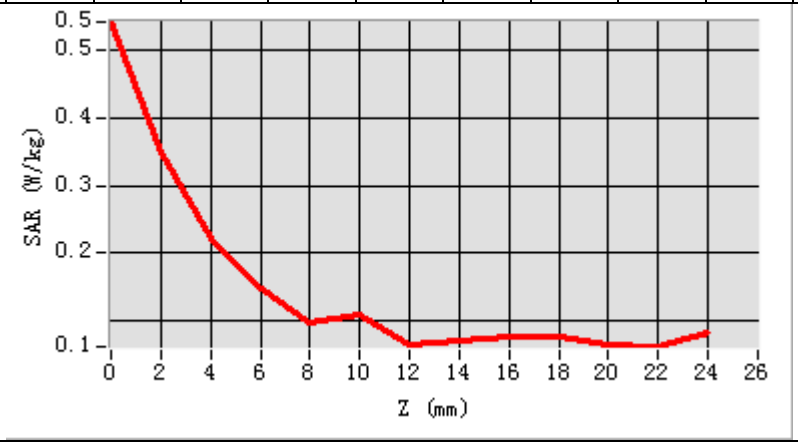
Frequency (MHz)	5825.000000
Relative permittivity (real part)	34.433530
Relative permittivity (imaginary part)	15.986214
Conductivity (S/m)	5.173316
Variation (%)	4.300000

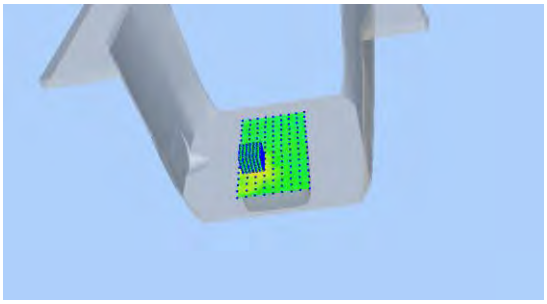
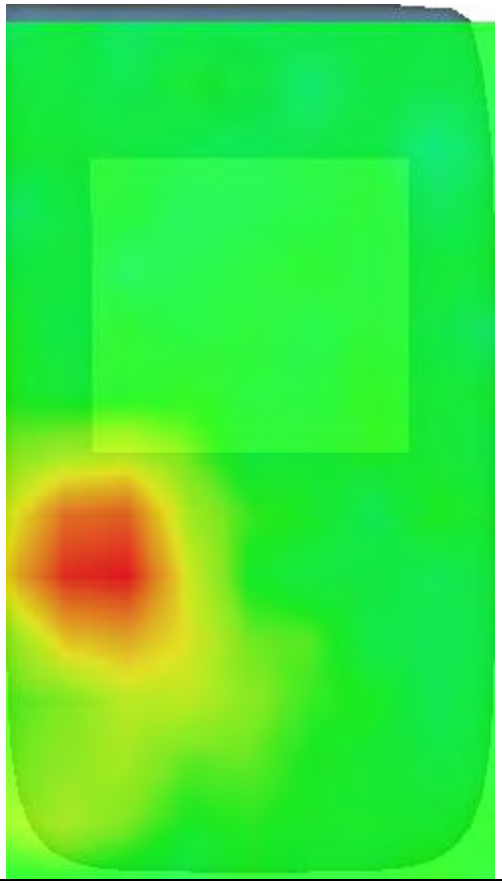
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-23.00, Y=-21.00
SAR Peak: 0.58 W/kg

SAR 10g (W/Kg)	0.127612
SAR 1g (W/Kg)	0.227956

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	0.5408	0.3472	0.2220	0.1481	0.0970	0.1112	0.0650	0.0721	0.0775	0.0785	0.0652	0.0624



3D screen shot	Hot spot position
	

MEASUREMENT 15

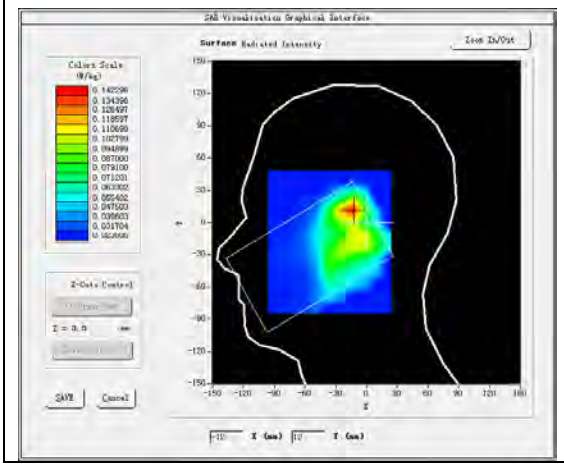
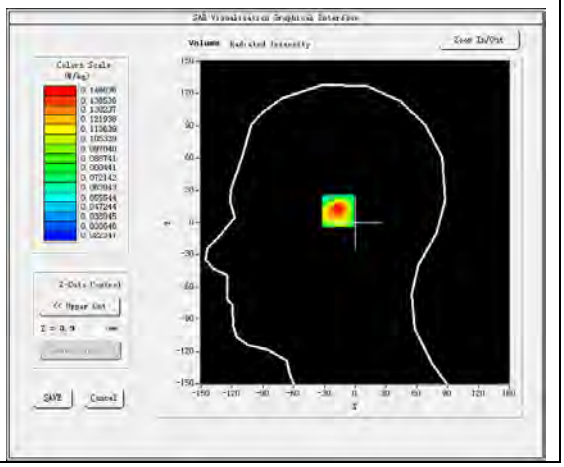
Date of measurement: 27/1/2024

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	IEEE 802.11b ISM
Channels	High
Signal	IEEE802.11b (Crest factor: 1.0)
ConvF	2.85

B. SAR Measurement Results

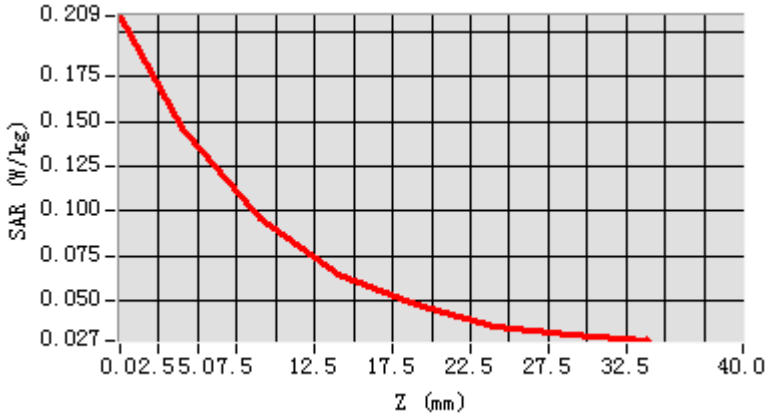
Frequency (MHz)	2462.000000
Relative permittivity (real part)	37.993198
Relative permittivity (imaginary part)	12.942536
Conductivity (S/m)	1.770251
Variation (%)	-2.720000

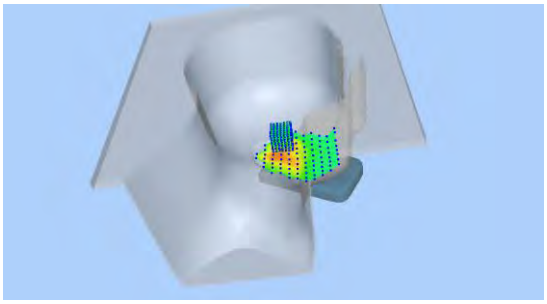
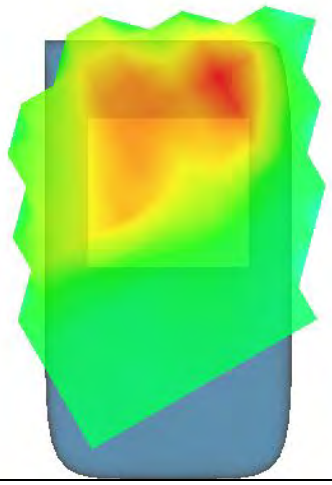
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-15.00, Y=12.00
SAR Peak: 0.21 W/kg

SAR 10g (W/Kg)	0.081681
SAR 1g (W/Kg)	0.137080

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.2091	0.1468	0.0954	0.0639	0.0473	0.0355	0.0309



3D screen shot	Hot spot position
	

MEASUREMENT 16

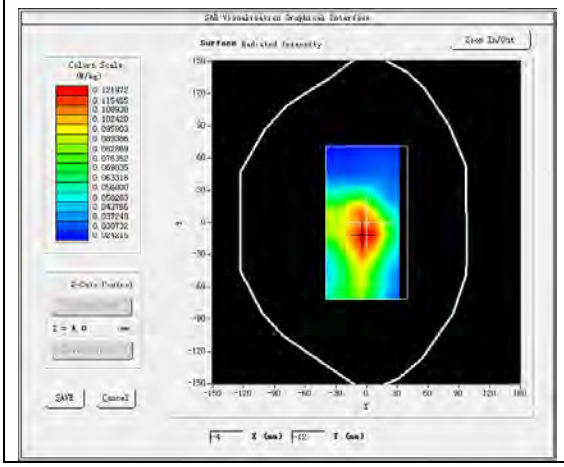
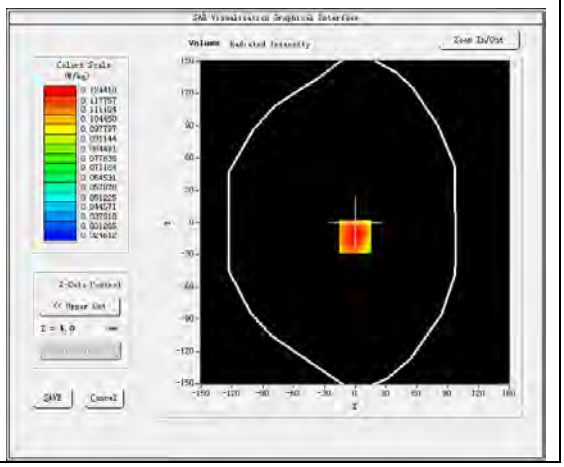
Date of measurement: 27/1/2024

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11b ISM
Channels	High
Signal	IEEE802.11b (Crest factor: 1.0)
ConvF	2.85

B. SAR Measurement Results

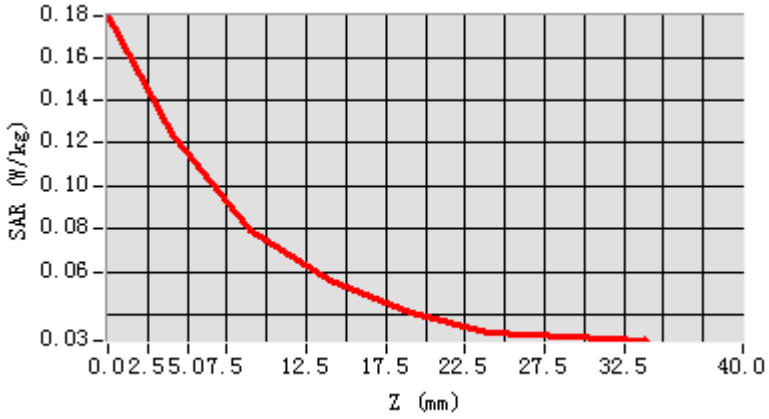
Frequency (MHz)	2462.000000
Relative permittivity (real part)	37.993198
Relative permittivity (imaginary part)	12.942536
Conductivity (S/m)	1.770251
Variation (%)	-0.340000

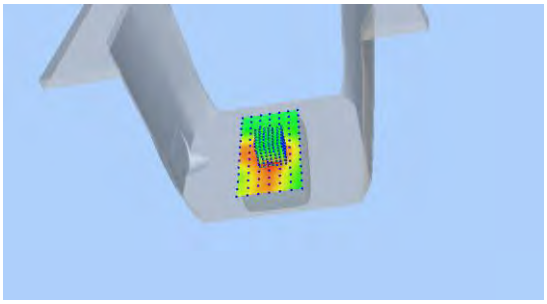
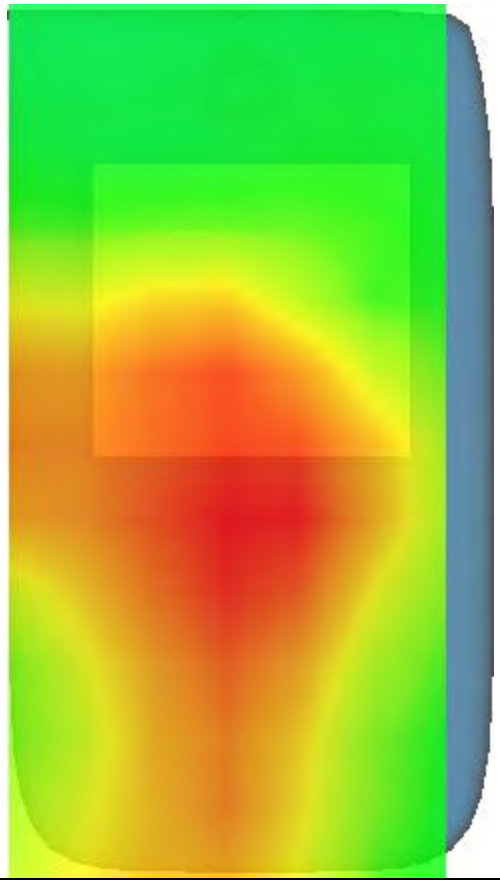
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=0.00, Y=-13.00
SAR Peak: 0.19 W/kg

SAR 10g (W/Kg)	0.078387
SAR 1g (W/Kg)	0.120254

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1794	0.1244	0.0793	0.0553	0.0406	0.0317	0.0296



3D screen shot	Hot spot position
	

MEASUREMENT 17

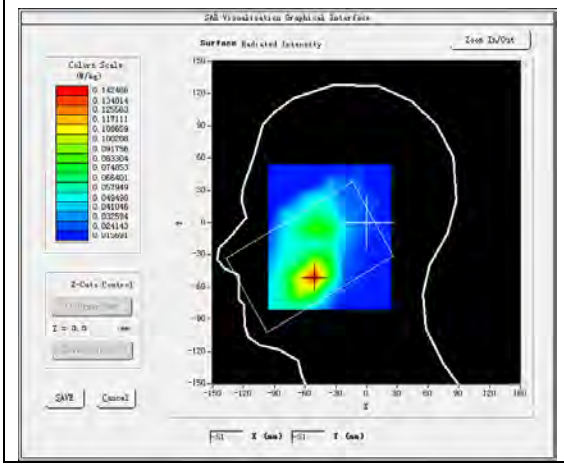
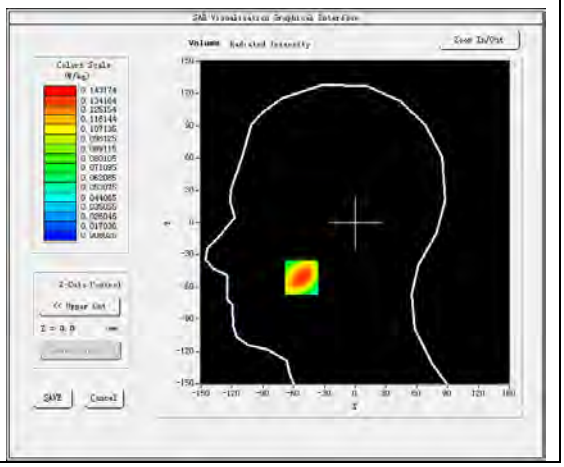
Date of measurement: 11/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 2
Channels	Middle
Signal	LTE (Crest factor: 1.0)
ConvF	2.63

B. SAR Measurement Results

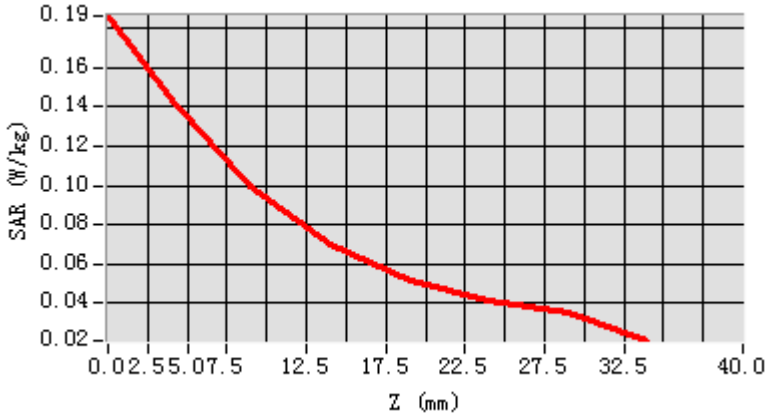
Frequency (MHz)	1880.000000
Relative permittivity (real part)	39.207344
Relative permittivity (imaginary part)	13.887850
Conductivity (S/m)	1.450509
Variation (%)	-4.500000

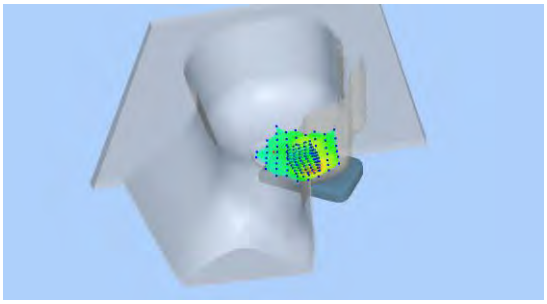
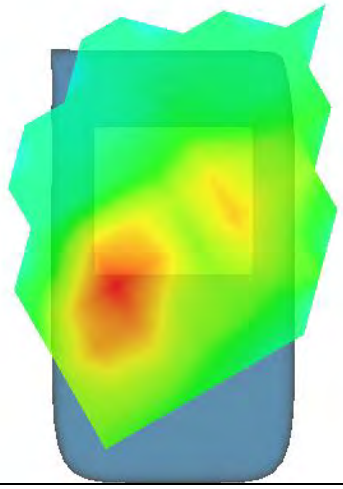
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-52.00, Y=-51.00
SAR Peak: 0.20 W/kg

SAR 10g (W/Kg)	0.086955
SAR 1g (W/Kg)	0.138442

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1863	0.1432	0.0999	0.0700	0.0521	0.0418	0.0351



3D screen shot	Hot spot position
	

MEASUREMENT 18

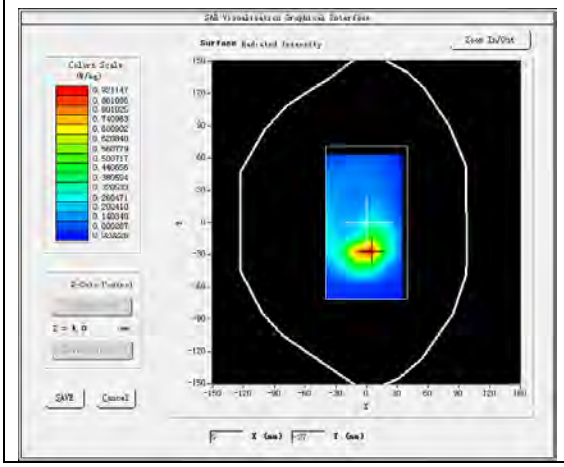
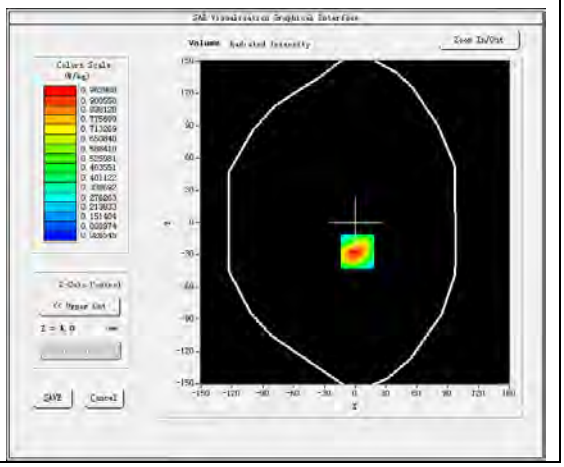
Date of measurement: 11/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 2
Channels	High
Signal	LTE (Crest factor: 1.0)
ConvF	2.63

B. SAR Measurement Results

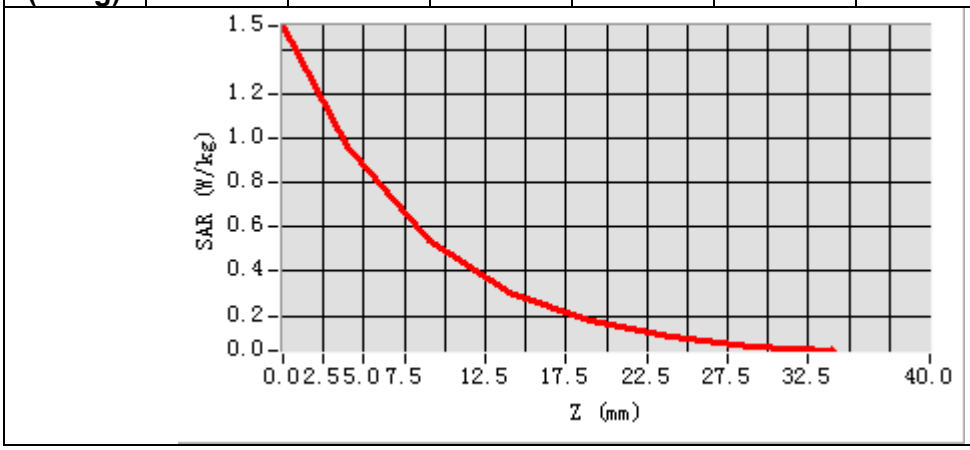
Frequency (MHz)	1900.000000
Relative permittivity (real part)	39.132044
Relative permittivity (imaginary part)	13.839950
Conductivity (S/m)	1.460884
Variation (%)	0.150000

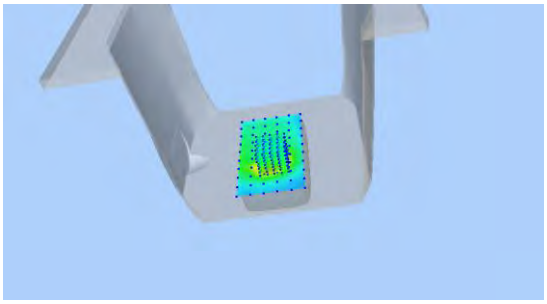
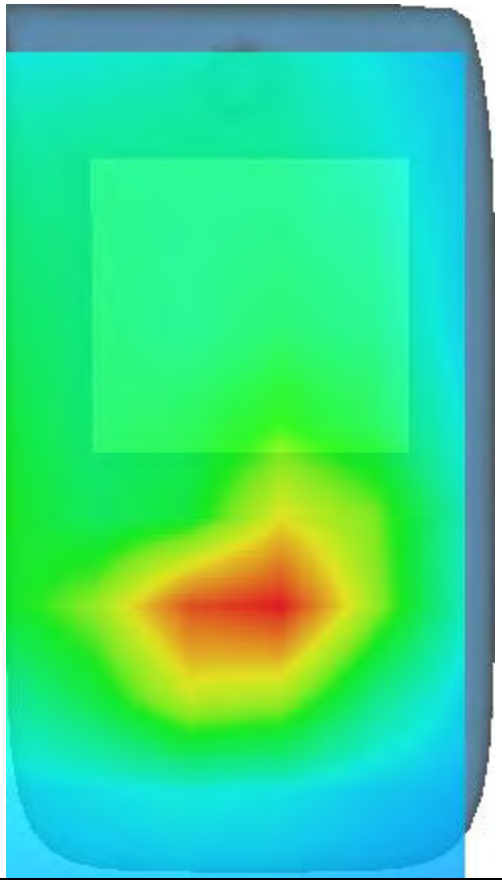
SURFACE SAR	VOLUME SAR
	

Maximum location: X=2.00, Y=-27.00
SAR Peak: 1.54 W/kg

SAR 10g (W/Kg)	0.471859
SAR 1g (W/Kg)	0.942789

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.5067	0.9630	0.5374	0.3037	0.1754	0.1049	0.0631



3D screen shot	Hot spot position
	

MEASUREMENT 19

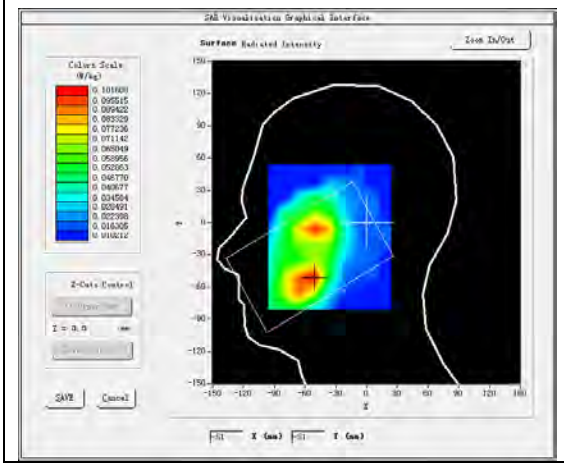
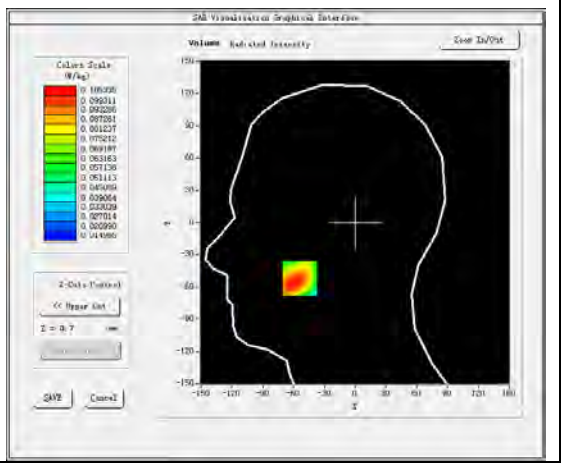
Date of measurement: 20/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 4
Channels	Middle
Signal	LTE (Crest factor: 1.0)
ConvF	2.45

B. SAR Measurement Results

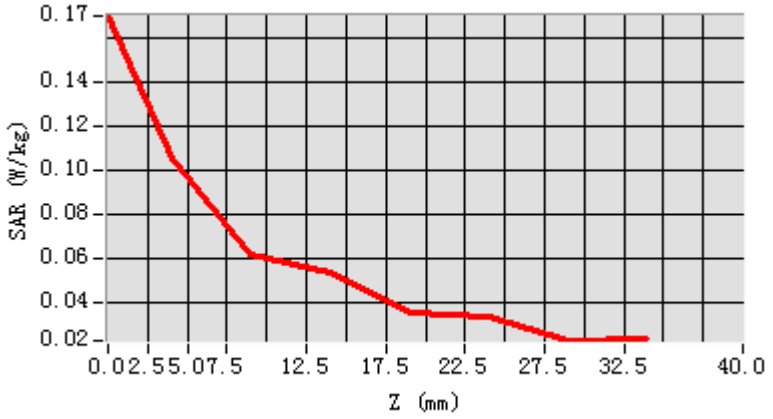
Frequency (MHz)	1732.500000
Relative permittivity (real part)	39.855705
Relative permittivity (imaginary part)	13.708197
Conductivity (S/m)	1.319414
Variation (%)	4.450000

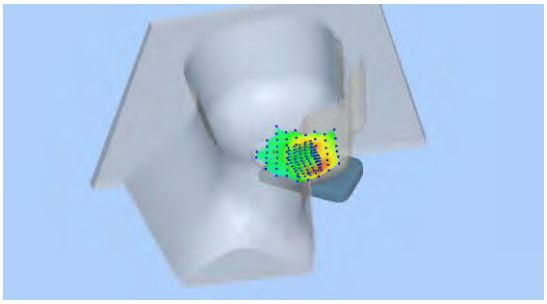
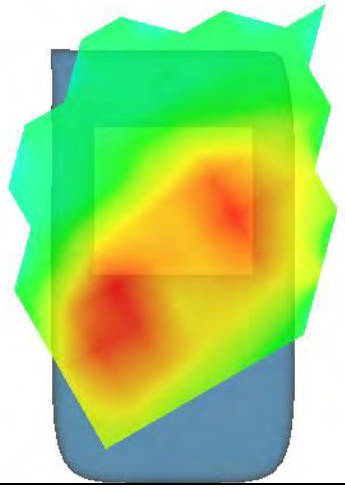
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-54.00, Y=-52.00
SAR Peak: 0.15 W/kg

SAR 10g (W/Kg)	0.069146
SAR 1g (W/Kg)	0.103461

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1700	0.1053	0.0621	0.0536	0.0352	0.0335	0.0228



3D screen shot	Hot spot position
	

MEASUREMENT 20

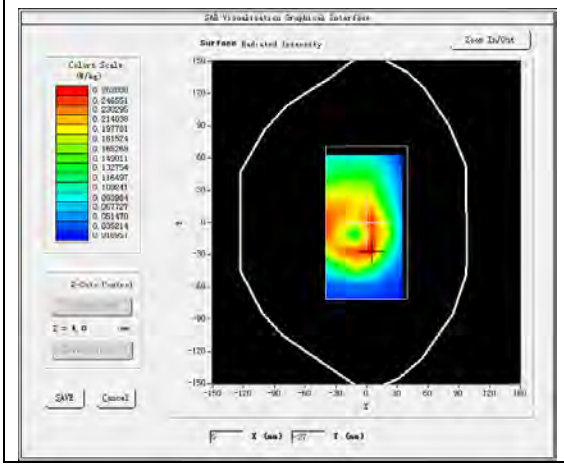
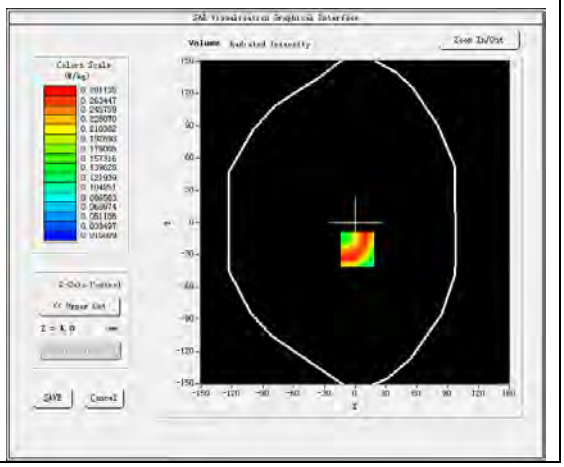
Date of measurement: 20/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 4
Channels	Middle
Signal	LTE (Crest factor: 1.0)
ConvF	2.45

B. SAR Measurement Results

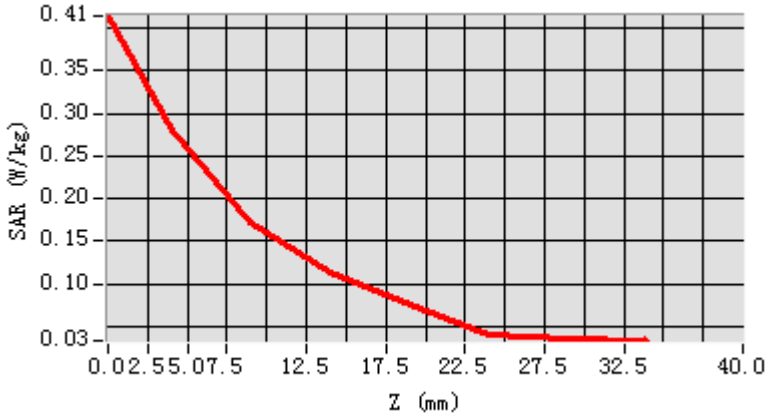
Frequency (MHz)	1732.500000
Relative permittivity (real part)	39.855705
Relative permittivity (imaginary part)	13.708197
Conductivity (S/m)	1.319414
Variation (%)	1.960000

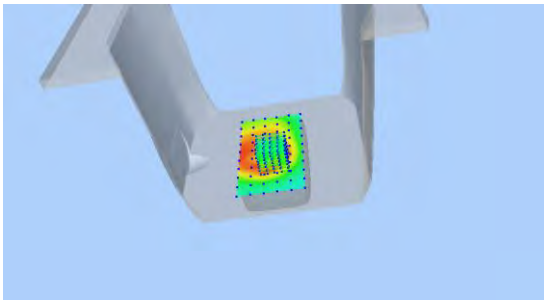
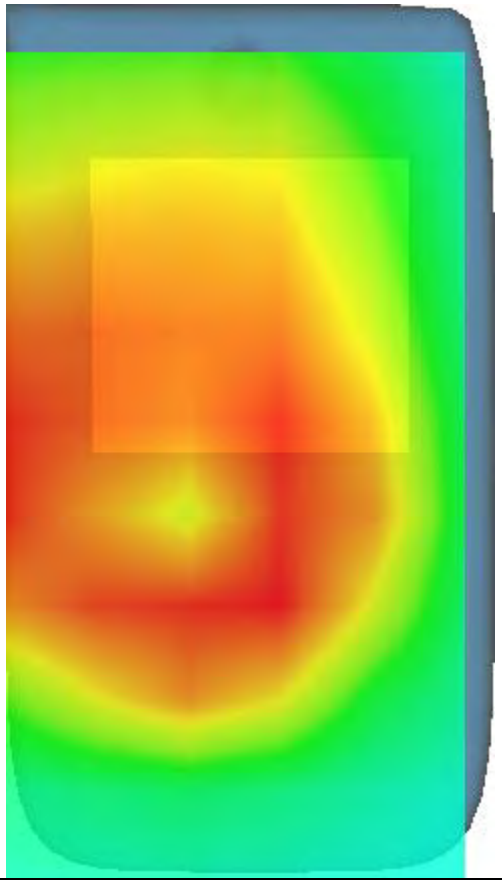
SURFACE SAR	VOLUME SAR
	

Maximum location: X=2.00, Y=-25.00
SAR Peak: 0.46 W/kg

SAR 10g (W/Kg)	0.158611
SAR 1g (W/Kg)	0.271557

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.4146	0.2811	0.1727	0.1124	0.0756	0.0412	0.0357



3D screen shot	Hot spot position
	

MEASUREMENT 21

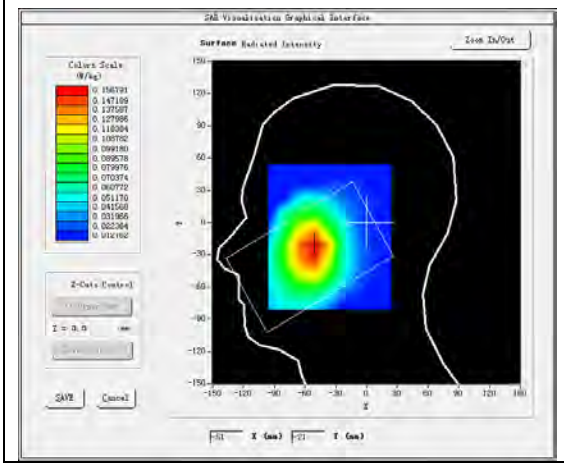
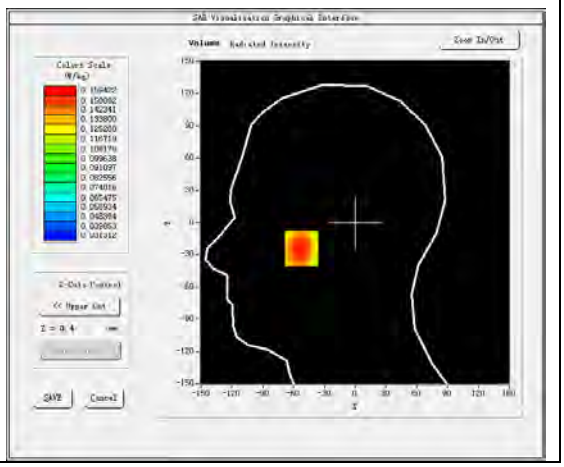
Date of measurement: 10/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 5
Channels	Middle
Signal	LTE (Crest factor: 1.0)
ConvF	2.32

B. SAR Measurement Results

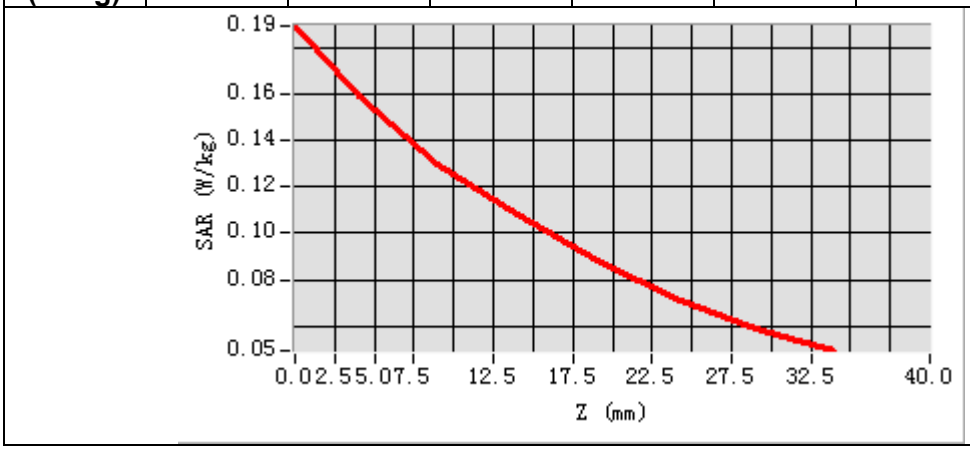
Frequency (MHz)	836.500000
Relative permittivity (real part)	41.269989
Relative permittivity (imaginary part)	19.208080
Conductivity (S/m)	0.892642
Variation (%)	0.610000

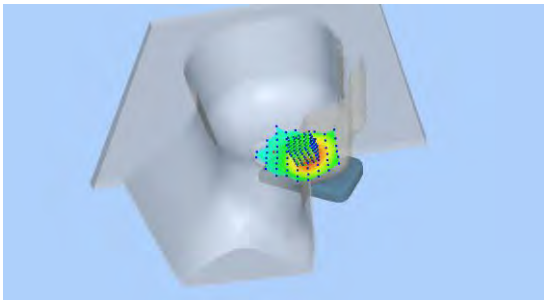
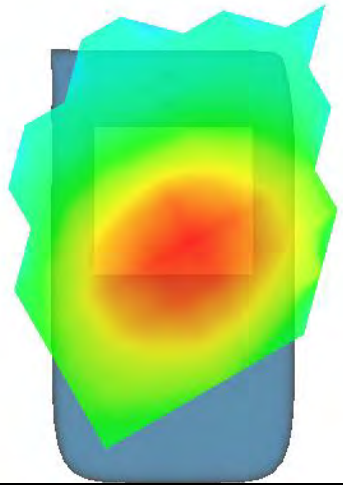
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-52.00, Y=-24.00
SAR Peak: 0.19 W/kg

SAR 10g (W/Kg)	0.119152
SAR 1g (W/Kg)	0.155112

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1896	0.1594	0.1301	0.1085	0.0885	0.0718	0.0586



3D screen shot	Hot spot position
	

MEASUREMENT 22

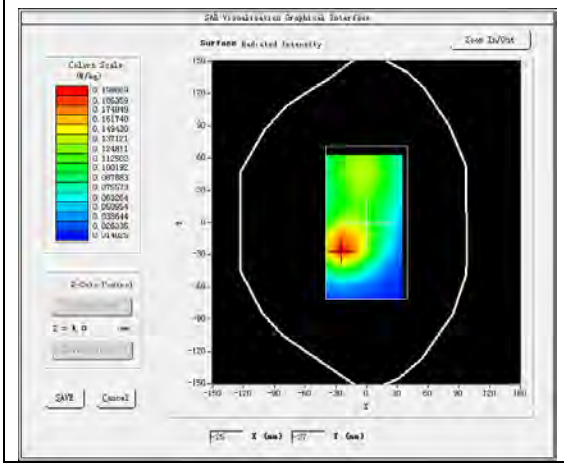
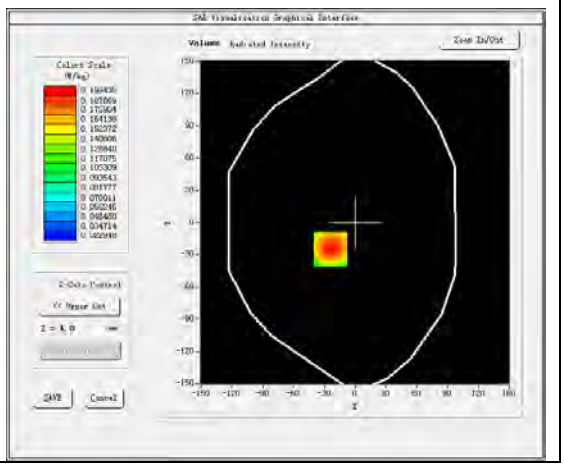
Date of measurement: 10/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 5
Channels	Middle
Signal	LTE (Crest factor: 1.0)
ConvF	2.32

B. SAR Measurement Results

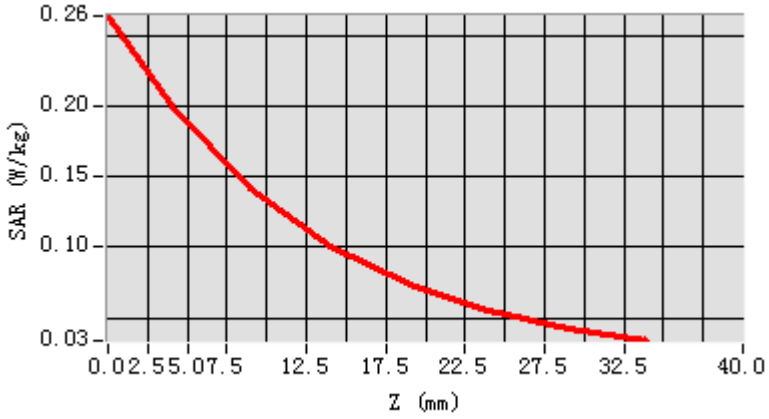
Frequency (MHz)	836.500000
Relative permittivity (real part)	41.269989
Relative permittivity (imaginary part)	19.208080
Conductivity (S/m)	0.892642
Variation (%)	-1.400000

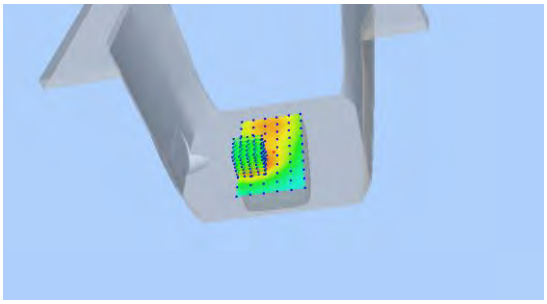
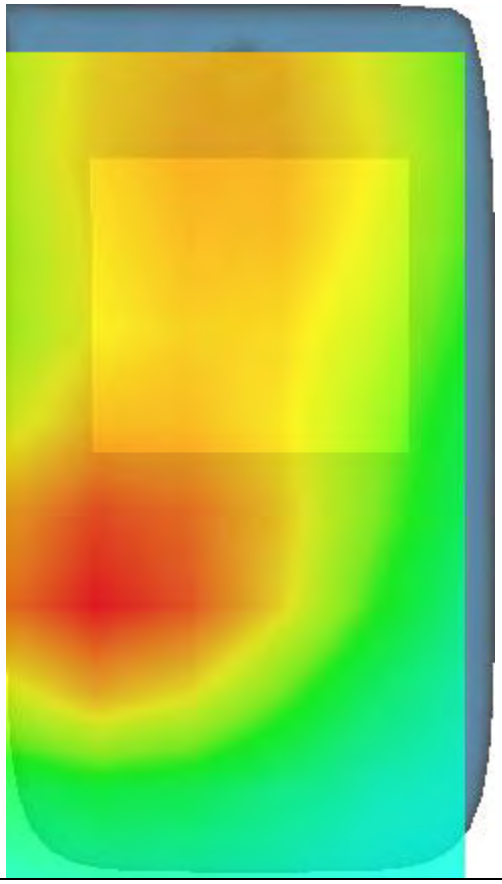
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-24.00, Y=-25.00
SAR Peak: 0.26 W/kg

SAR 10g (W/Kg)	0.130763
SAR 1g (W/Kg)	0.191825

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.2635	0.1994	0.1412	0.1006	0.0734	0.0546	0.0420



3D screen shot	Hot spot position
	

MEASUREMENT 23

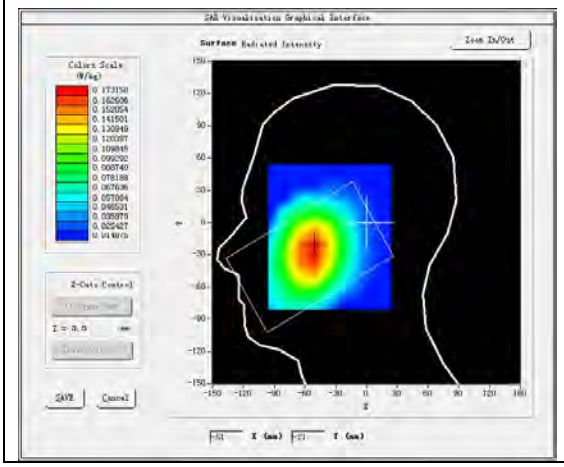
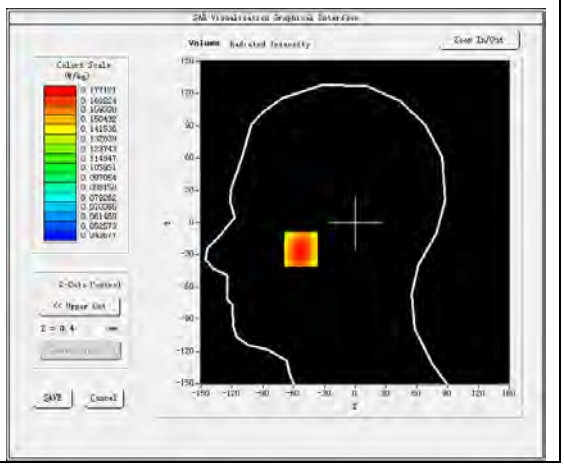
Date of measurement: 19/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 12
Channels	Middle
Signal	LTE (Crest factor: 1.0)
ConvF	2.37

B. SAR Measurement Results

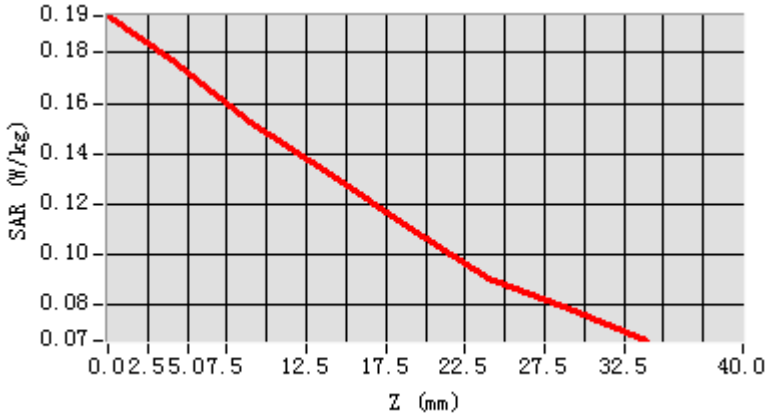
Frequency (MHz)	707.500000
Relative permittivity (real part)	42.091927
Relative permittivity (imaginary part)	22.097130
Conductivity (S/m)	0.868540
Variation (%)	0.460000

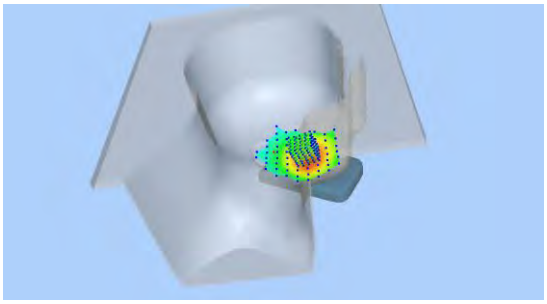
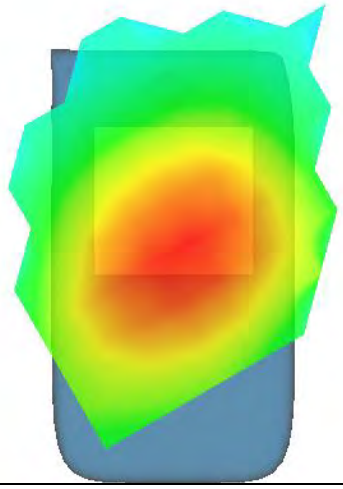
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-53.00, Y=-25.00
SAR Peak: 0.20 W/kg

SAR 10g (W/Kg)	0.139008
SAR 1g (W/Kg)	0.172048

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1947	0.1771	0.1524	0.1317	0.1100	0.0903	0.0786



3D screen shot	Hot spot position
	

MEASUREMENT 24

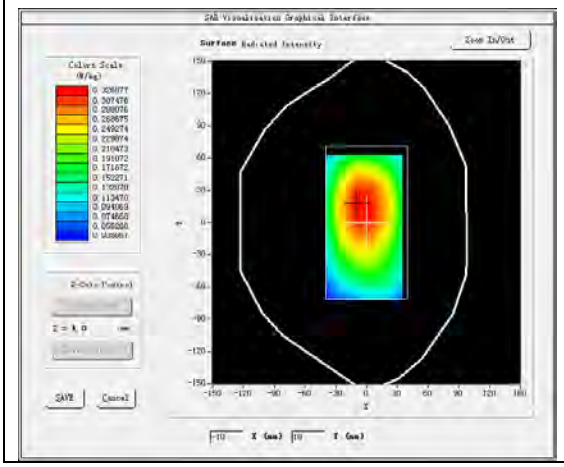
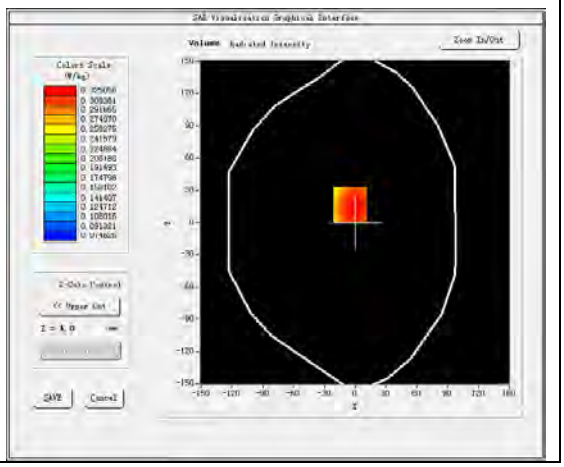
Date of measurement: 19/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 12
Channels	Middle
Signal	LTE (Crest factor: 1.0)
ConvF	2.37

B. SAR Measurement Results

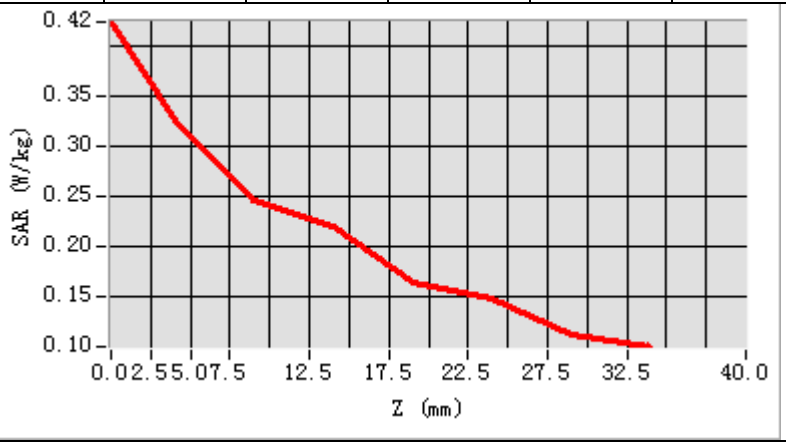
Frequency (MHz)	707.500000
Relative permittivity (real part)	42.091927
Relative permittivity (imaginary part)	22.097130
Conductivity (S/m)	0.868540
Variation (%)	-2.470000

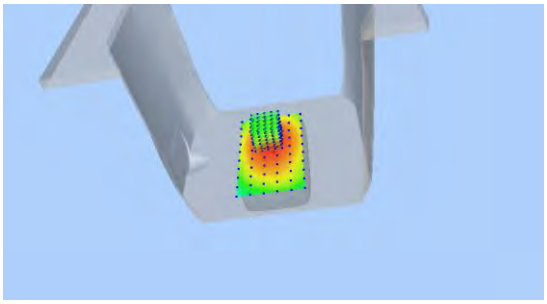
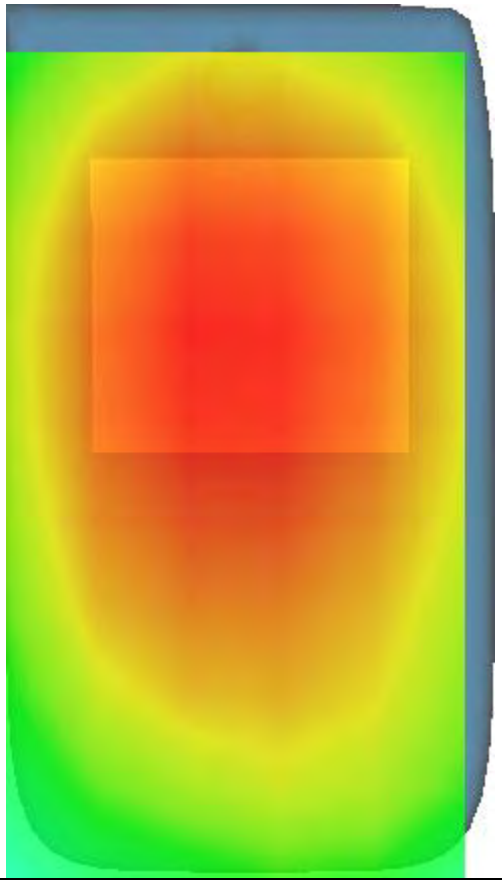
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-5.00, Y=17.00
SAR Peak: 0.39 W/kg

SAR 10g (W/Kg)	0.251350
SAR 1g (W/Kg)	0.318941

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.4237	0.3251	0.2460	0.2187	0.1639	0.1475	0.1115



3D screen shot	Hot spot position
	

MEASUREMENT 25

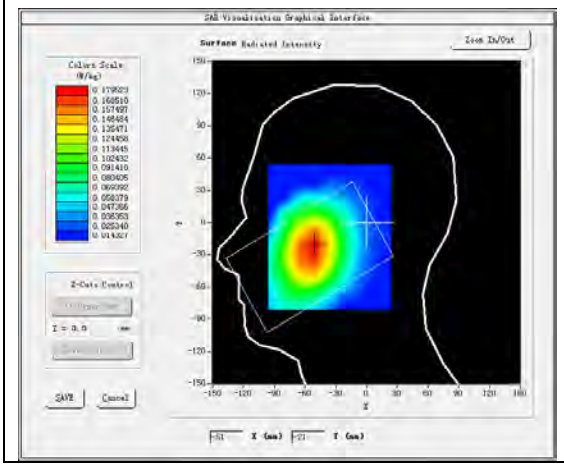
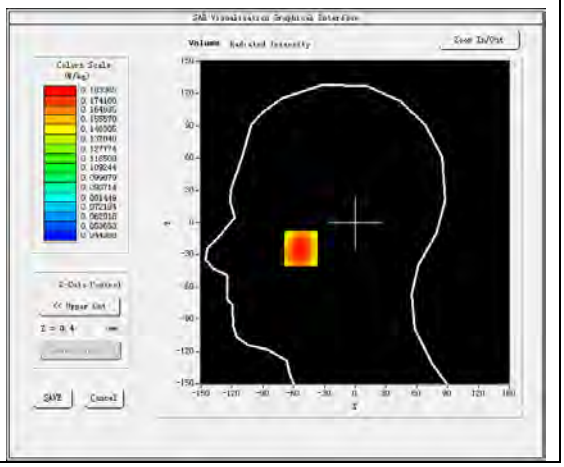
Date of measurement: 19/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 17
Channels	Middle
Signal	LTE (Crest factor: 1.0)
ConvF	2.37

B. SAR Measurement Results

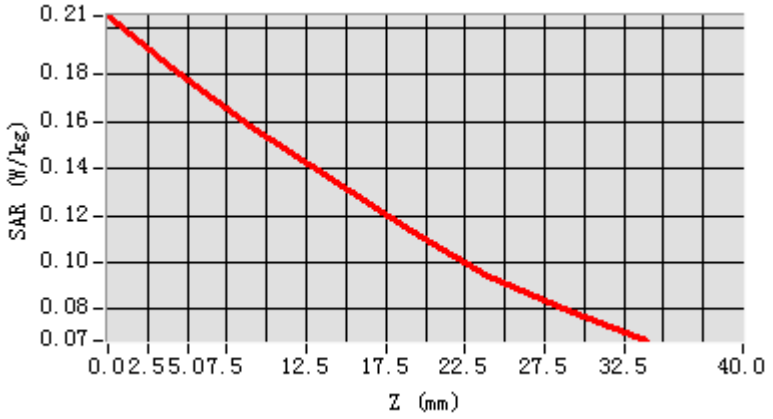
Frequency (MHz)	710.000000
Relative permittivity (real part)	42.076576
Relative permittivity (imaginary part)	22.037579
Conductivity (S/m)	0.869260
Variation (%)	0.890000

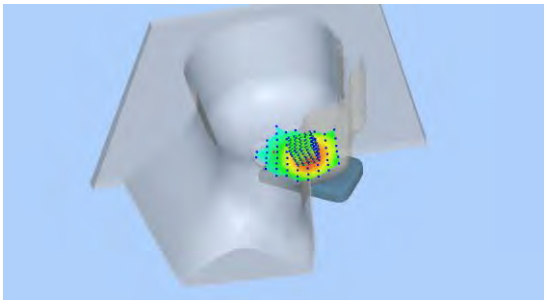
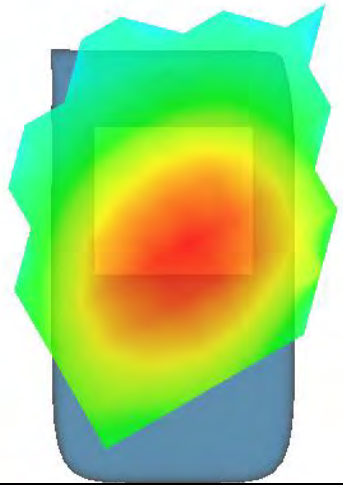
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-53.00, Y=-24.00
SAR Peak: 0.21 W/kg

SAR 10g (W/Kg)	0.144161
SAR 1g (W/Kg)	0.179032

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.2052	0.1834	0.1578	0.1359	0.1142	0.0945	0.0793



3D screen shot	Hot spot position
	

MEASUREMENT 26

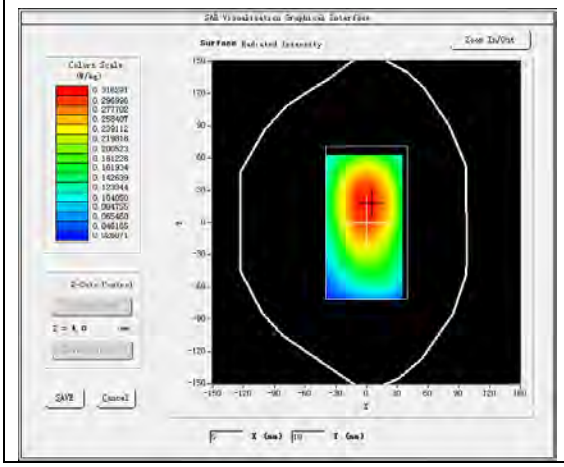
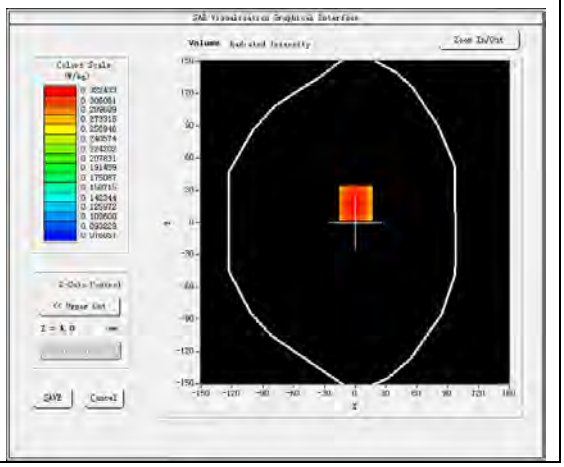
Date of measurement: 19/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 17
Channels	Middle
Signal	LTE (Crest factor: 1.0)
ConvF	2.37

B. SAR Measurement Results

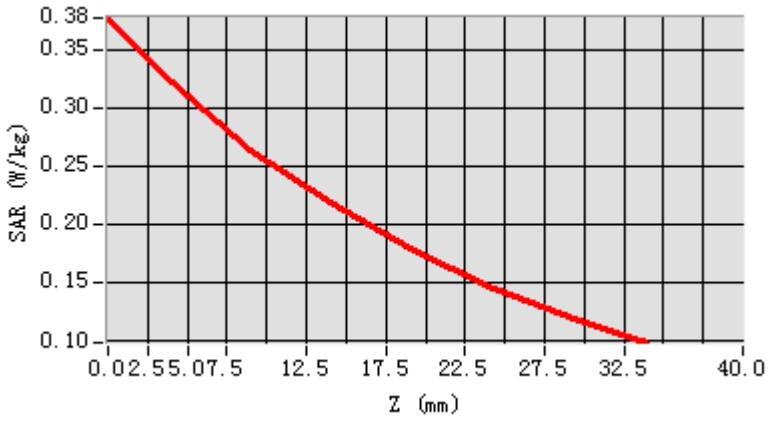
Frequency (MHz)	710.000000
Relative permittivity (real part)	42.076576
Relative permittivity (imaginary part)	22.037579
Conductivity (S/m)	0.869260
Variation (%)	-0.950000

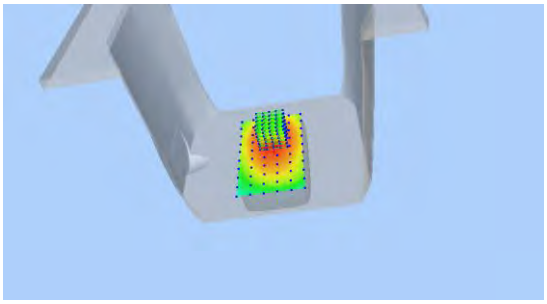
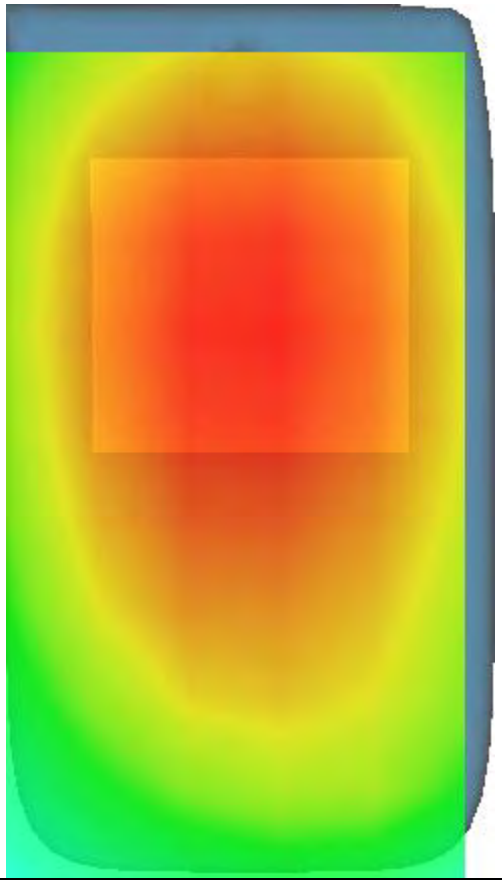
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=1.00, Y=18.00
SAR Peak: 0.38 W/kg

SAR 10g (W/Kg)	0.248054
SAR 1g (W/Kg)	0.314705

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.3778	0.3224	0.2640	0.2190	0.1786	0.1460	0.1204



3D screen shot	Hot spot position
	

MEASUREMENT 27

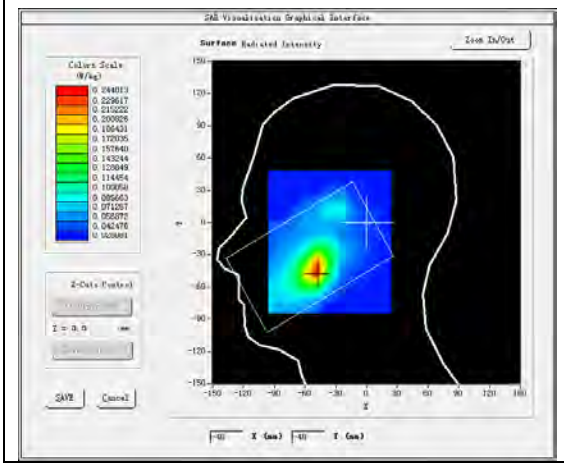
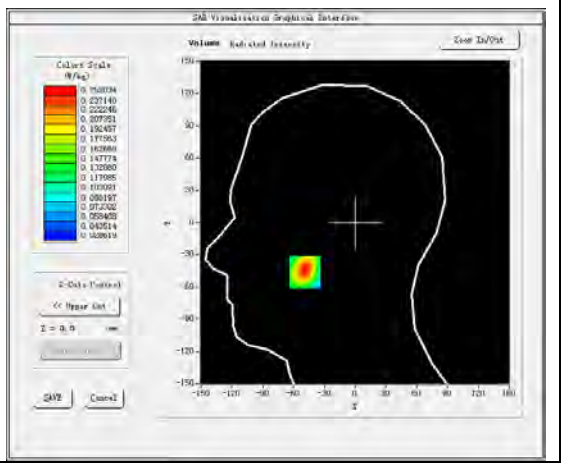
Date of measurement: 18/1/2024

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 41
Channels	Middle
Signal	LTE (Crest factor: 1.0)
ConvF	2.65

B. SAR Measurement Results

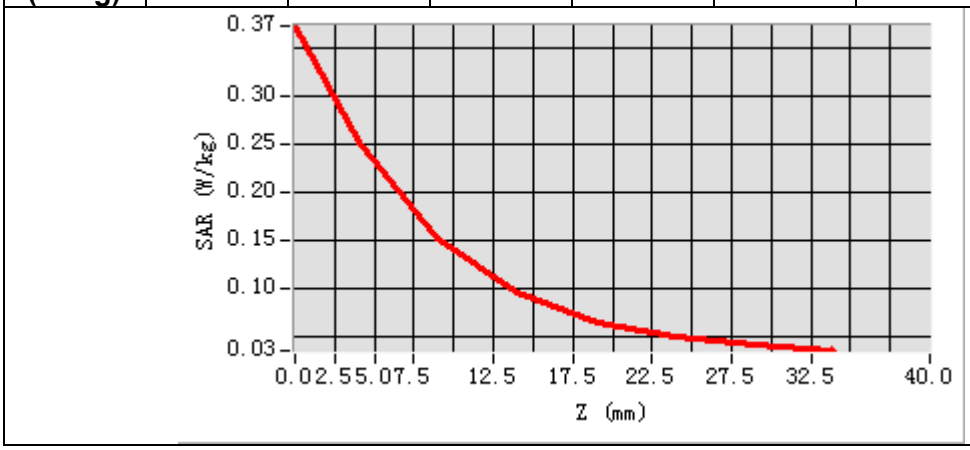
Frequency (MHz)	2593.000000
Relative permittivity (real part)	38.721222
Relative permittivity (imaginary part)	13.465674
Conductivity (S/m)	1.939805
Variation (%)	2.100000

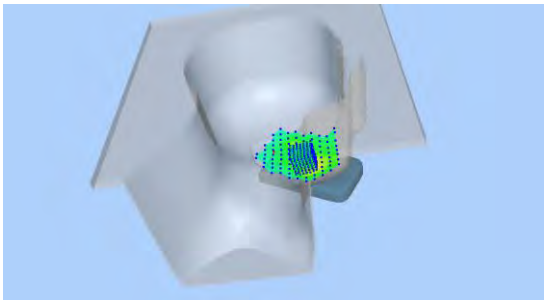
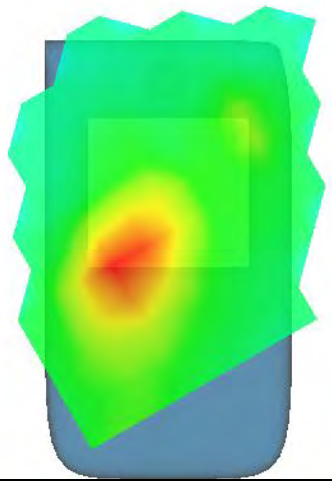
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-49.00, Y=-46.00
SAR Peak: 0.38 W/kg

SAR 10g (W/Kg)	0.132467
SAR 1g (W/Kg)	0.234593

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.3738	0.2520	0.1526	0.0961	0.0646	0.0497	0.0410



3D screen shot	Hot spot position
	

MEASUREMENT 28

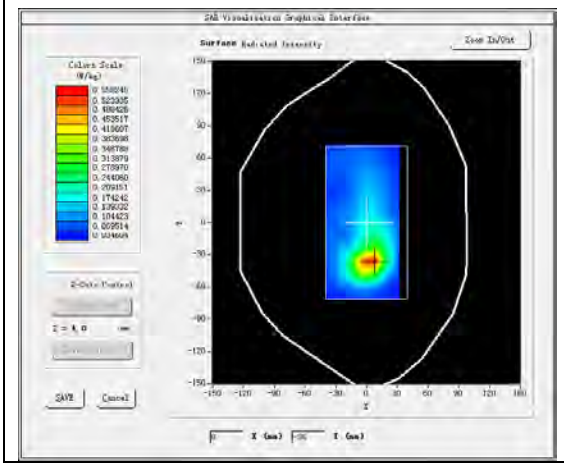
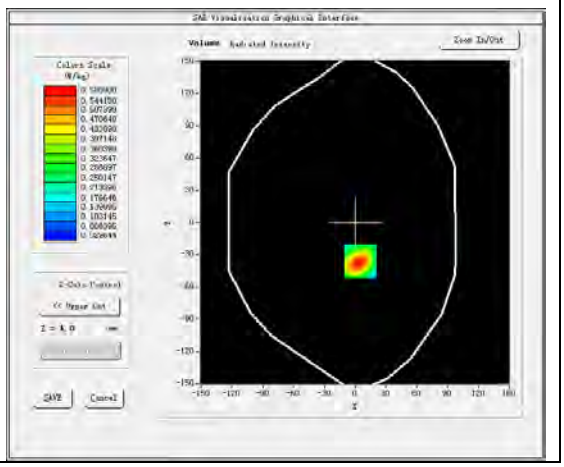
Date of measurement: 18/1/2024

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 41
Channels	Middle
Signal	LTE (Crest factor: 1.0)
ConvF	2.65

B. SAR Measurement Results

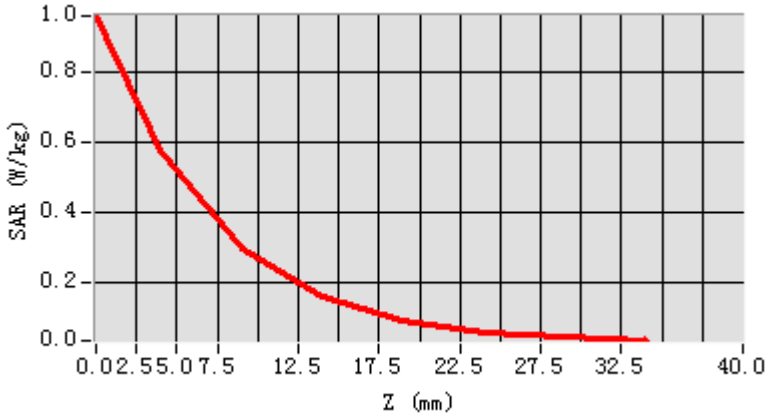
Frequency (MHz)	2593.000000
Relative permittivity (real part)	38.721222
Relative permittivity (imaginary part)	13.465674
Conductivity (S/m)	1.939805
Variation (%)	-2.230000

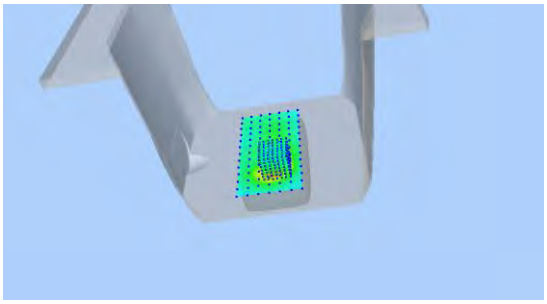
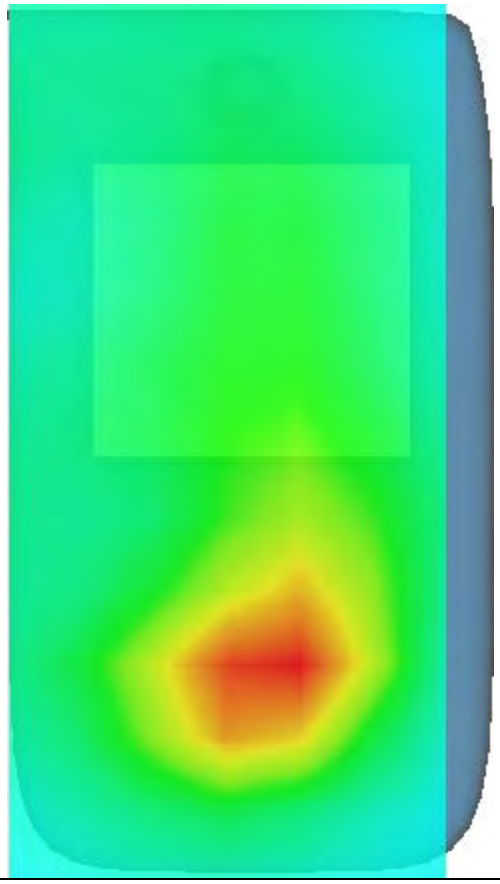
SURFACE SAR	VOLUME SAR
	

Maximum location: X=5.00, Y=-36.00
SAR Peak: 0.96 W/kg

SAR 10g (W/Kg)	0.275159
SAR 1g (W/Kg)	0.543395

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.9630	0.5809	0.2983	0.1613	0.0946	0.0611	0.0449



3D screen shot	Hot spot position
	

MEASUREMENT 29

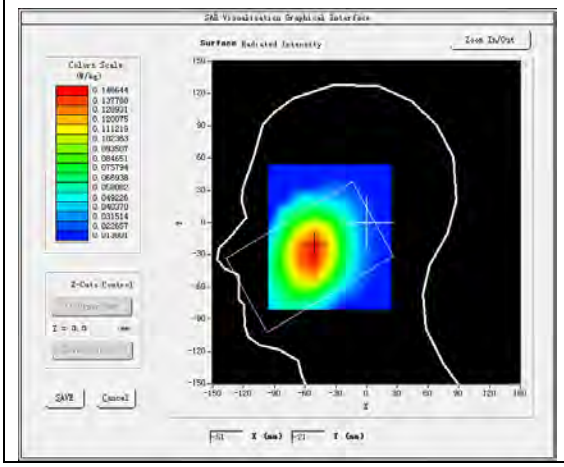
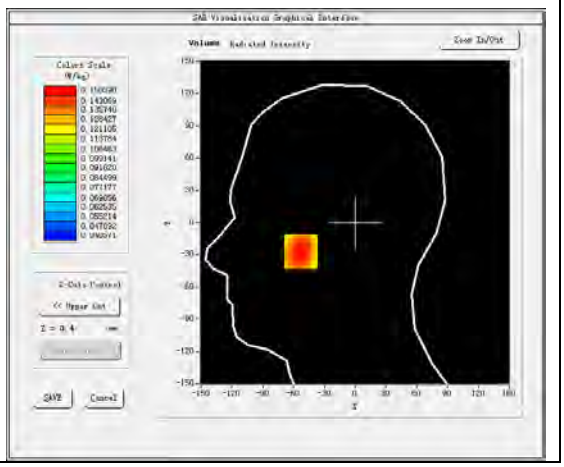
Date of measurement: 19/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	FDDBand71
Channels	Middle
Signal	(Crest factor: 1.0)
ConvF	2.37

B. SAR Measurement Results

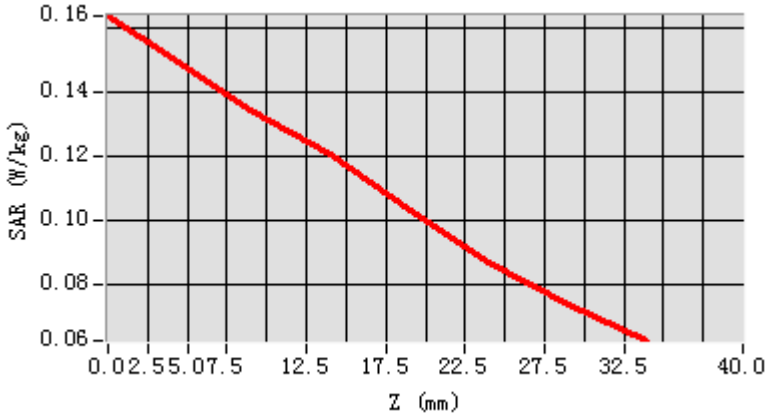
Frequency (MHz)	683.000000
Relative permittivity (real part)	42.389977
Relative permittivity (imaginary part)	22.839878
Conductivity (S/m)	0.866647
Variation (%)	3.110000

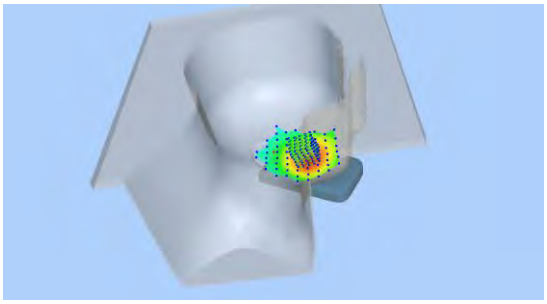
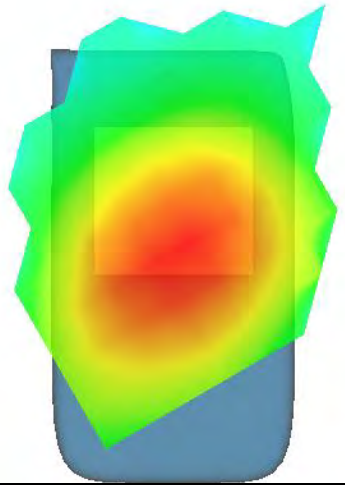
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-53.00, Y=-27.00
SAR Peak: 0.17 W/kg

SAR 10g (W/Kg)	0.123286
SAR 1g (W/Kg)	0.147995

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1637	0.1504	0.1341	0.1203	0.1034	0.0872	0.0738



3D screen shot	Hot spot position
	

MEASUREMENT 30

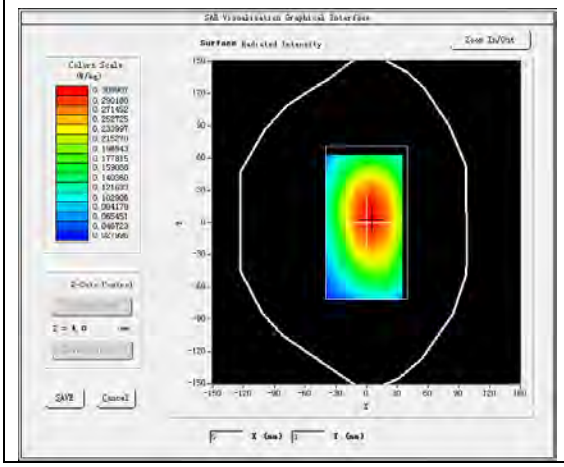
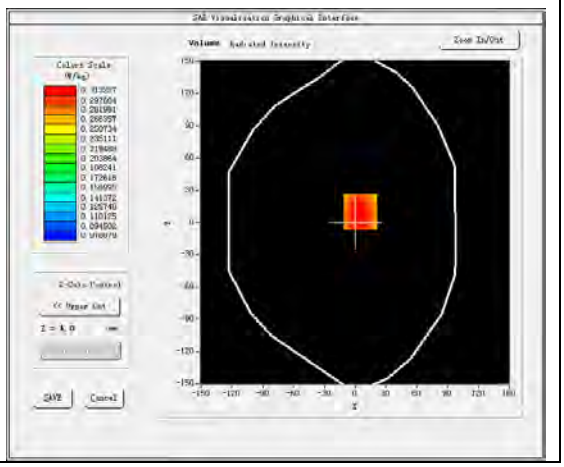
Date of measurement: 19/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	FDDBand71
Channels	Middle
Signal	(Crest factor: 1.0)
ConvF	2.37

B. SAR Measurement Results

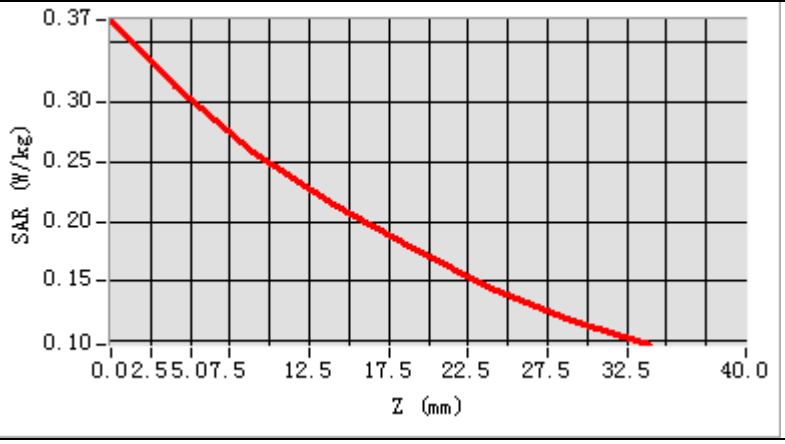
Frequency (MHz)	683.000000
Relative permittivity (real part)	42.389977
Relative permittivity (imaginary part)	22.839878
Conductivity (S/m)	0.866647
Variation (%)	-1.690000

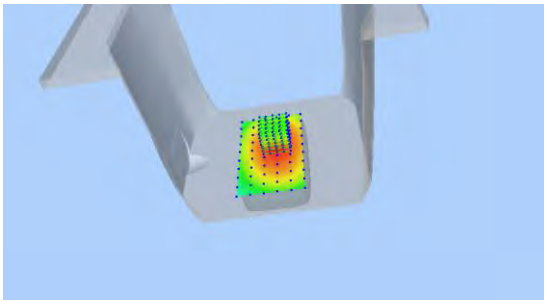
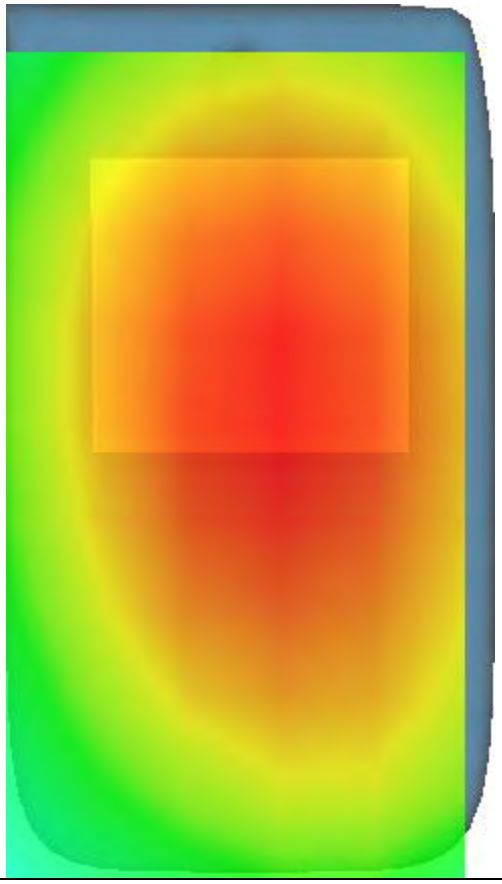
SURFACE SAR	VOLUME SAR
	

Maximum location: X=5.00, Y=10.00
SAR Peak: 0.37 W/kg

SAR 10g (W/Kg)	0.242359
SAR 1g (W/Kg)	0.306675

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.3682	0.3132	0.2583	0.2139	0.1767	0.1444	0.1176



3D screen shot	Hot spot position
	

MEASUREMENT 31

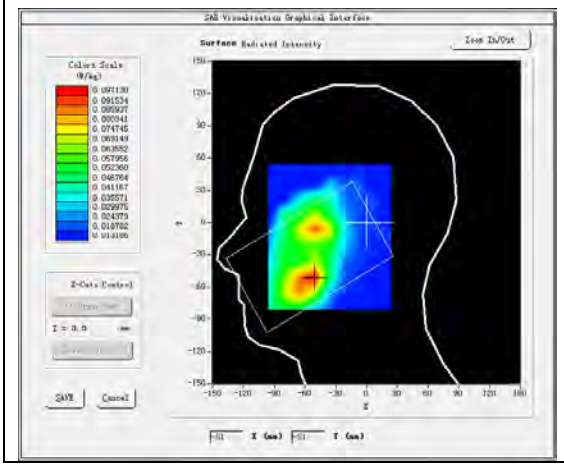
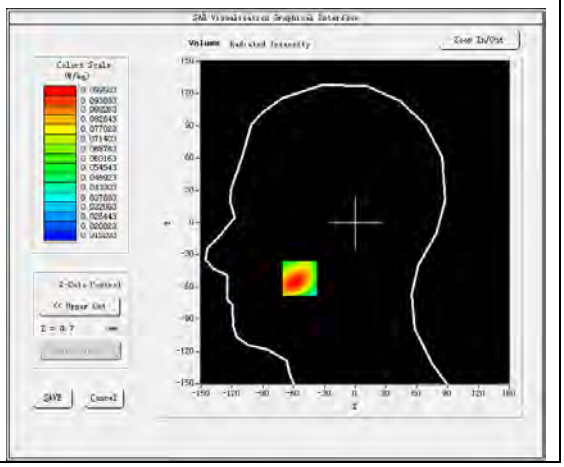
Date of measurement: 20/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	FDDBand66
Channels	Middle
Signal	(Crest factor: 1.0)
ConvF	2.45

B. SAR Measurement Results

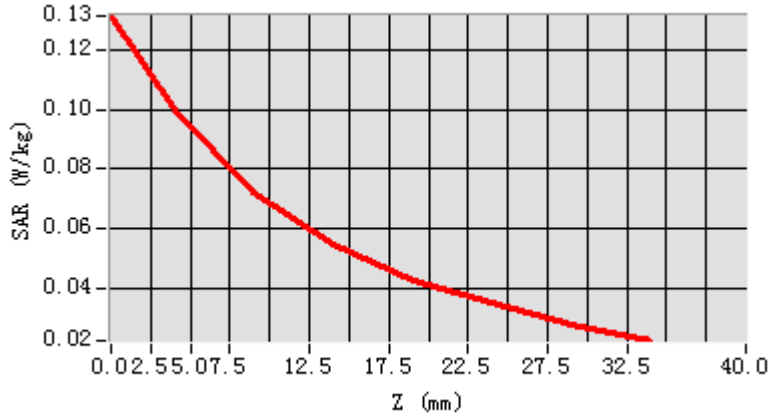
Frequency (MHz)	1745.000000
Relative permittivity (real part)	39.783905
Relative permittivity (imaginary part)	13.705747
Conductivity (S/m)	1.328696
Variation (%)	4.690000

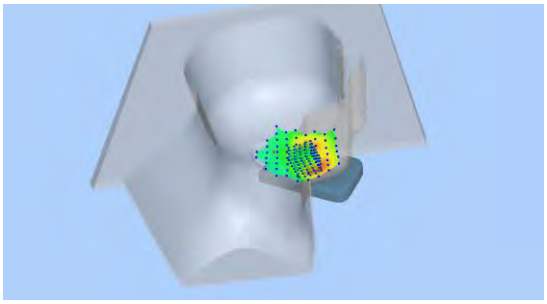
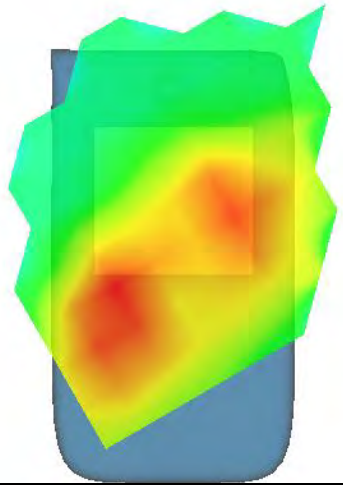
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-54.00, Y=-52.00
SAR Peak: 0.15 W/kg

SAR 10g (W/Kg)	0.064844
SAR 1g (W/Kg)	0.096959

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1315	0.0995	0.0723	0.0549	0.0427	0.0351	0.0277



3D screen shot	Hot spot position
	

MEASUREMENT 32

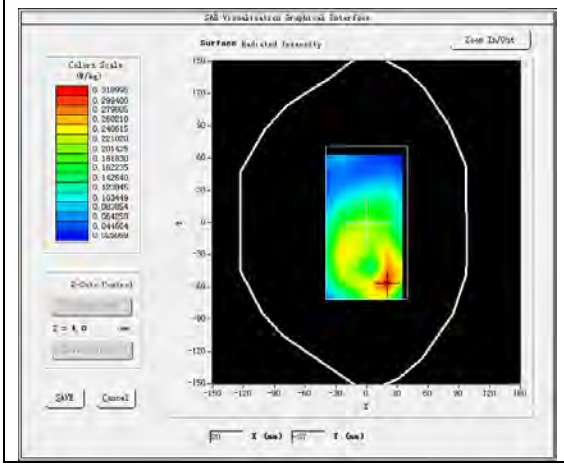
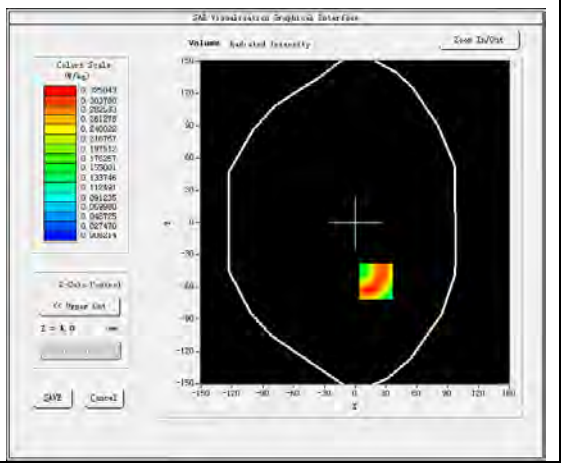
Date of measurement: 20/1/2024

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	FDDBand66
Channels	Middle
Signal	(Crest factor: 1.0)
ConvF	2.45

B. SAR Measurement Results

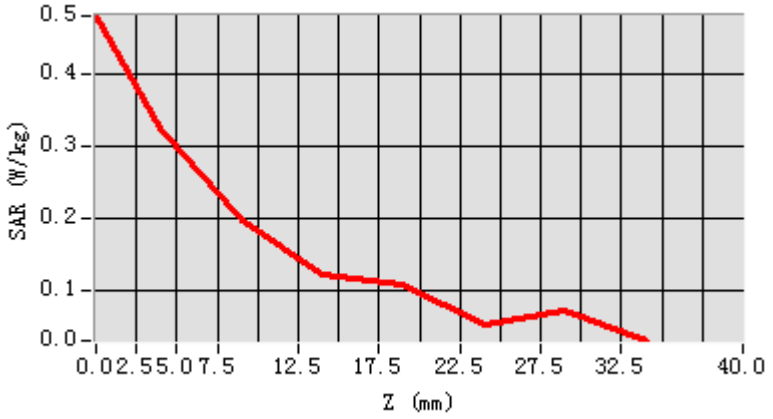
Frequency (MHz)	1745.000000
Relative permittivity (real part)	39.783905
Relative permittivity (imaginary part)	13.705747
Conductivity (S/m)	1.328696
Variation (%)	-0.500000

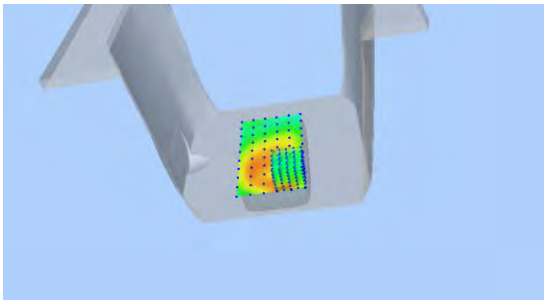
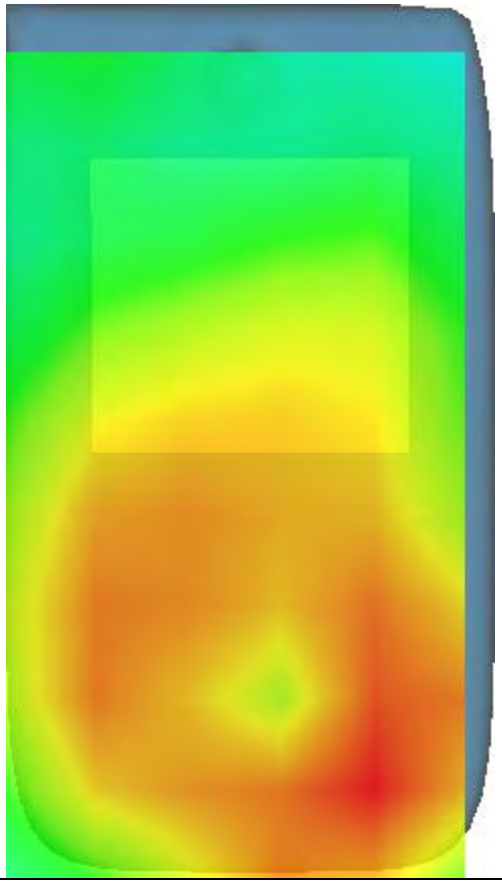
SURFACE SAR	VOLUME SAR
	

Maximum location: X=20.00, Y=-55.00
SAR Peak: 0.50 W/kg

SAR 10g (W/Kg)	0.179102
SAR 1g (W/Kg)	0.307264

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.4804	0.3250	0.1956	0.1211	0.1067	0.0531	0.0704



3D screen shot	Hot spot position
	

2. Appendix D. Calibration Certificate

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E Field Probe - 3423-EPGO-426
750 MHz Dipole - SN 03/15 DIP 0G750-355
835 MHz Dipole - SN 03/15 DIP 0G835-347
1800 MHz Dipole - SN 03/15 DIP 1G800-349
1900 MHz Dipole - SN 03/15 DIP 1G900-350
2450 MHz Dipole - SN 03/15 DIP 2G450-352
2600 MHz Dipole - SN 03/15 DIP 2G600-356
5000-6000 MHz Dipole - SN 13/14 WGA 33
Extended Calibration Certificate

COMOSAR E-Field Probe Calibration Report

Ref : ACR.261.11.23.BES.A

SHENZHEN NTEK TESTING TECHNOLOGY CO., LTD.

BUILDING E, FENDA SCIENCE PARK, SANWEI COMMUNITY, XIXIANG STREET, BAO'AN DISTRICT, SHENZHEN GUANGDONG, CHINA

MVG COMOSAR DOSIMETRIC E-FIELD PROBE

SERIAL NO.: 3423-EPGO-426

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 09/18/2023

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

The use of the Cofrac brand and the accreditation references is prohibited from any reproduction.

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.261.11.23.BES.A

	Name	*Function*	*Date*	*Signature*
Prepared by :	Cyrille ONNEE	Measurement Responsible	9/18/2023	
Checked & approved by:	Jérôme Luc	Technical Manager	9/18/2023	
Authorized by:	Yann Toutain	Laboratory Director	9/19/2023	Yann TOUTAIN

Yann Toutain ID Signature numérique de Yann Toutain ID Date : 2023.09.19 09:08:14 +02'00'

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

Issue	*Name*	*Date*	*Modifications*
A	Cyrille ONNEE	9/18/2023	Initial release

Template_ACR.DDD.N.YY.MVGB.ISSUE_COMOSAR Probe vL

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Template_ACR.DDD.N.YY.MVGB.ISSUE_COMOSAR Probe vL
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1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	3423-EPGO-426
Product Condition (new / used)	New
Frequency Range of Probe	0.15 GHz-7.5GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.261 MΩ Dipole 2: R2=0.213 MΩ Dipole 3: R3=0.233 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 effect. All calibrations / measurements performed meet the fore-mentioned standards.

3.1 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 for frequency range 600-7500MHz and using the calorimeter cell method (transfer method) as outlined in the standards for frequency 150-450 MHz.

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3.2 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.

3.3 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°).

3.4 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:

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

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 SARuncertainty[%] for scanning distances larger than 4mm is 1.0% Limit ,2%).

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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 a SAR probe calibration using the waveguide or calorimetric cell technique depending on the frequency.

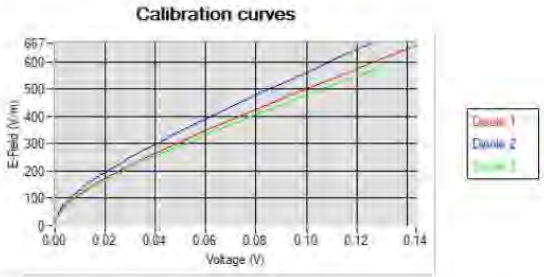
The estimated expanded uncertainty (k=2) in calibration for SAR (W/kg) is +/-11% for the frequency range 150-450MHz.
The estimated expanded uncertainty (k=2) in calibration for SAR (W/kg) is +/-14% for the frequency range 600-7500MHz.

5 CALIBRATION RESULTS

Ambient condition	
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

5.1 CALIBRATION IN AIR

The following curve represents the measurement in waveguide of the voltage picked up by the probe toward the E-field generated inside the waveguide.



From this curve, the sensitivity in air is calculated using the below formula.

$$E^2 = \sum_{i=1}^{3} \frac{V_i\left(1 + {V_i}/{DCP_i}\right)}{Norm_i}$$

where
Vi=voltage readings on the 3 channels of the probe
DCPi=diode compression point given below for the 3 channels of the probe
Normi=dipole sensitivity given below for the 3 channels of the probe

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Normx dipole 1 (μV/(V/m)^2)	Normy dipole 2 (μV/(V/m)^2)	Normz dipole 3 (μV/(V/m)^2)
0.78	0.62	0.85

DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
105	108	107

5.2 CALIBRATION IN LIQUID

The calorimeter cell or the waveguide is used to determine the calibration in liquid using the formula below.

$$ConvF = \frac{E^2_{liquid}}{E^2_{air}}$$

The E-field in the liquid is determined from the SAR measurement according to the below formula.

$$E^2_{liquid} = \frac{\rho\, SAR}{\sigma}$$

where
σ=the conductivity of the liquid
ρ=the volumetric density of the liquid
SAR=the SAR measured from the formula that depends on the setup used. The SAR formulas are given below

For the calorimeter cell (150-450 MHz), the formula is:

$$SAR = c\frac{dT}{dt}$$

where
c=the specific heat for the liquid
dT/dt=the temperature rises over the time

For the waveguide setup (600-75000 MHz), the formula is:

$$SAR = \frac{4P_W}{ab\delta} e^{\frac{-2z}{\delta}}$$

where
a=the larger cross-sectional of the waveguide
b=the smaller cross-sectional of the waveguide
δ=the skin depth for the liquid in the waveguide
Pw=the power delivered to the liquid

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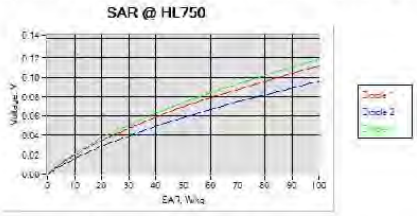
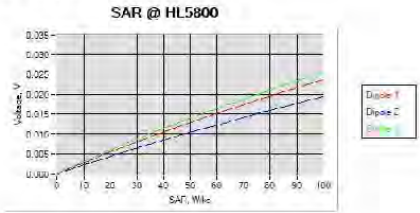
The below table summarize the ConvF for the calibrated liquid. The curves give examples for the measured SAR depending on the voltage in some liquid.

Liquid	Frequency (MHz*)	ConvF
HL750	750	2.37
HL850	835	2.32
HL900	900	2.23
HL1800	1800	2.45
HL1900	1900	2.63
HL2000	2000	2.83
HL2300	2300	2.81
HL2450	2450	2.85
HL2600	2600	2.65
HL3300	3300	2.21
HL3500	3500	2.20
HL3700	3700	2.11
HL3900	3900	2.40
HL4200	4200	2.40
HL4600	4600	2.33
HL4900	4900	2.37
HL5200	5200	2.07
HL5400	5400	2.11
HL5600	5600	2.20
HL5800	5800	2.04

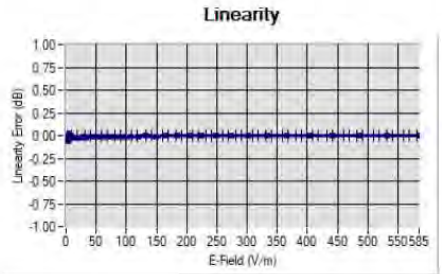
(*) Frequency validity is +/-50MHz below 600MHz, +/-100MHz from 600MHz to 6GHz and +/-700MHz above 6GHz



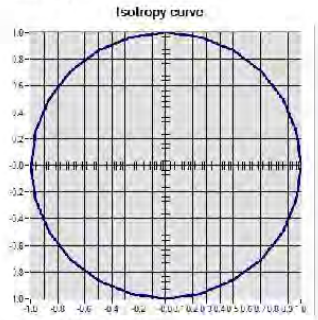


6 VERIFICATION RESULTS

The figures below represent the measured linearity and axial isotropy for this probe. The probe specification is +/-0.2 dB for linearity and +/-0.15 dB for axial isotropy.



Linearity:+/-1.42% (+/-0.06dB)



Isotropy +/-0.21% (+/-0.01dB)

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7 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	10/2019	10/2023
Network Analyzer – Calibration kit	HP 85033D	3423A08186	06/2021	06/2027
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	07/2022	07/2025
Multimeter	Keithley 2000	4013982	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	06/2021	06/2024
Power Meter	Keysight U2000A	SN: MY62340002	10/2022	10/2025
Directional Coupler	Krytar 158020	131467	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Fluoroptic Thermometer	LumaSense Luxtron 812	94264	09/2022	09/2025
Coaxial cell	MVG	SN 32/16 COAXCELL_1	Validated. No cal required.	Validated. No cal required.
Waveguide	MVG	SN 32/16 WG2_1	Validated. No cal required.	Validated. No cal required.
Liquid transition	MVG	SN 32/16 WGLIQ_0G600_1	Validated. No cal required.	Validated. No cal required.

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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.
Waveguide	MVG	SN 32/16 WG14_1	Validated. No cal required.	Validated. No cal required.
Liquid transition	MVG	SN 32/16 WGLIQ_7G000_1	Validated. No cal required.	Validated. No cal required.
Temperature / Humidity Sensor	Testo 184 H1	44225320	06/2021	06/2024

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SAR Reference Dipole Calibration Report

Ref : ACR.60.2.21.MVGB.A

SHENZHEN NTEK TESTING TECHNOLOGY CO., LTD.

BUILDING E, FENDA SCIENCE PARK, SANWEI COMMUNITY, XIXIANG STREET,

BAO'AN DISTRICT, SHENZHEN GUANGDONG, CHINA

MVG COMOSAR REFERENCE DIPOLE

FREQUENCY: 750 MHZ

SERIAL NO.: SN 03/15 DIP0G750-355

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 03/01/2021

ilac-MRA cofrac ETALONNAGE

Accreditations #2-6789 and #2-6814
Scope available on www.cofrac.fr

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed at MVG, using the COMOSAR test bench. The test results covered by accreditation are traceable to the International System of Units (SI).

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.60.2.21.MVGB.A

	Name	*Function*	*Date*	*Signature*
Prepared by :	Jérôme Luc	Technical Manager	3/1/2021	
Checked by :	Jérôme Luc	Technical Manager	3/1/2021	
Approved by :	Yann Toutain	Laboratory Director	3/1/2021	Yann Toutain 2021.03.01 13:08:18 +01'00'

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

Issue	*Name*	*Date*	*Modifications*
A	Jérôme Luc	3/1/2021	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 750 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID750
Serial Number	SN 03/15 DIP0G750-355
Product Condition (new / used)	Used

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*

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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 constructed as outlined in the fore mentioned standards. A direct method is used with a network analyser and its calibration kit, both with a valid ISO17025 calibration.

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 dimension's 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. A direct method is used with a ISO17025 calibrated caliper.

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	0.08 LIN

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
0 - 300	0.20 mm
300 - 450	0.44 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

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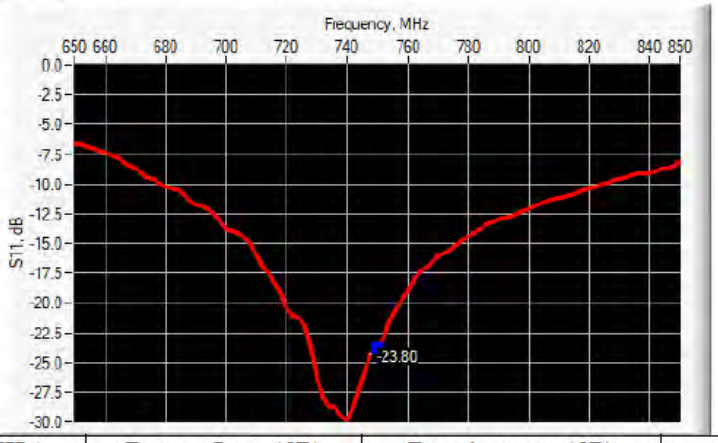
1 g	19 % (SAR)
10 g	19 % (SAR)

6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
750	-23.80	-20	56.4 Ω - 0.1 jΩ

6.2 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 %.	

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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 MEASUREMENT CONDITION

Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	SN 41/18 EPGO333
Liquid	Head Liquid Values: eps' : 41.8 sigma : 0.82
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	750750 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

7.2 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε,')		Conductivity (σ) S/m	
	required	measured	required	measured
300	45.3 ±10 %		0.87 ±10 %	
450	43.5 ±10 %		0.87 ±10 %	
750	41.9 ±10 %	41.8	0.89 ±10 %	0.82
835	41.5 ±10 %		0.90 ±10 %	
900	41.5 ±10 %		0.97 ±10 %	
1450	40.5 ±10 %		1.20 ±10 %	
1500	40.4 ±10 %		1.23 ±10 %	
1640	40.2 ±10 %		1.31 ±10 %	
1750	40.1 ±10 %		1.37 ±10 %	
1800	40.0 ±10 %		1.40 ±10 %	
1900	40.0 ±10 %		1.40 ±10 %	
1950	40.0 ±10 %		1.40 ±10 %	
2000	40.0 ±10 %		1.40 ±10 %	

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2100	39.8 ±10 %		1.49 ±10 %	
2300	39.5 ±10 %		1.67 ±10 %	
2450	39.2 ±10 %		1.80 ±10 %	
2600	39.0 ±10 %		1.96 ±10 %	
3000	38.5 ±10 %		2.40 ±10 %	
3500	37.9 ±10 %		2.91 ±10 %	

7.3 MEASUREMENT RESULT

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.

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	8.53 (0.85)	5.55	5.56 (0.56)
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		24.6	
3000	63.8		25.7	
3500	67.1		25	

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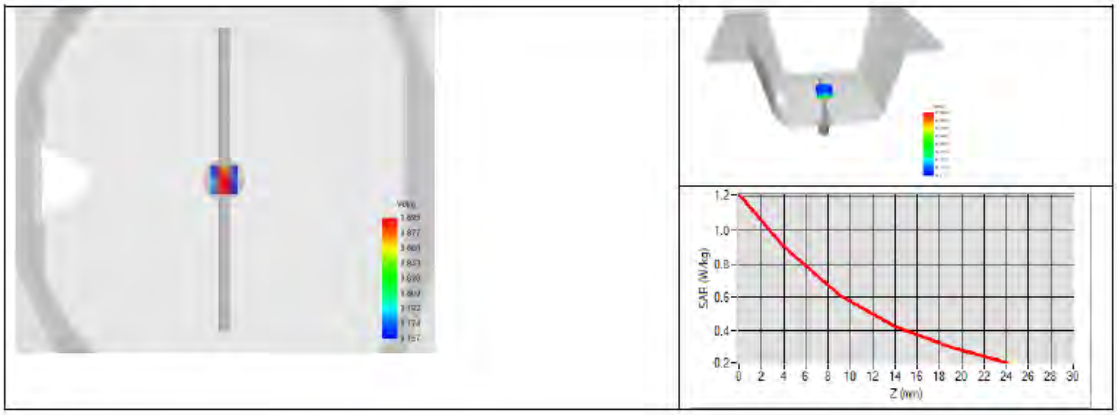

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8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
SAM Phantom	MVG	SN-13/09-SAM68	Validated. No cal required.	Validated. No cal required.
COMOSAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rohde & Schwarz ZVM	100203	05/2019	05/2022
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	05/2019	05/2022
Calipers	Mitutoyo	SN 0009732	10/2019	10/2022
Reference Probe	MVG	EPGO333 SN 41/18	05/2020	05/2021
Multimeter	Keithley 2000	1160271	02/2020	02/2023
Signal Generator	Rohde & Schwarz SMB	106589	04/2019	04/2022
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	NI-USB 5680	170100013	05/2019	05/2022
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature / Humidity Sensor	Testo 184 H1	44220687	05/2020	05/2023

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SAR Reference Dipole Calibration Report

Ref : ACR.60.3.21.MVGB.A

SHENZHEN NTEK TESTING TECHNOLOGY CO., LTD.

BUILDING E, FENDA SCIENCE PARK, SANWEI COMMUNITY, XIXIANG STREET,

BAO'AN DISTRICT, SHENZHEN GUANGDONG, CHINA

MVG COMOSAR REFERENCE DIPOLE

FREQUENCY: 835 MHZ

SERIAL NO.: SN 03/15 DIP0G835-347

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 03/01/2021

ilac-MRA cofrac ETALONNAGE

Accreditations #2-6789 and #2-6814
Scope available on www.cofrac.fr

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed at MVG, using the COMOSAR test bench. The test results covered by accreditation are traceable to the International System of Units (SI).

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.60.3.21.MVGB.A

	Name	*Function*	*Date*	*Signature*
Prepared by :	Jérôme Luc	Technical Manager	3/1/2021	
Checked by :	Jérôme Luc	Technical Manager	3/1/2021	
Approved by :	Yann Toutain	Laboratory Director	3/1/2021	Yann Toutain 2021.03.01 13:09:12 +01'00'

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

Issue	*Name*	*Date*	*Modifications*
A	Jérôme Luc	3/1/2021	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 835 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID835
Serial Number	SN 03/15 DIP0G835-347
Product Condition (new / used)	Used

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*

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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 constructed as outlined in the fore mentioned standards. A direct method is used with a network analyser and its calibration kit, both with a valid ISO17025 calibration.

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 dimension's 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. A direct method is used with a ISO17025 calibrated caliper.

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	0.08 LIN

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
0 - 300	0.20 mm
300 - 450	0.44 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

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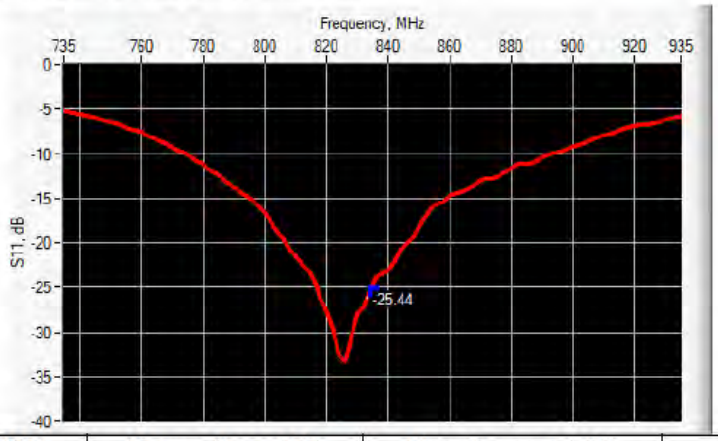
1 g	19 % (SAR)
10 g	19 % (SAR)

6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
835	-25.44	-20	54.4 Ω - 2.9 jΩ

6.2 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 %.	

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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 MEASUREMENT CONDITION

Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	SN 41/18 EPGO333
Liquid	Head Liquid Values: eps' : 40.6 sigma : 0.89
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	835835 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

7.2 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε_r')		Conductivity (σ) S/m	
	required	measured	required	measured
300	45.3 ±10 %		0.87 ±10 %	
450	43.5 ±10 %		0.87 ±10 %	
750	41.9 ±10 %		0.89 ±10 %	
835	41.5 ±10 %	40.6	0.90 ±10 %	0.89
900	41.5 ±10 %		0.97 ±10 %	
1450	40.5 ±10 %		1.20 ±10 %	
1500	40.4 ±10 %		1.23 ±10 %	
1640	40.2 ±10 %		1.31 ±10 %	
1750	40.1 ±10 %		1.37 ±10 %	
1800	40.0 ±10 %		1.40 ±10 %	
1900	40.0 ±10 %		1.40 ±10 %	
1950	40.0 ±10 %		1.40 ±10 %	
2000	40.0 ±10 %		1.40 ±10 %	

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2100	39.8 ±10 %		1.49 ±10 %	
2300	39.5 ±10 %		1.67 ±10 %	
2450	39.2 ±10 %		1.80 ±10 %	
2600	39.0 ±10 %		1.96 ±10 %	
3000	38.5 ±10 %		2.40 ±10 %	
3500	37.9 ±10 %		2.91 ±10 %	

7.3 MEASUREMENT RESULT

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.

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	9.84 (0.98)	6.22	6.22 (0.62)
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		24.6	
3000	63.8		25.7	
3500	67.1		25	

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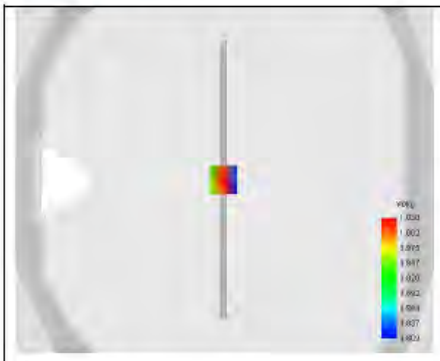

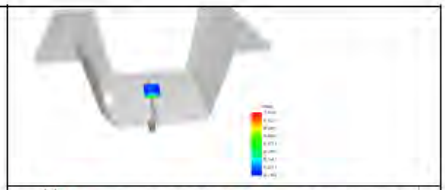

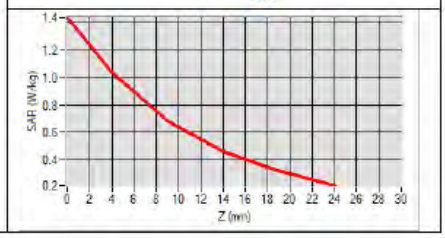

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