CE SAR EVALUATION REPORT

In accordance with the requirements of EN50360, EN50566, EN62209-1/-2, EN62479 and COUNCIL RECOMMENDATION 1999/519/EC

Product Name : Smart phone

Trademark : Blackview/OSCAL

Model Name : BL7000

Family Model : PILOT 3

Report No. : S25011701403001

Prepared for

DOKE COMMUNICATION (HK) LIMITED

19H MAXGRAND PLAZA NO 3 TAI YAU STREET SAN PO KONG KL

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name ..... :	DOKE COMMUNICATION (HK) LIMITED
Address ..... :	19H MAXGRAND PLAZA NO 3 TAI YAU STREET SAN PO KONG KL
Manufacturer's Name ..... :	Shenzhen DOKE Electronic Co., Ltd
Address ..... :	801, Building3, 7th Industrial Zone, Yulv Community, Yutang Road, Guangming District, Shenzhen, China.

Product description

Product name ..... :	Smart phone
Trademark ..... :	Blackview/OSCAL
Model and/or type reference .:	BL7000
Family Model ..... :	PILOT 3
Standards ..... :	EN 50360:2017; EN 50566:2017; EN 62209-1:2016; EN 62209-2:2010; EN 62479:2010;

This device described above has been tested by Shenzhen NTEK. In accordance with the measurement methods and procedures specified in EN62209. Testing has shown that this device is capable of compliance with localized specific absorption rate (SAR) specified in COUNCIL 1999/519/EC. 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 S250117014003

Date of Test

Date (s) of performance of tests ..... Jan. 24, 2025 ~ Feb. 25, 2025

Date of Issue..... Mar. 14, 2025

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

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	Owen Xiao (Project Engineer)		Aaron Cheng (Supervisor)		Alex Li (Manager)

Shenzhen NTEK Testing Technology Co., Ltd. NTEK Report Seal

※ ※ Revision History ※ ※

REV.	DESCRIPTION	ISSUED DATE	REMARK
Rev.1.0	Initial Test Report Release	Mar. 14, 2025	Owen xiao

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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	10.0	20.0

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

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	2.0	4.0

NOTE: ***Whole-Body SAR*** is averaged over the entire body, ***partial-body SAR*** is averaged over any 10 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

2.0 W/kg AND MEMBER LIMIT 4.0 W/kg

APPLIED TO THIS EUT

1.2. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for BL7000 are as follows.

Max SAR Value(W/kg)			
RF Exposure Conditions	10-g Head	10-g Body & Hotspot (Separation distance of 5mm)	10-g Member DAS (See note[3]) (Separation distance of 0mm)
	1.360	1.004	2.415
Max Simultaneous Tx	1.512	1.169	2.739

NOTE: 1. The Max Simultaneous Tx is calculated based on the same configuration and test position.

2. This device is in compliance with Specific Absorption Rate (SAR) for general population / uncontrolled exposure limits (2.0 W/kg for head and body, 4.0 W/kg for member) specified in COUNCIL RECOMMENDATION 1999/519/EC, and had been tested in accordance with the measurement methods and procedures specified in EN 62209-1:2016 & EN 62209-2:2010.

3. The member DAS, It is only an assessment required by the ANFR (Sell to France).

1.3. EUT Description

Device Information	
Product Name	Smart phone
Trademark	Blackview/OSCAL
Model Name	BL7000
Family Model	PILOT 3
Model Difference	All models are the same circuit and RF module, except for rear appearance and colours.
Device Phase	Identical Prototype
Exposure Category	General population / Uncontrolled environment
Antenna Type	PIFA Antenna
Battery Information	DC 3.87V, 7500mAh, 29.025Wh
Hardware version	F216_MAIN_PCB_V1.0
Software version	BL7000_NEU_F216_V1.0/PILOT 3_NEU_F216_V1.0
Device Operating Configurations	
Supporting Mode(s)	GSM 900/1800, WCDMA Band 1/8, LTE Band 1/3/7/8/20/28/40/41, NR SA n1/n3/n8/n20/n28/n40/n41/n77/n78, WLAN 2.4G/5G, Bluetooth, GPS,FM,NFC
Test Modulation	GSM(GMSK/8PSK), WCDMA(QPSK), LTE(QPSK/16-QAM), NR(DFT-s-OFDM:PI/2 BPSK/QPSK/16-QAM/64QAM/256QAM CP-OFDM:QPSK/16-QAM/64QAM/256QAM),WLAN(DSSS/OFDM), WLAN(DSSS/OFDM), Bluetooth(GFSK, π/4-DQPSK, 8DPSK) , GPS(BPSK),FM(FM), NFC(ASK)

Device Class	B		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM 900	880-915	925-960
	GSM 1800	1710-1785	1805-1880
	WCDMA Band 1	1920-1980	2110-2170
	WCDMA Band 8	880-915	925-960
	LTE Band 1	1920-1980	2110-2170
	LTE Band 3	1710-1785	1805-1880
	LTE Band 7	2500-2570	2620-2690
	LTE Band 8	880- 915	925– 960
	LTE Band 20	832-862	791-821
	LTE Band 28	703-748	758-803
	LTE Band 40	2300-2400	
	LTE Band 41	2535-2655	
	NR n1	1920-1980	2110-2170
	NR n3	1710-1785	1805-1880
	NR n8	880-915	925-960
	NR n20	832-862	791-821
	NR n28	703-748	758-803
	NR n40	2300-2400	
	NR n41	2496-2690	
	NR n77	3300-4200	
	NR n78	3300-3800	
	WLAN 2.4G	2412-2472	
	WLAN 5.2G	5180-5240	
	WLAN 5.8G	5745-5825	
	Bluetooth	2402-2480	
	FM	N/A	87.5-108
	GPS	N/A	1575.42
	NFC	13.56	
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 900)		
	1, tested with power level 0(GSM 1800)		
	3, tested with power control “all 1”(WCDMA Band 1)		
	3, tested with power control “all 1”(WCDMA Band 8)		

	3, tested with power control all Max.(LTE Band 1)
	3, tested with power control all Max.(LTE Band 3)
	3, tested with power control all Max.(LTE Band 7)
	3, tested with power control all Max.(LTE Band 8)
	3, tested with power control all Max.(LTE Band 20)
	3, tested with power control all Max.(LTE Band 28)
	3, tested with power control all Max.(LTE Band 40)
	3, tested with power control all Max.(LTE Band 41)
	3, tested with power control all Max.(NR SA 1)
	3, tested with power control all Max.(NR SA 3)
	3, tested with power control all Max.(NR SA 8)
	3, tested with power control all Max.(NR SA 20)
	3, tested with power control all Max.(NR SA 28)
	3, tested with power control all Max.(NR SA 40)
	3, tested with power control all Max.(NR SA 41)
	3, tested with power control all Max.(NR SA 77)
	3, tested with power control all Max.(NR SA 78)

1.4. Test specification(s)

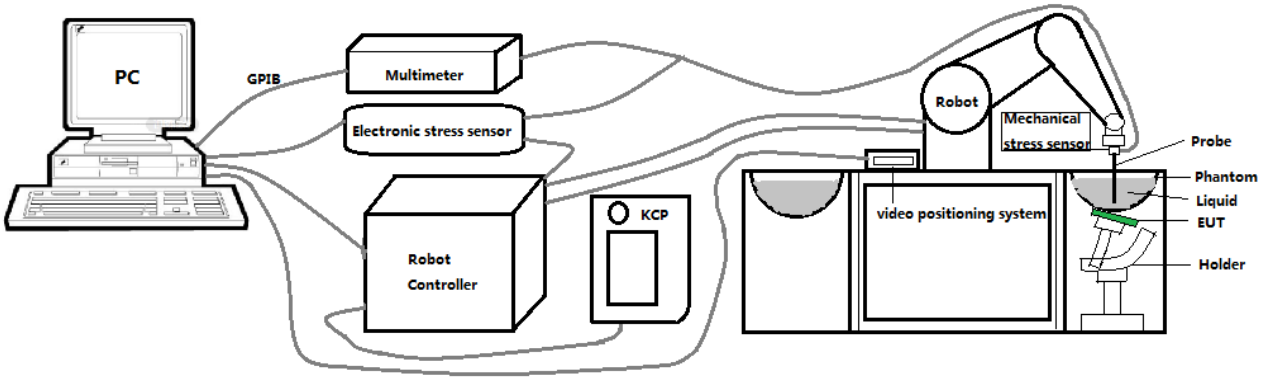
EN 50360:2017	Product standard to demonstrate the compliance of wireless communication devices, with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 300 MHz to 6 GHz: devices used next to the ear
EN 50566:2017	Product standard to demonstrate the compliance of wireless communication devices with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 30 MHz to 6 GHz: hand-held and body mounted devices in close proximity to the human body
EN 62209-1:2016	Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Part 1: Devices used next to the ear (Frequency range of 300 MHz to 6 GHz)
EN 62209-2:2010	Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 2: Procedure to determine the Specific Absorption Rate (SAR) in the head and body for 30MHz to 6GHz Handheld and Body-Mounted Devices used in close proximity to the body
EN 62479:2010	Assessment of the compliance of low-power electronic and electrical equipment with the restrictions related to human exposure to electromagnetic fields(10 MHz to 300 GHz)

1.5. Ambient Condition

Ambient temperature	20°C – 24°C
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 4024-EPGO-442 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

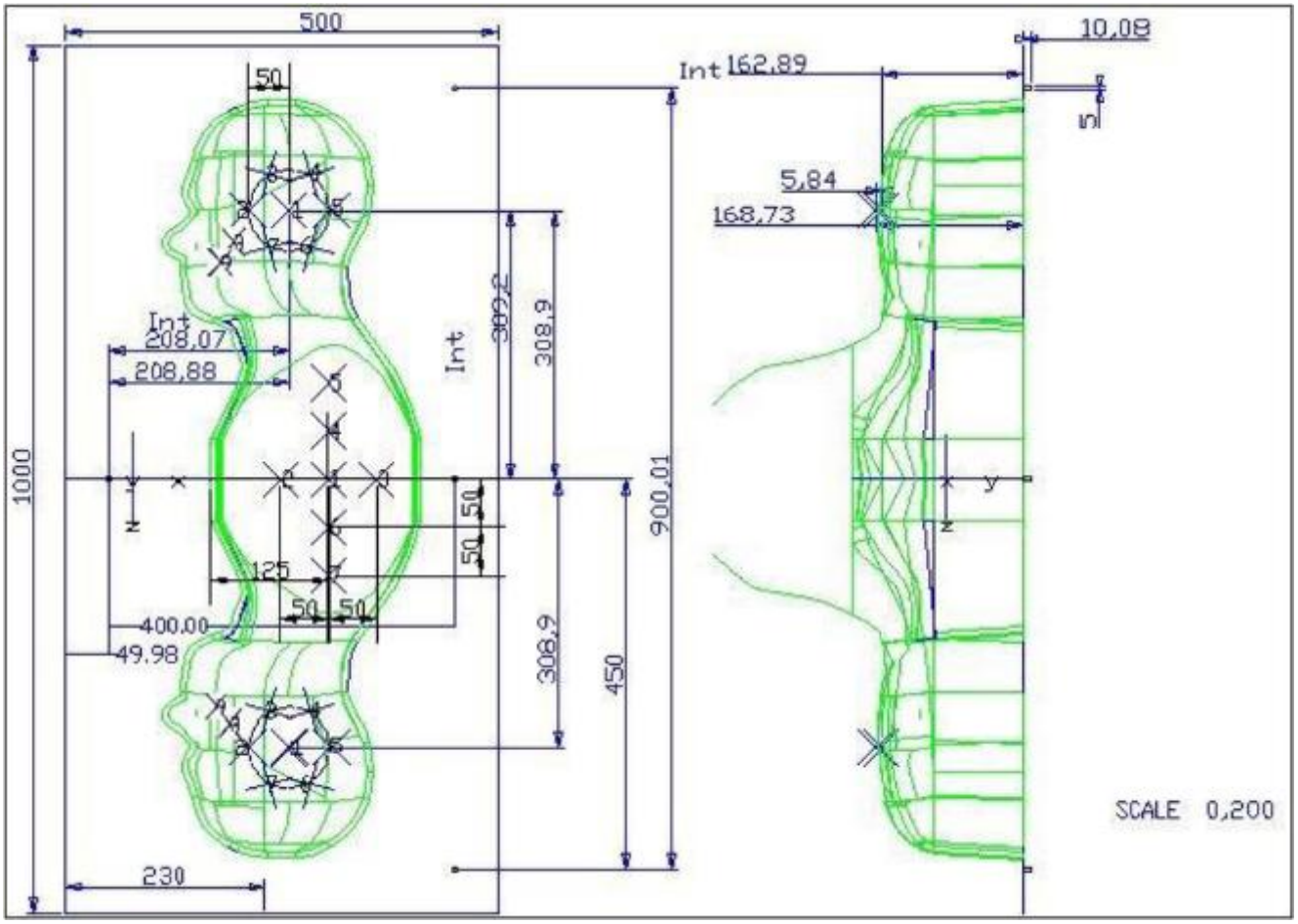
Photo of SAM phantom SN 16/15 SAM119



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

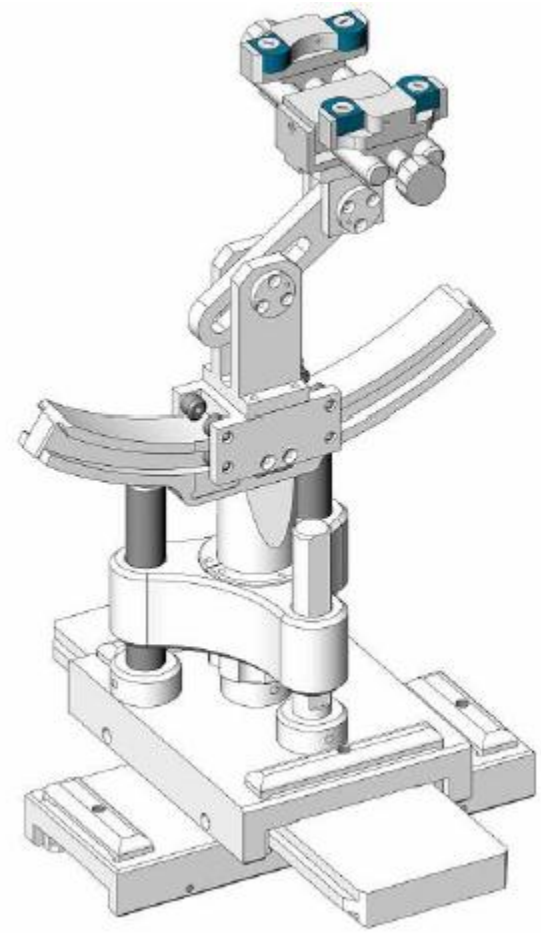


Serial Number	Left Head(mm)		Right Head(mm)		Flat Part(mm)	
SN 16/15 SAM119	2	2.02	2	2.08	1	2.09
	3	2.05	3	2.06	2	2.06
	4	2.07	4	2.07	3	2.08
	5	2.08	5	2.08	4	2.10
	6	2.05	6	2.07	5	2.10
	7	2.05	7	2.05	6	2.07
	8	2.07	8	2.06	7	2.07
	9	2.08	9	2.06	-	-

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	4024-EPGO-442	Oct. 04, 2024	Oct. 03, 2025
☒	MVG	750 MHz Dipole	SID750	SN 03/15 DIP 0G750-355	Feb. 22, 2024	Feb. 21, 2027
☐	MVG	835 MHz Dipole	SID835	SN 03/15 DIP 0G835-347	Feb. 22, 2024	Feb. 21, 2027
☒	MVG	900 MHz Dipole	SID900	SN 03/15 DIP 0G900-348	Feb. 22, 2024	Feb. 21, 2027
☒	MVG	1800 MHz Dipole	SID1800	SN 03/15 DIP 1G800-349	Feb. 22, 2024	Feb. 21, 2027
☐	MVG	1900 MHz Dipole	SID1900	SN 03/15 DIP 1G900-350	Feb. 22, 2024	Feb. 21, 2027
☒	MVG	2000 MHz Dipole	SID2000	SN 03/15 DIP 2G000-351	Feb. 22, 2024	Feb. 21, 2027
☒	MVG	2300 MHz Dipole	SID2300	SN 03/16 DIP 2G300-358	Feb. 22, 2024	Feb. 21, 2027
☒	MVG	2450 MHz Dipole	SID2450	SN 03/15 DIP 2G450-352	Feb. 22, 2024	Feb. 21, 2027
☒	MVG	2600 MHz Dipole	SID2600	SN 03/15 DIP 2G600-356	Feb. 22, 2024	Feb. 21, 2027
☒	MVG	3300 MHz Dipole	SID3300	SN 03/21 DIP 3G300-359	May. 18, 2024	May. 17, 2027
☒	MVG	3500 MHz Dipole	SID3500	SN 09/12 DIP 3G500-360	Oct. 15, 2022	Oct. 14, 2025
☒	MVG	3700 MHz Dipole	SID3700	SN 09/12 DIP 3G/700-361	Oct. 15 2022	Oct. 14 2025
☒	MVG	4200 MHz Dipole	SID4200	SN 03/21 DIP 4G200-363	May. 18, 2024	May. 17, 2027
☐	MVG	5000 MHz Dipole	SWG5500	SN 13/14 WGA 33	Feb. 22, 2024	Feb. 21, 2027
☒	MVG	Liquid measurement Kit	SCLMP	SN 21/15 OCPG 72	NCR	NCR
☒	MVG	Power	N.A	AMPLISAR_28/14_003	NCR	NCR

		Amplifier				
☒	KEITHLEY	Millivoltmeter	2000	4072790	Nov. 29, 2024	Nov. 28, 2025
☒	R&S	Universal radio communication tester	CMU200	105747	Apr. 26, 2024	Apr. 25, 2025
☒	R&S	Wideband radio communication tester	CMW500	103917	Apr. 26, 2024	Apr. 25, 2025
☒	HP	Network Analyzer	E5071C	LPS-461	Oct. 15, 2024	Oct. 14, 2025
☒	Agilent	MXG Vector Signal Generator	N5182A	MY47070317	Apr. 25, 2024	Apr. 24, 2025
☒	Agilent	Power meter	E4419B	MY45102538	Apr. 25, 2024	Apr. 24, 2025
☒	Agilent	Power sensor	E9301A	LES-413-C	May 30, 2024	May 29, 2025
☒	Agilent	Power sensor	E9301A	US39212148	Apr. 25, 2024	Apr. 24, 2025
☒	MCLI/USA	Directional Coupler	CB11-20	0D2L51502	Apr. 26, 2024	Apr. 25, 2027
☒	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

Measurement Software

Manufacturer	Software Name	Software Version
SATIMO	OpenSAR	V5.3.15.11

3. SAR Measurement Procedures

The measurement procedures are as follows:

(a) Use base station simulator (if applicable) or engineering software to transmit RF power continuously (continuous Tx) in the middle channel.

(b) Keep EUT to radiate maximum output power or 100% duty factor (if applicable)

(c) Measure output power through RF cable and power meter.

(d) Place the EUT in the positions as setup photos demonstrates.

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

(f) Measure SAR transmitting at the middle channel for all applicable exposure positions.

(g) Identify the exposure position and device configuration resulting the highest SAR

(h) Measure SAR at the lowest and highest channels at the worst exposure position and device configuration.

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).

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	5000
Water	34.40	34.40	34.40	55.36	55.36	71.88	71.88	71.88	65.53
NaCl	0.79	0.79	0.79	0.35	0.35	0.16	0.16	0.16	0.00
1,2-Propanediol	64.81	64.81	64.81	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	17.24
DGBE	0.00	0.00	0.00	13.84	13.84	7.99	7.99	7.99	0.00

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）	40.85	0.90	21.4 °C	Jan. 21, 2025
Head 900	900	41.50 (39.43~43.58)	0.97 (0.92~1.02)	40.97	0.98	21.6 °C	Jan. 31, 2025
Head 1800	1800	40.00 (38.00~42.00)	1.40 (1.33~1.47)	39.43	1.40	21.7 °C	Jan. 24, 2025
Head 2000	2000	40.00 (38.00~42.00)	1.40 (1.33~1.47)	38.42	1.43	21.7 °C	Feb. 01, 2025
Head 2300	2300	39.47 (37.50~41.44)	1.66 (1.58~1.74)	39.11	1.75	21.0 °C	Feb. 12, 2025
Head 2450	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	38.28	1.78	21.6 °C	Feb. 06, 2025
Head 2600	2600	39.01 (37.06~40.96)	1.96 (1.86~2.06)	38.77	1.97	21.6 °C	Jan. 28, 2025
Head 3300	3300	38.14 (36.04~39.82)	2.71 (2.77~3.05)	39.27	2.65	21.8 °C	Feb. 22, 2025
Head 3500	3500	37.93 (36.04~39.82)	2.91 (2.77~3.05)	37.52	2.82	21.3 °C	Feb. 24, 2025
Head 3700	3700	37.70 (35.82~39.59)	3.12 (2.97~3.27)	36.99	3.09	21.4 °C	Feb. 25, 2025
Head 4200	4200	37.10 (35.25~38.96)	3.63 (3.45~3.81)	38.08	3.55	21.2 °C	Feb. 18, 2025

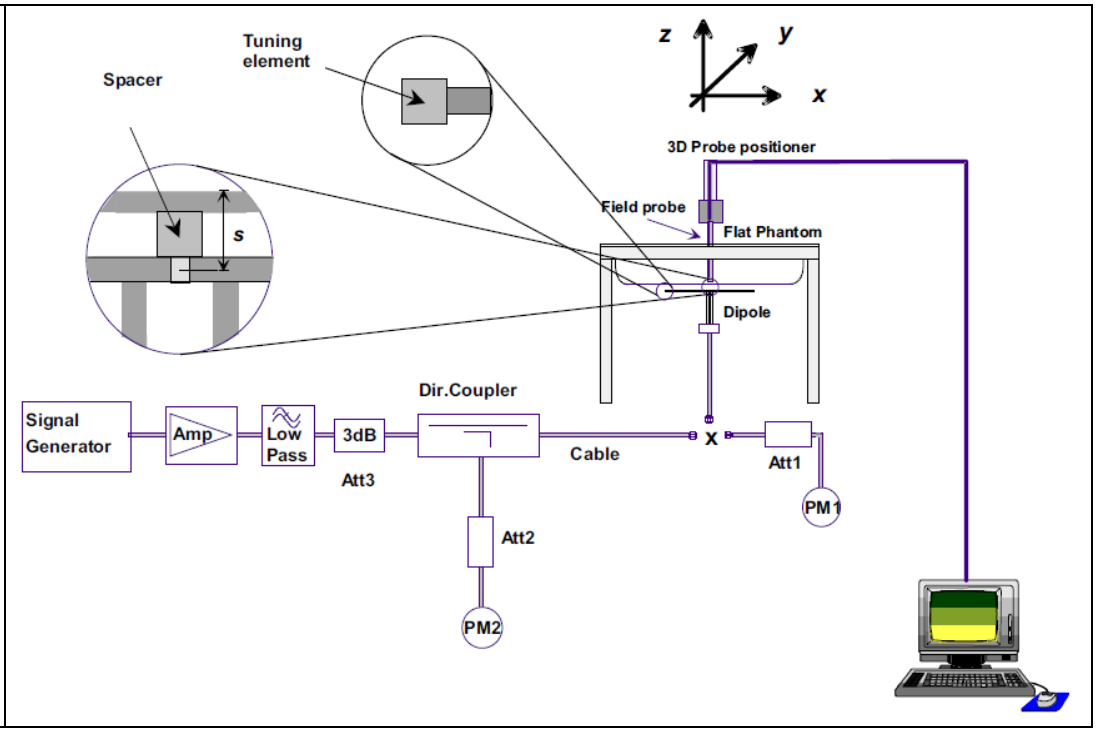
NOTE: The dielectric parameters of the tissue-equivalent liquid should be measured under similar ambient conditions and within 2 °C of the conditions expected during the SAR evaluation to satisfy protocol requirements.

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		Measured SAR (Normalized to 1W)		Liquid Temp.	Test Date
	1-g (W/Kg)	10-g (W/Kg)	1-g (W/Kg)	10-g (W/Kg)	1-g (W/Kg)	10-g (W/Kg)		
750MHz	8.60 (7.74~9.46)	5.78 (5.20~6.36)	0.835	0.582	8.35	5.82	21.4 °C	Jan. 21, 2025
900MHz	10.63 (9.57~11.69)	7.01 (6.31~7.71)	1.142	0.708	11.42	7.08	21.6 °C	Jan. 31, 2025
1800MHz	37.06 (33.35~40.77)	20.01 (18.01~22.01)	3.996	1.925	39.96	19.25	21.1 °C	Jan. 24, 2025
2000MHz	38.27 (34.44~42.10)	19.79 (17.81~21.77)	3.939	1.821	39.39	18.21	21.7 °C	Feb. 01, 2025
2300MHz	50.63 (45.57~55.69)	23.51 (21.16~25.86)	5.564	2.252	55.64	22.52	21.0 °C	Feb. 12, 2025
2450MHz	50.05 (45.05~55.06)	23.80 (21.42~26.18)	5.236	2.242	52.36	22.42	21.6 °C	Feb. 06, 2025
2600MHz	54.16 (48.74~59.58)	24.85 (22.37~27.34)	5.470	2.275	54.70	22.75	21.6 °C	Jan. 28, 2025
3300MHz	67.61 (60.85~74.37)	26.04 (23.44~28.64)	6.266	2.690	62.66	26.90	21.8 °C	Jan. 02, 2025
3500MHz	67.18 (60.47~73.89)	24.50 (22.05~26.95)	6.169	2.640	61.69	26.40	21.3 °C	Jan. 04, 2025
3700MHz	66.30 (59.67~72.93)	24.16 (22.96~26.57)	6.035	2.609	60.35	26.09	21.6 °C	Jan. 05, 2025
4200MHz	66.88 (60.19~73.57)	22.81 (20.53~25.09)	7.151	2.273	71.51	22.73	21.2 °C	Feb. 18, 2025

5. SAR Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in IEEE 1528: 2003. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Uncertainty Component	Tol. (±%)	Prob. Dist.	Div.	Ci (1 g)	Ci (10 g)	1 g Ui (±%)	10 g Ui (±%)	Vi
Measurement System□								
Probe Calibration	5.8	N	1	1	1	5.80	5.80	∞
Axial Isotropy	3.5	R	√3	0.97	0.97	1.98	1.98	∞
Hemispherical Isotropy	5.9	R	√3	0.28	0.28	0.96	0.96	∞
Boundary Effect	1	R	√3	1	1	0.58	0.58	∞
Linearity	4.7	R	√3	1	1	2.71	2.71	∞
System Detection Limits	1	R	√3	1	1	0.58	0.58	∞
Modulation response	3	N	1	1	1	3.00	3.00	∞
Readout Electronics	0.5	N	1	1	1	0.50	0.50	∞
Response Time	0	R	√3	1	1	0.00	0.00	∞
Integration Time	1.4	R	√3	1	1	0.81	0.81	∞
RF Ambient Conditions - Noise	3	R	√3	1	1	1.73	1.73	∞
RF Ambient Conditions - Reflections	3	R	√3	1	1	1.73	1.73	∞
Probe Positioner Mechanical Tolerance	1.4	R	√3	1	1	0.81	0.81	∞
Probe Positioning with respect to Phantom Shell	1.4	R	√3	1	1	0.81	0.81	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	2.3	R	√3	1	1	1.33	1.33	∞
Test sample Related								
Test Sample Positioning	2.6	N	1	1	1	2.60	2.60	11
Device Holder Uncertainty	3	N	1	1	1	3.00	3.00	7
Output Power Variation - SAR drift measurement	5	R	√3	1	1	2.89	2.89	∞
SAR scaling	2	R	√3	1	1	1.15	1.15	∞
Phantom and Tissue Parameters□								
Phantom Uncertainty (shape and thickness tolerances)	4	R	√3	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviation (in permittivity and conductivity)	2	N	1	1	0.84	2.00	1.68	∞
Liquid Conductivity (temperature uncertainty)	2.5	N	1	0.78	0.71	1.95	1.78	∞
Liquid conductivity - measurement uncertainty	1.59	N	1	0.23	0.26	0.37	0.41	99

Liquid permittivity (temperature uncertainty)	2.5	N	1	0.78	0.71	1.95	1.78	∞
Liquid permittivity - measurement uncertainty	1.65	N	1	0.23	0.26	0.38	0.43	99
Combined Standard Uncertainty		RSS				10.19	10.02	
Expanded Uncertainty (95% Confidence interval)		k				20.38	20.04	

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.

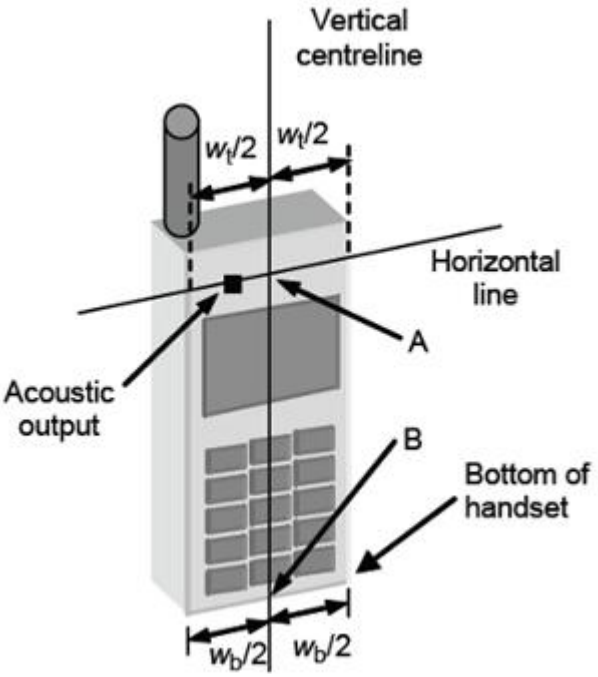


Fig 6.2.1 Handset vertical and horizontal reference lines—"fixed case

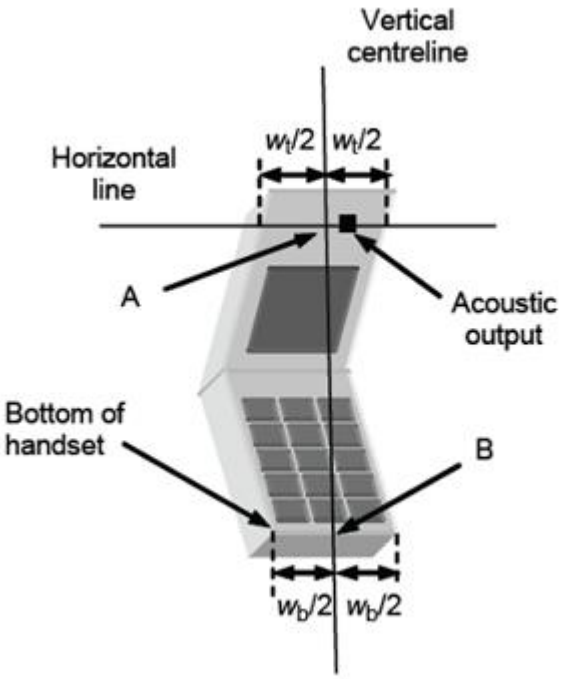


Fig 6.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

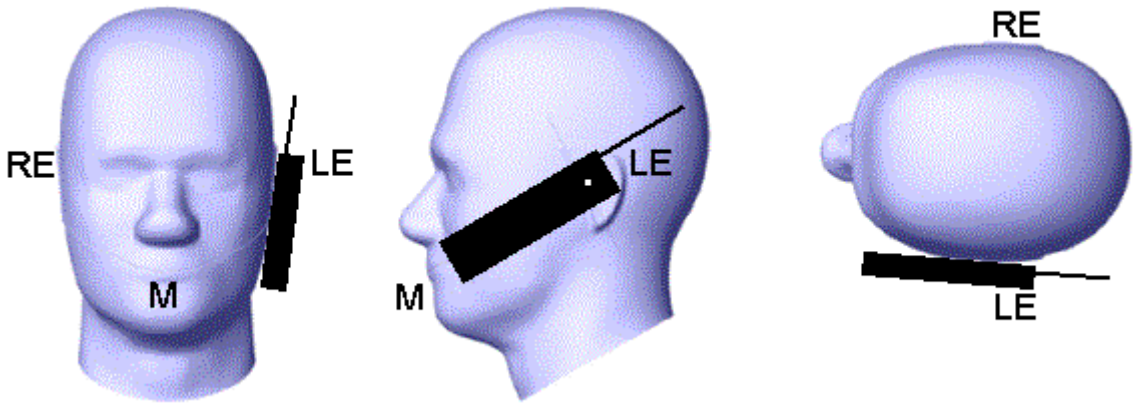


Fig 6.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

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.

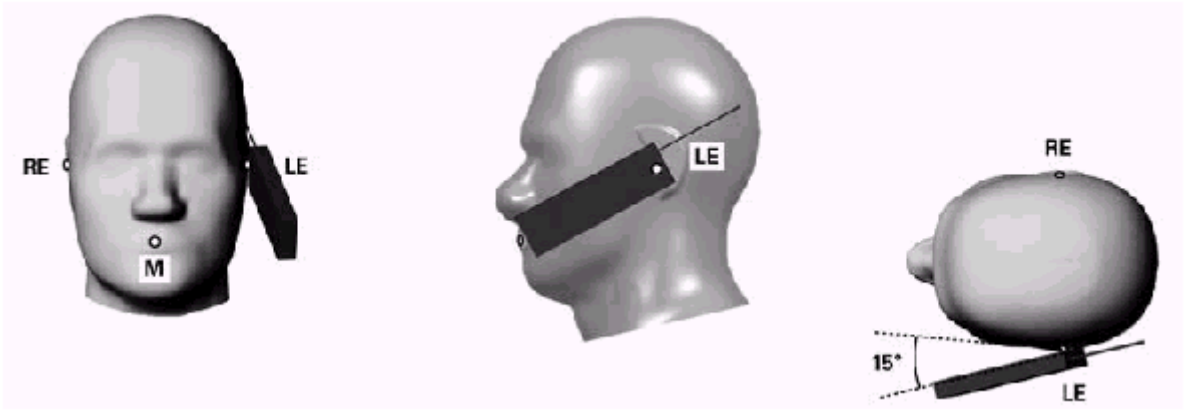


Figure 6.3.1 – Tilt position of the wireless device on the left side of SAM

6.4. Body-worn device

A typical example of a body-worn device is a mobile phone, wireless enabled PDA or other battery operated wireless device with the ability to transmit while mounted on a person's body using a carry accessory approved by the wireless device manufacturer. The device shall be positioned as intended at the distance to the outer surface of the phantom that corresponds to the specified distance (See figure 6.1). Adjust the distance between the device surface and the flat phantom to 5mm.

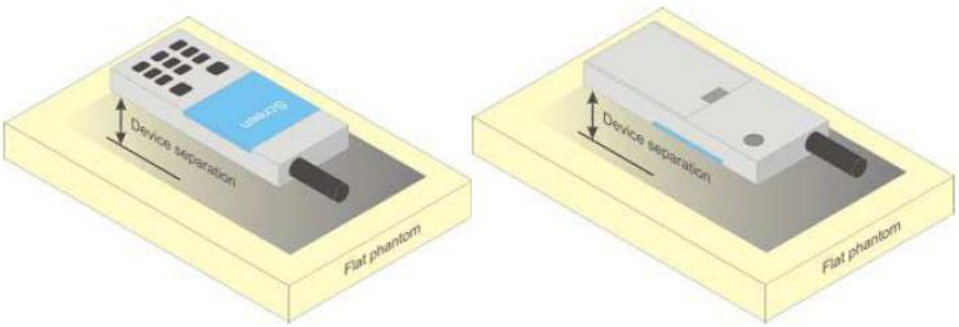


Figure 6.1 – Test positions for Body-worn device

7. RF Output Power

7.1. GSM Conducted Power

Band GSM900	Burst-Averaged output Power (dBm)				Frame-Averaged output Power (dBm)			
Tx Channel	Tune-up	975	38	124	Tune-up	975	38	124
Frequency (MHz)		880.2	897.6	914.8		880.2	897.6	914.8
GSM (GMSK)	33.50	33.02	33.15	33.10	24.47	23.99	24.12	24.07
GPRS(GMSK,1 Tx slot)	33.50	33.09	33.21	33.11	24.47	24.06	24.18	24.08
GPRS(GMSK,2 Tx slot)	33.00	32.48	32.57	32.52	26.98	26.46	26.55	26.50
GPRS(GMSK,3 Tx slot)	31.50	30.89	31.02	30.96	27.24	26.63	26.76	26.70
GPRS(GMSK,4 Tx slot)	30.00	29.66	29.79	29.73	26.99	26.65	26.78	26.72
EGPRS(8PSK,1 Tx slot)	29.00	27.94	28.06	28.50	19.97	18.91	19.03	19.47
EGPRS(8PSK,2 Tx slot)	28.00	27.40	27.58	27.93	21.98	21.38	21.56	21.91
EGPRS(8PSK,3 Tx slot)	25.50	24.68	24.87	25.16	21.24	20.42	20.61	20.90
EGPRS(8PSK,4 Tx slot)	24.00	23.29	23.47	23.75	20.99	20.28	20.46	20.74

Band GSM1800	Burst-Averaged output Power (dBm)				Frame-Averaged output Power (dBm)			
Tx Channel	Tune-up	512	698	885	Tune-up	512	698	885
Frequency (MHz)		1710.2	1747.4	1784.8		1710.2	1747.4	1784.8
GSM (GMSK)	30.50	30.29	30.26	30.41	21.47	21.26	21.23	21.38
GPRS(GMSK,1 Tx slot)	30.00	29.76	29.59	29.78	20.97	20.73	20.56	20.75
GPRS(GMSK,2 Tx slot)	29.50	29.20	29.08	29.19	23.48	23.18	23.06	23.17
GPRS(GMSK,3 Tx slot)	27.50	27.49	27.42	27.41	23.24	23.23	23.16	23.15
GPRS(GMSK,4 Tx slot)	26.50	26.43	26.38	26.33	23.49	23.42	23.37	23.32
EGPRS(8PSK,1 Tx slot)	28.00	27.51	27.30	26.98	18.97	18.48	18.27	17.95
EGPRS(8PSK,2 Tx slot)	27.00	26.97	26.83	26.48	20.98	20.95	20.81	20.46
EGPRS(8PSK,3 Tx slot)	26.50	26.06	25.93	25.59	22.24	21.80	21.67	21.33
EGPRS(8PSK,4 Tx slot)	25.50	25.47	25.33	24.97	22.49	22.46	22.32	21.96

Note: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots. The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9.03 dB

Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6.02 dB

Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3.01 dB

7.2. WCDMA Conducted Power

WCDMA Band1	Burst-Averaged output Power (dBm)			
Tx Channel	Tune-up (dBm)	9612	9750	9888
Frequency (MHz)		1922.4	1950	1977.6
RMC12.2K	23.50	23.25	23.21	23.14
HSDPA Sub 1	22.50	22.32	22.31	22.25
HSDPA Sub 2	22.50	22.06	21.95	21.94
HSDPA Sub 3	21.00	20.91	20.67	20.20
HSDPA Sub 4	21.00	20.88	20.66	20.87
HSUPA Sub 1	22.50	22.01	21.94	21.86
HSUPA Sub 2	22.50	22.16	21.91	21.91
HSUPA Sub 3	21.50	21.10	20.59	21.04
HSUPA Sub 4	22.50	22.14	22.11	22.09
HSUPA Sub 5	21.50	21.45	21.25	21.26
WCDMA Band 8	Burst-Averaged output Power (dBm)			
Tx Channel	Tune-up (dBm)	2712	2788	2863
Frequency (MHz)		882.4	897.6	912.6
RMC12.2K	23.00	22.70	22.71	22.69
HSDPA Sub 1	22.00	21.67	21.70	21.65
HSDPA Sub 2	21.50	21.40	21.23	21.13
HSDPA Sub 3	21.00	20.52	20.13	20.22
HSDPA Sub 4	20.50	20.12	20.19	20.49
HSUPA Sub 1	22.00	20.45	21.60	21.47
HSUPA Sub 2	22.00	21.68	21.51	21.63
HSUPA Sub 3	20.50	20.15	20.31	20.25
HSUPA Sub 4	22.00	21.68	21.69	21.65
HSUPA Sub 5	21.50	20.39	21.07	20.89

7.3. LTE Conducted Power

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Tune-up	Power (dBm)
Band1	5	18025	1	#0	QPSK	24.50	23.73
Band1	5	18025	8	#0	QPSK	24.50	23.87
Band1	5	18025	25	#0	QPSK	24.50	22.82
Band1	5	18300	1	#0	QPSK	24.50	23.72
Band1	5	18300	8	#0	QPSK	24.50	23.80
Band1	5	18300	25	#0	QPSK	24.50	22.78
Band1	5	18575	1	#0	QPSK	24.50	23.46
Band1	5	18575	8	#0	QPSK	24.50	23.64
Band1	5	18575	25	#0	QPSK	24.50	22.60
Band1	20	18100	1	#0	QPSK	24.50	24.06
Band1	20	18100	18	#0	QPSK	24.50	23.93
Band1	20	18100	100	#0	QPSK	24.50	22.93
Band1	20	18300	1	#0	QPSK	24.50	23.97
Band1	20	18300	18	#0	QPSK	24.50	23.92
Band1	20	18300	100	#0	QPSK	24.50	22.83
Band1	20	18500	1	#0	QPSK	24.50	23.75
Band1	20	18500	18	#0	QPSK	24.50	23.62
Band1	20	18500	100	#0	QPSK	24.50	22.69
Band20	5	24175	1	#0	QPSK	24.50	24.28
Band20	5	24175	8	#0	QPSK	24.50	24.22
Band20	5	24175	25	#0	QPSK	24.50	23.21
Band20	5	24300	1	#0	QPSK	24.50	24.02
Band20	5	24300	8	#0	QPSK	24.50	24.03
Band20	5	24300	25	#0	QPSK	24.50	23.03
Band20	5	24425	1	#0	QPSK	24.50	24.00
Band20	5	24425	8	#0	QPSK	24.50	24.05
Band20	5	24425	25	#0	QPSK	24.50	23.06
Band20	20	24250	1	#0	QPSK	24.50	24.28
Band20	20	24250	18	#0	QPSK	24.50	24.19
Band20	20	24250	100	#0	QPSK	24.50	23.08
Band20	20	24300	1	#0	QPSK	24.50	24.19
Band20	20	24300	18	#0	QPSK	24.50	24.08
Band20	20	24300	100	#0	QPSK	24.50	23.06
Band20	20	24350	1	#0	QPSK	24.50	24.12

Band20	20	24350	18	#0	QPSK	24.50	24.07
Band20	20	24350	100	#0	QPSK	24.50	23.11
Band28	3	27225	1	#0	QPSK	24.50	24.15
Band28	3	27225	1	#Max	QPSK	24.50	24.14
Band28	3	27225	4	#0	QPSK	24.50	24.16
Band28	3	27225	4	#Max	QPSK	24.50	24.18
Band28	3	27360	1	#0	QPSK	24.50	24.23
Band28	3	27360	1	#Max	QPSK	24.50	24.18
Band28	3	27360	4	#0	QPSK	24.50	24.25
Band28	3	27360	4	#Max	QPSK	24.50	24.25
Band28	3	27495	1	#0	QPSK	24.50	24.38
Band28	3	27495	1	#Max	QPSK	24.50	24.26
Band28	3	27495	4	#0	QPSK	24.50	24.34
Band28	3	27495	4	#Max	QPSK	24.50	24.26
Band28	5	27235	1	#0	QPSK	24.50	24.22
Band28	5	27235	1	#Max	QPSK	24.50	24.22
Band28	5	27235	8	#0	QPSK	24.50	24.22
Band28	5	27235	8	#Max	QPSK	24.50	24.21
Band28	5	27385	1	#0	QPSK	24.50	24.34
Band28	5	27385	1	#Max	QPSK	24.50	24.37
Band28	5	27385	8	#0	QPSK	24.50	24.29
Band28	5	27385	8	#Max	QPSK	24.50	24.32
Band28	5	27635	1	#0	QPSK	24.50	24.40
Band28	5	27635	1	#Max	QPSK	24.50	24.26
Band28	5	27635	8	#0	QPSK	24.50	24.39
Band28	5	27635	8	#Max	QPSK	24.50	24.34
Band28	20	27310	1	#0	QPSK	24.50	24.24
Band28	20	27310	1	#Max	QPSK	24.50	24.30
Band28	20	27310	18	#0	QPSK	24.50	24.27
Band28	20	27310	18	#Max	QPSK	24.50	24.26
Band28	20	27460	1	#0	QPSK	24.50	24.36
Band28	20	27460	1	#Max	QPSK	24.50	24.29
Band28	20	27460	18	#0	QPSK	24.50	24.37
Band28	20	27460	18	#Max	QPSK	24.50	24.31
Band28	20	27560	1	#0	QPSK	24.50	24.41
Band28	20	27560	1	#Max	QPSK	24.50	24.17
Band28	20	27560	18	#0	QPSK	24.50	24.38
Band28	20	27560	18	#Max	QPSK	24.50	24.26
Band3	1.4	19207	1	#0	QPSK	24.50	23.93

Band3	1.4	19207	5	#0	QPSK	24.50	23.92
Band3	1.4	19207	6	#0	QPSK	24.50	22.89
Band3	1.4	19575	1	#0	QPSK	24.50	23.87
Band3	1.4	19575	5	#0	QPSK	24.50	23.79
Band3	1.4	19575	6	#0	QPSK	24.50	22.88
Band3	1.4	19943	1	#0	QPSK	24.50	24.00
Band3	1.4	19943	5	#0	QPSK	24.50	24.07
Band3	1.4	19943	6	#0	QPSK	24.50	23.03
Band3	5	19225	1	#0	QPSK	24.50	24.02
Band3	5	19225	8	#0	QPSK	24.50	24.07
Band3	5	19225	25	#0	QPSK	24.50	23.07
Band3	5	19575	1	#0	QPSK	24.50	23.99
Band3	5	19575	8	#0	QPSK	24.50	24.01
Band3	5	19575	25	#0	QPSK	24.50	23.03
Band3	5	19925	1	#0	QPSK	24.50	24.33
Band3	5	19925	8	#0	QPSK	24.50	24.30
Band3	5	19925	25	#0	QPSK	24.50	23.24
Band3	20	19300	1	#0	QPSK	24.50	24.12
Band3	20	19300	18	#0	QPSK	24.50	24.09
Band3	20	19300	100	#0	QPSK	24.50	23.16
Band3	20	19575	1	#0	QPSK	24.50	24.12
Band3	20	19575	18	#0	QPSK	24.50	24.12
Band3	20	19575	100	#0	QPSK	24.50	23.12
Band3	20	19850	1	#0	QPSK	24.50	24.13
Band3	20	19850	18	#0	QPSK	24.50	24.17
Band3	20	19850	100	#0	QPSK	24.50	23.32
Band40	5	38675	1	#0	QPSK	23.00	22.67
Band40	5	38675	8	#0	QPSK	23.00	22.68
Band40	5	38675	25	#0	QPSK	23.00	21.62
Band40	5	39150	1	#0	QPSK	23.00	22.74
Band40	5	39150	8	#0	QPSK	23.00	22.75
Band40	5	39150	25	#0	QPSK	23.00	21.74
Band40	5	39625	1	#0	QPSK	23.00	22.75
Band40	5	39625	8	#0	QPSK	23.00	22.79
Band40	5	39625	25	#0	QPSK	23.00	21.78
Band40	20	38750	1	#0	QPSK	23.00	22.77
Band40	20	38750	18	#0	QPSK	23.00	22.68
Band40	20	38750	100	#0	QPSK	23.00	21.61
Band40	20	39150	1	#0	QPSK	23.00	21.79

Band40	20	39150	18	#0	QPSK	23.00	21.70
Band40	20	39150	100	#0	QPSK	23.00	21.75
Band40	20	39550	1	#0	QPSK	23.00	21.93
Band40	20	39550	18	#0	QPSK	23.00	21.84
Band40	20	39550	100	#0	QPSK	23.00	21.81
Band41	5	39675	1	#0	QPSK	27.00	26.25
Band41	5	39675	8	#0	QPSK	27.00	26.23
Band41	5	39675	25	#0	QPSK	27.00	25.23
Band41	5	40620	1	#0	QPSK	27.00	26.53
Band41	5	40620	8	#0	QPSK	27.00	26.54
Band41	5	40620	25	#0	QPSK	27.00	25.52
Band41	5	41565	1	#0	QPSK	27.00	26.48
Band41	5	41565	8	#0	QPSK	27.00	26.43
Band41	5	41565	25	#0	QPSK	27.00	25.37
Band41	20	39750	1	#0	QPSK	27.00	26.27
Band41	20	39750	18	#0	QPSK	27.00	26.23
Band41	20	39750	100	#0	QPSK	27.00	25.17
Band41	20	40620	1	#0	QPSK	27.00	26.46
Band41	20	40620	18	#0	QPSK	27.00	26.41
Band41	20	40620	100	#0	QPSK	27.00	25.56
Band41	20	41490	1	#0	QPSK	27.00	26.50
Band41	20	41490	18	#0	QPSK	27.00	26.42
Band41	20	41490	100	#0	QPSK	27.00	25.40
Band7	5	20775	1	#0	QPSK	24.50	24.08
Band7	5	20775	8	#0	QPSK	24.50	24.21
Band7	5	20775	25	#0	QPSK	24.50	23.21
Band7	5	21100	1	#0	QPSK	24.50	24.01
Band7	5	21100	8	#0	QPSK	24.50	24.03
Band7	5	21100	25	#0	QPSK	24.50	23.09
Band7	5	21425	1	#0	QPSK	24.50	23.96
Band7	5	21425	8	#0	QPSK	24.50	24.14
Band7	5	21425	25	#0	QPSK	24.50	23.21
Band7	20	20850	1	#0	QPSK	24.50	24.21
Band7	20	20850	18	#0	QPSK	24.50	24.29
Band7	20	20850	100	#0	QPSK	24.50	23.24
Band7	20	21100	1	#0	QPSK	24.50	24.02
Band7	20	21100	18	#0	QPSK	24.50	23.99
Band7	20	21100	100	#0	QPSK	24.50	23.22
Band7	20	21350	1	#0	QPSK	24.50	24.03

Band7	20	21350	18	#0	QPSK	24.50	23.99
Band7	20	21350	100	#0	QPSK	24.50	23.02
Band8	1.4	21457	1	#0	QPSK	24.50	24.05
Band8	1.4	21457	5	#0	QPSK	24.50	24.07
Band8	1.4	21457	6	#0	QPSK	24.50	23.09
Band8	1.4	21625	1	#0	QPSK	24.50	23.98
Band8	1.4	21625	5	#0	QPSK	24.50	24.15
Band8	1.4	21625	6	#0	QPSK	24.50	23.14
Band8	1.4	21793	1	#0	QPSK	24.50	24.13
Band8	1.4	21793	5	#0	QPSK	24.50	24.14
Band8	1.4	21793	6	#0	QPSK	24.50	23.15
Band8	5	21475	1	#0	QPSK	24.50	24.17
Band8	5	21475	8	#0	QPSK	24.50	24.18
Band8	5	21475	25	#0	QPSK	24.50	23.21
Band8	5	21625	1	#0	QPSK	24.50	24.04
Band8	5	21625	8	#0	QPSK	24.50	24.15
Band8	5	21625	25	#0	QPSK	24.50	23.22
Band8	5	21775	1	#0	QPSK	24.50	24.15
Band8	5	21775	8	#0	QPSK	24.50	24.17
Band8	5	21775	25	#0	QPSK	24.50	23.23
Band8	10	21500	1	#0	QPSK	24.50	24.24
Band8	10	21500	12	#0	QPSK	24.50	24.20
Band8	10	21500	50	#0	QPSK	24.50	23.20
Band8	10	21625	1	#0	QPSK	24.50	24.17
Band8	10	21625	12	#0	QPSK	24.50	24.21
Band8	10	21625	50	#0	QPSK	24.50	23.27
Band8	10	21750	1	#0	QPSK	24.50	24.21
Band8	10	21750	12	#0	QPSK	24.50	24.24
Band8	10	21750	50	#0	QPSK	24.50	23.25

7.4. NR Output Power

Band	SCS (kHz)	Bandwidth (MHz)	UL Channel	RB Allocation	Modulation	Tune-up	Power (dBm)
n1	30	10	385000	12@6	DFT_BPSK	24.50	23.94
n1	30	10	385000	1@1	DFT_BPSK	24.50	23.72
n1	30	10	385000	1@22	DFT_BPSK	24.50	23.88
n1	30	10	385000	12@6	DFT_QPSK	24.50	23.77
n1	30	10	385000	1@1	DFT_QPSK	24.50	23.58

n1	30	10	385000	1@22	DFT_QPSK	24.50	23.80
n1	30	10	390000	12@6	DFT_BPSK	24.50	23.80
n1	30	10	390000	1@1	DFT_BPSK	24.50	23.74
n1	30	10	390000	1@22	DFT_BPSK	24.50	23.91
n1	30	10	390000	12@6	DFT_QPSK	24.50	23.90
n1	30	10	390000	1@1	DFT_QPSK	24.50	23.70
n1	30	10	390000	1@22	DFT_QPSK	24.50	23.82
n1	30	10	395000	12@6	DFT_BPSK	24.50	23.78
n1	30	10	395000	1@1	DFT_BPSK	24.50	23.90
n1	30	10	395000	1@22	DFT_BPSK	24.50	23.88
n1	30	10	395000	12@6	DFT_QPSK	24.50	23.86
n1	30	10	395000	1@1	DFT_QPSK	24.50	23.80
n1	30	10	395000	1@22	DFT_QPSK	24.50	23.78
n1	30	25	386500	32@16	DFT_BPSK	24.50	23.53
n1	30	25	386500	1@1	DFT_BPSK	24.50	23.95
n1	30	25	386500	1@63	DFT_BPSK	24.50	23.92
n1	30	25	386500	32@16	DFT_QPSK	24.50	24.09
n1	30	25	386500	1@1	DFT_QPSK	24.50	23.70
n1	30	25	386500	1@63	DFT_QPSK	24.50	23.82
n1	30	25	390000	32@16	DFT_BPSK	24.50	23.98
n1	30	25	390000	1@1	DFT_BPSK	24.50	23.93
n1	30	25	390000	1@63	DFT_BPSK	24.50	24.13
n1	30	25	390000	32@16	DFT_QPSK	24.50	24.01
n1	30	25	390000	1@1	DFT_QPSK	24.50	23.84
n1	30	25	390000	1@63	DFT_QPSK	24.50	24.02
n1	30	25	393500	32@16	DFT_BPSK	24.50	24.10
n1	30	25	393500	1@1	DFT_BPSK	24.50	24.10
n1	30	25	393500	1@63	DFT_BPSK	24.50	24.10
n1	30	25	393500	32@16	DFT_QPSK	24.50	24.07
n1	30	25	393500	1@1	DFT_QPSK	24.50	23.91
n1	30	25	393500	1@63	DFT_QPSK	24.50	23.86
n1	30	50	389000	64@32	DFT_BPSK	24.50	24.16
n1	30	50	389000	1@1	DFT_BPSK	24.50	23.97
n1	30	50	389000	1@131	DFT_BPSK	24.50	24.28
n1	30	50	389000	64@32	DFT_QPSK	24.50	24.23
n1	30	50	389000	1@1	DFT_QPSK	24.50	23.76
n1	30	50	389000	1@131	DFT_QPSK	24.50	24.04
n1	30	50	390000	64@32	DFT_BPSK	24.50	24.11
n1	30	50	390000	1@1	DFT_BPSK	24.50	23.97

n1	30	50	390000	1@131	DFT_BPSK	24.50	24.12
n1	30	50	390000	64@32	DFT_QPSK	24.50	24.10
n1	30	50	390000	1@1	DFT_QPSK	24.50	23.76
n1	30	50	390000	1@131	DFT_QPSK	24.50	23.84
n1	30	50	391000	64@32	DFT_BPSK	24.50	24.16
n1	30	50	391000	1@1	DFT_BPSK	24.50	23.97
n1	30	50	391000	1@131	DFT_BPSK	24.50	24.02
n1	30	50	391000	64@32	DFT_QPSK	24.50	23.19
n1	30	50	391000	1@1	DFT_QPSK	24.50	22.77
n1	30	50	391000	1@131	DFT_QPSK	24.50	22.90
n20	30	10	167400	12@6	DFT_BPSK	24.00	23.82
n20	30	10	167400	1@1	DFT_BPSK	24.00	23.79
n20	30	10	167400	1@22	DFT_BPSK	24.00	23.67
n20	30	10	167400	12@6	DFT_QPSK	24.00	23.89
n20	30	10	167400	1@1	DFT_QPSK	24.00	23.75
n20	30	10	167400	1@22	DFT_QPSK	24.00	23.68
n20	30	10	169400	12@6	DFT_BPSK	24.00	23.79
n20	30	10	169400	1@1	DFT_BPSK	24.00	23.73
n20	30	10	169400	1@22	DFT_BPSK	24.00	23.71
n20	30	10	169400	12@6	DFT_QPSK	24.00	23.80
n20	30	10	169400	1@1	DFT_QPSK	24.00	23.76
n20	30	10	169400	1@22	DFT_QPSK	24.00	23.82
n20	30	10	171400	12@6	DFT_BPSK	24.00	23.89
n20	30	10	171400	1@1	DFT_BPSK	24.00	23.74
n20	30	10	171400	1@22	DFT_BPSK	24.00	23.81
n20	30	10	171400	12@6	DFT_QPSK	24.00	23.97
n20	30	10	171400	1@1	DFT_QPSK	24.00	23.89
n20	30	10	171400	1@22	DFT_QPSK	24.00	23.83
n20	30	15	167900	18@9	DFT_BPSK	24.00	23.78
n20	30	15	167900	1@1	DFT_BPSK	24.00	23.79
n20	30	15	167900	1@36	DFT_BPSK	24.00	23.74
n20	30	15	167900	18@9	DFT_QPSK	24.00	23.77
n20	30	15	167900	1@1	DFT_QPSK	24.00	23.88
n20	30	15	167900	1@36	DFT_QPSK	24.00	23.79
n20	30	15	169400	18@9	DFT_BPSK	24.00	23.87
n20	30	15	169400	1@1	DFT_BPSK	24.00	23.66
n20	30	15	169400	1@36	DFT_BPSK	24.00	23.76
n20	30	15	169400	18@9	DFT_QPSK	24.00	23.81
n20	30	15	169400	1@1	DFT_QPSK	24.00	23.69

n20	30	15	169400	1@36	DFT_QPSK	24.00	23.86
n20	30	15	170900	18@9	DFT_BPSK	24.00	23.83
n20	30	15	170900	1@1	DFT_BPSK	24.00	23.71
n20	30	15	170900	1@36	DFT_BPSK	24.00	23.84
n20	30	15	170900	18@9	DFT_QPSK	24.00	23.85
n20	30	15	170900	1@1	DFT_QPSK	24.00	23.73
n20	30	15	170900	1@36	DFT_QPSK	24.00	23.82
n20	30	20	168400	25@12	DFT_BPSK	24.00	23.80
n20	30	20	168400	1@1	DFT_BPSK	24.00	23.81
n20	30	20	168400	1@49	DFT_BPSK	24.00	23.76
n20	30	20	168400	25@12	DFT_QPSK	24.00	23.88
n20	30	20	168400	1@1	DFT_QPSK	24.00	23.81
n20	30	20	168400	1@49	DFT_QPSK	24.00	23.80
n20	30	20	169400	25@12	DFT_BPSK	24.00	23.73
n20	30	20	169400	1@1	DFT_BPSK	24.00	23.75
n20	30	20	169400	1@49	DFT_BPSK	24.00	23.87
n20	30	20	169400	25@12	DFT_QPSK	24.00	23.88
n20	30	20	169400	1@1	DFT_QPSK	24.00	23.88
n20	30	20	169400	1@49	DFT_QPSK	24.00	23.91
n20	30	20	170400	25@12	DFT_BPSK	24.00	23.83
n20	30	20	170400	1@1	DFT_BPSK	24.00	23.77
n20	30	20	170400	1@49	DFT_BPSK	24.00	23.76
n20	30	20	170400	25@12	DFT_QPSK	24.00	23.94
n20	30	20	170400	1@1	DFT_QPSK	24.00	23.78
n20	30	20	170400	1@49	DFT_QPSK	24.00	23.88
n28	15	5	141100	12@6	DFT_BPSK	23.50	23.08
n28	15	5	141100	1@1	DFT_BPSK	23.50	23.03
n28	15	5	141100	1@23	DFT_BPSK	23.50	23.07
n28	15	5	141100	12@6	DFT_QPSK	23.50	23.08
n28	15	5	141100	1@1	DFT_QPSK	23.50	23.02
n28	15	5	141100	1@23	DFT_QPSK	23.50	23.05
n28	15	5	145100	12@6	DFT_BPSK	23.50	23.08
n28	15	5	145100	1@1	DFT_BPSK	23.50	23.09
n28	15	5	145100	1@23	DFT_BPSK	23.50	22.97
n28	15	5	145100	12@6	DFT_QPSK	23.50	23.11
n28	15	5	145100	1@1	DFT_QPSK	23.50	23.10
n28	15	5	145100	1@23	DFT_QPSK	23.50	22.96
n28	15	5	149100	12@6	DFT_BPSK	23.50	23.27
n28	15	5	149100	1@1	DFT_BPSK	23.50	23.21

n28	15	5	149100	1@23	DFT_BPSK	23.50	23.18
n28	15	5	149100	12@6	DFT_QPSK	23.50	23.28
n28	15	5	149100	1@1	DFT_QPSK	23.50	23.24
n28	15	5	149100	1@23	DFT_QPSK	23.50	23.16
n28	15	15	142100	36@18	DFT_BPSK	23.50	23.17
n28	15	15	142100	1@1	DFT_BPSK	23.50	23.03
n28	15	15	142100	1@77	DFT_BPSK	23.50	23.18
n28	15	15	142100	36@18	DFT_QPSK	23.50	23.18
n28	15	15	142100	1@1	DFT_QPSK	23.50	23.04
n28	15	15	142100	1@77	DFT_QPSK	23.50	23.21
n28	15	15	145100	36@18	DFT_BPSK	23.50	23.11
n28	15	15	145100	1@1	DFT_BPSK	23.50	23.13
n28	15	15	145100	1@77	DFT_BPSK	23.50	23.00
n28	15	15	145100	36@18	DFT_QPSK	23.50	23.13
n28	15	15	145100	1@1	DFT_QPSK	23.50	23.18
n28	15	15	145100	1@77	DFT_QPSK	23.50	23.04
n28	15	15	148100	36@18	DFT_BPSK	23.50	23.25
n28	15	15	148100	1@1	DFT_BPSK	23.50	23.15
n28	15	15	148100	1@77	DFT_BPSK	23.50	23.23
n28	15	15	148100	36@18	DFT_QPSK	23.50	23.29
n28	15	15	148100	1@1	DFT_QPSK	23.50	23.14
n28	15	15	148100	1@77	DFT_QPSK	23.50	23.19
n28	15	30	143600	80@40	DFT_BPSK	23.50	22.67
n28	15	30	143600	1@1	DFT_BPSK	23.50	22.47
n28	15	30	143600	1@158	DFT_BPSK	23.50	22.45
n28	15	30	143600	80@40	DFT_QPSK	23.50	22.64
n28	15	30	143600	1@1	DFT_QPSK	23.50	22.49
n28	15	30	143600	1@158	DFT_QPSK	23.50	22.50
n28	15	30	145100	80@40	DFT_BPSK	23.50	22.60
n28	15	30	145100	1@1	DFT_BPSK	23.50	22.62
n28	15	30	145100	1@158	DFT_BPSK	23.50	22.60
n28	15	30	145100	80@40	DFT_QPSK	23.50	22.61
n28	15	30	145100	1@1	DFT_QPSK	23.50	22.68
n28	15	30	145100	1@158	DFT_QPSK	23.50	22.62
n28	15	30	146600	80@40	DFT_BPSK	23.50	22.60
n28	15	30	146600	1@1	DFT_BPSK	23.50	22.73
n28	15	30	146600	1@158	DFT_BPSK	23.50	22.78
n28	15	30	146600	80@40	DFT_QPSK	23.50	22.62
n28	15	30	146600	1@1	DFT_QPSK	23.50	22.80

n28	15	30	146600	1@158	DFT_QPSK	23.50	22.74
n3	30	10	343000	12@6	DFT_BPSK	24.50	24.04
n3	30	10	343000	1@1	DFT_BPSK	24.50	24.04
n3	30	10	343000	1@22	DFT_BPSK	24.50	24.01
n3	30	10	343000	12@6	DFT_QPSK	24.50	23.97
n3	30	10	343000	1@1	DFT_QPSK	24.50	24.02
n3	30	10	343000	1@22	DFT_QPSK	24.50	23.92
n3	30	10	349500	12@6	DFT_BPSK	24.50	22.90
n3	30	10	349500	1@1	DFT_BPSK	24.50	23.03
n3	30	10	349500	1@22	DFT_BPSK	24.50	22.91
n3	30	10	349500	12@6	DFT_QPSK	24.50	21.06
n3	30	10	349500	1@1	DFT_QPSK	24.50	21.06
n3	30	10	349500	1@22	DFT_QPSK	24.50	21.01
n3	30	10	356000	12@6	DFT_BPSK	24.50	21.06
n3	30	10	356000	1@1	DFT_BPSK	24.50	20.92
n3	30	10	356000	1@22	DFT_BPSK	24.50	20.99
n3	30	10	356000	12@6	DFT_QPSK	24.50	21.11
n3	30	10	356000	1@1	DFT_QPSK	24.50	20.98
n3	30	10	356000	1@22	DFT_QPSK	24.50	21.00
n3	30	20	344000	25@12	DFT_BPSK	24.50	24.08
n3	30	20	344000	1@1	DFT_BPSK	24.50	23.96
n3	30	20	344000	1@49	DFT_BPSK	24.50	23.98
n3	30	20	344000	25@12	DFT_QPSK	24.50	24.00
n3	30	20	344000	1@1	DFT_QPSK	24.50	23.88
n3	30	20	344000	1@49	DFT_QPSK	24.50	23.84
n3	30	20	349500	25@12	DFT_BPSK	24.50	24.02
n3	30	20	349500	1@1	DFT_BPSK	24.50	24.01
n3	30	20	349500	1@49	DFT_BPSK	24.50	23.87
n3	30	20	349500	25@12	DFT_QPSK	24.50	24.09
n3	30	20	349500	1@1	DFT_QPSK	24.50	23.85
n3	30	20	349500	1@49	DFT_QPSK	24.50	23.81
n3	30	20	355000	25@12	DFT_BPSK	24.50	23.97
n3	30	20	355000	1@1	DFT_BPSK	24.50	23.85
n3	30	20	355000	1@49	DFT_BPSK	24.50	24.10
n3	30	20	355000	25@12	DFT_QPSK	24.50	24.08
n3	30	20	355000	1@1	DFT_QPSK	24.50	23.61
n3	30	20	355000	1@49	DFT_QPSK	24.50	23.87
n3	30	30	345000	36@18	DFT_BPSK	24.50	24.00
n3	30	30	345000	1@1	DFT_BPSK	24.50	23.91

n3	30	30	345000	1@76	DFT_BPSK	24.50	23.98
n3	30	30	345000	36@18	DFT_QPSK	24.50	23.92
n3	30	30	345000	1@1	DFT_QPSK	24.50	23.81
n3	30	30	345000	1@76	DFT_QPSK	24.50	23.74
n3	30	30	349500	36@18	DFT_BPSK	24.50	23.97
n3	30	30	349500	1@1	DFT_BPSK	24.50	23.93
n3	30	30	349500	1@76	DFT_BPSK	24.50	23.79
n3	30	30	349500	36@18	DFT_QPSK	24.50	23.95
n3	30	30	349500	1@1	DFT_QPSK	24.50	23.76
n3	30	30	349500	1@76	DFT_QPSK	24.50	23.72
n3	30	30	354000	36@18	DFT_BPSK	24.50	23.79
n3	30	30	354000	1@1	DFT_BPSK	24.50	23.76
n3	30	30	354000	1@76	DFT_BPSK	24.50	24.02
n3	30	30	354000	36@18	DFT_QPSK	24.50	20.93
n3	30	30	354000	1@1	DFT_QPSK	24.50	23.79
n3	30	30	354000	1@76	DFT_QPSK	24.50	20.91
n40	30	10	461000	12@6	DFT_BPSK	24.50	23.69
n40	30	10	461000	1@1	DFT_BPSK	24.50	23.60
n40	30	10	461000	1@22	DFT_BPSK	24.50	23.60
n40	30	10	461000	12@6	DFT_QPSK	24.50	23.63
n40	30	10	461000	1@1	DFT_QPSK	24.50	23.61
n40	30	10	461000	1@22	DFT_QPSK	24.50	23.62
n40	30	10	470000	12@6	DFT_BPSK	24.50	24.09
n40	30	10	470000	1@1	DFT_BPSK	24.50	24.04
n40	30	10	470000	1@22	DFT_BPSK	24.50	24.03
n40	30	10	470000	12@6	DFT_QPSK	24.50	24.03
n40	30	10	470000	1@1	DFT_QPSK	24.50	24.08
n40	30	10	470000	1@22	DFT_QPSK	24.50	24.08
n40	30	10	479000	12@6	DFT_BPSK	24.50	24.09
n40	30	10	479000	1@1	DFT_BPSK	24.50	23.95
n40	30	10	479000	1@22	DFT_BPSK	24.50	23.98
n40	30	10	479000	12@6	DFT_QPSK	24.50	24.01
n40	30	10	479000	1@1	DFT_QPSK	24.50	23.99
n40	30	10	479000	1@22	DFT_QPSK	24.50	24.06
n40	30	30	463000	36@18	DFT_BPSK	24.50	23.82
n40	30	30	463000	1@1	DFT_BPSK	24.50	23.85
n40	30	30	463000	1@76	DFT_BPSK	24.50	23.68
n40	30	30	463000	36@18	DFT_QPSK	24.50	23.80
n40	30	30	463000	1@1	DFT_QPSK	24.50	23.91

n40	30	30	463000	1@76	DFT_QPSK	24.50	23.72
n40	30	30	470000	36@18	DFT_BPSK	24.50	24.24
n40	30	30	470000	1@1	DFT_BPSK	24.50	24.07
n40	30	30	470000	1@76	DFT_BPSK	24.50	24.12
n40	30	30	470000	36@18	DFT_QPSK	24.50	24.21
n40	30	30	470000	1@1	DFT_QPSK	24.50	24.10
n40	30	30	470000	1@76	DFT_QPSK	24.50	24.19
n40	30	30	477000	36@18	DFT_BPSK	24.50	24.11
n40	30	30	477000	1@1	DFT_BPSK	24.50	24.18
n40	30	30	477000	1@76	DFT_BPSK	24.50	24.06
n40	30	30	477000	36@18	DFT_QPSK	24.50	24.07
n40	30	30	477000	1@1	DFT_QPSK	24.50	24.24
n40	30	30	477000	1@76	DFT_QPSK	24.50	24.08
n40	30	80	468000	108@54	DFT_BPSK	24.50	24.27
n40	30	80	468000	1@1	DFT_BPSK	24.50	24.25
n40	30	80	468000	1@215	DFT_BPSK	24.50	23.96
n40	30	80	468000	108@54	DFT_QPSK	24.50	24.20
n40	30	80	468000	1@1	DFT_QPSK	24.50	24.27
n40	30	80	468000	1@215	DFT_QPSK	24.50	24.01
n40	30	80	470000	108@54	DFT_BPSK	24.50	24.37
n40	30	80	470000	1@1	DFT_BPSK	24.50	24.11
n40	30	80	470000	1@215	DFT_BPSK	24.50	23.96
n40	30	80	470000	108@54	DFT_QPSK	24.50	24.32
n40	30	80	470000	1@1	DFT_QPSK	24.50	24.19
n40	30	80	470000	1@215	DFT_QPSK	24.50	24.01
n40	30	80	472000	108@54	DFT_BPSK	24.50	24.19
n40	30	80	472000	1@1	DFT_BPSK	24.50	23.95
n40	30	80	472000	1@215	DFT_BPSK	24.50	23.92
n40	30	80	472000	108@54	DFT_QPSK	24.50	24.21
n40	30	80	472000	1@1	DFT_QPSK	24.50	24.01
n40	30	80	472000	1@215	DFT_QPSK	24.50	23.96
n41	30	10	500202	12@6	DFT_BPSK	28.00	26.81
n41	30	10	500202	1@1	DFT_BPSK	28.00	26.90
n41	30	10	500202	1@22	DFT_BPSK	28.00	26.77
n41	30	10	500202	12@6	DFT_QPSK	28.00	27.00
n41	30	10	500202	1@1	DFT_QPSK	28.00	27.08
n41	30	10	500202	1@22	DFT_QPSK	28.00	26.90
n41	30	10	518598	12@6	DFT_BPSK	28.00	27.30
n41	30	10	518598	1@1	DFT_BPSK	28.00	27.28

n41	30	10	518598	1@22	DFT_BPSK	28.00	27.37
n41	30	10	518598	12@6	DFT_QPSK	28.00	27.41
n41	30	10	518598	1@1	DFT_QPSK	28.00	27.44
n41	30	10	518598	1@22	DFT_QPSK	28.00	27.52
n41	30	10	537000	12@6	DFT_BPSK	28.00	27.32
n41	30	10	537000	1@1	DFT_BPSK	28.00	27.17
n41	30	10	537000	1@22	DFT_BPSK	28.00	27.38
n41	30	10	537000	12@6	DFT_QPSK	28.00	27.43
n41	30	10	537000	1@1	DFT_QPSK	28.00	27.21
n41	30	10	537000	1@22	DFT_QPSK	28.00	27.43
n41	30	50	504204	64@32	DFT_BPSK	28.00	26.84
n41	30	50	504204	1@1	DFT_BPSK	28.00	26.99
n41	30	50	504204	1@131	DFT_BPSK	28.00	26.55
n41	30	50	504204	64@32	DFT_QPSK	28.00	26.85
n41	30	50	504204	1@1	DFT_QPSK	28.00	27.16
n41	30	50	504204	1@131	DFT_QPSK	28.00	26.72
n41	30	50	518598	64@32	DFT_BPSK	28.00	27.50
n41	30	50	518598	1@1	DFT_BPSK	28.00	26.90
n41	30	50	518598	1@131	DFT_BPSK	28.00	27.39
n41	30	50	518598	64@32	DFT_QPSK	28.00	27.51
n41	30	50	518598	1@1	DFT_QPSK	28.00	26.99
n41	30	50	518598	1@131	DFT_QPSK	28.00	27.47
n41	30	50	532998	64@32	DFT_BPSK	28.00	27.19
n41	30	50	532998	1@1	DFT_BPSK	28.00	26.75
n41	30	50	532998	1@131	DFT_BPSK	28.00	27.53
n41	30	50	532998	64@32	DFT_QPSK	28.00	27.21
n41	30	50	532998	1@1	DFT_QPSK	28.00	26.95
n41	30	50	532998	1@131	DFT_QPSK	28.00	27.76
n41	30	100	509202	135@67	DFT_BPSK	28.00	27.05
n41	30	100	509202	1@1	DFT_BPSK	28.00	27.13
n41	30	100	509202	1@271	DFT_BPSK	28.00	27.64
n41	30	100	509202	135@67	DFT_QPSK	28.00	27.06
n41	30	100	509202	1@1	DFT_QPSK	28.00	27.32
n41	30	100	509202	1@271	DFT_QPSK	28.00	27.89
n41	30	100	518598	135@67	DFT_BPSK	28.00	27.36
n41	30	100	518598	1@1	DFT_BPSK	28.00	26.53
n41	30	100	518598	1@271	DFT_BPSK	28.00	27.30
n41	30	100	518598	135@67	DFT_QPSK	28.00	27.39
n41	30	100	518598	1@1	DFT_QPSK	28.00	26.61

n41	30	100	518598	1@271	DFT_QPSK	28.00	27.46
n41	30	100	528000	135@67	DFT_BPSK	28.00	27.26
n41	30	100	528000	1@1	DFT_BPSK	28.00	27.24
n41	30	100	528000	1@271	DFT_BPSK	28.00	27.86
n41	30	100	528000	135@67	DFT_QPSK	28.00	27.30
n41	30	100	528000	1@1	DFT_QPSK	28.00	27.31
n41	30	100	528000	1@271	DFT_QPSK	28.00	27.95
n77	30	10	620334	12@6	DFT_BPSK	28.00	26.83
n77	30	10	620334	1@1	DFT_BPSK	28.00	26.93
n77	30	10	620334	1@22	DFT_BPSK	28.00	26.83
n77	30	10	620334	12@6	DFT_QPSK	28.00	26.95
n77	30	10	620334	1@1	DFT_QPSK	28.00	27.11
n77	30	10	620334	1@22	DFT_QPSK	28.00	27.02
n77	30	10	650000	12@6	DFT_BPSK	28.00	27.33
n77	30	10	650000	1@1	DFT_BPSK	28.00	27.22
n77	30	10	650000	1@22	DFT_BPSK	28.00	27.25
n77	30	10	650000	12@6	DFT_QPSK	28.00	27.40
n77	30	10	650000	1@1	DFT_QPSK	28.00	27.29
n77	30	10	650000	1@22	DFT_QPSK	28.00	27.33
n77	30	10	679666	12@6	DFT_BPSK	28.00	27.41
n77	30	10	679666	1@1	DFT_BPSK	28.00	27.33
n77	30	10	679666	1@22	DFT_BPSK	28.00	27.34
n77	30	10	679666	12@6	DFT_QPSK	28.00	27.43
n77	30	10	679666	1@1	DFT_QPSK	28.00	27.40
n77	30	10	679666	1@22	DFT_QPSK	28.00	27.41
n77	30	50	621668	64@32	DFT_BPSK	28.00	26.99
n77	30	50	621668	1@1	DFT_BPSK	28.00	26.96
n77	30	50	621668	1@131	DFT_BPSK	28.00	26.73
n77	30	50	621668	64@32	DFT_QPSK	28.00	27.03
n77	30	50	621668	1@1	DFT_QPSK	28.00	27.09
n77	30	50	621668	1@131	DFT_QPSK	28.00	26.81
n77	30	50	650000	64@32	DFT_BPSK	28.00	27.32
n77	30	50	650000	1@1	DFT_BPSK	28.00	27.06
n77	30	50	650000	1@131	DFT_BPSK	28.00	27.28
n77	30	50	650000	64@32	DFT_QPSK	28.00	27.33
n77	30	50	650000	1@1	DFT_QPSK	28.00	27.13
n77	30	50	650000	1@131	DFT_QPSK	28.00	27.29
n77	30	50	678332	64@32	DFT_BPSK	28.00	27.58
n77	30	50	678332	1@1	DFT_BPSK	28.00	27.44

n77	30	50	678332	1@131	DFT_BPSK	28.00	27.41
n77	30	50	678332	64@32	DFT_QPSK	28.00	27.59
n77	30	50	678332	1@1	DFT_QPSK	28.00	27.51
n77	30	50	678332	1@131	DFT_QPSK	28.00	27.45
n77	30	100	623334	135@67	DFT_BPSK	28.00	26.83
n77	30	100	623334	1@1	DFT_BPSK	28.00	26.95
n77	30	100	623334	1@271	DFT_BPSK	28.00	27.05
n77	30	100	623334	135@67	DFT_QPSK	28.00	26.86
n77	30	100	623334	1@1	DFT_QPSK	28.00	27.13
n77	30	100	623334	1@271	DFT_QPSK	28.00	27.19
n77	30	100	650000	135@67	DFT_BPSK	28.00	27.31
n77	30	100	650000	1@1	DFT_BPSK	28.00	27.10
n77	30	100	650000	1@271	DFT_BPSK	28.00	27.40
n77	30	100	650000	135@67	DFT_QPSK	28.00	27.27
n77	30	100	650000	1@1	DFT_QPSK	28.00	27.16
n77	30	100	650000	1@271	DFT_QPSK	28.00	27.47
n77	30	100	676666	135@67	DFT_BPSK	28.00	27.49
n77	30	100	676666	1@1	DFT_BPSK	28.00	27.42
n77	30	100	676666	1@271	DFT_BPSK	28.00	27.24
n77	30	100	676666	135@67	DFT_QPSK	28.00	27.49
n77	30	100	676666	1@1	DFT_QPSK	28.00	27.54
n77	30	100	676666	1@271	DFT_QPSK	28.00	27.33
n78	30	10	620334	12@6	DFT_BPSK	27.50	26.82
n78	30	10	620334	1@1	DFT_BPSK	27.50	26.97
n78	30	10	620334	1@22	DFT_BPSK	27.50	26.81
n78	30	10	620334	12@6	DFT_QPSK	27.50	26.97
n78	30	10	620334	1@1	DFT_QPSK	27.50	27.17
n78	30	10	620334	1@22	DFT_QPSK	27.50	27.02
n78	30	10	636666	12@6	DFT_BPSK	27.50	26.72
n78	30	10	636666	1@1	DFT_BPSK	27.50	26.72
n78	30	10	636666	1@22	DFT_BPSK	27.50	26.74
n78	30	10	636666	12@6	DFT_QPSK	27.50	26.80
n78	30	10	636666	1@1	DFT_QPSK	27.50	26.80
n78	30	10	636666	1@22	DFT_QPSK	27.50	26.82
n78	30	10	653000	12@6	DFT_BPSK	27.50	27.29
n78	30	10	653000	1@1	DFT_BPSK	27.50	27.20
n78	30	10	653000	1@22	DFT_BPSK	27.50	27.20
n78	30	10	653000	12@6	DFT_QPSK	27.50	27.27
n78	30	10	653000	1@1	DFT_QPSK	27.50	27.26

n78	30	10	653000	1@22	DFT_QPSK	27.50	27.28
n78	30	50	621668	64@32	DFT_BPSK	27.50	26.84
n78	30	50	621668	1@1	DFT_BPSK	27.50	27.01
n78	30	50	621668	1@131	DFT_BPSK	27.50	26.60
n78	30	50	621668	64@32	DFT_QPSK	27.50	26.92
n78	30	50	621668	1@1	DFT_QPSK	27.50	27.09
n78	30	50	621668	1@131	DFT_QPSK	27.50	26.72
n78	30	50	636666	64@32	DFT_BPSK	27.50	26.86
n78	30	50	636666	1@1	DFT_BPSK	27.50	26.96
n78	30	50	636666	1@131	DFT_BPSK	27.50	26.68
n78	30	50	636666	64@32	DFT_QPSK	27.50	26.89
n78	30	50	636666	1@1	DFT_QPSK	27.50	26.99
n78	30	50	636666	1@131	DFT_QPSK	27.50	26.73
n78	30	50	651666	64@32	DFT_BPSK	27.50	27.28
n78	30	50	651666	1@1	DFT_BPSK	27.50	26.98
n78	30	50	651666	1@131	DFT_BPSK	27.50	27.26
n78	30	50	651666	64@32	DFT_QPSK	27.50	27.28
n78	30	50	651666	1@1	DFT_QPSK	27.50	27.06
n78	30	50	651666	1@131	DFT_QPSK	27.50	27.29
n78	30	100	623334	135@67	DFT_BPSK	27.50	26.75
n78	30	100	623334	1@1	DFT_BPSK	27.50	26.90
n78	30	100	623334	1@271	DFT_BPSK	27.50	27.05
n78	30	100	623334	135@67	DFT_QPSK	27.50	26.78
n78	30	100	623334	1@1	DFT_QPSK	27.50	27.09
n78	30	100	623334	1@271	DFT_QPSK	27.50	27.18
n78	30	100	636666	135@67	DFT_BPSK	27.50	26.90
n78	30	100	636666	1@1	DFT_BPSK	27.50	27.14
n78	30	100	636666	1@271	DFT_BPSK	27.50	26.68
n78	30	100	636666	135@67	DFT_QPSK	27.50	26.90
n78	30	100	636666	1@1	DFT_QPSK	27.50	27.28
n78	30	100	636666	1@271	DFT_QPSK	27.50	26.83
n78	30	100	650000	135@67	DFT_BPSK	27.50	27.33
n78	30	100	650000	1@1	DFT_BPSK	27.50	27.06
n78	30	100	650000	1@271	DFT_BPSK	27.50	27.42
n78	30	100	650000	135@67	DFT_QPSK	27.50	27.30
n78	30	100	650000	1@1	DFT_QPSK	27.50	27.14
n78	30	100	650000	1@271	DFT_QPSK	27.50	27.50
n8	30	10	177000	12@6	DFT_BPSK	24.00	20.87
n8	30	10	177000	1@1	DFT_BPSK	24.00	20.83

n8	30	10	177000	1@22	DFT_BPSK	24.00	20.88
n8	30	10	177000	12@6	DFT_QPSK	24.00	20.90
n8	30	10	177000	1@1	DFT_QPSK	24.00	20.90
n8	30	10	177000	1@22	DFT_QPSK	24.00	20.86
n8	30	10	179500	12@6	DFT_BPSK	24.00	20.83
n8	30	10	179500	1@1	DFT_BPSK	24.00	20.81
n8	30	10	179500	1@22	DFT_BPSK	24.00	20.80
n8	30	10	179500	12@6	DFT_QPSK	24.00	20.75
n8	30	10	179500	1@1	DFT_QPSK	24.00	20.90
n8	30	10	179500	1@22	DFT_QPSK	24.00	20.80
n8	30	10	182000	12@6	DFT_BPSK	24.00	20.84
n8	30	10	182000	1@1	DFT_BPSK	24.00	20.74
n8	30	10	182000	1@22	DFT_BPSK	24.00	20.76
n8	30	10	182000	12@6	DFT_QPSK	24.00	20.74
n8	30	10	182000	1@1	DFT_QPSK	24.00	20.78
n8	30	10	182000	1@22	DFT_QPSK	24.00	20.81
n8	30	15	177500	18@9	DFT_BPSK	24.00	23.92
n8	30	15	177500	1@1	DFT_BPSK	24.00	23.70
n8	30	15	177500	1@36	DFT_BPSK	24.00	23.75
n8	30	15	177500	18@9	DFT_QPSK	24.00	23.75
n8	30	15	177500	1@1	DFT_QPSK	24.00	23.71
n8	30	15	177500	1@36	DFT_QPSK	24.00	23.76
n8	30	15	179500	18@9	DFT_BPSK	24.00	23.73
n8	30	15	179500	1@1	DFT_BPSK	24.00	23.69
n8	30	15	179500	1@36	DFT_BPSK	24.00	23.73
n8	30	15	179500	18@9	DFT_QPSK	24.00	22.80
n8	30	15	179500	1@1	DFT_QPSK	24.00	22.77
n8	30	15	179500	1@36	DFT_QPSK	24.00	20.85
n8	30	15	181500	18@9	DFT_BPSK	24.00	20.95
n8	30	15	181500	1@1	DFT_BPSK	24.00	20.72
n8	30	15	181500	1@36	DFT_BPSK	24.00	20.83
n8	30	15	181500	18@9	DFT_QPSK	24.00	20.81
n8	30	15	181500	1@1	DFT_QPSK	24.00	20.89
n8	30	15	181500	1@36	DFT_QPSK	24.00	20.79
n8	30	20	178000	25@12	DFT_BPSK	24.00	23.79
n8	30	20	178000	1@1	DFT_BPSK	24.00	23.70
n8	30	20	178000	1@49	DFT_BPSK	24.00	23.78
n8	30	20	178000	25@12	DFT_QPSK	24.00	23.83
n8	30	20	178000	1@1	DFT_QPSK	24.00	23.77

n8	30	20	178000	1@49	DFT_QPSK	24.00	23.80
n8	30	20	179500	25@12	DFT_BPSK	24.00	20.84
n8	30	20	179500	1@1	DFT_BPSK	24.00	20.79
n8	30	20	179500	1@49	DFT_BPSK	24.00	20.79
n8	30	20	179500	25@12	DFT_QPSK	24.00	20.89
n8	30	20	179500	1@1	DFT_QPSK	24.00	20.82
n8	30	20	179500	1@49	DFT_QPSK	24.00	20.89
n8	30	20	181000	25@12	DFT_BPSK	24.00	20.87
n8	30	20	181000	1@1	DFT_BPSK	24.00	20.81
n8	30	20	181000	1@49	DFT_BPSK	24.00	20.83
n8	30	20	181000	25@12	DFT_QPSK	24.00	20.86
n8	30	20	181000	1@1	DFT_QPSK	24.00	20.82
n8	30	20	181000	1@49	DFT_QPSK	24.00	20.89

7.5. WLAN & Bluetooth Output Power

Mode	Channel	Frequency (MHz)	Tune-up	Output Power (dBm)
802.11b	1	2412	14.50	13.88
	7	2442	14.50	14.02
	13	2472	14.50	13.45
802.11g	1	2412	13.00	12.90
	7	2442	13.00	12.99
	13	2472	13.00	12.62
802.11n (HT20)	1	2412	11.00	10.87
	7	2442	11.00	10.69
	13	2472	11.00	10.40
802.11n (HT40)	3	2422	11.00	10.79
	7	2442	11.00	10.95
	11	2462	11.00	10.60

NOTE: Power measurement results of WLAN 2.4G.

Mode	Channel	Frequency (MHz)	Tune-up	Output Power (dBm)
802.11a	36	5180	9.00	8.77
	40	5200	9.00	8.28
	48	5240	9.00	8.20
802.11n HT20	36	5180	9.00	8.77
	40	5200	9.00	8.57
	48	5240	9.00	8.40

802.11n HT40	38	5190	9.00	8.69
	46	5230	9.00	7.78
802.11ac VHT20	36	5180	9.00	8.90
	40	5200	9.00	8.31
	48	5240	9.00	8.23
802.11ac VHT40	38	5190	9.00	9.00
	46	5230	9.00	8.77
802.11ac VHT80	42	5210	9.00	8.91

NOTE: Power measurement results of WLAN 5.2G. Refer to EN 62479, the available power of this EUT is 9.00dBm (7.94mW), the power is less than the low-power exclusion level defined in 4.2 (P max: 20mW), So WLAN 5.2G stand-alone SAR is not required

Mode	Channel	Frequency (MHz)	Tune-up	Output Power (dBm)
802.11a	149	5745	9.50	8.65
	157	5785	9.50	9.37
	165	5825	9.50	9.33
802.11n HT20	149	5745	9.50	8.84
	157	5785	9.50	9.22
	165	5825	9.50	9.18
802.11n HT40	151	5755	9.50	9.11
	159	5795	9.50	9.47
802.11ac VHT20	149	5745	9.50	8.67
	157	5785	9.50	9.19
	165	5825	9.50	9.13
802.11ac VHT40	151	5755	9.50	9.02
	159	5795	9.50	9.32
802.11ac VHT80	155	5775	9.00	9.00

NOTE: Power measurement results of WLAN 5.8G. Refer to EN 62479, the available power of this EUT is 9.50dBm (8.91mW), the power is less than the low-power exclusion level defined in 4.2 (P max: 20mW), So WLAN 5.8G stand-alone SAR is not required

	Data Rates	Tune - up(dBm)	Output Power (dBm)
BR+EDR	GFSK DH5	6.50	6.06
	Pi/4 DQPSK DH5	3.50	3.41
	8DPSK DH5	6.00	5.69

BLE	Channel	Tune - up	Output Power (dBm)	
			1M	2M
	0CH	-1.00	-1.92	-1.60
	19CH	-1.00	-1.72	-1.74
	39CH	-1.00	-1.65	-1.93

NOTE: Power measurement results of Bluetooth. Refer to EN 62479, the available power of this EUT is 6.50dBm (4.47mW), the power is less than the low-power exclusion level defined in 4.2 (P max: 20mW), So Bluetooth stand-alone SAR is not required

8. Assessment of the compliance of low power equipment

According to EN 62479 Clause 4.1& 4.2, these require does not apply to the receivers that has no transmit. So, GPS and FM is compliance.

9. SAR Results

9.1. SAR measurement results

9.1.1. SAR measurement Result of GSM900

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	38/897.6	GPRS(GMSK 3TS)	0	1.409	0.939	-0.74	31.02	30.89	0.911	2025/1/31
Left Tilt 15 Degree	38/897.6	GPRS(GMSK 3TS)	0	0.843	0.562	0.24	31.02	30.89	0.545	2025/1/31
Right Cheek	38/897.6	GPRS(GMSK 3TS)	0	1.309	0.855	-0.45	31.02	30.89	0.830	2025/1/31
Right Tilt 15 Degree	38/897.6	GPRS(GMSK 3TS)	0	0.640	0.405	-4.09	31.02	30.89	0.393	2025/1/31
Left Cheek	975/880.2	GPRS(GMSK 3TS)	0	1.266	0.810	3.26	30.89	30.89	0.810	2025/1/31
Left Cheek	124/914.8	GPRS(GMSK 3TS)	0	1.299	0.857	-1.72	30.96	30.89	0.843	2025/1/31
Extremity										
Front Side	38/897.6	GPRS(GMSK	0	3.124	1.558	0.95	31.02	30.89	1.512	2025/1/31

		3TS)								
Back Side	38/897.6	GPRS(GMSK 3TS)	0	2.655	1.324	3.80	31.02	30.89	1.285	2025/1/31
Left Side	38/897.6	GPRS(GMSK 3TS)	0	0.781	0.386	-0.41	31.02	30.89	0.375	2025/1/31
Right Side	38/897.6	GPRS(GMSK 3TS)	0	0.937	0.444	2.24	31.02	30.89	0.431	2025/1/31
Top Side	38/897.6	GPRS(GMSK 3TS)	0	1.843	0.873	-3.07	31.02	30.89	0.847	2025/1/31
Bottom Side	38/897.6	GPRS(GMSK 3TS)	0	0.062	0.031	-0.88	31.02	30.89	0.030	2025/1/31
Front Side	975/880.2	GPRS(GMSK 3TS)	0	2.812	1.332	3.86	30.89	30.89	1.332	2025/1/31
Front Side	124/914.8	GPRS(GMSK 3TS)	0	2.905	1.391	3.65	30.96	30.89	1.369	2025/1/31
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	38/897.6	GPRS(GMSK 3TS)	5	1.375	0.686	-2.01	31.02	30.89	0.666	2025/1/31

9.1.2. SAR measurement Result of GSM1800

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	698/1747.4	GPRS(GMSK 4TS)	0	1.442	0.853	-2.39	26.38	26.50	0.877	2025/1/24
Left Tilt 15 Degree	698/1747.4	GPRS(GMSK 4TS)	0	0.785	0.460	5.16	26.38	26.50	0.473	2025/1/24
Right Cheek	698/1747.4	GPRS(GMSK 4TS)	0	1.304	0.756	-2.94	26.38	26.50	0.777	2025/1/24
Right Tilt 15 Degree	698/1747.4	GPRS(GMSK 4TS)	0	0.600	0.355	4.25	26.38	26.50	0.365	2025/1/24
Left Cheek	512/1710.2	GPRS(GMSK 4TS)	0	1.264	0.725	-4.35	26.43	26.50	0.737	2025/1/24
Left Cheek	885/1784.8	GPRS(GMSK 4TS)	0	1.326	0.777	2.00	26.33	26.50	0.808	2025/1/24
Extremity										
Front Side	698/1747.4	GPRS(GMSK	0	4.331	2.093	0.88	26.38	26.50	2.152	2025/1/24

		4TS)								
Back Side	698/1747.4	GPRS(GMSK 4TS)	0	2.599	1.206	3.80	26.38	26.50	1.240	2025/1/24
Left Side	698/1747.4	GPRS(GMSK 4TS)	0	2.079	0.985	1.82	26.38	26.50	1.013	2025/1/24
Right Side	698/1747.4	GPRS(GMSK 4TS)	0	0.433	0.207	3.70	26.38	26.50	0.213	2025/1/24
Top Side	698/1747.4	GPRS(GMSK 4TS)	0	1.386	0.663	-1.39	26.38	26.50	0.682	2025/1/24
Bottom Side	698/1747.4	GPRS(GMSK 4TS)	0	0.260	0.121	-0.79	26.38	26.50	0.124	2025/1/24
Front Side	512/1710.2	GPRS(GMSK 4TS)	0	3.898	1.846	3.31	26.43	26.50	1.876	2025/1/24
Front Side	885/1784.8	GPRS(GMSK 4TS)	0	4.071	1.889	-0.77	26.33	26.50	1.964	2025/1/24
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	698/1747.4	GPRS(GMSK 4TS)	5	1.776	0.815	-0.78	26.38	26.50	0.838	2025/1/24

9.1.3. SAR measurement Result of WCDMA Band 1

Test Position	Test channel /Freq	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	9750/1950	RMC12.2K	0	1.125	0.669	-0.52	23.21	23.50	0.715	2025/2/01
Left Tilt 15 Degree	9750/1950	RMC12.2K	0	0.631	0.356	3.77	23.21	23.50	0.381	2025/2/01
Right Cheek	9750/1950	RMC12.2K	0	0.967	0.552	1.65	23.21	23.50	0.590	2025/2/01
Right Tilt 15 Degree	9750/1950	RMC12.2K	0	0.474	0.271	1.01	23.21	23.50	0.290	2025/2/01
Left Cheek	9612/1922.4	RMC12.2K	0	0.986	0.563	-0.71	23.25	23.50	0.596	2025/2/01
Left Cheek	9888/1977.6	RMC12.2K	0	0.974	0.556	4.28	23.14	23.50	0.604	2025/2/01
Extremity										
Front Side	9750/1950	RMC12.2K	0	3.601	1.802	0.15	23.21	23.50	1.926	2025/2/01
Back Side	9750/1950	RMC12.2K	0	2.053	1.027	3.66	23.21	23.50	1.098	2025/2/01
Left Side	9750/1950	RMC12.2K	0	1.801	0.856	-3.64	23.21	23.50	0.915	2025/2/01
Right Side	9750/1950	RMC12.2K	0	0.432	0.212	1.81	23.21	23.50	0.227	2025/2/01
Top Side	9750/1950	RMC12.2K	0	1.224	0.613	2.72	23.21	23.50	0.655	2025/2/01
Bottom Side	9750/1950	RMC12.2K	0	0.180	0.086	-2.96	23.21	23.50	0.092	2025/2/01

Front Side	9612/1922.4	RMC12.2K	0	3.241	1.589	0.04	23.25	23.50	1.683	2025/2/01
Front Side	9888/1977.6	RMC12.2K	0	3.385	1.609	-0.53	23.14	23.50	1.748	2025/2/01
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	9750/1950	RMC12.2K	5	1.512	0.741	1.47	23.21	23.50	0.792	2025/2/01

9.1.4. SAR measurement Result of WCDMA Band 8

Test Position	Test channel /Freq	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	2788/897.6	RMC12.2K	0	0.567	0.410	-1.73	22.71	23.00	0.438	2025/1/31
Left Tilt 15 Degree	2788/897.6	RMC12.2K	0	0.310	0.222	-1.65	22.71	23.00	0.237	2025/1/31
Right Cheek	2788/897.6	RMC12.2K	0	0.485	0.333	3.35	22.71	23.00	0.356	2025/1/31
Right Tilt 15 Degree	2788/897.6	RMC12.2K	0	0.250	0.177	-0.35	22.71	23.00	0.189	2025/1/31
Left Cheek	2712/882.4	RMC12.2K	0	0.492	0.352	1.01	22.70	23.00	0.377	2025/1/31
Left Cheek	2863/912.6	RMC12.2K	0	0.519	0.372	-1.86	22.69	23.00	0.400	2025/1/31
Extremity										
Front Side	2788/897.6	RMC12.2K	0	1.648	0.823	0.31	22.71	23.00	0.880	2025/1/31
Back Side	2788/897.6	RMC12.2K	0	1.450	0.695	1.36	22.71	23.00	0.743	2025/1/31
Left Side	2788/897.6	RMC12.2K	0	0.379	0.187	-0.81	22.71	23.00	0.200	2025/1/31
Right Side	2788/897.6	RMC12.2K	0	0.544	0.261	-0.22	22.71	23.00	0.279	2025/1/31
Top Side	2788/897.6	RMC12.2K	0	0.956	0.463	2.83	22.71	23.00	0.495	2025/1/31
Bottom Side	2788/897.6	RMC12.2K	0	0.016	0.014	2.99	22.71	23.00	0.015	2025/1/31
Front Side	2712/882.4	RMC12.2K	0	1.533	0.735	3.23	22.70	23.00	0.788	2025/1/31
Front Side	2863/912.6	RMC12.2K	0	1.582	0.751	0.09	22.69	23.00	0.807	2025/1/31
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	2788/897.6	RMC12.2K	5	0.659	0.313	1.19	22.71	23.00	0.335	2025/1/31

9.1.5. SAR measurement Result of LTE Band 1

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	18300/1950	20M QPSK(1,0)	0	1.463	0.875	0.03	23.97	24.50	0.989	2025/2/01
Left Tilt 15	18300/1950	20M	0	0.846	0.506	1.98	23.97	24.50	0.572	2025/2/01

Degree		QPSK(1,0)								
Right Cheek	18300/1950	20M QPSK(1,0)	0	1.324	0.768	4.49	23.97	24.50	0.868	2025/2/01
Right Tilt 15 Degree	18300/1950	20M QPSK(1,0)	0	0.625	0.366	0.99	23.97	24.50	0.414	2025/2/01
Left Cheek	18100/1930	20M QPSK(1,0)	0	1.388	0.805	-2.39	24.06	24.50	0.891	2025/2/01
Left Cheek	18500/1970	20M QPSK(1,0)	0	1.279	0.734	0.01	23.75	24.50	0.872	2025/2/01
Extremity										
Front Side	18300/1950	20M QPSK(1,0)	0	3.256	1.636	-0.12	23.97	24.50	1.848	2025/2/01
Back Side	18300/1950	20M QPSK(1,0)	0	1.921	0.965	-0.62	23.97	24.50	1.090	2025/2/01
Left Side	18300/1950	20M QPSK(1,0)	0	1.595	0.761	-3.22	23.97	24.50	0.860	2025/2/01
Right Side	18300/1950	20M QPSK(1,0)	0	0.391	0.187	-0.70	23.97	24.50	0.211	2025/2/01
Top Side	18300/1950	20M QPSK(1,0)	0	1.107	0.534	-1.37	23.97	24.50	0.603	2025/2/01
Bottom Side	18300/1950	20M QPSK(1,0)	0	0.098	0.049	1.71	23.97	24.50	0.055	2025/2/01
Front Side	18100/1930	20M QPSK(1,0)	0	3.093	1.507	-0.52	24.06	24.50	1.668	2025/2/01
Front Side	18500/1970	20M QPSK(1,0)	0	3.093	1.492	-1.33	23.75	24.50	1.773	2025/2/01
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	18300/1950	20M QPSK(1,0)	5	0.807	0.389	-3.75	23.97	24.50	0.439	2025/2/01

9.1.6. SAR measurement Result of LTE Band 3

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	19575/1747.5	20M QPSK(1,0)	0	1.629	1.020	-0.18	24.12	24.50	1.113	2025/1/24
Left Tilt 15	19575/1747.5	20M	0	0.889	0.529	-2.84	24.12	24.50	0.577	2025/1/24

Degree		QPSK(1,0)								
Right Cheek	19575/1747.5	20M QPSK(1,0)	0	1.451	0.872	-1.89	24.12	24.50	0.952	2025/1/24
Right Tilt 15 Degree	19575/1747.5	20M QPSK(1,0)	0	0.796	0.493	3.85	24.12	24.50	0.538	2025/1/24
Left Cheek	19300/1720	20M QPSK(1,0)	0	1.423	0.846	-2.24	24.12	24.50	0.923	2025/1/24
Left Cheek	19850/1775	20M QPSK(1,0)	0	1.504	0.913	2.54	24.13	24.50	0.994	2025/1/24
Extremity										
Front Side	19575/1747.5	20M QPSK(1,0)	0	4.203	2.188	0.21	24.12	24.50	2.388	2025/1/24
Back Side	19575/1747.5	20M QPSK(1,0)	0	2.564	1.321	-2.88	24.12	24.50	1.442	2025/1/24
Left Side	19575/1747.5	20M QPSK(1,0)	0	2.017	1.008	2.73	24.12	24.50	1.100	2025/1/24
Right Side	19575/1747.5	20M QPSK(1,0)	0	0.630	0.318	-0.53	24.12	24.50	0.347	2025/1/24
Top Side	19575/1747.5	20M QPSK(1,0)	0	1.345	0.679	-2.48	24.12	24.50	0.741	2025/1/24
Bottom Side	19575/1747.5	20M QPSK(1,0)	0	0.126	0.062	3.03	24.12	24.50	0.068	2025/1/24
Front Side	19300/1720	20M QPSK(1,0)	0	3.909	1.933	2.13	24.12	24.50	2.110	2025/1/24
Front Side	19850/1775	20M QPSK(1,0)	0	4.077	2.059	-3.80	24.13	24.50	2.242	2025/1/24
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	19575/1747.5	20M QPSK(1,0)	5	1.077	0.538	3.78	24.12	24.50	0.587	2025/1/24

9.1.7. SAR measurement Result of LTE Band 7

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	21100/2535	20M QPSK(1,0)	0	3.046	1.218	1.01	24.02	24.50	1.360	2025/1/28
Left Tilt 15 Degree	21100/2535	20M QPSK(1,0)	0	1.770	0.708	-3.42	24.02	24.50	0.791	2025/1/28

Right Cheek	21100/2535	20M QPSK(1,0)	0	2.682	1.019	-1.01	24.02	24.50	1.138	2025/1/28
Right Tilt 15 Degree	21100/2535	20M QPSK(1,0)	0	1.240	0.481	-3.79	24.02	24.50	0.537	2025/1/28
Left Cheek	20850/2510	20M QPSK(1,0)	0	2.736	1.094	-0.45	24.21	24.50	1.170	2025/1/28
Left Cheek	21350/2560	20M QPSK(1,0)	0	2.799	1.119	-2.14	24.03	24.50	1.247	2025/1/28
Extremity										
Front Side	21100/2535	20M QPSK(1,0)	0	6.159	2.162	-0.22	24.02	24.50	2.415	2025/1/28
Back Side	21100/2535	20M QPSK(1,0)	0	3.880	1.348	-1.42	24.02	24.50	1.506	2025/1/28
Left Side	21100/2535	20M QPSK(1,0)	0	1.047	0.368	-0.51	24.02	24.50	0.411	2025/1/28
Right Side	21100/2535	20M QPSK(1,0)	0	0.062	0.021	1.40	24.02	24.50	0.023	2025/1/28
Top Side	21100/2535	20M QPSK(1,0)	0	4.681	1.577	0.87	24.02	24.50	1.761	2025/1/28
Bottom Side	21100/2535	20M QPSK(1,0)	0	0.370	0.125	-3.04	24.02	24.50	0.140	2025/1/28
Front Side	20850/2510	20M QPSK(1,0)	0	5.543	1.848	-0.42	24.21	24.50	1.976	2025/1/28
Front Side	21350/2560	20M QPSK(1,0)	0	5.913	2.055	-1.26	24.03	24.50	2.290	2025/1/28
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	21100/2535	20M QPSK(1,0)	5	2.587	0.899	3.56	24.02	24.50	1.004	2025/1/28

9.1.8. SAR measurement Result of LTE Band 8

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	21625/897.5	10M QPSK(1,0)	0	0.997	0.670	-0.38	24.17	24.50	0.723	2025/1/31
Left Tilt 15 Degree	21625/897.5	10M QPSK(1,0)	0	0.571	0.384	1.42	24.17	24.50	0.414	2025/1/31
Right Cheek	21625/897.5	10M	0	0.938	0.618	3.62	24.17	24.50	0.667	2025/1/31

		QPSK(1,0)								
Right Tilt 15 Degree	21625/897.5	10M QPSK(1,0)	0	0.475	0.306	0.30	24.17	24.50	0.330	2025/1/31
Left Cheek	21500/885	10M QPSK(1,0)	0	0.912	0.601	2.95	24.24	24.50	0.638	2025/1/31
Left Cheek	21750/910	10M QPSK(1,0)	0	0.854	0.562	3.04	24.21	24.50	0.601	2025/1/31
Extremity										
Front Side	21625/897.5	10M QPSK(1,0)	0	1.772	0.921	0.01	24.17	24.50	0.994	2025/1/31
Back Side	21625/897.5	10M QPSK(1,0)	0	1.577	0.779	2.73	24.17	24.50	0.840	2025/1/31
Left Side	21625/897.5	10M QPSK(1,0)	0	0.443	0.226	2.41	24.17	24.50	0.244	2025/1/31
Right Side	21625/897.5	10M QPSK(1,0)	0	0.567	0.283	1.28	24.17	24.50	0.305	2025/1/31
Top Side	21625/897.5	10M QPSK(1,0)	0	1.010	0.514	-3.55	24.17	24.50	0.555	2025/1/31
Bottom Side	21625/897.5	10M QPSK(1,0)	0	0.053	0.026	2.70	24.17	24.50	0.028	2025/1/31
Front Side	21500/885	10M QPSK(1,0)	0	1.630	0.830	-0.82	24.24	24.50	0.881	2025/1/31
Front Side	21750/910	10M QPSK(1,0)	0	1.666	0.866	-2.96	24.21	24.50	0.926	2025/1/31
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	21625/897.5	10M QPSK(1,0)	5	0.797	0.414	-1.39	24.17	24.50	0.447	2025/1/31

9.1.9. SAR measurement Result of LTE Band 20

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	24300/847	20M QPSK(1,0)	0	0.931	0.640	-0.46	24.19	24.50	0.687	2025/1/31
Left Tilt 15 Degree	24300/847	20M QPSK(1,0)	0	0.475	0.323	3.16	24.19	24.50	0.347	2025/1/31
Right Cheek	24300/847	20M QPSK(1,0)	0	0.844	0.557	-1.90	24.19	24.50	0.598	2025/1/31

Right Tilt 15 Degree	24300/847	20M QPSK(1,0)	0	0.380	0.256	3.15	24.19	24.50	0.275	2025/1/31
Left Cheek	24250/842	20M QPSK(1,0)	0	0.812	0.547	-4.60	24.28	24.50	0.575	2025/1/31
Left Cheek	24350/852	20M QPSK(1,0)	0	0.851	0.573	4.35	24.12	24.50	0.625	2025/1/31
Extremity										
Front Side	24300/847	20M QPSK(1,0)	0	1.865	0.962	0.49	24.19	24.50	1.033	2025/1/31
Back Side	24300/847	20M QPSK(1,0)	0	1.641	0.830	0.41	24.19	24.50	0.891	2025/1/31
Left Side	24300/847	20M QPSK(1,0)	0	0.448	0.224	-2.82	24.19	24.50	0.241	2025/1/31
Right Side	24300/847	20M QPSK(1,0)	0	0.634	0.320	3.29	24.19	24.50	0.344	2025/1/31
Top Side	24300/847	20M QPSK(1,0)	0	1.063	0.526	3.39	24.19	24.50	0.565	2025/1/31
Bottom Side	24300/847	20M QPSK(1,0)	0	0.019	0.017	-2.52	24.19	24.50	0.018	2025/1/31
Front Side	24250/842	20M QPSK(1,0)	0	1.734	0.859	-1.51	24.28	24.50	0.904	2025/1/31
Front Side	24350/852	20M QPSK(1,0)	0	1.734	0.894	1.51	24.12	24.50	0.976	2025/1/31
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	24300/847	20M QPSK(1,0)	5	0.746	0.366	-2.27	24.19	24.50	0.393	2025/1/31

9.1.10. SAR measurement Result of LTE Band 28

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	27460/728	20M QPSK(1,0)	0	0.571	0.402	-1.00	24.36	24.50	0.415	2025/1/21
Left Tilt 15 Degree	27460/728	20M QPSK(1,0)	0	0.305	0.204	3.23	24.36	24.50	0.211	2025/1/21
Right Cheek	27460/728	20M QPSK(1,0)	0	0.517	0.364	0.38	24.36	24.50	0.376	2025/1/21
Right Tilt 15 Degree	27460/728	20M	0	0.245	0.172	4.10	24.36	24.50	0.178	2025/1/21

		QPSK(1,0)								
Left Cheek	27310/713	20M QPSK(1,0)	0	0.497	0.336	-0.39	24.24	24.50	0.357	2025/1/21
Left Cheek	27560/738	20M QPSK(1,0)	0	0.528	0.372	-3.47	24.41	24.50	0.380	2025/1/21
Extremity										
Front Side	27460/728	20M QPSK(1,0)	0	1.930	1.008	-0.93	24.36	24.50	1.041	2025/1/21
Back Side	27460/728	20M QPSK(1,0)	0	1.698	0.869	3.71	24.36	24.50	0.897	2025/1/21
Left Side	27460/728	20M QPSK(1,0)	0	0.425	0.215	2.96	24.36	24.50	0.222	2025/1/21
Right Side	27460/728	20M QPSK(1,0)	0	0.579	0.302	3.63	24.36	24.50	0.312	2025/1/21
Top Side	27460/728	20M QPSK(1,0)	0	1.081	0.559	-2.13	24.36	24.50	0.577	2025/1/21
Bottom Side	27460/728	20M QPSK(1,0)	0	0.058	0.030	1.80	24.36	24.50	0.031	2025/1/21
Front Side	27310/713	20M QPSK(1,0)	0	1.795	0.900	1.96	24.24	24.50	0.956	2025/1/21
Front Side	27560/738	20M QPSK(1,0)	0	1.834	0.929	1.14	24.41	24.50	0.948	2025/1/21
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	27460/728	20M QPSK(1,0)	5	0.849	0.443	-2.78	24.36	24.50	0.458	2025/1/21

9.1.11. SAR measurement Result of LTE Band 40

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	39150/2350	20M QPSK(1,0)	0	2.503	0.989	0.95	21.79	23.00	1.307	2025/2/12
Left Tilt 15 Degree	39150/2350	20M QPSK(1,0)	0	1.429	0.559	2.53	21.79	23.00	0.739	2025/2/12
Right Cheek	39150/2350	20M QPSK(1,0)	0	2.176	0.851	-2.07	21.79	23.00	1.124	2025/2/12
Right Tilt 15 Degree	39150/2350	20M QPSK(1,0)	0	1.150	0.445	0.41	21.79	23.00	0.588	2025/2/12

Left Cheek	38750/2310	20M QPSK(1,0)	0	2.192	0.857	1.43	22.77	23.00	0.904	2025/2/12
Left Cheek	39550/2390	20M QPSK(1,0)	0	2.251	0.872	4.41	21.93	23.00	1.116	2025/2/12
Extremity										
Front Side	39150/2350	20M QPSK(1,0)	0	4.329	1.610	4.35	21.79	23.00	2.127	2025/2/12
Back Side	39150/2350	20M QPSK(1,0)	0	2.814	1.015	-1.61	21.79	23.00	1.341	2025/2/12
Left Side	39150/2350	20M QPSK(1,0)	0	0.693	0.253	-3.56	21.79	23.00	0.334	2025/2/12
Right Side	39150/2350	20M QPSK(1,0)	0	0.130	0.047	3.32	21.79	23.00	0.062	2025/2/12
Top Side	39150/2350	20M QPSK(1,0)	0	3.377	1.256	-0.97	21.79	23.00	1.660	2025/2/12
Bottom Side	39150/2350	20M QPSK(1,0)	0	0.087	0.031	0.93	21.79	23.00	0.041	2025/2/12
Front Side	38750/2310	20M QPSK(1,0)	0	4.113	1.499	1.48	22.77	23.00	1.581	2025/2/12
Front Side	39550/2390	20M QPSK(1,0)	0	4.113	1.468	3.28	21.93	23.00	1.878	2025/2/12
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	39150/2350	20M QPSK(1,0)	5	1.775	0.660	3.70	21.79	23.00	0.872	2025/2/12

9.1.12. SAR measurement Result of LTE Band 41

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	40620/2593	20M QPSK(1,0)	0	0.828	0.405	4.01	26.46	27.00	0.459	2025/1/28
Left Tilt 15 Degree	40620/2593	20M QPSK(1,0)	0	0.464	0.225	-0.35	26.46	27.00	0.255	2025/1/28
Right Cheek	40620/2593	20M QPSK(1,0)	0	0.750	0.363	-0.73	26.46	27.00	0.411	2025/1/28
Right Tilt 15 Degree	40620/2593	20M QPSK(1,0)	0	0.383	0.178	1.38	26.46	27.00	0.202	2025/1/28
Left Cheek	39750/2506	20M	0	0.785	0.372	0.18	26.27	27.00	0.440	2025/1/28

		QPSK(1,0)								
Left Cheek	41490/2680	20M QPSK(1,0)	0	0.720	0.352	2.30	26.50	27.00	0.395	2025/1/28
Extremity										
Front Side	40620/2593	20M QPSK(1,0)	0	2.695	1.044	0.38	26.46	27.00	1.182	2025/1/28
Back Side	40620/2593	20M QPSK(1,0)	0	1.698	0.625	-0.46	26.46	27.00	0.708	2025/1/28
Left Side	40620/2593	20M QPSK(1,0)	0	0.404	0.150	0.56	26.46	27.00	0.170	2025/1/28
Right Side	40620/2593	20M QPSK(1,0)	0	0.054	0.020	3.08	26.46	27.00	0.023	2025/1/28
Top Side	40620/2593	20M QPSK(1,0)	0	2.075	0.764	-2.91	26.46	27.00	0.865	2025/1/28
Bottom Side	40620/2593	20M QPSK(1,0)	0	0.081	0.031	-3.06	26.46	27.00	0.035	2025/1/28
Front Side	39750/2506	20M QPSK(1,0)	0	2.426	0.912	-3.78	26.27	27.00	1.079	2025/1/28
Front Side	41490/2680	20M QPSK(1,0)	0	2.587	0.972	-0.28	26.50	27.00	1.091	2025/1/28
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	40620/2593	20M QPSK(1,0)	5	1.132	0.439	2.54	26.46	27.00	0.497	2025/1/28

9.1.13. SAR measurement Result of NR SA n1

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	390000/1950	30kHz 50M QPSK(1,1)	0	0.070	0.047	3.41	23.76	24.50	0.056	2025/2/01
Left Tilt 15 Degree	390000/1950	30kHz 50M QPSK(1,1)	0	0.041	0.027	3.96	23.76	24.50	0.032	2025/2/01
Right Cheek	390000/1950	30kHz 50M QPSK(1,1)	0	0.064	0.042	-4.93	23.76	24.50	0.050	2025/2/01
Right Tilt 15 Degree	390000/1950	30kHz 50M QPSK(1,1)	0	0.031	0.020	-1.54	23.76	24.50	0.024	2025/2/01
Left Cheek	389000/1945	30kHz 50M QPSK(1,1)	0	0.065	0.043	3.83	23.76	24.50	0.051	2025/2/01

Left Cheek	391000/1955	30kHz 50M QPSK(1,1)	0	0.050	0.035	-4.29	22.77	24.50	0.052	2025/2/01
Extremity										
Front Side	390000/1950	30kHz 50M QPSK(1,1)	0	1.239	0.510	1.11	23.76	24.50	0.605	2025/2/01
Back Side	390000/1950	30kHz 50M QPSK(1,1)	0	0.706	0.282	-1.36	23.76	24.50	0.334	2025/2/01
Left Side	390000/1950	30kHz 50M QPSK(1,1)	0	0.161	0.066	-3.62	23.76	24.50	0.078	2025/2/01
Right Side	390000/1950	30kHz 50M QPSK(1,1)	0	0.607	0.250	-0.47	23.76	24.50	0.296	2025/2/01
Top Side	390000/1950	30kHz 50M QPSK(1,1)	0	0.372	0.149	-0.01	23.76	24.50	0.177	2025/2/01
Bottom Side	390000/1950	30kHz 50M QPSK(1,1)	0	0.062	0.026	-2.51	23.76	24.50	0.031	2025/2/01
Front Side	389000/1945	30kHz 50M QPSK(1,1)	0	1.152	0.450	0.93	23.76	24.50	0.534	2025/2/01
Front Side	391000/1955	30kHz 50M QPSK(1,1)	0	1.100	0.405	2.18	22.77	24.50	0.603	2025/2/01
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	390000/1950	30kHz 50M QPSK(1,1)	5	0.657	0.268	2.16	23.76	24.50	0.318	2025/2/01

9.1.14. SAR measurement Result of NR SA n3

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	349500/1747.5	30kHz 30M QPSK(1,1)	0	0.101	0.067	2.55	23.76	24.50	0.079	2025/1/24
Left Tilt 15 Degree	349500/1747.5	30kHz 30M QPSK(1,1)	0	0.056	0.036	-1.21	23.76	24.50	0.043	2025/1/24
Right Cheek	349500/1747.5	30kHz 30M QPSK(1,1)	0	0.093	0.060	3.53	23.76	24.50	0.071	2025/1/24
Right Tilt 15 Degree	349500/1747.5	30kHz 30M QPSK(1,1)	0	0.049	0.032	-4.68	23.76	24.50	0.038	2025/1/24
Left Cheek	345000/1725	30kHz 30M QPSK(1,1)	0	0.096	0.064	-3.62	23.81	24.50	0.075	2025/1/24
Left Cheek	354000/1770	30kHz 30M	0	0.088	0.058	3.24	23.79	24.50	0.068	2025/1/24

		QPSK(1,1)								
Extremity										
Front Side	349500/1747.5	30kHz 30M QPSK(1,1)	0	1.080	0.546	4.59	23.76	24.50	0.647	2025/1/24
Back Side	349500/1747.5	30kHz 30M QPSK(1,1)	0	0.616	0.296	0.57	23.76	24.50	0.351	2025/1/24
Left Side	349500/1747.5	30kHz 30M QPSK(1,1)	0	0.162	0.079	-3.71	23.76	24.50	0.094	2025/1/24
Right Side	349500/1747.5	30kHz 30M QPSK(1,1)	0	0.508	0.252	2.09	23.76	24.50	0.299	2025/1/24
Top Side	349500/1747.5	30kHz 30M QPSK(1,1)	0	0.356	0.175	-3.83	23.76	24.50	0.208	2025/1/24
Bottom Side	349500/1747.5	30kHz 30M QPSK(1,1)	0	0.011	0.009	-1.59	23.76	24.50	0.011	2025/1/24
Front Side	345000/1725	30kHz 30M QPSK(1,1)	0	0.983	0.472	3.09	23.81	24.50	0.553	2025/1/24
Front Side	354000/1770	30kHz 30M QPSK(1,1)	0	0.864	0.437	-2.50	23.79	24.50	0.515	2025/1/24
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	349500/1747.5	30kHz 30M QPSK(1,1)	5	0.583	0.289	0.16	23.76	24.50	0.343	2025/1/24

9.1.15. SAR measurement Result of NR SA n8

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	179500/897.5	30kHz 20M QPSK(1,1)	0	0.055	0.036	-0.23	20.82	24.00	0.075	2025/1/31
Left Tilt 15 Degree	179500/897.5	30kHz 20M QPSK(1,1)	0	0.028	0.018	4.64	20.82	24.00	0.037	2025/1/31
Right Cheek	179500/897.5	30kHz 20M QPSK(1,1)	0	0.047	0.030	2.85	20.82	24.00	0.062	2025/1/31
Right Tilt 15 Degree	179500/897.5	30kHz 20M QPSK(1,1)	0	0.025	0.016	2.65	20.82	24.00	0.033	2025/1/31
Left Cheek	178000/890	30kHz 20M QPSK(1,1)	0	0.047	0.031	-0.61	23.77	24.00	0.033	2025/1/31
Left Cheek	181000/905	30kHz 20M QPSK(1,1)	0	0.048	0.030	3.75	20.82	24.00	0.062	2025/1/31

Extremity										
Front Side	179500/897.5	30kHz 20M QPSK(1,1)	0	0.284	0.141	3.01	20.82	24.00	0.293	2025/1/31
Back Side	179500/897.5	30kHz 20M QPSK(1,1)	0	0.645	0.323	-0.25	20.82	24.00	0.672	2025/1/31
Left Side	179500/897.5	30kHz 20M QPSK(1,1)	0	0.097	0.049	1.09	20.82	24.00	0.102	2025/1/31
Right Side	179500/897.5	30kHz 20M QPSK(1,1)	0	0.084	0.042	-3.36	20.82	24.00	0.087	2025/1/31
Top Side	179500/897.5	30kHz 20M QPSK(1,1)	0	0.026	0.013	1.96	20.82	24.00	0.027	2025/1/31
Bottom Side	179500/897.5	30kHz 20M QPSK(1,1)	0	0.400	0.198	-0.65	20.82	24.00	0.412	2025/1/31
Back Side	178000/890	30kHz 20M QPSK(1,1)	0	0.613	0.292	3.76	23.77	24.00	0.308	2025/1/31
Back Side	181000/905	30kHz 20M QPSK(1,1)	0	0.645	0.313	-1.77	20.82	24.00	0.651	2025/1/31
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Back Side	179500/897.5	30kHz 20M QPSK(1,1)	5	0.284	0.135	1.93	20.82	24.00	0.281	2025/1/31

9.1.16. SAR measurement Result of NR SA n20

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	169400/847	30kHz 20M QPSK(1,1)	0	0.046	0.028	-0.52	23.88	24.00	0.029	2025/1/31
Left Tilt 15 Degree	169400/847	30kHz 20M QPSK(1,1)	0	0.027	0.016	0.68	23.88	24.00	0.016	2025/1/31
Right Cheek	169400/847	30kHz 20M QPSK(1,1)	0	0.040	0.023	1.83	23.88	24.00	0.024	2025/1/31
Right Tilt 15 Degree	169400/847	30kHz 20M QPSK(1,1)	0	0.019	0.017	-0.33	23.88	24.00	0.017	2025/1/31
Left Cheek	168400/842	30kHz 20M QPSK(1,1)	0	0.044	0.026	1.76	23.81	24.00	0.027	2025/1/31
Left Cheek	170400/852	30kHz 20M QPSK(1,1)	0	0.043	0.026	-3.32	23.78	24.00	0.027	2025/1/31

Extremity										
Front Side	169400/847	30kHz 20M QPSK(1,1)	0	0.478	0.222	3.46	23.88	24.00	0.228	2025/1/31
Back Side	169400/847	30kHz 20M QPSK(1,1)	0	1.086	0.504	0.47	23.88	24.00	0.518	2025/1/31
Left Side	169400/847	30kHz 20M QPSK(1,1)	0	0.152	0.071	-3.78	23.88	24.00	0.073	2025/1/31
Right Side	169400/847	30kHz 20M QPSK(1,1)	0	0.130	0.060	-3.52	23.88	24.00	0.062	2025/1/31
Top Side	169400/847	30kHz 20M QPSK(1,1)	0	0.011	0.009	0.99	23.88	24.00	0.009	2025/1/31
Bottom Side	169400/847	30kHz 20M QPSK(1,1)	0	0.695	0.319	1.26	23.88	24.00	0.328	2025/1/31
Back Side	168400/842	30kHz 20M QPSK(1,1)	0	0.977	0.440	3.40	23.81	24.00	0.460	2025/1/31
Back Side	170400/852	30kHz 20M QPSK(1,1)	0	1.086	0.489	2.51	23.78	24.00	0.514	2025/1/31
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Back Side	169400/847	30kHz 20M QPSK(1,1)	5	0.445	0.196	0.15	23.88	24.00	0.201	2025/1/31

9.1.17. SAR measurement Result of NR SA n28

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	145100/725.5	15kHz 30M QPSK(1,1)	0	0.057	0.046	1.66	22.68	23.50	0.056	2025/1/21
Left Tilt 15 Degree	145100/725.5	15kHz 30M QPSK(1,1)	0	0.030	0.024	3.05	22.68	23.50	0.029	2025/1/21
Right Cheek	145100/725.5	15kHz 30M QPSK(1,1)	0	0.053	0.041	-4.38	22.68	23.50	0.050	2025/1/21
Right Tilt 15 Degree	145100/725.5	15kHz 30M QPSK(1,1)	0	0.027	0.021	1.39	22.68	23.50	0.025	2025/1/21
Left Cheek	143600/718	15kHz 30M QPSK(1,1)	0	0.051	0.040	4.41	22.49	23.50	0.050	2025/1/21
Left Cheek	146600/733	15kHz 30M QPSK(1,1)	0	0.051	0.040	-1.63	22.80	23.50	0.047	2025/1/21

Extremity										
Front Side	145100/725.5	15kHz 30M QPSK(1,1)	0	0.983	0.467	0.48	22.68	23.50	0.564	2025/1/21
Back Side	145100/725.5	15kHz 30M QPSK(1,1)	0	1.347	0.674	0.18	22.68	23.50	0.814	2025/1/21
Left Side	145100/725.5	15kHz 30M QPSK(1,1)	0	0.135	0.066	3.32	22.68	23.50	0.080	2025/1/21
Right Side	145100/725.5	15kHz 30M QPSK(1,1)	0	0.108	0.054	-0.02	22.68	23.50	0.065	2025/1/21
Top Side	145100/725.5	15kHz 30M QPSK(1,1)	0	0.054	0.026	0.07	22.68	23.50	0.031	2025/1/21
Bottom Side	145100/725.5	15kHz 30M QPSK(1,1)	0	0.876	0.430	3.68	22.68	23.50	0.519	2025/1/21
Back Side	143600/718	15kHz 30M QPSK(1,1)	0	1.212	0.594	-1.50	22.49	23.50	0.750	2025/1/21
Back Side	146600/733	15kHz 30M QPSK(1,1)	0	1.280	0.608	2.68	22.80	23.50	0.714	2025/1/21
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Back Side	145100/725.5	15kHz 30M QPSK(1,1)	5	0.552	0.273	2.73	22.68	23.50	0.330	2025/1/21

9.1.18. SAR measurement Result of NR SA n40

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	470000/2350	30kHz 80M QPSK(1,1)	0	0.144	0.075	4.79	24.19	24.50	0.081	2025/2/12
Left Tilt 15 Degree	470000/2350	30kHz 80M QPSK(1,1)	0	0.079	0.041	1.50	24.19	24.50	0.044	2025/2/12
Right Cheek	470000/2350	30kHz 80M QPSK(1,1)	0	0.136	0.068	0.69	24.19	24.50	0.073	2025/2/12
Right Tilt 15 Degree	470000/2350	30kHz 80M QPSK(1,1)	0	0.073	0.038	1.88	24.19	24.50	0.041	2025/2/12
Left Cheek	468000/2340	30kHz 80M QPSK(1,1)	0	0.135	0.067	0.72	24.27	24.50	0.071	2025/2/12
Left Cheek	472000/2360	30kHz 80M QPSK(1,1)	0	0.130	0.067	1.35	24.01	24.50	0.075	2025/2/12

Extremity										
Front Side	470000/2350	30kHz 80M QPSK(1,1)	0	1.058	0.399	-2.86	24.19	24.50	0.429	2025/2/12
Back Side	470000/2350	30kHz 80M QPSK(1,1)	0	2.783	1.094	0.91	24.19	24.50	1.175	2025/2/12
Left Side	470000/2350	30kHz 80M QPSK(1,1)	0	0.584	0.230	-3.35	24.19	24.50	0.247	2025/2/12
Right Side	470000/2350	30kHz 80M QPSK(1,1)	0	0.028	0.011	3.39	24.19	24.50	0.012	2025/2/12
Top Side	470000/2350	30kHz 80M QPSK(1,1)	0	0.111	0.042	2.59	24.19	24.50	0.045	2025/2/12
Bottom Side	470000/2350	30kHz 80M QPSK(1,1)	0	1.753	0.655	-1.08	24.19	24.50	0.703	2025/2/12
Back Side	468000/2340	30kHz 80M QPSK(1,1)	0	2.616	1.028	-2.15	24.27	24.50	1.084	2025/2/12
Back Side	472000/2360	30kHz 80M QPSK(1,1)	0	2.505	0.935	1.93	24.01	24.50	1.047	2025/2/12
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Back Side	470000/2350	30kHz 80M QPSK(1,1)	5	1.113	0.420	0.74	24.19	24.50	0.451	2025/2/12

9.1.19. SAR measurement Result of NR SA n41

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	518598/2592.99	30kHz 100M QPSK(1,1)	0	0.212	0.114	-1.28	26.61	28.00	0.157	2025/1/28
Left Tilt 15 Degree	518598/2592.99	30kHz 100M QPSK(1,1)	0	0.107	0.057	-0.43	26.61	28.00	0.079	2025/1/28
Right Cheek	518598/2592.99	30kHz 100M QPSK(1,1)	0	0.188	0.099	4.87	26.61	28.00	0.136	2025/1/28
Right Tilt 15 Degree	518598/2592.99	30kHz 100M QPSK(1,1)	0	0.089	0.045	-2.94	26.61	28.00	0.062	2025/1/28
Left Cheek	509202/2546.01	30kHz	0	0.196	0.100	-0.72	27.32	28.00	0.117	2025/1/28

		100M QPSK(1,1)								
Left Cheek	528000/2640	30kHz 100M QPSK(1,1)	0	0.196	0.104	4.23	27.31	28.00	0.122	2025/1/28
Extremity										
Front Side	518598/2592.99	30kHz 100M QPSK(1,1)	0	1.042	0.436	-3.70	26.61	28.00	0.600	2025/1/28
Back Side	518598/2592.99	30kHz 100M QPSK(1,1)	0	2.817	1.190	-1.56	26.61	28.00	1.639	2025/1/28
Left Side	518598/2592.99	30kHz 100M QPSK(1,1)	0	0.592	0.238	1.56	26.61	28.00	0.328	2025/1/28
Right Side	518598/2592.99	30kHz 100M QPSK(1,1)	0	0.169	0.068	-2.47	26.61	28.00	0.094	2025/1/28
Top Side	518598/2592.99	30kHz 100M QPSK(1,1)	0	0.085	0.034	-3.90	26.61	28.00	0.047	2025/1/28
Bottom Side	518598/2592.99	30kHz 100M QPSK(1,1)	0	1.718	0.689	0.68	26.61	28.00	0.949	2025/1/28
Back Side	509202/2546.01	30kHz 100M QPSK(1,1)	0	2.620	1.085	-1.45	27.32	28.00	1.269	2025/1/28
Back Side	528000/2640	30kHz 100M QPSK(1,1)	0	2.676	1.130	0.31	27.31	28.00	1.325	2025/1/28
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Back Side	518598/2592.99	30kHz 100M QPSK(1,1)	5	1.268	0.530	-1.51	26.61	28.00	0.730	2025/1/28

9.1.20. SAR measurement Result of NR SA n77

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

Head										
Left Cheek	650000/3750	30kHz 100M QPSK(1,1)	0	0.375	0.157	-2.02	27.16	28.00	0.191	2025/2/25
Left Tilt 15 Degree	650000/3750	30kHz 100M QPSK(1,1)	0	0.198	0.082	2.75	27.16	28.00	0.099	2025/2/25
Right Cheek	650000/3750	30kHz 100M QPSK(1,1)	0	0.337	0.134	0.26	27.16	28.00	0.163	2025/2/25
Right Tilt 15 Degree	650000/3750	30kHz 100M QPSK(1,1)	0	0.153	0.061	-2.21	27.16	28.00	0.074	2025/2/25
Left Cheek	623334/3350.01	30kHz 100M QPSK(1,1)	0	0.322	0.129	-4.64	27.13	28.00	0.158	2025/2/25
Left Cheek	676666/4149.99	30kHz 100M QPSK(1,1)	0	0.355	0.149	4.39	27.54	28.00	0.166	2025/2/25
Extremity										
Front Side	650000/3750	30kHz 100M QPSK(1,1)	0	2.212	0.860	0.66	27.16	28.00	1.044	2025/2/25
Back Side	650000/3750	30kHz 100M QPSK(1,1)	0	1.836	0.685	-1.38	27.16	28.00	0.831	2025/2/25
Left Side	650000/3750	30kHz 100M QPSK(1,1)	0	0.929	0.347	-2.78	27.16	28.00	0.421	2025/2/25
Right Side	650000/3750	30kHz 100M QPSK(1,1)	0	0.265	0.103	-2.19	27.16	28.00	0.125	2025/2/25
Top Side	650000/3750	30kHz 100M QPSK(1,1)	0	0.354	0.136	-2.06	27.16	28.00	0.165	2025/2/25
Bottom Side	650000/3750	30kHz 100M QPSK(1,1)	0	0.022	0.008	-1.96	27.16	28.00	0.010	2025/2/25
Front Side	623334/3350.01	30kHz 100M	0	2.013	0.767	3.61	27.13	28.00	0.937	2025/2/25

		QPSK(1,1)								
Front Side	676666/4149.99	30kHz 100M QPSK(1,1)	0	2.079	0.800	-2.22	27.54	28.00	0.889	2025/2/25
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	650000/3750	30kHz 100M QPSK(1,1)	5	0.929	0.350	2.66	27.16	28.00	0.425	2025/2/25

9.1.21. SAR measurement Result of NR SA n78

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	636666/3549.99	30kHz 100M QPSK(1,1)	0	1.094	0.437	-2.34	27.28	27.50	0.460	2025/2/24
Left Tilt 15 Degree	636666/3549.99	30kHz 100M QPSK(1,1)	0	0.644	0.244	-1.74	27.28	27.50	0.257	2025/2/24
Right Cheek	636666/3549.99	30kHz 100M QPSK(1,1)	0	1.001	0.392	1.97	27.28	27.50	0.412	2025/2/24
Right Tilt 15 Degree	636666/3549.99	30kHz 100M QPSK(1,1)	0	0.474	0.184	-1.86	27.28	27.50	0.194	2025/2/24
Left Cheek	623334/3350.01	30kHz 100M QPSK(1,1)	0	0.956	0.367	-4.34	27.09	27.50	0.403	2025/2/24
Left Cheek	650000/3750	30kHz 100M QPSK(1,1)	0	0.960	0.368	2.16	27.14	27.50	0.400	2025/2/24
Extremity										
Front Side	636666/3549.99	30kHz 100M QPSK(1,1)	0	3.065	1.261	4.24	27.28	27.50	1.327	2025/2/24
Back Side	636666/3549.99	30kHz 100M QPSK(1,1)	0	2.544	0.994	2.86	27.28	27.50	1.046	2025/2/24

Left Side	636666/3549.99	30kHz 100M QPSK(1,1)	0	1.257	0.496	-0.01	27.28	27.50	0.522	2025/2/24
Right Side	636666/3549.99	30kHz 100M QPSK(1,1)	0	0.398	0.164	-3.37	27.28	27.50	0.173	2025/2/24
Top Side	636666/3549.99	30kHz 100M QPSK(1,1)	0	0.552	0.218	3.48	27.28	27.50	0.229	2025/2/24
Bottom Side	636666/3549.99	30kHz 100M QPSK(1,1)	0	0.061	0.024	-2.62	27.28	27.50	0.025	2025/2/24
Front Side	623334/3350.01	30kHz 100M QPSK(1,1)	0	2.912	1.186	1.56	27.09	27.50	1.303	2025/2/24
Front Side	650000/3750	30kHz 100M QPSK(1,1)	0	2.942	1.162	-0.36	27.14	27.50	1.262	2025/2/24
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	636666/3549.99	30kHz 100M QPSK(1,1)	5	1.257	0.507	3.32	27.28	27.50	0.533	2025/2/24

9.1.22. SAR measurement Result of WLAN 2.4G

Test Position	Test channel /Freq.	Mode	Separation distance (mm)	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 10-g (W/Kg)	Date
				1-g	10-g					
Head										
Left Cheek	7/2442	802.11 b	0	0.293	0.136	1.51	14.02	14.50	0.152	2025/2/06
Left Tilt 15 Degree	7/2442	802.11 b	0	0.166	0.076	2.84	14.02	14.50	0.085	2025/2/06
Right Cheek	7/2442	802.11 b	0	0.257	0.115	1.00	14.02	14.50	0.128	2025/2/06
Right Tilt 15 Degree	7/2442	802.11 b	0	0.123	0.056	-4.92	14.02	14.50	0.063	2025/2/06
Left Cheek	1/2412	802.11 b	0	0.276	0.124	-2.77	13.88	14.50	0.143	2025/2/06
Left Cheek	13/2472	802.11	0	0.257	0.113	0.06	13.45	14.50	0.144	2025/2/06

		b								
Extremity										
Front Side	7/2442	802.11 b	0	0.689	0.290	-0.54	14.02	14.50	0.324	2025/2/06
Back Side	7/2442	802.11 b	0	0.358	0.184	-0.70	14.02	14.50	0.206	2025/2/06
Left Side	7/2442	802.11 b	0	0.129	0.067	-2.82	14.02	14.50	0.075	2025/2/06
Right Side	7/2442	802.11 b	0	0.291	0.157	-1.80	14.02	14.50	0.175	2025/2/06
Top Side	7/2442	802.11 b	0	0.302	0.162	-0.91	14.02	14.50	0.181	2025/2/06
Bottom Side	7/2442	802.11 b	0	0.028	0.015	3.22	14.02	14.50	0.017	2025/2/06
Front Side	1/2412	802.11 b	0	0.531	0.278	0.10	13.88	14.50	0.321	2025/2/06
Front Side	13/2472	802.11 b	0	0.634	0.254	-3.05	13.45	14.50	0.323	2025/2/06
Body & Hotspot with 5mm (Worst-case position for 0mm)										
Front Side	7/2442	802.11 b	5	0.280	0.148	2.08	14.02	14.50	0.165	2025/2/06

9.2. Simultaneous Transmission Analysis

Refer to EN 62209-2:2010 Annex K, the secondary transmitter SAR test exclusion thresholds are determined by:

$$P_{available} = P_{th,m}\left(\frac{SAR_{lim} - SAR_1}{SAR_{lim}}\right)$$

$P_{th,\,m}$ is the threshold exclusion power level taken from Annex B of EN 62479.

Mode	P_{max} (dBm)	P_{max} (mW)	$P_{th,\,m}$ (mW)	SAR_{lim} (W/Kg)	SAR_1 (W/Kg)	Calculation Result (mW)	Simultaneous Transmission Exclusion
Bluetooth	6.50	4.47	20	2	1.004	9.96	YES
Bluetooth	6.50	4.47	40	4	2.415	15.85	YES
WLAN 5.2G	9.00	7.94	20	2	1.004	9.96	YES
WLAN 5.2G	9.00	7.94	40	4	2.415	15.85	YES
WLAN 5.8G	9.50	8.91	20	2	1.004	9.96	YES
WLAN 5.8G	9.50	8.91	40	4	2.415	15.85	YES

9.3. Exposure Conditions

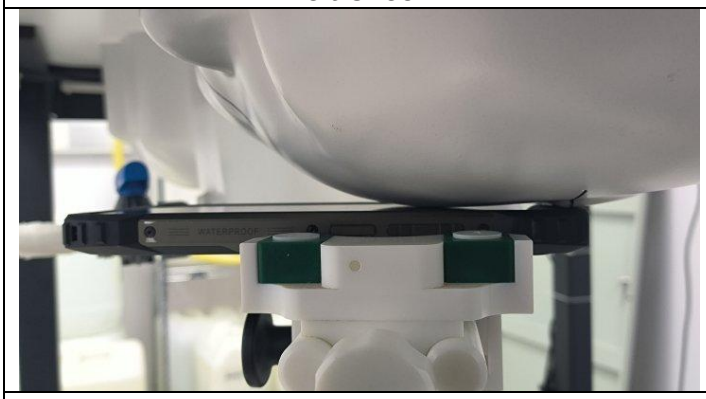
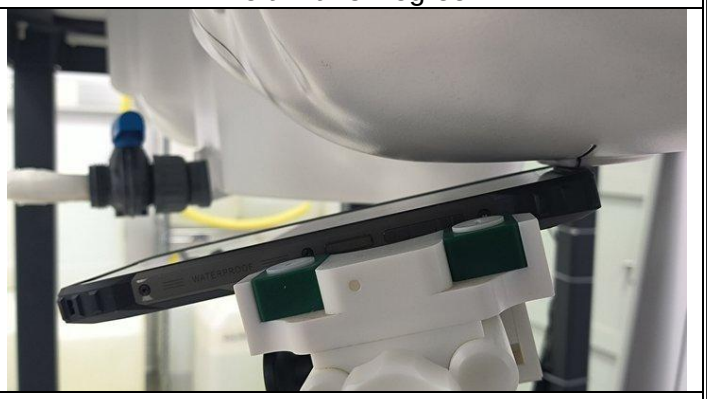
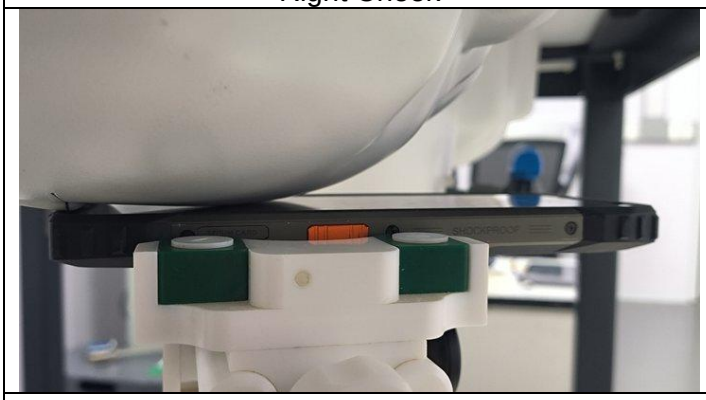
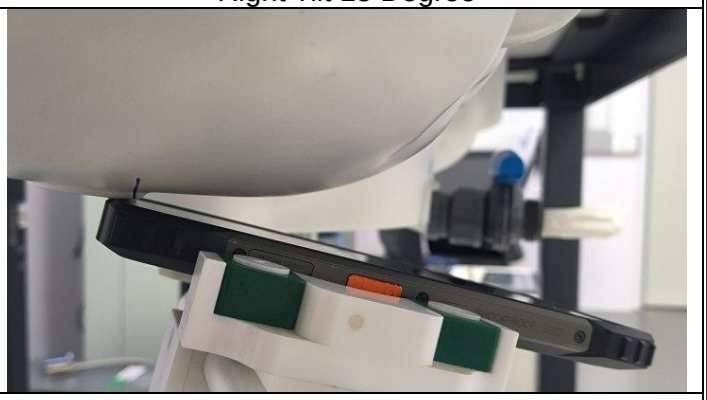
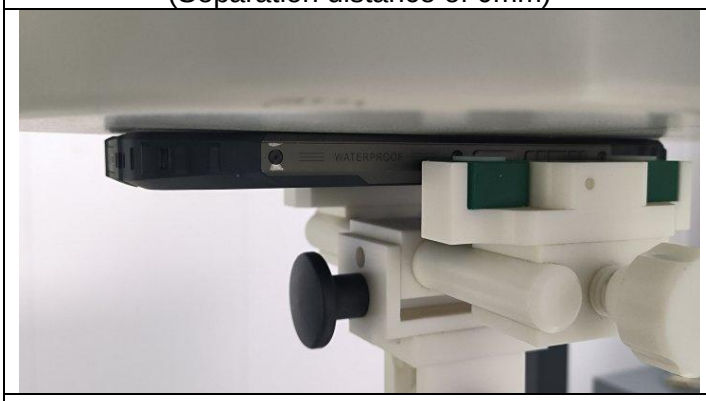
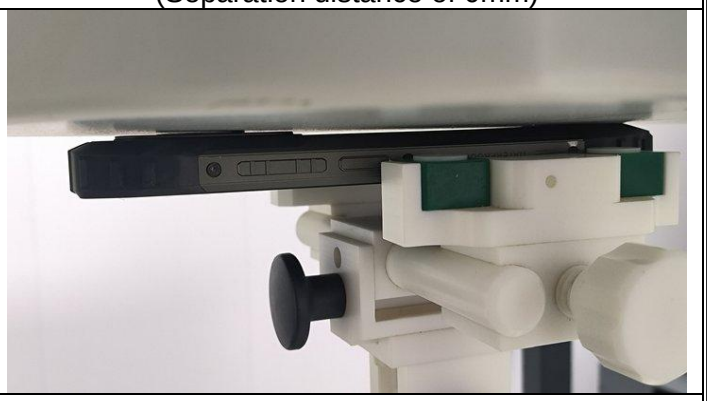
Exposure Position		WWAN Band	WLAN Band	Simultaneous Tx SAR(W/Kg)
		SAR(W/Kg)	SAR(W/Kg)	
Head	Left Cheek	1.360	0.152	1.512
	Left Tilt 15 Degree	0.791	0.085	0.876
	Right Cheek	1.138	0.128	1.266
	Right Tilt 15 Degree	0.588	0.063	0.651
Member	Front Side	2.415	0.324	2.739
	Back Side	2.290	0.323	2.613
	Left Side	1.100	0.075	1.175
	Right Side	0.431	0.175	0.606
	Top Side	1.761	0.181	1.942
	Bottom Side	0.949	0.017	0.966
Body&Hotspot	Front Side	1.004	0.165	1.169

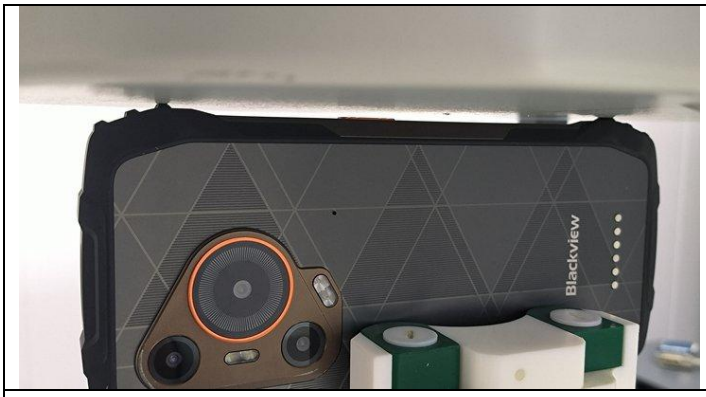
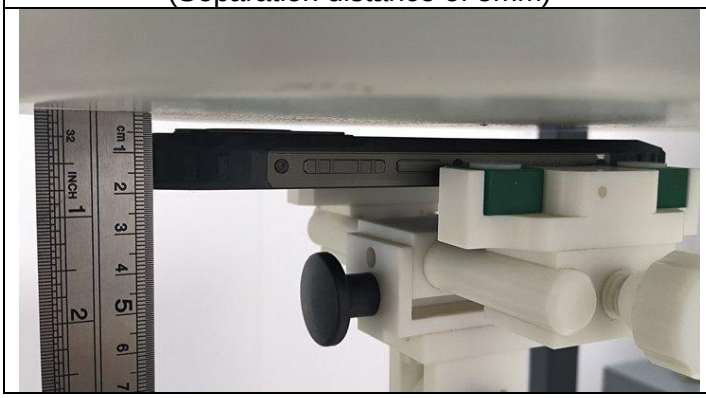
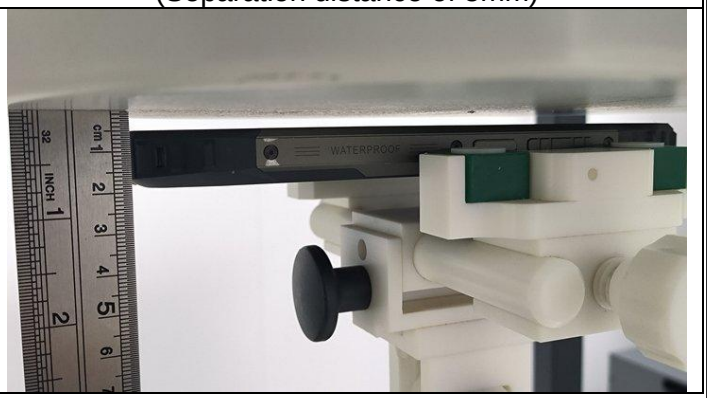
	Back Side	0.73	/	0.73

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

10. Appendix A. Photo documentation

Test Positions

Left Cheek	Left Tilt 15 Degree
	
Right Cheek	Right Tilt 15 Degree
	
Front Side (Separation distance of 0mm)	Back Side (Separation distance of 0mm)
	
Left Side (Separation distance of 0mm)	Right Side (Separation distance of 0mm)

	
Top Side (Separation distance of 0mm)	Bottom Side (Separation distance of 0mm)
	
Back Side (Separation distance of 5mm)	Front Side (Separation distance of 5mm)
	

11. Appendix B. System Check Plots

Table of contents
MEASUREMENT 1 System Performance Check - 750MHz
MEASUREMENT 2 System Performance Check - 900MHz
MEASUREMENT 3 System Performance Check - 1800MHz
MEASUREMENT 4 System Performance Check - 2000MHz
MEASUREMENT 5 System Performance Check - 2300MHz
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MEASUREMENT 7 System Performance Check - 2600MHz
MEASUREMENT 8 System Performance Check - 3300MHz
MEASUREMENT 9 System Performance Check - 3500MHz
MEASUREMENT 10 System Performance Check - 3700MHz
MEASUREMENT 11 System Performance Check - 4200MHz

1# System check at 750 MHz
Date of measurement: 21/1/2025

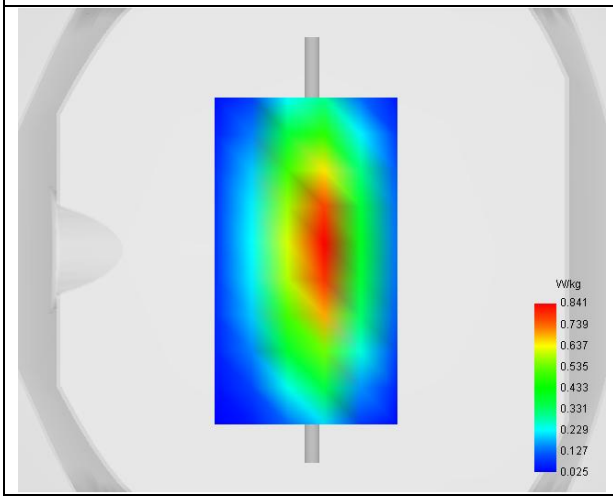
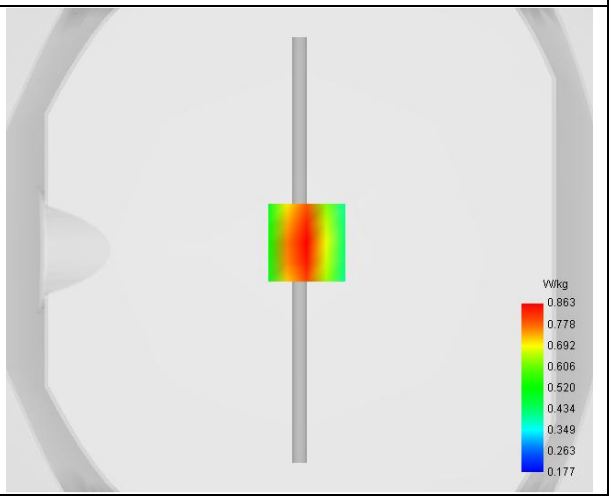
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.42
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW750
Channels/Frequency	Middle
Signal	CW

B. Permitivity

Middle TX Frequency (MHz)	750.000
Relative permitivity (real part)	40.85
Relative permitivity (imaginary part)	21.61
Conductivity (S/m)	0.90

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

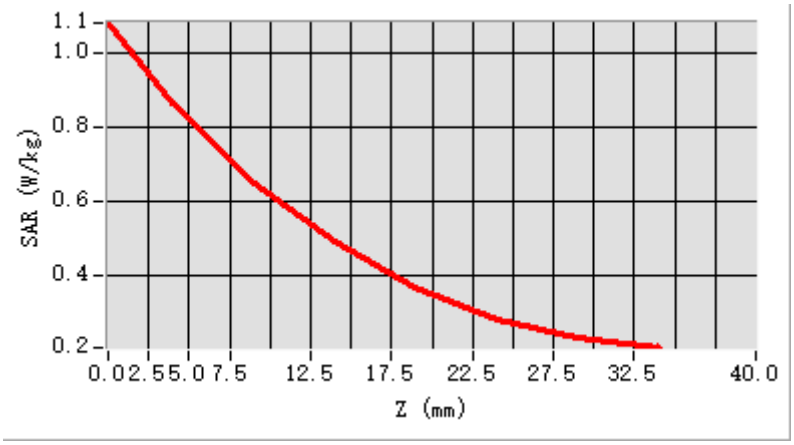
Maximum location: X=3.00, Y=3.00 ; SAR Peak: 1.09 W/kg

D. SAR 1g & 10g

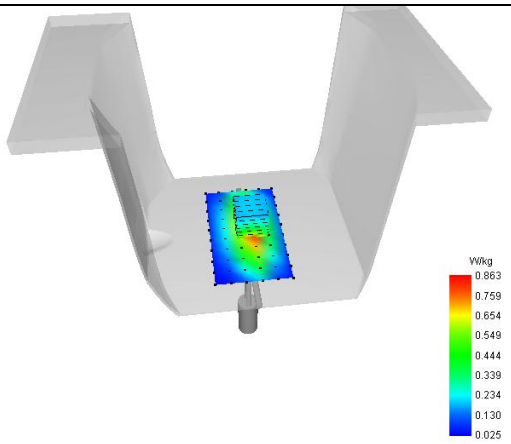
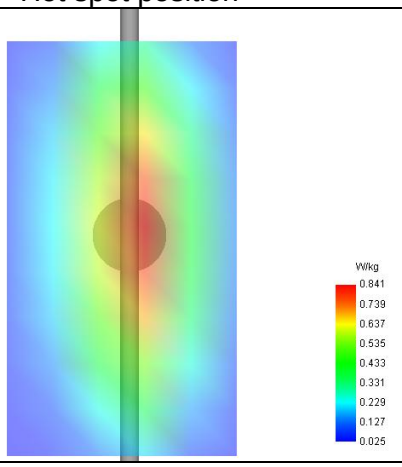
SAR 10g (W/Kg)	0.582
SAR 1g (W/Kg)	0.835
Variation (%)	-0.40
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	75.18

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.080	0.863	0.649	0.494	0.371	0.284	0.232



F. 3D Image

3D screen shot	Hot spot position
	

2# System check at 900 MHz
Date of measurement: 31/1/2025

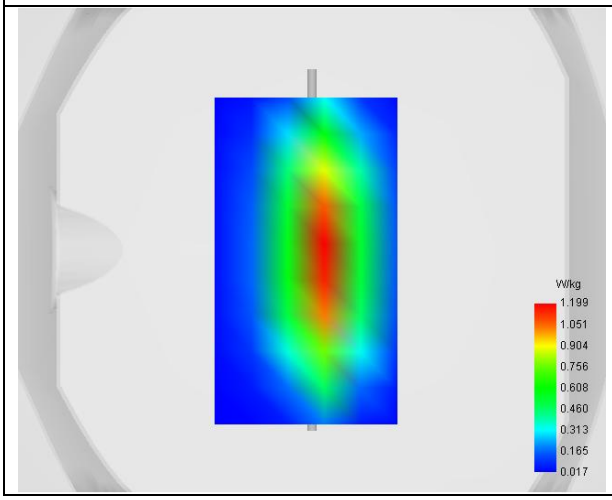
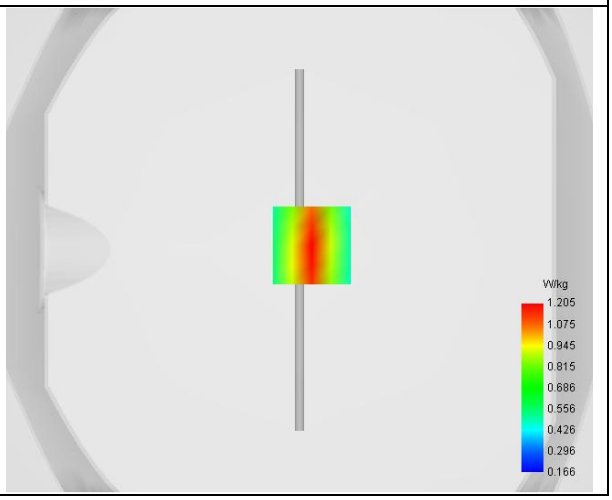
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.24
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW900
Channels/Frequency	Middle
Signal	CW

B. Permitivity

Middle TX Frequency (MHz)	900.000
Relative permitivity (real part)	40.97
Relative permitivity (imaginary part)	19.61
Conductivity (S/m)	0.98

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

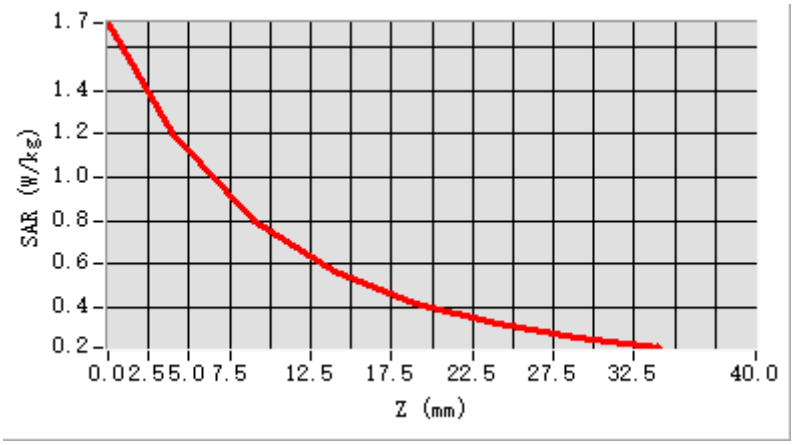
Maximum location: X=5.00, Y=2.00 ; SAR Peak: 1.70 W/kg

D. SAR 1g & 10g

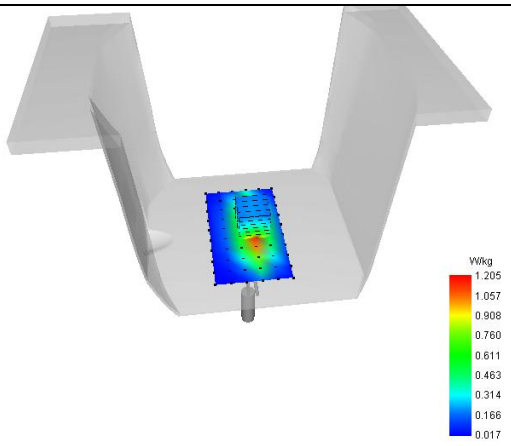
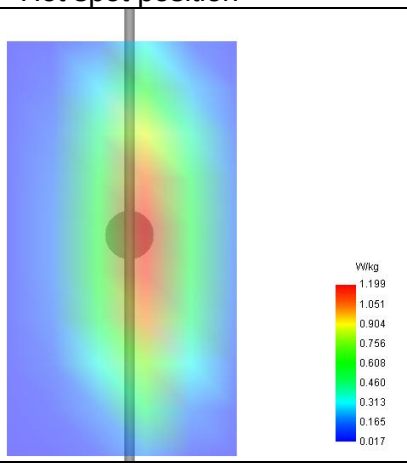
SAR 10g (W/Kg)	0.708
SAR 1g (W/Kg)	1.142
Variation (%)	-0.15
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	66.13

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.709	1.205	0.797	0.564	0.420	0.329	0.266



F. 3D Image

3D screen shot	Hot spot position
	

3# System check at 1800 MHz
Date of measurement: 25/1/2025

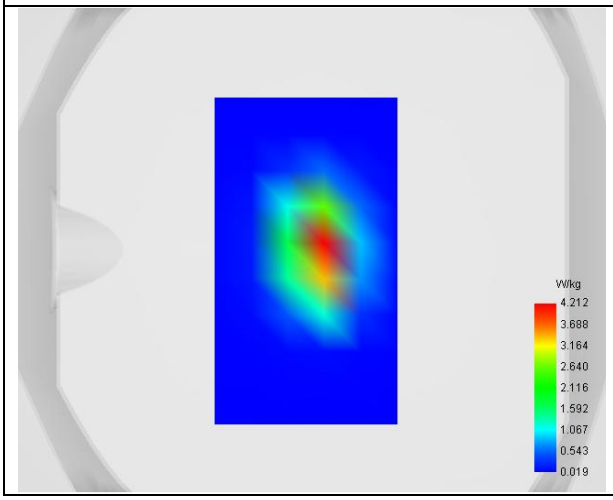
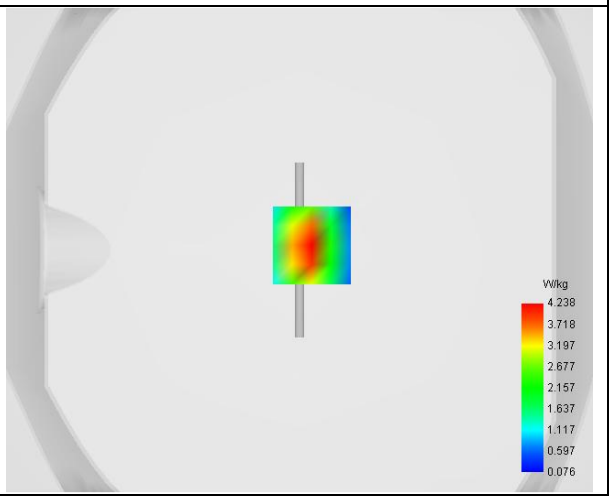
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW1800
Channels/Frequency	Middle
Signal	CW

B. Permitivity

Middle TX Frequency (MHz)	1800.000
Relative permitivity (real part)	39.43
Relative permitivity (imaginary part)	13.98
Conductivity (S/m)	1.40

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

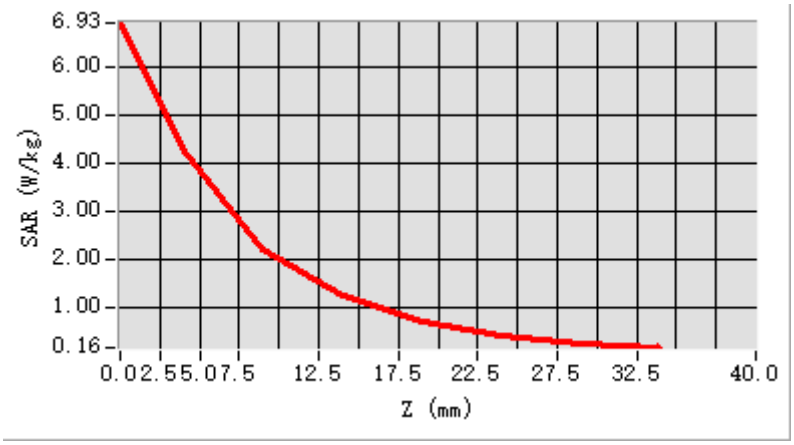
Maximum location: X=5.00, Y=2.00 ; SAR Peak: 7.03 W/kg

D. SAR 1g & 10g

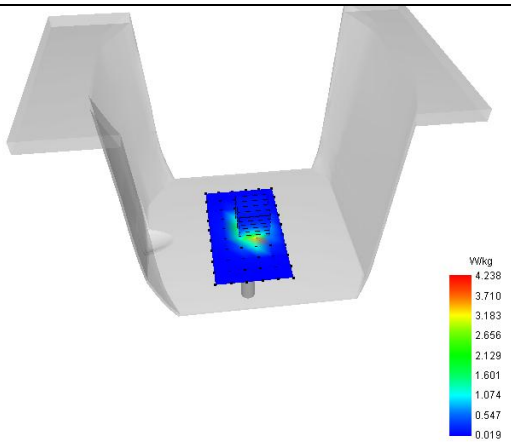
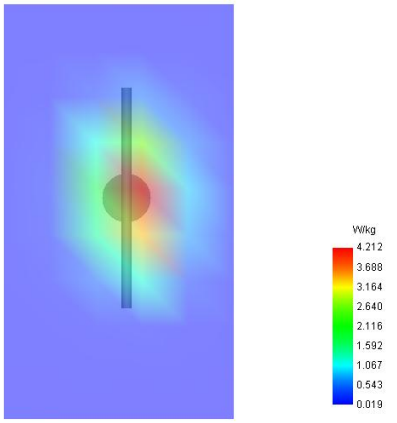
SAR 10g (W/Kg)	1.925
SAR 1g (W/Kg)	3.996
Variation (%)	-2.56
Horizontal validation criteria: minimum distance (mm)	11.31
Vertical validation criteria: SAR ratio M2/M1 (%)	52.57

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.933	4.238	2.228	1.237	0.715	0.423	0.260



F. 3D Image

3D screen shot	Hot spot position
	

4# System check at 2000 MHz
Date of measurement: 1/2/2025

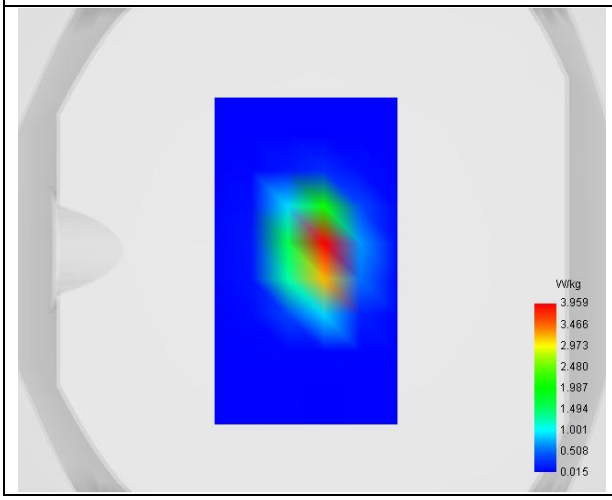
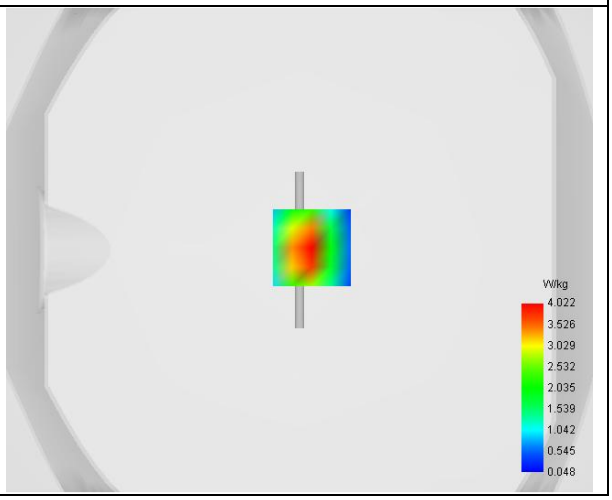
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.64
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW2000
Channels/Frequency	Middle
Signal	CW

B. Permitivity

Middle TX Frequency (MHz)	2000.000
Relative permitivity (real part)	38.42
Relative permitivity (imaginary part)	12.84
Conductivity (S/m)	1.43

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

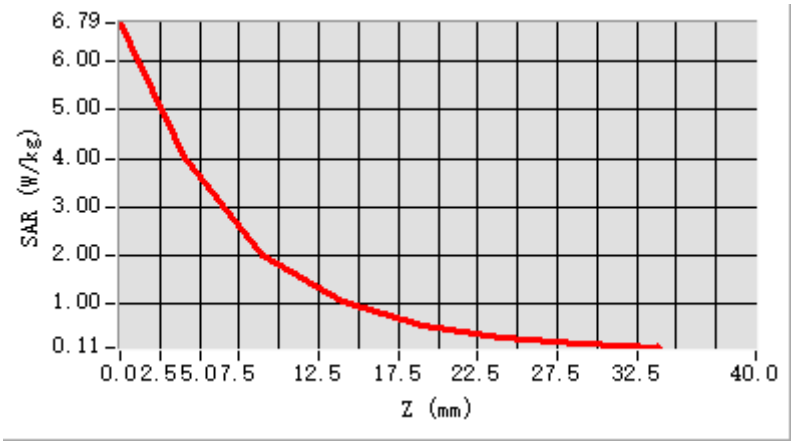
Maximum location: X=5.00, Y=1.00 ; SAR Peak: 6.99 W/kg

D. SAR 1g & 10g

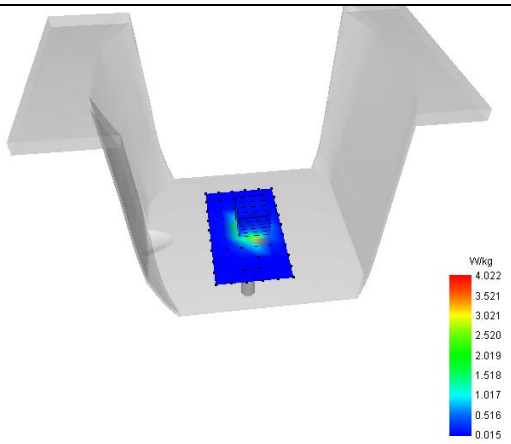
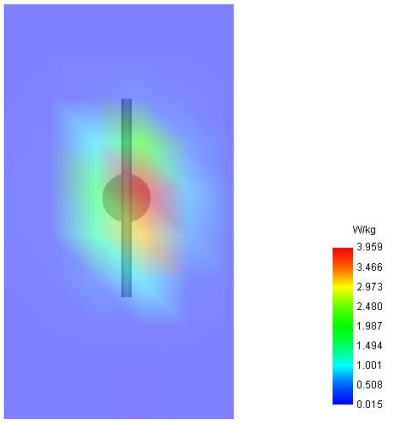
SAR 10g (W/Kg)	1.821
SAR 1g (W/Kg)	3.939
Variation (%)	-0.03
Horizontal validation criteria: minimum distance (mm)	8.00
Vertical validation criteria: SAR ratio M2/M1 (%)	49.78

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.786	4.022	2.002	1.056	0.572	0.321	0.184



F. 3D Image

3D screen shot	Hot spot position
	

5# System check at 2300 MHz
Date of measurement: 12/2/20250.450

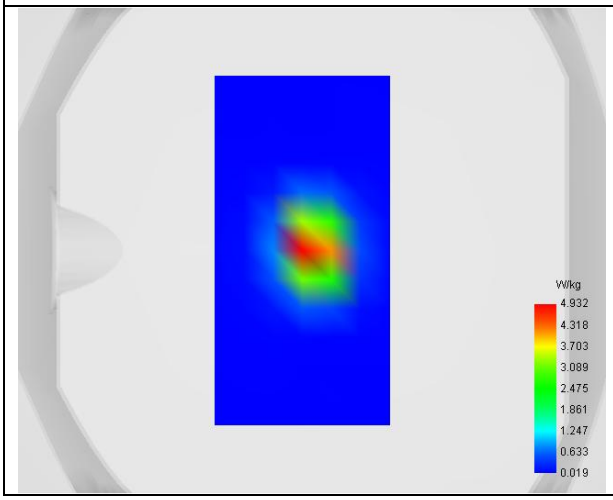
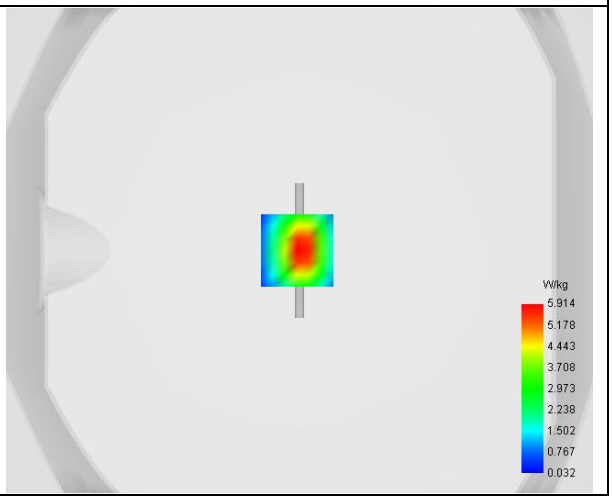
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.73
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW2300
Channels/Frequency	Middle
Signal	CW

B. Permitivity

Middle TX Frequency (MHz)	2300.000
Relative permitivity (real part)	39.11
Relative permitivity (imaginary part)	12.69
Conductivity (S/m)	1.75

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

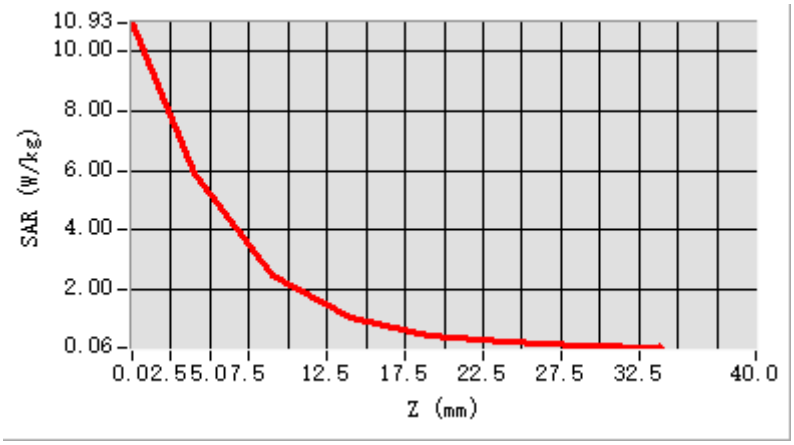
Maximum location: X=-1.00, Y=0.00 ; SAR Peak: 11.12 W/kg

D. SAR 1g & 10g

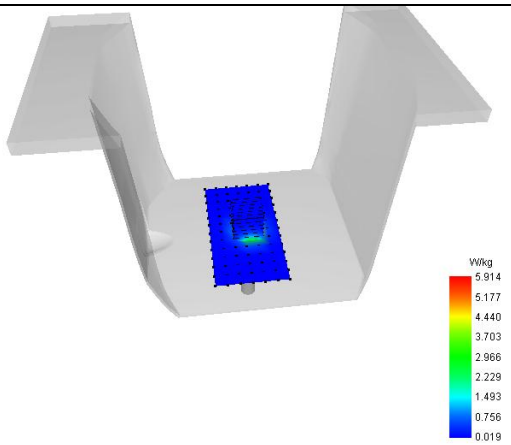
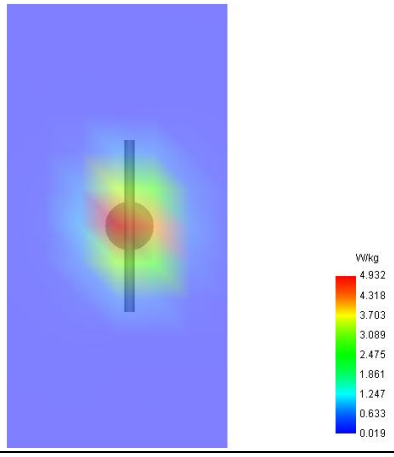
SAR 10g (W/Kg)	2.252
SAR 1g (W/Kg)	5.564
Variation (%)	-0.58
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	41.76

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	10.932	5.914	2.469	1.081	0.492	0.234	0.115



F. 3D Image

3D screen shot	Hot spot position
	

6# System check at 2450 MHz
Date of measurement: 6/2/2025

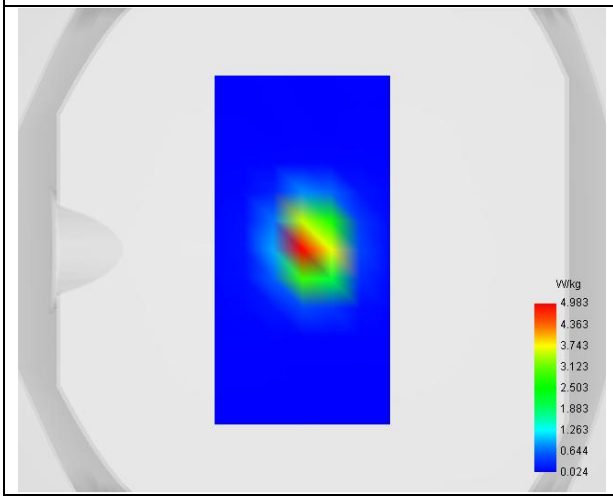
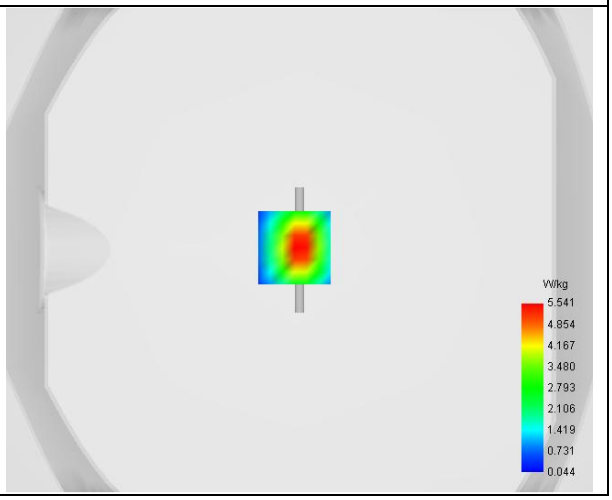
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.74
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Channels/Frequency	Middle
Signal	CW

B. Permitivity

Middle TX Frequency (MHz)	2450.000
Relative permitivity (real part)	38.28
Relative permitivity (imaginary part)	13.07
Conductivity (S/m)	1.78

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

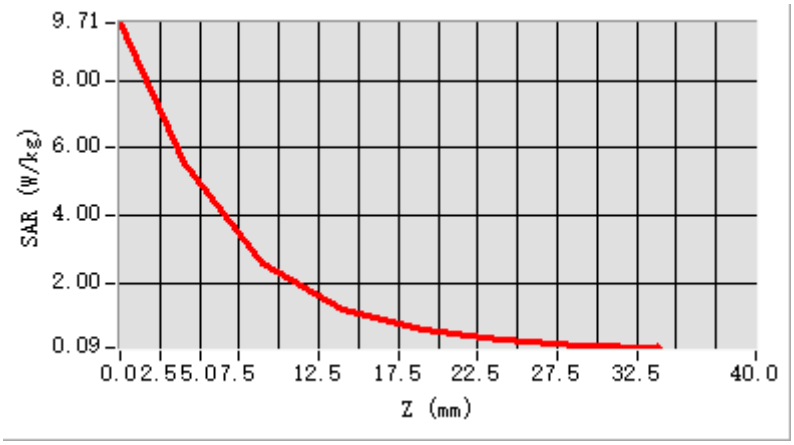
Maximum location: X=-2.00, Y=1.00 ; SAR Peak: 9.98 W/kg

D. SAR 1g & 10g

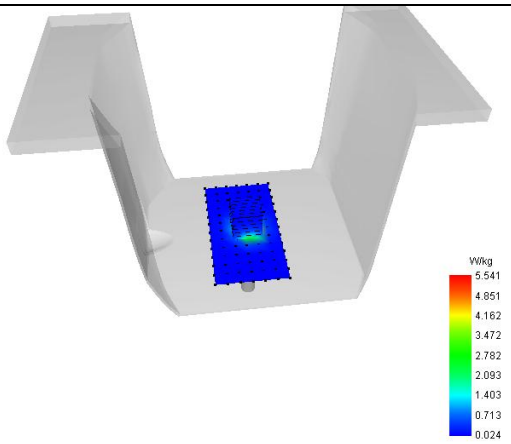
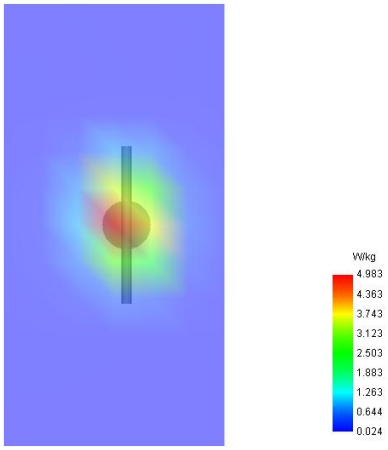
SAR 10g (W/Kg)	2.242
SAR 1g (W/Kg)	5.236
Variation (%)	-0.47
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	46.17

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	9.710	5.541	2.558	1.232	0.604	0.306	0.164



F. 3D Image

3D screen shot	Hot spot position
	

7# System check at 2600 MHz
Date of measurement: 28/1/2025

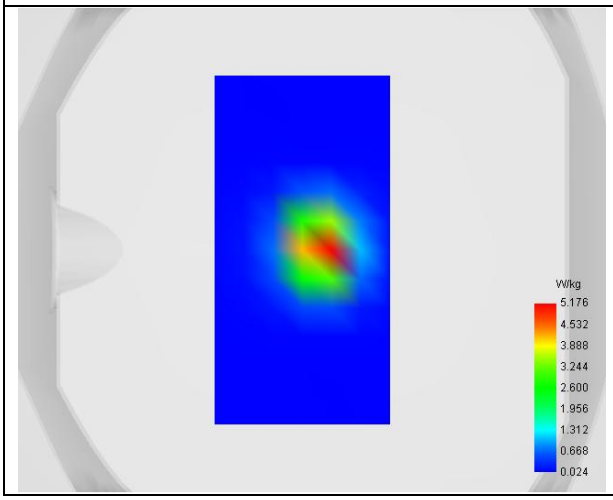
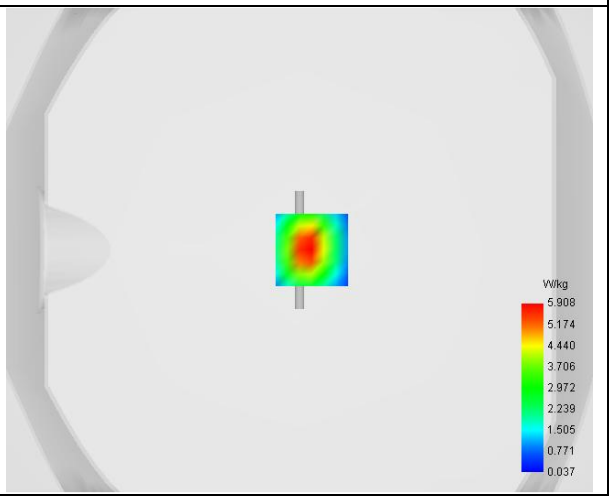
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW2600
Channels/Frequency	Middle
Signal	CW

B. Permitivity

Middle TX Frequency (MHz)	2600.000
Relative permitivity (real part)	38.77
Relative permitivity (imaginary part)	13.63
Conductivity (S/m)	1.97

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

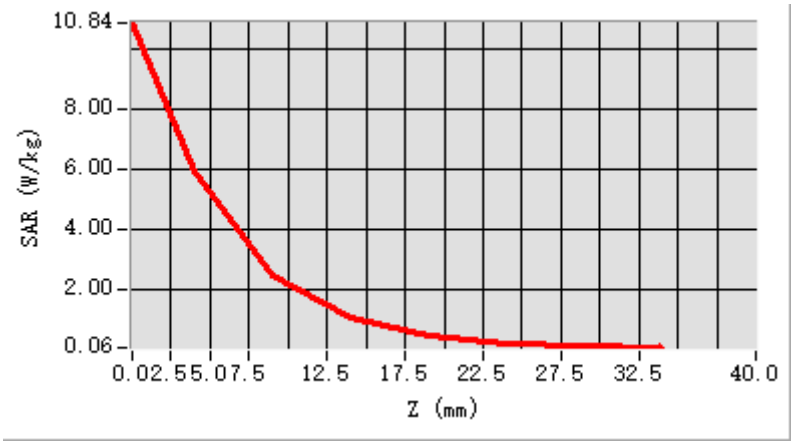
Maximum location: X=5.00, Y=0.00 ; SAR Peak: 10.87 W/kg

D. SAR 1g & 10g

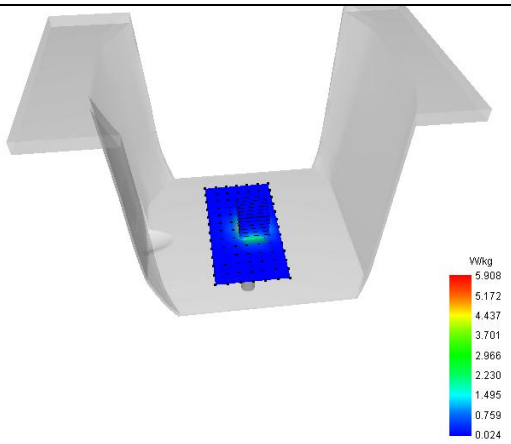
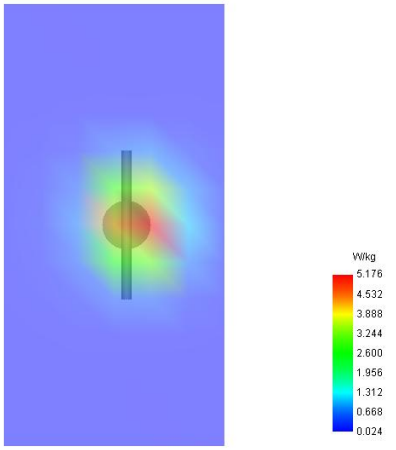
SAR 10g (W/Kg)	2.275
SAR 1g (W/Kg)	5.470
Variation (%)	-0.83
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	42.14

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	10.842	5.908	2.490	1.066	0.475	0.224	0.114



F. 3D Image

3D screen shot	Hot spot position
	

8# System check at 3300 MHz
Date of measurement: 8/3/2025

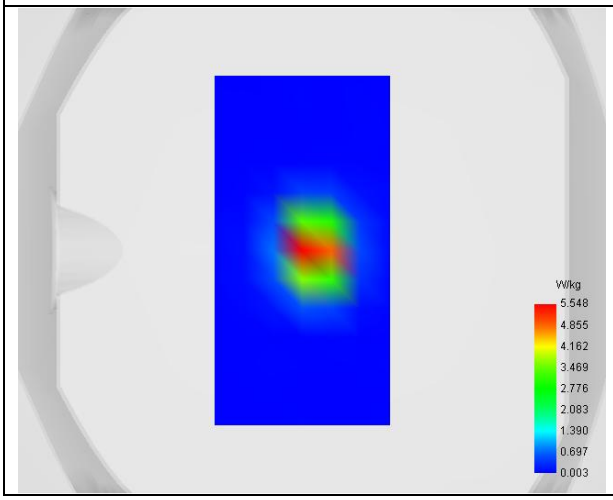
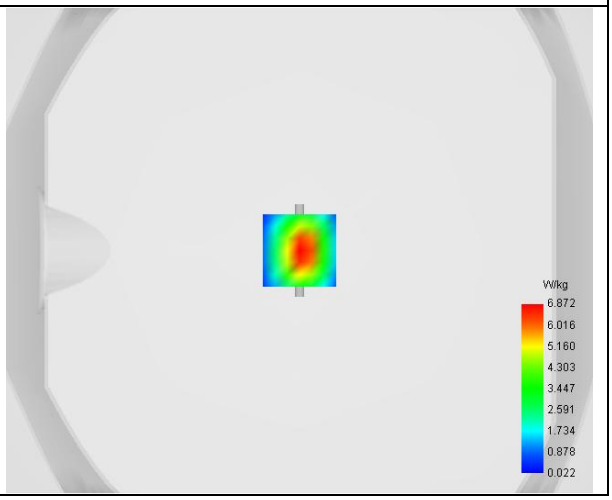
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.11
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW3300
Signal	CW
Channels/Frequency	Middle

B. Permitivity

Middle TX Frequency (MHz)	3300.00
Relative permitivity (real part)	39.27
Relative permitivity (imaginary part)	14.47
Conductivity (S/m)	2.65

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

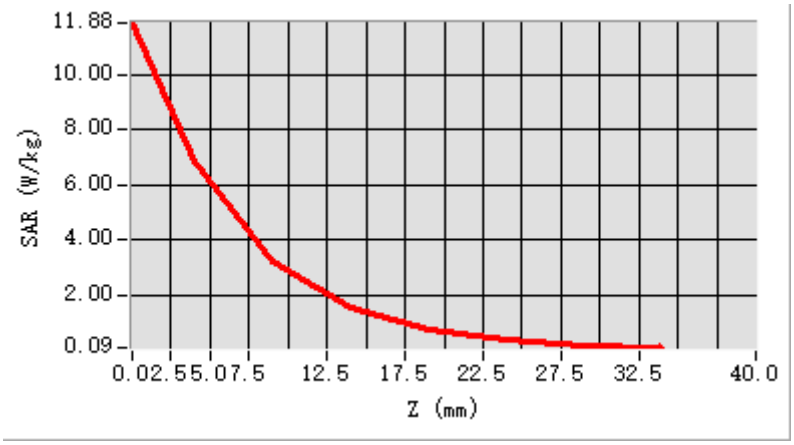
Maximum location: X=0.00, Y=0.00 ; SAR Peak: 11.88 W/kg

D. SAR 1g & 10g

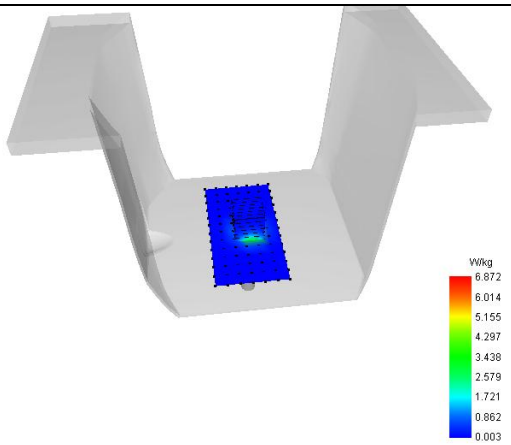
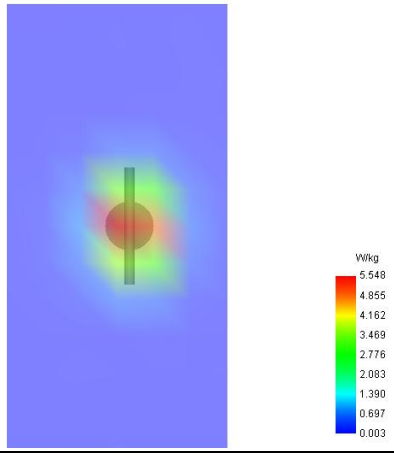
SAR 10g (W/Kg)	2.694
SAR 1g (W/Kg)	6.266
Variation (%)	-0.19
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	47.23

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	11.883	6.872	3.246	1.578	0.777	0.375	0.185



F. 3D Image

3D screen shot	Hot spot position
	

9# System check at 3500 MHz
Date of measurement: 24/2/2025

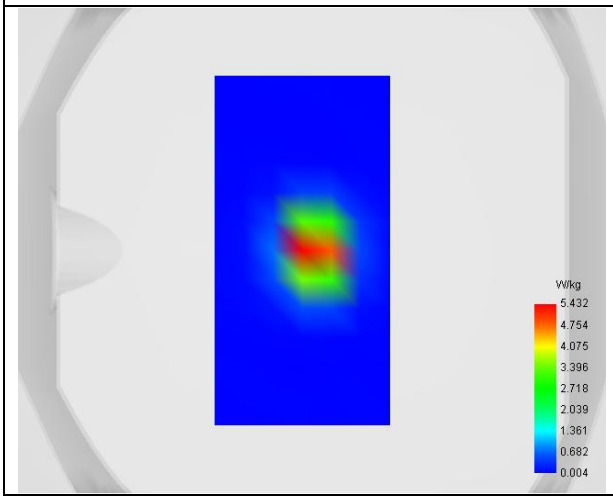
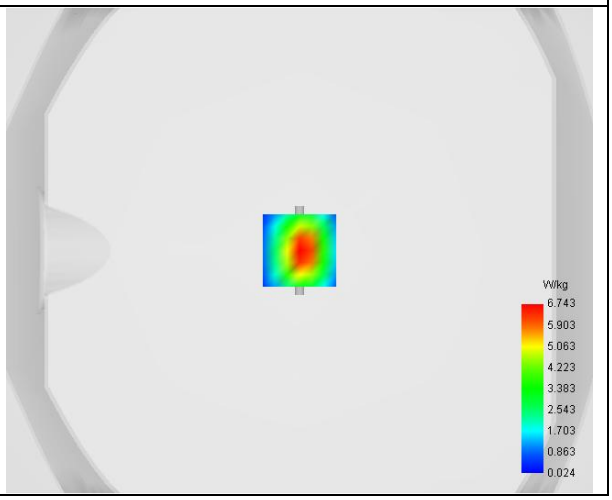
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.15
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW3500
Signal	CW
Channels/Frequency	Middle

B. Permitivity

Middle TX Frequency (MHz)	3500.00
Relative permitivity (real part)	37.52
Relative permitivity (imaginary part)	14.49
Conductivity (S/m)	2.82

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

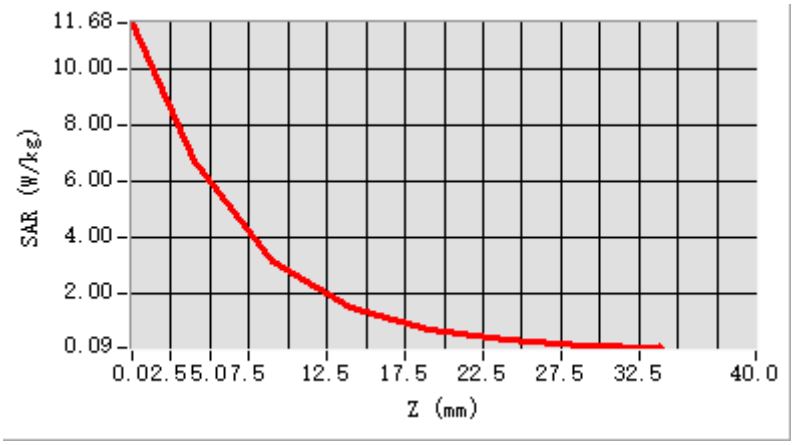
Maximum location: X=0.00, Y=0.00 ; SAR Peak: 11.71 W/kg

D. SAR 1g & 10g

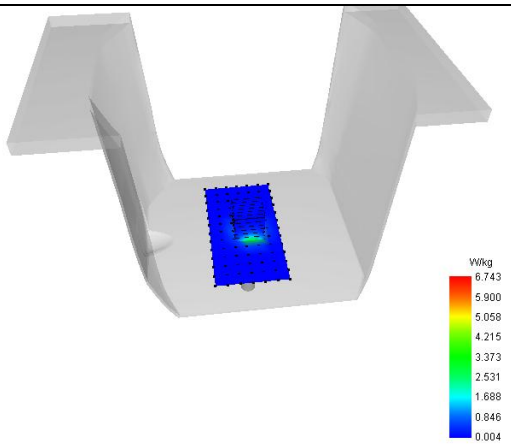
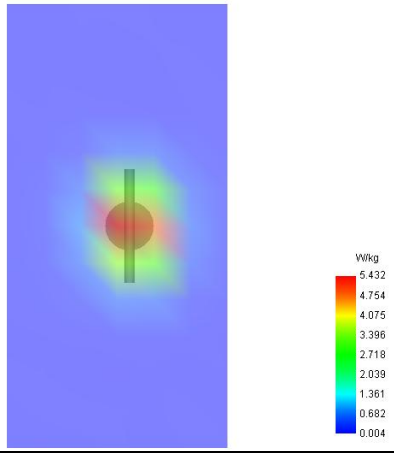
SAR 10g (W/Kg)	2.640
SAR 1g (W/Kg)	6.169
Variation (%)	-0.02
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	46.98

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	11.678	6.743	3.168	1.535	0.750	0.373	0.194



F. 3D Image

3D screen shot	Hot spot position
	

10# System check at 3700 MHz
Date of measurement: 25/2/2025

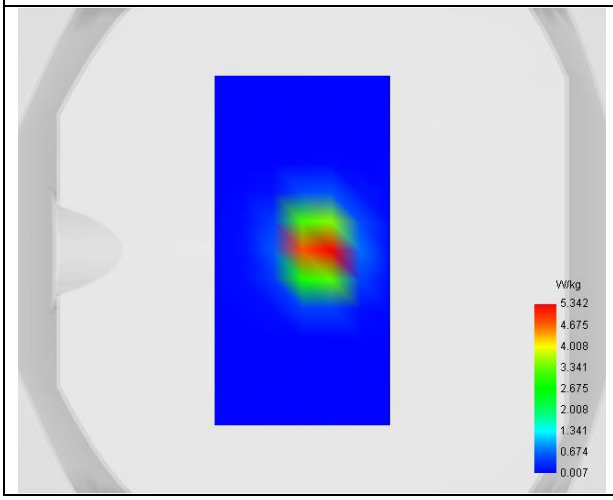
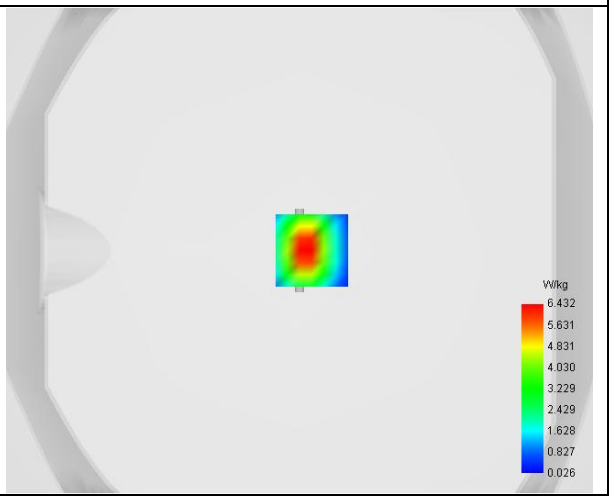
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.08
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW3700
Signal	CW
Channels/Frequency	Middle

B. Permitivity

Middle TX Frequency (MHz)	3700.00
Relative permitivity (real part)	36.98
Relative permitivity (imaginary part)	15.04
Conductivity (S/m)	3.09

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

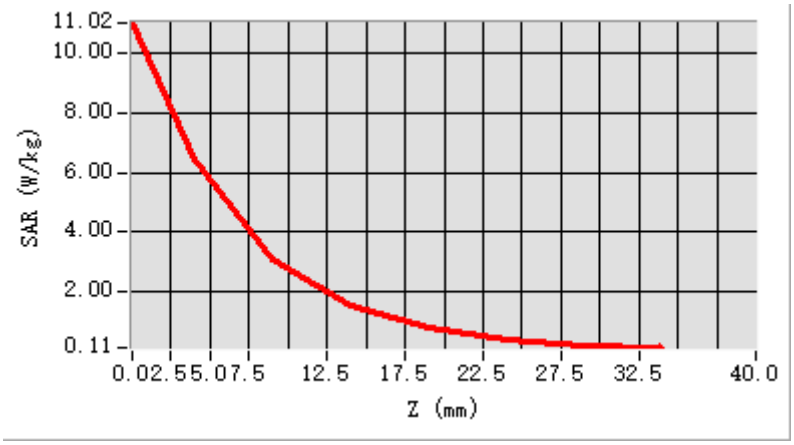
Maximum location: X=5.00, Y=0.00 ; SAR Peak: 11.44 W/kg

D. SAR 1g & 10g

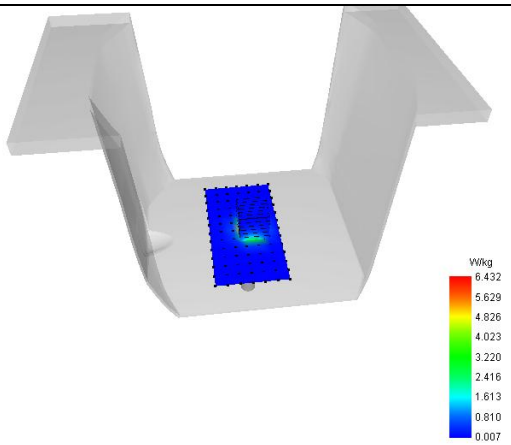
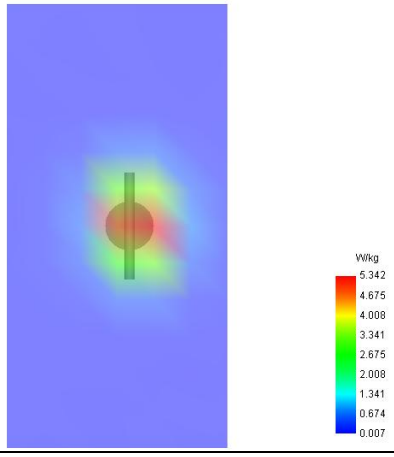
SAR 10g (W/Kg)	2.609
SAR 1g (W/Kg)	6.035
Variation (%)	-0.97
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	48.05

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	11.017	6.432	3.091	1.495	0.763	0.370	0.202



F. 3D Image

3D screen shot	Hot spot position
	

11# System check at 4200 MHz
Date of measurement: 182/2025

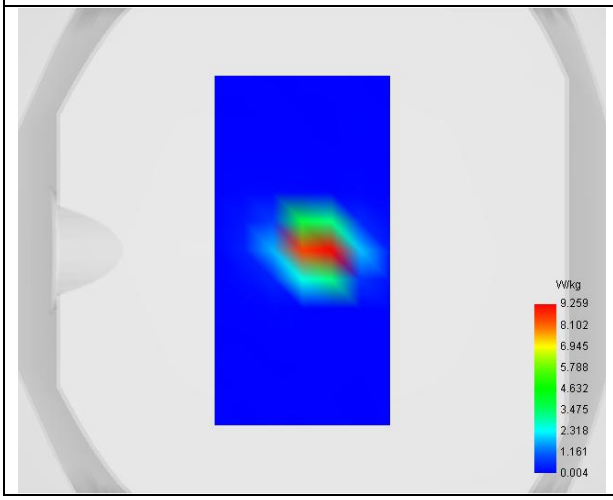
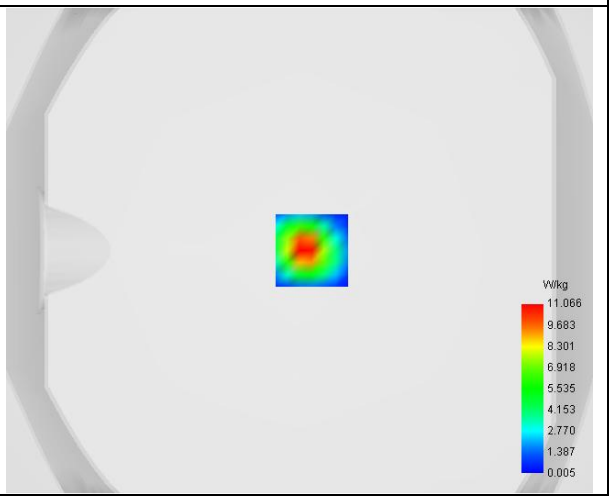
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.39
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW4200
Signal	CW
Channels/Frequency	Middle

B. Permitivity

Middle TX Frequency (MHz)	4200.00
Relative permitivity (real part)	38.08
Relative permitivity (imaginary part)	15.21
Conductivity (S/m)	3.55

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

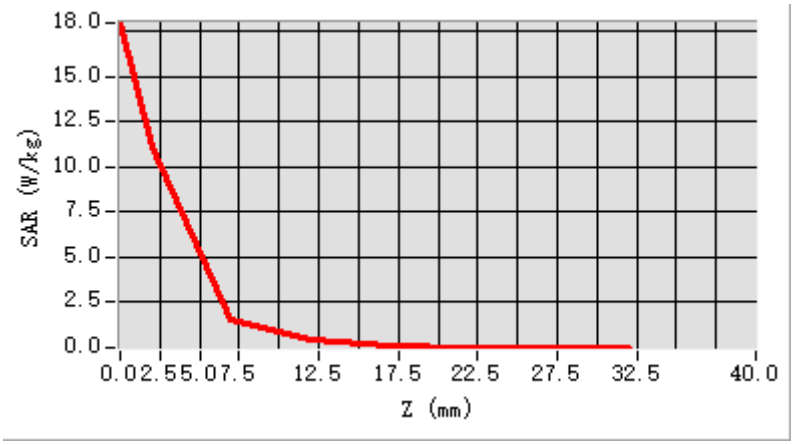
Maximum location: X=5.00, Y=0.00 ; SAR Peak: 18.81 W/kg

D. SAR 1g & 10g

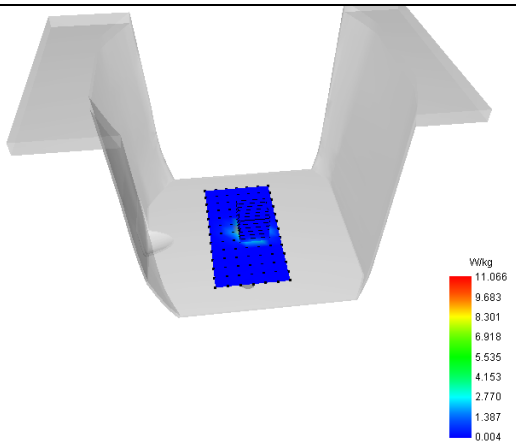
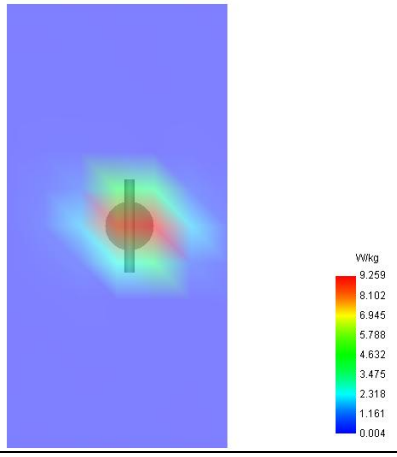
SAR 10g (W/Kg)	2.273
SAR 1g (W/Kg)	7.151
Variation (%)	0.38
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	21.01

E. Z Axis Scan

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	17.964	11.066	1.589	0.482	0.078	0.042	0.020



F. 3D Image

3D screen shot	Hot spot position
	

12. Appendix C. Plots of High SAR Measurement

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22# SAR Measurement at LTE band 28 (Body, Validation Plane)
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32# SAR Measurement at NR band 20 (Body, Validation Plane)
33# SAR Measurement at NR band 28 (Cheek, Left)
34# SAR Measurement at NR band 28 (Body, Validation Plane)
35# SAR Measurement at NR band 40 (Cheek, Left)
36# SAR Measurement at NR band 40 (Body, Validation Plane)
37# SAR Measurement at NR band 77 (Cheek, Left)
38# SAR Measurement at NR band 77 (Body, Validation Plane)
39# SAR Measurement at NR band 78 (Cheek, Left)
40# SAR Measurement at NR band 78 (Body, Validation Plane)
41# SAR Measurement at LTE band 41 (Cheek, Left)
42# SAR Measurement at LTE band 41 (Body, Validation Plane)
43# SAR Measurement at NR band 41 (Cheek, Left)
44# SAR Measurement at NR band 41 (Body, Validation Plane)

1# SAR Measurement at GSM1800 (Cheek, Left)
Date of measurement: 24/1/2025

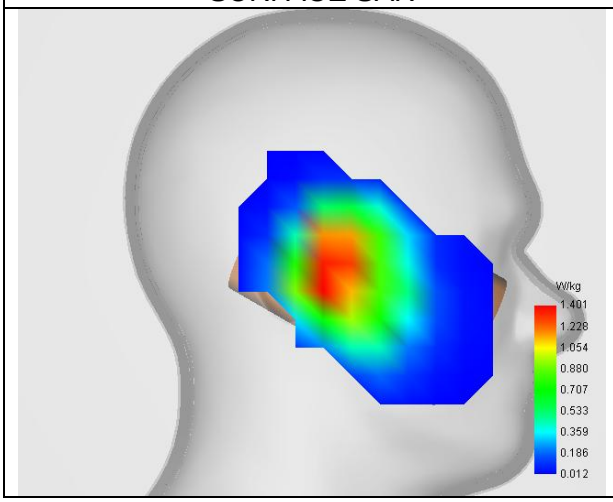
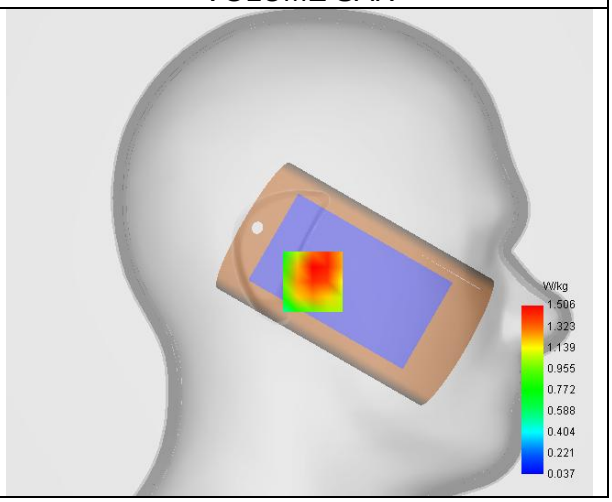
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	GSM1800
Channels/Frequency	Middle (698)/ frequency 1747.400 Mhz
Signal	TDMA (GPRS)
Modulation	GMSK (CS-4)
TX-slots	4

B. Permitivity

Middle TX Frequency (MHz)	1747.400
Relative permitivity (real part)	39.78
Relative permitivity (imaginary part)	13.94
Conductivity (S/m)	1.35

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

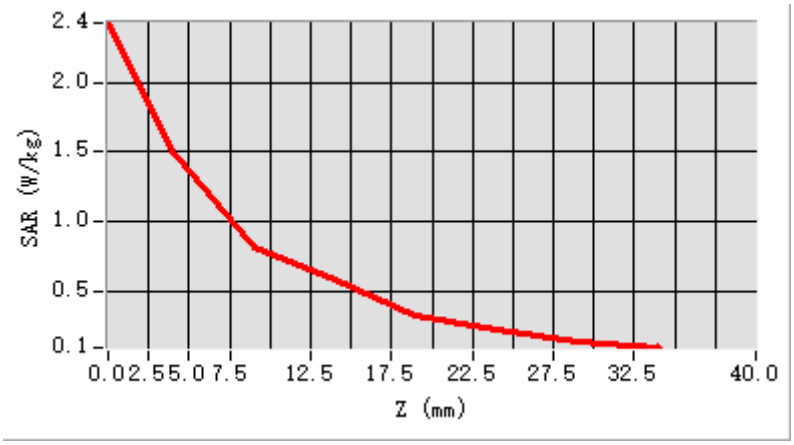
Maximum location: X=-7.00, Y=-16.00 ; SAR Peak: 2.26 W/kg

D. SAR 1g & 10g

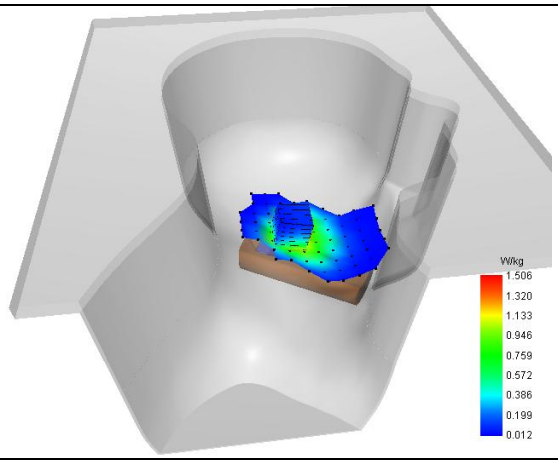
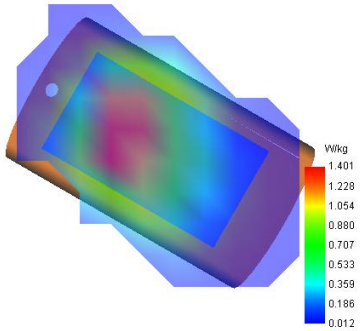
SAR 10g (W/Kg)	0.853
SAR 1g (W/Kg)	1.442
Variation (%)	-2.39
Horizontal validation criteria: minimum distance (mm)	17.08
Vertical validation criteria: SAR ratio M2/M1 (%)	59.62

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.428	1.506	0.817	0.587	0.325	0.232	0.140



F. 3D Image

3D screen shot	Hot spot position
	

2# SAR Measurement at GSM1800 (Body, Validation Plane)
Date of measurement: 24/1/2025

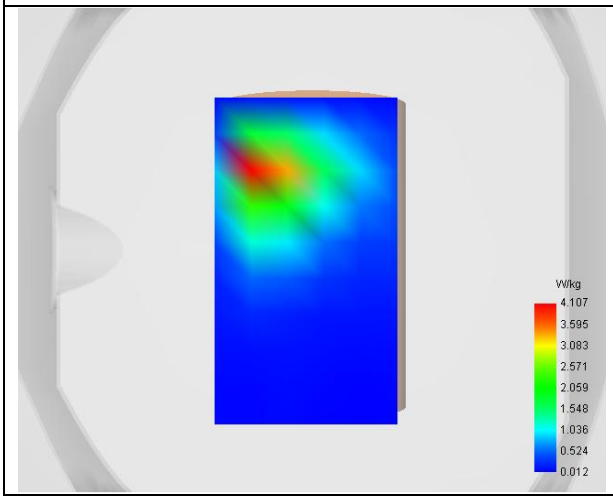
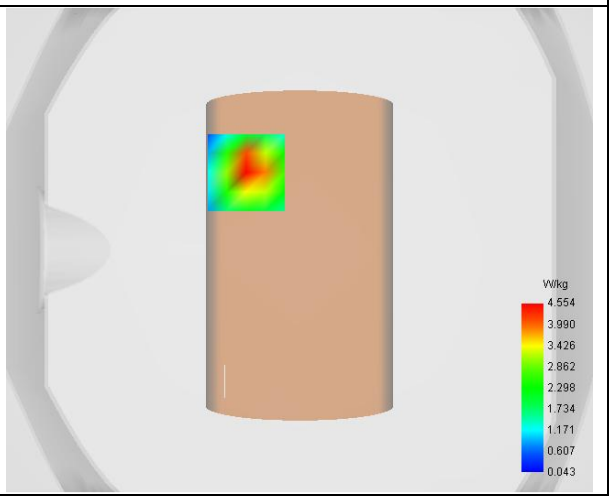
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	GPRS 1800
Channels/Frequency	Middle (698)/ frequency 1747.400 Mhz
Signal	TDMA (GPRS)
Modulation	GMSK (CS-4)
TX-slots	4

B. Permitivity

Middle TX Frequency (MHz)	1747.400
Relative permitivity (real part)	39.78
Relative permitivity (imaginary part)	13.94
Conductivity (S/m)	1.35

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

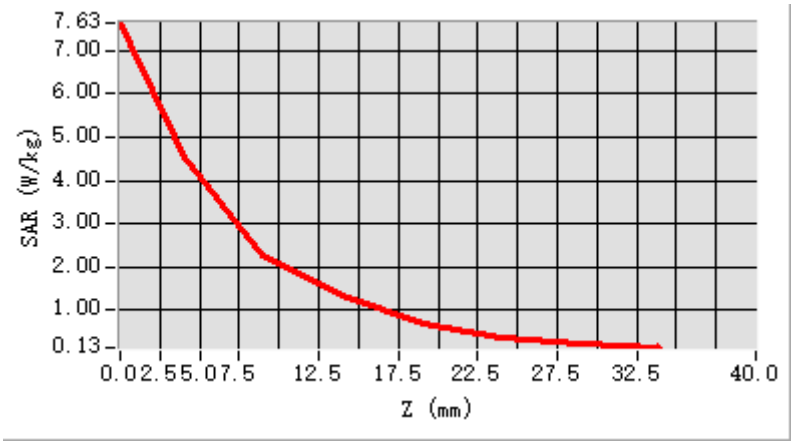
Maximum location: X=-22.00, Y=32.00 ; SAR Peak: 8.02 W/kg

D. SAR 1g & 10g

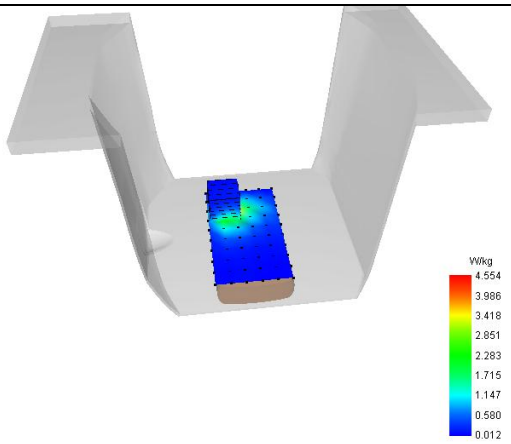
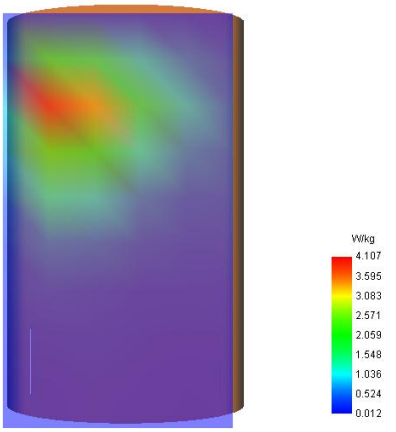
SAR 10g (W/Kg)	2.093
SAR 1g (W/Kg)	4.331
Variation (%)	0.88
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	50.11

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	7.634	4.554	2.282	1.353	0.704	0.375	0.219



F. 3D Image

3D screen shot	Hot spot position
	

3# SAR Measurement at GPRS900 (Cheek, Left)
Date of measurement: 31/1/2025

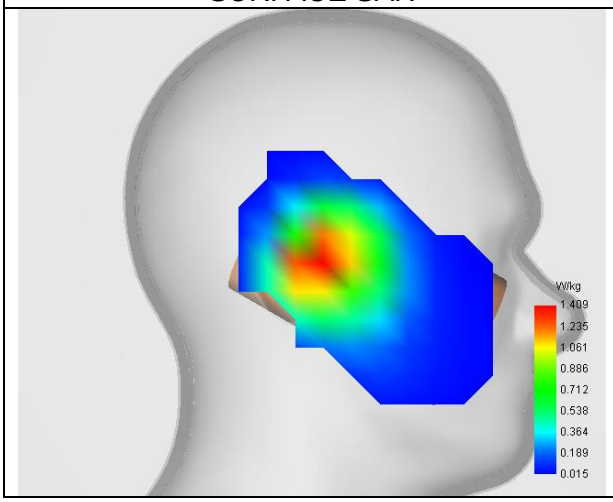
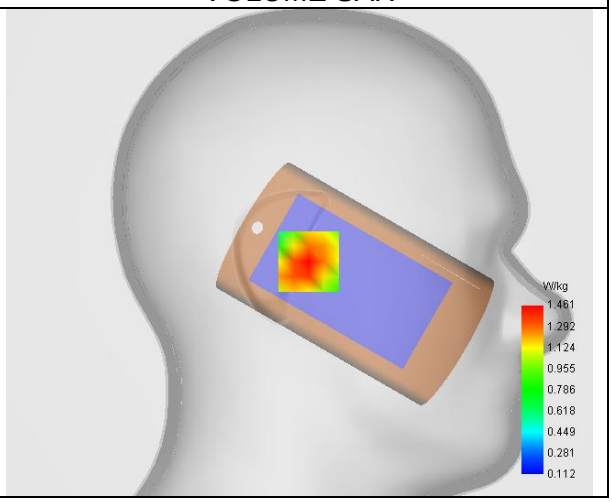
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.24
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	GPRS900
Channels/Frequency	Middle (38)/ frequency 897.600 Mhz
Signal	TDMA (GPRS)
Modulation	GMSK (CS-4)
TX-slots	3

B. Permitivity

Middle TX Frequency (MHz)	897.600
Relative permitivity (real part)	41.05
Relative permitivity (imaginary part)	19.67
Conductivity (S/m)	0.98

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

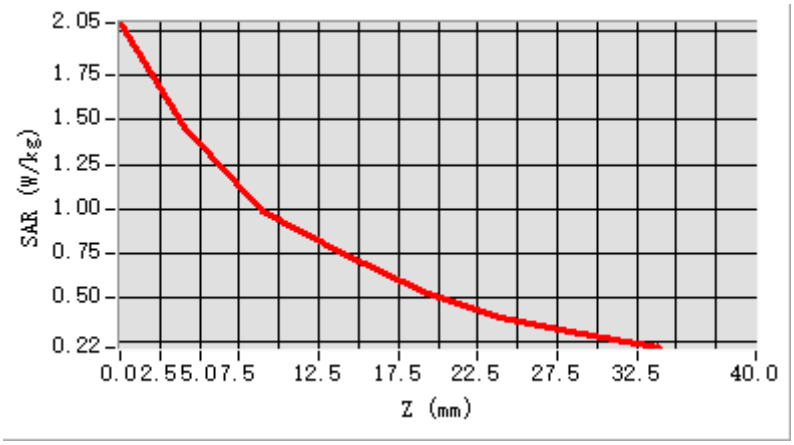
Maximum location: X=-5.00, Y=-5.00 ; SAR Peak: 2.04 W/kg

D. SAR 1g & 10g

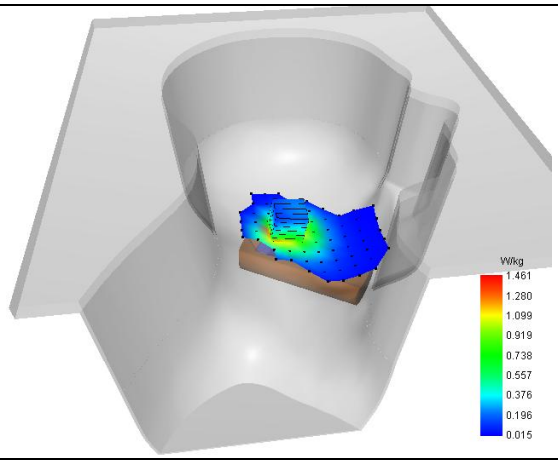
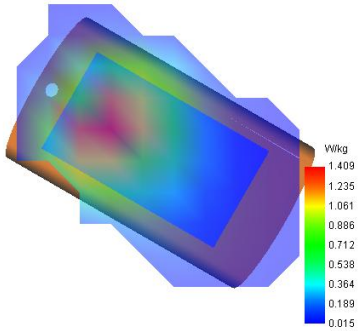
SAR 10g (W/Kg)	0.939
SAR 1g (W/Kg)	1.409
Variation (%)	-0.74
Horizontal validation criteria: minimum distance (mm)	22.16
Vertical validation criteria: SAR ratio M2/M1 (%)	67.27

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.045	1.461	0.983	0.756	0.541	0.394	0.301



F. 3D Image

3D screen shot	Hot spot position
	

4# SAR Measurement at GPRS900 (Body, Validation Plane)
Date of measurement: 31/1/2025

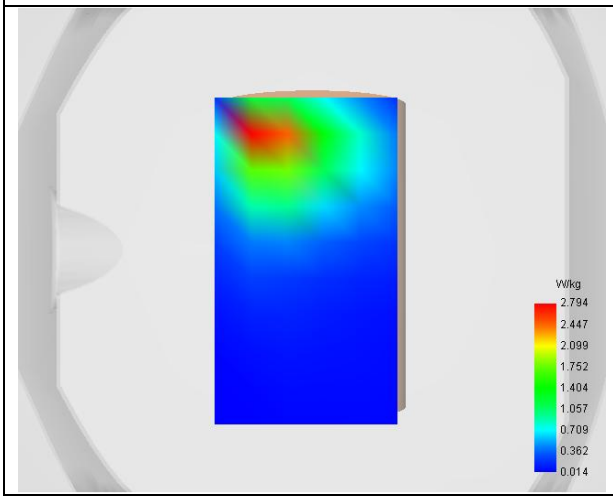
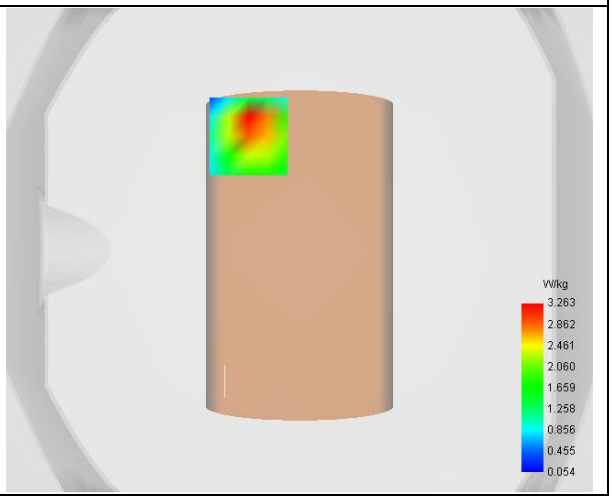
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.24
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	GPRS900
Channels/Frequency	Middle (38)/ frequency 897.600 Mhz
Signal	TDMA (GPRS)
Modulation	GMSK (CS-4)
TX-slots	3

B. Permitivity

Middle TX Frequency (MHz)	897.600
Relative permitivity (real part)	41.05
Relative permitivity (imaginary part)	19.67
Conductivity (S/m)	0.98

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

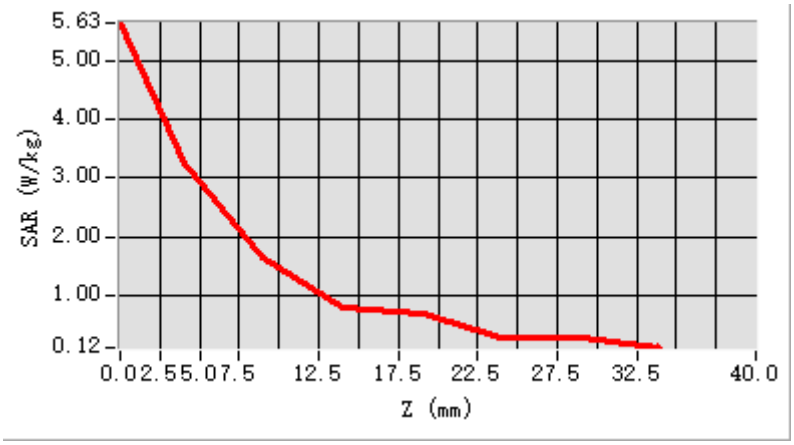
Maximum location: X=-21.00, Y=47.00 ; SAR Peak: 5.84 W/kg

D. SAR 1g & 10g

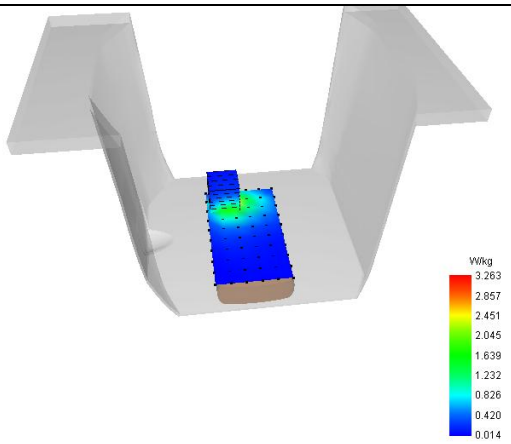
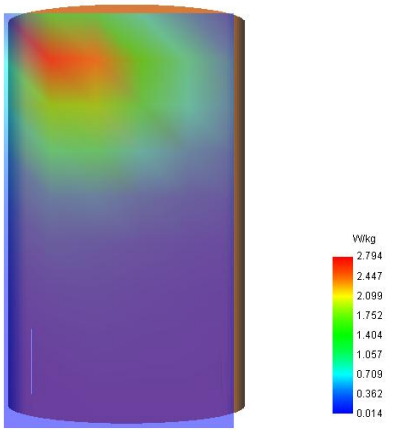
SAR 10g (W/Kg)	1.558
SAR 1g (W/Kg)	3.124
Variation (%)	0.95
Horizontal validation criteria: minimum distance (mm)	8.00
Vertical validation criteria: SAR ratio M2/M1 (%)	47.22

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	5.634	3.263	1.657	0.783	0.690	0.276	0.278



F. 3D Image

3D screen shot	Hot spot position
	

5# SAR Measurement at Band 1 (UMTS) (Cheek, Left)
Date of measurement:1/2/2025

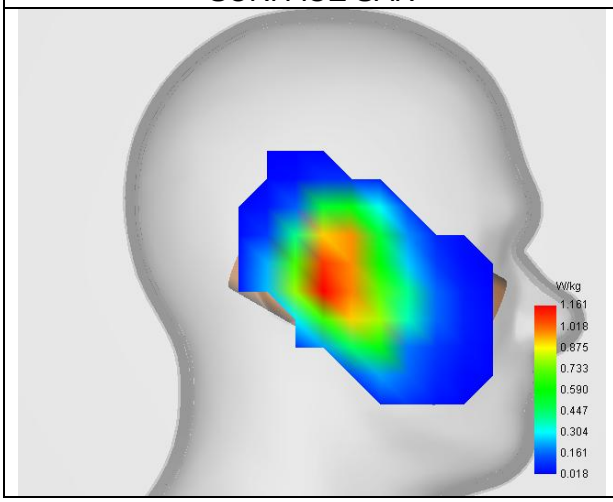
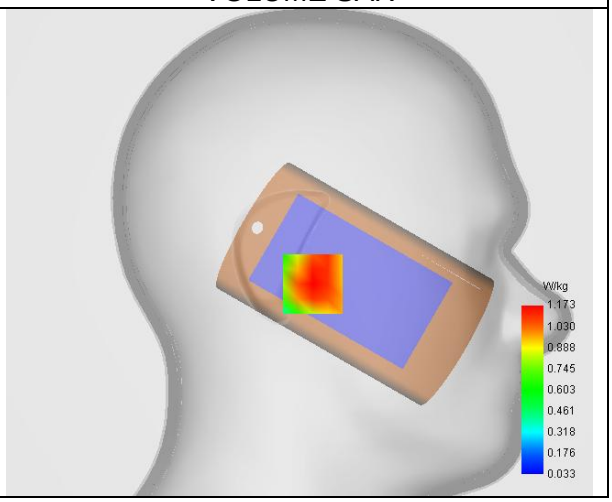
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.57
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	Band 1 (UMTS)
Channels/Frequency	Middle (9750)/ frequency 1950.000 Mhz
Signal	WCDMA
Mode	Release 99
Connection Type	RMC, 12.2 kbps

B. Permitivity

Middle TX Frequency (MHz)	1950.000
Relative permitivity (real part)	38.55
Relative permitivity (imaginary part)	12.80
Conductivity (S/m)	1.39

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

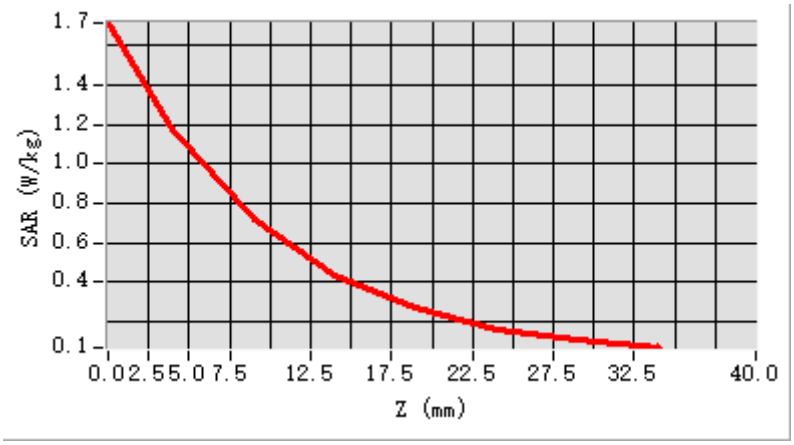
Maximum location: X=-7.00, Y=-17.00 ; SAR Peak: 1.72 W/kg

D. SAR 1g & 10g

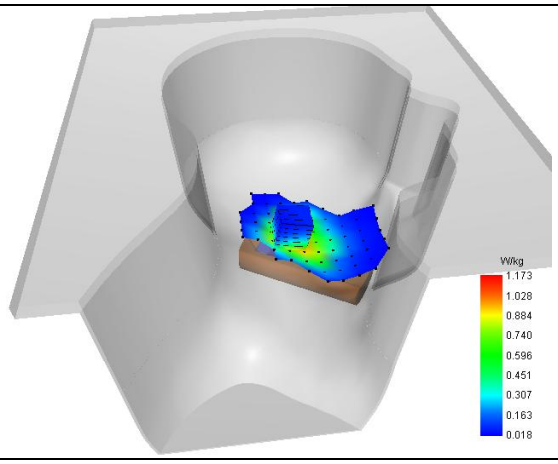
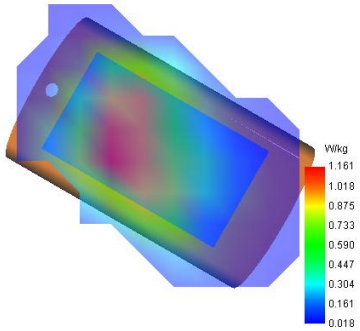
SAR 10g (W/Kg)	0.669
SAR 1g (W/Kg)	1.125
Variation (%)	-0.52
Horizontal validation criteria: minimum distance (mm)	22.25
Vertical validation criteria: SAR ratio M2/M1 (%)	60.93

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.717	1.173	0.715	0.434	0.266	0.161	0.104



F. 3D Image

3D screen shot	Hot spot position
	

6# SAR Measurement at Band 1 (UMTS) (Body, Validation Plane)
Date of measurement: 1/2/2025

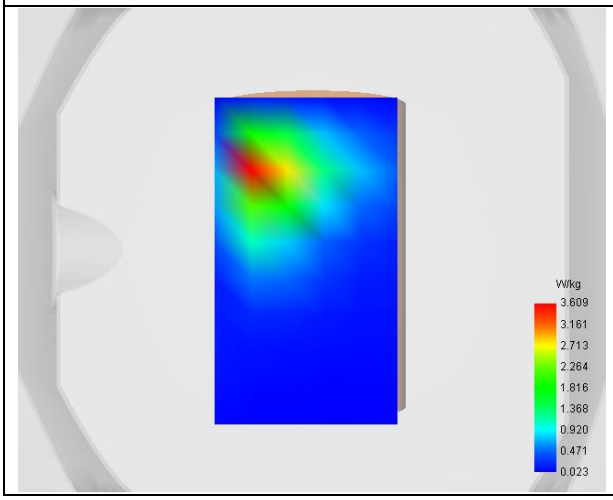
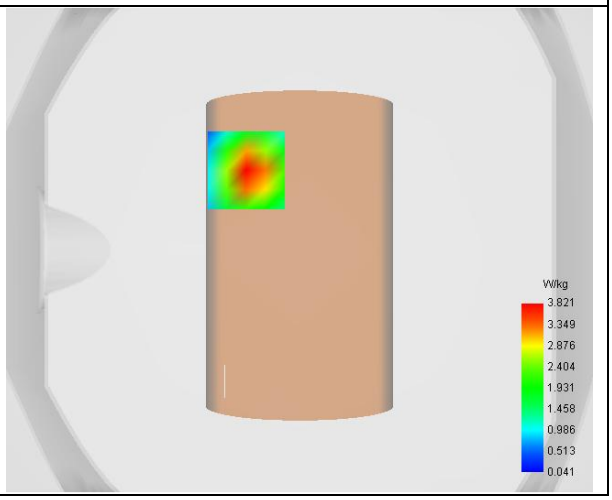
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.57
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	Band 1 (UMTS)
Channels/Frequency	Middle (9750)/ frequency 1950.000 Mhz
Signal	WCDMA
Mode	Release 99
Connection Type	RMC, 12.2 kbps

B. Permitivity

Middle TX Frequency (MHz)	1950.000
Relative permitivity (real part)	38.55
Relative permitivity (imaginary part)	12.80
Conductivity (S/m)	1.39

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

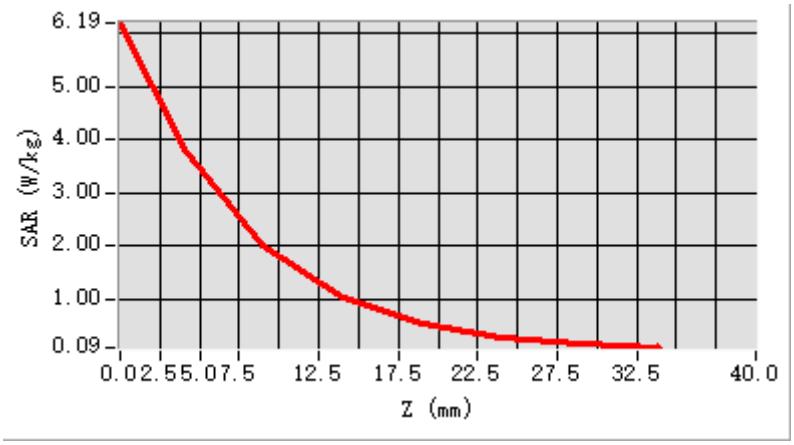
Maximum location: X=-22.00, Y=33.00 ; SAR Peak: 6.21 W/kg

D. SAR 1g & 10g

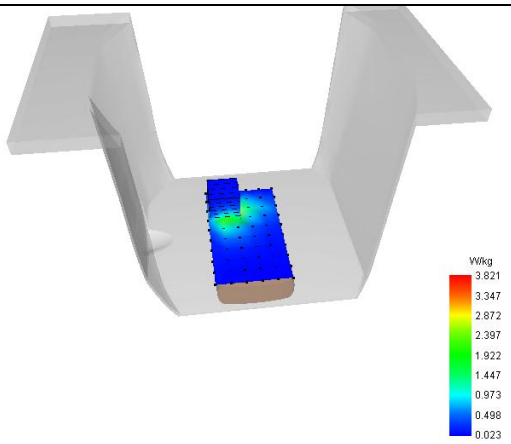
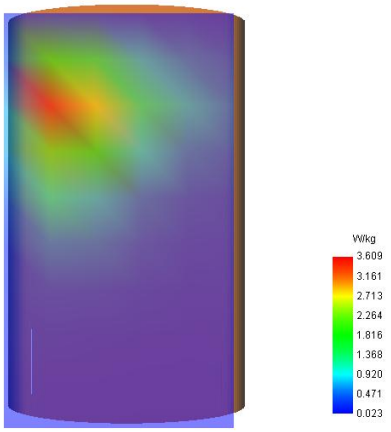
SAR 10g (W/Kg)	1.802
SAR 1g (W/Kg)	3.601
Variation (%)	0.15
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	52.24

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.192	3.821	1.996	1.029	0.537	0.287	0.159



F. 3D Image

3D screen shot	Hot spot position
	

7# SAR Measurement at Band 8 (900) (Cheek, Left)
Date of measurement: 31/1/2025

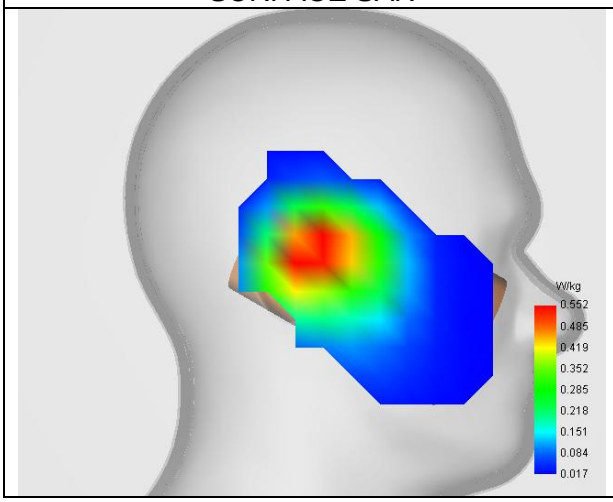
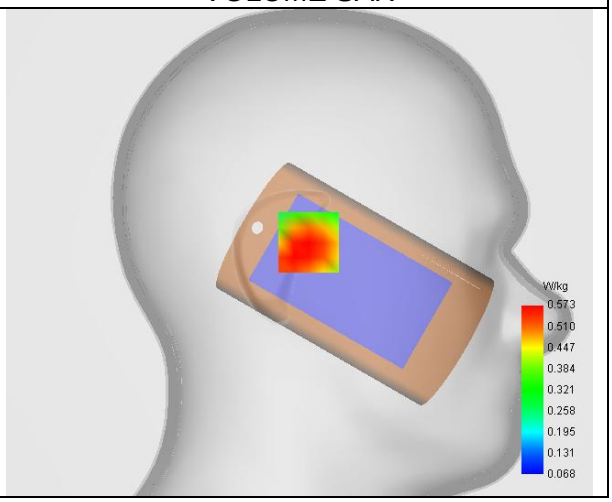
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.24
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	Band 8 (900)
Channels/Frequency	Middle (2788)/ frequency 897.600 Mhz
Signal	WCDMA
Mode	Release 99
Connection Type	RMC, 12.2 kbps

B. Permitivity

Middle TX Frequency (MHz)	897.600
Relative permitivity (real part)	41.05
Relative permitivity (imaginary part)	19.67
Conductivity (S/m)	0.98

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

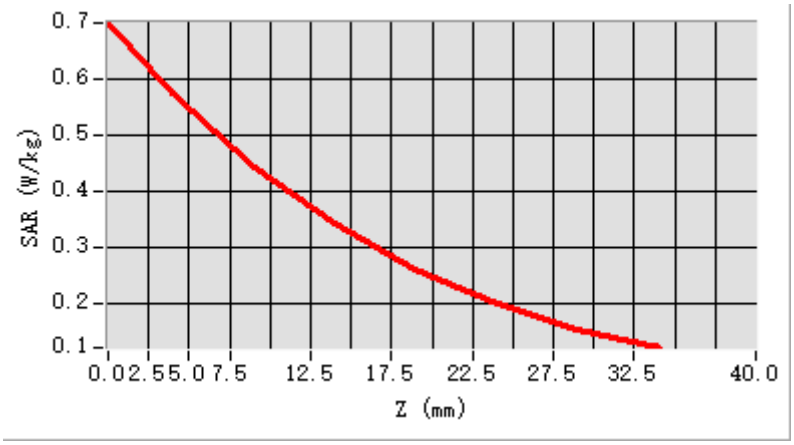
Maximum location: X=-5.00, Y=5.00 ; SAR Peak: 0.73 W/kg

D. SAR 1g & 10g

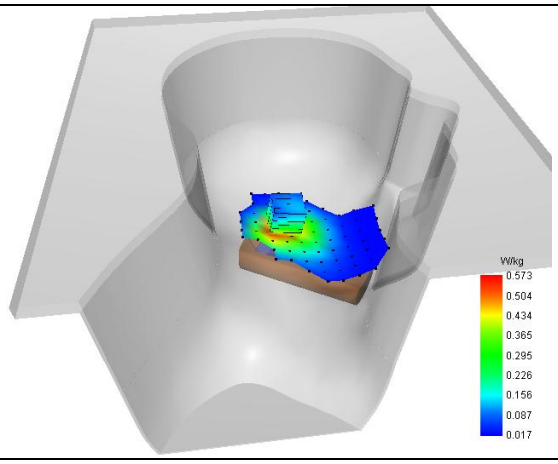
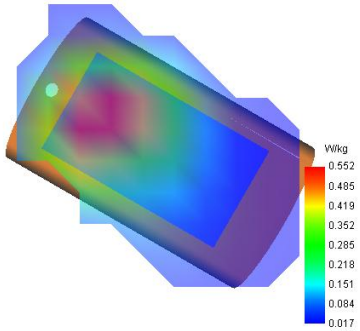
SAR 10g (W/Kg)	0.410
SAR 1g (W/Kg)	0.567
Variation (%)	-1.73
Horizontal validation criteria: minimum distance (mm)	22.07
Vertical validation criteria: SAR ratio M2/M1 (%)	77.39

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.700	0.573	0.444	0.343	0.261	0.201	0.154



F. 3D Image

3D screen shot	Hot spot position
	

8# SAR Measurement at Band 8 (900) (Body, Validation Plane)
Date of measurement: 31/1/2025

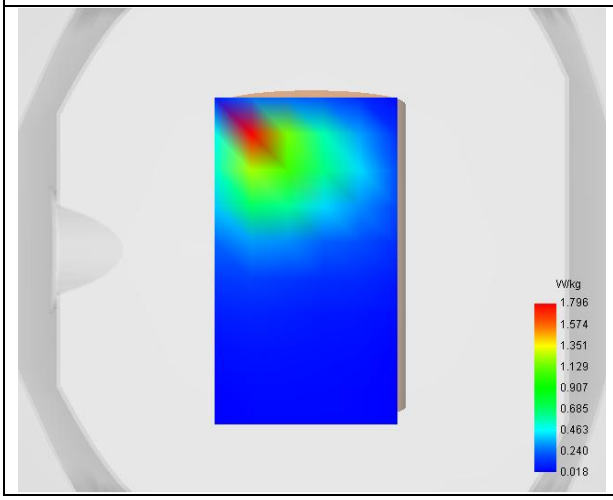
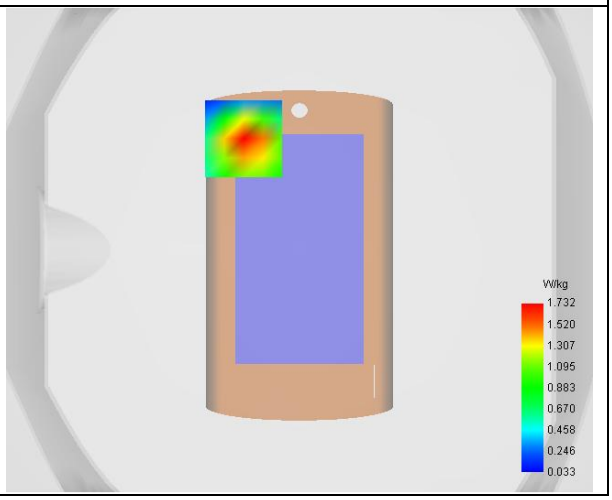
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.24
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	Band 8 (900)
Channels/Frequency	Middle (2788)/ frequency 897.600 Mhz
Signal	WCDMA
Mode	Release 99
Connection Type	RMC, 12.2 kbps

B. Permitivity

Middle TX Frequency (MHz)	897.600
Relative permitivity (real part)	41.05
Relative permitivity (imaginary part)	19.67
Conductivity (S/m)	0.98

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

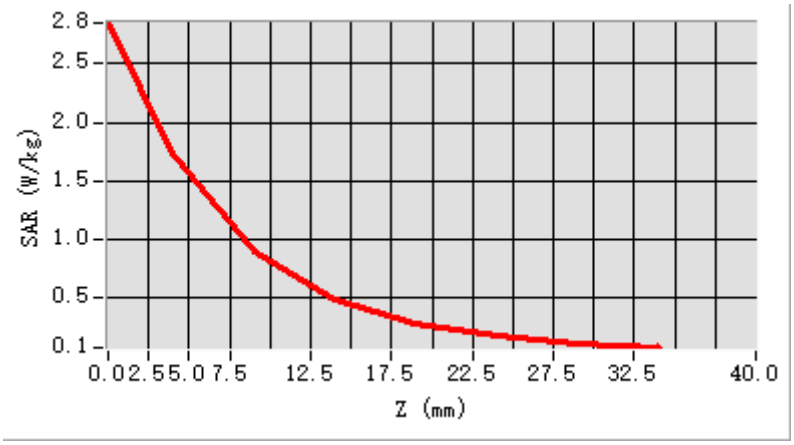
Maximum location: X=-23.00, Y=46.00 ; SAR Peak: 2.88 W/kg

D. SAR 1g & 10g

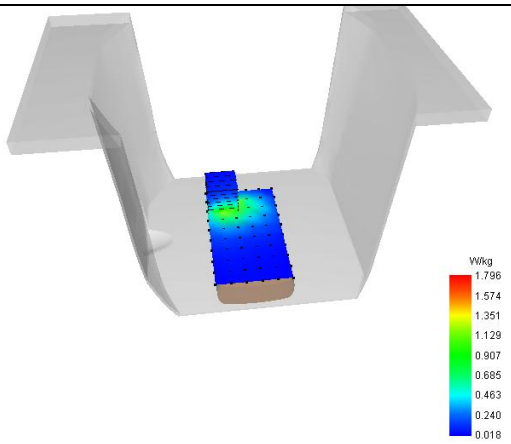
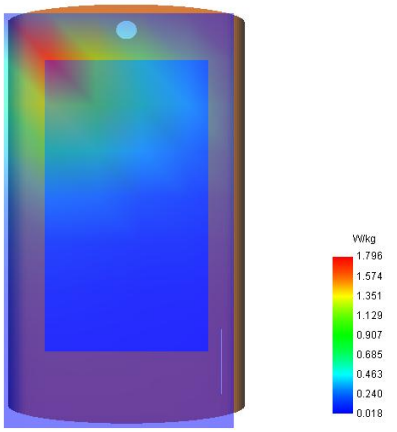
SAR 10g (W/Kg)	0.823
SAR 1g (W/Kg)	1.648
Variation (%)	0.31
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	52.28

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.846	1.732	0.905	0.497	0.291	0.183	0.118



F. 3D Image

3D screen shot	Hot spot position
	

9# SAR Measurement at ISM (Cheek, Left)
Date of measurement: 6/2/2025

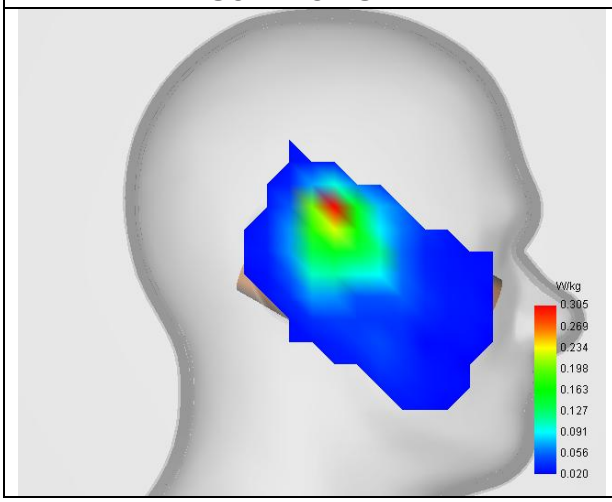
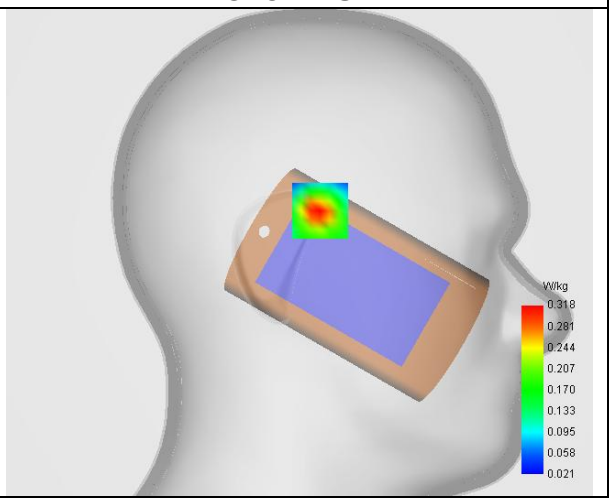
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.74
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	ISM
Channels/Frequency	Middle (7)/ frequency 2442.000 Mhz
Signal	IEEE 802.11 b

B. Permitivity

Middle TX Frequency (MHz)	2442.000
Relative permitivity (real part)	38.36
Relative permitivity (imaginary part)	13.06
Conductivity (S/m)	1.77

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

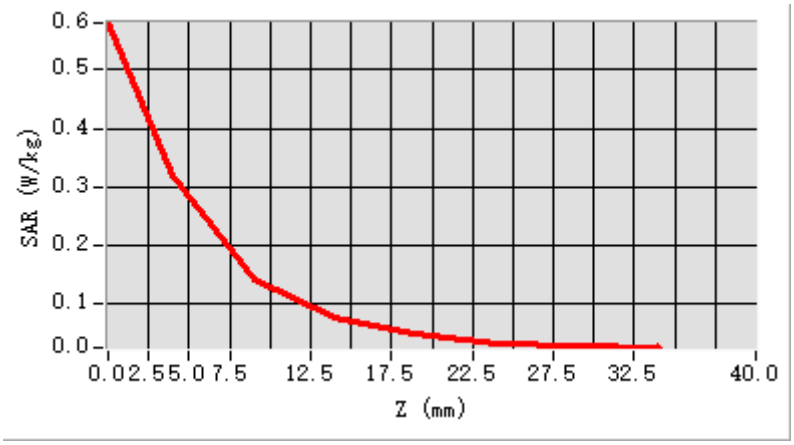
Maximum location: X=-11.00, Y=22.00 ; SAR Peak: 0.57 W/kg

D. SAR 1g & 10g

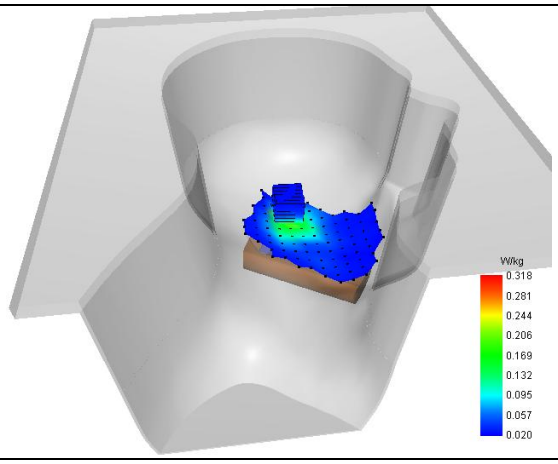
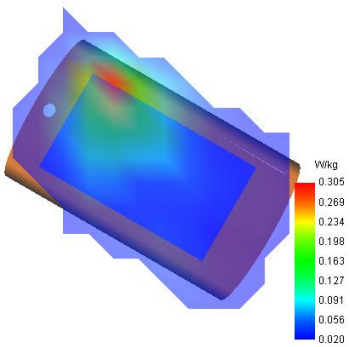
SAR 10g (W/Kg)	0.136
SAR 1g (W/Kg)	0.293
Variation (%)	1.51
Horizontal validation criteria: minimum distance (mm)	11.18
Vertical validation criteria: SAR ratio M2/M1 (%)	44.30

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.580	0.318	0.141	0.077	0.048	0.032	0.029



F. 3D Image

3D screen shot	Hot spot position
	

10# SAR Measurement at ISM (Body, Validation Plane)
Date of measurement: 6/2/2025

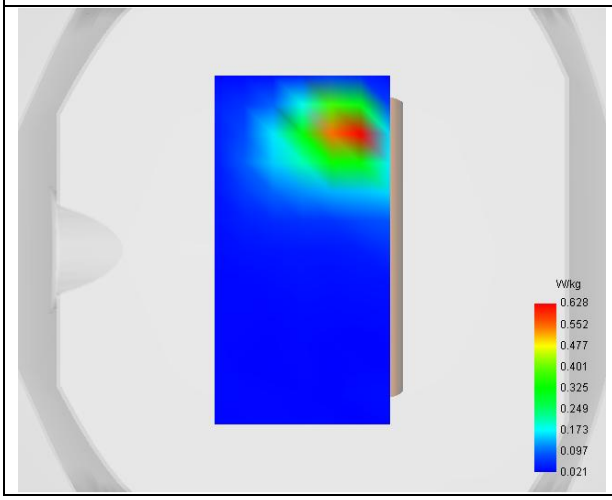
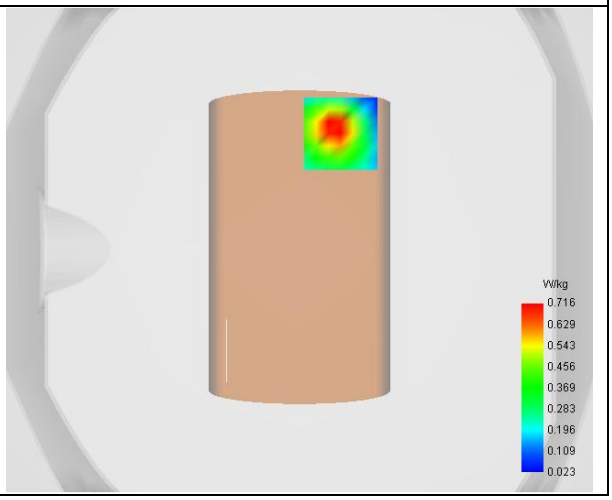
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.74
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	ISM
Channels/Frequency	Middle (7)/ frequency 2442.000 Mhz
Signal	IEEE 802.11 b

B. Permitivity

Middle TX Frequency (MHz)	2442.000
Relative permitivity (real part)	38.36
Relative permitivity (imaginary part)	13.06
Conductivity (S/m)	1.77

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

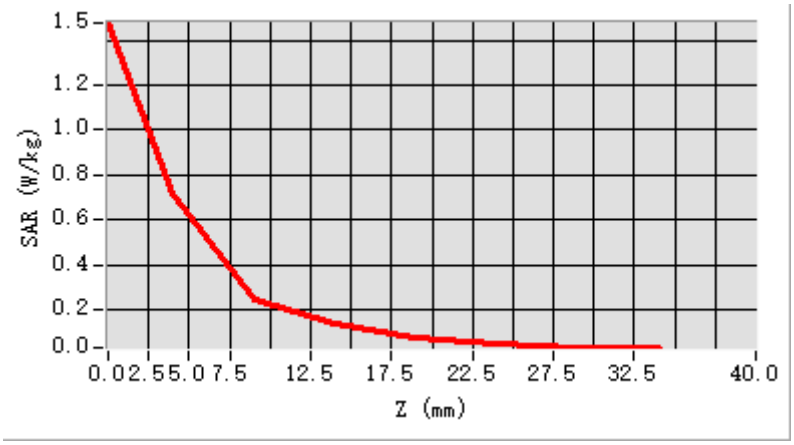
Maximum location: X=17.00, Y=48.00 ; SAR Peak: 1.42 W/kg

D. SAR 1g & 10g

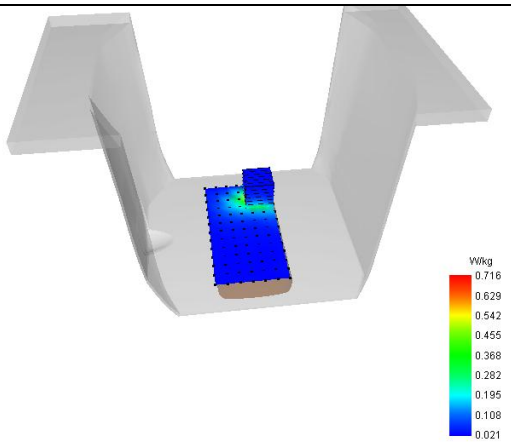
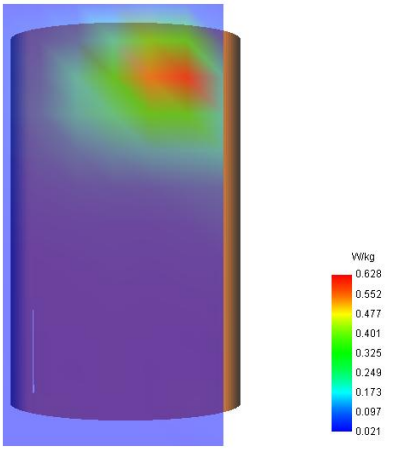
SAR 10g (W/Kg)	0.290
SAR 1g (W/Kg)	0.689
Variation (%)	-0.54
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	38.45

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.477	0.716	0.242	0.133	0.071	0.045	0.032



F. 3D Image

3D screen shot	Hot spot position
	

11# SAR Measurement at LTE band 1 (Cheek, Left)
Date of measurement: 1/2/2025

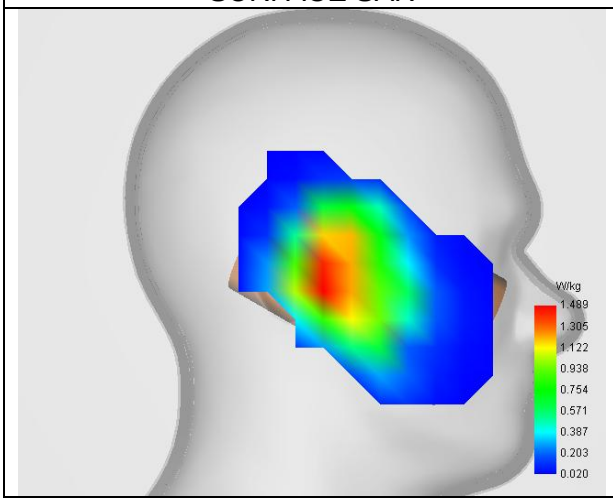
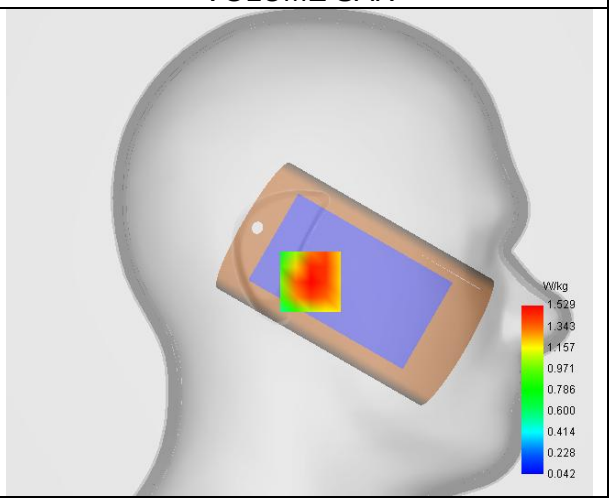
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.57
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	LTE band 1
Channels/Frequency	Middle (18300)/ frequency 1950.000 Mhz
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	1950.000
Relative permitivity (real part)	38.55
Relative permitivity (imaginary part)	12.80
Conductivity (S/m)	1.39

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

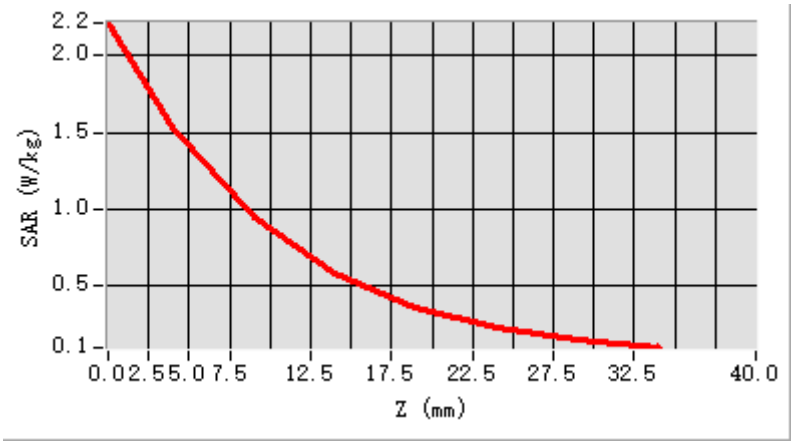
Maximum location: X=-6.00, Y=-16.00 ; SAR Peak: 2.22 W/kg

D. SAR 1g & 10g

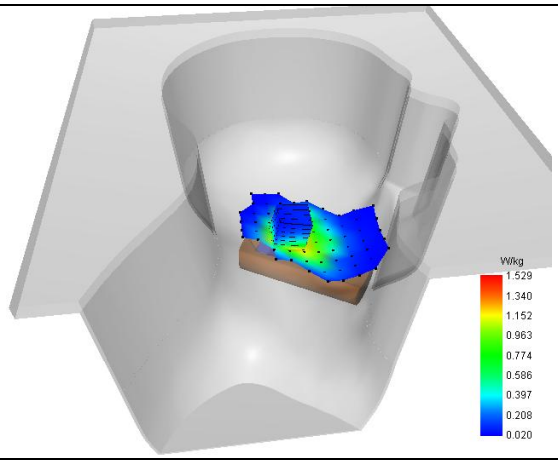
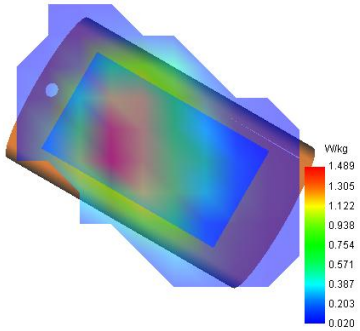
SAR 10g (W/Kg)	0.875
SAR 1g (W/Kg)	1.463
Variation (%)	0.03
Horizontal validation criteria: minimum distance (mm)	22.25
Vertical validation criteria: SAR ratio M2/M1 (%)	61.73

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.216	1.529	0.944	0.579	0.358	0.223	0.142



F. 3D Image

3D screen shot	Hot spot position
	

12# SAR Measurement at LTE band 1 (Body, Validation Plane)
Date of measurement: 1/2/2025

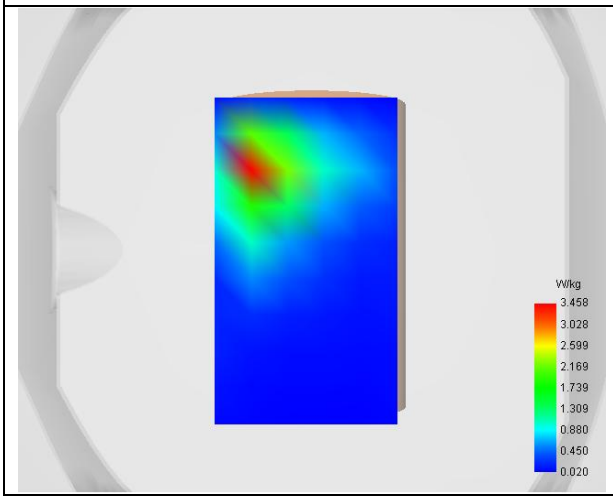
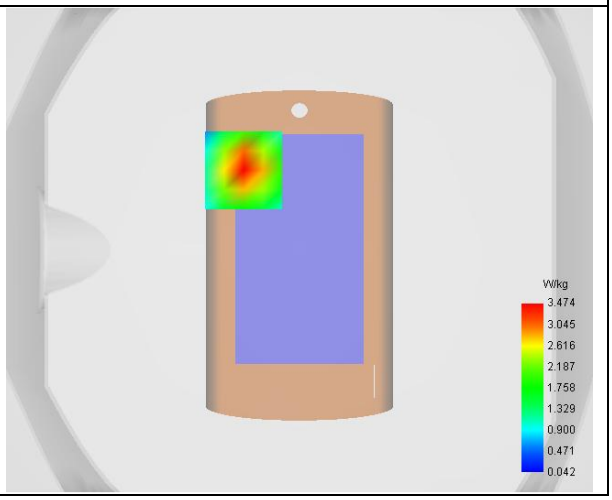
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.57
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 1
Channels/Frequency	Middle (18300)/ frequency 1950.000 Mhz
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	1950.000
Relative permitivity (real part)	38.55
Relative permitivity (imaginary part)	12.80
Conductivity (S/m)	1.39

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

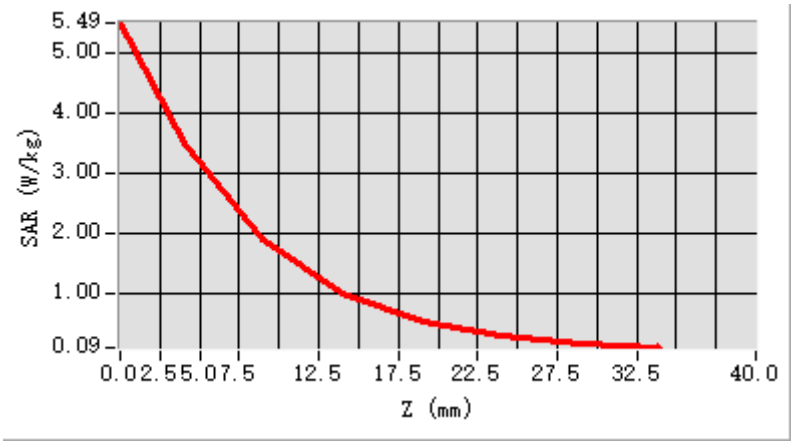
Maximum location: X=-23.00, Y=33.00 ; SAR Peak: 5.62 W/kg

D. SAR 1g & 10g

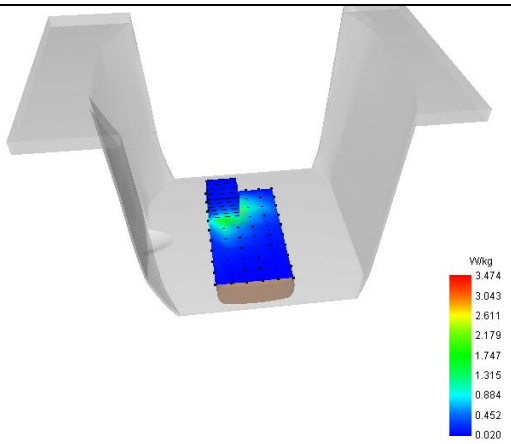
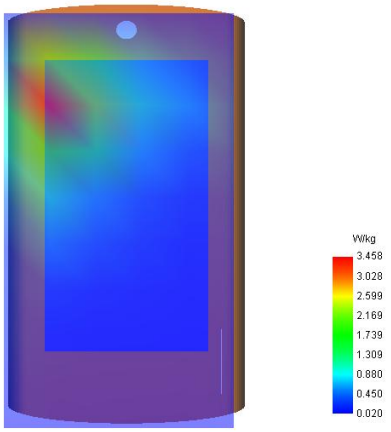
SAR 10g (W/Kg)	1.636
SAR 1g (W/Kg)	3.256
Variation (%)	-0.12
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	54.12

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	5.490	3.474	1.880	0.991	0.524	0.282	0.154



F. 3D Image

3D screen shot	Hot spot position
	

13# SAR Measurement at LTE band 3 (Cheek, Left)
Date of measurement: 24/1/2025

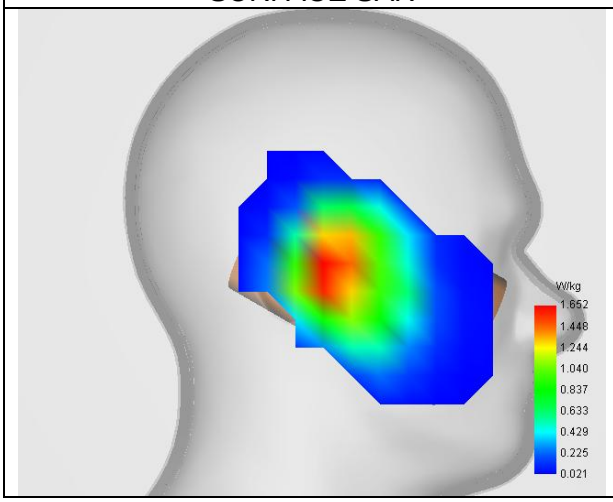
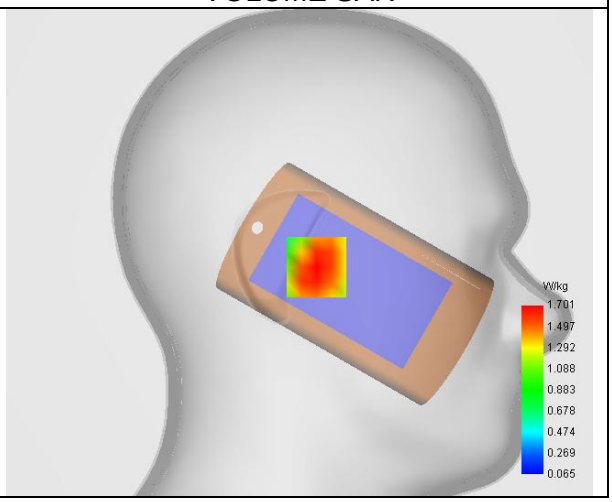
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	LTE band 3
Channels/Frequency	Middle (19575)/ frequency 1747.500 Mhz
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	1747.500
Relative permitivity (real part)	39.78
Relative permitivity (imaginary part)	13.94
Conductivity (S/m)	1.35

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

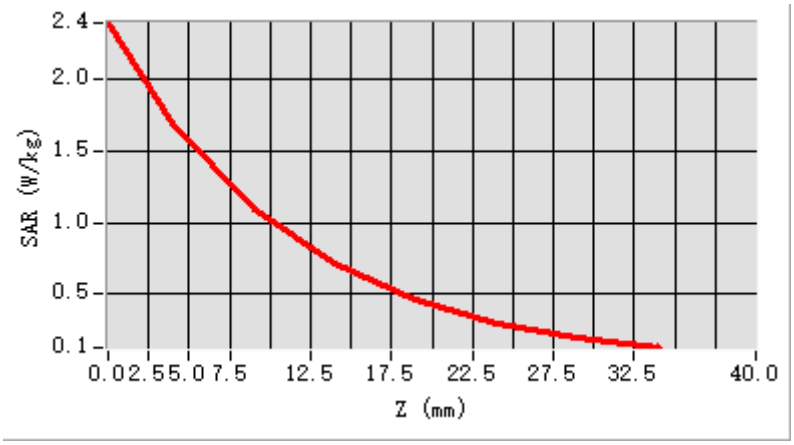
Maximum location: X=-9.00, Y=-8.00 ; SAR Peak: 2.40 W/kg

D. SAR 1g & 10g

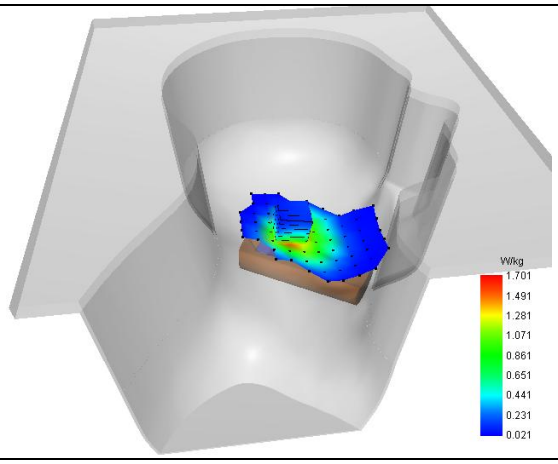
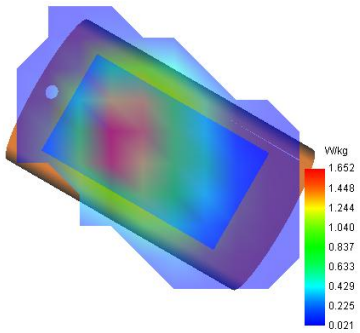
SAR 10g (W/Kg)	1.020
SAR 1g (W/Kg)	1.629
Variation (%)	-0.18
Horizontal validation criteria: minimum distance (mm)	22.23
Vertical validation criteria: SAR ratio M2/M1 (%)	64.58

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.396	1.701	1.099	0.715	0.463	0.297	0.193



F. 3D Image

3D screen shot	Hot spot position
	

14# SAR Measurement at LTE band 3 (Body, Validation Plane)
Date of measurement: 24/1/2025

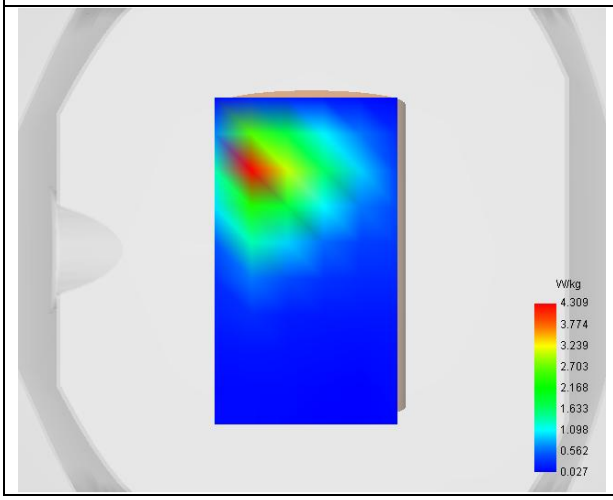
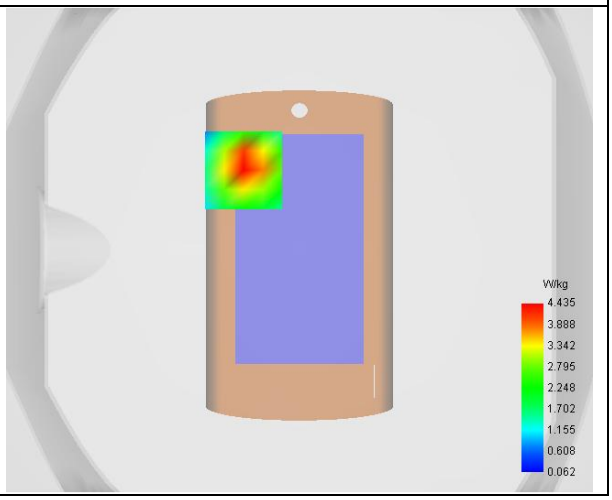
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 3
Channels/Frequency	Middle (19575)/ frequency 1747.500 Mhz
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	1747.500
Relative permitivity (real part)	39.78
Relative permitivity (imaginary part)	13.94
Conductivity (S/m)	1.35

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

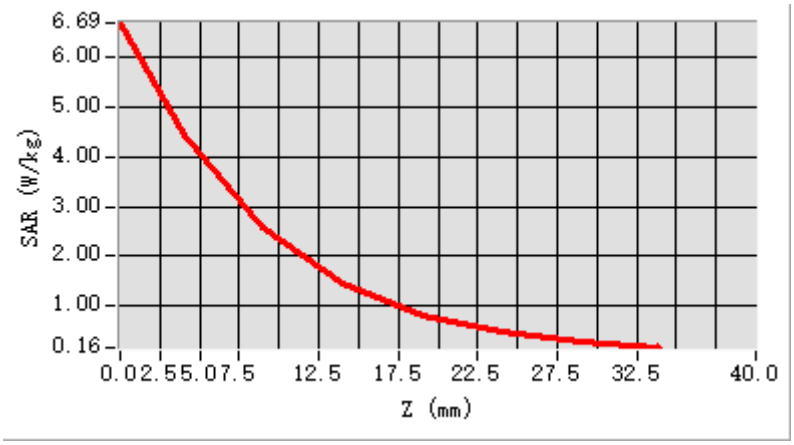
Maximum location: X=-23.00, Y=33.00 ; SAR Peak: 7.17 W/kg

D. SAR 1g & 10g

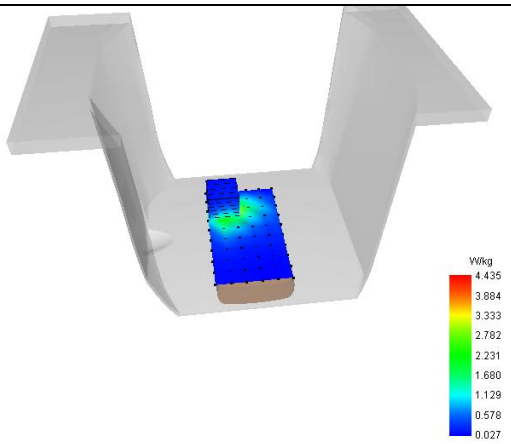
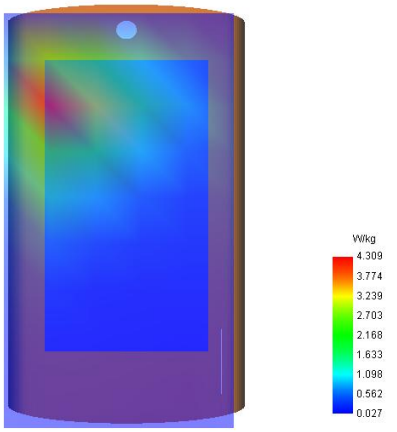
SAR 10g (W/Kg)	2.188
SAR 1g (W/Kg)	4.203
Variation (%)	0.21
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	57.87

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.692	4.435	2.567	1.451	0.815	0.466	0.268



F. 3D Image

3D screen shot	Hot spot position
	

15# SAR Measurement at LTE band 7 (Cheek, Left)
Date of measurement: 28/1/2025

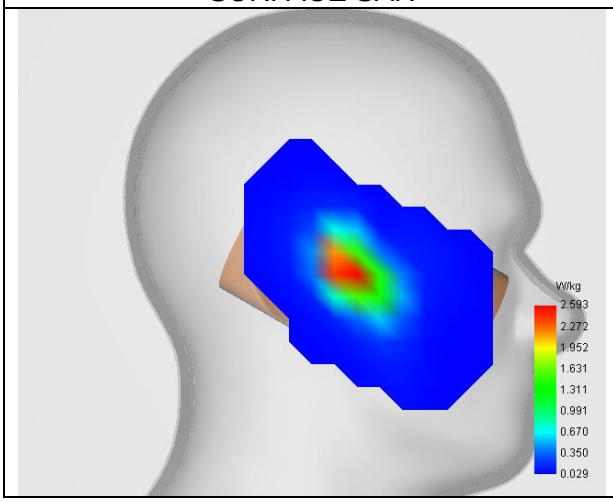
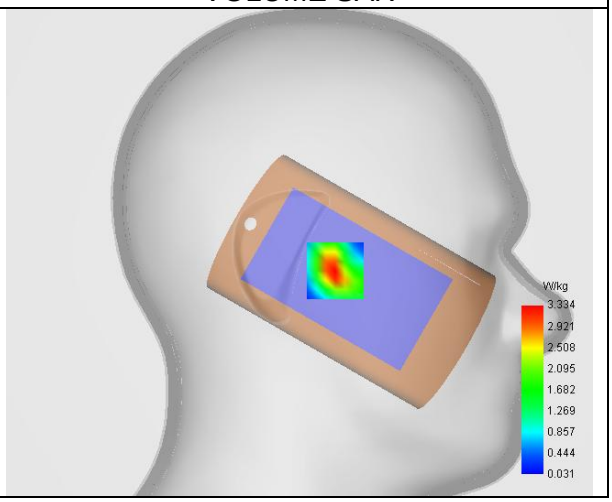
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	LTE band 7
Channels/Frequency	Middle (21100)/ frequency 2535.000 Mhz
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	2535.000
Relative permitivity (real part)	39.11
Relative permitivity (imaginary part)	13.49
Conductivity (S/m)	1.90

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

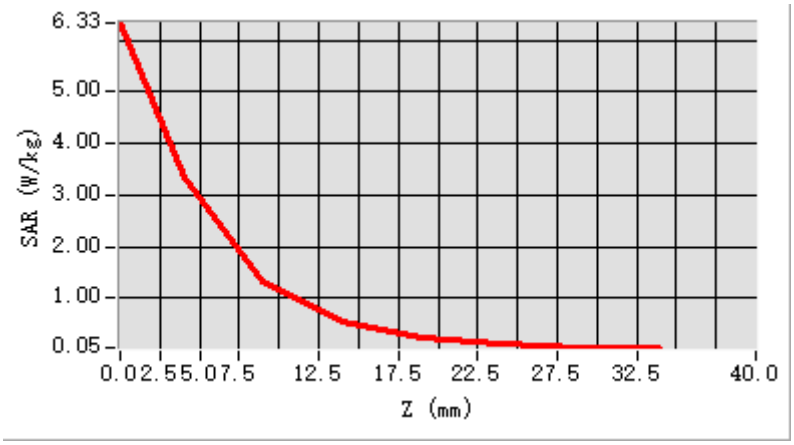
Maximum location: X=-19.00, Y=-10.00 ; SAR Peak: 6.31 W/kg

D. SAR 1g & 10g

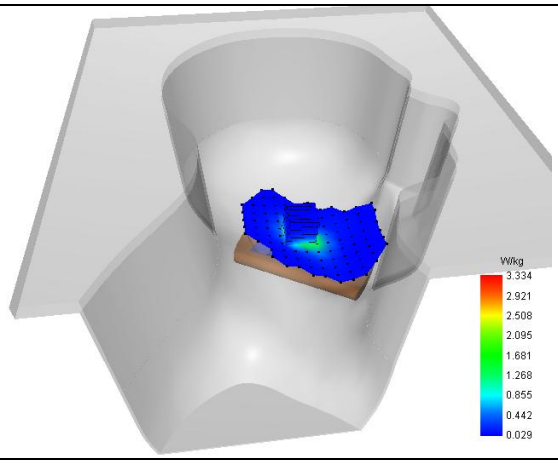
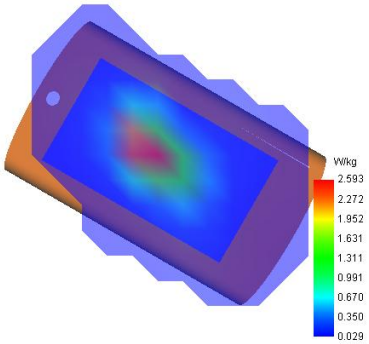
SAR 10g (W/Kg)	1.218
SAR 1g (W/Kg)	3.046
Variation (%)	1.01
Horizontal validation criteria: minimum distance (mm)	11.18
Vertical validation criteria: SAR ratio M2/M1 (%)	39.57

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.332	3.334	1.319	0.555	0.250	0.122	0.067



F. 3D Image

3D screen shot	Hot spot position
	

16# SAR Measurement at LTE band 7 (Body, Validation Plane)
Date of measurement: 28/1/2025

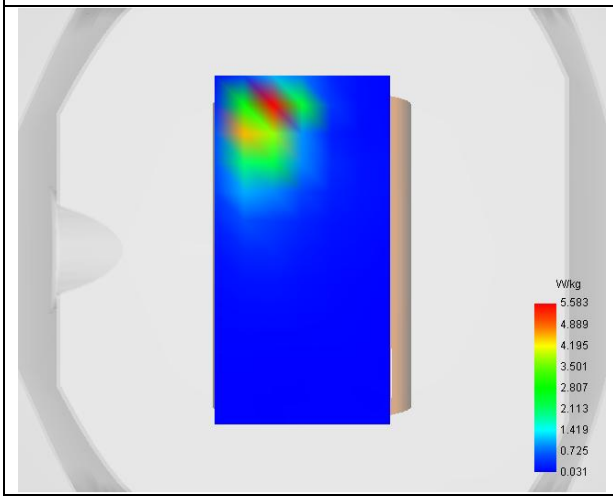
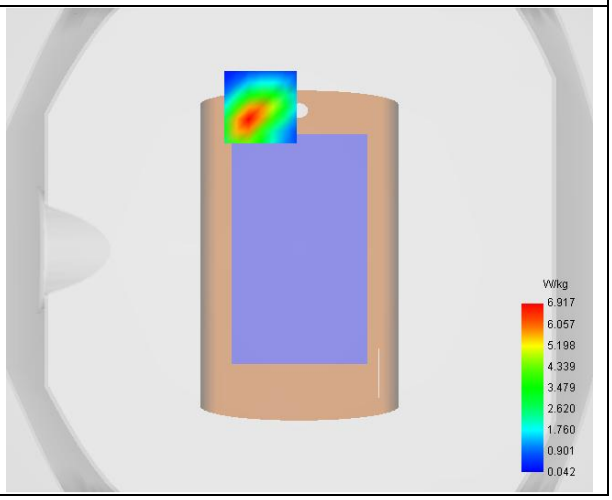
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 7
Channels/Frequency	Middle (21100)/ frequency 2535.000 Mhz
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	2535.000
Relative permitivity (real part)	39.11
Relative permitivity (imaginary part)	13.49
Conductivity (S/m)	1.90

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

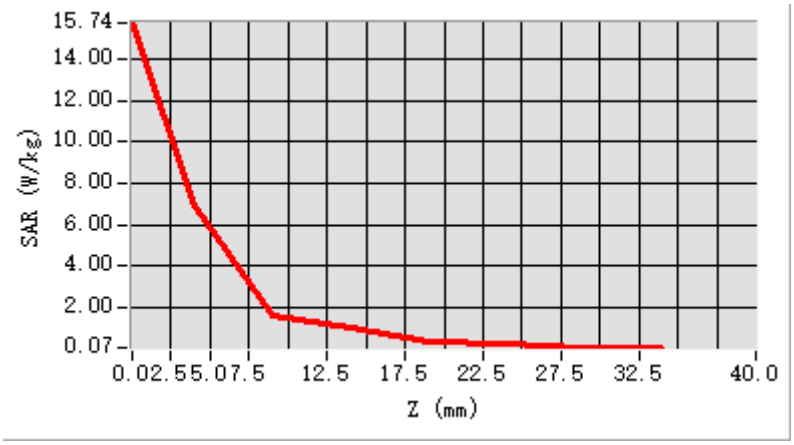
Maximum location: X=-16.00, Y=59.00 ; SAR Peak: 13.16 W/kg

D. SAR 1g & 10g

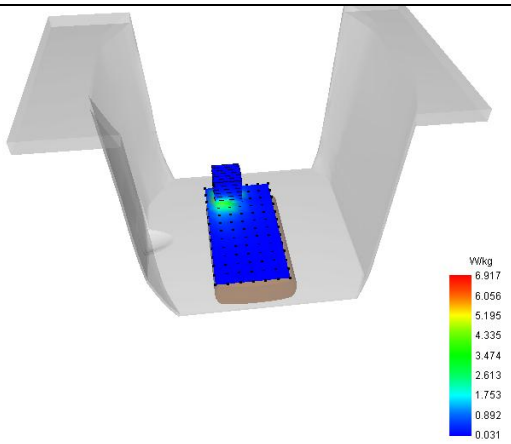
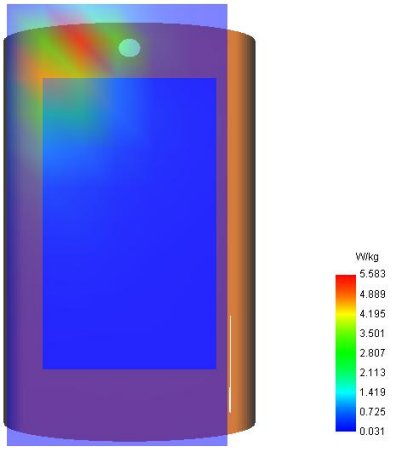
SAR 10g (W/Kg)	2.162
SAR 1g (W/Kg)	6.159
Variation (%)	-0.22
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	37.64

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	15.737	6.917	1.619	1.060	0.321	0.217	0.086



F. 3D Image

3D screen shot	Hot spot position
	

17# SAR Measurement at LTE band 8 (Cheek, Left)
Date of measurement: 31/1/2025

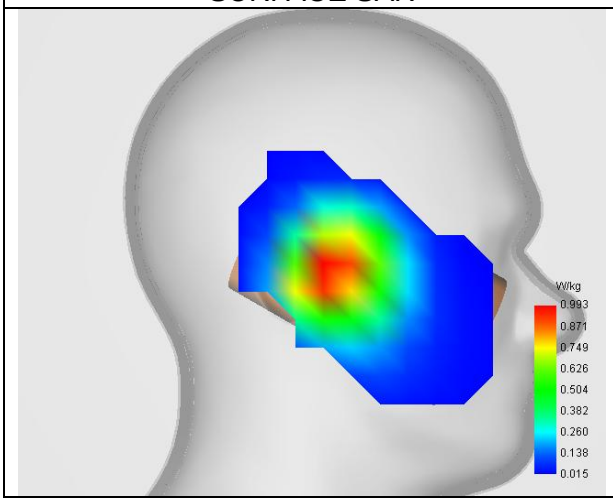
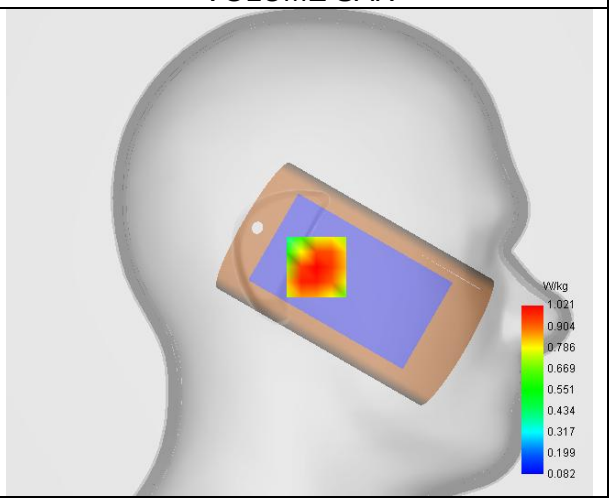
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.24
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	LTE band 8
Channels/Frequency	Middle (21625)/ frequency 897.500 Mhz
Signal	LTE FDD
Cell Bandwidth	10 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	897.500
Relative permitivity (real part)	41.06
Relative permitivity (imaginary part)	19.66
Conductivity (S/m)	0.98

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

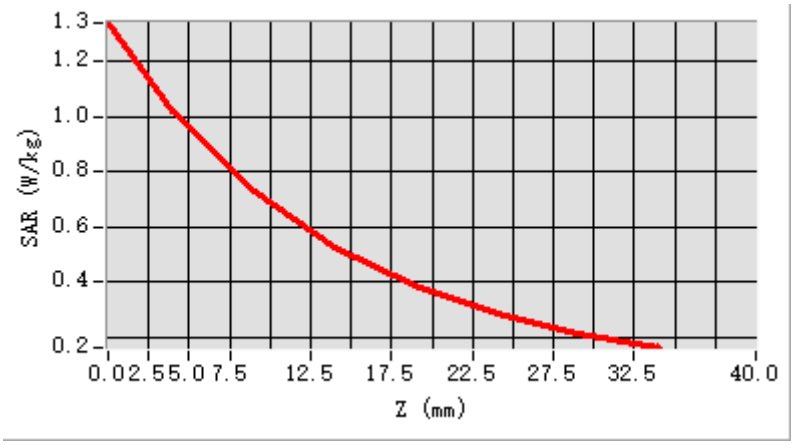
Maximum location: X=-9.00, Y=-8.00 ; SAR Peak: 1.38 W/kg

D. SAR 1g & 10g

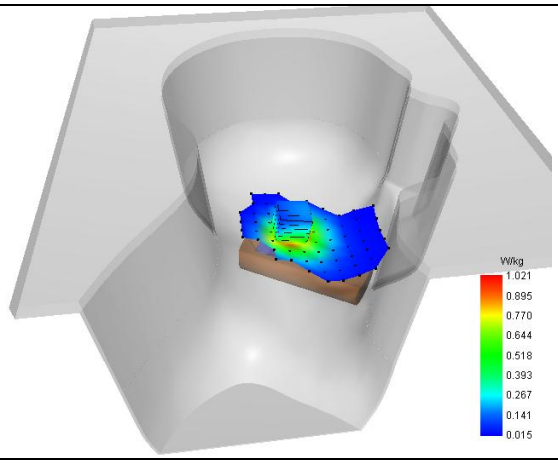
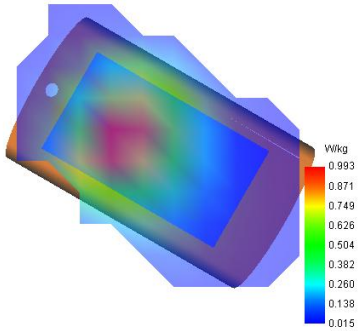
SAR 10g (W/Kg)	0.670
SAR 1g (W/Kg)	0.997
Variation (%)	-0.38
Horizontal validation criteria: minimum distance (mm)	22.23
Vertical validation criteria: SAR ratio M2/M1 (%)	71.50

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.340	1.021	0.730	0.527	0.387	0.289	0.217



F. 3D Image

3D screen shot	Hot spot position
	

18# SAR Measurement at LTE band 8 (Body, Validation Plane)
Date of measurement: 31/1/2025

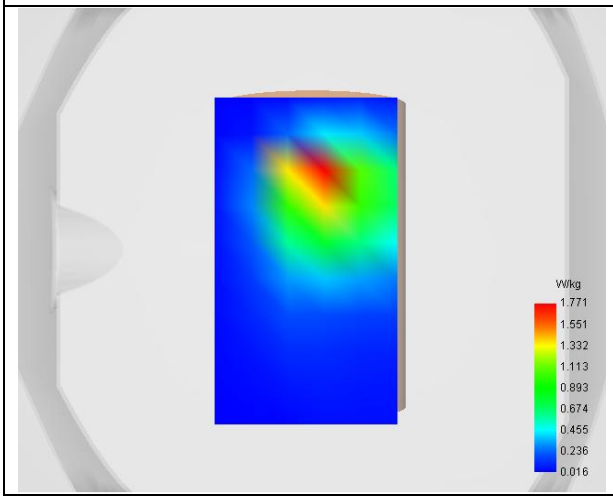
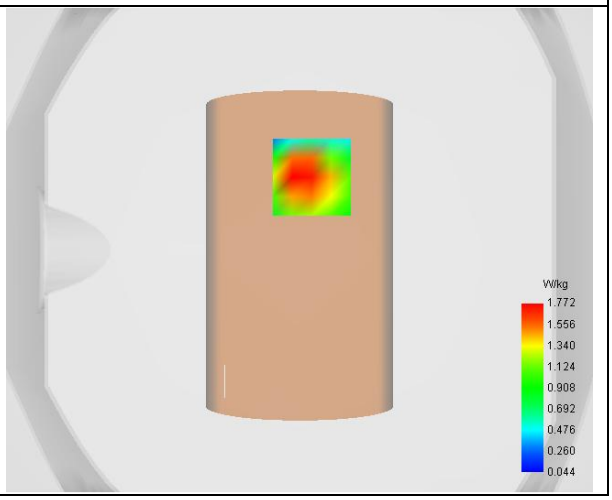
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.24
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 8
Channels/Frequency	Middle (21625)/ frequency 897.500 Mhz
Signal	LTE FDD
Cell Bandwidth	10 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	897.500
Relative permitivity (real part)	41.06
Relative permitivity (imaginary part)	19.66
Conductivity (S/m)	0.98

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

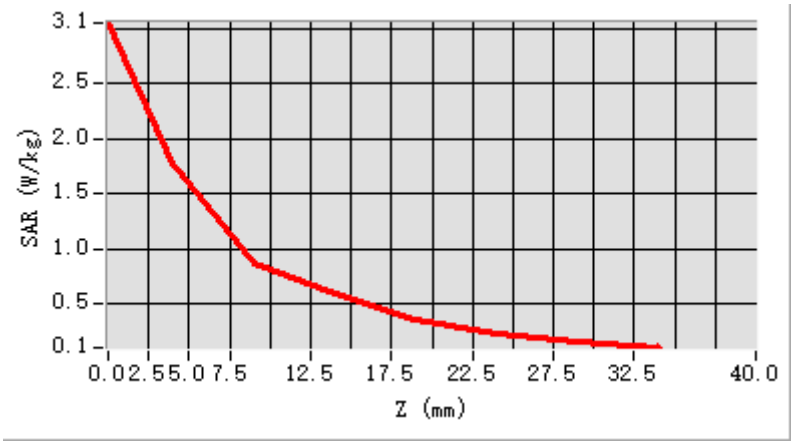
Maximum location: X=5.00, Y=30.00 ; SAR Peak: 3.16 W/kg

D. SAR 1g & 10g

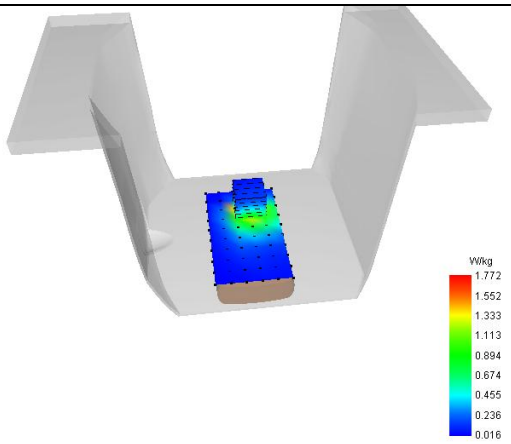
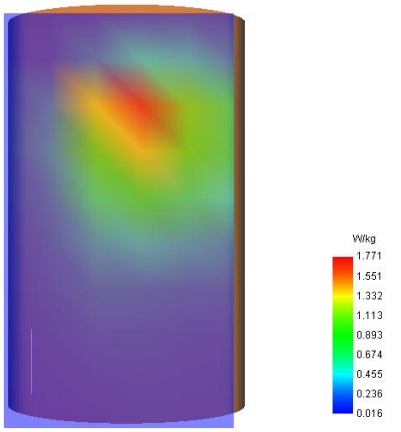
SAR 10g (W/Kg)	0.921
SAR 1g (W/Kg)	1.772
Variation (%)	0.01
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	57.43

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	3.053	1.772	0.876	0.593	0.354	0.226	0.159



F. 3D Image

3D screen shot	Hot spot position
	

19# SAR Measurement at LTE band 20 (Cheek, Left)
Date of measurement: 31/1/2025

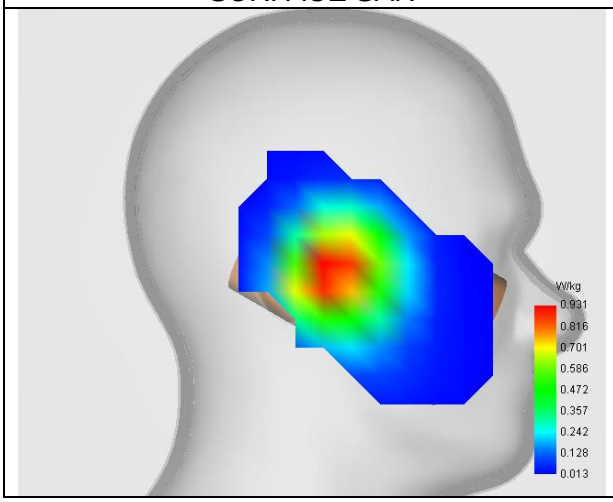
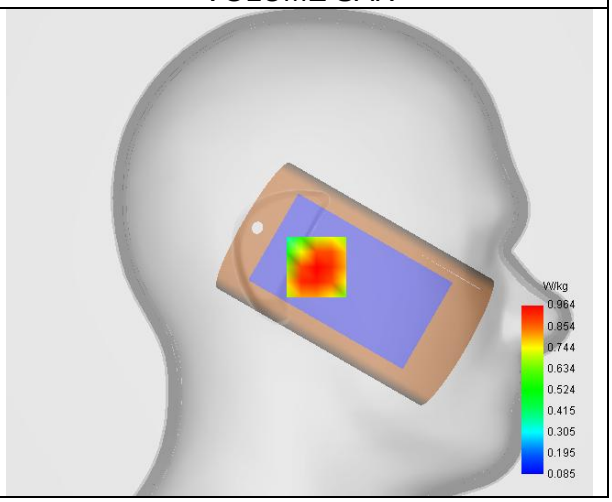
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.34
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	LTE band 20
Channels/Frequency	Middle (24300)/ frequency 847.000 Mhz
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	847.000
Relative permitivity (real part)	41.69
Relative permitivity (imaginary part)	19.41
Conductivity (S/m)	0.91

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

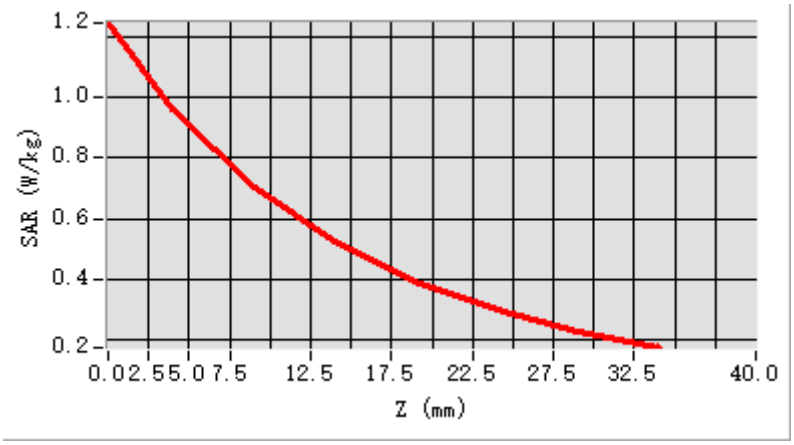
Maximum location: X=-9.00, Y=-8.00 ; SAR Peak: 1.27 W/kg

D. SAR 1g & 10g

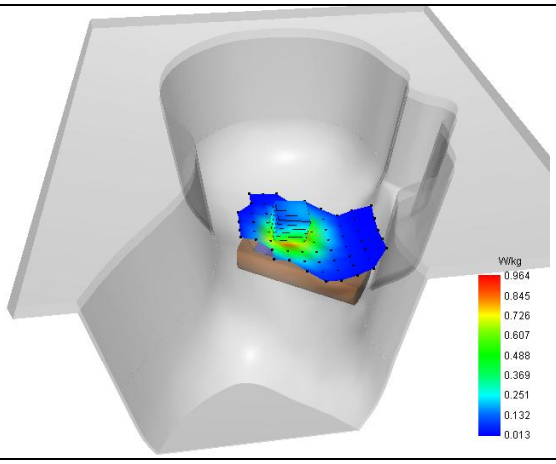
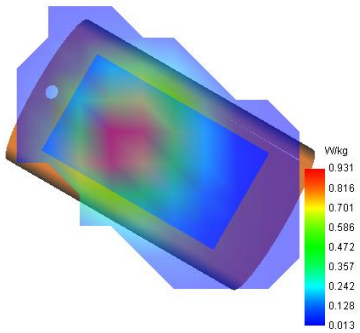
SAR 10g (W/Kg)	0.640
SAR 1g (W/Kg)	0.931
Variation (%)	-0.46
Horizontal validation criteria: minimum distance (mm)	22.23
Vertical validation criteria: SAR ratio M2/M1 (%)	73.06

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.246	0.964	0.704	0.523	0.392	0.299	0.228



F. 3D Image

3D screen shot	Hot spot position
	

20# SAR Measurement at LTE band 20 (Body, Validation Plane)
Date of measurement: 31/1/2025

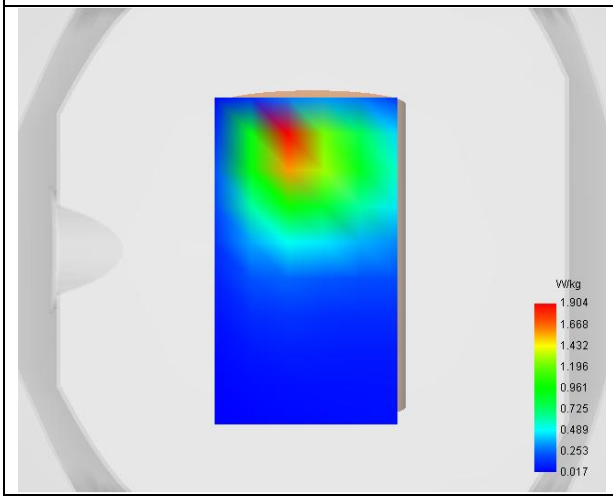
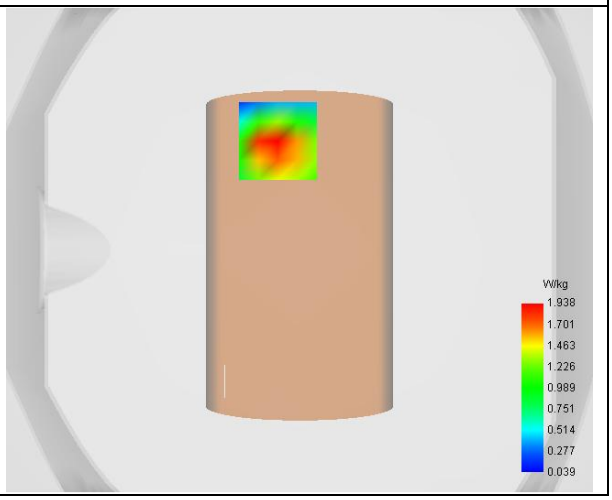
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.34
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 20
Channels/Frequency	Middle (24300)/ frequency 847.000 Mhz
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	847.000
Relative permitivity (real part)	41.69
Relative permitivity (imaginary part)	19.41
Conductivity (S/m)	0.91

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

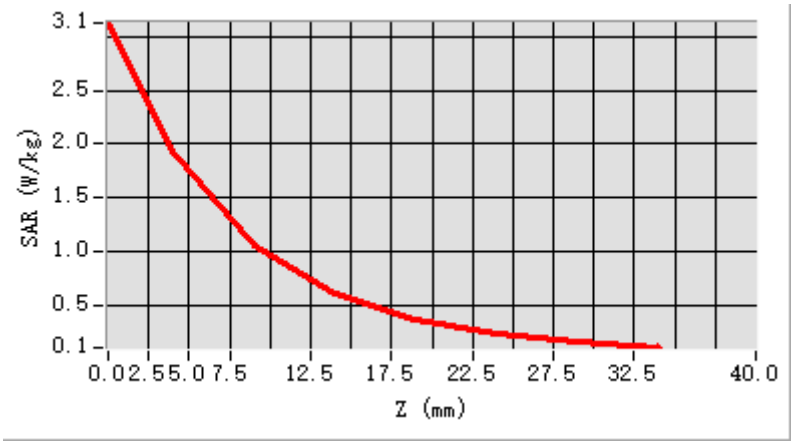
Maximum location: X=-9.00, Y=45.00 ; SAR Peak: 3.24 W/kg

D. SAR 1g & 10g

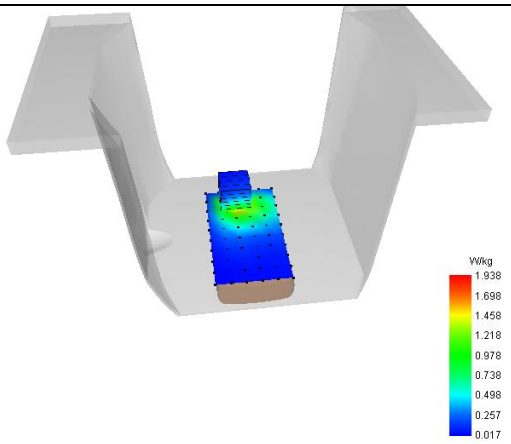
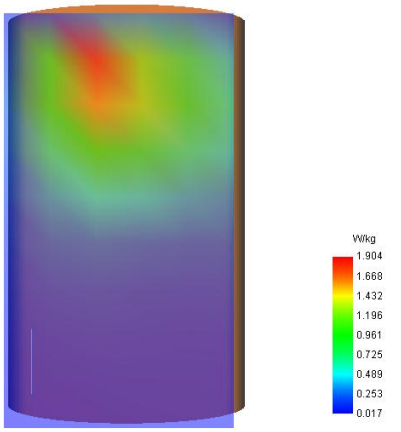
SAR 10g (W/Kg)	0.962
SAR 1g (W/Kg)	1.865
Variation (%)	0.49
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	54.31

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	3.124	1.938	1.053	0.610	0.377	0.242	0.161



F. 3D Image

3D screen shot	Hot spot position
	

21# SAR Measurement at LTE band 28 (Cheek, Left)
Date of measurement: 21/1/2025

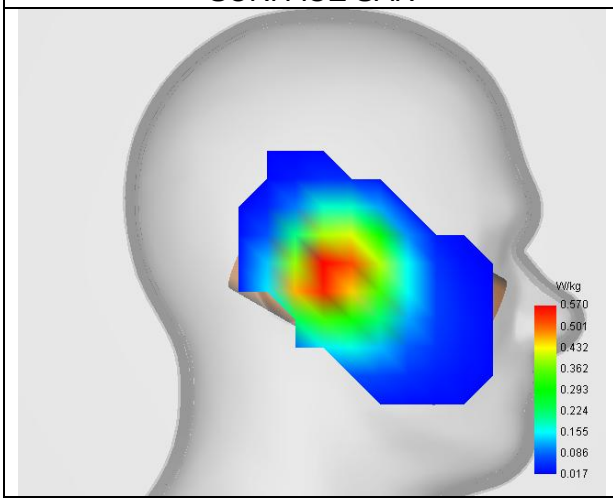
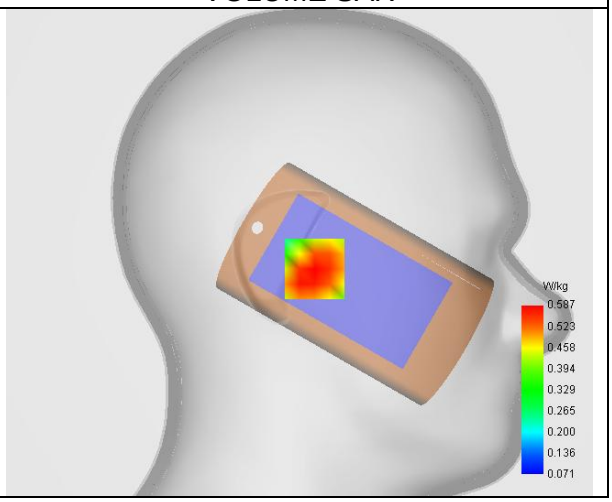
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.42
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	LTE band 28
Channels/Frequency	Middle (27460)/ frequency 728.000 Mhz
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	728.000
Relative permitivity (real part)	41.16
Relative permitivity (imaginary part)	21.70
Conductivity (S/m)	0.88

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

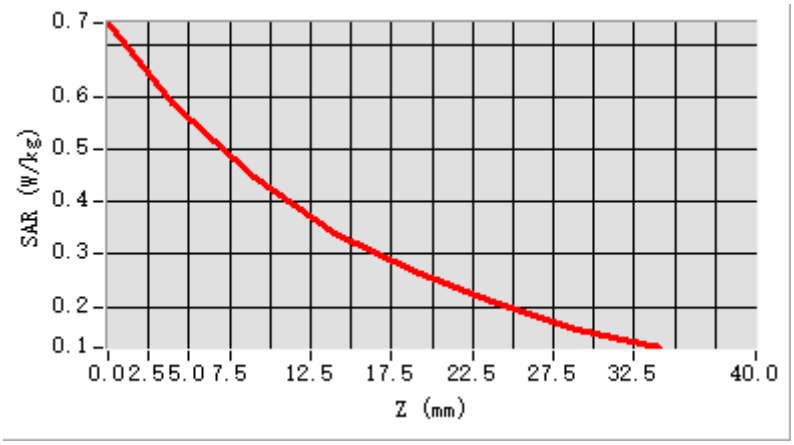
Maximum location: X=-8.00, Y=-9.00 ; SAR Peak: 0.77 W/kg

D. SAR 1g & 10g

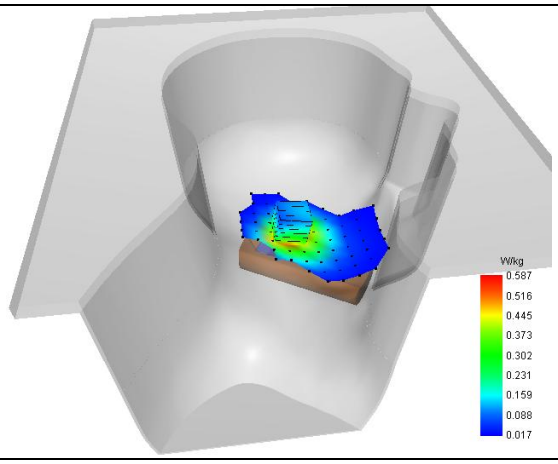
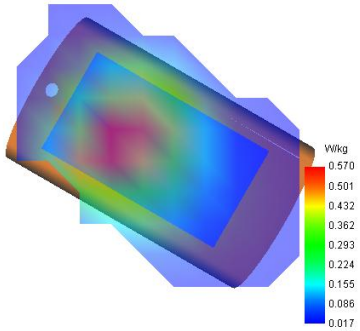
SAR 10g (W/Kg)	0.402
SAR 1g (W/Kg)	0.571
Variation (%)	-1.00
Horizontal validation criteria: minimum distance (mm)	22.23
Vertical validation criteria: SAR ratio M2/M1 (%)	76.03

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.741	0.587	0.446	0.340	0.266	0.205	0.157



F. 3D Image

3D screen shot	Hot spot position
	

22# SAR Measurement at LTE band 28 (Body, Validation Plane)
Date of measurement: 21/1/2025

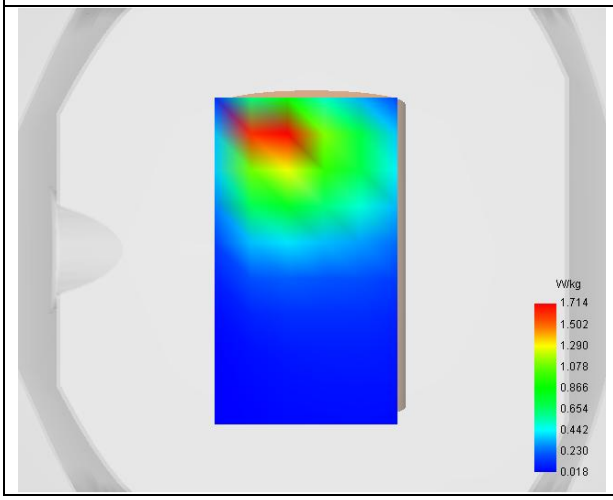
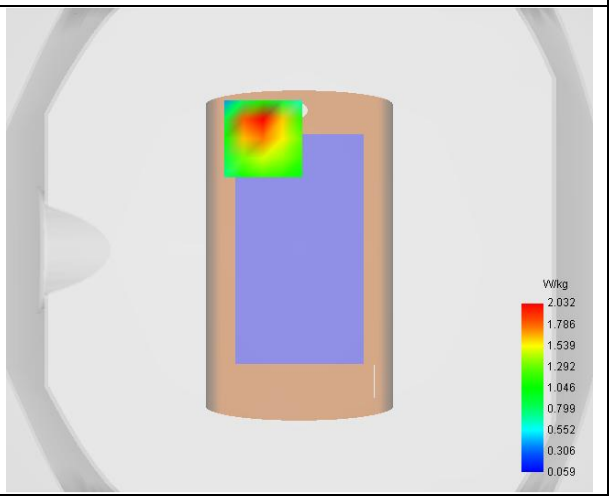
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.42
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 28
Channels/Frequency	Middle (27460)/ frequency 728.000 Mhz
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	728.000
Relative permitivity (real part)	41.16
Relative permitivity (imaginary part)	21.70
Conductivity (S/m)	0.88

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

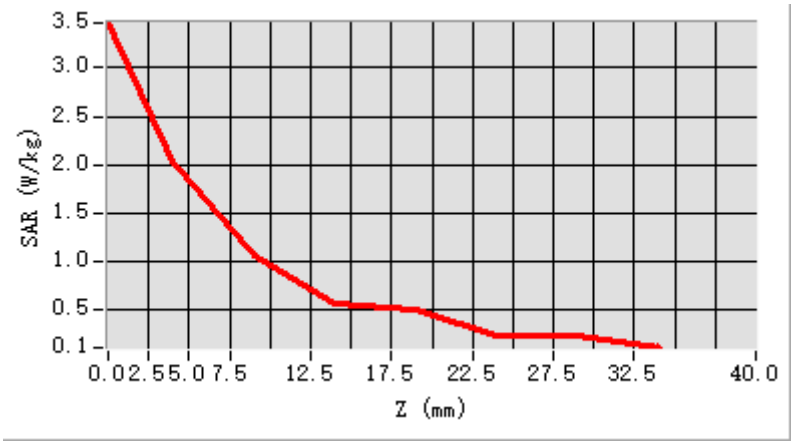
Maximum location: X=-15.00, Y=46.00 ; SAR Peak: 3.62 W/kg

D. SAR 1g & 10g

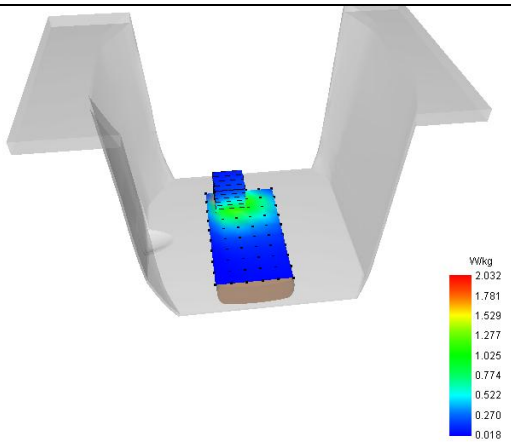
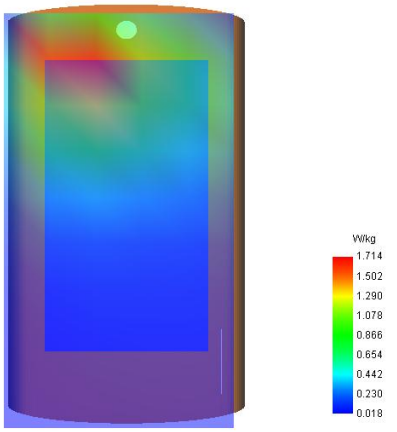
SAR 10g (W/Kg)	1.008
SAR 1g (W/Kg)	1.930
Variation (%)	-0.93
Horizontal validation criteria: minimum distance (mm)	11.31
Vertical validation criteria: SAR ratio M2/M1 (%)	49.80

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	3.462	2.032	1.064	0.579	0.513	0.240	0.246



F. 3D Image

3D screen shot	Hot spot position
	

23# SAR Measurement at LTE band 40 (Cheek, Left)
Date of measurement: 12/2/2025

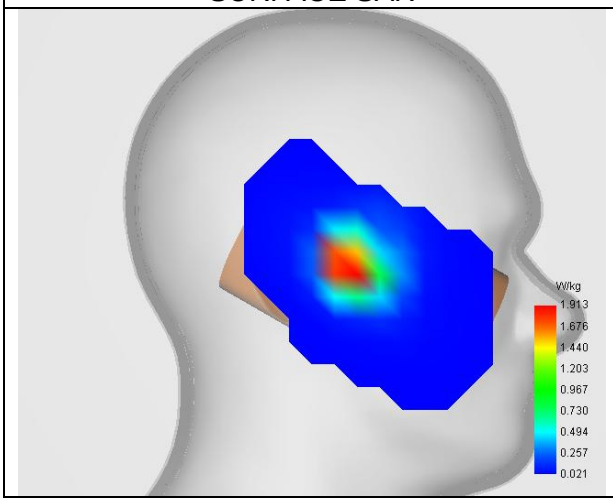
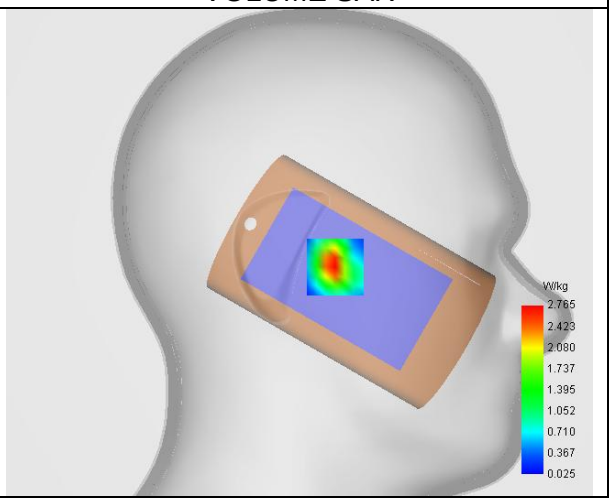
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.73
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	LTE band 40
Channels/Frequency	Middle (39150)/ frequency 2350.000 Mhz
Signal	LTE TDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	2350.000
Relative permitivity (real part)	38.94
Relative permitivity (imaginary part)	12.96
Conductivity (S/m)	1.69

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

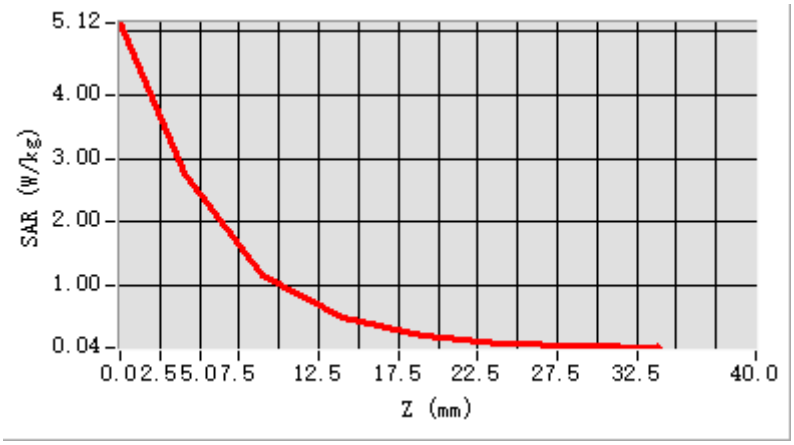
Maximum location: X=-19.00, Y=-8.00 ; SAR Peak: 5.12 W/kg

D. SAR 1g & 10g

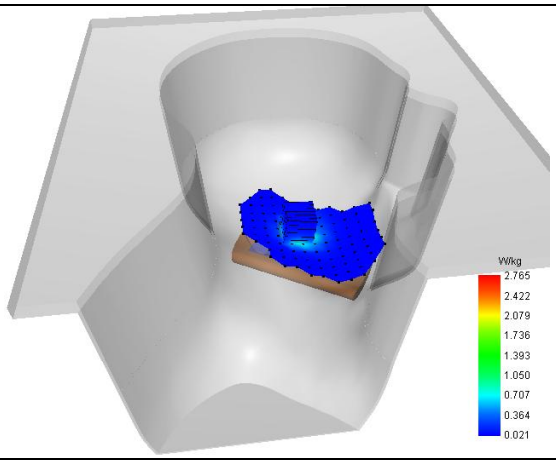
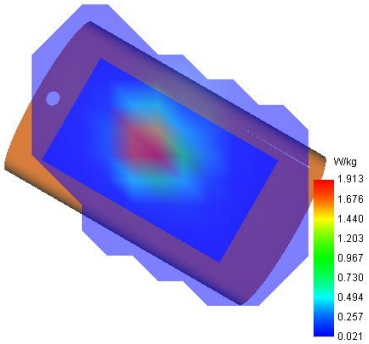
SAR 10g (W/Kg)	0.989
SAR 1g (W/Kg)	2.503
Variation (%)	0.95
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	41.76

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	5.116	2.765	1.155	0.507	0.238	0.117	0.065



F. 3D Image

3D screen shot	Hot spot position
	

24# SAR Measurement at LTE band 40 (Body, Validation Plane)
Date of measurement: 12/2/2025

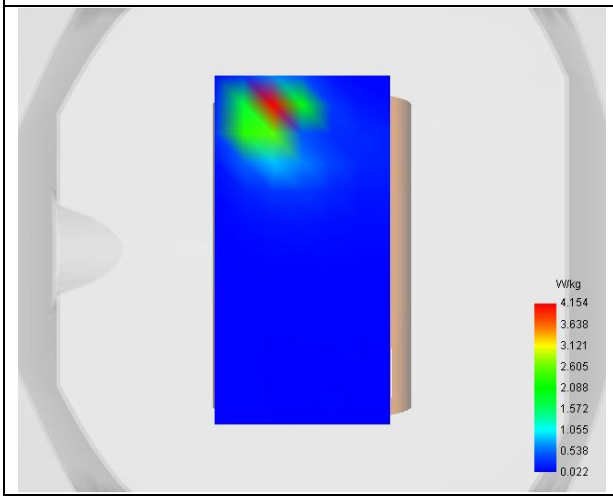
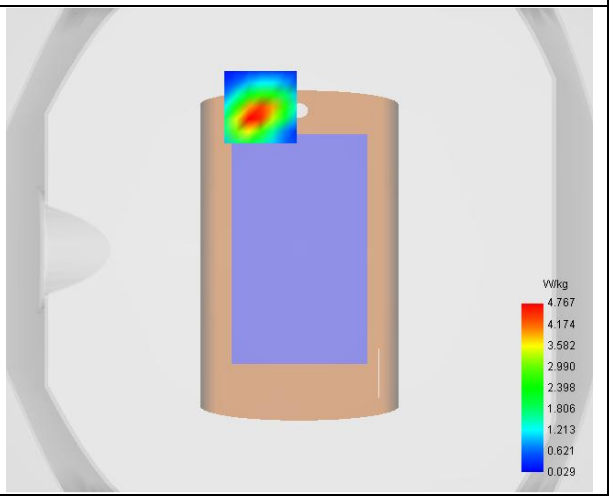
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.73
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 40
Channels/Frequency	Middle (39150)/ frequency 2350.000 Mhz
Signal	LTE TDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	2350.000
Relative permitivity (real part)	38.94
Relative permitivity (imaginary part)	12.96
Conductivity (S/m)	1.69

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

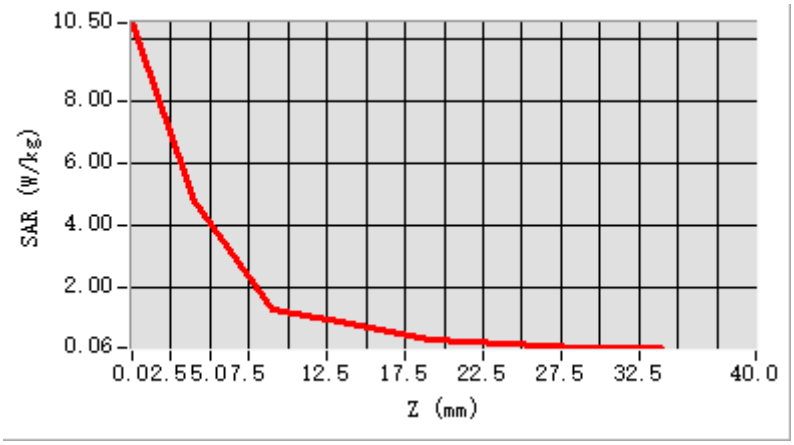
Maximum location: X=-16.00, Y=59.00 ; SAR Peak: 9.06 W/kg

D. SAR 1g & 10g

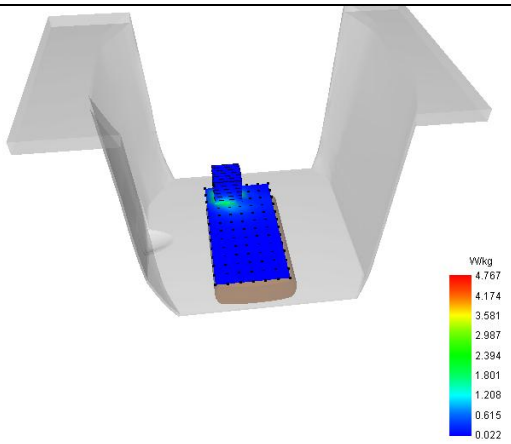
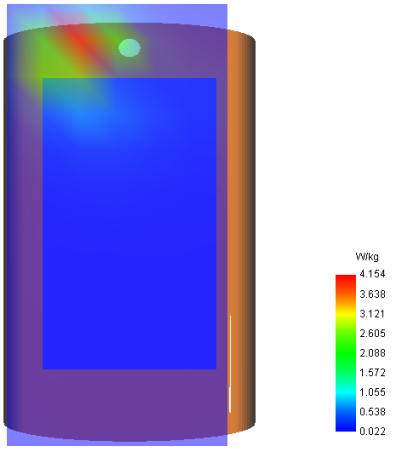
SAR 10g (W/Kg)	1.610
SAR 1g (W/Kg)	4.329
Variation (%)	4.35
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	39.91

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	10.496	4.767	1.272	0.821	0.288	0.182	0.081



F. 3D Image

3D screen shot	Hot spot position
	

25# SAR Measurement at NR band 1 (Cheek, Left)
Date of measurement: 1/2/2025

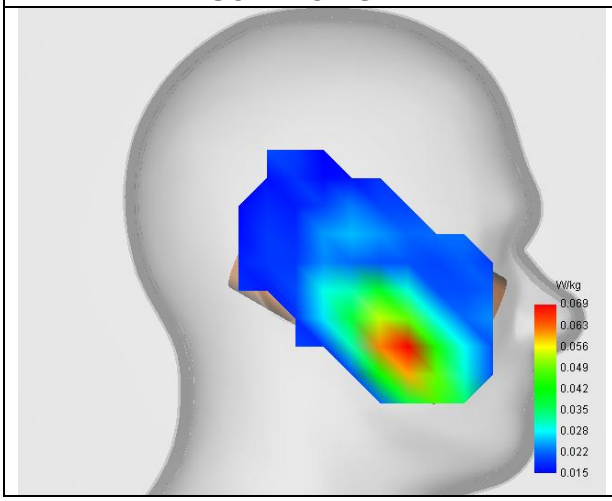
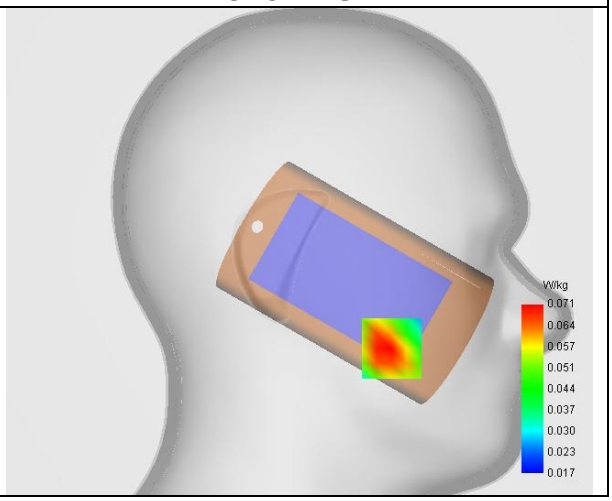
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.64
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	NR band 1
Channels/Frequency	Middle (390000)/ frequency 1950.000 Mhz
Signal	NR FDD
Cell Bandwidth	50 Mhz
Modulation	OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	1950.000
Relative permitivity (real part)	38.55
Relative permitivity (imaginary part)	12.80
Conductivity (S/m)	1.39

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

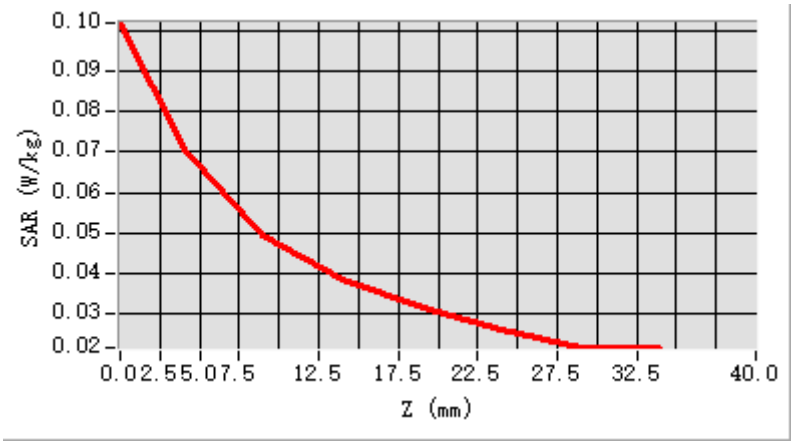
Maximum location: X=-49.00, Y=-52.00 ; SAR Peak: 0.10 W/kg

D. SAR 1g & 10g

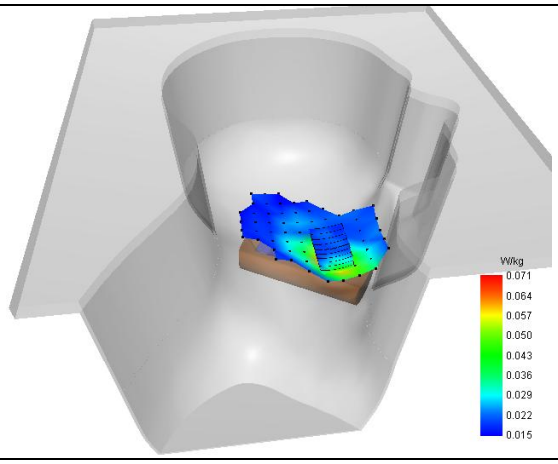
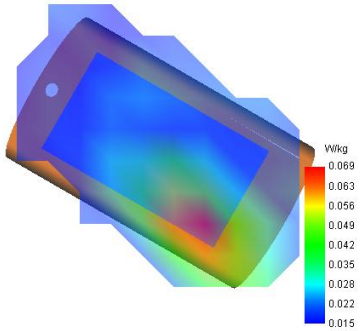
SAR 10g (W/Kg)	0.047
SAR 1g (W/Kg)	0.070
Variation (%)	3.41
Horizontal validation criteria: minimum distance (mm)	17.89
Vertical validation criteria: SAR ratio M2/M1 (%)	69.58

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.102	0.071	0.049	0.039	0.032	0.026	0.021



F. 3D Image

3D screen shot	Hot spot position
	

26# SAR Measurement at NR band 1 (Body, Validation Plane)
Date of measurement: 1/2/2025

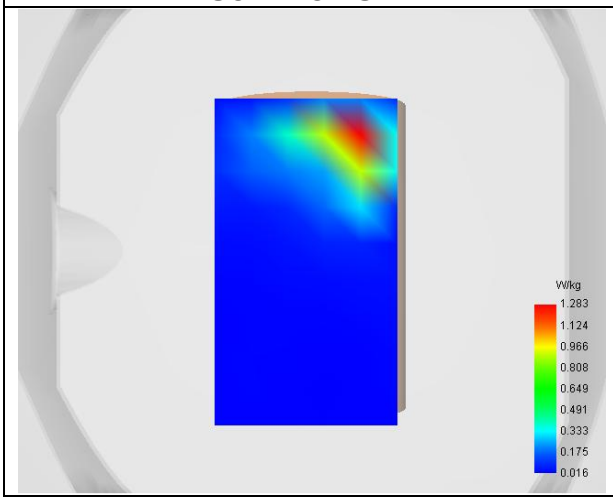
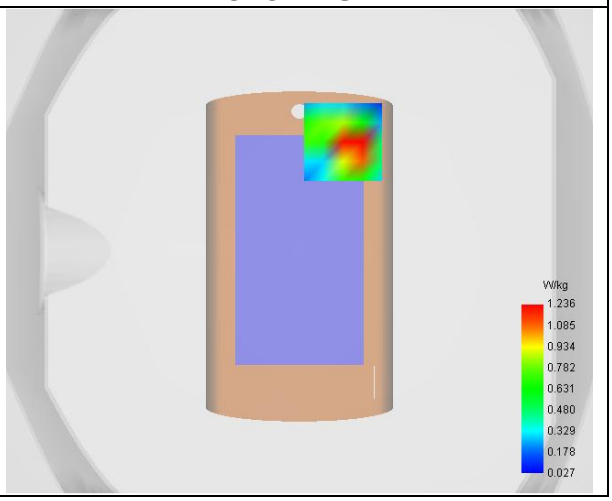
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.57
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	NR band 1
Channels/Frequency	Middle (390000)/ frequency 1950.000 Mhz
Signal	NR FDD
Cell Bandwidth	50 Mhz
Modulation	OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	1950.000
Relative permitivity (real part)	38.55
Relative permitivity (imaginary part)	12.80
Conductivity (S/m)	1.39

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

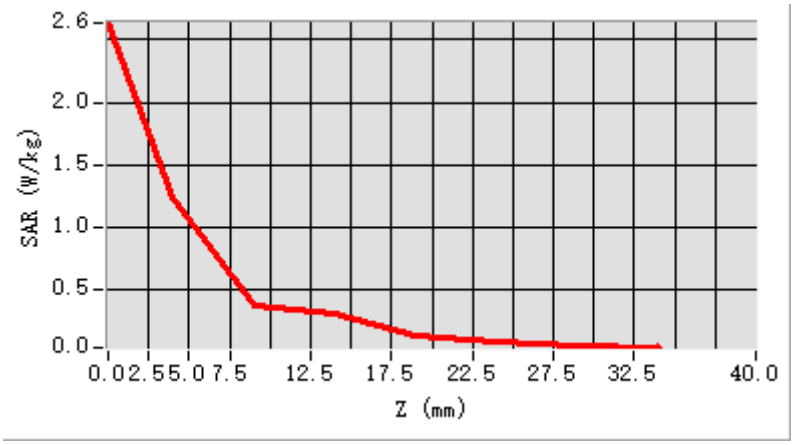
Maximum location: X=18.00, Y=45.00 ; SAR Peak: 2.47 W/kg

D. SAR 1g & 10g

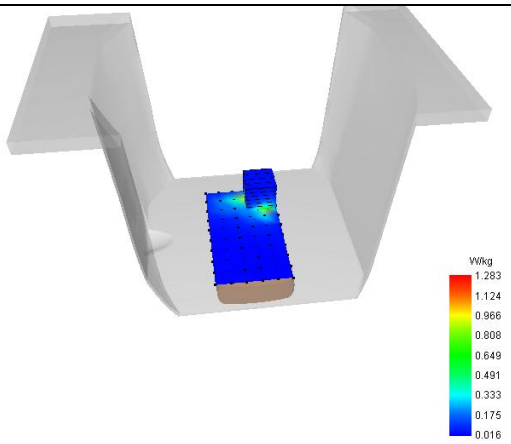
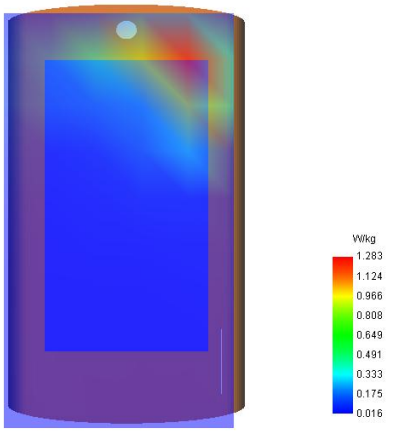
SAR 10g (W/Kg)	0.510
SAR 1g (W/Kg)	1.239
Variation (%)	1.11
Horizontal validation criteria: minimum distance (mm)	8.00
Vertical validation criteria: SAR ratio M2/M1 (%)	48.54

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.633	1.236	0.377	0.305	0.129	0.094	0.050



F. 3D Image

3D screen shot	Hot spot position
	

27# SAR Measurement at NR band 3 (Cheek, Left)
Date of measurement: 24/1/2025

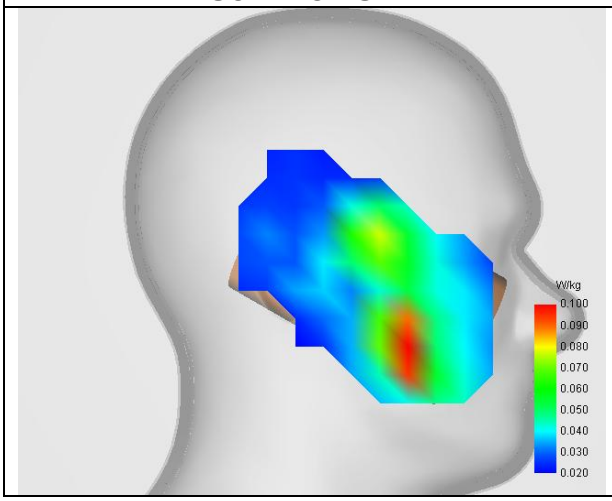
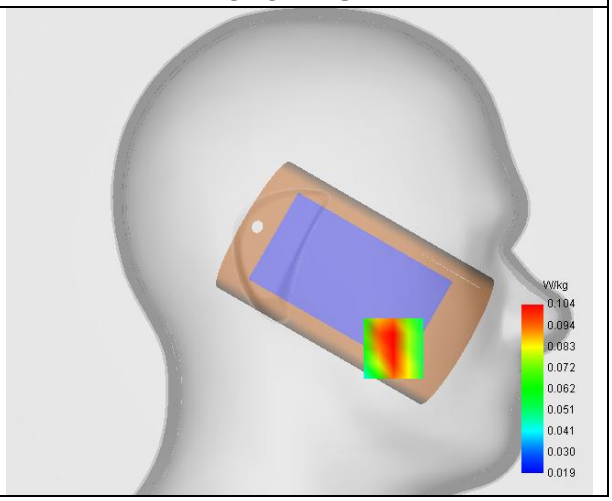
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	NR band 3
Channels/Frequency	Middle (349500)/ frequency 1747.500 Mhz
Signal	NR FDD
Cell Bandwidth	30 Mhz
Modulation	OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	1747.500
Relative permitivity (real part)	39.78
Relative permitivity (imaginary part)	13.94
Conductivity (S/m)	1.35

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

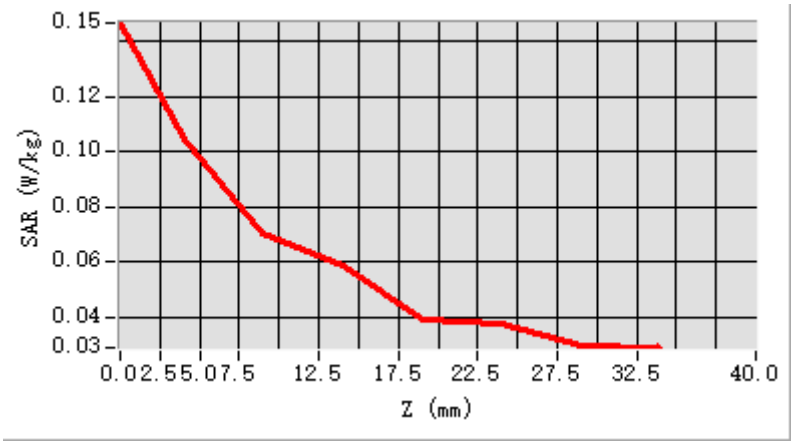
Maximum location: X=-50.00, Y=-52.00 ; SAR Peak: 0.14 W/kg

D. SAR 1g & 10g

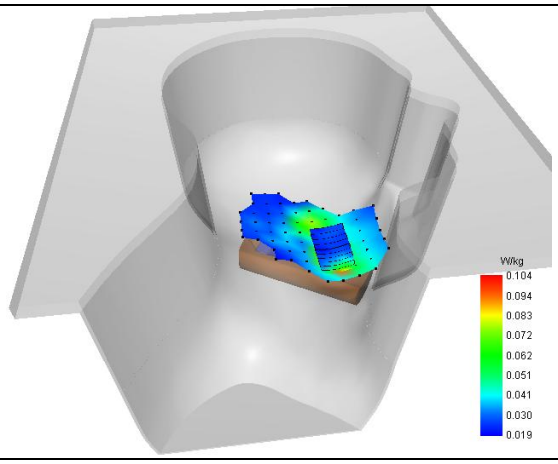
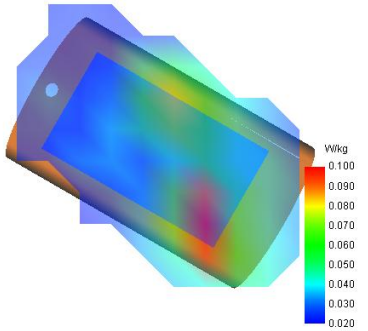
SAR 10g (W/Kg)	0.067
SAR 1g (W/Kg)	0.101
Variation (%)	2.55
Horizontal validation criteria: minimum distance (mm)	17.89
Vertical validation criteria: SAR ratio M2/M1 (%)	71.52

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.147	0.104	0.070	0.059	0.039	0.038	0.029



F. 3D Image

3D screen shot	Hot spot position
	

28# SAR Measurement at NR band 3 (Body, Validation Plane)
Date of measurement: 24/1/2025

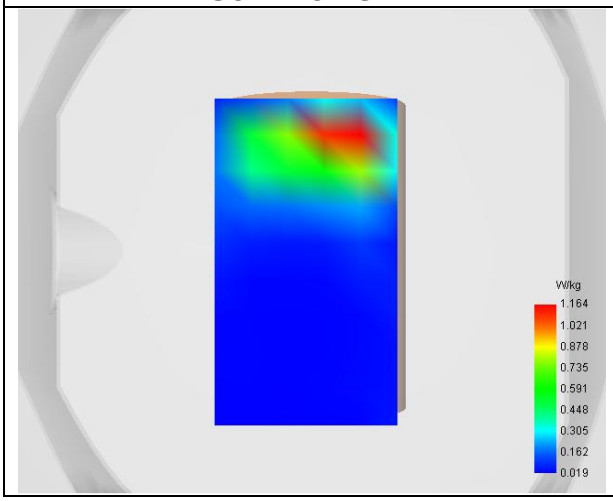
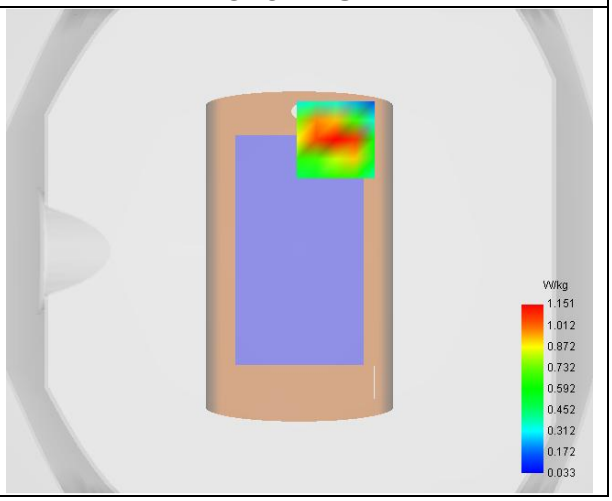
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	NR band 3
Channels/Frequency	Middle (349500)/ frequency 1747.500 Mhz
Signal	NR FDD
Cell Bandwidth	30 Mhz
Modulation	OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	1747.500
Relative permitivity (real part)	39.78
Relative permitivity (imaginary part)	13.94
Conductivity (S/m)	1.35

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

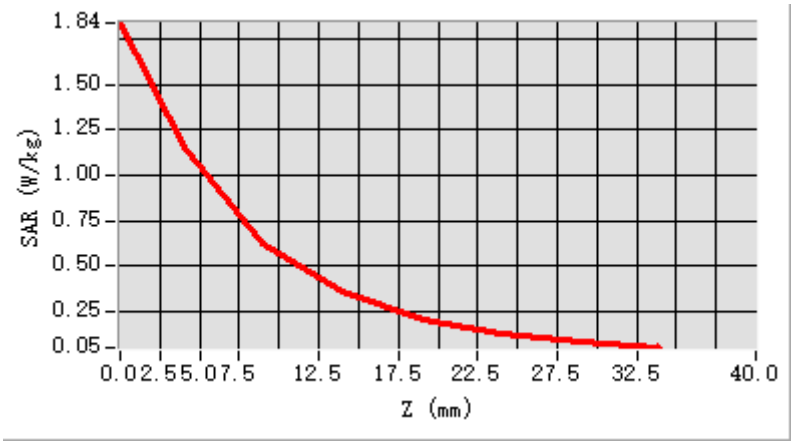
Maximum location: X=15.00, Y=46.00 ; SAR Peak: 1.93 W/kg

D. SAR 1g & 10g

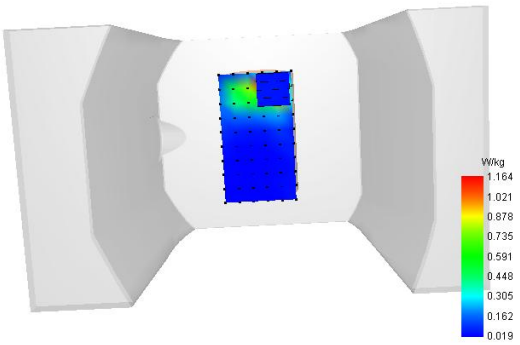
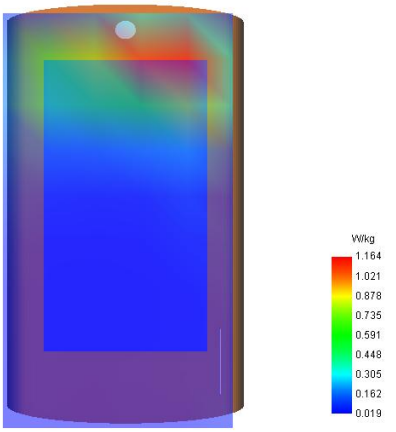
SAR 10g (W/Kg)	0.546
SAR 1g (W/Kg)	1.080
Variation (%)	4.59
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	54.29

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.836	1.151	0.625	0.360	0.210	0.127	0.085



F. 3D Image

3D screen shot	Hot spot position
	

29# SAR Measurement at NR band 8 (Cheek, Left)
Date of measurement: 31/1/2025

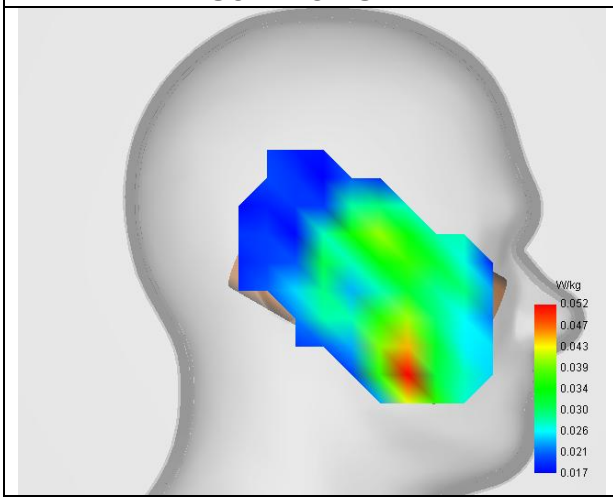
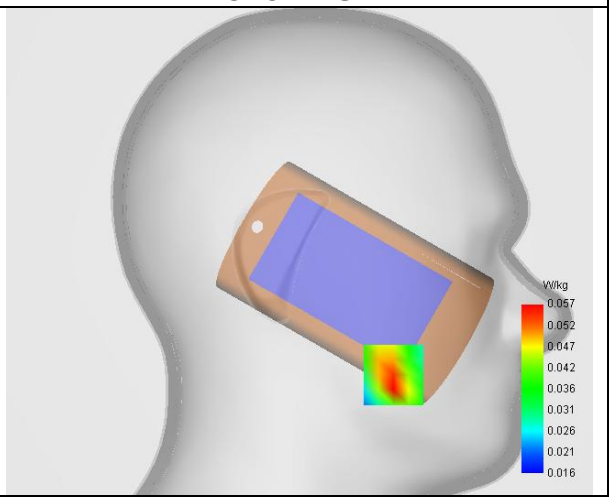
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.24
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	NR band 8
Channels/Frequency	Middle (179500)/ frequency 897.500 Mhz
Signal	NR FDD
Cell Bandwidth	20 Mhz
Modulation	DFT-s-OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	897.500
Relative permitivity (real part)	41.06
Relative permitivity (imaginary part)	19.66
Conductivity (S/m)	0.98

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

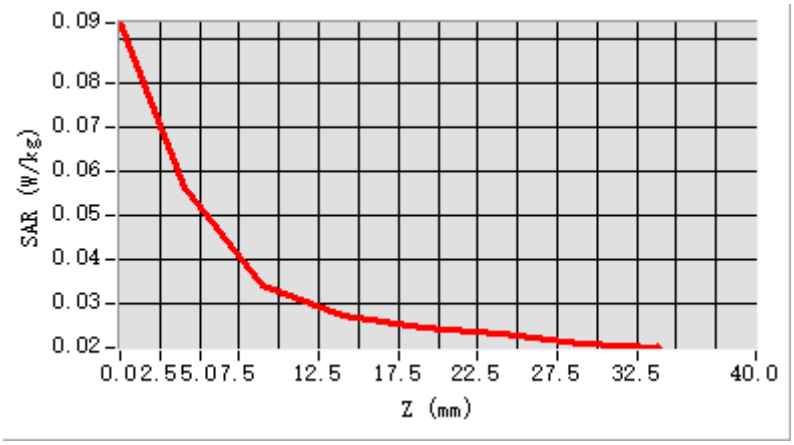
Maximum location: X=-50.00, Y=-66.00 ; SAR Peak: 0.08 W/kg

D. SAR 1g & 10g

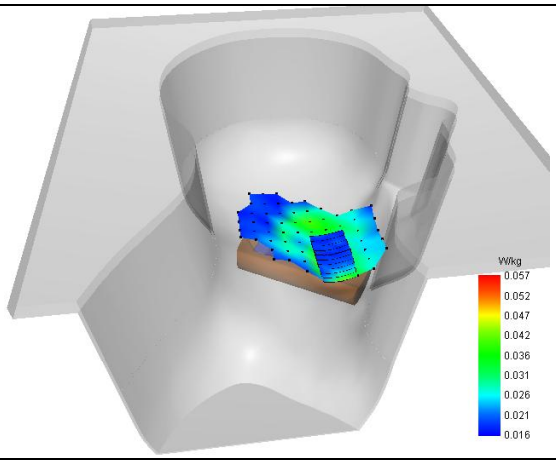
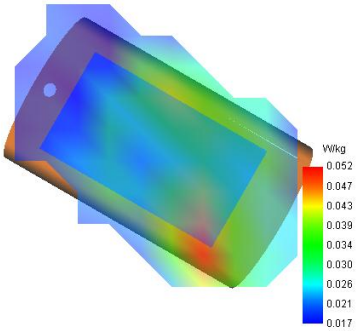
SAR 10g (W/Kg)	0.036
SAR 1g (W/Kg)	0.055
Variation (%)	-0.23
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	66.51

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.094	0.057	0.034	0.027	0.024	0.023	0.021



F. 3D Image

3D screen shot	Hot spot position
	

30# SAR Measurement at NR band 8 (Body, Validation Plane)
Date of measurement: 31/1/2025

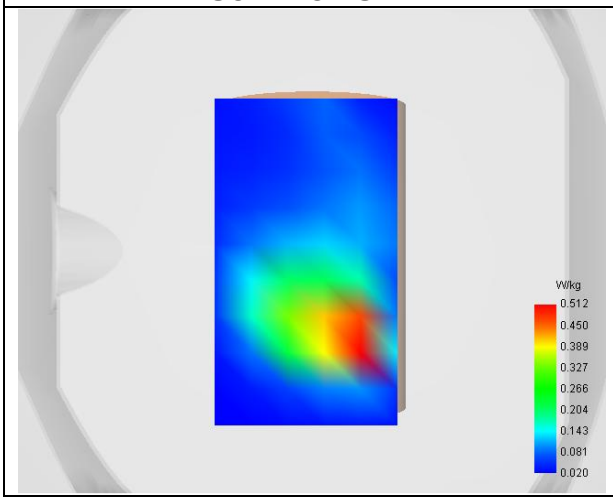
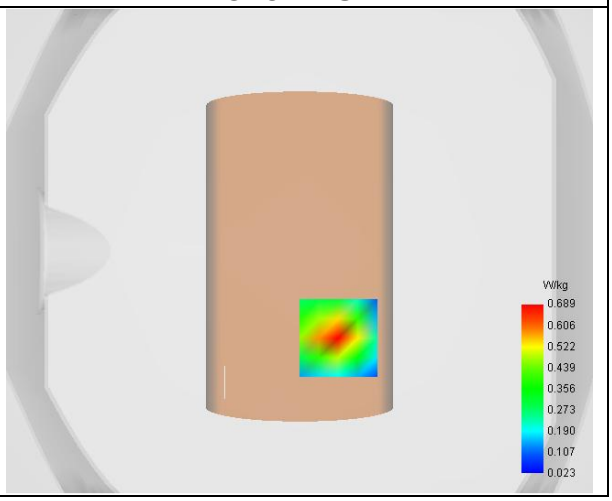
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.24
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	NR band 8
Channels/Frequency	Middle (179500)/ frequency 897.500 Mhz
Signal	NR FDD
Cell Bandwidth	20 Mhz
Modulation	DFT-s-OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	897.500
Relative permitivity (real part)	41.06
Relative permitivity (imaginary part)	19.66
Conductivity (S/m)	0.98

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

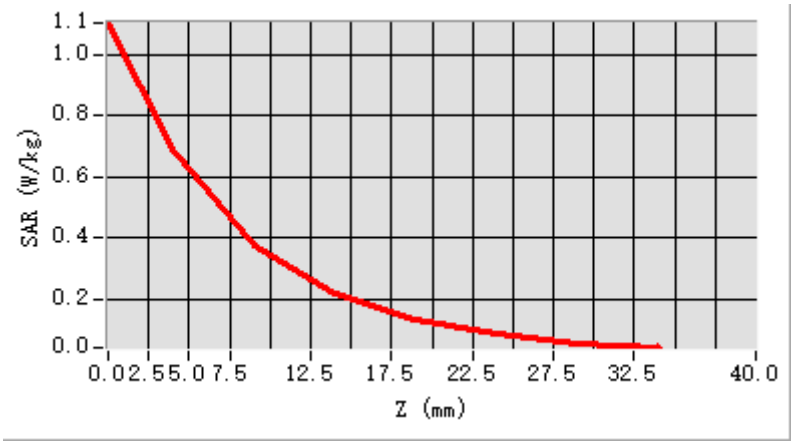
Maximum location: X=16.00, Y=-36.00 ; SAR Peak: 1.09 W/kg

D. SAR 1g & 10g

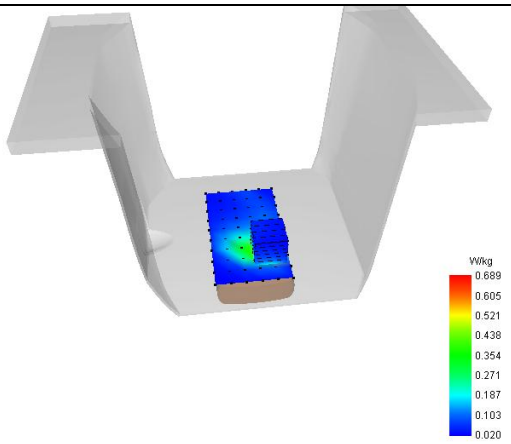
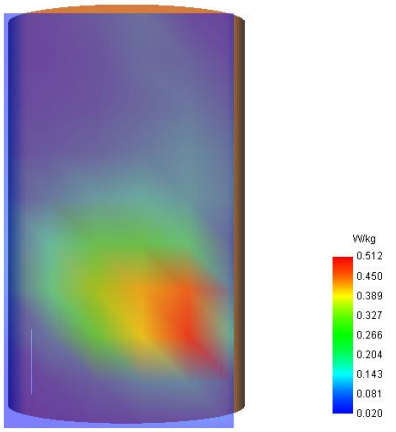
SAR 10g (W/Kg)	0.323
SAR 1g (W/Kg)	0.645
Variation (%)	-0.25
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	54.52

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.104	0.689	0.376	0.217	0.131	0.085	0.057



F. 3D Image

3D screen shot	Hot spot position
	

31# SAR Measurement at NR band 20 (Cheek, Left)
Date of measurement: 31/1/2025

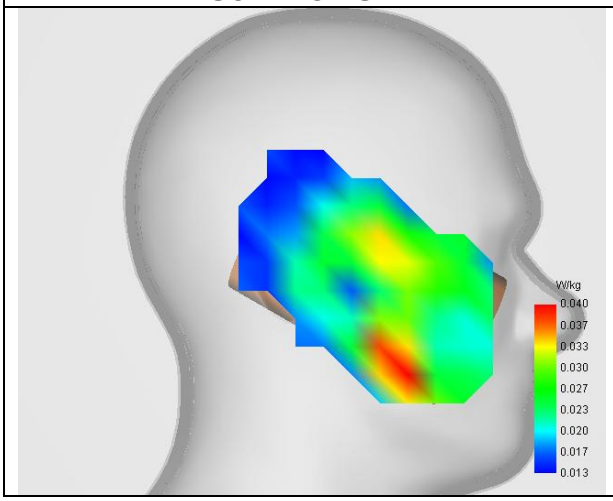
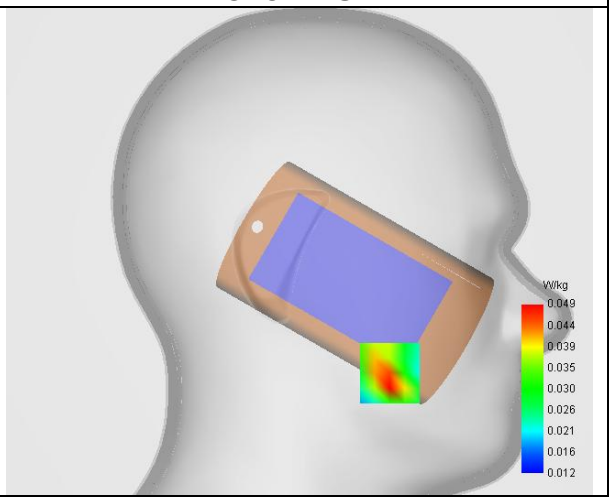
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.34
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	NR band 20
Channels/Frequency	Middle (169400)/ frequency 847.000 Mhz
Signal	NR FDD
Cell Bandwidth	20 Mhz
Modulation	DFT-s-OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	847.000
Relative permitivity (real part)	41.69
Relative permitivity (imaginary part)	19.41
Conductivity (S/m)	0.91

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

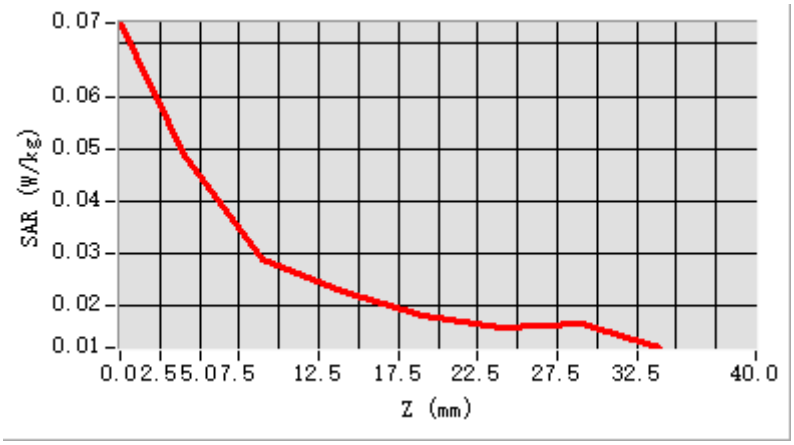
Maximum location: X=-48.00, Y=-65.00 ; SAR Peak: 0.07 W/kg

D. SAR 1g & 10g

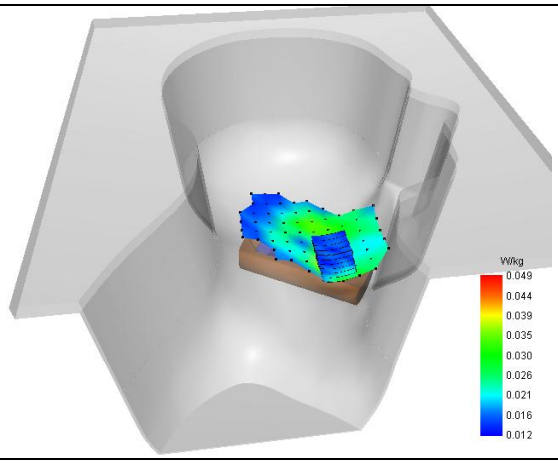
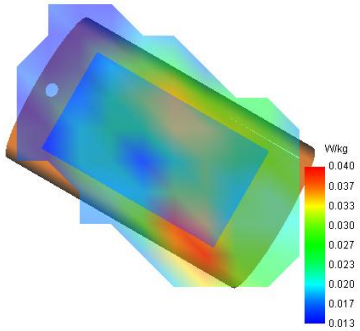
SAR 10g (W/Kg)	0.028
SAR 1g (W/Kg)	0.046
Variation (%)	-0.52
Horizontal validation criteria: minimum distance (mm)	11.31
Vertical validation criteria: SAR ratio M2/M1 (%)	70.40

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.074	0.049	0.029	0.023	0.018	0.016	0.017



F. 3D Image

3D screen shot	Hot spot position
	

32# SAR Measurement at NR band 20 (Body, Validation Plane)
Date of measurement: 31/1/2025

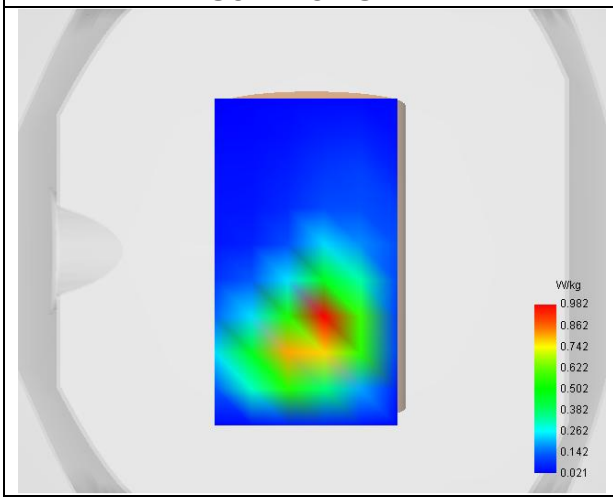
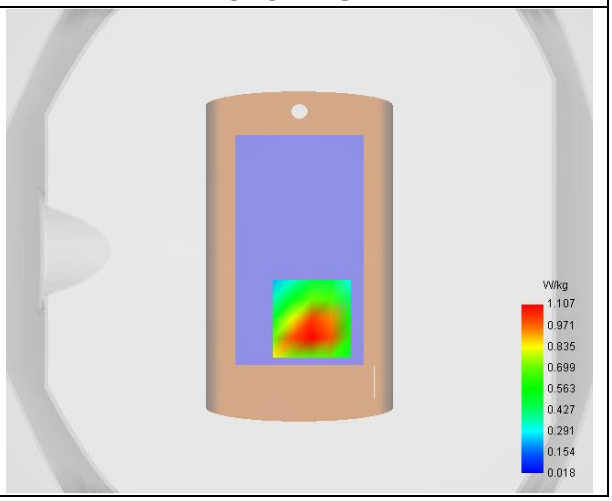
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.34
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	NR band 20
Channels/Frequency	Middle (169400)/ frequency 847.000 Mhz
Signal	NR FDD
Cell Bandwidth	20 Mhz
Modulation	DFT-s-OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	847.000
Relative permitivity (real part)	41.69
Relative permitivity (imaginary part)	19.41
Conductivity (S/m)	0.91

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

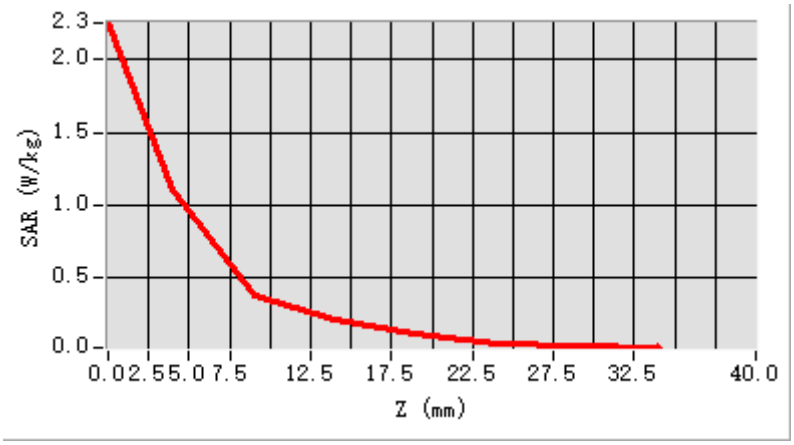
Maximum location: X=5.00, Y=-28.00 ; SAR Peak: 2.04 W/kg

D. SAR 1g & 10g

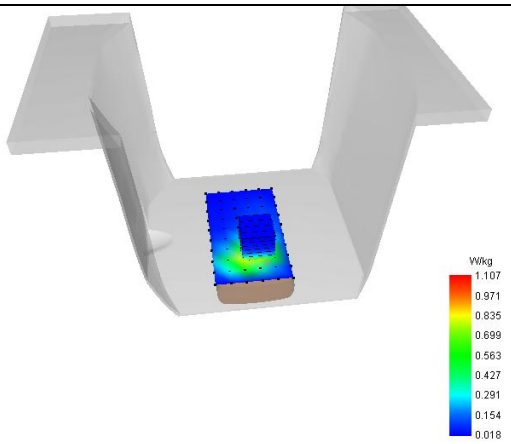
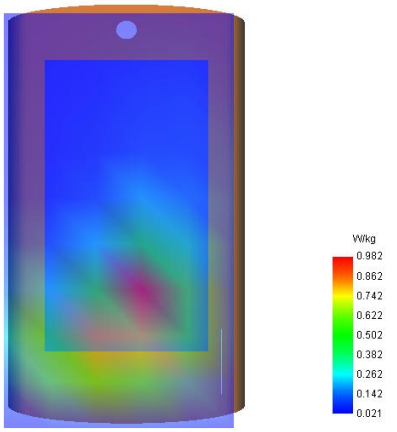
SAR 10g (W/Kg)	0.504
SAR 1g (W/Kg)	1.086
Variation (%)	0.47
Horizontal validation criteria: minimum distance (mm)	17.89
Vertical validation criteria: SAR ratio M2/M1 (%)	43.68

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.254	1.107	0.384	0.215	0.116	0.051	0.038



F. 3D Image

3D screen shot	Hot spot position
	

33# SAR Measurement at NR band 28 (Cheek, Left)
Date of measurement: 21/1/2025

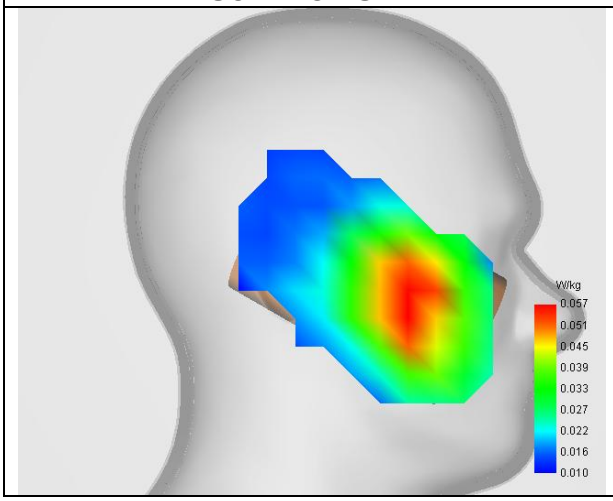
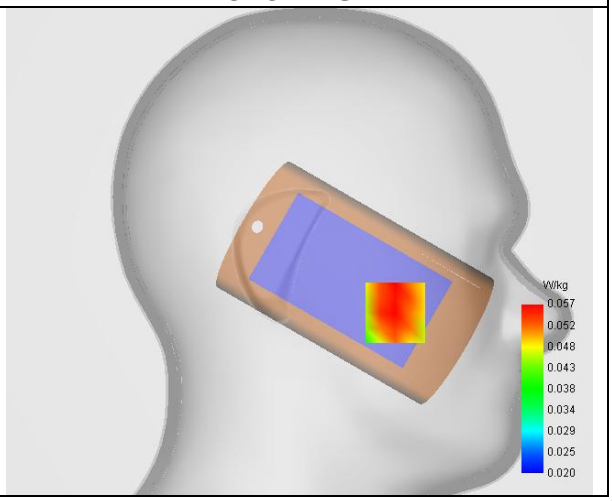
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.42
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	NR band 28
Channels/Frequency	Middle (145100)/ frequency 725.500 Mhz
Signal	NR FDD
Cell Bandwidth	30 Mhz
Modulation	DFT-s-OFDM - QPSK
subcarrier spacing (SCS)	15 kHz

B. Permitivity

Middle TX Frequency (MHz)	725.500
Relative permitivity (real part)	41.14
Relative permitivity (imaginary part)	21.85
Conductivity (S/m)	0.88

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

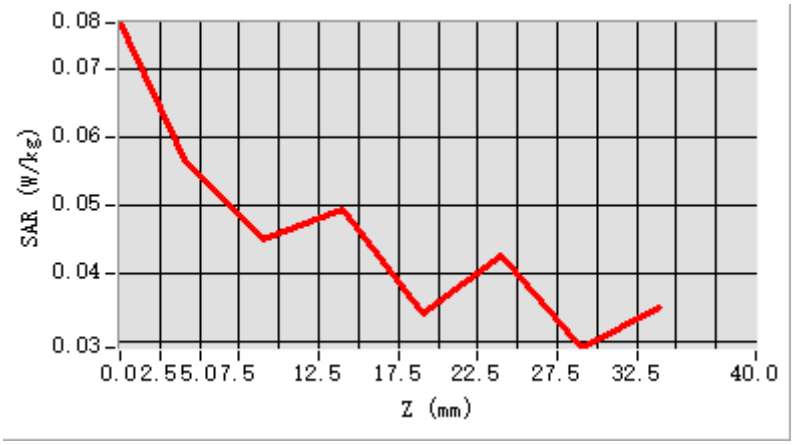
Maximum location: X=-51.00, Y=-33.00 ; SAR Peak: 0.07 W/kg

D. SAR 1g & 10g

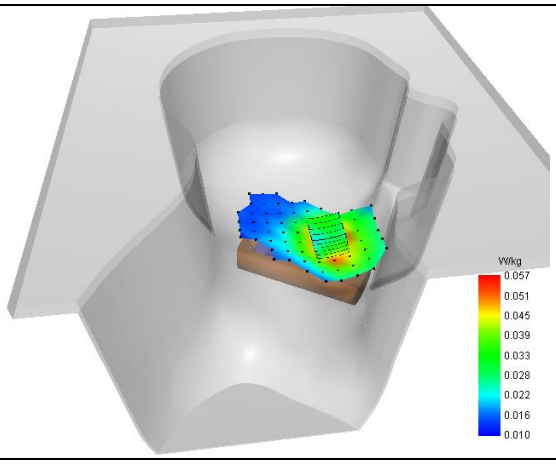
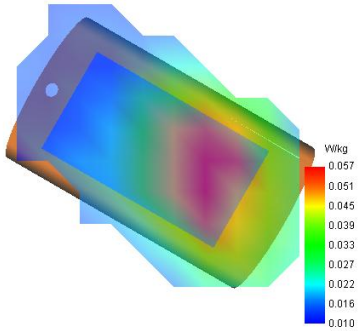
SAR 10g (W/Kg)	0.046
SAR 1g (W/Kg)	0.057
Variation (%)	1.66
Horizontal validation criteria: minimum distance (mm)	-1.00
Vertical validation criteria: SAR ratio M2/M1 (%)	88.46

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.077	0.057	0.045	0.049	0.034	0.043	0.029



F. 3D Image

3D screen shot	Hot spot position
	

34# SAR Measurement at NR band 28 (Body, Validation Plane)
Date of measurement: 21/1/2025

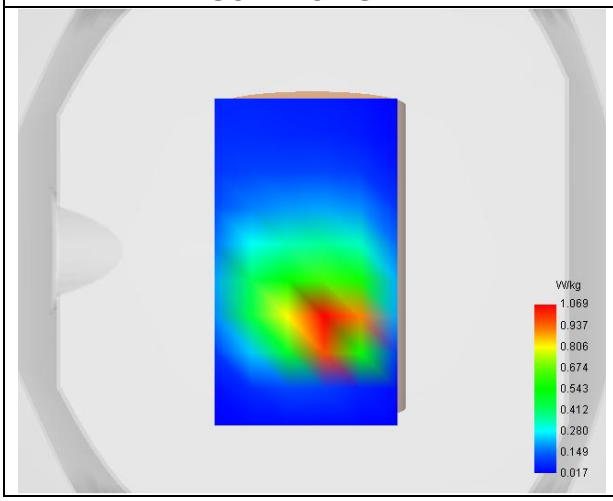
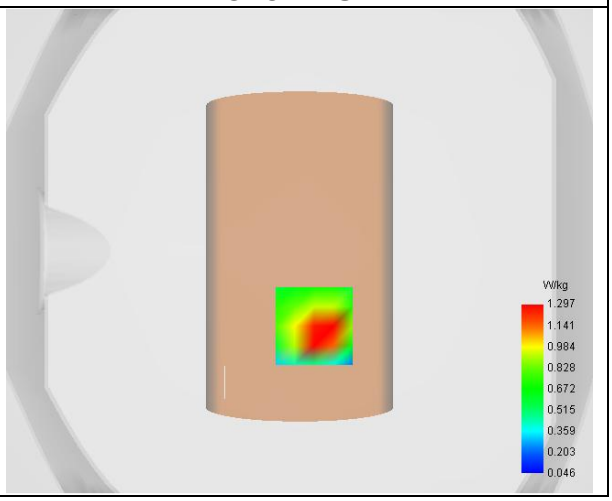
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.42
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	NR band 28
Channels/Frequency	Middle (145100)/ frequency 725.500 Mhz
Signal	NR FDD
Cell Bandwidth	30 Mhz
Modulation	DFT-s-OFDM - QPSK
subcarrier spacing (SCS)	15 kHz

B. Permitivity

Middle TX Frequency (MHz)	725.500
Relative permitivity (real part)	41.14
Relative permitivity (imaginary part)	21.85
Conductivity (S/m)	0.88

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

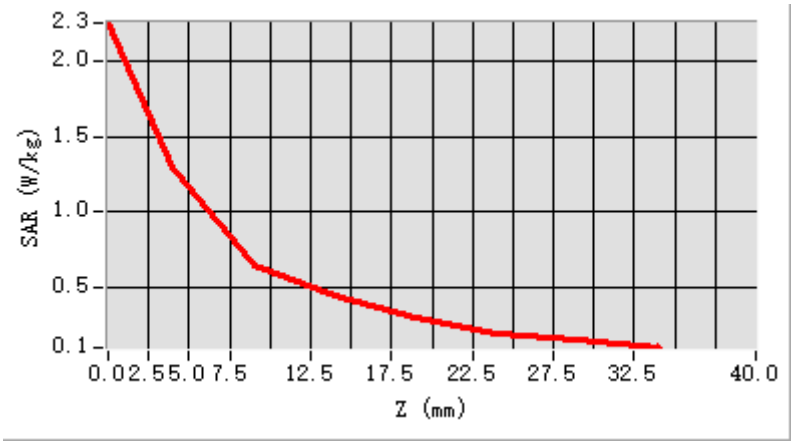
Maximum location: X=6.00, Y=-31.00 ; SAR Peak: 2.47 W/kg

D. SAR 1g & 10g

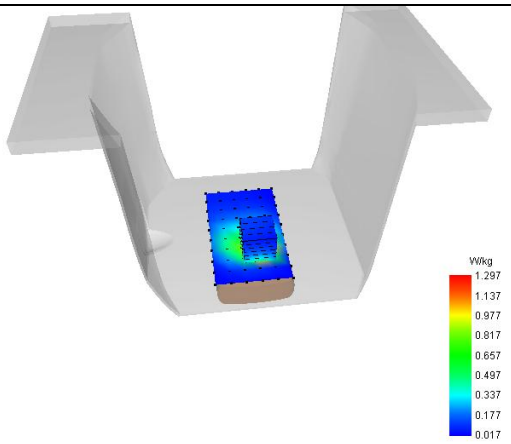
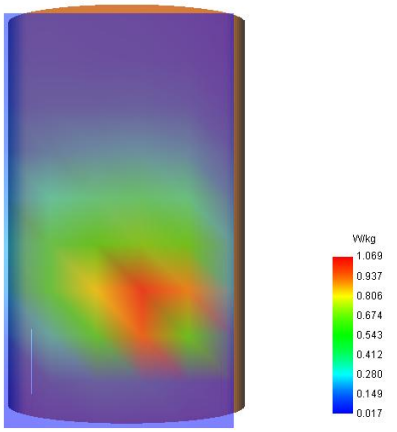
SAR 10g (W/Kg)	0.674
SAR 1g (W/Kg)	1.347
Variation (%)	0.18
Horizontal validation criteria: minimum distance (mm)	11.31
Vertical validation criteria: SAR ratio M2/M1 (%)	56.17

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.257	1.297	0.644	0.441	0.300	0.184	0.149



F. 3D Image

3D screen shot	Hot spot position
	

35# SAR Measurement at NR band 40 (Cheek, Left)
Date of measurement: 12/2/2025

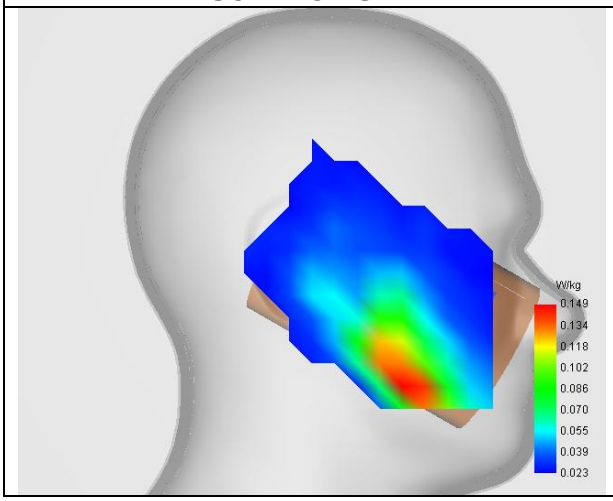
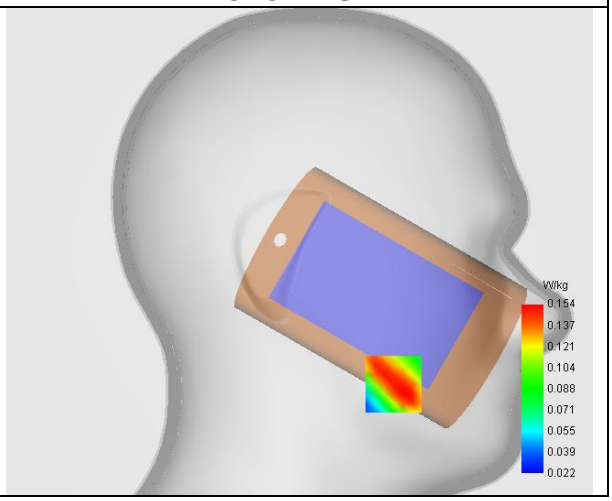
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.73
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	NR band 40
Channels/Frequency	Middle (470000)/ frequency 2350.000 Mhz
Signal	NR TDD
Cell Bandwidth	80 Mhz
Modulation	DFT-s-OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	2350.000
Relative permitivity (real part)	38.94
Relative permitivity (imaginary part)	12.96
Conductivity (S/m)	1.69

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

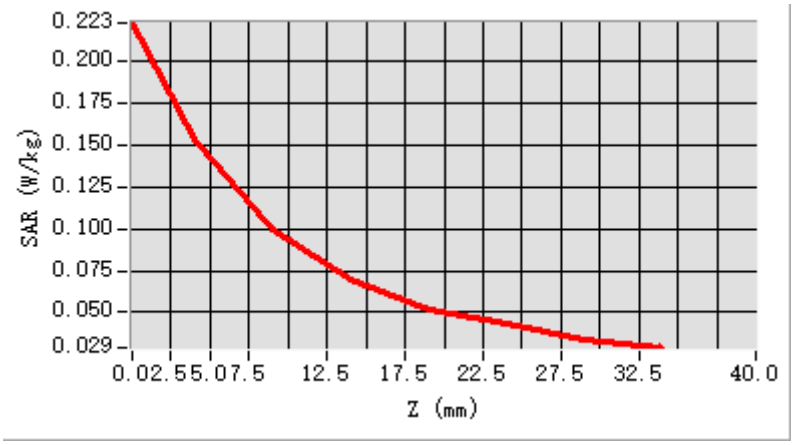
Maximum location: X=-50.00, Y=-71.00 ; SAR Peak: 0.22 W/kg

D. SAR 1g & 10g

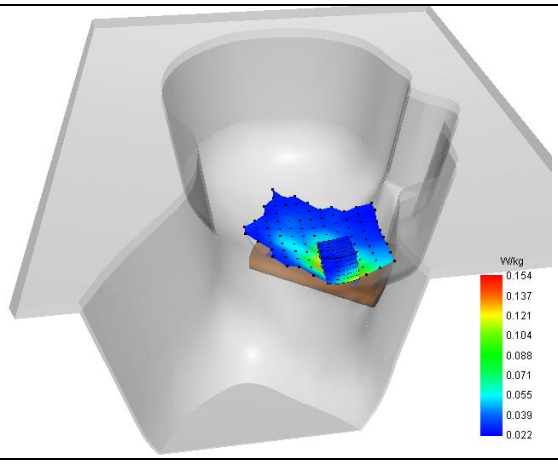
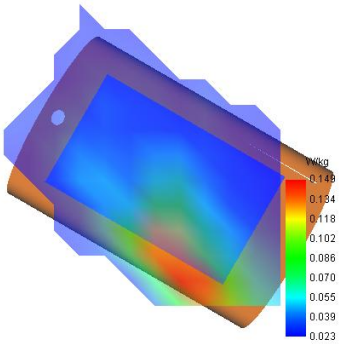
SAR 10g (W/Kg)	0.075
SAR 1g (W/Kg)	0.144
Variation (%)	4.79
Horizontal validation criteria: minimum distance (mm)	14.14
Vertical validation criteria: SAR ratio M2/M1 (%)	65.93

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.223	0.154	0.100	0.070	0.052	0.043	0.034



F. 3D Image

3D screen shot	Hot spot position
	

36# SAR Measurement at NR band 40 (Body, Validation Plane)
Date of measurement: 12/2/2025

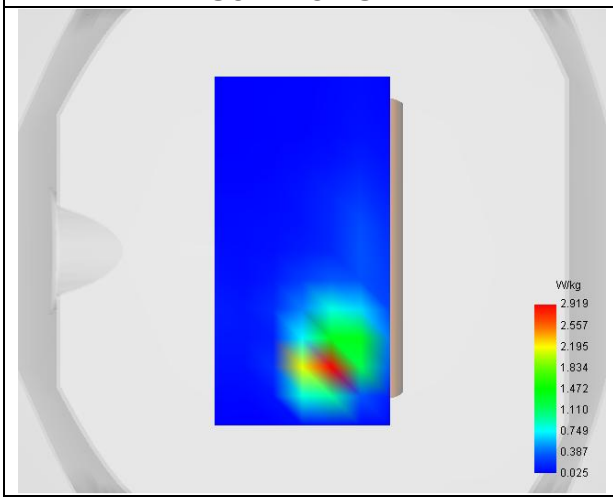
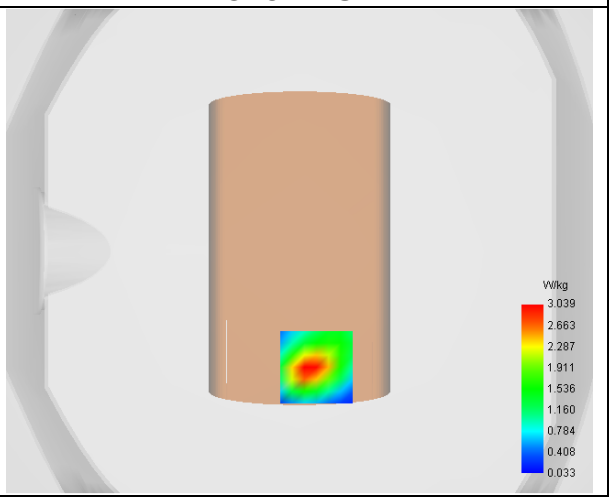
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.73
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	NR band 40
Channels/Frequency	Middle (470000)/ frequency 2350.000 Mhz
Signal	NR TDD
Cell Bandwidth	80 Mhz
Modulation	DFT-s-OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	2350.000
Relative permitivity (real part)	38.94
Relative permitivity (imaginary part)	12.96
Conductivity (S/m)	1.69

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

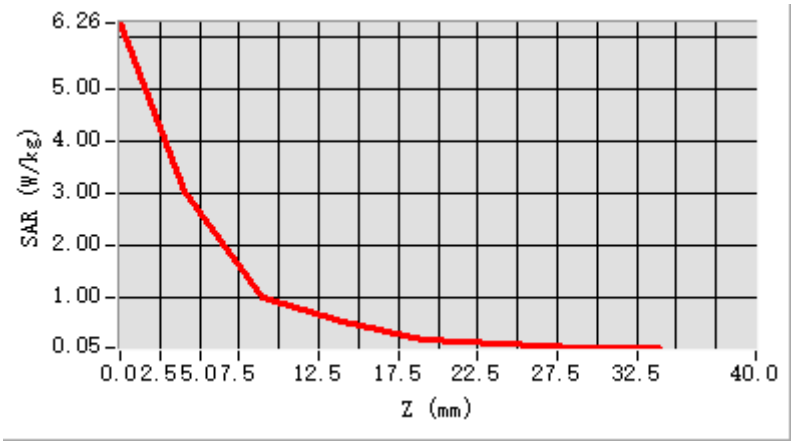
Maximum location: X=7.00, Y=-48.00 ; SAR Peak: 5.72 W/kg

D. SAR 1g & 10g

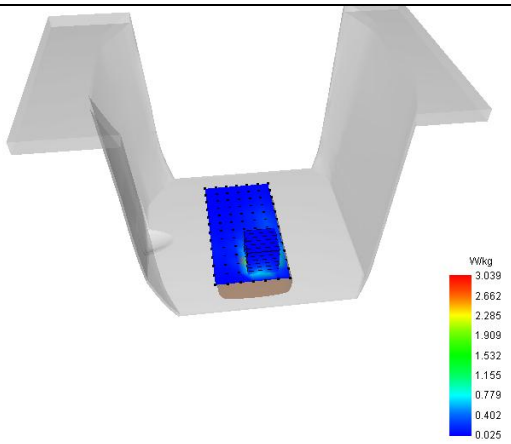
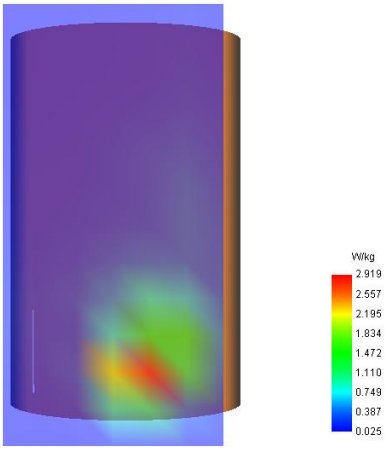
SAR 10g (W/Kg)	1.094
SAR 1g (W/Kg)	2.783
Variation (%)	0.91
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	40.32

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.263	3.039	0.995	0.541	0.218	0.129	0.067



F. 3D Image

3D screen shot	Hot spot position
	

37# SAR Measurement at NR band 77 (Cheek, Left)
Date of measurement: 25/2/2025

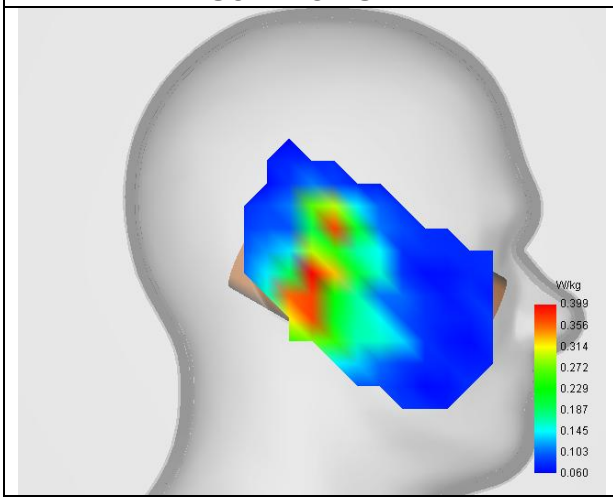
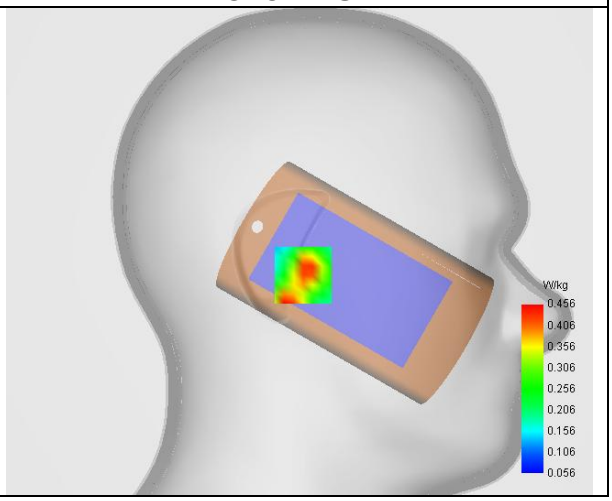
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.08
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	NR band 77
Channels/Frequency	Middle (650000)/ frequency 3750.000 Mhz
Signal	NR TDD
Cell Bandwidth	100 Mhz
Modulation	DFT-s-OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	3750.000
Relative permitivity (real part)	36.66
Relative permitivity (imaginary part)	15.11
Conductivity (S/m)	3.15

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

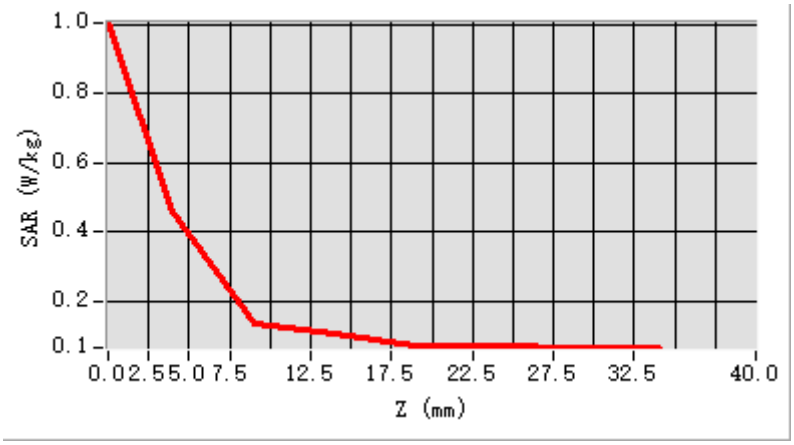
Maximum location: X=-2.00, Y=-13.00 ; SAR Peak: 0.82 W/kg

D. SAR 1g & 10g

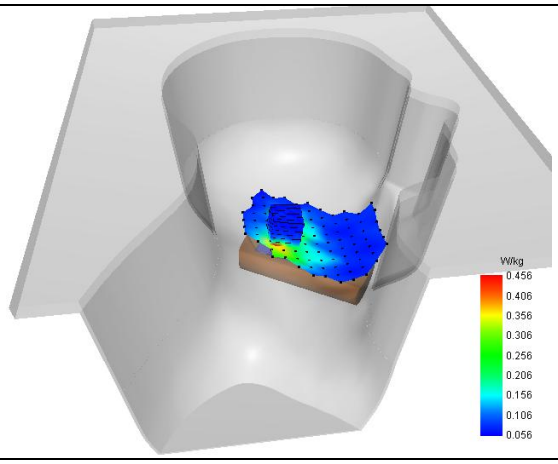
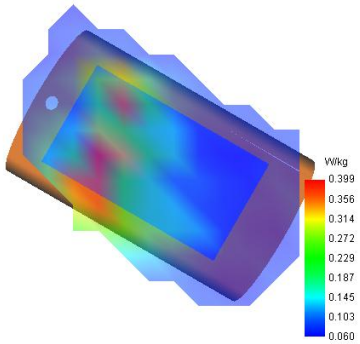
SAR 10g (W/Kg)	0.157
SAR 1g (W/Kg)	0.375
Variation (%)	-2.02
Horizontal validation criteria: minimum distance (mm)	15.81
Vertical validation criteria: SAR ratio M2/M1 (%)	45.54

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.004	0.456	0.133	0.108	0.072	0.070	0.068



F. 3D Image

3D screen shot	Hot spot position
	

38# SAR Measurement at NR band 77 (Body, Validation Plane)
Date of measurement: 25/2/2025

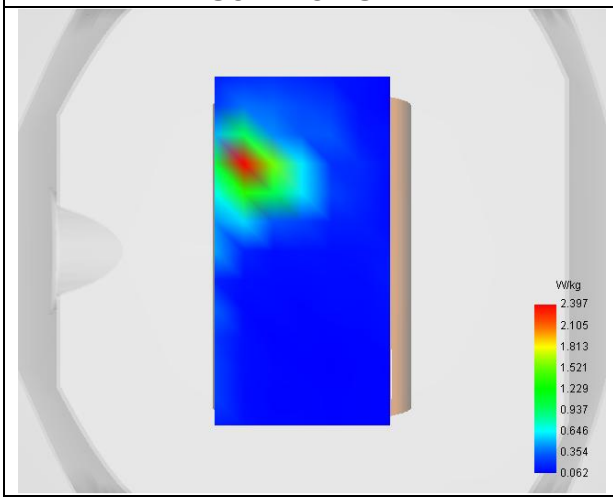
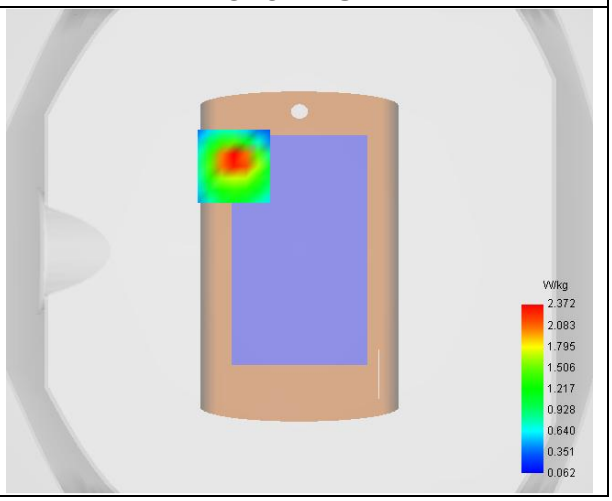
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.08
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	NR band 77
Channels/Frequency	Middle (650000)/ frequency 3750.000 Mhz
Signal	NR TDD
Cell Bandwidth	100 Mhz
Modulation	OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	3750.000
Relative permitivity (real part)	36.66
Relative permitivity (imaginary part)	15.11
Conductivity (S/m)	3.15

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

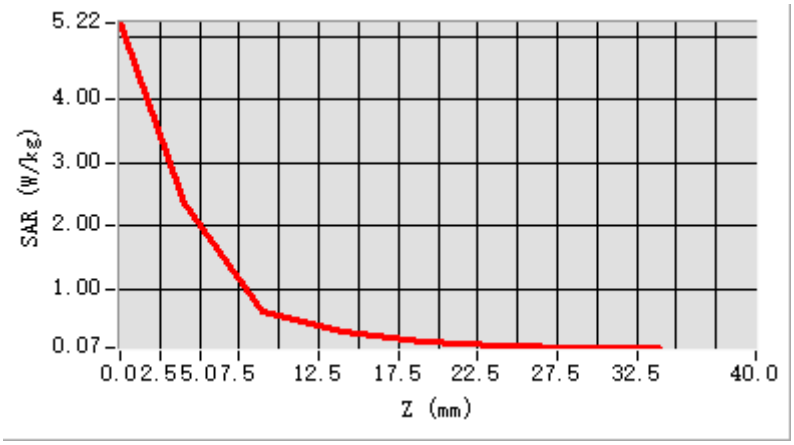
Maximum location: X=-27.00, Y=35.00 ; SAR Peak: 4.77 W/kg

D. SAR 1g & 10g

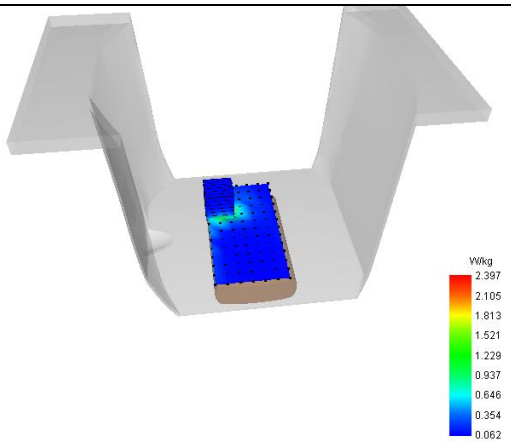
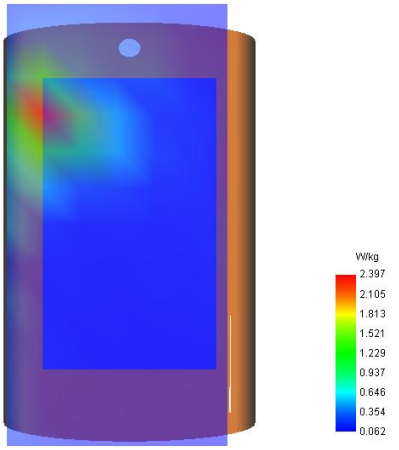
SAR 10g (W/Kg)	0.860
SAR 1g (W/Kg)	2.212
Variation (%)	0.66
Horizontal validation criteria: minimum distance (mm)	7.07
Vertical validation criteria: SAR ratio M2/M1 (%)	35.89

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	5.224	2.372	0.647	0.328	0.152	0.099	0.073



F. 3D Image

3D screen shot	Hot spot position
	

39# SAR Measurement at NR band 78 (Cheek, Left)
Date of measurement: 24/2/2025

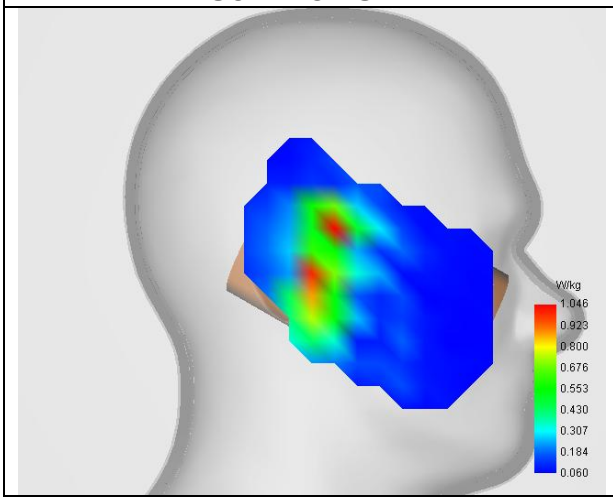
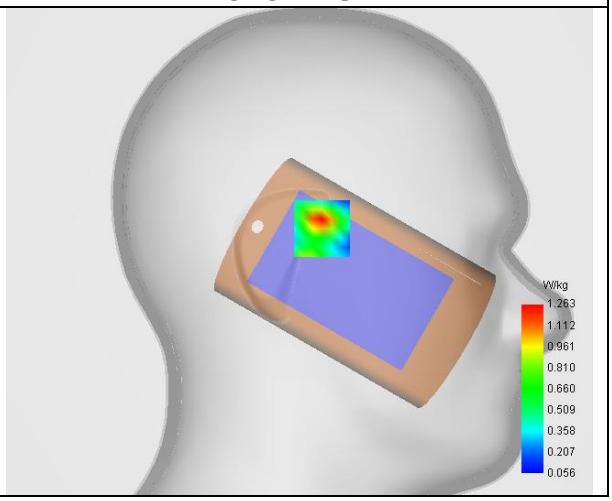
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.15
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	NR band 78
Channels/Frequency	Middle (636667)/ frequency 3550.005 Mhz
Signal	NR TDD
Cell Bandwidth	100 Mhz
Modulation	DFT-s-OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	3549.990
Relative permitivity (real part)	37.19
Relative permitivity (imaginary part)	14.55
Conductivity (S/m)	2.87

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

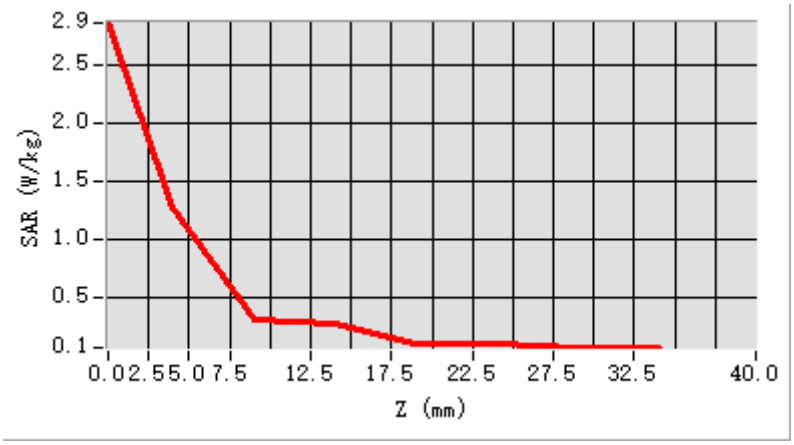
Maximum location: X=-12.00, Y=12.00 ; SAR Peak: 2.22 W/kg

D. SAR 1g & 10g

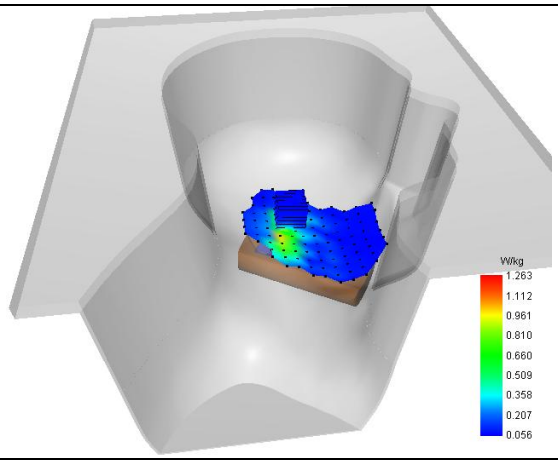
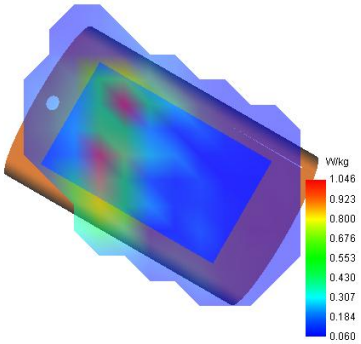
SAR 10g (W/Kg)	0.437
SAR 1g (W/Kg)	1.094
Variation (%)	-2.34
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	45.08

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.854	1.263	0.311	0.273	0.106	0.096	0.066



F. 3D Image

3D screen shot	Hot spot position
	

40# SAR Measurement at NR band 78 (Body, Validation Plane)
Date of measurement: 24/2/2025

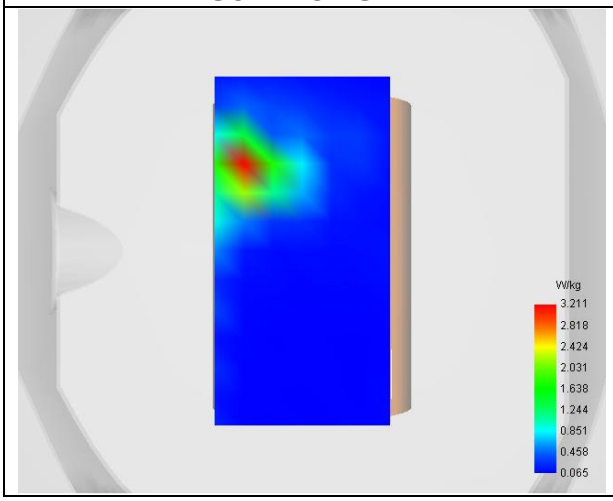
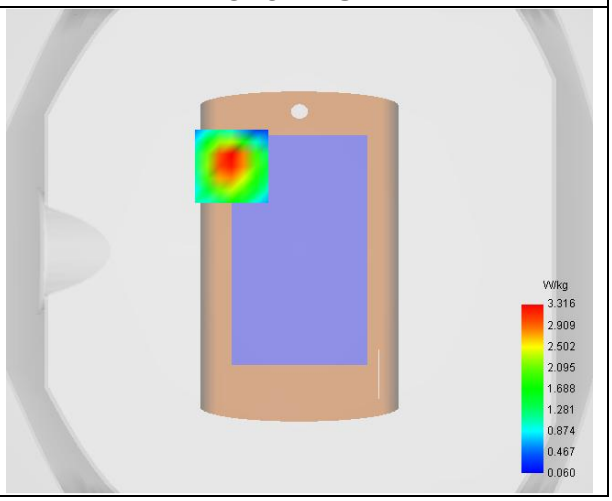
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.15
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	NR band 78
Channels/Frequency	Middle (636667)/ frequency 3550.005 Mhz
Signal	NR TDD
Cell Bandwidth	100 Mhz
Modulation	DFT-s-OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	3549.990
Relative permitivity (real part)	37.19
Relative permitivity (imaginary part)	14.55
Conductivity (S/m)	2.87

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

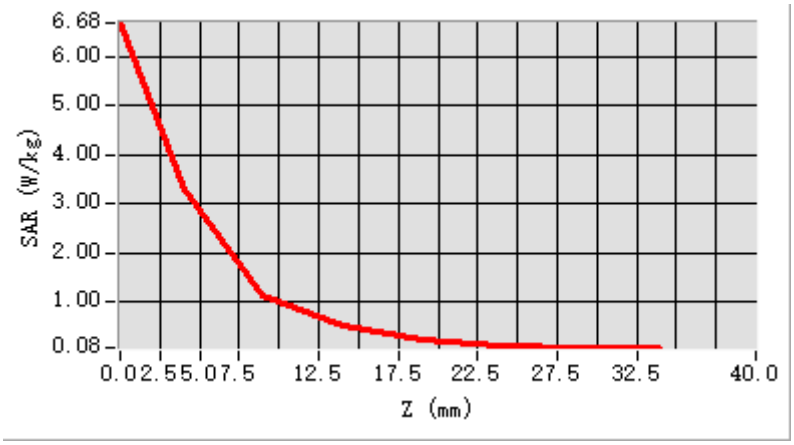
Maximum location: X=-28.00, Y=35.00 ; SAR Peak: 6.21 W/kg

D. SAR 1g & 10g

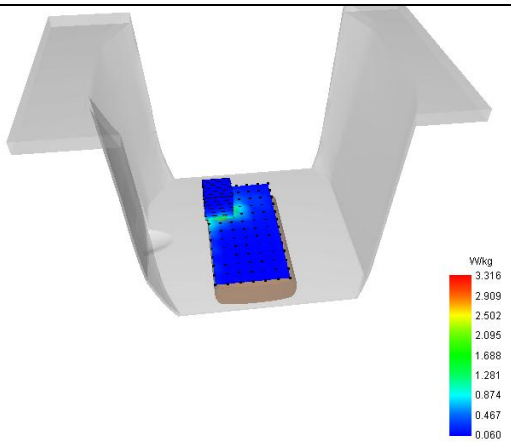
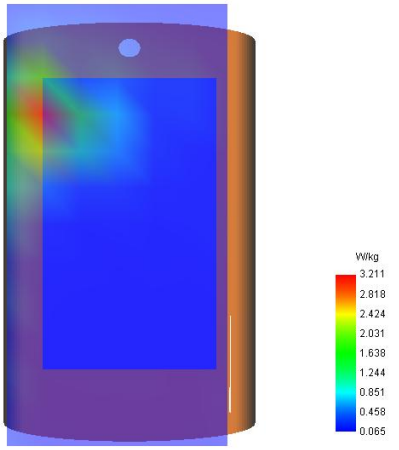
SAR 10g (W/Kg)	1.261
SAR 1g (W/Kg)	3.065
Variation (%)	4.24
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	40.13

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.678	3.316	1.146	0.539	0.227	0.125	0.087



F. 3D Image

3D screen shot	Hot spot position
	

41# SAR Measurement at LTE band 41 (Cheek, Left)
Date of measurement: 28/1/2025

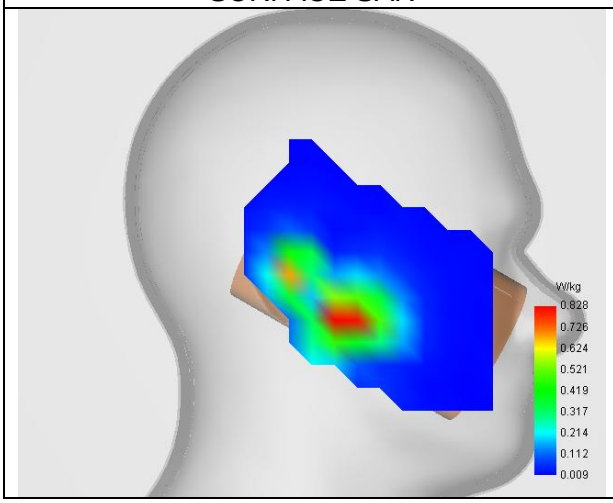
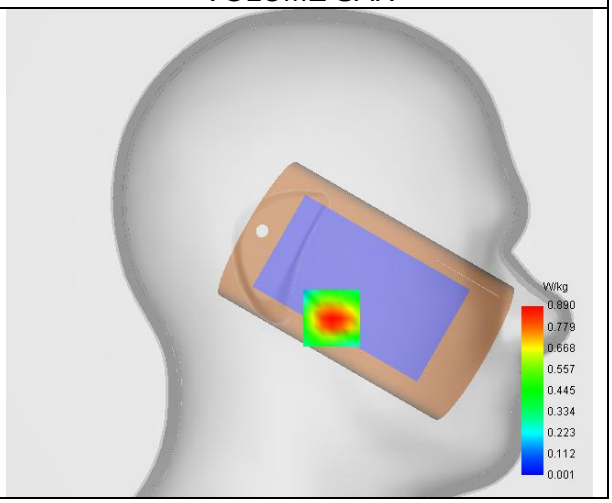
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	LTE band 41
Channels/Frequency	Middle (40640)/ frequency 2593.000 Mhz
Signal	LTE TDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	2593.00
Relative permitivity (real part)	38.82
Relative permitivity (imaginary part)	13.66
Conductivity (S/m)	1.97

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

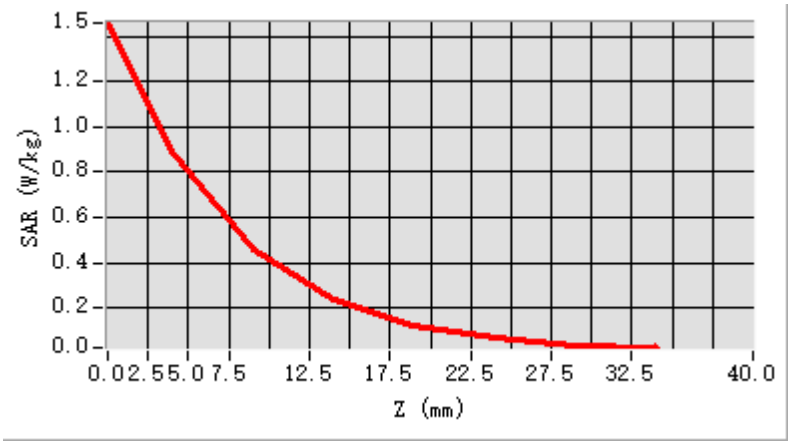
Maximum location: X=-17.00, Y=-35.00 ; SAR Peak: 1.48 W/kg

D. SAR 1g & 10g

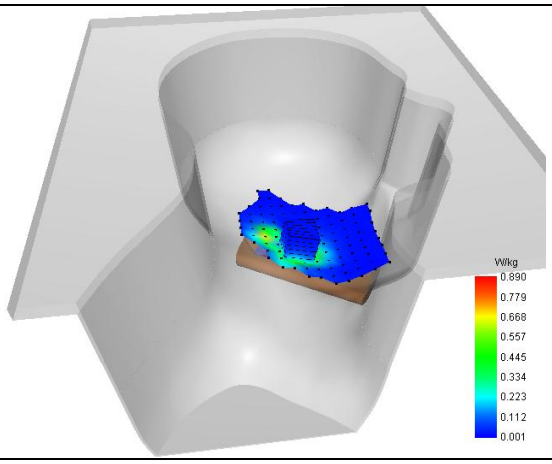
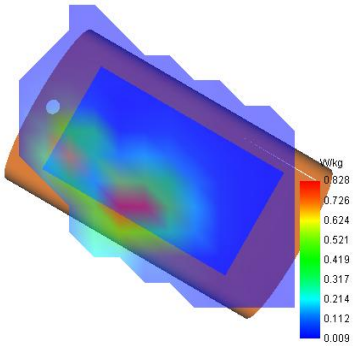
SAR 10g (W/Kg)	0.405
SAR 1g (W/Kg)	0.828
Variation (%)	4.01
Horizontal validation criteria: minimum distance (mm)	14.14
Vertical validation criteria: SAR ratio M2/M1 (%)	51.48

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.458	0.890	0.458	0.236	0.121	0.069	0.037



F. 3D Image

3D screen shot	Hot spot position
	

42# SAR Measurement at LTE band 41 (Body, Validation Plane)
Date of measurement: 28/1/2025

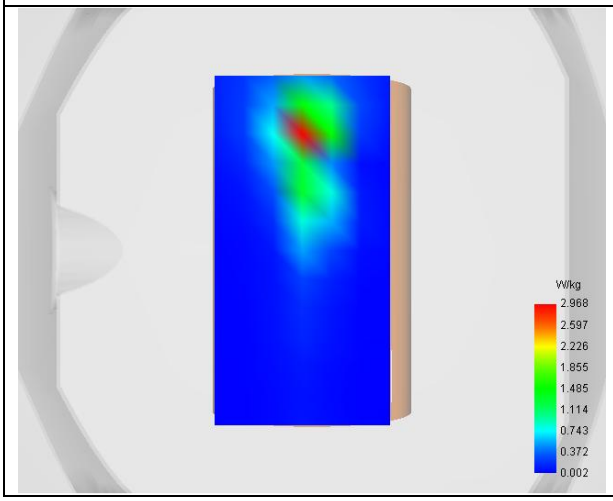
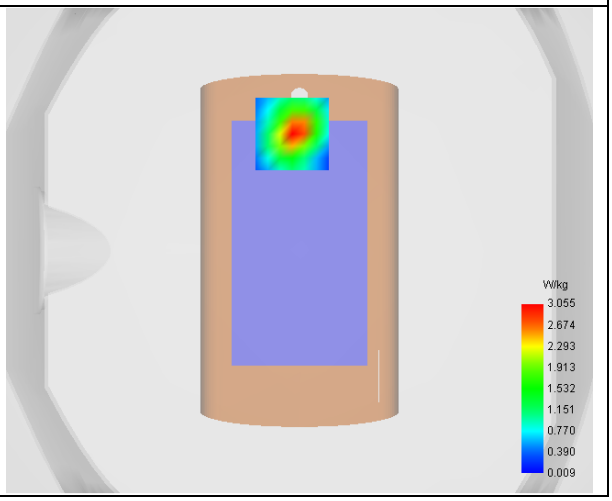
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 41
Channels/Frequency	Middle (40640)/ frequency 2593.000 Mhz
Signal	LTE TDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK

B. Permitivity

Middle TX Frequency (MHz)	2593.00
Relative permitivity (real part)	38.82
Relative permitivity (imaginary part)	13.66
Conductivity (S/m)	1.97

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

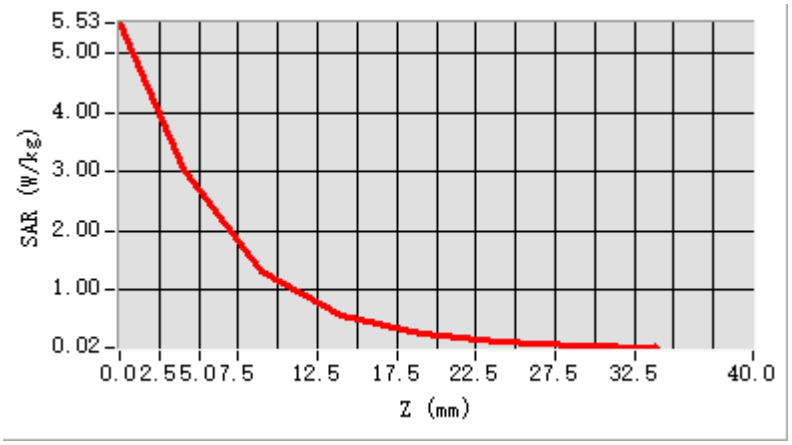
Maximum location: X=-3.00, Y=48.00 ; SAR Peak: 5.53 W/kg

D. SAR 1g & 10g

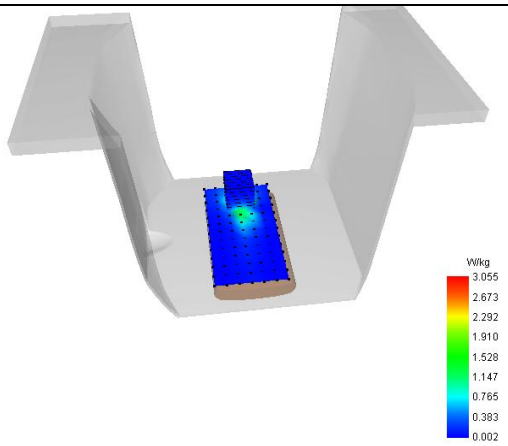
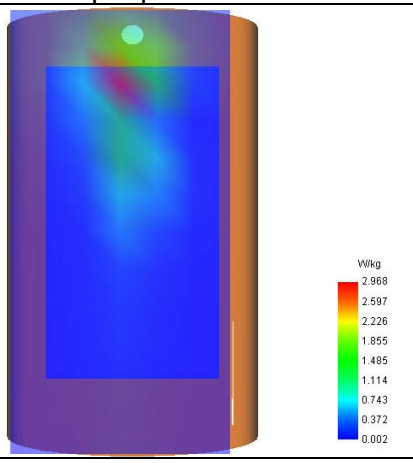
SAR 10g (W/Kg)	1.044
SAR 1g (W/Kg)	2.695
Variation (%)	0.38
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	43.26

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	5.526	3.055	1.321	0.575	0.261	0.117	0.058



F. 3D Image

3D screen shot	Hot spot position
	

43# SAR Measurement at NR band 41 (Cheek, Left)
Date of measurement: 28/1/2025

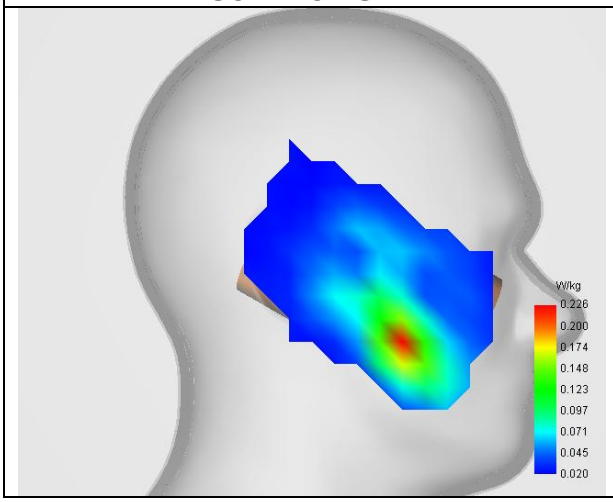
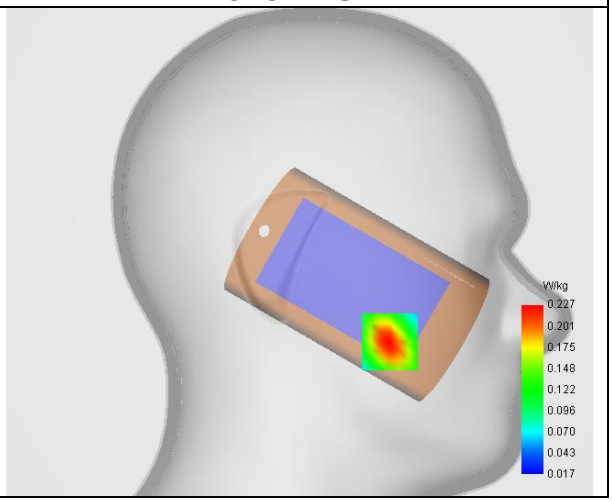
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Left head
Device Position	Cheek
Band	NR band 41
Channels/Frequency	Middle (518598)/ frequency 2592.99 Mhz
Signal	NR TDD
Cell Bandwidth	100 Mhz
Modulation	DFT-s-OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	2592.99
Relative permitivity (real part)	38.82
Relative permitivity (imaginary part)	13.66
Conductivity (S/m)	1.97

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

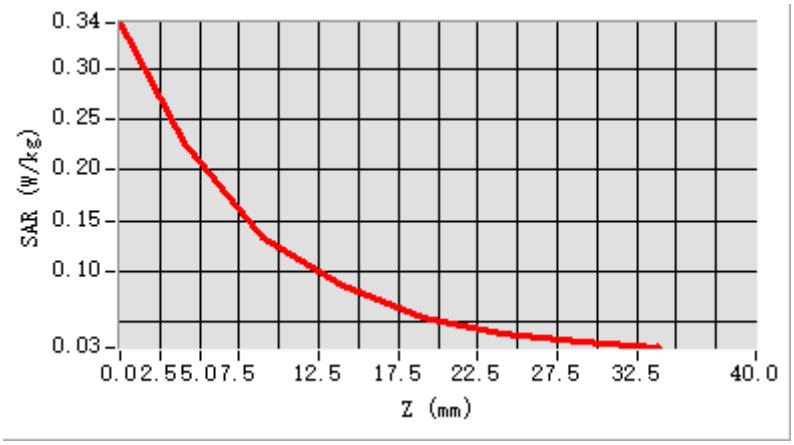
Maximum location: X=-48.00, Y=-48.00 ; SAR Peak: 0.35 W/kg

D. SAR 1g & 10g

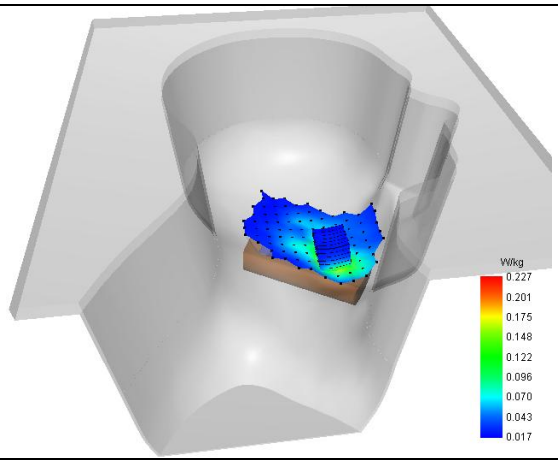
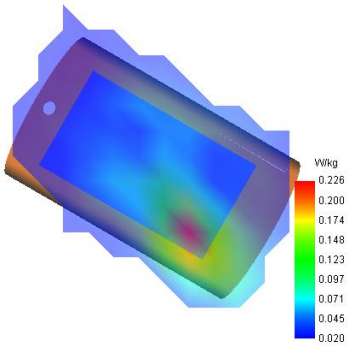
SAR 10g (W/Kg)	0.114
SAR 1g (W/Kg)	0.212
Variation (%)	-1.28
Horizontal validation criteria: minimum distance (mm)	14.14
Vertical validation criteria: SAR ratio M2/M1 (%)	58.56

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.345	0.227	0.133	0.086	0.055	0.038	0.031



F. 3D Image

3D screen shot	Hot spot position
	

44# SAR Measurement at NR band 41 (Body, Validation Plane)
Date of measurement: 28/1/2025

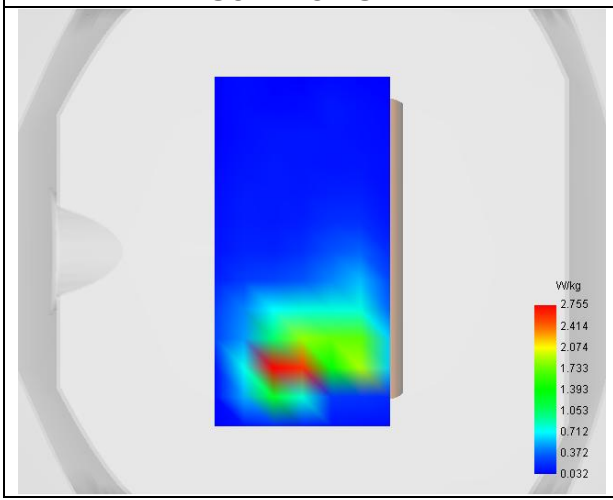
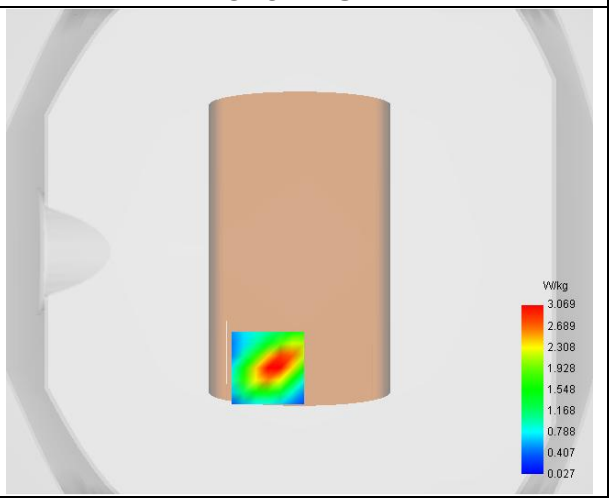
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.51
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	NR band 41
Channels/Frequency	Middle (518598)/ frequency 2592.99 Mhz
Signal	NR TDD
Cell Bandwidth	100 Mhz
Modulation	DFT-s-OFDM - QPSK
subcarrier spacing (SCS)	30 kHz

B. Permitivity

Middle TX Frequency (MHz)	2592.99
Relative permitivity (real part)	38.82
Relative permitivity (imaginary part)	13.66
Conductivity (S/m)	1.97

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

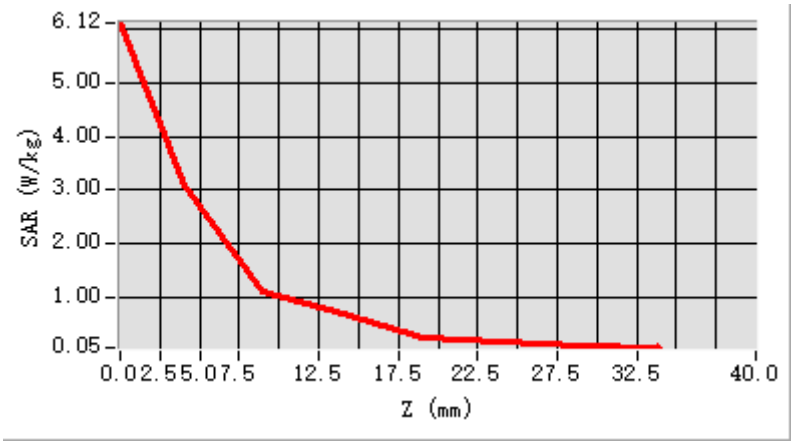
Maximum location: X=-13.00, Y=-48.00 ; SAR Peak: 5.45 W/kg

D. SAR 1g & 10g

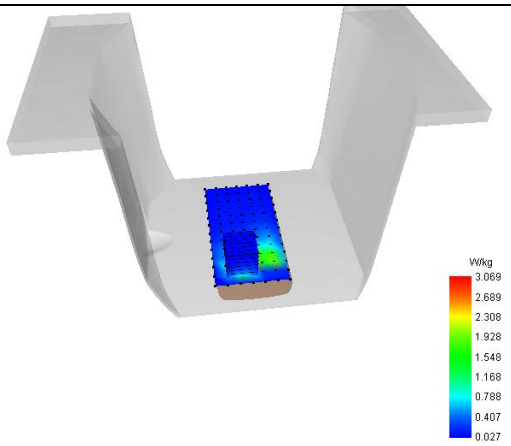
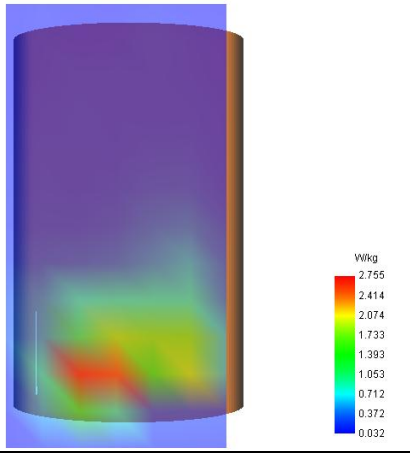
SAR 10g (W/Kg)	1.190
SAR 1g (W/Kg)	2.817
Variation (%)	-1.56
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	46.85

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.116	3.069	1.082	0.692	0.255	0.169	0.077



F. 3D Image

3D screen shot	Hot spot position
	

13. Appendix D. Calibration Certificate

Table of contents
E Field Probe - 4024-EPGO-442
750 MHz Dipole - SN 03/15 DIP 0G750-355
900 MHz Dipole - SN 03/15 DIP 0G900-348
1800 MHz Dipole - SN 03/15 DIP 1G800-349
2000 MHz Dipole - SN 03/15 DIP 2G000-351
2300 MHz Dipole - SN 03/16 DIP 2G300-358
2450 MHz Dipole - SN 03/15 DIP 2G450-352
2600 MHz Dipole - SN 03/15 DIP 2G600-356
3300 MHz Dipole - SN 03/21 DIP 3G300-359
3500 MHz Dipole - SN 09/12 DIP 3G500-360
3700 MHz Dipole - SN 09/12 DIP 3G700-361
4200 MHz Dipole - SN 03/21 DIP 4G200-363

Docusign Envelope ID: 223C1A7C-4751-4B95-8502-1618DC0951E3

COMOSAR E-Field Probe Calibration Report

Ref : ACR.278.12.24.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.: 4024-EPGO-442

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 10/04/2024

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).

Docusign Envelope ID: 223C1A7C-4751-4B95-8502-1618DC0951E3

	Name	Function	Date	Signature
Prepared by :	Cyrille ONNEE	Measurement Responsible	10/4/2024	
Checked & approved by:	Pedro Ruiz	Technical Manager	10/4/2024	
Authorized by:	Pedro Ruiz	Laboratory Director	10/4/2024 Assinado por: Pedro RUIZ 29093B31C46F428...	

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

Issue	Name	Date	Modifications
A	Cyrille ONNEE	10/4/2024	Initial release

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Docusign Envelope ID: 223C1A7C-4751-4B95-8502-1618DC0951E3

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Docusign Envelope ID: 223C1A7C-4751-4B95-8502-1618DC0951E3

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	4024-EPGO-442
Product Condition (new / used)	New
Frequency Range of Probe	0.15 GHz-7.5GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.206 MΩ Dipole 2: R2=0.223 MΩ Dipole 3: R3=0.235 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:

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

where

$SAR_{uncertainty}$	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;
ΔSAR_{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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3.5 PROBE MODULATION RESPONSE

MVG's probe were evaluated experimentally with various modulated signal and the deviation from CW response were found neglectable in the used power range of the probe. So the correction to taking into account the linearization parameters for different modulation is null, therefore the CW factor given in this report can be used whatever the measured modulation

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.

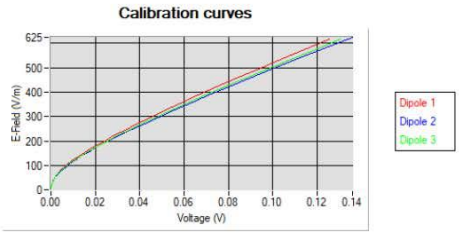
The estimated expanded uncertainty (k=2) in calibration for SAR (W/kg) is +/-11% for the frequency range 150-450MHz.
The estimated expanded uncertainty (k=2) in calibration for SAR (W/kg) is +/-14% for the frequency range 600-7500MHz.

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.

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

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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

Normx dipole 1 (μV/(V/m)^2)	Normy dipole 2 (μV/(V/m)^2)	Normz dipole 3 (μV/(V/m)^2)
0.73	0.79	0.78

DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
105	109	103

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:

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

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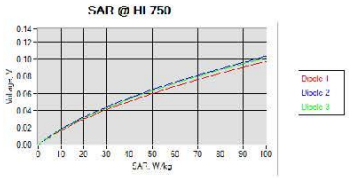
Docusign Envelope ID: 223C1A7C-4751-4B95-8502-1618DC0951E3

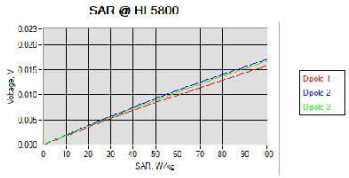
where
a=the larger cross-sectional of the waveguide
b=the smaller cross-sectional of the waveguide
δ=the skin depth for the liquid in the waveguide
Pw=the power delivered to the liquid

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	2.42
HL850	835	2.34
HL900	900	2.24
HL1800	1800	2.51
HL1900	1900	2.57
HL2000	2000	2.64
HL2300	2300	2.73
HL2450	2450	2.74
HL2600	2600	2.51
HL3300	3300	2.11
HL3500	3500	2.15
HL3700	3700	2.08
HL3900	3900	2.27
HL4200	4200	2.39
HL4600	4600	2.30
HL4900	4900	2.13
HL5200	5200	1.89
HL5400	5400	1.97
HL5600	5600	1.88
HL5800	5800	1.90

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



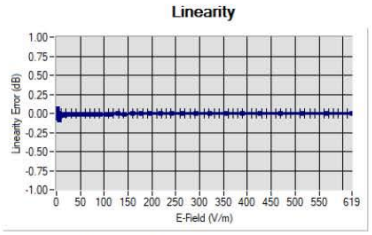


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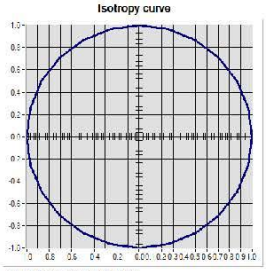
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6 VERIFICATION RESULTS

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:+/-1.90% (+/-0.08dB)



Isotropy:+/-0.12% (+/-0.01dB)

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	08/2026
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	06/2026
USB Sensor	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.

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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.
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	44235403	02/2024	02/2027

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SAR Reference Dipole Calibration Report

Ref : ACR.53.23.24.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 REFERENCE DIPOLE

FREQUENCY: 750 MHZ

SERIAL NO.: SN 03/15DIP0G750-355

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 02/21/2024

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

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Summary:

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

SAR REFERENCE DIPOLE CALIBRATION REPORT

REF : ACR.53.23.24.BES.A

	Name	*Function*	*Date*	*Signature*
Prepared by :	Pedro Ruiz	Measurement Responsible	2/22/2024	
Checked & approved by:	Jérôme Luc	Technical Manager	2/22/2024	
Authorized by:	Yann Toutain	Laboratory Director	2/27/2024	

Yann Toutain ID Signature numérique de Yann Toutain ID Date : 2024.02.27 08:54:37 +01'00'

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

Issue	*Name*	*Date*	*Modifications*
A	Pedro Ruiz	2/22/2024	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 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 03/15DIP0G750-355
Product Condition (new / used)	Used

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 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

4.1 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

4.2 S11 PARAMETER REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a S11 of -20 dB or better. The S11 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.

4.3 SAR REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

5 MEASUREMENT UNCERTAINTY

5.1 MECHANICAL DIMENSIONS

For the measurement in the range 0-300mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.20 mm with respect to measurement conditions.

For the measurement in the range 300-450mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.44 mm with respect to measurement conditions.

5.2 S11 PARAMETER

The estimated expanded uncertainty (k=2) in calibration for the S11 parameter in linear is +/-0.08 with respect to measurement conditions.

5.3 SAR

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

The estimated expanded uncertainty (k=2) in calibration for the 1g and 10g SAR measurement in W/kg is +/-19% with respect to measurement conditions.

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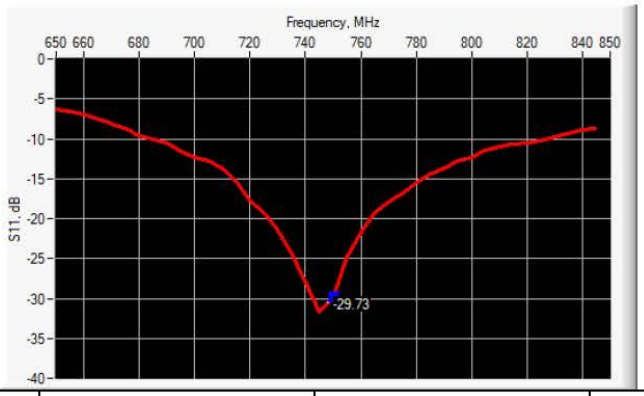
6 CALIBRATION RESULTS

6.1 MECHANICAL DIMENSIONS

L mm		h mm		d mm	
Measured	**Required**	**Measured**	**Required**	**Measured**	**Required**
-	176.00 +/- 2%	-	100.00 +/- 2%	-	6.35 +/- 2%

6.2 S11 PARAMETER

6.2.1 S11 parameter in Head Liquid



Frequency (MHz)	S11 parameter (dB)	Requirement (dB)	Impedance
750	-29.73	-20	52.5Ω + 2.2jΩ

6.3 SAR

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

6.3.1 SAR with Head Liquid

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

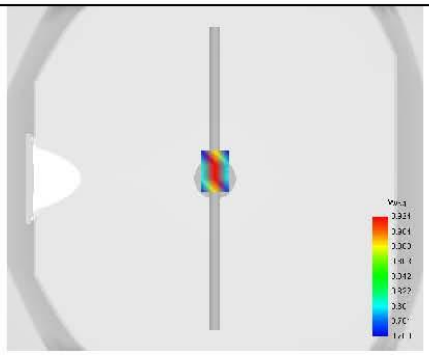
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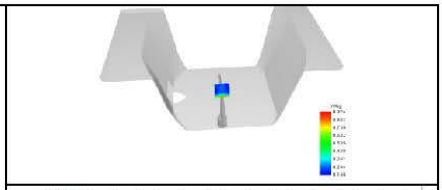
SAR REFERENCE DIPOLE CALIBRATION REPORT

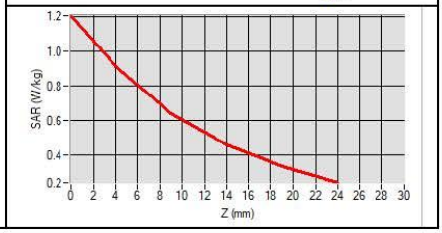
REF : ACR.53.23.24.BES.A

Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	3523-EPGO-429
Liquid	Head Liquid Values: eps' : 45.0 sigma : 0.87
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	750 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

Frequency	1g SAR (W/kg)			10g SAR (W/kg)		
	Measured	Measured normalized to 1W	Target normalized to 1W	Measured	Measured normalized to 1W	Target normalized to 1W
750 MHz	0.86	8.60	8.49	0.58	5.78	5.55







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7 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	08/2021	08/2024
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	07/2022	07/2025
Calipers	Mitutoyo	SN 0009732	11/2022	11/2025
Reference Probe	MVG	3523-EPGO-429	11/2023	11/2024
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.
Temperature / Humidity Sensor	Testo 184 H1	44225320	06/2021	06/2024

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SAR Reference Dipole Calibration Report

Ref : ACR.53.25.24.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 REFERENCE DIPOLE

FREQUENCY: 900 MHZ

SERIAL NO.: SN 03/15DIP0G900-348

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 21/02/2024

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

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Summary:

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

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref : ACR.53.25.24.BES.A

	Name	*Function*	*Date*	*Signature*
Prepared by :	Pedro Ruiz	Measurement Responsible	2/22/2024	
Checked & approved by:	Jérôme Luc	Technical Manager	2/22/2024	
Authorized by:	Yann Toutain	Laboratory Director	2/27/2024	

Yann Toutain ID Signature numérique de Yann Toutain ID Date : 2024.02.27 08:55:46 +01'00'

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

Issue	*Name*	*Date*	*Modifications*
A	Pedro Ruiz	2/22/2024	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 900 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID900
Serial Number	SN 03/15DIP0G900-348
Product Condition (new / used)	Used

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 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

4.1 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

4.2 S11 PARAMETER REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a S11 of -20 dB or better. The S11 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.

4.3 SAR REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

5 MEASUREMENT UNCERTAINTY

5.1 MECHANICAL DIMENSIONS

For the measurement in the range 0-300mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.20 mm with respect to measurement conditions.

For the measurement in the range 300-450mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.44 mm with respect to measurement conditions.

5.2 S11 PARAMETER

The estimated expanded uncertainty (k=2) in calibration for the S11 parameter in linear is +/-0.08 with respect to measurement conditions.

5.3 SAR

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

The estimated expanded uncertainty (k=2) in calibration for the 1g and 10g SAR measurement in W/kg is +/-19% with respect to measurement conditions.

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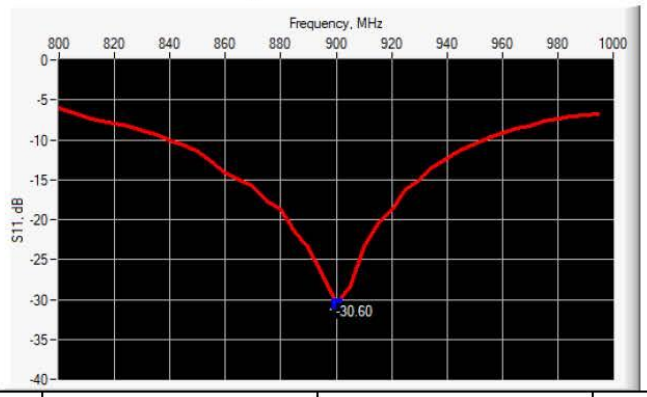
6 CALIBRATION RESULTS

6.1 MECHANICAL DIMENSIONS

L mm		h mm		d mm	
Measured	**Required**	**Measured**	**Required**	**Measured**	**Required**
-	149.00 +/- 2%	-	83.30 +/- 2%	-	3.60 +/- 2%

6.2 S11 PARAMETER

6.2.1 S11 parameter in Head Liquid



Frequency (MHz)	S11 parameter (dB)	Requirement (dB)	Impedance
900	-30.60	-20	51.5Ω + 2.6jΩ

6.3 SAR

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

6.3.1 SAR with Head Liquid

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

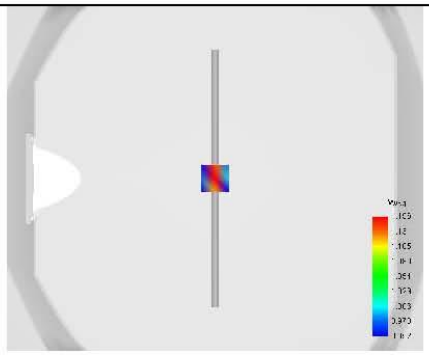
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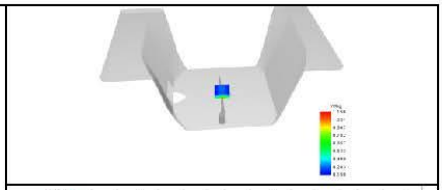
SAR REFERENCE DIPOLE CALIBRATION REPORT

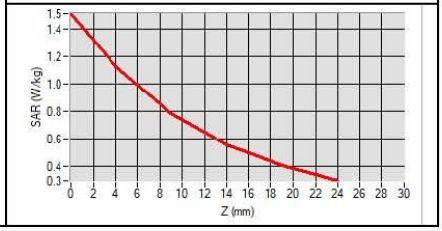
Ref : ACR.53.25.24.BES.A

Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	3523-EPGO-429
Liquid	Head Liquid Values: eps' : 44.6 sigma : 0.92
Distance between dipole center and liquid	15.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8mm/dz=5mm
Frequency	900 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

Frequency	1g SAR (W/kg)			10g SAR (W/kg)		
	Measured	Measured normalized to 1W	Target normalized to 1W	Measured	Measured normalized to 1W	Target normalized to 1W
900 MHz	1.06	10.63	10.90	0.70	7.01	6.99







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7 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	08/2021	08/2024
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	07/2022	07/2025
Calipers	Mitutoyo	SN 0009732	11/2022	11/2025
Reference Probe	MVG	3523-EPGO-429	11/2023	11/2024
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.
Temperature / Humidity Sensor	Testo 184 H1	44225320	06/2021	06/2024

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SAR Reference Dipole Calibration Report

Ref : ACR.53.26.24.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 REFERENCE DIPOLE

FREQUENCY: 1800 MHZ

SERIAL NO.: SN 03/15DIP1G800-349

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 02/21/2024

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

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Summary:

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

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref : ACR.53.26.24.BES.A

	Name	*Function*	*Date*	*Signature*
Prepared by :	Pedro Ruiz	Measurement Responsible	2/22/2024	
Checked & approved by:	Jérôme Luc	Technical Manager	2/22/2024	
Authorized by:	Yann Toutain	Laboratory Director	2/27/2024	

Yann Toutain ID
Signature numérique de Yann Toutain ID
Date : 2024.02.27 08:56:12 +01'00'

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

Issue	*Name*	*Date*	*Modifications*
A	Pedro Ruiz	2/22/2024	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 1800 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID1800
Serial Number	SN 03/15DIP1G800-349
Product Condition (new / used)	Used

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 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

4.1 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

4.2 S11 PARAMETER REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a S11 of -20 dB or better. The S11 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.

4.3 SAR REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

5 MEASUREMENT UNCERTAINTY

5.1 MECHANICAL DIMENSIONS

For the measurement in the range 0-300mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.20 mm with respect to measurement conditions.

For the measurement in the range 300-450mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.44 mm with respect to measurement conditions.

5.2 S11 PARAMETER

The estimated expanded uncertainty (k=2) in calibration for the S11 parameter in linear is +/-0.08 with respect to measurement conditions.

5.3 SAR

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

The estimated expanded uncertainty (k=2) in calibration for the 1g and 10g SAR measurement in W/kg is +/-19% with respect to measurement conditions.

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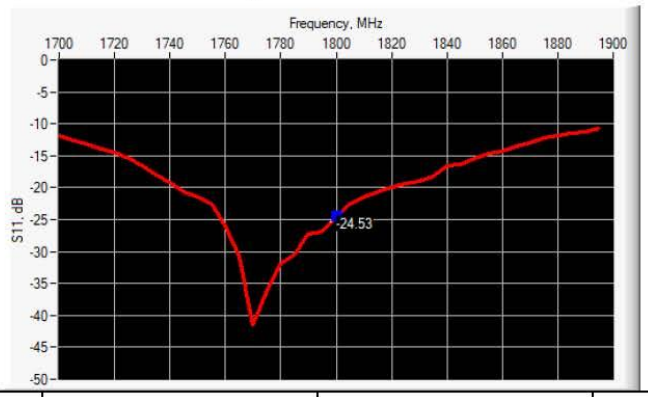
6 CALIBRATION RESULTS

6.1 MECHANICAL DIMENSIONS

L mm		h mm		d mm	
Measured	**Required**	**Measured**	**Required**	**Measured**	**Required**
-	72.00 +/- 2%	-	41.70 +/- 2%	-	3.60 +/- 2%

6.2 S11 PARAMETER

6.2.1 S11 parameter in Head Liquid



Frequency (MHz)	S11 parameter (dB)	Requirement (dB)	Impedance
1800	-24.53	-20	44.8Ω + 2.0jΩ

6.3 SAR

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

6.3.1 SAR with Head Liquid

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

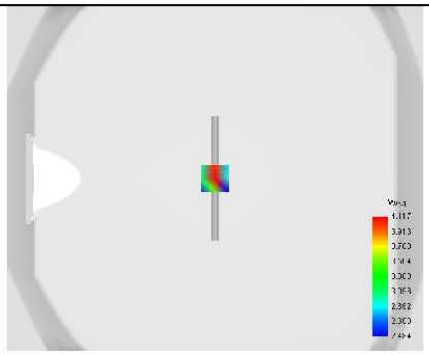
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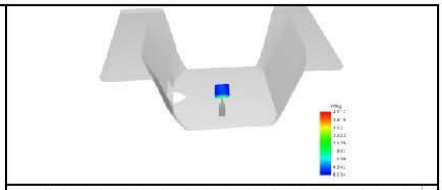
SAR REFERENCE DIPOLE CALIBRATION REPORT

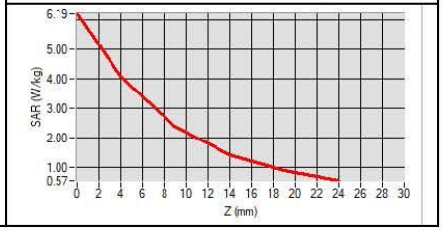
Ref : ACR.53.26.24.BES.A

Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	3523-EPGO-429
Liquid	Head Liquid Values: eps' : 42.7 sigma : 1.36
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8mm/dz=5mm
Frequency	1800 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

Frequency	1g SAR (W/kg)			10g SAR (W/kg)		
	Measured	Measured normalized to 1W	Target normalized to 1W	Measured	Measured normalized to 1W	Target normalized to 1W
1800 MHz	3.71	37.06	38.40	2.00	20.01	20.10







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7 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	08/2021	08/2024
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	07/2022	07/2025
Calipers	Mitutoyo	SN 0009732	11/2022	11/2025
Reference Probe	MVG	3523-EPGO-429	11/2023	11/2024
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.
Temperature / Humidity Sensor	Testo 184 H1	44225320	06/2021	06/2024

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SAR Reference Dipole Calibration Report

Ref : ACR.53.28.24.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 REFERENCE DIPOLE

FREQUENCY: 2000 MHZ

SERIAL NO.: SN 03/15DIP2G000-351

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 02/21/2024

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

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Summary:

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

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref : ACR.53.28.24.BES.A

	Name	*Function*	*Date*	*Signature*
Prepared by :	Pedro Ruiz	Measurement Responsible	2/22/2024	
Checked & approved by:	Jérôme Luc	Technical Manager	2/22/2024	
Authorized by:	Yann Toutain	Laboratory Director	2/27/2024	

Yann Toutain ID Signature numérique de Yann Toutain ID Date : 2024.02.27 08:57:13 +01'00'

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

Issue	*Name*	*Date*	*Modifications*
A	Pedro Ruiz	2/22/2024	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 2000 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID2000
Serial Number	SN 03/15DIP2G000-351
Product Condition (new / used)	Used

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 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

4.1 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

4.2 S11 PARAMETER REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a S11 of -20 dB or better. The S11 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.

4.3 SAR REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

5 MEASUREMENT UNCERTAINTY

5.1 MECHANICAL DIMENSIONS

For the measurement in the range 0-300mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.20 mm with respect to measurement conditions.

For the measurement in the range 300-450mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.44 mm with respect to measurement conditions.

5.2 S11 PARAMETER

The estimated expanded uncertainty (k=2) in calibration for the S11 parameter in linear is +/-0.08 with respect to measurement conditions.

5.3 SAR

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

The estimated expanded uncertainty (k=2) in calibration for the 1g and 10g SAR measurement in W/kg is +/-19% with respect to measurement conditions.

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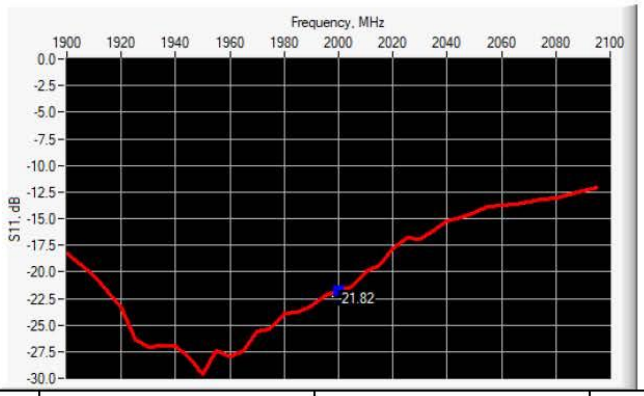
6 CALIBRATION RESULTS

6.1 MECHANICAL DIMENSIONS

L mm		h mm		d mm	
Measured	**Required**	**Measured**	**Required**	**Measured**	**Required**
-	64.50 +/- 2%	-	37.50 +/- 2%	-	3.60 +/- 2%

6.2 S11 PARAMETER

6.2.1 S11 parameter in Head Liquid



Frequency (MHz)	S11 parameter (dB)	Requirement (dB)	Impedance
2000	-21.82	-20	58.3Ω + 2.9jΩ

6.3 SAR

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

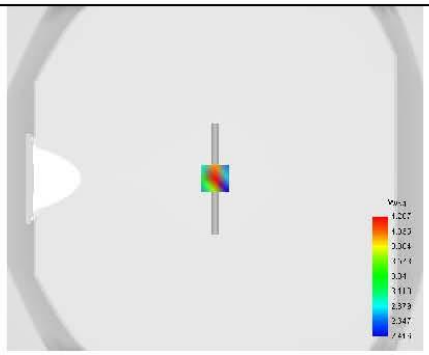
6.3.1 SAR with Head Liquid

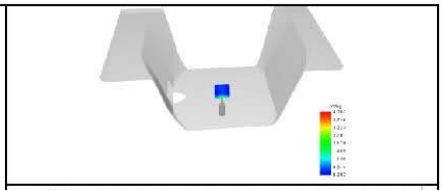
The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

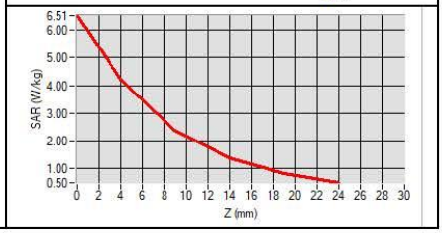
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Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	3523-EPGO-429
Liquid	Head Liquid Values: eps' : 42.6 sigma : 1.46
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	2000 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

Frequency	1g SAR (W/kg)			10g SAR (W/kg)		
	Measured	Measured normalized to 1W	Target normalized to 1W	Measured	Measured normalized to 1W	Target normalized to 1W
2000 MHz	3.83	38.27	41.10	1.98	19.79	21.10







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7 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	08/2021	08/2024
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	07/2022	07/2025
Calipers	Mitutoyo	SN 0009732	11/2022	11/2025
Reference Probe	MVG	3523-EPGO-429	11/2023	11/2024
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.
Temperature / Humidity Sensor	Testo 184 H1	44225320	06/2021	06/2024

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SAR Reference Dipole Calibration Report

Ref : ACR.53.32.24.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 REFERENCE DIPOLE

FREQUENCY: 2300 MHZ

SERIAL NO.: SN 03/16DIP2G300-358

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 02/21/2024

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

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Summary:

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

	Name	Function	Date	Signature
Prepared by :	Pedro Ruiz	Measurement Responsible	2/22/2024	
Checked & approved by:	Jérôme Luc	Technical Manager	2/22/2024	
Authorized by:	Yann Toutain	Laboratory Director	2/27/2024	

Yann Toutain ID Signature numérique de Yann Toutain ID Date : 2024.02.27 08:57:39 +01'00'

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

Issue	Name	Date	Modifications
A	Pedro Ruiz	2/22/2024	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 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 2300 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID2300
Serial Number	SN 03/16DIP2G300-358
Product Condition (new / used)	Used

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 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

4.1 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

4.2 S11 PARAMETER REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a S11 of -20 dB or better. The S11 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.

4.3 SAR REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

5 MEASUREMENT UNCERTAINTY

5.1 MECHANICAL DIMENSIONS

For the measurement in the range 0-300mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.20 mm with respect to measurement conditions.

For the measurement in the range 300-450mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.44 mm with respect to measurement conditions.

5.2 S11 PARAMETER

The estimated expanded uncertainty (k=2) in calibration for the S11 parameter in linear is +/-0.08 with respect to measurement conditions.

5.3 SAR

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

The estimated expanded uncertainty (k=2) in calibration for the 1g and 10g SAR measurement in W/kg is +/-19% with respect to measurement conditions.

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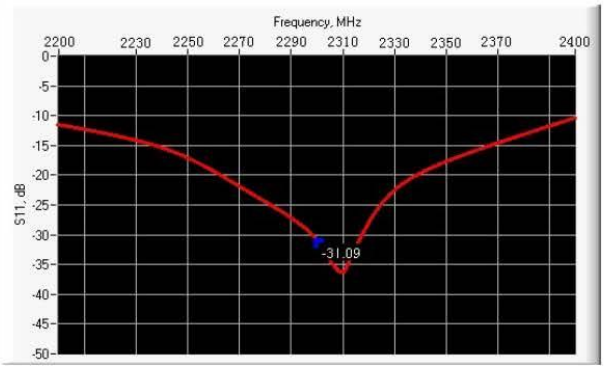
6 CALIBRATION RESULTS

6.1 MECHANICAL DIMENSIONS

L mm		h mm		d mm	
Measured	Required	Measured	Required	Measured	Required
-	55.50 +/- 2%	-	32.60 +/- 2%	-	3.60 +/- 2%

6.2 S11 PARAMETER

6.2.1 S11 parameter in Head Liquid



Frequency (MHz)	S11 parameter (dB)	Requirement (dB)	Impedance
2300	-31.09	-20	56.3Ω - 2.9jΩ

6.3 SAR

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

6.3.1 SAR with Head Liquid

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

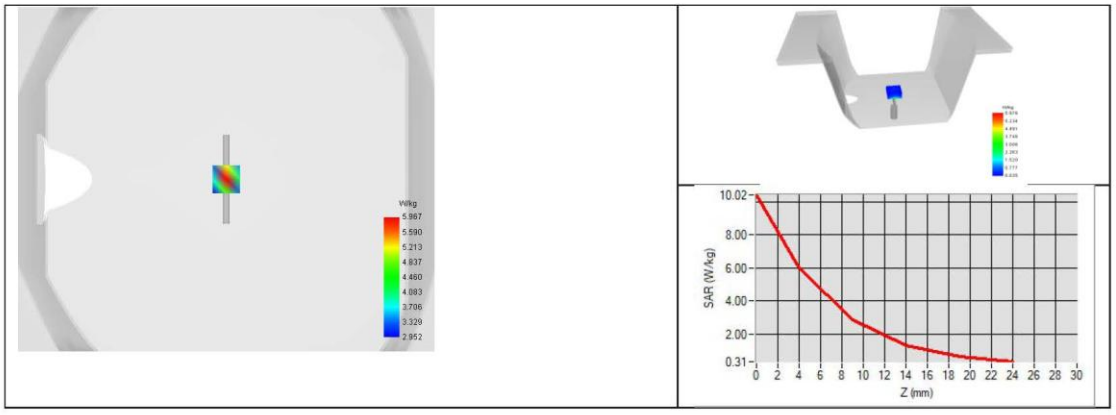
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SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref : ACR.53.32.24.BES.A

Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	3523-EPGO-429
Liquid	Head Liquid Values: eps' : 42.0 sigma : 1.80
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	2300 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

Frequency	1g SAR (W/kg)			10g SAR (W/kg)		
	Measured	Measured normalized to 1W	Target normalized to 1W	Measured	Measured normalized to 1W	Target normalized to 1W
2300 MHz	5.06	50.63	48.70	2.35	23.51	23.30



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7 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	08/2021	08/2024
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	07/2022	07/2025
Calipers	Mitutoyo	SN 0009732	11/2022	11/2025
Reference Probe	MVG	3523-EPGO-429	11/2023	11/2024
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.
Temperature / Humidity Sensor	Testo 184 H1	44225320	06/2021	06/2024

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SAR Reference Dipole Calibration Report

Ref : ACR.53.29.24.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 REFERENCE DIPOLE

FREQUENCY: 2450 MHZ

SERIAL NO.: SN 03/15DIP2G450-352

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 02/21/2024

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

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Summary:

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

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref : ACR.53.29.24.BES.A

	Name	*Function*	*Date*	*Signature*
Prepared by :	Pedro Ruiz	Measurement Responsible	2/22/2024	
Checked & approved by:	Jérôme Luc	Technical Manager	2/22/2024	
Authorized by:	Yann Toutain	Laboratory Director	2/27/2024	

Yann Toutain ID Signature numérique de Yann Toutain ID Date : 2024.02.27 08:57:39 +01'00'

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

Issue	*Name*	*Date*	*Modifications*
A	Pedro Ruiz	2/22/2024	Initial release

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7 List of Equipment 8

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 2450 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID2450
Serial Number	SN 03/15DIP2G450-352
Product Condition (new / used)	Used

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 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

4.1 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

4.2 S11 PARAMETER REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a S11 of -20 dB or better. The S11 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.

4.3 SAR REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

5 MEASUREMENT UNCERTAINTY

5.1 MECHANICAL DIMENSIONS

For the measurement in the range 0-300mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.20 mm with respect to measurement conditions.

For the measurement in the range 300-450mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.44 mm with respect to measurement conditions.

5.2 S11 PARAMETER

The estimated expanded uncertainty (k=2) in calibration for the S11 parameter in linear is +/-0.08 with respect to measurement conditions.

5.3 SAR

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

The estimated expanded uncertainty (k=2) in calibration for the 1g and 10g SAR measurement in W/kg is +/-19% with respect to measurement conditions.

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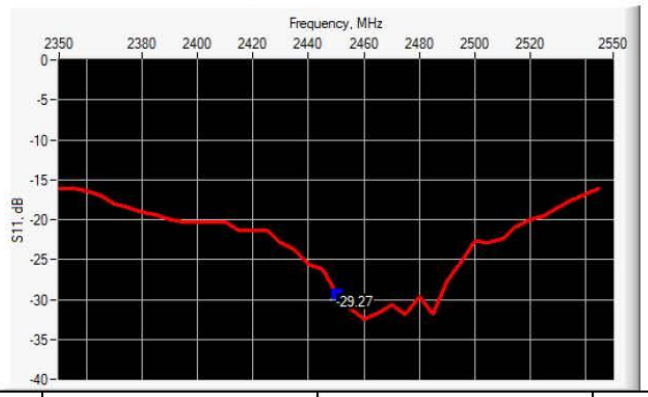
6 CALIBRATION RESULTS

6.1 MECHANICAL DIMENSIONS

L mm		h mm		d mm	
Measured	**Required**	**Measured**	**Required**	**Measured**	**Required**
-	51.50 +/- 2%	-	30.40 +/- 2%	-	3.60 +/- 2%

6.2 S11 PARAMETER

6.2.1 S11 parameter in Head Liquid



Frequency (MHz)	S11 parameter (dB)	Requirement (dB)	Impedance
2450	-29.27	-20	53.6Ω + 0.1jΩ

6.3 SAR

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

6.3.1 SAR with Head Liquid

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

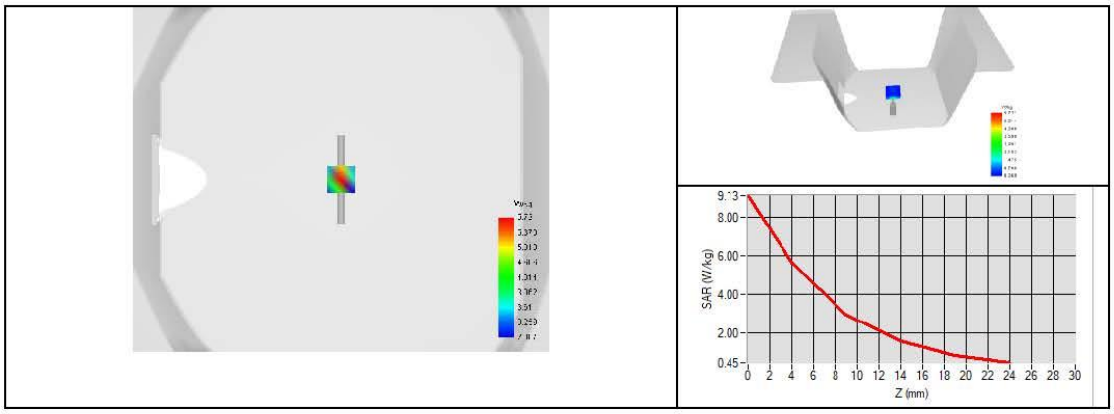
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SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref : ACR.53.29.24.BES.A

Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	3523-EPGO-429
Liquid	Head Liquid Values: eps' : 42.1 sigma : 1.83
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	2450 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

Frequency	1g SAR (W/kg)			10g SAR (W/kg)		
	Measured	Measured normalized to 1W	Target normalized to 1W	Measured	Measured normalized to 1W	Target normalized to 1W
2450 MHz	5.00	50.05	52.40	2.38	23.80	24.00



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7 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	08/2021	08/2024
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	07/2022	07/2025
Calipers	Mitutoyo	SN 0009732	11/2022	11/2025
Reference Probe	MVG	3523-EPGO-429	11/2023	11/2024
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.
Temperature / Humidity Sensor	Testo 184 H1	44225320	06/2021	06/2024

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SAR Reference Dipole Calibration Report

Ref : ACR.53.30.24.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 REFERENCE DIPOLE

FREQUENCY: 2600 MHZ

SERIAL NO.: SN 03/15DIP2G600-356

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 02/21/2024

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

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Summary:

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

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref : ACR.53.30.24.BES.A

	Name	*Function*	*Date*	*Signature*
Prepared by :	Pedro Ruiz	Measurement Responsible	2/22/2024	
Checked & approved by:	Jérôme Luc	Technical Manager	2/22/2024	
Authorized by:	Yann Toutain	Laboratory Director	2/27/2024	

Yann Toutain ID

Signature numérique de Yann Toutain ID
Date : 2024.02.27 08:58:12 +01'00'

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

Issue	*Name*	*Date*	*Modifications*
A	Pedro Ruiz	2/22/2024	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 2600 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID2600
Serial Number	SN 03/15DIP2G600-356
Product Condition (new / used)	Used

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 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

4.1 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

4.2 S11 PARAMETER REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a S11 of -20 dB or better. The S11 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.

4.3 SAR REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

5 MEASUREMENT UNCERTAINTY

5.1 MECHANICAL DIMENSIONS

For the measurement in the range 0-300mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.20 mm with respect to measurement conditions.

For the measurement in the range 300-450mm, the estimated expanded uncertainty (k=2) in calibration for the dimension measurement in mm is +/-0.44 mm with respect to measurement conditions.

5.2 S11 PARAMETER

The estimated expanded uncertainty (k=2) in calibration for the S11 parameter in linear is +/-0.08 with respect to measurement conditions.

5.3 SAR

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

The estimated expanded uncertainty (k=2) in calibration for the 1g and 10g SAR measurement in W/kg is +/-19% with respect to measurement conditions.

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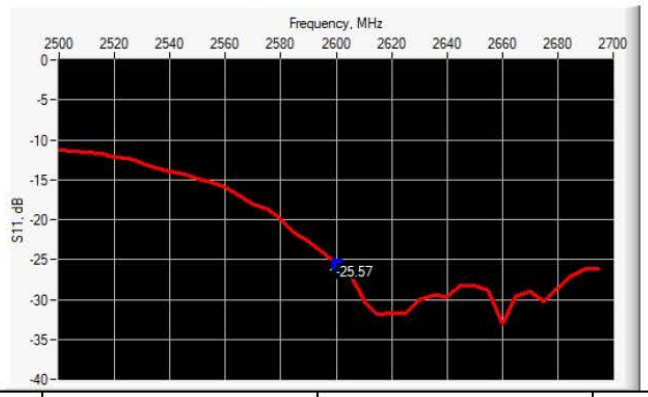
6 CALIBRATION RESULTS

6.1 MECHANICAL DIMENSIONS

L mm		h mm		d mm	
Measured	**Required**	**Measured**	**Required**	**Measured**	**Required**
-	48.50 +/- 2%	-	28.80 +/- 2%	-	3.60 +/- 2%

6.2 S11 PARAMETER

6.2.1 S11 parameter in Head Liquid



Frequency (MHz)	S11 parameter (dB)	Requirement (dB)	Impedance
2600	-25.57	-20	54.5Ω - 3.2jΩ

6.3 SAR

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

6.3.1 SAR with Head Liquid

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

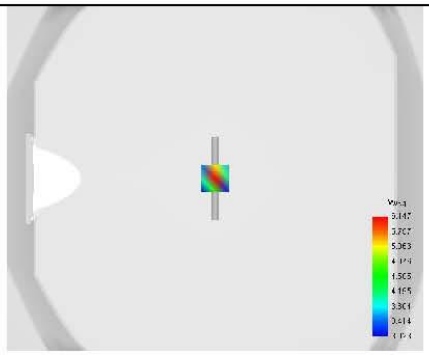
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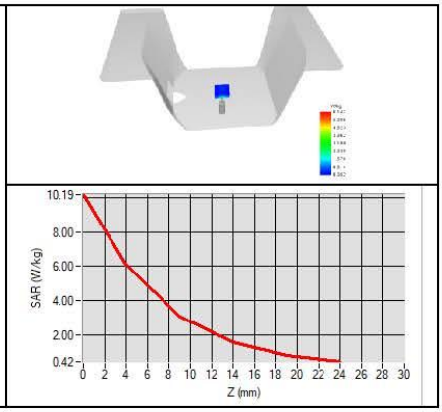
SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref : ACR.53.30.24.BES.A

Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	3523-EPGO-429
Liquid	Head Liquid Values: eps' : 41.3 sigma : 1.95
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	2600 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

Frequency	1g SAR (W/kg)			10g SAR (W/kg)		
	Measured	Measured normalized to 1W	Target normalized to 1W	Measured	Measured normalized to 1W	Target normalized to 1W
2600 MHz	5.42	54.16	55.30	2.49	24.85	24.60





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SAR Reference Dipole Calibration Report

Ref : ACR.53.33.24.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 REFERENCE DIPOLE

FREQUENCY: 3300 MHZ

SERIAL NO.: SN 03/21DIP3G300-359

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 5/18/2024

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

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Summary:

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

SAR REFERENCE DIPOLE CALIBRATION REPORT Ref : ACR.53.33.24.BES.A

	Name	*Function*	*Date*	*Signature*
Prepared by :	Pedro Ruiz	Measurement Responsible	5/18/2024	
Checked & approved by:	Jérôme Luc	Technical Manager	5/18/2024	
Authorized by:	Yann Toutain	Laboratory Director	5/19/2024	

Yann Toutain ID Signature numérique de Yann Toutain ID Date : 2024.05.19 08:51:11 +01'00'

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

Issue	*Name*	*Date*	*Modifications*
A	Pedro Ruiz	5/19/2024	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 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 3300 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID3300
Serial Number	SN 03/21 DIP 3G300-359
Product Condition (new / used)	Used

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 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 IEC/IEEE 62209-1528 and FCC KDB865664 D01 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 IEC/IEEE 62209-1528 and FCC KDB865664 D01 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

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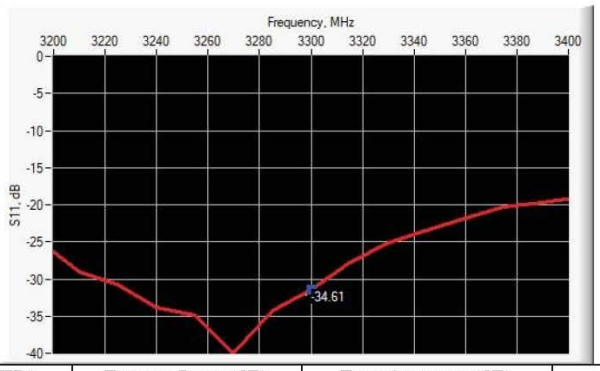
5.3 VALIDATION MEASUREMENT

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

Scan Volume	Expanded Uncertainty
1 g	19 % (SAR)
10 g	19 % (SAR)

6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
3300	-34.61	-20	50.7 Ω + 2.6 jΩ

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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 %.	
2600	48.5 ±1 %.		28.8 ±1 %.		3.6 ±1 %.	
3000	41.5 ±1 %.		25.0 ±1 %.		3.6 ±1 %.	
3300	-	39.65	-	25.41	-	3.63
3500	37.0±1 %.		26.4 ±1 %.		3.6 ±1 %.	
3700	34.7±1 %.		26.4 ±1 %.		3.6 ±1 %.	
3900	-		-		-	
4200	-		-		-	
4600	-		-		-	
4900	-		-		-	

7 VALIDATION MEASUREMENT

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

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7.1 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 %		0.89 ±10 %	
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 %	
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 %	
3300	38.2 ±10 %	37.8	2.71 ±10 %	2.85
3500	37.9 ±10 %		2.91 ±10 %	
3700	37.7 ±10 %		3.12 ±10 %	
3900	37.5 ±10 %		3.32 ±10 %	
4200	37.1 ±10 %		3.63 ±10 %	
4600	36.7 ±10 %		4.04 ±10 %	
4900	36.3 ±10 %		4.35 ±10 %	

7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

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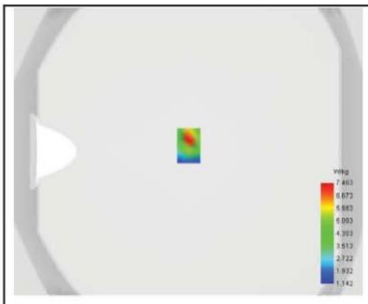
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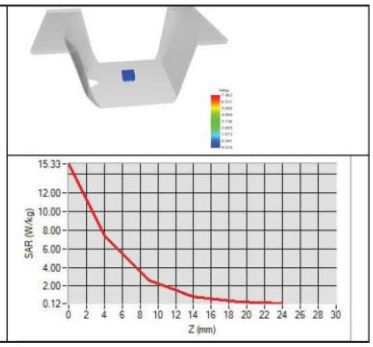
Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	3523-EPGO-429
Liquid	Head Liquid Values: eps' : 37.8 sigma : 2.85
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=4mm
Frequency	3300 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9		6.99	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	
1900	39.7		20.5	
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4		24	
2600	55.3		24.6	
3000	63.8		25.7	
3300	-	67.61 (6.76)	-	26.04 (2.60)
3500	67.1		25	
3700	67.4		24.2	
3900	-		-	
4200	-		-	
4600	-		-	
4900	-		-	

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7 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	08/2021	08/2024
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	07/2022	07/2025
Calipers	Mitutoyo	SN 0009732	11/2022	11/2025
Reference Probe	MVG	3523-EPGO-429	11/2023	11/2024
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.
Temperature / Humidity Sensor	Testo 184 H1	44225320	06/2021	06/2024

Template_ACR.DDD.N.YY.MVGB.ISSUE_SAR Reference Dipole vJ
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7 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	08/2021	08/2024
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	07/2022	07/2025
Calipers	Mitutoyo	SN 0009732	11/2022	11/2025
Reference Probe	MVG	3523-EPGO-429	11/2023	11/2024
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.
Temperature / Humidity Sensor	Testo 184 H1	44225320	06/2021	06/2024

Template_ACR.DDD.N.YY.MVGB.ISSUE_SAR Reference Dipole vL
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SAR Reference Dipole Calibration Report

Ref : ACR.139.15.20.SATU.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: 3500 MHZ

SERIAL NO.: SN 09/12 DIP 3G500-360

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144

ACCREDITED Calibration CERT #2246-02

10/15/2022

Summary:

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

	Name	*Function*	*Date*	*Signature*
Prepared by :	Jérôme LUC	Product Manager	10/15/2022	
Checked by :	Jérôme LUC	Product Manager	10/15/2022	
Approved by :	Kim RUTKOWSKI	Quality Manager	10/15/2022	

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

Issue	*Date*	*Modifications*
A	10/15/2022	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 3500 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID3500
Serial Number	SN 09/12 DIP 3G500-360
Product Condition (new / used)	New

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

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



Figure 1 – *MVG COMOSAR Validation Dipole*

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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 constucted as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

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

5 MEASUREMENT UNCERTAINTY

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

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

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

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

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

5.3 VALIDATION MEASUREMENT

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

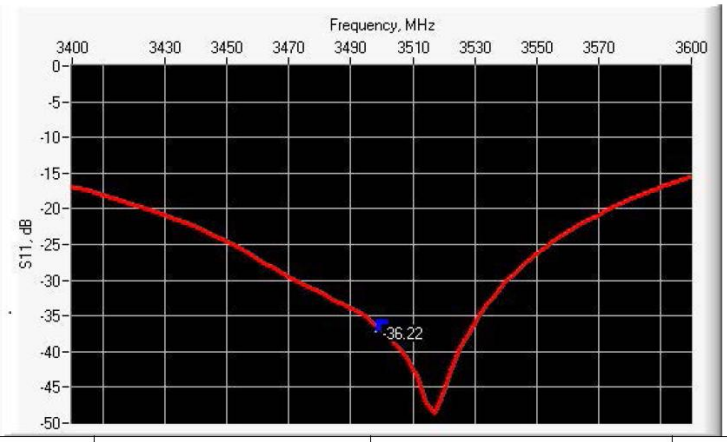
Scan Volume	Expanded Uncertainty
1 g	20.3 %

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10 g	20.1 %

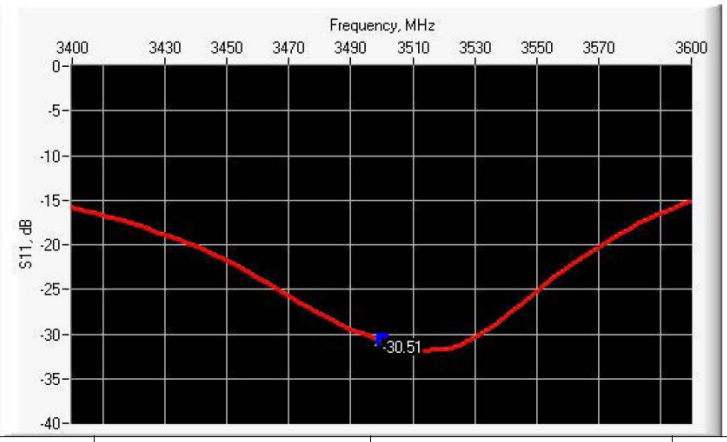
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
3500	-36.22	-20	48.9 Ω + 1.1 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
3500	-30.51	-20	52.2 Ω + 2.0 jΩ

6.3 MECHANICAL DIMENSIONS

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

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450	290.0 ±1 %.		166.7 ±1 %.		6.35 ±1 %.	
750	176.0 ±1 %.		100.0 ±1 %.		6.35 ±1 %.	
835	161.0 ±1 %.		89.8 ±1 %.		3.6 ±1 %.	
900	149.0 ±1 %.		83.3 ±1 %.		3.6 ±1 %.	
1450	89.1 ±1 %.		51.7 ±1 %.		3.6 ±1 %.	
1500	80.5 ±1 %.		50.0 ±1 %.		3.6 ±1 %.	
1640	79.0 ±1 %.		45.7 ±1 %.		3.6 ±1 %.	
1750	75.2 ±1 %.		42.9 ±1 %.		3.6 ±1 %.	
1800	72.0 ±1 %.		41.7 ±1 %.		3.6 ±1 %.	
1900	68.0 ±1 %.		39.5 ±1 %.		3.6 ±1 %.	
1950	66.3 ±1 %.		38.5 ±1 %.		3.6 ±1 %.	
2000	64.5 ±1 %.		37.5 ±1 %.		3.6 ±1 %.	
2100	61.0 ±1 %.		35.7 ±1 %.		3.6 ±1 %.	
2300	55.5 ±1 %.		32.6 ±1 %.		3.6 ±1 %.	
2450	51.5 ±1 %.		30.4 ±1 %.		3.6 ±1 %.	
2600	48.5 ±1 %.		28.8 ±1 %.		3.6 ±1 %.	
3400	41.5 ±1 %.		25.0 ±1 %.		3.6 ±1 %.	
3500	37.0±1 %.	PASS	26.4 ±1 %.	PASS	3.6 ±1 %.	PASS
3800	34.7±1 %.		26.4 ±1 %.		3.6 ±1 %.	

7 VALIDATION MEASUREMENT

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

7.1 HEAD LIQUID MEASUREMENT

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

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1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %		1.96 ±5 %	
3400	38.0 ±5 %		2.81 ±5 %	
3500	37.9 ±5 %	PASS	2.91 ±5 %	PASS

7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

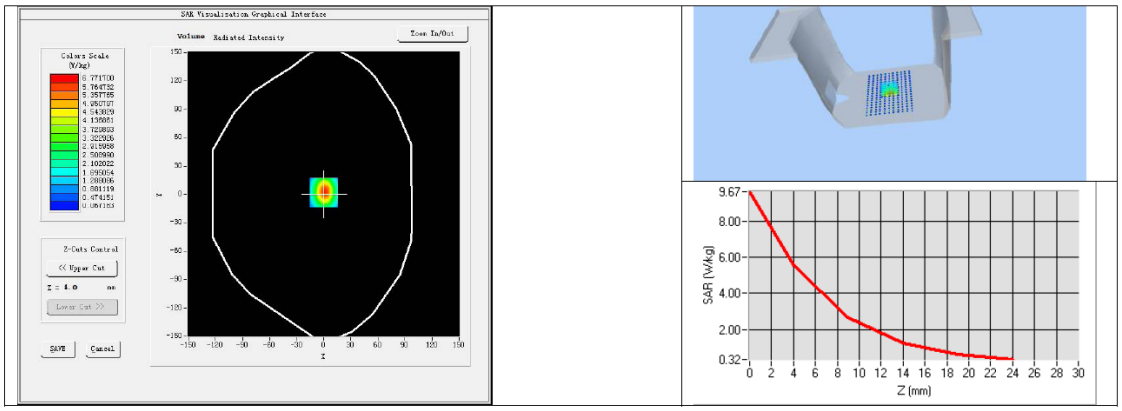
The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is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

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 37.9 sigma : 2.95
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	3500 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

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

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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	
3400	66.4		25.1	
3500	67.1	67.18 (6.72)	25	24.50 (2.45)



7.3 BODY LIQUID MEASUREMENT

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

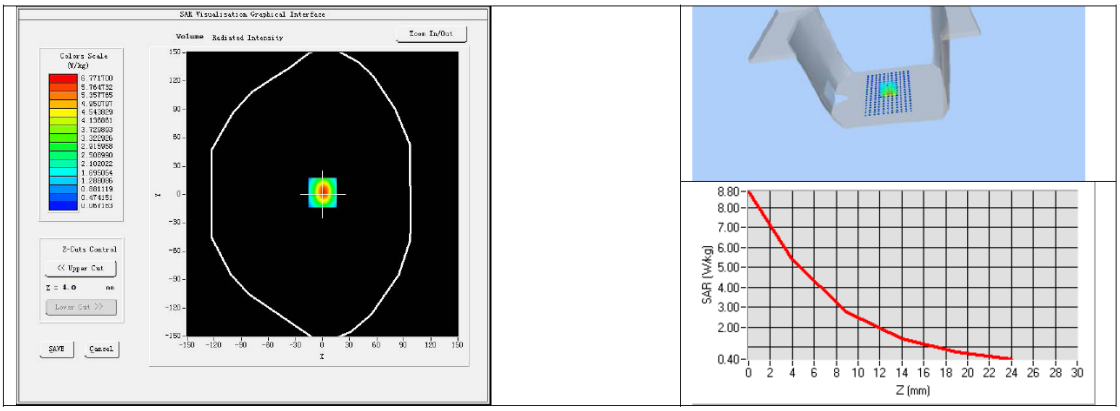
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3400	51.5 ±5 %		3.20 ±5 %	
3500	51.3 ±5 %	PASS	3.31 ±5 %	PASS
3800	50.9 ±5 %		3.66 ±5 %	
5200	49.0 ±10 %		5.30 ±10 %	
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %		5.53 ±10 %	
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %		5.77 ±10 %	
5800	48.2 ±10 %		6.00 ±10 %	

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values: eps' : 51.4 sigma : 3.40
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	3500 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)	10 g SAR (W/kg/W)
	measured	measured
3500	59.22(5.92)	23.80 (2.38)



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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-20/09-SAM71	Validated. No cal required.	Validated. No cal required.
COMOSAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rhode & Schwarz ZVA	SN100132	02/2020	02/2023
Calipers	Carrera	CALIPER-01	01/2020	01/2023
Reference Probe	MVG	EPG122 SN 18/11	06/2022	06/2023
Multimeter	Keithley 2000	1188656	01/2020	01/2023
Signal Generator	Agilent E4438C	MY49070581	01/2020	01/2023
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	01/2020	01/2023
Power Sensor	HP ECP-E26A	US37181460	01/2020	01/2023
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	11/2019	11/2022

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SAR Reference Dipole Calibration Report

Ref : ACR.139.16.20.SATU.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: 3700 MHZ

SERIAL NO.: SN 09/12 DIP 3G700-361

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144

ACCREDITED Calibration CERT #2246-02

10/15/2022

Summary:

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

	Name	*Function*	*Date*	*Signature*
Prepared by :	Jérôme LUC	Product Manager	10/15/2022	
Checked by :	Jérôme LUC	Product Manager	10/15/2022	
Approved by :	Kim RUTKOWSKI	Quality Manager	10/15/2022	

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

Issue	*Date*	*Modifications*
A	10/15/2022	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 3700 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID3700
Serial Number	SN 09/12 DIP 3G700-361
Product Condition (new / used)	New

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

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



Figure 1 – *MVG COMOSAR Validation Dipole*

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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.

4.2 MECHANICAL REQUIREMENTS

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

5 MEASUREMENT UNCERTAINTY

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

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

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

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

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

5.3 VALIDATION MEASUREMENT

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

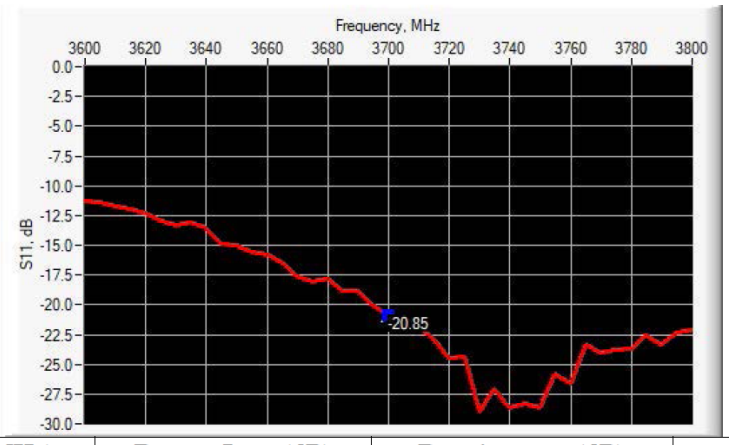
Scan Volume	Expanded Uncertainty
1 g	20.3 %

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10 g	20.1 %

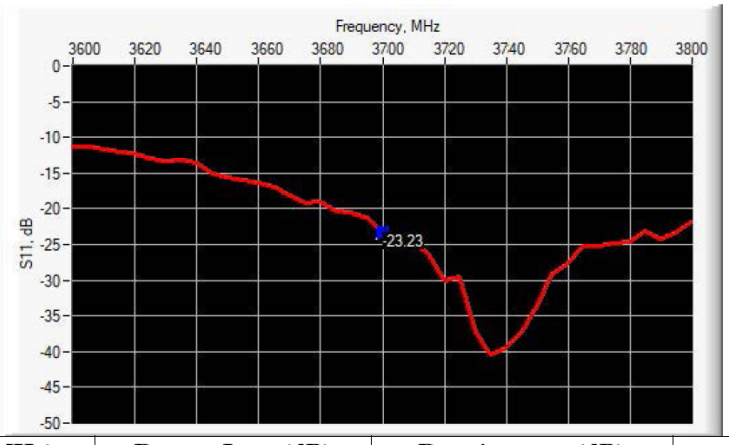
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
3700	-20.85	-20	54.9 Ω - 8.3 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
3700	-23.23	-20	50.6 Ω - 7.0 jΩ

6.3 MECHANICAL DIMENSIONS

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

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450	290.0 ±1 %.		166.7 ±1 %.		6.35 ±1 %.	
750	176.0 ±1 %.		100.0 ±1 %.		6.35 ±1 %.	
835	161.0 ±1 %.		89.8 ±1 %.		3.6 ±1 %.	
900	149.0 ±1 %.		83.3 ±1 %.		3.6 ±1 %.	
1450	89.1 ±1 %.		51.7 ±1 %.		3.6 ±1 %.	
1500	80.5 ±1 %.		50.0 ±1 %.		3.6 ±1 %.	
1640	79.0 ±1 %.		45.7 ±1 %.		3.6 ±1 %.	
1750	75.2 ±1 %.		42.9 ±1 %.		3.6 ±1 %.	
1800	72.0 ±1 %.		41.7 ±1 %.		3.6 ±1 %.	
1900	68.0 ±1 %.		39.5 ±1 %.		3.6 ±1 %.	
1950	66.3 ±1 %.		38.5 ±1 %.		3.6 ±1 %.	
2000	64.5 ±1 %.		37.5 ±1 %.		3.6 ±1 %.	
2100	61.0 ±1 %.		35.7 ±1 %.		3.6 ±1 %.	
2300	55.5 ±1 %.		32.6 ±1 %.		3.6 ±1 %.	
2450	51.5 ±1 %.		30.4 ±1 %.		3.6 ±1 %.	
2600	48.5 ±1 %.		28.8 ±1 %.		3.6 ±1 %.	
3400	41.5 ±1 %.		25.0 ±1 %.		3.6 ±1 %.	
3600	37.0±1 %.		26.4 ±1 %.		3.6 ±1 %.	
3700	34.7±1 %.	PASS	26.4 ±1 %.	PASS	3.6 ±1 %.	PASS

7 VALIDATION MEASUREMENT

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

7.1 HEAD LIQUID MEASUREMENT

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

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1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
3400	38.0 ±5 %		2.81 ±5 %	
3600	37.8 ±5 %		3.02 ±5 %	
3700	37.7 ±5 %	PASS	3.12 ±5 %	PASS

7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

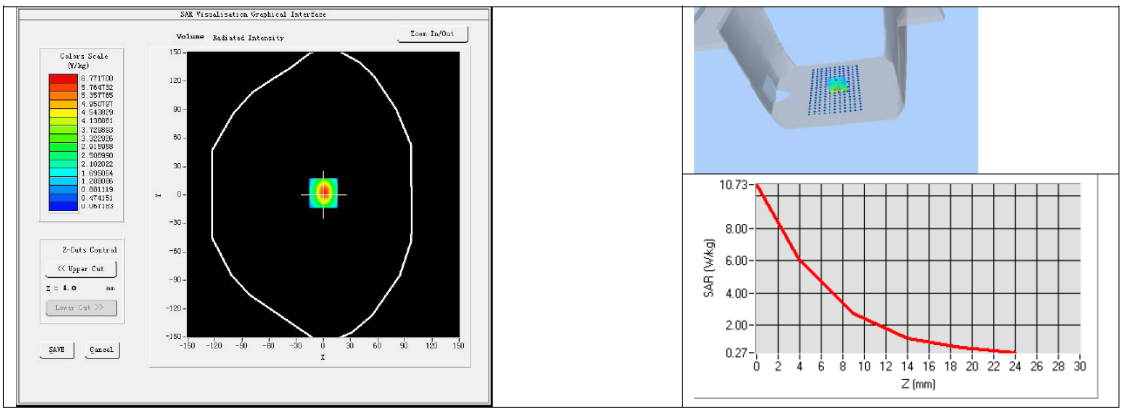
The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is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

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 37.8 sigma : 3.25
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	3700 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

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

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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	
3400	66.4		25.1	
3600	67.3		24.6	
3700	67.4	66.30 (6.63)	24.2	24.16 (2.42)



7.3 BODY LIQUID MEASUREMENT

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

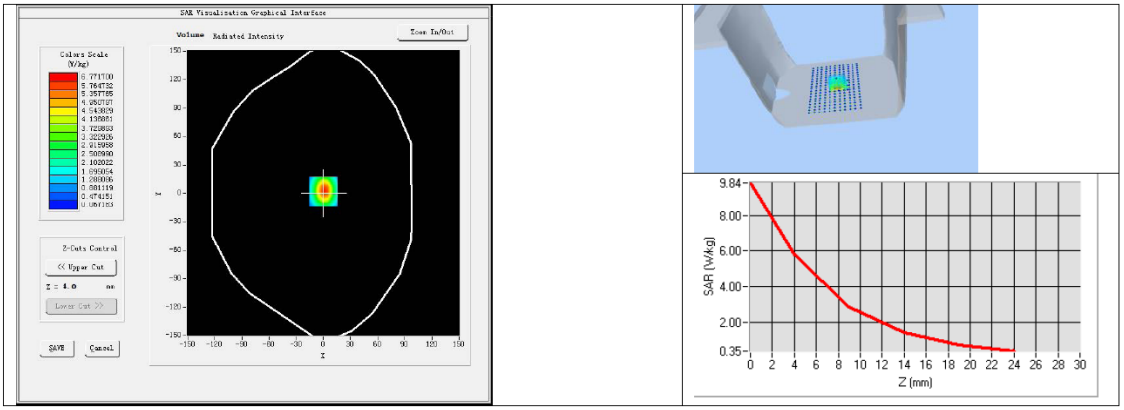
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2300	52.9 ±5 %		1.81 ±5 %	
2450	52.7 ±5 %		1.95 ±5 %	
2600	52.5 ±5 %		2.16 ±5 %	
3400	51.5 ±5 %		3.20 ±5 %	
3600	51.2 ±5 %		3.43 ±5 %	
3700	51.1 ±5 %	PASS	3.55 ±5 %	PASS
5200	49.0 ±10 %		5.30 ±10 %	
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %		5.53 ±10 %	
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %		5.77 ±10 %	
5800	48.2 ±10 %		6.00 ±10 %	

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values: eps' : 51.3 sigma : 3.56
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	3700 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)	10 g SAR (W/kg/W)
	measured	measured
3700	62.36 (6.24)	23.56 (2.35)



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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-20/09-SAM71	Validated. No cal required.	Validated. No cal required.
COMOSAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rhode & Schwarz ZVA	SN100132	02/2020	02/2023
Calipers	Carrera	CALIPER-01	01/2020	01/2023
Reference Probe	MVG	EPG122 SN 18/11	06/2022	06/2023
Multimeter	Keithley 2000	1188656	01/2020	01/2023
Signal Generator	Agilent E4438C	MY49070581	01/2020	01/2023
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	01/2020	01/2023
Power Sensor	HP ECP-E26A	US37181460	01/2020	01/2023
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	11/2019	11/2022

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SAR Reference Dipole Calibration Report

Ref : ACR.53.37.24.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 REFERENCE DIPOLE

FREQUENCY: 4200 MHZ

SERIAL NO.: SN 03/21DIP4G200-363

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 05/18/2024

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

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Summary:

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

SAR REFERENCE DIPOLE CALIBRATION REPORT Ref : ACR.53.37.24.BES.A

	Name	*Function*	*Date*	*Signature*
Prepared by :	Pedro Ruiz	Measurement Responsible	5/18/2024	
Checked & approved by:	Jérôme Luc	Technical Manager	5/18/2024	
Authorized by:	Yann Toutain	Laboratory Director	5/19/2024	

Yann Toutain ID Signature numérique de Yann Toutain ID Date : 2024.05.19 08:56:12 +01'00'

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

Issue	*Name*	*Date*	*Modifications*
A	Pedro Ruiz	5/19/2024	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 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 4200 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID4200
Serial Number	SN 03/21 DIP 4G200-363
Product Condition (new / used)	Used

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 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 IEC/IEEE 62209-1528 and FCC KDB865664 D01 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 IEC/IEEE 62209-1528 and FCC KDB865664 D01 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

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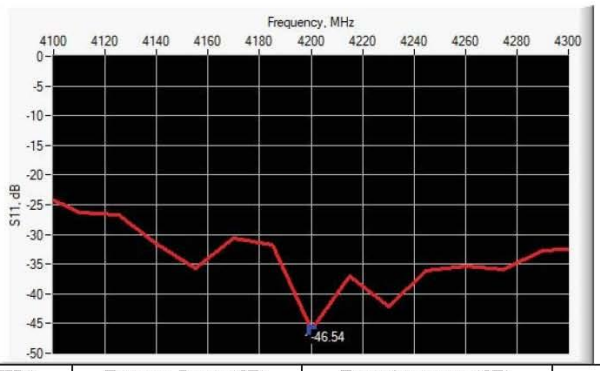
5.3 VALIDATION MEASUREMENT

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

Scan Volume	Expanded Uncertainty
1 g	19 % (SAR)
10 g	19 % (SAR)

6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
4200	-46.54	-20	49.3 Ω - 0.0 jΩ

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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 %.	
2600	48.5 ±1 %.		28.8 ±1 %.		3.6 ±1 %.	
3000	41.5 ±1 %.		25.0 ±1 %.		3.6 ±1 %.	
3300	-		-		-	
3500	37.0±1 %.		26.4 ±1 %.		3.6 ±1 %.	
3700	34.7±1 %.		26.4 ±1 %.		3.6 ±1 %.	
3900	-		-		-	
4200	-	30.24	-	22.49	-	3.65
4600	-		-		-	
4900	-		-		-	

7 VALIDATION MEASUREMENT

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

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7.1 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 %		0.89 ±10 %	
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 %	
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 %	
3300	38.2 ±10 %		2.71 ±10 %	
3500	37.9 ±10 %		2.91 ±10 %	
3700	37.7 ±10 %		3.12 ±10 %	
3900	37.5 ±10 %		3.32 ±10 %	
4200	37.1 ±10 %	37.5	3.63 ±10 %	3.54
4600	36.7 ±10 %		4.04 ±10 %	
4900	36.3 ±10 %		4.35 ±10 %	

7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 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.

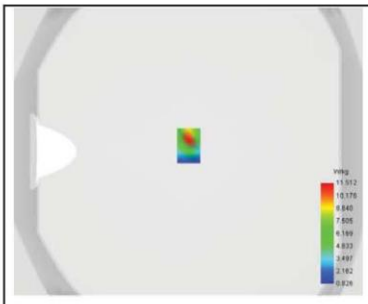
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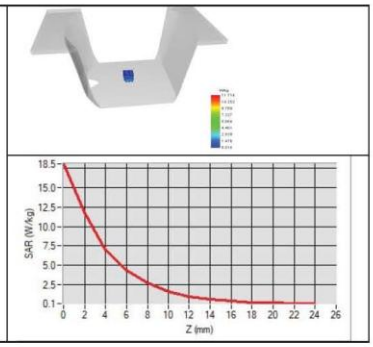
Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	3523-EPGO-429
Liquid	Head Liquid Values: eps' : 37.5 sigma : 3.54
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=4mm
Frequency	4200 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9		6.99	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	
1900	39.7		20.5	
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4		24	
2600	55.3		24.6	
3000	63.8		25.7	
3300	-		-	
3500	67.1		25	
3700	67.4		24.2	
3900	-		-	
4200	-	66.85 (6.69)	-	22.84 (2.28)
4600	-		-	
4900	-		-	

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7 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	08/2021	08/2024
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	07/2022	07/2025
Calipers	Mitutoyo	SN 0009732	11/2022	11/2025
Reference Probe	MVG	3523-EPGO-429	11/2023	11/2024
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.
Temperature / Humidity Sensor	Testo 184 H1	44225320	06/2021	06/2024

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