



SAR TEST REPORT

Product Name : Smart phone

Model Number : DL4 Plus

FCC ID : 2A35K - DL4 Plus

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Max. SAR (1g):
Head: 0.269 W/kg
Body: 0.749 W/kg



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Revision History

Rev.	Issue Date	Contents
00	November 01, 2022	Initial Issue



TEST REPORT CERTIFICATION

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Address Room 603, Block 4, Tongtai Times Center, Fuyong, Bao'an District, Shenzhen, Guangdong, China.
Product Name Smart phone
Trade Mark DIGICEL
Model Name DL4 Plus
Sample Status: Normal

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC KDB 447498 D04 v01; FCC KDB 865664 D01 v01r04; FCC KDB 865664 D02 v01r02; FCC KDB 941225 D01 v03r01; FCC KDB 941225 D05 v02r05; FCC KDB 941225 D06 v02r01; FCC KDB 648474 D04 v01r03; FCC KDB 248227 D01 Wi-Fi SAR v02r02	PASS

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- (1) The test report is effective only with both signature and specialized stamp.
- (2) This report shall not be reproduced except in full without the written approval of the Laboratory.
- (3) The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products.



1. General Information

1.1 EUT Description

Product Name	Smart phone		
Brand Name	DIGICEL		
Model Name	DL4 Plus		
Series Model	N/A		
Model Difference	N/A		
Hardware Version	V1.0		
Software Version	N/A		
Frequency Range	GSM 850: 824 ~ 849 MHz PCS 1900: 1850 ~ 1910 MHz WCDMA Band II: 1850 ~ 1910 MHz WCDMA Band V: 824 ~ 849 MHz LTE Band 2: 1850 ~1910MHz LTE Band 4: 1710 ~1755MHz LTE Band 5: 824 ~ 849MHz LTE Band 12: 699~716MHz LTE Band 13: 777~787MHz WLAN 802.11b/g/n20: 2412 MHz ~ 2462 MHz WLAN 802.11n40: 2422 MHz ~ 2452 MHz Bluetooth: 2402 ~ 2480 MHz NFC: 13.56MHz		
Max. Reported SAR(1g)	Mode	Head(W/ kg)	Body(W/ kg)
	GSM 850	0.066	0.282
	PCS 1900	0.193	0.749
	WCDMA Band II	0.269	0.590
	WCDMA Band V	0.082	0.097
	LTE Band 2	0.242	0.721
	LTE Band 4	0.153	0.299
	LTE Band 5	0.048	0.129
	LTE Band 12	0.043	0.045
	LTE Band 13	0.063	0.094
	2.4G WLAN	0.114	0.166
	Bluetooth	0.055	0.043
Limit	1.6 W/kg		
Battery	Rated Voltage:3.85V Charge Limit Voltage:4.45V Capacity: 4250mAh		
Description test modes	Only one SIM card		
Modulation Mode	GSM: GSM Voice; GPRS/EGPRS Class 12 WCDMA: RMC, HSDPA, HSUPA Release 6 LTE: QPSK, 16QAM 2.4G WLAN : 802.11b(DSSS):CCK,DQPSK,DBPSK 802.11g(OFDM):BPSK,QPSK,16-QAM,64-QAM 802.11n(OFDM):BPSK,QPSK,16-QAM,64-QAM Bluetooth: GFSK + π /4DQPSK+8DPSK NFC: FSK		
Power control level	GSM900: 5, DCS1800: 0		
Power class	GSM900: 4, GSM1800: 1		
Antenna Specification	GSM/WCDMA/LTE: PIFA Antenna Bluetooth: PIFA Antenna WLAN: PIFA Antenna NFC: Coil Antenna		
Operating Mode	Maximum continuous output		



1.2 Test Environment

Ambient conditions in the SAR laboratory:

Items	Required
Temperature (°C)	18-25
Humidity (%RH)	30-70

1.3 Test Factory

Company Name:	Shenzhen LGT Test Service Co., Ltd.
Address:	Room 205, Building 13, Zone B, Chen Hsong Industrial Park, No.177 Renmin West Road, Jinsha Community, Kengzi Street, Pingshan New District, Shenzhen, China



2. Test Standards and Limits

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	ANSI/IEEE Std. C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
3	IEEE Std. 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
4	FCC KDB 447498 D04 v01	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices
5	FCC KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
6	FCC KDB 865664 D02 v01r02	RF Exposure Reporting
7	FCC KDB 941225 D01 v03r01	SAR Measurement Procedures for 3G Devices
8	FCC KDB 941225 D05 v02r05	SAR for LTE Devices
9	FCC KDB 941225 D06 v02r01	Hotspot Mode SAR
10	FCC KDB 648474 D04 v01r03	SAR Evaluation Considerations for Wireless Handsets
11	FCC KDB 248227 D01 Wi-Fi SAR v02r02	SAR Considerations for 802.11 Devices

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

Whole-Body Partial-Body Hands, Wrists, Feet and Ankles

0.4 8.0 20.0

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

Whole-Body Partial-Body Hands, Wrists, Feet and Ankles

0.08 1.6 4.0

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

Population/Uncontrolled Environments:

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

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).

NOTE
GENERAL POPULATION/UNCONTROLLED EXPOSURE
PARTIAL BODY LIMIT
1.6 W/kg



3. SAR Measurement System

3.1 Definition of Specific Absorption Rate (SAR)

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

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

SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

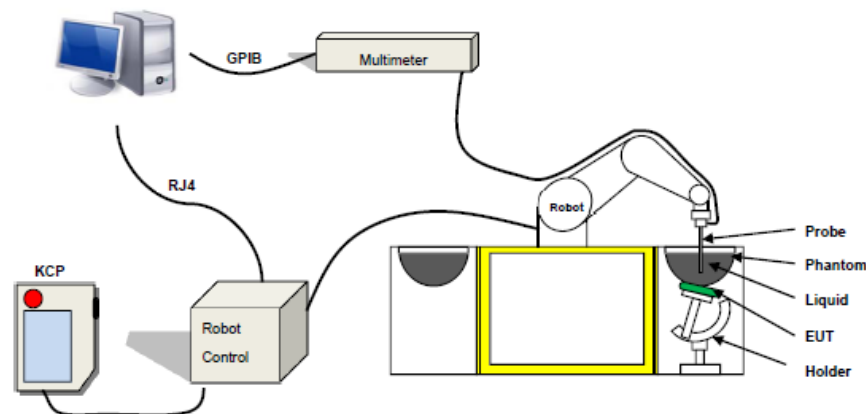
$$SAR = \frac{\sigma E^2}{\rho}$$

Where: σ is the conductivity of the tissue;

ρ is the mass density of the tissue and E is the RMS electrical field strength.

3.2 SAR System

MVG SAR System Diagram:



COMOSAR is a system that is able to determine the SAR distribution inside a phantom of human being according to different standards. The COMOSAR system consists of the following items:

- Main computer to control all the system
- 6 axis robot
- Data acquisition system
- Miniature E-field probe
- Phone holder
- Head simulating tissue

The following figure shows the system.



The EUT under test operating at the maximum power level is placed in the phone holder, under the phantom, which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The OpenSAR software computes the results to give a SAR value in a 1g or 1g mass.

3.2.1 Probe

For the measurements the Specific Dosimetric E-Field Probe SN 04/22 EPGO364 with following specifications is used

- Probe Length: 330 mm
- Length of Individual Dipoles: 2mm
- Maximum external diameter: 8 mm
- Probe Tip External Diameter: 2.5 mm
- Distance between dipole/probe extremity: 1 mm
- Dynamic range: 0.01-100 W/kg
- Probe linearity: 3%
- Axial Isotropy: < 0.10 dB
- Spherical Isotropy: < 0.10 dB
- Calibration range: 150 MHz to 6 GHz for head & body simulating liquid.
- Angle between probe axis (evaluation axis) and surface normal line: less than 30°



Figure 1-MVG COMOSAR Dosimetric E field Probe

3.2.2 Phantom

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2mm +/- 0.2mm. It enables the dosimetric evaluation of left and right phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.

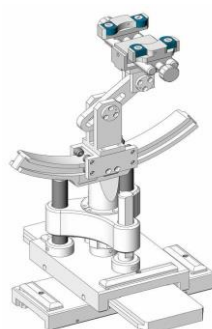


Figure-SN 06/22 SAM 148



Figure-SN 06/22 ELLI 51

3.2.3 Device Holder



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



4. Tissue Simulating Liquids

4.1 Simulating Liquids Parameter Check

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine if the dielectric parameters are within the tolerances of the specified target values

The uncertainty due to the liquid conductivity and permittivity arises from two different sources. The first source of error is the deviation of the liquid conductivity from its target value (max _ 5 %) and the second source of error arises from the measurement procedures used to assess conductivity. The uncertainty shall be assessed using a rectangular probability For 1 g averaging, the maximum weighting coefficient for SAR is 0,5.

IEEE SCC-34/SC-2 RECOMMENDED TISSUE DIELECTRIC PARAMETERS

The head and body tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 have been incorporated in the following table.

Frequency	ϵ_r		σ 1g S/m	
	Head	Body	Head	Body
300	45.3	45.3	0.87	0.87
450	43.5	43.5	0.87	0.87
900	41.5	41.5	0.97	0.97
1450	40.5	40.5	1.20	1.20
1800	40.0	40.0	1.40	1.40
2450	39.2	39.2	1.80	1.80
3000	38.5	38.5	2.40	2.40
5200	36.0	36.0	4.70	4.70

LIQUID MEASUREMENT RESULTS

Date	Ambient		Simulating Liquid		Parameters	Target	Measured	Deviation %	Limited %
	Temp.[°C]	Humidity %	Frequency(MHz)	Temp.[°C]					
2022.10.13	23.7	52	750 MHz	23.5	Permittivity	41.9	42.30	0.963	±5
					Conductivity	0.89	0.898	0.878	±5
2022.10.13	23.5	54	835 MHz	23.8	Permittivity	41.50	41.48	-0.038	±5
					Conductivity	0.92	0.930	1.140	±5
2022.10.14	23.6	55	1800 MHz	23.6	Permittivity	40.00	39.87	-0.318	±5
					Conductivity	1.40	1.452	3.726	±5
2022.10.15	23.5	54	1900 MHz	23.4	Permittivity	40	39.09	-2.286	±5
					Conductivity	1.4	1.374	-1.883	±5
2022.10.29	23.7	56	2450MHz	23.6	Permittivity	39.2	39.28	0.216	±5
					Conductivity	1.8	1.769	-1.749	±5

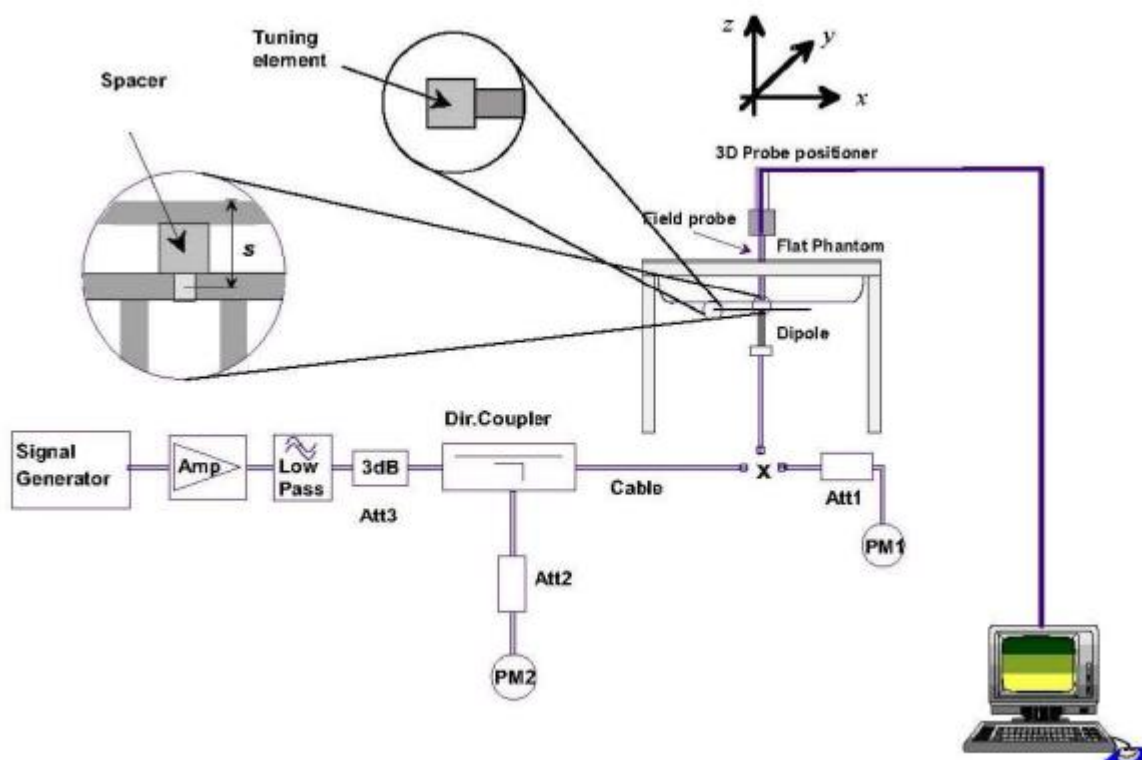


5. SAR System Validation

5.1 Validation System

Each MVG system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the MVG software, enable the user to conduct the system performance check and system validation. System kit includes a dipole, and dipole device holder.

The system check verifies that the system operates within its specifications. It's performed daily or before every SAR measurement. The system check uses normal SAR measurement in the flat section of the phantom with a matched dipole at a specified distance. The system validation setup is shown as below.





5.2 Validation Result

Comparing to the original SAR value provided by MVG, the validation data should be within its specification of $\pm 10\%$.

Date	Freq.	Power	Power drift	Tested Value	Normalized SAR	Target SAR	Tolerance
	(MHz)	(mW)	(%)	(W/Kg)	(W/kg)	1g(W/kg)	(%)
2022.10.13	750	100	-2.19	0.9	9.00	8.49	6.01
2022.10.13	835	100	-3.12	0.98	9.80	9.56	0.20
2022.10.14	1800	100	2.43	3.871	38.71	38.4	0.81
2022.10.15	1900	100	-1.22	4.22	42.20	39.7	6.30
2022.10.29	2450	100	-0.91	4.724	47.24	52.4	-9.85



6. SAR Evaluation Procedures

The procedure for assessing the average SAR value consists of the following steps:

The following steps are used for each test position

- Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface
- Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
- Measurement of the SAR distribution with a grid of 8 to 16mm * 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.

➤ Area Scan & Zoom Scan

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g. Area scan and zoom scan resolution setting follows KDB 865664 D01 quoted below.

When the 1-g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.

7. EUT Test Position

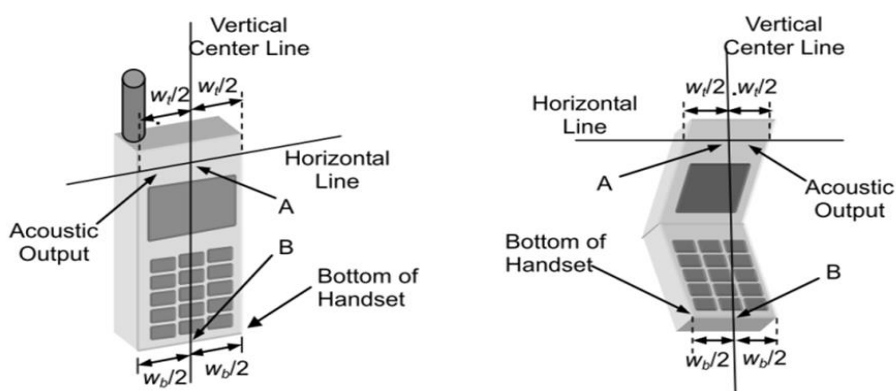
This EUT was tested in Right Cheek, Right Titled, Left Cheek, Left Titled, Front Face and Rear Face.

Define Two Imaginary Lines On The Handset:

1) 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, and the midpoint of the width w_b of the handset.

2) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.

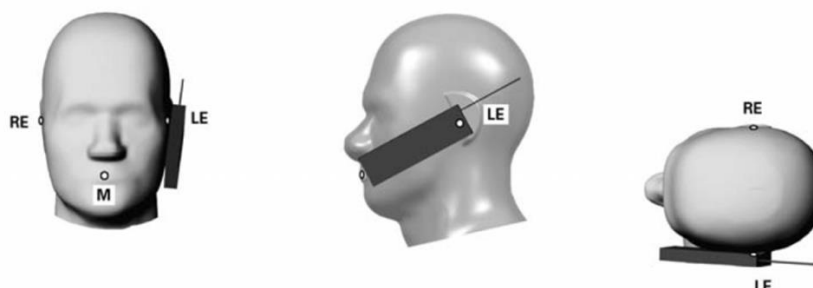
3) The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.



7.1 Cheek Position

1) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

2) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.





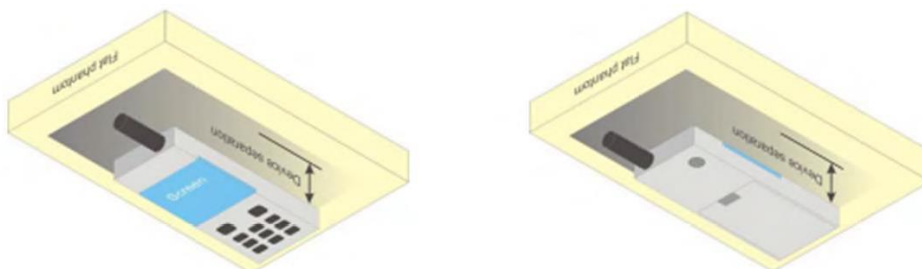
7.2 Tilt Position

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



7.3 Body-worn Position Conditions

- 1) To position the EUT parallel to the phantom surface.
- 2) To adjust the EUT parallel to the flat phantom.
- 3) To adjust the distance between the EUT surface and the flat phantom to 10mm.





8. Measurement Uncertainty

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 (1g)	Ci (10g)	1g Ui (+/-%)	10g Ui (+/-%)	ν_i
Measurement System								
Probe calibration	5.86	N	1	1	1	5.86	5.86	∞
Axial Isotropy	0.16	R	$\sqrt{3}$	$\sqrt{0.5}$	$\sqrt{0.5}$	0.07	0.07	∞
Hemispherical Isotropy	1.06	R	$\sqrt{3}$	$\sqrt{0.5}$	$\sqrt{0.5}$	0.43	0.43	∞
Boundary effect	1	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	1.27	R	$\sqrt{3}$	1	1	0.73	0.73	∞
System detection limits	1.23	R	$\sqrt{3}$	1	1	0.71	0.71	∞
Modulation response	3.6	R	$\sqrt{3}$	1	1	3.60	3.60	∞
Readout Electronics	0.28	N	1	1	1	0.28	0.28	∞
Response Time	0.19	R	$\sqrt{3}$	1	1	0.11	0.11	∞
Integration Time	1.47	R	$\sqrt{3}$	1	1	0.85	0.85	∞
RF ambient conditions- Noise	3.5	R	$\sqrt{3}$	1	1	2.02	2.02	∞
RF ambient conditions- reflections	3.2	R	$\sqrt{3}$	1	1	1.85	1.85	∞
Probe positioner mechanical tolerance	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to phantom shell	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Post-processing	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
Test sample Related								
Test sample positioning	3.1	N	1	1	1	3.10	3.10	∞
Device holder uncertainty	3.8	N	1	1	1	3.80	3.80	∞
SAR drift measurement	4.8	R	$\sqrt{3}$	1	1	2.77	2.77	∞
SAR scaling	2	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Phantom and tissue parameters								
Phantom uncertainty (shape and thickness uncertainty)	4	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	2	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity (temperature uncertainty)	2.5	R	$\sqrt{3}$	0.78	0.71	1.95	1.78	∞
Liquid conductivity (measured)	4	N	1	0.78	0.71	0.92	1.04	M
Liquid permittivity (temperature uncertainty)	2.5	R	$\sqrt{3}$	0.23	0.26	1.95	1.78	∞
Liquid permittivity (measured)	5	N	1	0.23	0.26	1.15	1.30	M
Combined Standard Uncertainty		RSS				10.60	10.51	
Expanded Uncertainty (95% Confidence interval)		K=2				21.21	21.03	



9. Conducted Power Measurement

Test Result:

Burst Average Power (dBm)						
Band	GSM 850			PCS 1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880.0	1909.8
GSM (GMSK, 1-Slot)	31.52	31.39	31.58	29.54	29.43	29.15
GPRS (GMSK, 1-Slot)	32.06	31.88	32.03	29.53	29.45	29.12
GPRS (GMSK, 2-Slot)	31.46	31.26	31.39	28.83	28.73	28.38
GPRS (GMSK, 3-Slot)	29.9	29.64	29.74	27.13	26.95	26.58
GPRS (GMSK, 4-Slot)	28.9	28.59	28.65	26.11	25.93	25.55
EGPRS(8PSK, 1-Slot)	25.33	25.08	25.15	25.34	25.5	25.38
EGPRS(8PSK, 2-Slot)	24.64	24.24	24.2	24.73	24.72	24.25
EGPRS(8PSK, 3-Slot)	23.36	22.85	22.52	22.91	22.99	22.43
EGPRS(8PSK, 4-Slot)	21.38	21.39	21.36	21.95	22.33	21.77
Remark: GPRS, CS4 coding scheme. EGPRS, MCS5 coding scheme. Multi-Slot Class 8, Support Max 4 downlink, 1 uplink, 5 working link Multi-Slot Class 10, Support Max 4 downlink, 2 uplink, 5 working link Multi-Slot Class 12, Support Max 4 downlink, 4 uplink, 5 working link						

Frame- Average Power(dBm)						
Band	GSM 850			PCS 1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880.0	1909.8
GSM (GMSK, 1-Slot)	22.49	22.36	22.55	20.51	20.40	20.12
GPRS (GMSK, 1-Slot)	23.03	22.85	23.00	20.50	20.42	20.09
GPRS (GMSK, 2-Slot)	25.44	25.24	25.37	22.81	22.71	22.36
GPRS (GMSK, 3-Slot)	25.64	25.38	25.48	22.87	22.69	22.32
GPRS (GMSK, 4-Slot)	25.89	25.58	25.64	23.10	22.92	22.54
EGPRS(8PSK, 1-Slot)	16.30	16.05	16.12	16.31	16.47	16.35
EGPRS(8PSK, 2-Slot)	18.62	18.22	18.18	18.71	18.70	18.23
EGPRS(8PSK, 3-Slot)	19.10	18.59	18.26	18.65	18.73	18.17
EGPRS(8PSK, 4-Slot)	18.37	18.38	18.35	18.94	19.32	18.76
Remark: 1. SAR testing was performed on the maximum frame-averaged power mode. 2. The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum Burst - averaged power based on time slots. The calculated method is shown as below: Frame-averaged power = Burst averaged power (1 TX Slot) – 9.03 dB Frame-averaged power = Burst averaged power (2 TX Slots) – 6.02 dB Frame-averaged power = Burst averaged power (3 TX Slots) - 4.26 dB Frame-averaged power = Burst averaged power (4 TX Slots) – 3.01 dB						



WCDMA

Band	WCDMA Band 2			WCDMA Band 5		
Channel	9262	9400	9538	4132	4183	4233
Frequency (MHz)	1852.4	1880	1907.6	826.4	836.6	846.6
RMC 12.2Kbps	21.6	21.49	21.19	21.68	21.85	21.87
HSDPA Subtest-1	20.69	20.59	20.27	21.62	21.85	21.89
HSDPA Subtest-2	20.29	20.11	19.78	21.64	21.83	21.89
HSDPA Subtest-3	19.18	19.18	18.59	21.64	21.81	21.88
HSDPA Subtest-4	19.26	18.72	18.39	21.64	21.82	21.88
HSUPA Subtest-1	20.55	20.44	20.27	21.61	21.82	21.86
HSUPA Subtest-2	20.22	20.07	19.63	21.63	21.85	21.88
HSUPA Subtest-3	19.16	18.79	18.59	21.63	21.82	21.88
HSUPA Subtest-4	19.09	18.64	18.76	21.63	21.83	21.86
HSUPA Subtest-5	20.68	20.61	20.16	21.64	21.82	21.83

According to 3GPP 25.101 sub-clause 6.2.2, the maximum output power is allowed to be reduced by following the table.

Table 6.1A: UE maximum output power with HS-DPCCH and E-DCH

UE Transmit Channel Configuration	CM(db)	MPR(db)
For all combinations of ,DPDCH,DPCCH HS-DPDCH,E-DPDCH and E-DPCCH	$0 \leq CM \leq 3.5$	$MAX(CM-1,0)$
Note: CM=1 for $\beta_c/\beta_d=12/15$, $\beta_{hs}/\beta_c=24/15$.For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.		

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done .However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a compensation for the power back-off by increasing the gain of TX_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.



2.4G WLAN

2.4GWIFI				
Mode	Channel Number	Frequency (MHz)	Average Power (dBm)	Output Power (mW)
802.11b	1	2412	9.13	8.18
	6	2437	8.96	7.87
	11	2462	5.36	3.43
802.11g	1	2412	11.82	15.20
	6	2437	11.76	15.00
	11	2462	8.68	7.37
802.11 n-HT20	1	2412	11.92	15.56
	6	2437	11.92	15.56
	11	2462	9.61	9.14
802.11 n-HT40	3	2422	12.25	16.79
	6	2437	12.43	17.50
	9	2452	10.91	12.33

Bluetooth

BT				
Mode	Channel Number	Frequency (MHz)	Average Power (dBm)	Output Power (mW)
GFSK(1Mbps)	0	2402	7.86	6.10
	39	2441	7.04	5.05
	78	2480	7.82	6.05
$\pi/4$ -QPSK(2Mbps)	0	2402	6.7	4.68
	39	2441	6.2	4.17
	78	2480	7.03	5.05
8DPSK(3Mbps)	0	2402	6.71	4.69
	39	2441	6.23	4.20
	78	2480	7.03	5.05

BLE	Output Power (dBm)		
	0CH	19CH	39CH
GFSK(1Mbps)	-4.12	-2.09	-3
GFSK(2Mbps)	-4.19	-2.11	-2.99

Tune Up Power:

Mode	GSM900(AVG)	GSM1800(AVG)
GSM/DCS	31±1dBm	29±1dBm
GPRS (1 Slot)	31.5±1dBm	29±1dBm
GPRS (2 Slot)	30.5±1dBm	28±1dBm
GPRS (3 Slot)	29±1dBm	26.5±1dBm
GPRS (4 Slot)	28±1dBm	25.5±1dBm
EGPRS(8PSK, 1-Slot)	24.5±1dBm	24.5±1dBm



EGPRS(8PSK, 2-Slot)	24±1dBm	24±1dBm
EGPRS(8PSK, 3-Slot)	22.5±1dBm	22±1dBm
EGPRS(8PSK, 4-Slot)	20.5±1dBm	21.5±1dBm

Mode	WCDMA Band 2	WCDMA Band 5
RMC 12.2Kbps	21±1dBm	21±1dBm
HSDPA Subtest-1	20±1dBm	21±1dBm
HSDPA Subtest-2	19.5±1dBm	21±1dBm
HSDPA Subtest-3	18.5±1dBm	21±1dBm
HSDPA Subtest-4	18.5±1dBm	21±1dBm
HSUPA Subtest-1	20±1dBm	21±1dBm
HSUPA Subtest-2	20.5±1dBm	21±1dBm
HSUPA Subtest-3	18.5±1dBm	21±1dBm
HSUPA Subtest-4	18.5±1dBm	21±1dBm
HSUPA Subtest-5	20±1dBm	21±1dBm

Mode	BT(AVG)
GFSK	7±1dBm
$\pi/4$ -DQPSK	6.5±1dBm
8DPSK	6.5±1dBm

Mode	BLE(AVG)	
GFSK(1Mbps)	0	-4.5±1dBm
	19	-2.5±1dBm
	39	-3±1dBm
GFSK(2Mbps)	0	-4.5±1dBm
	19	-2.5±1dBm
	39	-3±1dBm



LTE Conducted Power

General Note:

1. Anritsu CMW500 base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05, smaller bandwidth SAR testing is not required.



Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)	Verdict
Band2	1.4	18607	1	#0	QPSK	21.97	PASS
Band2	1.4	18607	1	#Mid	QPSK	22.12	PASS
Band2	1.4	18607	1	#Max	QPSK	21.93	PASS
Band2	1.4	18607	3	#0	QPSK	21.9	PASS
Band2	1.4	18607	3	#Mid	QPSK	21.92	PASS
Band2	1.4	18607	3	#Max	QPSK	21.92	PASS
Band2	1.4	18607	6	#0	QPSK	20.95	PASS
Band2	1.4	18900	1	#0	QPSK	21.65	PASS
Band2	1.4	18900	1	#Mid	QPSK	21.79	PASS
Band2	1.4	18900	1	#Max	QPSK	21.62	PASS
Band2	1.4	18900	3	#0	QPSK	21.76	PASS
Band2	1.4	18900	3	#Mid	QPSK	21.75	PASS
Band2	1.4	18900	3	#Max	QPSK	21.76	PASS
Band2	1.4	18900	6	#0	QPSK	20.68	PASS
Band2	1.4	19193	1	#0	QPSK	21.45	PASS
Band2	1.4	19193	1	#Mid	QPSK	21.63	PASS
Band2	1.4	19193	1	#Max	QPSK	21.49	PASS
Band2	1.4	19193	3	#0	QPSK	21.44	PASS
Band2	1.4	19193	3	#Mid	QPSK	21.51	PASS
Band2	1.4	19193	3	#Max	QPSK	21.42	PASS
Band2	1.4	19193	6	#0	QPSK	20.5	PASS
Band2	3	18615	1	#0	QPSK	21.83	PASS
Band2	3	18615	1	#Mid	QPSK	22.16	PASS
Band2	3	18615	1	#Max	QPSK	21.77	PASS
Band2	3	18615	8	#0	QPSK	20.85	PASS
Band2	3	18615	8	#Mid	QPSK	20.86	PASS
Band2	3	18615	8	#Max	QPSK	20.84	PASS
Band2	3	18615	15	#0	QPSK	20.81	PASS
Band2	3	18900	1	#0	QPSK	21.63	PASS
Band2	3	18900	1	#Mid	QPSK	21.93	PASS
Band2	3	18900	1	#Max	QPSK	21.63	PASS
Band2	3	18900	8	#0	QPSK	20.64	PASS
Band2	3	18900	8	#Mid	QPSK	20.68	PASS
Band2	3	18900	8	#Max	QPSK	20.66	PASS
Band2	3	18900	15	#0	QPSK	20.6	PASS
Band2	3	19185	1	#0	QPSK	21.42	PASS
Band2	3	19185	1	#Mid	QPSK	21.97	PASS
Band2	3	19185	1	#Max	QPSK	21.53	PASS
Band2	3	19185	8	#0	QPSK	20.42	PASS
Band2	3	19185	8	#Mid	QPSK	20.47	PASS
Band2	3	19185	8	#Max	QPSK	20.45	PASS
Band2	3	19185	15	#0	QPSK	20.35	PASS
Band2	5	18625	1	#0	QPSK	21.77	PASS
Band2	5	18625	1	#Mid	QPSK	22.1	PASS
Band2	5	18625	1	#Max	QPSK	21.72	PASS
Band2	5	18625	12	#0	QPSK	20.81	PASS
Band2	5	18625	12	#Mid	QPSK	20.88	PASS
Band2	5	18625	12	#Max	QPSK	20.8	PASS



Band2	5	18625	25	#0	QPSK	20.84	PASS
Band2	5	18900	1	#0	QPSK	21.49	PASS
Band2	5	18900	1	#Mid	QPSK	21.89	PASS
Band2	5	18900	1	#Max	QPSK	21.5	PASS
Band2	5	18900	12	#0	QPSK	20.64	PASS
Band2	5	18900	12	#Mid	QPSK	20.7	PASS
Band2	5	18900	12	#Max	QPSK	20.62	PASS
Band2	5	18900	25	#0	QPSK	20.66	PASS
Band2	5	19175	1	#0	QPSK	21.29	PASS
Band2	5	19175	1	#Mid	QPSK	21.6	PASS
Band2	5	19175	1	#Max	QPSK	21.37	PASS
Band2	5	19175	12	#0	QPSK	20.41	PASS
Band2	5	19175	12	#Mid	QPSK	20.45	PASS
Band2	5	19175	12	#Max	QPSK	20.42	PASS
Band2	5	19175	25	#0	QPSK	20.43	PASS
Band2	10	18650	1	#0	QPSK	21.82	PASS
Band2	10	18650	1	#Mid	QPSK	21.85	PASS
Band2	10	18650	1	#Max	QPSK	21.77	PASS
Band2	10	18650	25	#0	QPSK	20.77	PASS
Band2	10	18650	25	#Mid	QPSK	20.79	PASS
Band2	10	18650	25	#Max	QPSK	20.88	PASS
Band2	10	18650	50	#0	QPSK	20.8	PASS
Band2	10	18900	1	#0	QPSK	21.64	PASS
Band2	10	18900	1	#Mid	QPSK	21.74	PASS
Band2	10	18900	1	#Max	QPSK	21.67	PASS
Band2	10	18900	25	#0	QPSK	20.76	PASS
Band2	10	18900	25	#Mid	QPSK	20.7	PASS
Band2	10	18900	25	#Max	QPSK	20.68	PASS
Band2	10	18900	50	#0	QPSK	20.67	PASS
Band2	10	19150	1	#0	QPSK	21.43	PASS
Band2	10	19150	1	#Mid	QPSK	21.57	PASS
Band2	10	19150	1	#Max	QPSK	21.5	PASS
Band2	10	19150	25	#0	QPSK	20.52	PASS
Band2	10	19150	25	#Mid	QPSK	20.36	PASS
Band2	10	19150	25	#Max	QPSK	20.43	PASS
Band2	10	19150	50	#0	QPSK	20.44	PASS
Band2	15	18675	1	#0	QPSK	21.82	PASS
Band2	15	18675	1	#Mid	QPSK	22.13	PASS
Band2	15	18675	1	#Max	QPSK	21.71	PASS
Band2	15	18675	36	#0	QPSK	20.81	PASS
Band2	15	18675	36	#Mid	QPSK	20.91	PASS
Band2	15	18675	36	#Max	QPSK	20.92	PASS
Band2	15	18675	75	#0	QPSK	20.91	PASS
Band2	15	18900	1	#0	QPSK	21.68	PASS
Band2	15	18900	1	#Mid	QPSK	21.99	PASS
Band2	15	18900	1	#Max	QPSK	21.54	PASS
Band2	15	18900	36	#0	QPSK	20.8	PASS
Band2	15	18900	36	#Mid	QPSK	20.8	PASS
Band2	15	18900	36	#Max	QPSK	20.73	PASS
Band2	15	18900	75	#0	QPSK	20.74	PASS



Band2	15	19125	1	#0	QPSK	21.3	PASS
Band2	15	19125	1	#Mid	QPSK	21.56	PASS
Band2	15	19125	1	#Max	QPSK	21.39	PASS
Band2	15	19125	36	#0	QPSK	20.59	PASS
Band2	15	19125	36	#Mid	QPSK	20.53	PASS
Band2	15	19125	36	#Max	QPSK	20.44	PASS
Band2	15	19125	75	#0	QPSK	20.5	PASS
Band2	20	18700	1	#0	QPSK	21.78	PASS
Band2	20	18700	1	#Mid	QPSK	22.03	PASS
Band2	20	18700	1	#Max	QPSK	21.72	PASS
Band2	20	18700	50	#0	QPSK	20.62	PASS
Band2	20	18700	50	#Mid	QPSK	20.81	PASS
Band2	20	18700	50	#Max	QPSK	20.81	PASS
Band2	20	18700	100	#0	QPSK	20.78	PASS
Band2	20	18900	1	#0	QPSK	21.57	PASS
Band2	20	18900	1	#Mid	QPSK	21.8	PASS
Band2	20	18900	1	#Max	QPSK	21.47	PASS
Band2	20	18900	50	#0	QPSK	20.8	PASS
Band2	20	18900	50	#Mid	QPSK	20.72	PASS
Band2	20	18900	50	#Max	QPSK	20.58	PASS
Band2	20	18900	100	#0	QPSK	20.69	PASS
Band2	20	19100	1	#0	QPSK	21.33	PASS
Band2	20	19100	1	#Mid	QPSK	21.53	PASS
Band2	20	19100	1	#Max	QPSK	21.36	PASS
Band2	20	19100	50	#0	QPSK	20.39	PASS
Band2	20	19100	50	#Mid	QPSK	20.42	PASS
Band2	20	19100	50	#Max	QPSK	20.14	PASS
Band2	20	19100	100	#0	QPSK	20.31	PASS



Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)	Verdict
Band4	1.4	19957	1	#0	QPSK	22.19	PASS
Band4	1.4	19957	1	#Mid	QPSK	22.31	PASS
Band4	1.4	19957	1	#Max	QPSK	22.14	PASS
Band4	1.4	19957	3	#0	QPSK	22.1	PASS
Band4	1.4	19957	3	#Mid	QPSK	22.12	PASS
Band4	1.4	19957	3	#Max	QPSK	22.13	PASS
Band4	1.4	19957	6	#0	QPSK	21.15	PASS
Band4	1.4	20175	1	#0	QPSK	21.78	PASS
Band4	1.4	20175	1	#Mid	QPSK	21.96	PASS
Band4	1.4	20175	1	#Max	QPSK	21.75	PASS
Band4	1.4	20175	3	#0	QPSK	21.84	PASS
Band4	1.4	20175	3	#Mid	QPSK	21.85	PASS
Band4	1.4	20175	3	#Max	QPSK	21.84	PASS
Band4	1.4	20175	6	#0	QPSK	20.88	PASS
Band4	1.4	20393	1	#0	QPSK	21.91	PASS
Band4	1.4	20393	1	#Mid	QPSK	22.11	PASS
Band4	1.4	20393	1	#Max	QPSK	21.94	PASS
Band4	1.4	20393	3	#0	QPSK	21.96	PASS
Band4	1.4	20393	3	#Mid	QPSK	21.98	PASS
Band4	1.4	20393	3	#Max	QPSK	21.94	PASS
Band4	1.4	20393	6	#0	QPSK	21.03	PASS
Band4	3	19965	1	#0	QPSK	22.03	PASS
Band4	3	19965	1	#Mid	QPSK	22.17	PASS
Band4	3	19965	1	#Max	QPSK	21.99	PASS
Band4	3	19965	8	#0	QPSK	21.1	PASS
Band4	3	19965	8	#Mid	QPSK	21.09	PASS
Band4	3	19965	8	#Max	QPSK	21.06	PASS
Band4	3	19965	15	#0	QPSK	21.01	PASS
Band4	3	20175	1	#0	QPSK	21.8	PASS
Band4	3	20175	1	#Mid	QPSK	22.2	PASS
Band4	3	20175	1	#Max	QPSK	21.83	PASS
Band4	3	20175	8	#0	QPSK	20.85	PASS
Band4	3	20175	8	#Mid	QPSK	20.86	PASS
Band4	3	20175	8	#Max	QPSK	20.87	PASS
Band4	3	20175	15	#0	QPSK	20.85	PASS
Band4	3	20385	1	#0	QPSK	21.92	PASS
Band4	3	20385	1	#Mid	QPSK	22.19	PASS
Band4	3	20385	1	#Max	QPSK	22	PASS
Band4	3	20385	8	#0	QPSK	20.95	PASS
Band4	3	20385	8	#Mid	QPSK	21	PASS
Band4	3	20385	8	#Max	QPSK	20.97	PASS
Band4	3	20385	15	#0	QPSK	20.91	PASS
Band4	5	19975	1	#0	QPSK	21.91	PASS
Band4	5	19975	1	#Mid	QPSK	22.15	PASS
Band4	5	19975	1	#Max	QPSK	21.82	PASS
Band4	5	19975	12	#0	QPSK	21.06	PASS
Band4	5	19975	12	#Mid	QPSK	21.05	PASS
Band4	5	19975	12	#Max	QPSK	20.96	PASS



Band4	5	19975	25	#0	QPSK	20.98	PASS
Band4	5	20175	1	#0	QPSK	21.68	PASS
Band4	5	20175	1	#Mid	QPSK	22	PASS
Band4	5	20175	1	#Max	QPSK	21.72	PASS
Band4	5	20175	12	#0	QPSK	20.83	PASS
Band4	5	20175	12	#Mid	QPSK	20.91	PASS
Band4	5	20175	12	#Max	QPSK	20.88	PASS
Band4	5	20175	25	#0	QPSK	20.87	PASS
Band4	5	20375	1	#0	QPSK	21.79	PASS
Band4	5	20375	1	#Mid	QPSK	22.23	PASS
Band4	5	20375	1	#Max	QPSK	21.86	PASS
Band4	5	20375	12	#0	QPSK	20.94	PASS
Band4	5	20375	12	#Mid	QPSK	21	PASS
Band4	5	20375	12	#Max	QPSK	20.93	PASS
Band4	5	20375	25	#0	QPSK	20.94	PASS
Band4	10	20000	1	#0	QPSK	22.15	PASS
Band4	10	20000	1	#Mid	QPSK	22.19	PASS
Band4	10	20000	1	#Max	QPSK	21.98	PASS
Band4	10	20000	25	#0	QPSK	21.09	PASS
Band4	10	20000	25	#Mid	QPSK	20.97	PASS
Band4	10	20000	25	#Max	QPSK	20.94	PASS
Band4	10	20000	50	#0	QPSK	21	PASS
Band4	10	20175	1	#0	QPSK	21.74	PASS
Band4	10	20175	1	#Mid	QPSK	21.92	PASS
Band4	10	20175	1	#Max	QPSK	21.8	PASS
Band4	10	20175	25	#0	QPSK	20.86	PASS
Band4	10	20175	25	#Mid	QPSK	20.89	PASS
Band4	10	20175	25	#Max	QPSK	21.01	PASS
Band4	10	20175	50	#0	QPSK	20.92	PASS
Band4	10	20350	1	#0	QPSK	21.86	PASS
Band4	10	20350	1	#Mid	QPSK	21.99	PASS
Band4	10	20350	1	#Max	QPSK	21.89	PASS
Band4	10	20350	25	#0	QPSK	21.04	PASS
Band4	10	20350	25	#Mid	QPSK	20.97	PASS
Band4	10	20350	25	#Max	QPSK	20.95	PASS
Band4	10	20350	50	#0	QPSK	20.99	PASS
Band4	15	20025	1	#0	QPSK	21.95	PASS
Band4	15	20025	1	#Mid	QPSK	22.32	PASS
Band4	15	20025	1	#Max	QPSK	21.75	PASS
Band4	15	20025	36	#0	QPSK	21.1	PASS
Band4	15	20025	36	#Mid	QPSK	21.07	PASS
Band4	15	20025	36	#Max	QPSK	20.95	PASS
Band4	15	20025	75	#0	QPSK	21.04	PASS
Band4	15	20175	1	#0	QPSK	21.8	PASS
Band4	15	20175	1	#Mid	QPSK	22.21	PASS
Band4	15	20175	1	#Max	QPSK	21.84	PASS
Band4	15	20175	36	#0	QPSK	20.81	PASS
Band4	15	20175	36	#Mid	QPSK	20.95	PASS
Band4	15	20175	36	#Max	QPSK	21	PASS
Band4	15	20175	75	#0	QPSK	20.93	PASS



Band4	15	20325	1	#0	QPSK	21.74	PASS
Band4	15	20325	1	#Mid	QPSK	22.18	PASS
Band4	15	20325	1	#Max	QPSK	21.77	PASS
Band4	15	20325	36	#0	QPSK	21.01	PASS
Band4	15	20325	36	#Mid	QPSK	21.06	PASS
Band4	15	20325	36	#Max	QPSK	21.02	PASS
Band4	15	20325	75	#0	QPSK	21.01	PASS
Band4	20	20050	1	#0	QPSK	21.94	PASS
Band4	20	20050	1	#Mid	QPSK	22.08	PASS
Band4	20	20050	1	#Max	QPSK	21.78	PASS
Band4	20	20050	50	#0	QPSK	21.01	PASS
Band4	20	20050	50	#Mid	QPSK	20.92	PASS
Band4	20	20050	50	#Max	QPSK	20.91	PASS
Band4	20	20050	100	#0	QPSK	20.95	PASS
Band4	20	20175	1	#0	QPSK	21.68	PASS
Band4	20	20175	1	#Mid	QPSK	21.95	PASS
Band4	20	20175	1	#Max	QPSK	21.8	PASS
Band4	20	20175	50	#0	QPSK	20.71	PASS
Band4	20	20175	50	#Mid	QPSK	20.87	PASS
Band4	20	20175	50	#Max	QPSK	20.96	PASS
Band4	20	20175	100	#0	QPSK	20.86	PASS
Band4	20	20300	1	#0	QPSK	21.62	PASS
Band4	20	20300	1	#Mid	QPSK	21.98	PASS
Band4	20	20300	1	#Max	QPSK	21.74	PASS
Band4	20	20300	50	#0	QPSK	20.88	PASS
Band4	20	20300	50	#Mid	QPSK	20.94	PASS
Band4	20	20300	50	#Max	QPSK	20.82	PASS
Band4	20	20300	100	#0	QPSK	20.86	PASS



Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)	Verdict
Band5	1.4	20407	1	#0	QPSK	21.85	PASS
Band5	1.4	20407	1	#Mid	QPSK	22.02	PASS
Band5	1.4	20407	1	#Max	QPSK	21.89	PASS
Band5	1.4	20407	3	#0	QPSK	21.96	PASS
Band5	1.4	20407	3	#Mid	QPSK	21.98	PASS
Band5	1.4	20407	3	#Max	QPSK	21.99	PASS
Band5	1.4	20407	6	#0	QPSK	20.86	PASS
Band5	1.4	20525	1	#0	QPSK	22.16	PASS
Band5	1.4	20525	1	#Mid	QPSK	22.29	PASS
Band5	1.4	20525	1	#Max	QPSK	22.16	PASS
Band5	1.4	20525	3	#0	QPSK	22.18	PASS
Band5	1.4	20525	3	#Mid	QPSK	22.17	PASS
Band5	1.4	20525	3	#Max	QPSK	22.19	PASS
Band5	1.4	20525	6	#0	QPSK	21.14	PASS
Band5	1.4	20643	1	#0	QPSK	22.2	PASS
Band5	1.4	20643	1	#Mid	QPSK	22.28	PASS
Band5	1.4	20643	1	#Max	QPSK	22.12	PASS
Band5	1.4	20643	3	#0	QPSK	22.09	PASS
Band5	1.4	20643	3	#Mid	QPSK	22.14	PASS
Band5	1.4	20643	3	#Max	QPSK	22.13	PASS
Band5	1.4	20643	6	#0	QPSK	21.1	PASS
Band5	3	20415	1	#0	QPSK	21.83	PASS
Band5	3	20415	1	#Mid	QPSK	22.09	PASS
Band5	3	20415	1	#Max	QPSK	21.88	PASS
Band5	3	20415	8	#0	QPSK	20.85	PASS
Band5	3	20415	8	#Mid	QPSK	20.89	PASS
Band5	3	20415	8	#Max	QPSK	20.89	PASS
Band5	3	20415	15	#0	QPSK	20.87	PASS
Band5	3	20525	1	#0	QPSK	22.16	PASS
Band5	3	20525	1	#Mid	QPSK	22.46	PASS
Band5	3	20525	1	#Max	QPSK	22.14	PASS
Band5	3	20525	8	#0	QPSK	21.09	PASS
Band5	3	20525	8	#Mid	QPSK	21.13	PASS
Band5	3	20525	8	#Max	QPSK	21.12	PASS
Band5	3	20525	15	#0	QPSK	21.06	PASS
Band5	3	20635	1	#0	QPSK	22.19	PASS
Band5	3	20635	1	#Mid	QPSK	22.4	PASS
Band5	3	20635	1	#Max	QPSK	22.17	PASS
Band5	3	20635	8	#0	QPSK	21.15	PASS
Band5	3	20635	8	#Mid	QPSK	21.17	PASS
Band5	3	20635	8	#Max	QPSK	21.15	PASS
Band5	3	20635	15	#0	QPSK	21.13	PASS
Band5	5	20425	1	#0	QPSK	21.73	PASS
Band5	5	20425	1	#Mid	QPSK	22.18	PASS
Band5	5	20425	1	#Max	QPSK	21.89	PASS
Band5	5	20425	12	#0	QPSK	20.93	PASS
Band5	5	20425	12	#Mid	QPSK	20.93	PASS
Band5	5	20425	12	#Max	QPSK	20.9	PASS



Band5	5	20425	25	#0	QPSK	20.89	PASS
Band5	5	20525	1	#0	QPSK	21.93	PASS
Band5	5	20525	1	#Mid	QPSK	22.29	PASS
Band5	5	20525	1	#Max	QPSK	22.04	PASS
Band5	5	20525	12	#0	QPSK	21.06	PASS
Band5	5	20525	12	#Mid	QPSK	21.15	PASS
Band5	5	20525	12	#Max	QPSK	21.13	PASS
Band5	5	20525	25	#0	QPSK	21.09	PASS
Band5	5	20625	1	#0	QPSK	22.01	PASS
Band5	5	20625	1	#Mid	QPSK	22.46	PASS
Band5	5	20625	1	#Max	QPSK	22.06	PASS
Band5	5	20625	12	#0	QPSK	21.21	PASS
Band5	5	20625	12	#Mid	QPSK	21.26	PASS
Band5	5	20625	12	#Max	QPSK	21.2	PASS
Band5	5	20625	25	#0	QPSK	21.28	PASS
Band5	10	20450	1	#0	QPSK	21.82	PASS
Band5	10	20450	1	#Mid	QPSK	22.06	PASS
Band5	10	20450	1	#Max	QPSK	22.09	PASS
Band5	10	20450	25	#0	QPSK	20.98	PASS
Band5	10	20450	25	#Mid	QPSK	20.97	PASS
Band5	10	20450	25	#Max	QPSK	21.11	PASS
Band5	10	20450	50	#0	QPSK	21.03	PASS
Band5	10	20525	1	#0	QPSK	22.06	PASS
Band5	10	20525	1	#Mid	QPSK	22.22	PASS
Band5	10	20525	1	#Max	QPSK	22.18	PASS
Band5	10	20525	25	#0	QPSK	21.03	PASS
Band5	10	20525	25	#Mid	QPSK	21.11	PASS
Band5	10	20525	25	#Max	QPSK	21.11	PASS
Band5	10	20525	50	#0	QPSK	21.07	PASS
Band5	10	20600	1	#0	QPSK	22.15	PASS
Band5	10	20600	1	#Mid	QPSK	22.29	PASS
Band5	10	20600	1	#Max	QPSK	22.14	PASS
Band5	10	20600	25	#0	QPSK	21.32	PASS
Band5	10	20600	25	#Mid	QPSK	21.25	PASS
Band5	10	20600	25	#Max	QPSK	21.31	PASS
Band5	10	20600	50	#0	QPSK	21.31	PASS



Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)	Verdict
Band12	1.4	23017	1	#0	QPSK	22.29	PASS
Band12	1.4	23017	1	#Mid	QPSK	22.44	PASS
Band12	1.4	23017	1	#Max	QPSK	22.29	PASS
Band12	1.4	23017	3	#0	QPSK	22.2	PASS
Band12	1.4	23017	3	#Mid	QPSK	22.22	PASS
Band12	1.4	23017	3	#Max	QPSK	22.29	PASS
Band12	1.4	23017	6	#0	QPSK	21.26	PASS
Band12	1.4	23095	1	#0	QPSK	22.21	PASS
Band12	1.4	23095	1	#Mid	QPSK	22.39	PASS
Band12	1.4	23095	1	#Max	QPSK	22.22	PASS
Band12	1.4	23095	3	#0	QPSK	22.28	PASS
Band12	1.4	23095	3	#Mid	QPSK	22.29	PASS
Band12	1.4	23095	3	#Max	QPSK	22.29	PASS
Band12	1.4	23095	6	#0	QPSK	21.27	PASS
Band12	1.4	23173	1	#0	QPSK	22.29	PASS
Band12	1.4	23173	1	#Mid	QPSK	22.42	PASS
Band12	1.4	23173	1	#Max	QPSK	22.29	PASS
Band12	1.4	23173	3	#0	QPSK	22.24	PASS
Band12	1.4	23173	3	#Mid	QPSK	22.27	PASS
Band12	1.4	23173	3	#Max	QPSK	22.23	PASS
Band12	1.4	23173	6	#0	QPSK	21.28	PASS
Band12	3	23025	1	#0	QPSK	22.3	PASS
Band12	3	23025	1	#Mid	QPSK	22.6	PASS
Band12	3	23025	1	#Max	QPSK	22.36	PASS
Band12	3	23025	8	#0	QPSK	21.26	PASS
Band12	3	23025	8	#Mid	QPSK	21.3	PASS
Band12	3	23025	8	#Max	QPSK	21.24	PASS
Band12	3	23025	15	#0	QPSK	21.21	PASS
Band12	3	23095	1	#0	QPSK	22.3	PASS
Band12	3	23095	1	#Mid	QPSK	22.63	PASS
Band12	3	23095	1	#Max	QPSK	22.3	PASS
Band12	3	23095	8	#0	QPSK	21.29	PASS
Band12	3	23095	8	#Mid	QPSK	21.34	PASS
Band12	3	23095	8	#Max	QPSK	21.3	PASS
Band12	3	23095	15	#0	QPSK	21.24	PASS
Band12	3	23165	1	#0	QPSK	22.36	PASS
Band12	3	23165	1	#Mid	QPSK	22.6	PASS
Band12	3	23165	1	#Max	QPSK	22.28	PASS
Band12	3	23165	8	#0	QPSK	21.29	PASS
Band12	3	23165	8	#Mid	QPSK	21.32	PASS
Band12	3	23165	8	#Max	QPSK	21.3	PASS
Band12	3	23165	15	#0	QPSK	21.26	PASS
Band12	5	23035	1	#0	QPSK	22.15	PASS
Band12	5	23035	1	#Mid	QPSK	22.61	PASS
Band12	5	23035	1	#Max	QPSK	22.22	PASS
Band12	5	23035	12	#0	QPSK	21.27	PASS
Band12	5	23035	12	#Mid	QPSK	21.31	PASS
Band12	5	23035	12	#Max	QPSK	21.31	PASS



Band12	5	23035	25	#0	QPSK	21.33	PASS
Band12	5	23095	1	#0	QPSK	22.24	PASS
Band12	5	23095	1	#Mid	QPSK	22.6	PASS
Band12	5	23095	1	#Max	QPSK	22.25	PASS
Band12	5	23095	12	#0	QPSK	21.24	PASS
Band12	5	23095	12	#Mid	QPSK	21.33	PASS
Band12	5	23095	12	#Max	QPSK	21.29	PASS
Band12	5	23095	25	#0	QPSK	21.29	PASS
Band12	5	23155	1	#0	QPSK	22.16	PASS
Band12	5	23155	1	#Mid	QPSK	22.51	PASS
Band12	5	23155	1	#Max	QPSK	22.17	PASS
Band12	5	23155	12	#0	QPSK	21.28	PASS
Band12	5	23155	12	#Mid	QPSK	21.35	PASS
Band12	5	23155	12	#Max	QPSK	21.3	PASS
Band12	5	23155	25	#0	QPSK	21.32	PASS
Band12	10	23060	1	#0	QPSK	22.25	PASS
Band12	10	23060	1	#Mid	QPSK	22.42	PASS
Band12	10	23060	1	#Max	QPSK	22.37	PASS
Band12	10	23060	25	#0	QPSK	21.32	PASS
Band12	10	23060	25	#Mid	QPSK	21.3	PASS
Band12	10	23060	25	#Max	QPSK	21.38	PASS
Band12	10	23060	50	#0	QPSK	21.34	PASS
Band12	10	23095	1	#0	QPSK	22.28	PASS
Band12	10	23095	1	#Mid	QPSK	22.45	PASS
Band12	10	23095	1	#Max	QPSK	22.42	PASS
Band12	10	23095	25	#0	QPSK	21.21	PASS
Band12	10	23095	25	#Mid	QPSK	21.31	PASS
Band12	10	23095	25	#Max	QPSK	21.25	PASS
Band12	10	23095	50	#0	QPSK	21.23	PASS
Band12	10	23130	1	#0	QPSK	22.25	PASS
Band12	10	23130	1	#Mid	QPSK	22.43	PASS
Band12	10	23130	1	#Max	QPSK	22.32	PASS
Band12	10	23130	25	#0	QPSK	21.4	PASS
Band12	10	23130	25	#Mid	QPSK	21.31	PASS
Band12	10	23130	25	#Max	QPSK	21.47	PASS
Band12	10	23130	50	#0	QPSK	21.43	PASS

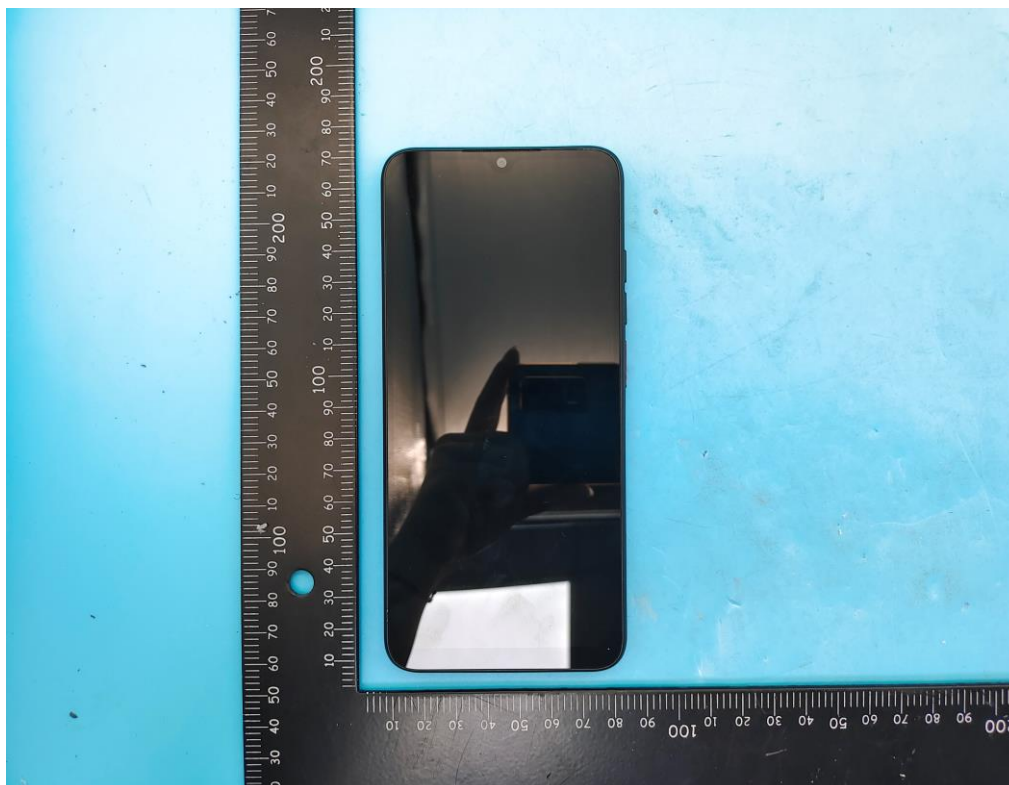


Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)	Verdict
Band13	5	23205	1	#0	QPSK	21.99	PASS
Band13	5	23205	1	#Mid	QPSK	22.5	PASS
Band13	5	23205	1	#Max	QPSK	22.01	PASS
Band13	5	23205	12	#0	QPSK	21	PASS
Band13	5	23205	12	#Mid	QPSK	21.2	PASS
Band13	5	23205	12	#Max	QPSK	21.14	PASS
Band13	5	23205	25	#0	QPSK	21.13	PASS
Band13	5	23230	1	#0	QPSK	22	PASS
Band13	5	23230	1	#Mid	QPSK	22.55	PASS
Band13	5	23230	1	#Max	QPSK	22.05	PASS
Band13	5	23230	12	#0	QPSK	20.98	PASS
Band13	5	23230	12	#Mid	QPSK	21.18	PASS
Band13	5	23230	12	#Max	QPSK	21.23	PASS
Band13	5	23230	25	#0	QPSK	21.21	PASS
Band13	5	23255	1	#0	QPSK	22.03	PASS
Band13	5	23255	1	#Mid	QPSK	22.39	PASS
Band13	5	23255	1	#Max	QPSK	22.1	PASS
Band13	5	23255	12	#0	QPSK	20.96	PASS
Band13	5	23255	12	#Mid	QPSK	21.13	PASS
Band13	5	23255	12	#Max	QPSK	21.04	PASS
Band13	5	23255	25	#0	QPSK	21.04	PASS
Band13	10	23230	1	#0	QPSK	22.16	PASS
Band13	10	23230	1	#Mid	QPSK	22.33	PASS
Band13	10	23230	1	#Max	QPSK	22.27	PASS
Band13	10	23230	25	#0	QPSK	21.11	PASS
Band13	10	23230	25	#Mid	QPSK	21.21	PASS
Band13	10	23230	25	#Max	QPSK	21.33	PASS
Band13	10	23230	50	#0	QPSK	21.22	PASS

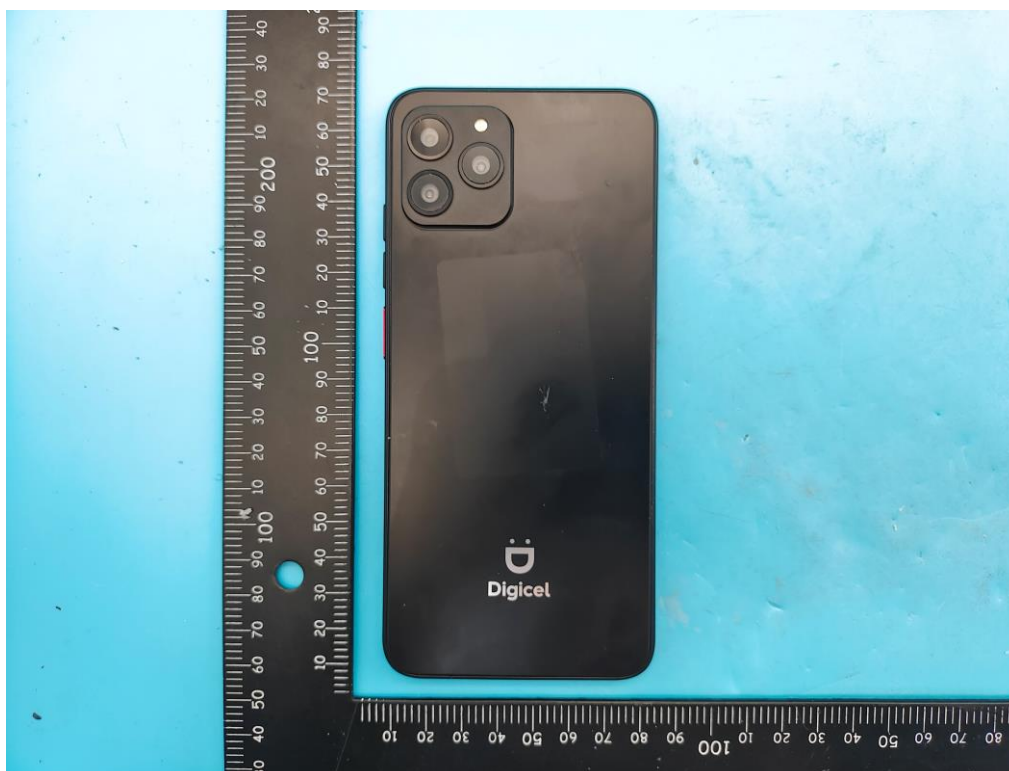
10. Test Photos and Results

10.1 EUT Photos

Front side



Back side

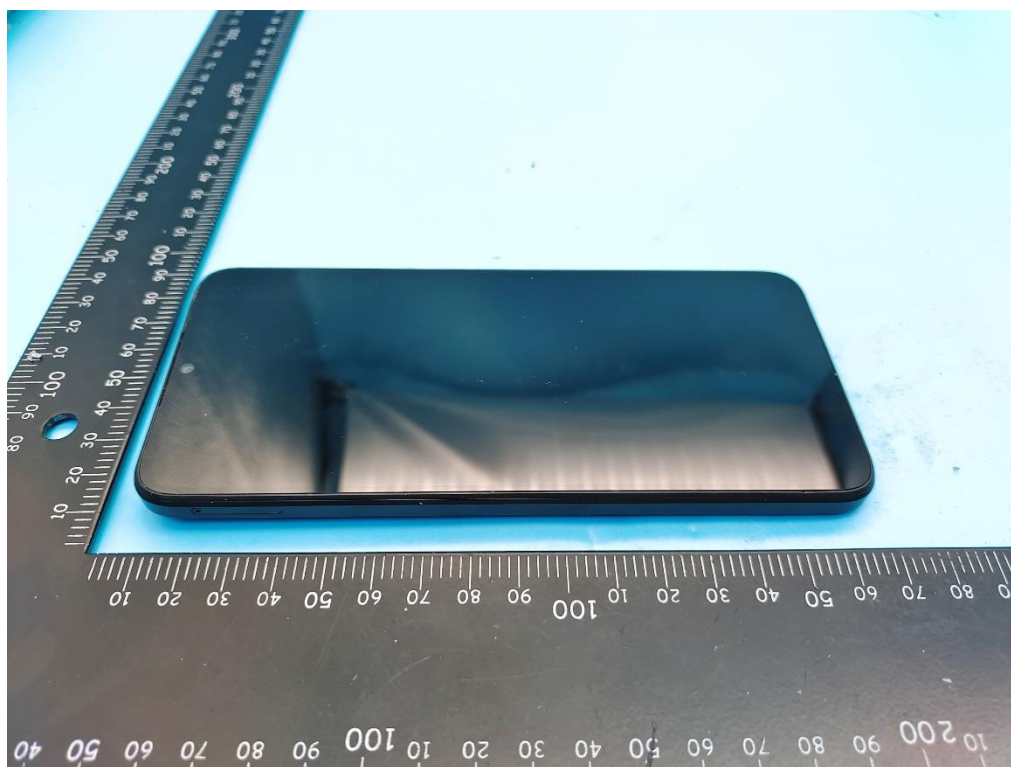




Right Edge

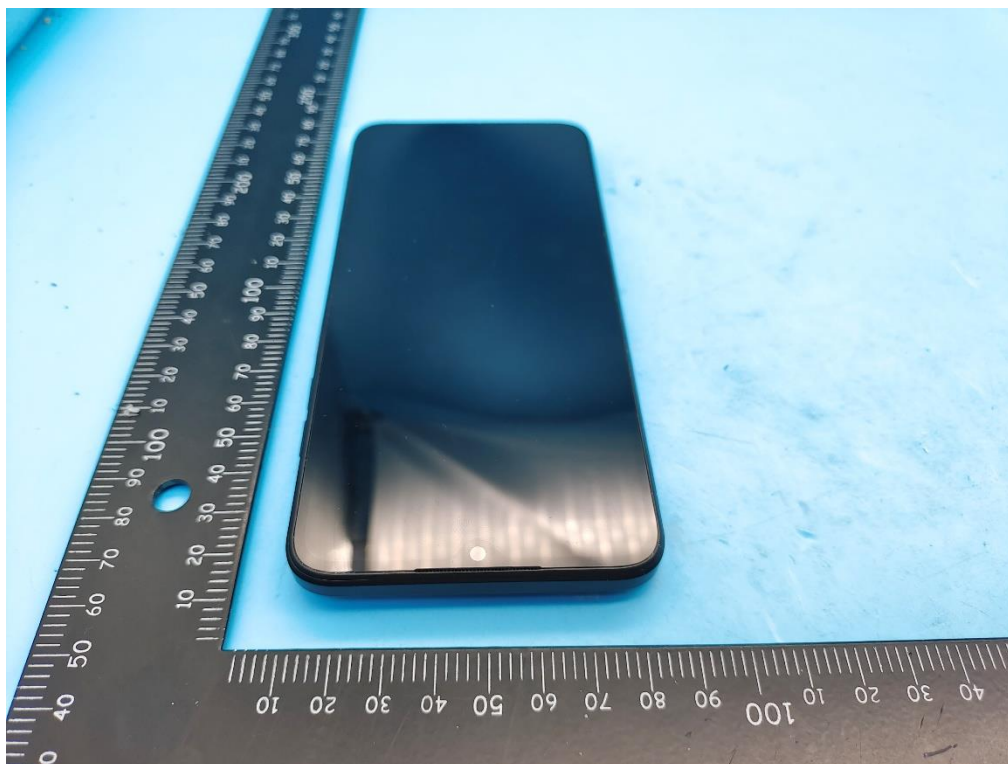


Left Edge

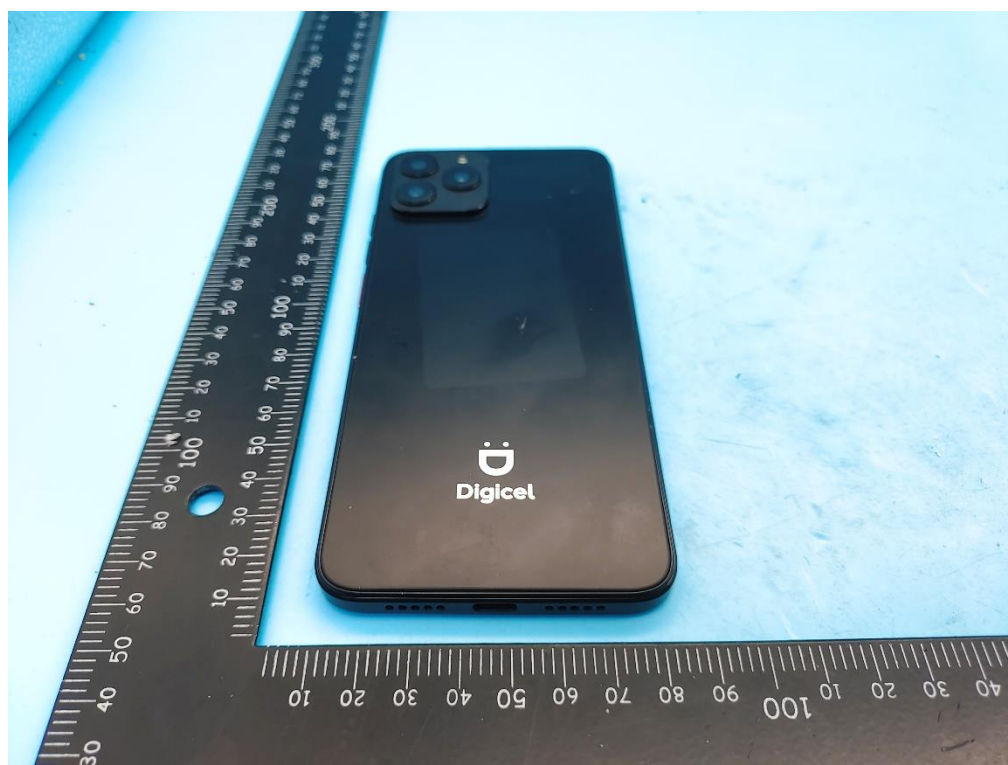




Top Edge

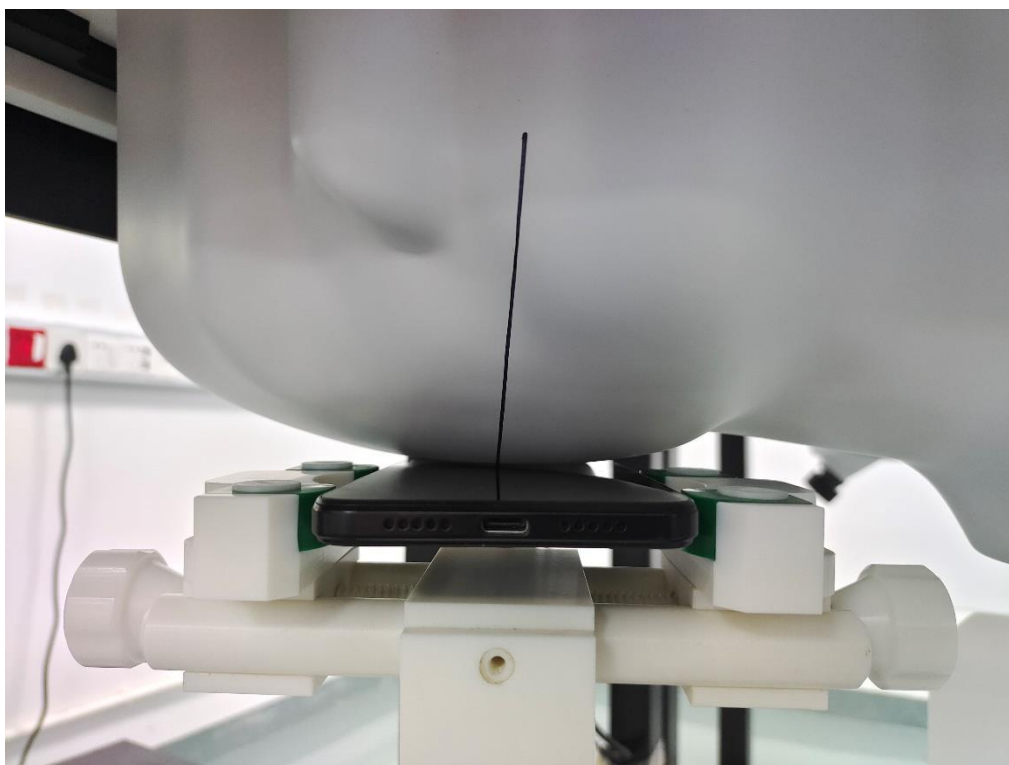


Bottom Edge

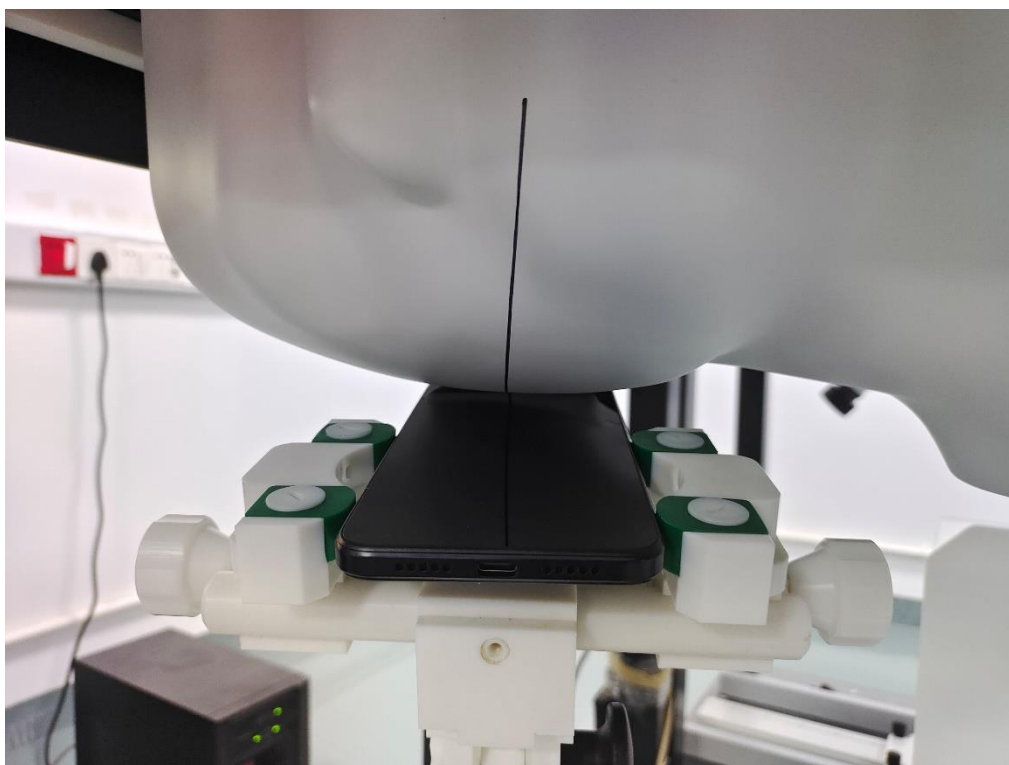


10.2 Setup Photos

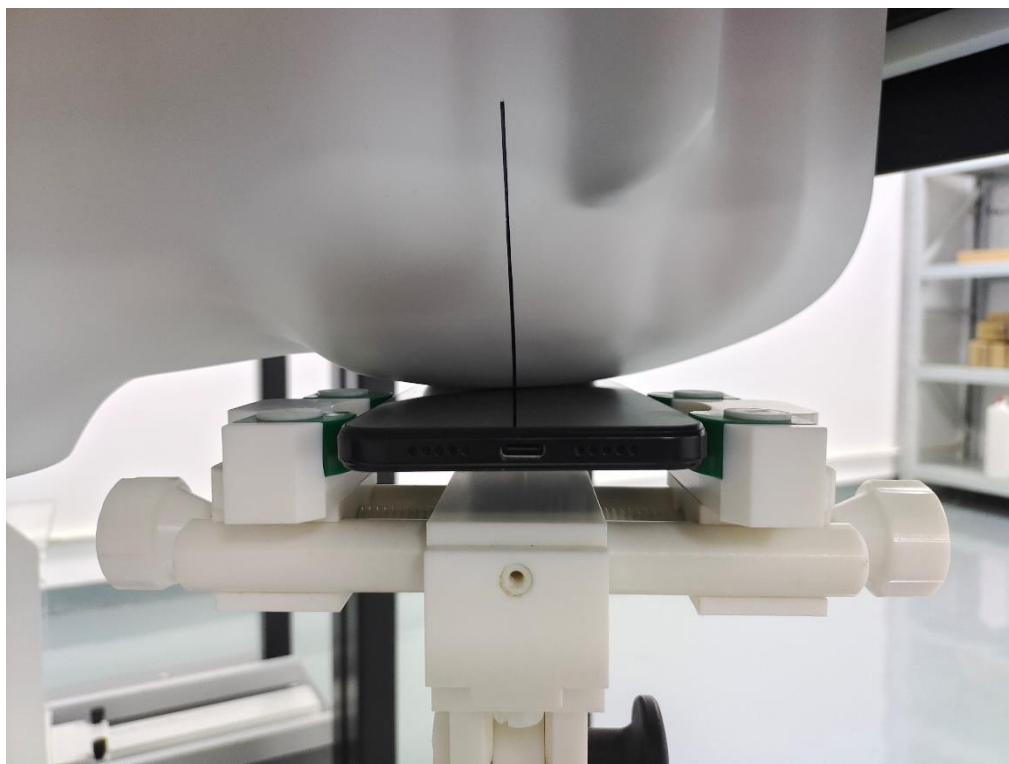
Right Touch



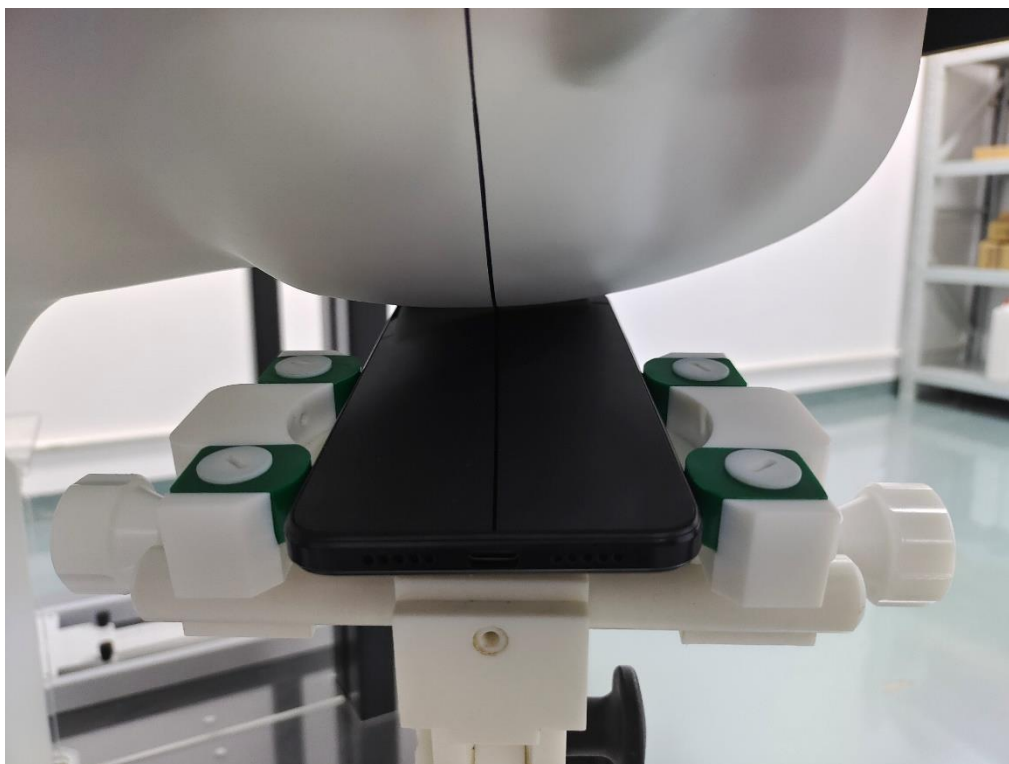
Right Tilt



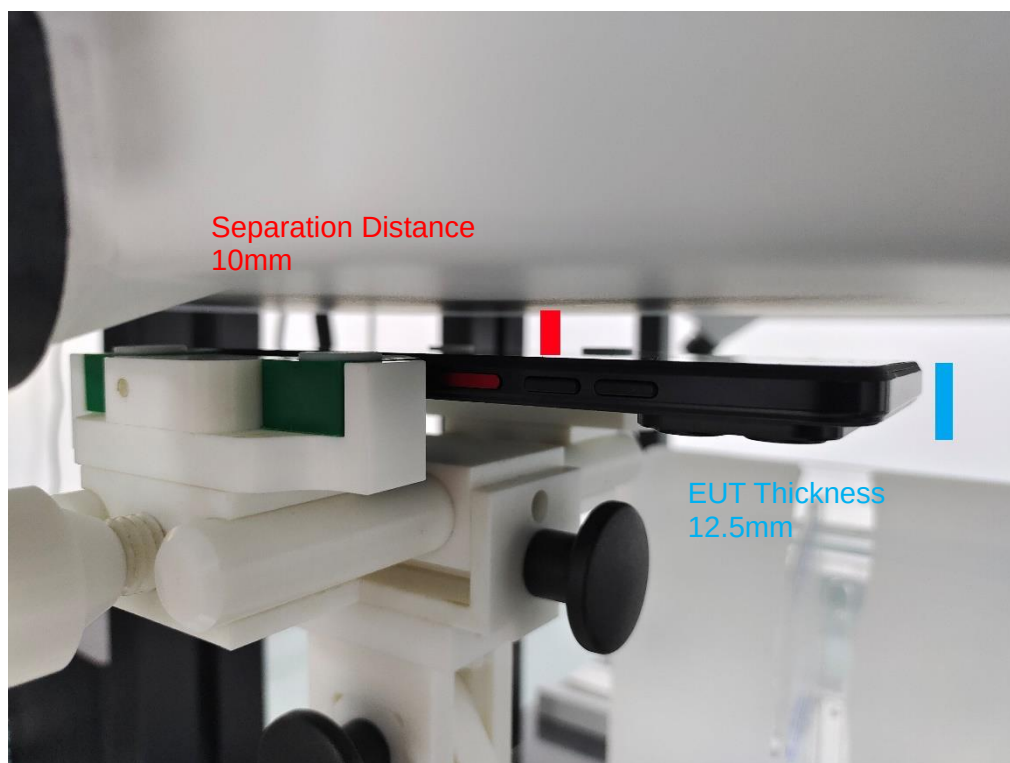
Left Touch



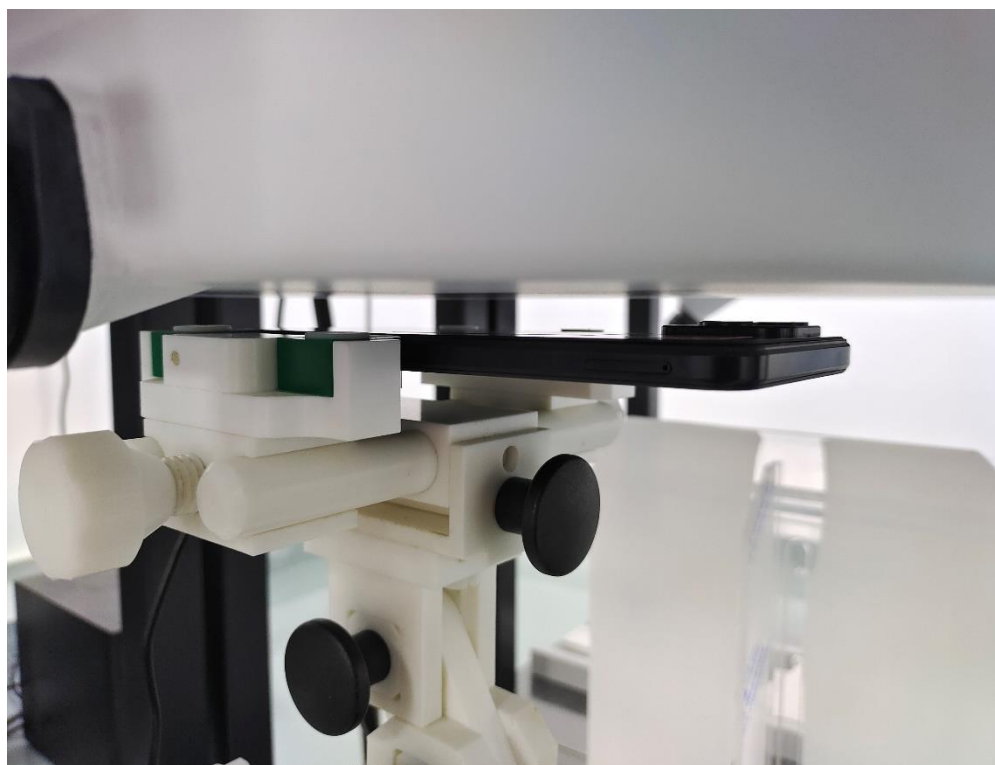
Left Tilt



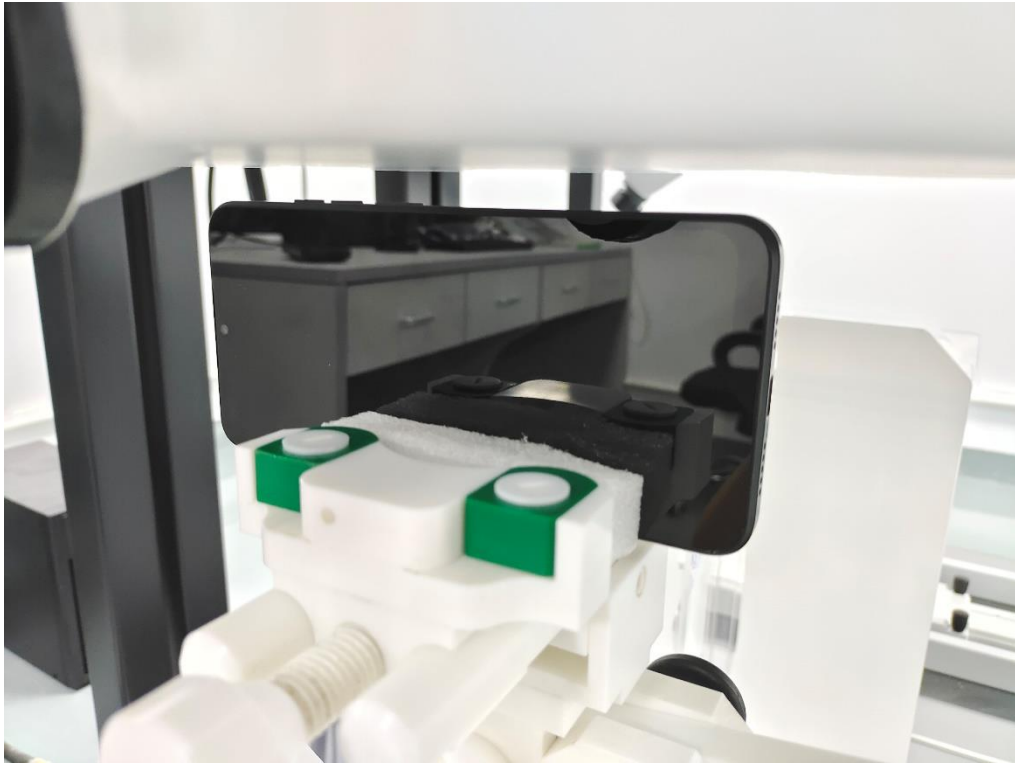
Body Front side



Body Back side



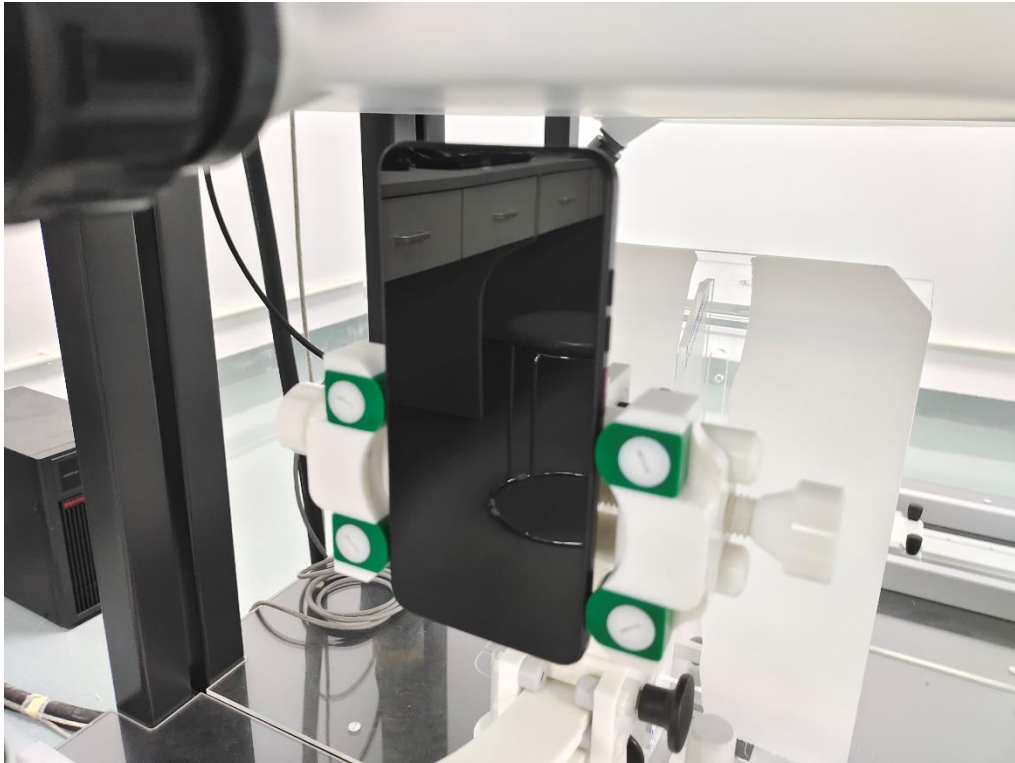
Body Right side



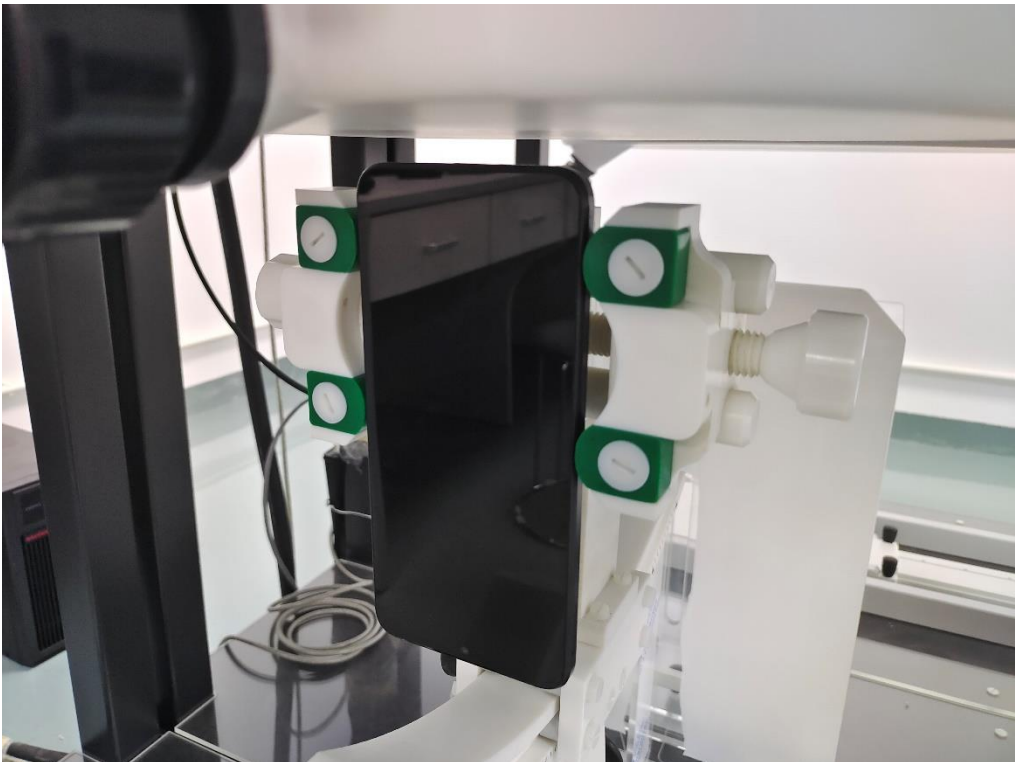
Body Left side



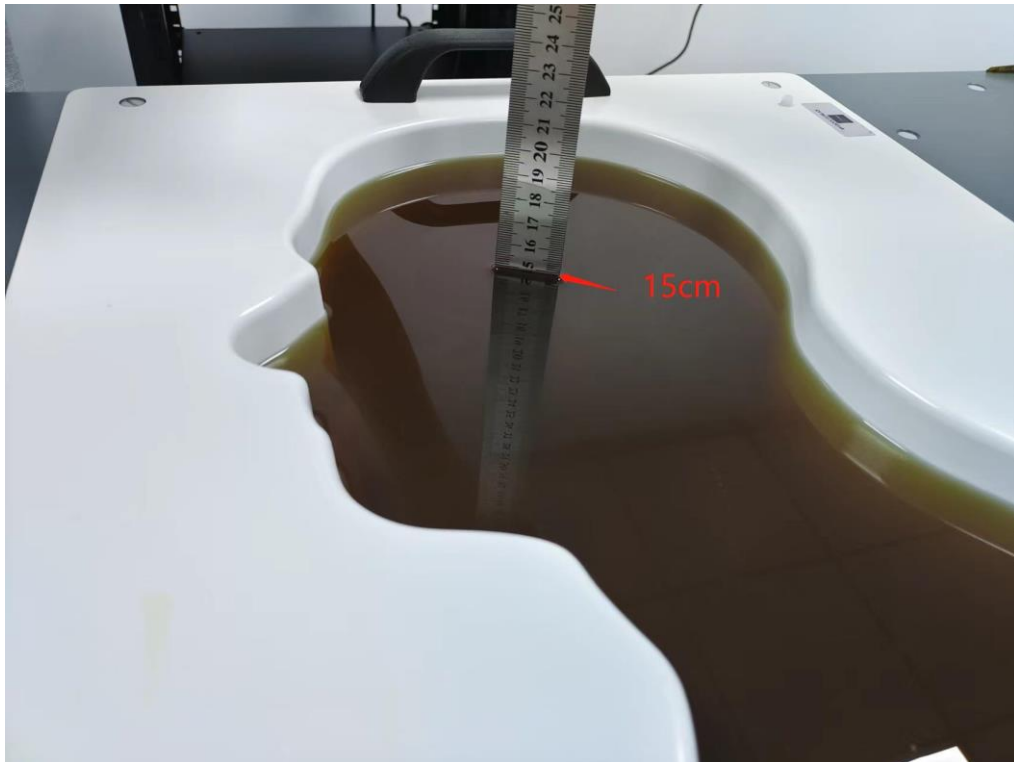
Top Edge



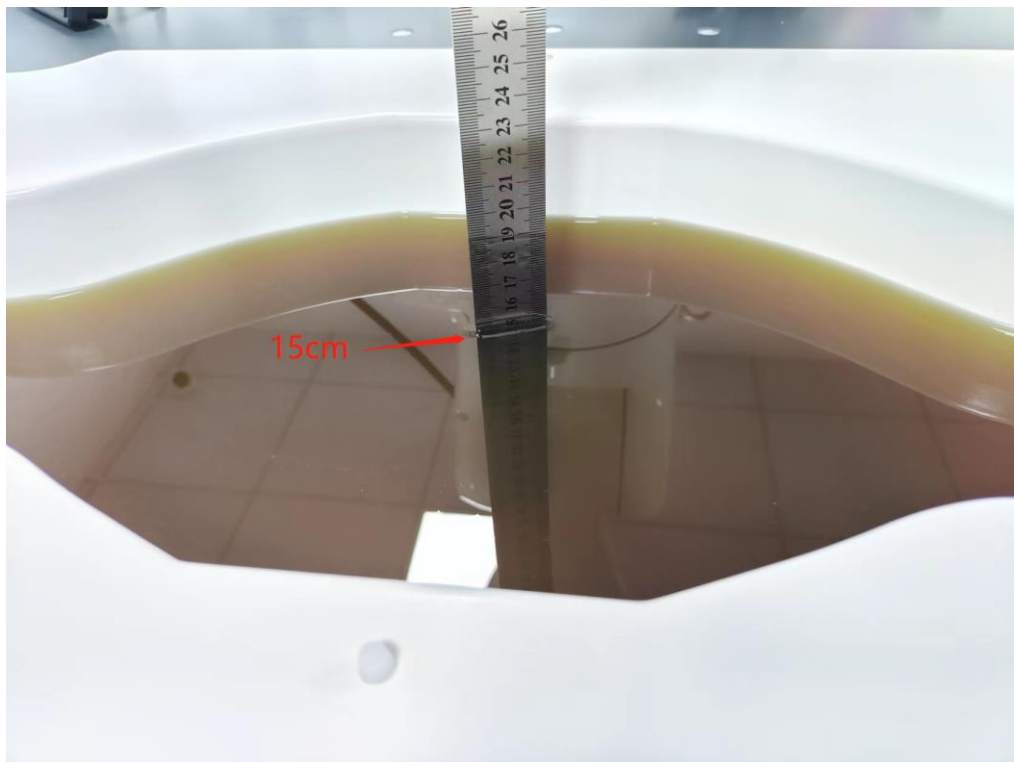
Bottom Edge



Liquid depth (15 cm)



Liquid depth (15 cm)





11. SAR Result Summary

HEAD SAR

Band	Model	Test Position	Freq.	SAR (1g) (W/kg)	Power Drift(%)	Meas.Output Power(dBm)	Max.Turn-up Power(dBm)	Scaled SAR (W/Kg)	Meas.No.
GSM850	Voice	Right Cheek	848.8	0.029	-1.94	31.58	32	0.032	/
		Right Tilt	848.8	0.034	2.76	31.58	32	0.037	/
		Left Cheek	848.8	0.06	-1.77	31.58	32	0.066	1
		Left Tilt	848.8	0.046	-2.57	31.58	32	0.051	/
GSM1900	Voice	Right Cheek	1850.4	0.068	-1.15	29.54	30	0.075	/
		Right Tilt	1850.4	0.047	-1.61	29.54	30	0.052	/
		Left Cheek	1850.4	0.133	-1.91	29.54	30	0.148	/
		Left Cheek	1880.0	0.103	-0.68	29.43	30	0.117	/
		Left Cheek	1909.8	0.159	1.15	29.15	30	0.193	3
		Left Tilt	1850.4	0.061	-2.35	29.54	30	0.068	/
WCDMA Band 2	RMC	Right Cheek	1852.4	0.15	-2.36	21.6	22	0.164	/
		Right Tilt	1852.4	0.16	1.15	21.6	22	0.175	/
		Left Cheek	1852.4	0.176	-1.61	21.6	22	0.191	/
		Left Cheek	1880	0.174	-2.61	21.49	22	0.196	/
		Left Cheek	1907.6	0.223	-2.83	21.19	22	0.269	5
		Left Tilt	1852.4	0.101	-3.11	21.6	22	0.111	/
WCDMA Band 5	RMC	Right Cheek	846.6	0.074	-2.08	21.87	22	0.076	/
		Right Tilt	846.6	0.068	0.33	21.87	22	0.070	/
		Left Cheek	846.6	0.08	-1.32	21.87	22	0.082	7
		Left Tilt	846.6	0.055	-1.68	21.87	22	0.057	/
LTE Band 2	20MHz QPSK	Right Cheek	1873.7	0.13	-2.01	21.8	22.5	0.153	/
		Right Tilt	1873.7	0.057	2.25	21.8	22.5	0.067	/
		Left Cheek	1853.7	0.186	-2.44	22.03	22.5	0.207	/
		Left Cheek	1873.7	0.206	-3.67	21.8	22.5	0.242	9
		Left Cheek	1893.7	0.169	3.29	21.53	22.5	0.211	/
		Left Tilt	1873.7	0.089	-1.71	21.8	22.5	0.105	/
LTE Band 4	20MHz QPSK	Right Cheek	1726.2	0.071	3.28	21.95	22.5	0.081	/
		Right Tilt	1726.2	0.029	1.68	21.95	22.5	0.033	/
		Left Cheek	1726.2	0.081	1.50	21.95	22.5	0.153	11
		Left Tilt	1726.2	0.063	1.96	21.95	22.5	0.067	/



LTE Band 5	10MHz QPSK	Right Cheek	834.7	0.034	-1.16	22.22	22.5	0.036	/
		Right Tilt	834.7	0.018	4.21	22.22	22.5	0.019	/
		Left Cheek	834.7	0.045	-3.80	22.22	22.5	0.048	13
		Left Tilt	834.7	0.044	1.97	22.22	22.5	0.047	/
LTE Band 12	10MHz	Right Cheek	705.7	0.023	-4.69	22.45	22.5	0.023	/
		Right Tilt	705.7	0.024	3.70	22.45	22.5	0.024	/
		Left Cheek	705.7	0.023	2.94	22.45	22.5	0.023	/
		Left Tilt	705.7	0.043	-3.49	22.45	22.5	0.043	15
LTE Band 13	10MHz	Right Cheek	780.2	0.039	-2.62	22.33	22.5	0.041	/
		Right Tilt	780.2	0.043	1.86	22.33	22.5	0.045	/
		Left Cheek	780.2	0.061	-4.85	22.33	22.5	0.063	17
		Left Tilt	780.2	0.053	-3.14	22.33	22.5	0.055	/
2.4G WLAN	802.11n40	Right Cheek	2422	0.092	-4.82	12.25	12.5	0.097	/
		Right Tilt	2422	0.108	0.60	12.25	12.5	0.114	19
		Left Cheek	2422	0.091	-1.17	12.25	12.5	0.096	/
		Left Tilt	2422	0.041	4.75	12.25	12.5	0.043	/
Bluetooth	GFSK	Right Cheek	2402	0.048	-0.60	7.86	8	0.050	/
		Right Tilt	2402	0.044	-1.81	7.86	8	0.045	/
		Left Cheek	2402	0.04	2.49	7.86	8	0.041	/
		Left Tilt	2402	0.053	-1.45	7.86	8	0.055	21



BODY SAR

Band	Model	Test Position	Freq.	SAR (1g) (W/kg)	Power Drift(%)	Meas.Output Power(dBm)	Max.Turn-up Power(dBm)	Scaled SAR (W/Kg)	Meas.No.
GSM850	GPRS (GMSK, 4-Slot)	Front Side	824.2	0.217	4.65	28.9	29	0.222	/
		Back Side	824.2	0.276	-1.83	28.9	29	0.282	2
		Right Edge	824.2	0.19	-1.61	28.9	29	0.194	/
		Left Edge	824.2	0.086	-4.52	28.9	29	0.088	/
		Bottom Edge	824.2	0.185	2.66	28.9	29	0.189	/
GSM1900	GPRS (GMSK, 4-Slot)	Front Side	1850.4	0.479	3.82	26.11	26.5	0.524	/
		Back Side	1850.4	0.512	-2.51	26.11	26.5	0.560	/
		Back Side	1880.0	0.623	-1.77	25.93	26.5	0.710	/
		Back Side	1909.8	0.602	-1.81	25.55	26.5	0.749	4
		Right Edge	1850.4	0.015	-4.06	26.11	26.5	0.016	/
		Left Edge	1850.4	0.359	1.08	26.11	26.5	0.393	/
		Bottom Edge	1850.4	0.517	-4.02	26.11	26.5	0.566	/
WCDMA Band 2	HSDPA Subtest-1	Front Side	1852.4	0.384	-1.02	20.69	21	0.412	/
		Back Side	1852.4	0.355	-4.23	20.69	21	0.381	/
		Back Side	1880	0.415	-1.78	20.59	21	0.456	/
		Back Side	1907.6	0.499	1.89	20.27	21	0.590	6
		Right Edge	1852.4	0.025	-3.18	20.69	21	0.027	/
		Left Edge	1852.4	0.314	1.19	20.69	21	0.337	/
		Bottom Edge	1852.4	0.349	-2.39	20.69	21	0.375	/
WCDMA Band 5	HSDPA Subtest-1	Front Side	846.6	0.082	-3.36	21.89	22	0.084	/
		Back Side	846.6	0.095	-1.57	21.89	22	0.097	8
		Right Edge	846.6	0.050	-3.95	21.89	22	0.051	/
		Left Edge	846.6	0.053	-4.64	21.89	22	0.054	/
		Bottom Edge	846.6	0.080	-1.40	21.89	22	0.082	/
LTE Band 2	20MHz QPSK	Front Side	1873.7	0.440	-2.60	21.8	22.5	0.517	/
		Back Side	1853.7	0.562	-0.50	22.03	22.5	0.626	/
		Back Side	1873.7	0.466	3.29	21.8	22.5	0.548	/
		Back Side	1893.7	0.577	-1.78	21.53	22.5	0.721	10
		Right Edge	1873.7	0.027	-1.55	21.8	22.5	0.032	/
		Left Edge	1873.7	0.306	-2.94	21.8	22.5	0.360	/
		Bottom Edge	1873.7	0.418	-3.72	21.8	22.5	0.491	/
LTE Band 4	20MHz QPSK	Front Side	1726.2	0.157	-0.57	21.95	22.5	0.178	/
		Back Side	1726.2	0.263	-1.92	21.95	22.5	0.299	12
		Right Edge	1726.2	0.051	3.50	21.95	22.5	0.058	/
		Left Edge	1726.2	0.170	-1.83	21.95	22.5	0.193	/
		Bottom Edge	1726.2	0.245	-2.03	21.95	22.5	0.278	/
LTE Band 5	10MHz QPSK	Front Side	834.7	0.069	-1.33	22.22	22.5	0.074	/
		Back Side	834.7	0.121	1.94	22.22	22.5	0.129	14
		Right Edge	834.7	0.038	-1.45	22.22	22.5	0.041	/
		Left Edge	834.7	0.070	-2.08	22.22	22.5	0.075	/
		Bottom Edge	834.7	0.051	0.93	22.22	22.5	0.054	/
LTE	10MHz	Front Side	705.7	0.027	0.56	22.45	22.5	0.027	/



Band 12	QPSK	Back Side	705.7	0.044	-1.20	22.45	22.5	0.045	16
		Right Edge	705.7	0.025	-4.76	22.45	22.5	0.025	/
		Left Edge	705.7	0.02	-2.81	22.45	22.5	0.020	/
		Bottom Edge	705.7	0.02	-2.35	22.45	22.5	0.020	/
LTE Band 13	10MHz QPSK	Front Side	780.2	0.024	-1.60	22.33	22.5	0.025	/
		Back Side	780.2	0.090	2.34	22.33	22.5	0.094	18
		Right Edge	780.2	0.035	-0.67	22.33	22.5	0.036	/
		Left Edge	780.2	0.038	-2.80	22.33	22.5	0.040	/
		Bottom Edge	780.2	0.057	3.97	22.33	22.5	0.059	/
2.4G WLAN	802.11n40	Front Side	2422	0.131	-2.62	12.25	12.5	0.139	/
		Back Side	2422	0.157	-3.45	12.25	12.5	0.166	20
		Right Edge	2422	0.126	-1.56	12.25	12.5	0.133	/
		Left Edge	2422	0.037	-1.49	12.25	12.5	0.039	/
		Bottom Edge	2422	0.113	3.45	12.25	12.5	0.120	/
Bluetooth	GFSK	Front Side	2402	0.029	1.63	7.86	8	0.030	/
		Back Side	2402	0.041	2.74	7.86	8	0.042	/
		Right Edge	2402	0.036	-3.09	7.86	8	0.037	/
		Left Edge	2402	0.026	-1.88	7.86	8	0.027	/
		Bottom Edge	2402	0.042	-2.51	7.86	8	0.043	22

Note:

1. Per KDB 447498 D04, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. Scaled SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
2. Per KDB 865664 D01, Repeated measurement is not required when the original highest measured SAR is <0.80 W/kg



Simultaneous Multi-band Transmission Evaluation:

Application Simultaneous Transmission information:

Position	Simultaneous State
Head	1. GSM + 2.4GHz WLAN
	2. GSM + Bluetooth
	3. WCDMA + 2.4GHz WLAN
	4. WCDMA + Bluetooth
	5. LTE + 2.4GHz WLAN
	6. LTE + Bluetooth
Body	1. GSM + 2.4GHz WLAN
	2. GSM + Bluetooth
	3. WCDMA + 2.4GHz WLAN
	4. WCDMA + Bluetooth
	5. LTE + 2.4GHz WLAN
	6. LTE + Bluetooth

NOTE:

1. Bluetooth and WLAN can't simultaneous transmission at the same time.

2. For simultaneous transmission at head and body exposure position, 2 transmitters simultaneous transmission was the worst state.

3. If the test separation distance is <5mm, 5mm is used for excluded SAR calculation.

4. KDB 447498 Appendix E, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

$$SAR_{est} = 1.6 \cdot P_{ant} / P_{th} [W/kg].$$

P_{ant} is maximum time-averaged power or effective radiated power (ERP), whichever is greater, and P_{th} is defined in Formula KDB 447498 (B.2).



Simultaneous Mode	Position	Mode	Max. 1-g SAR	1-g Sum SAR
			(W/kg)	(W/kg)
GSM + 2.4G WLAN	Head	GSM	0.193	0.307
		2.4G WLAN	0.114	
	Body	GSM	0.749	0.915
		2.4G WLAN	0.166	
GSM + Bluetooth	Head	GSM	0.193	0.248
		Bluetooth	0.055	
	Body	GSM	0.749	0.792
		Bluetooth	0.043	
WCDMA + 2.4G WLAN	Head	WCDMA	0.269	0.383
		2.4G WLAN	0.114	
	Body	WCDMA	0.590	0.756
		2.4G WLAN	0.166	
WCDMA + Bluetooth	Head	WCDMA	0.269	0.324
		Bluetooth	0.055	
	Body	WCDMA	0.590	0.633
		Bluetooth	0.043	
LTE + 2.4G WLAN	Head	LTE	0.242	0.356
		2.4G WLAN	0.114	
	Body	LTE	0.721	0.887
		2.4G WLAN	0.166	
LTE + Bluetooth	Head	LTE	0.242	0.297
		Bluetooth	0.055	
	Body	LTE	0.721	0.764
		Bluetooth	0.043	

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna.

When the sum of SAR 1g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR-1g 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR 1g is greater than the SAR limit (SAR-1g 1.6 W/kg), SAR test exclusion is determined by the SPLSR.



12. Equipment List

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
750MHz Dipole	MVG	DIP0G750	SN 06/22 DIP0G750-638	2022.02.11	2023.02.10
835MHz Dipole	MVG	DIP0G835	SN 06/22 DIP0G835-639	2022.02.11	2023.02.10
1800MHz Dipole	MVG	DIP1G800	SN 06/22 DIP1G800-640	2022.02.11	2023.02.10
1900MHz Dipole	MVG	DIP1G900	SN 06/22 DIP1G900-641	2022.02.11	2023.02.10
2450MHz Dipole	MVG	GIP2G450	SN 06/22 DIP2G450-645	2022.02.11	2023.02.10
E-Field Probe	MVG	EPGO364	SN 04/22 EPGO364	2022.02.11	2023.02.10
Dielectric Probe Kit	MVG	OCPG 87	SN 06/22 OCPG87	2022.02.11	2023.02.10
Antenna	MVG	ANTA 73	SN 06/22 ANTA 73	N/A	N/A
Ellipsoid Phantom	MVG	ELLI 51	SN 06/22 ELLI 51	N/A	N/A
Phantom	MVG	SAM 148	SN 06/22 SAM148	N/A	N/A
Phone holder	MVG	MSH 117	SN 06/22 MSH 117	N/A	N/A
Laptop holder	MVG	LSH 36	SN 06/22 LSH 38	N/A	N/A
Directional coupler	SHW	SHWDCP	202203280013	N/A	N/A
Network Analyzer	Agilent	E5071C	MY46418070	2022.03.28	2023.03.27
Multi Meter	Keithley	DMM6500	DMM6500	2022.05.05	2023.05.04
Signal Generator	Keithley	N5182B	MY59100717	2022.04.29	2023.04.28
Wireless Communication Test Set	R&S	CMW500	137737	2022.04.29	2023.04.28
Power Sensor	R&S	Z11	116184	2022.03.28	2023.03.27
Temperature hygrometer	N/A	ST-W2318	N/A	2022.05.05	2023.05.04
Thermograph	N/A	TP101	N/A	2022.05.05	2023.05.04



Appendix A. System Validation Plots

System Performance Check Data (750MHz)

Type: Phone measurement (Complete)

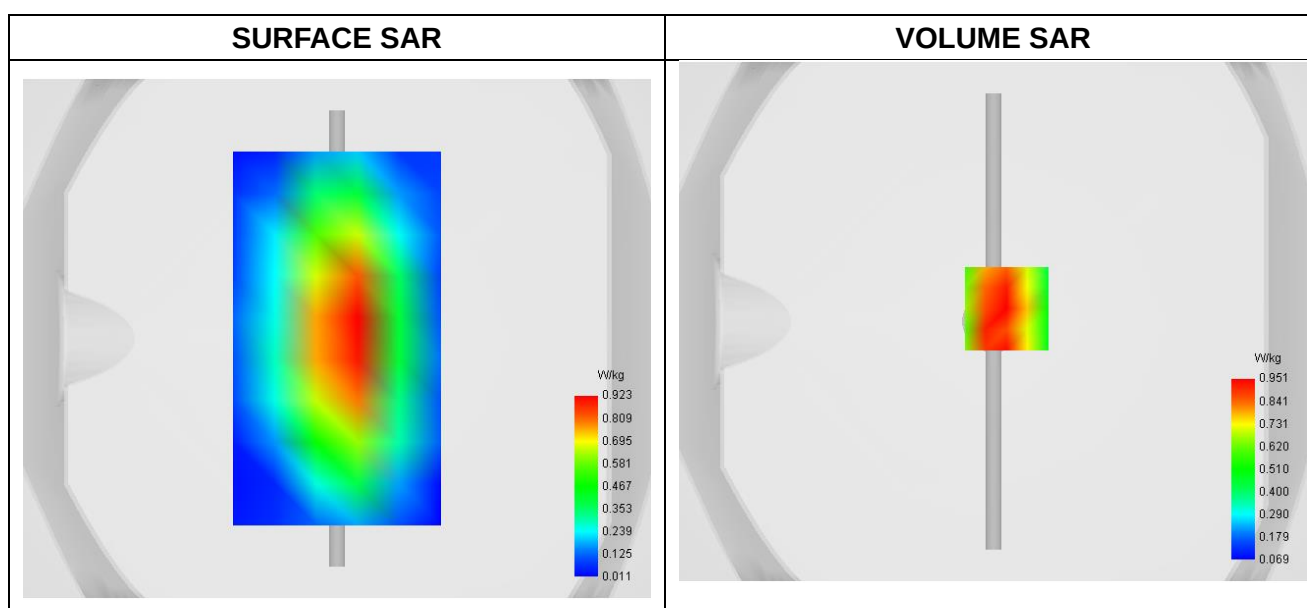
Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 2022.10.13

Experimental conditions.

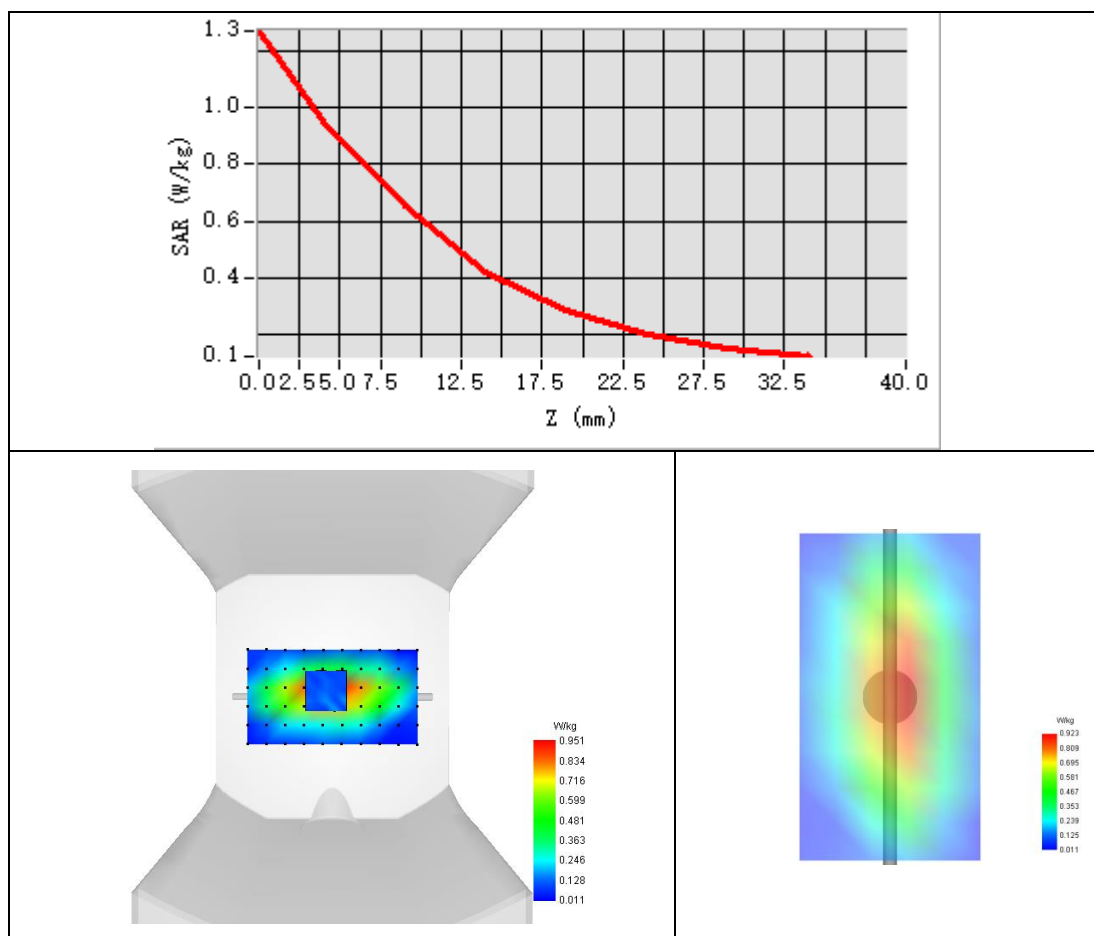
Phantom	Validation plane
Device Position	Dipole
Band	CW750
Channels	Middle
Signal	CW
Frequency (MHz)	750.000
Relative permittivity	41.900
Conductivity (S/m)	0.890
Probe	SN 04/22 EPGO364
ConvF	1.69
Crest factor:	1:1



Maximum location: X=5.00, Y=5.00 ; SAR Peak: 1.42 W/kg

SAR 10g (W/Kg)	0.575
SAR 1g (W/Kg)	0.900

Z Axis Scan





System Performance Check Data (835MHz)

Type: Phone measurement (Complete)

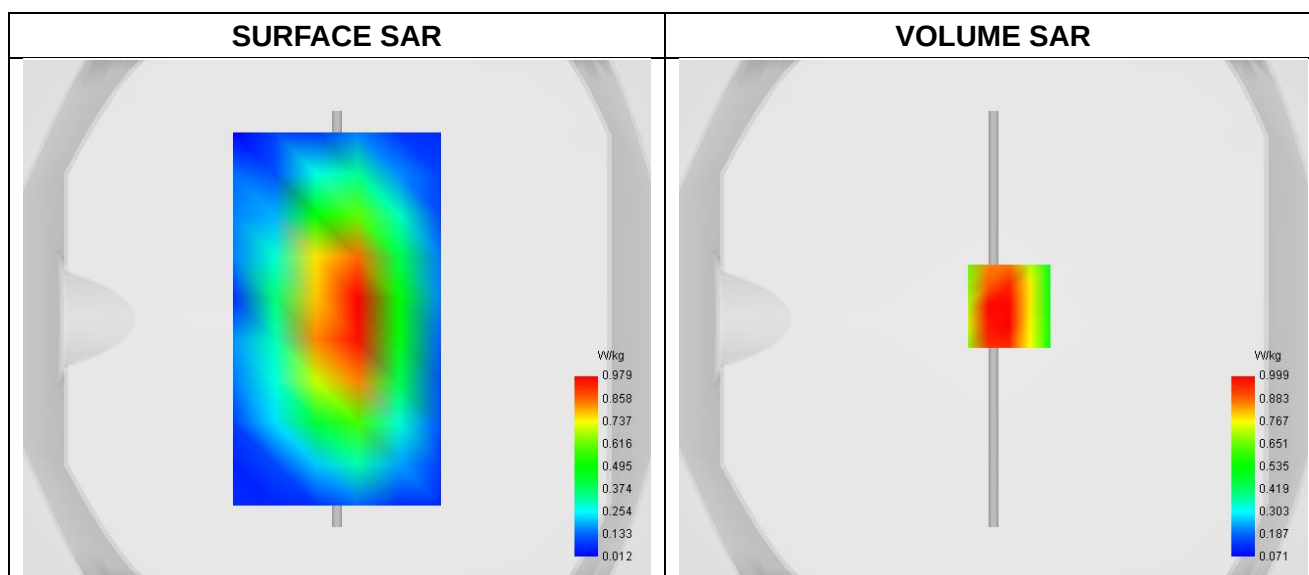
Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 2022.10.13

Experimental conditions.

Phantom	Validation plane
Device Position	Dipole
Band	CW835
Channels	Middle
Signal	CW
Frequency (MHz)	835.000
Relative permittivity	41.500
Conductivity (S/m)	0.900
Probe	SN 04/22 EPGO364
ConvF	1.72
Crest factor:	1:1

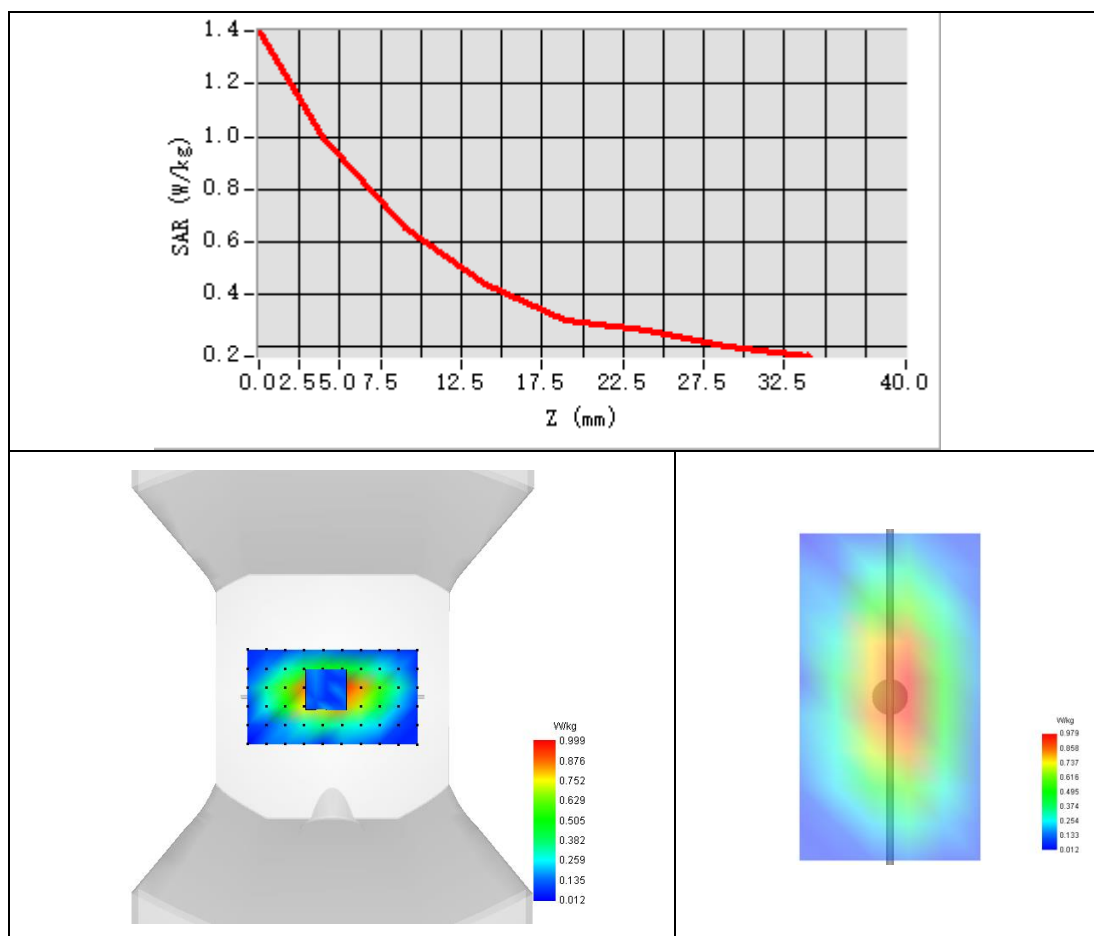


Maximum location: X=5.00, Y=1.00 ; SAR Peak: 1.42 W/kg

SAR 10g (W/Kg)	0.616
SAR 1g (W/Kg)	0.980



Z Axis Scan





System Performance Check Data (1800MHz)

Type: Phone measurement (Complete)

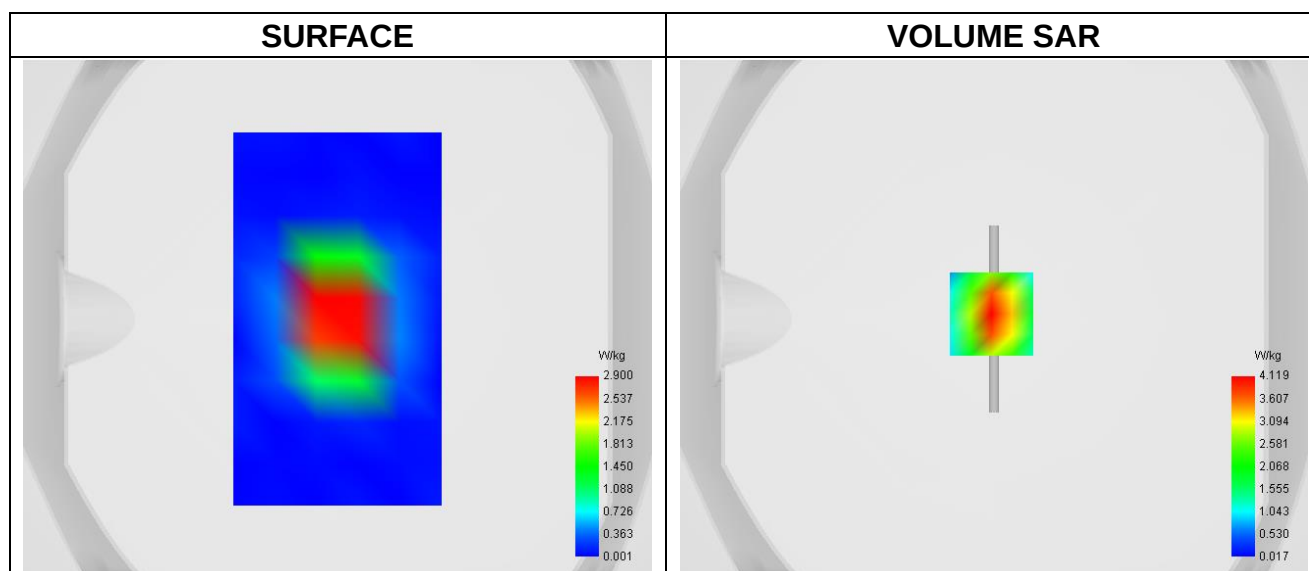
Area scan resolution: dx=8mm, dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement:2022.10.14

Experimental conditions.

Phantom	Validation plane
Device Position	Dipole
Band	CW1800
Channels	Middle
Signal	CW
Frequency (MHz)	1800.000
Relative permittivity	40.000
Conductivity (S/m)	1.400
Probe	SN 04/22 EPG0364
ConvF	1.95
Crest factor:	1:1

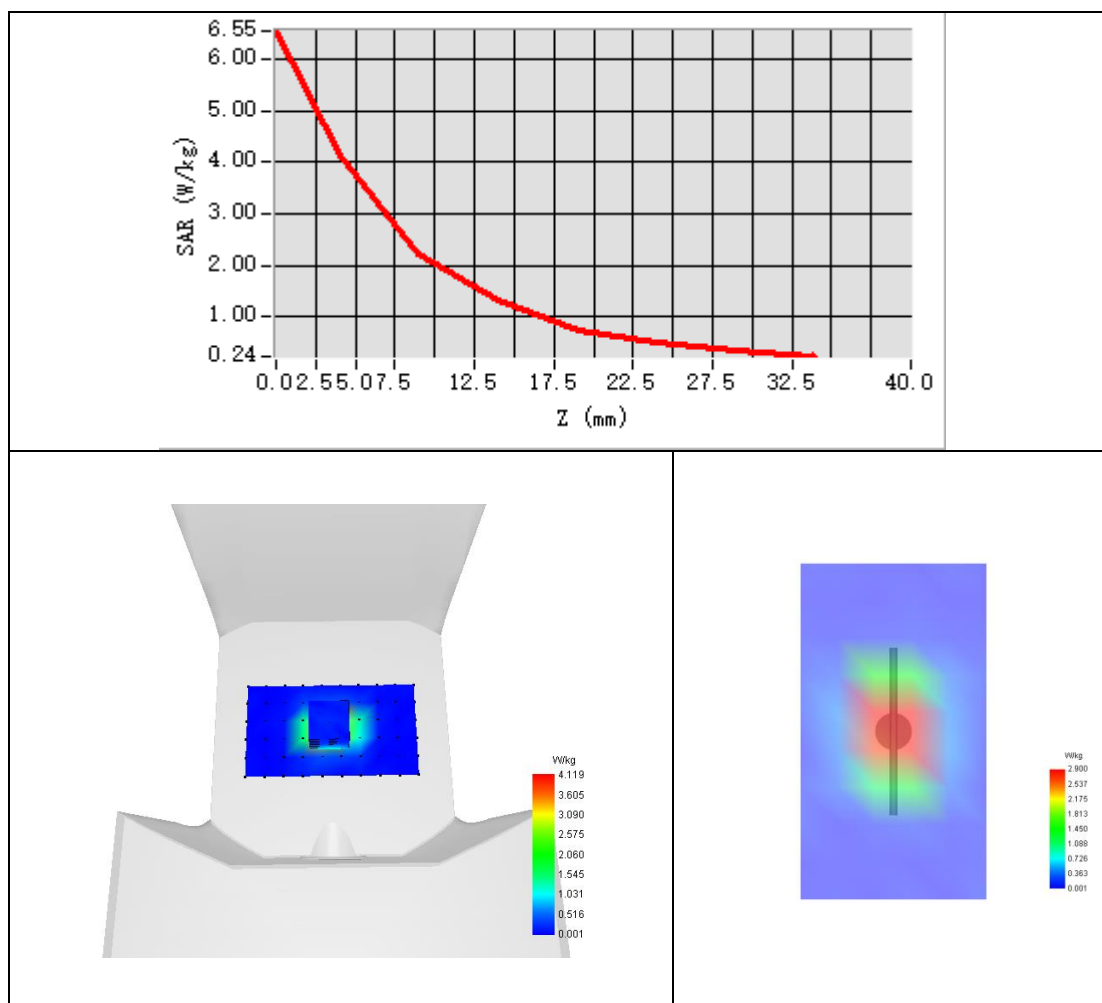


Maximum location: X=-1.00, Y=2.00 ; SAR Peak: 6.53 W/kg

SAR 10g (W/Kg)	2.010
SAR 1g (W/Kg)	3.871



Z Axis Scan





System Performance Check Data (1900MHz)

Type: Phone measurement (Complete)

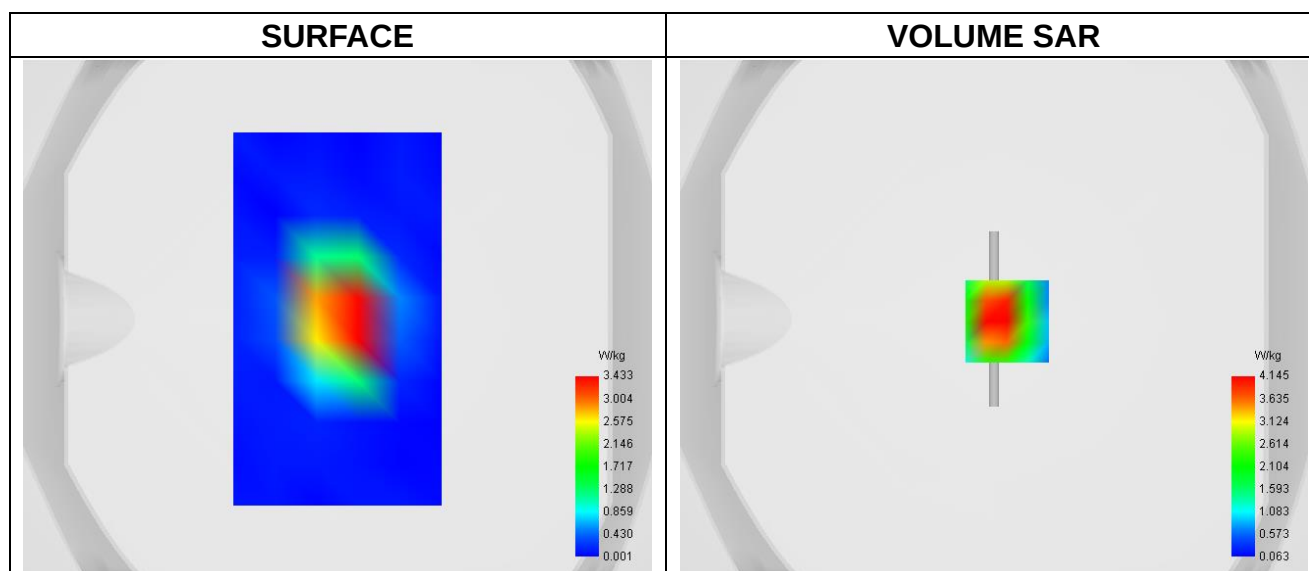
Area scan resolution: dx=8mm, dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement:2022.10.15

Experimental conditions.

Phantom	Validation plane
Device Position	Dipole
Band	CW1900
Channels	Middle
Signal	CW
Frequency (MHz)	1900.000
Relative permittivity	40.000
Conductivity (S/m)	1.400
Probe	SN 04/22 EPG0364
ConvF	2.25
Crest factor:	1:1

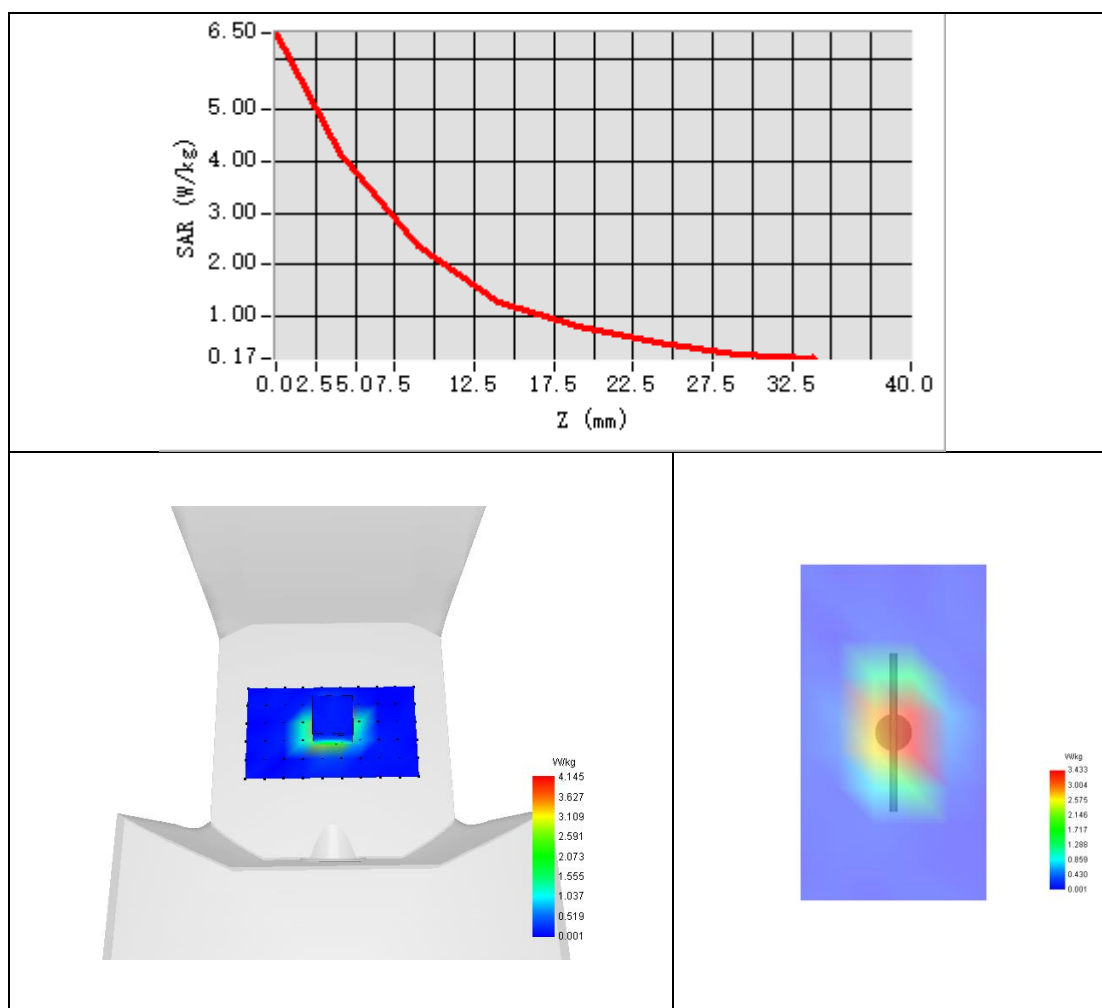


Maximum location: X=5.00, Y=-1.00 ; SAR Peak: 7.28 W/kg

SAR 10g (W/Kg)	2.105
SAR 1g (W/Kg)	4.220



Z Axis Scan





System Performance Check Data (2450MHz)

Type: Phone measurement (Complete)

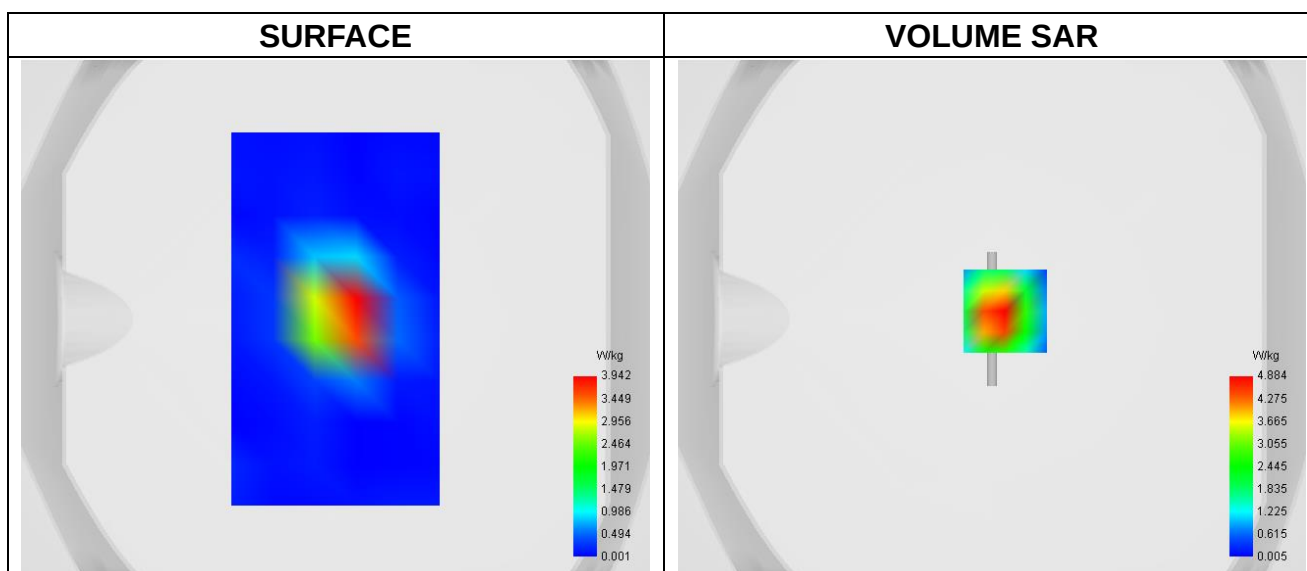
Area scan resolution: dx=8mm, dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement:2022.10.29

Experimental conditions.

Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Channels	Middle
Signal	CW
Frequency (MHz)	2450.000
Relative permittivity	39.200
Conductivity (S/m)	1.799
Probe	SN 04/22 EPG0364
ConvF	2.33
Crest factor:	1:1

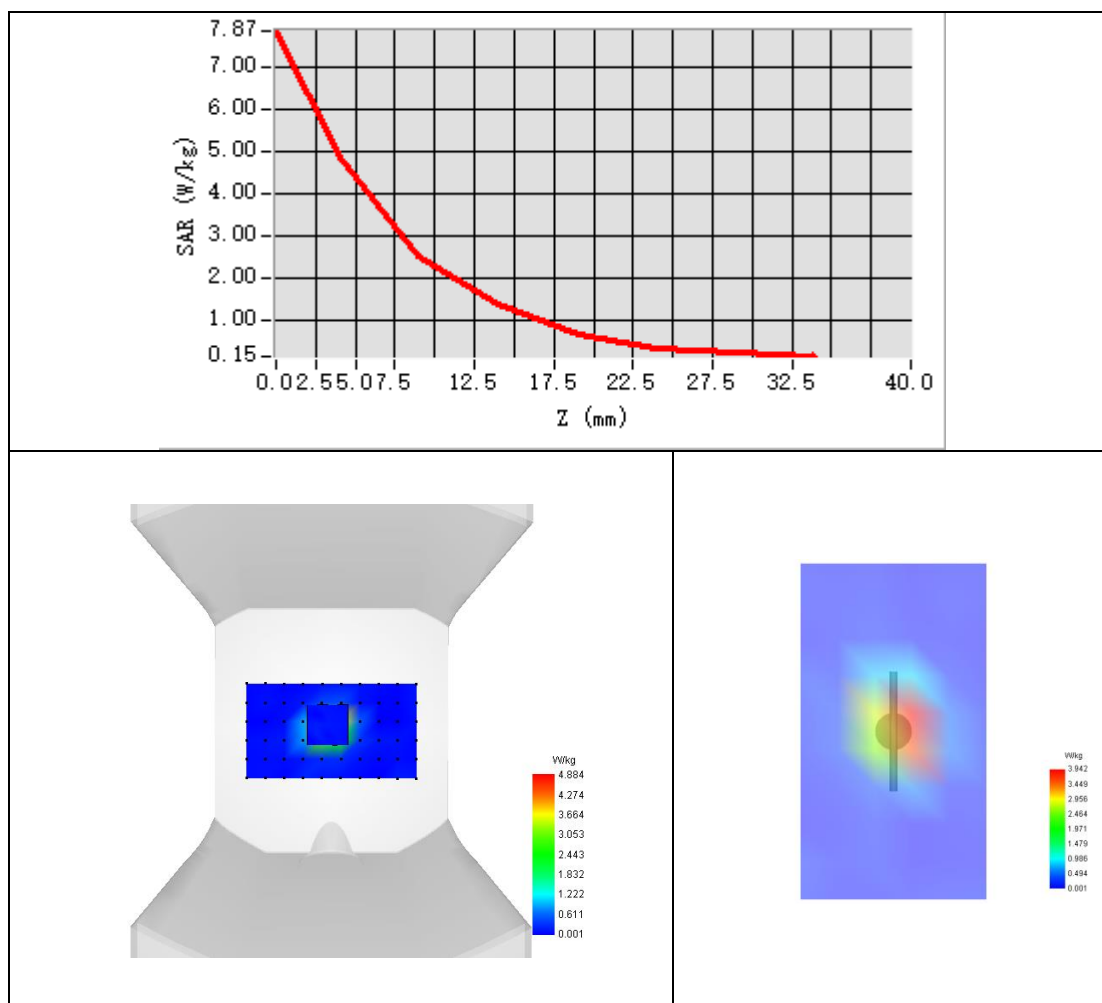


Maximum location: X=5.00, Y=3.00 ; SAR Peak: 8.28 W/kg

SAR 10g (W/Kg)	2.190
SAR 1g (W/Kg)	4.724



Z Axis Scan



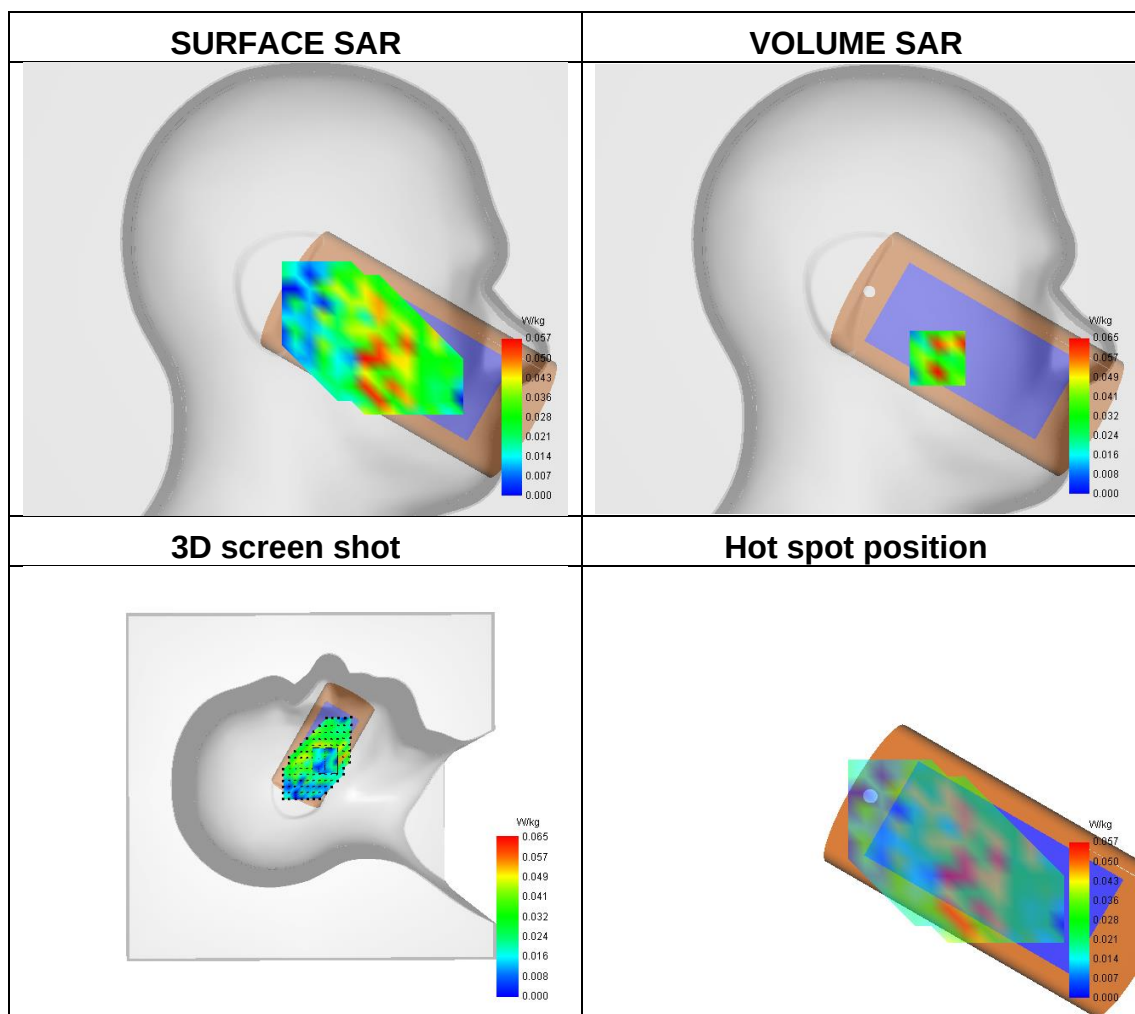


Appendix B. SAR Test Plots

Plot 1:

Test Date	2022-10-13
Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	GSM850
Signal	TDMA (GSM)
Frequency	836.600
SAR 10g (W/Kg)	0.035
SAR 1g (W/Kg)	0.060

Maximum location: X=-42.00, Y=-40.00 ; SAR Peak: 0.13 W/kg

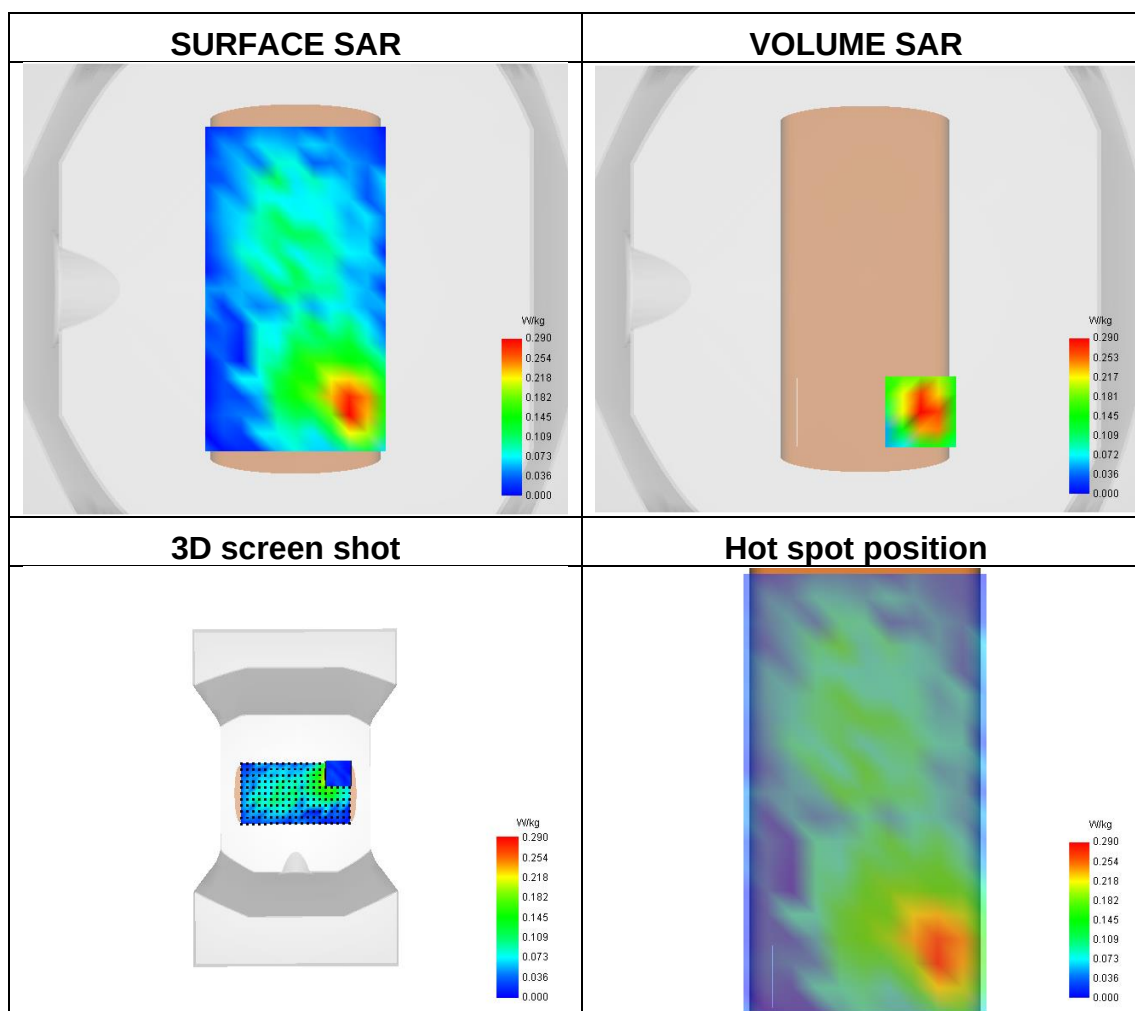




Plot 2:

Test Date	2022-10-13
Area Scan	surf_sam_plan.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	GPRS850
Signal	TDMA (GPRS)
Frequency	836.600
SAR 10g (W/Kg)	0.150
SAR 1g (W/Kg)	0.276

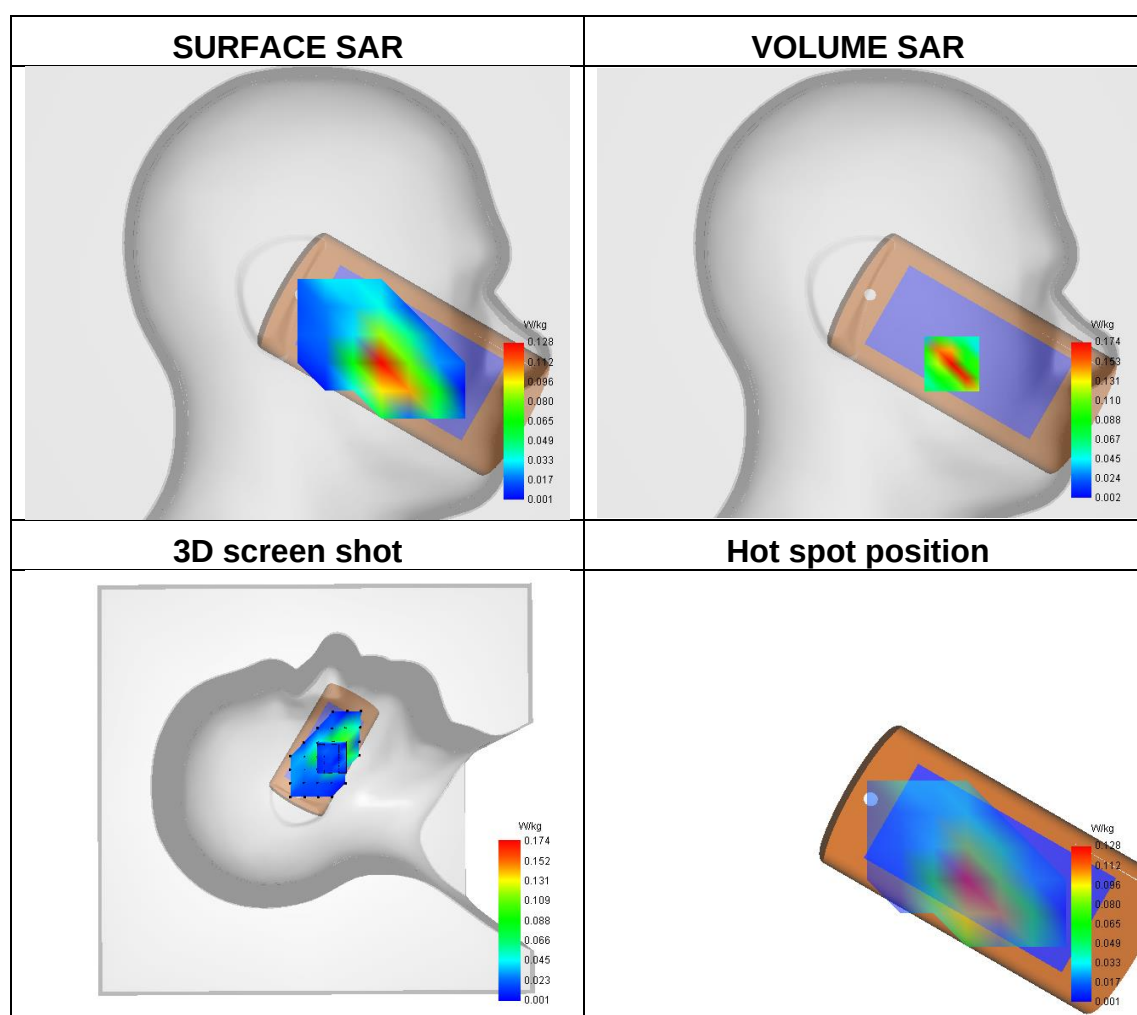
Maximum location: X=25.00, Y=-55.00 ; SAR Peak: 0.46 W/kg



Plot 3:

Test Date	2022-10-15
Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Tilt
Band	GSM1900
Signal	TDMA (GSM)
Frequency	1909.800
SAR 10g (W/Kg)	0.082
SAR 1g (W/Kg)	0.159

Maximum location: X=-49.00, Y=-41.00 ; SAR Peak: 0.33 W/kg

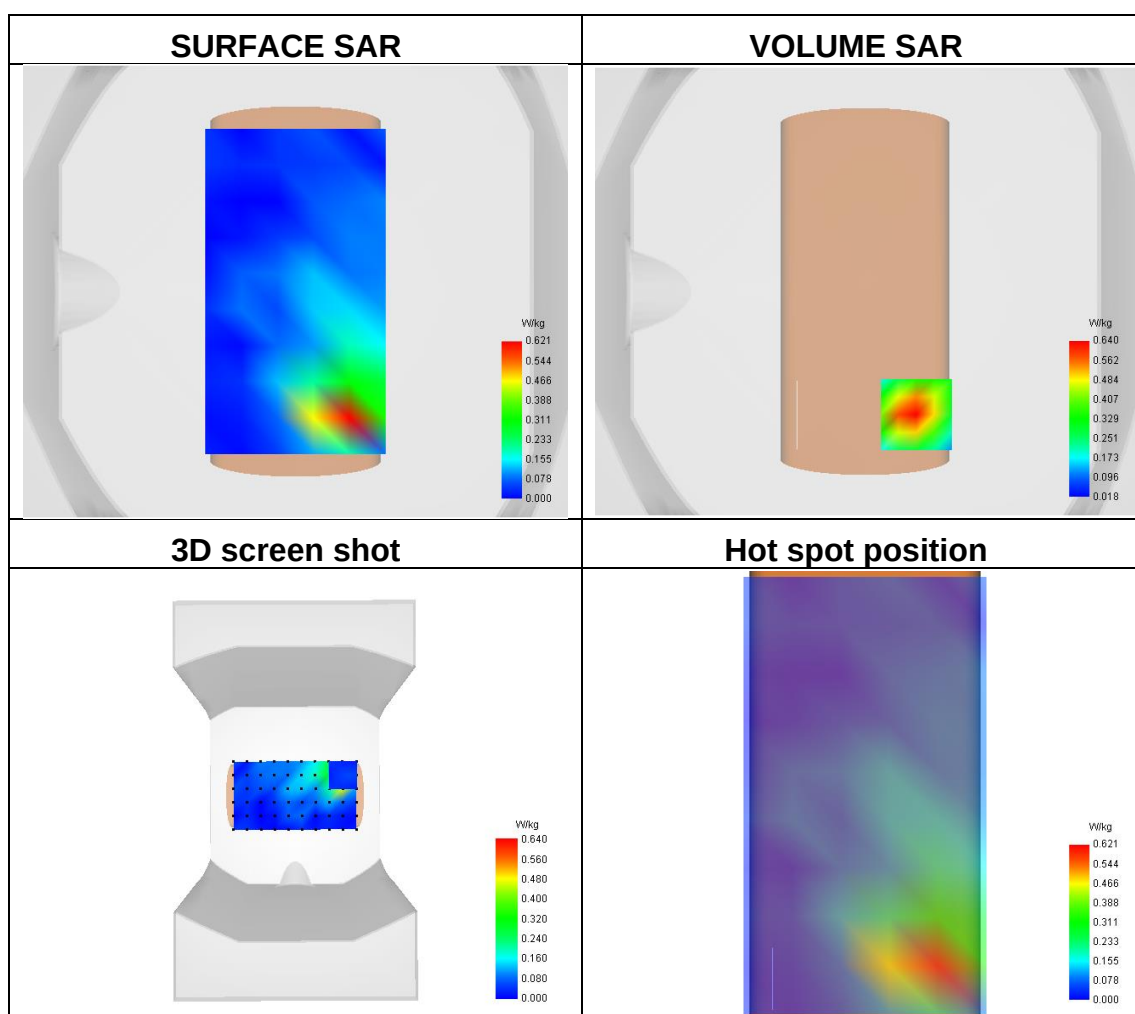




Plot 4:

Test Date	2022-10-15
Area Scan	surf_sam_plan.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	GPRS1900
Signal	TDMA (GPRS)
Frequency	1909.600
SAR 10g (W/Kg)	0.300
SAR 1g (W/Kg)	0.602

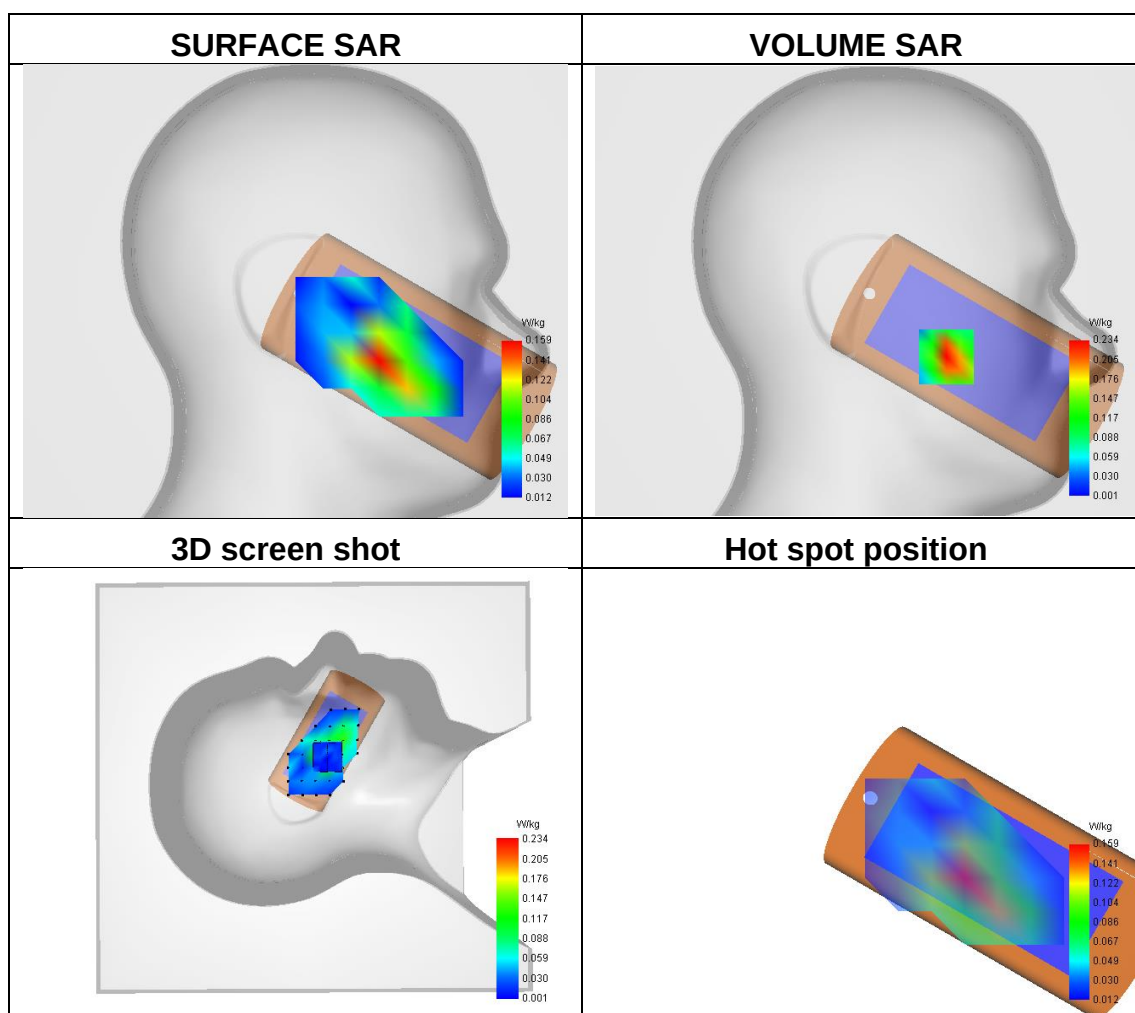
Maximum location: X=23.00, Y=-55.00 ; SAR Peak: 1.15 W/kg



Plot 5:

Test Date	2022-10-15
Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	Band 2 (1900)
Signal	WCDMA
Frequency	1907.600
SAR 10g (W/Kg)	0.105
SAR 1g (W/Kg)	0.223

Maximum location: X=-47.00, Y=-38.00 ; SAR Peak: 0.48 W/kg

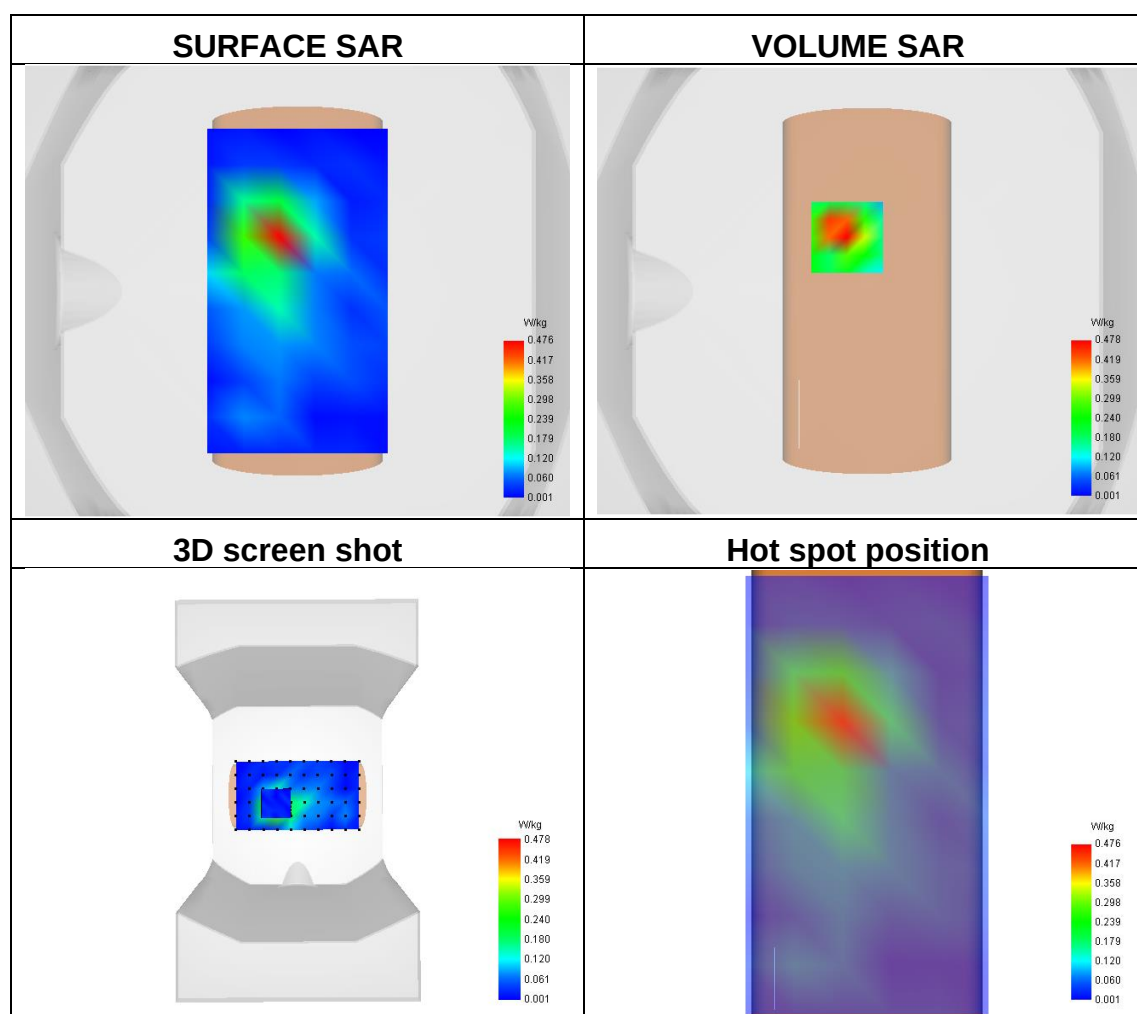




Plot 6:

Test Date	2022-10-15
Area Scan	surf_sam_plan.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	Band 2 (1900)
Signal	WCDMA
Frequency	1907.600
SAR 10g (W/Kg)	0.215
SAR 1g (W/Kg)	0.499

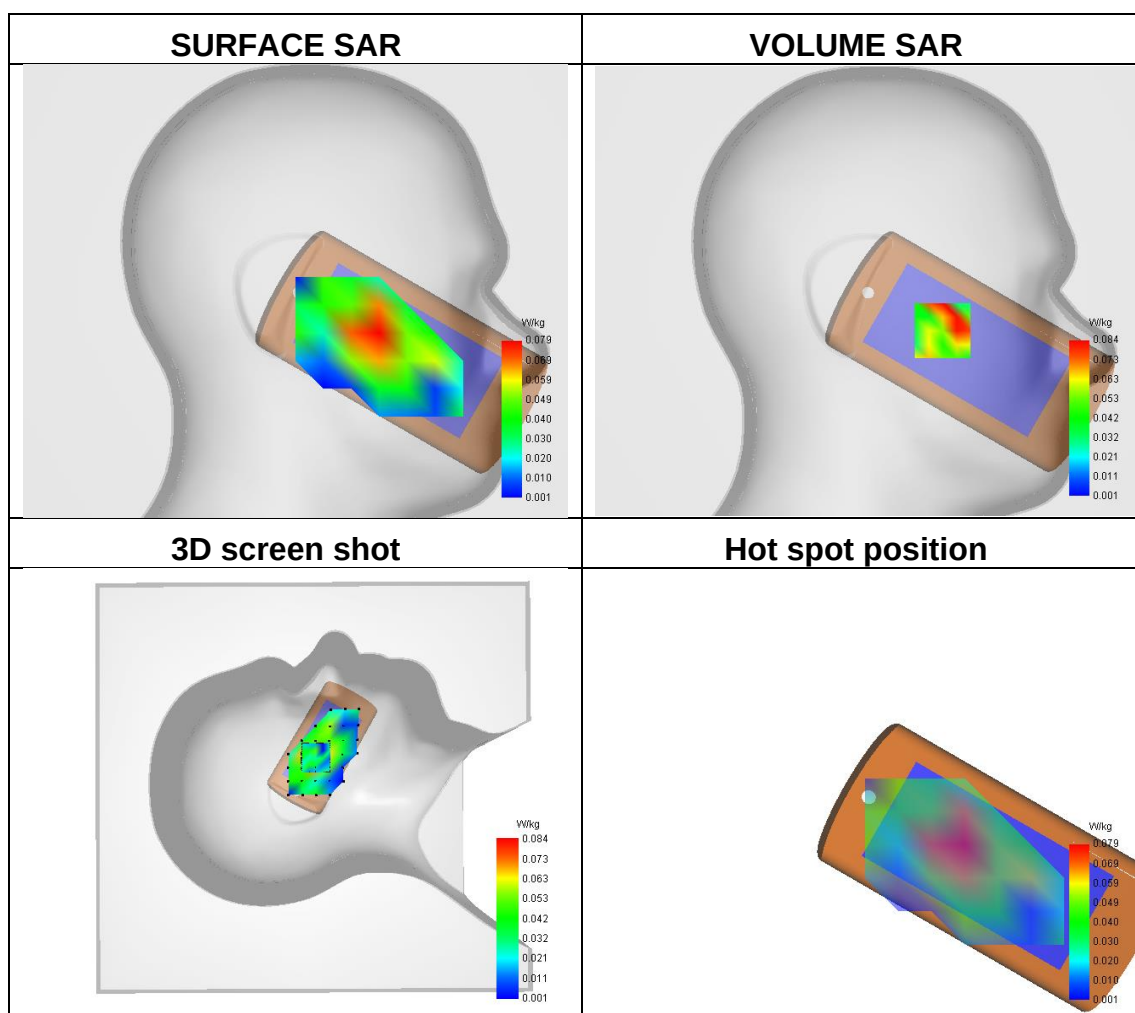
Maximum location: X=-9.00, Y=24.00 ; SAR Peak: 1.02 W/kg



Plot 7:

Test Date	2022-10-13
Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Tilt
Band	Band 5 (850)
Signal	WCDMA
Frequency	846.600
SAR 10g (W/Kg)	0.048
SAR 1g (W/Kg)	0.080

Maximum location: X=-45.00, Y=-23.00 ; SAR Peak: 0.18 W/kg

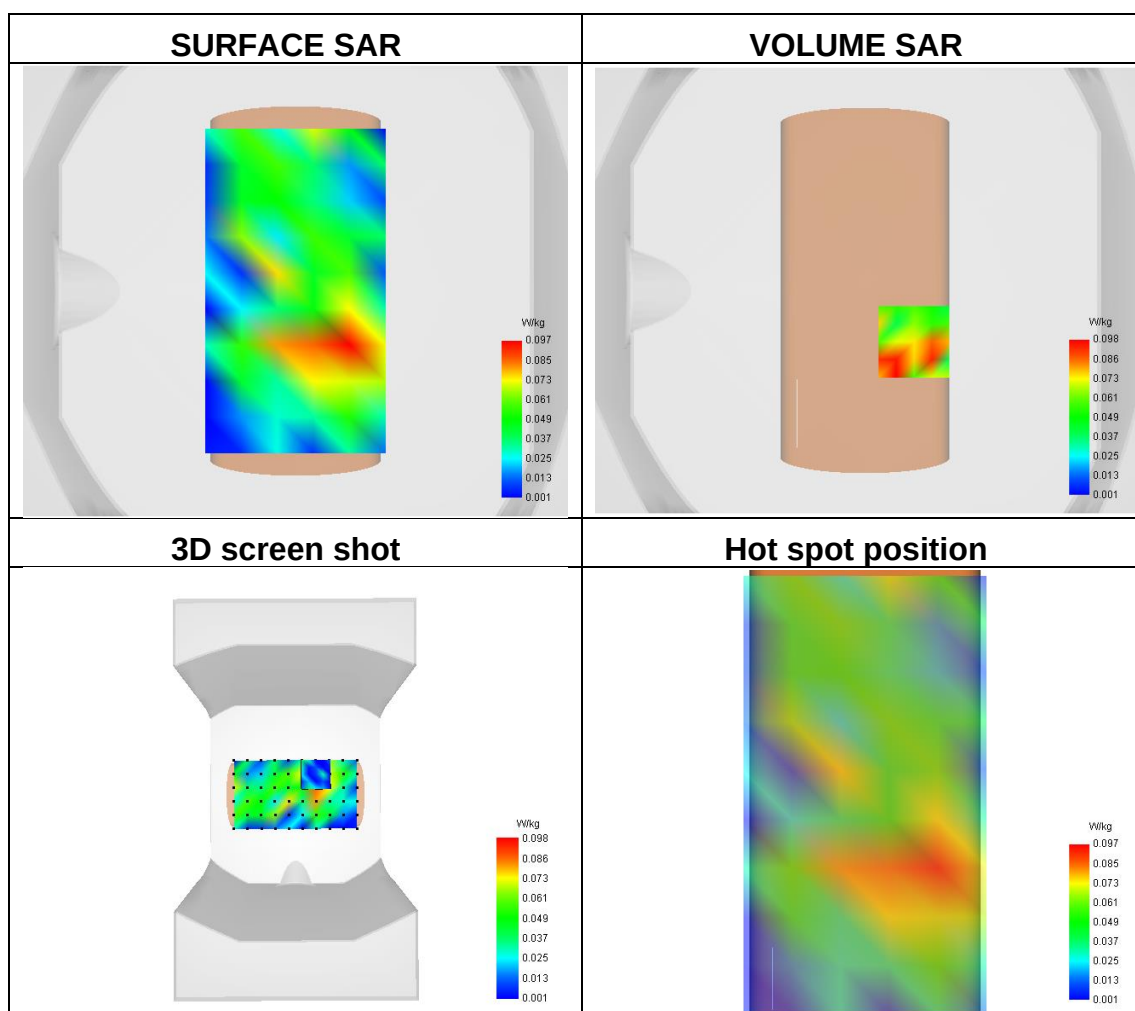




Plot 8:

Test Date	2022-10-13
Area Scan	surf_sam_plan.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	Band 5 (850)
Signal	WCDMA
Frequency	846.600
SAR 10g (W/Kg)	0.052
SAR 1g (W/Kg)	0.095

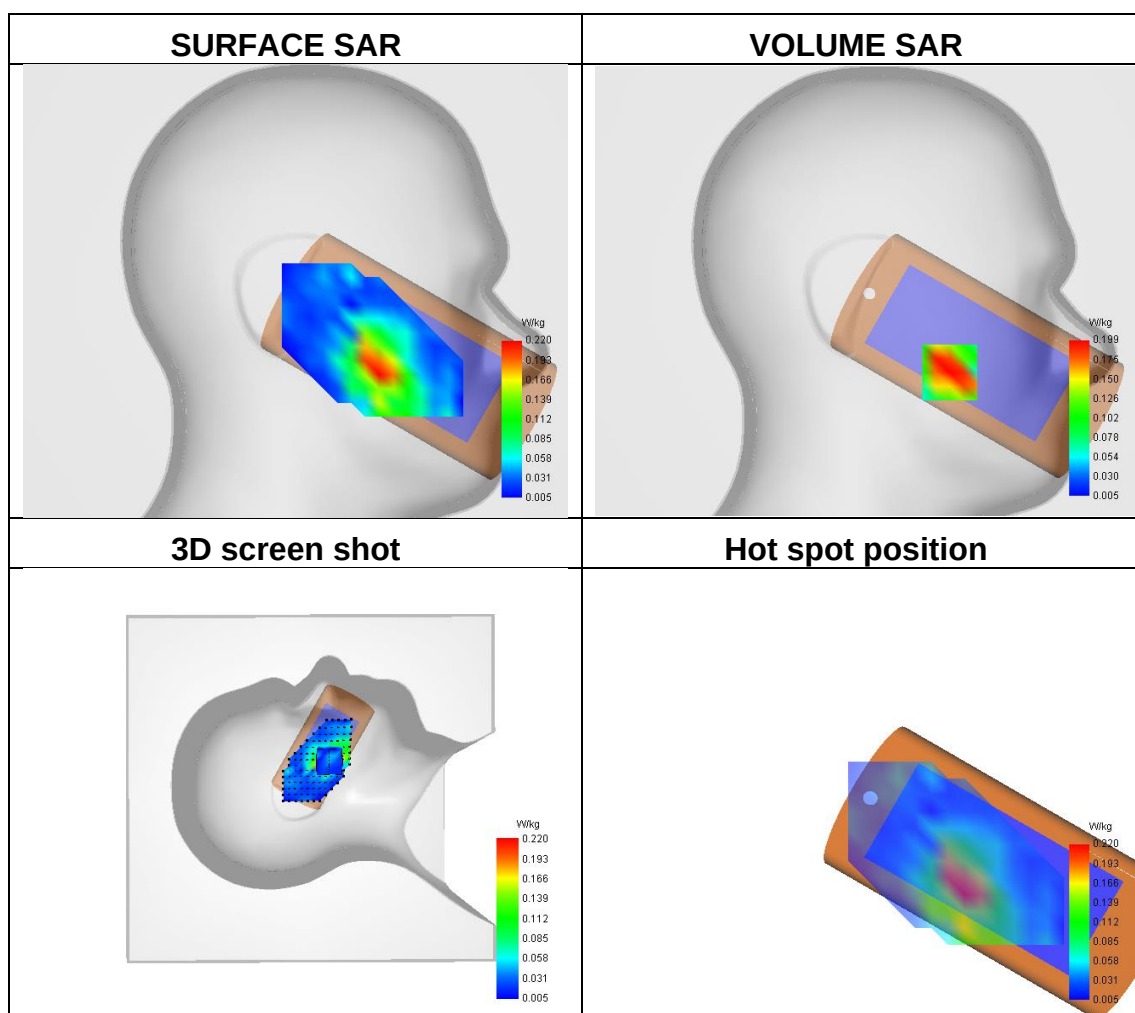
Maximum location: X=22.00, Y=-23.00 ; SAR Peak: 0.19 W/kg



Plot 9:

Test Date	2022-10-15
Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 2
Signal	LTE FDD
Frequency	1873.700
SAR 10g (W/Kg)	0.123
SAR 1g (W/Kg)	0.206

Maximum location: X=-49.00, Y=-47.00 ; SAR Peak: 0.37 W/kg

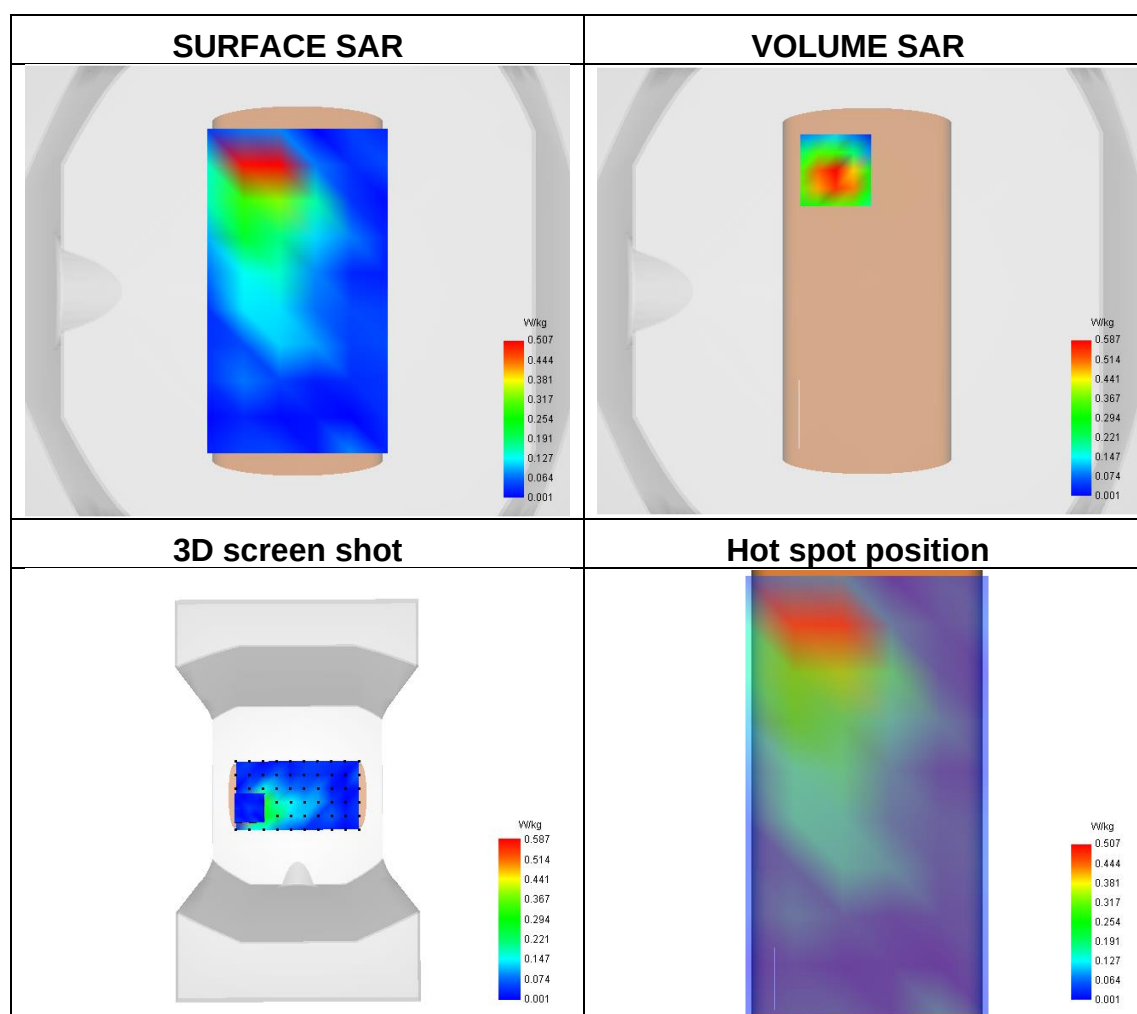




Plot 10:

Test Date	2022-10-15
Area Scan	surf_sam_plan.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 2
Signal	LTE FDD
Frequency	1893.700
SAR 10g (W/Kg)	0.283
SAR 1g (W/Kg)	0.577

Maximum location: X=-14.00, Y=54.00 ; SAR Peak: 1.01 W/kg

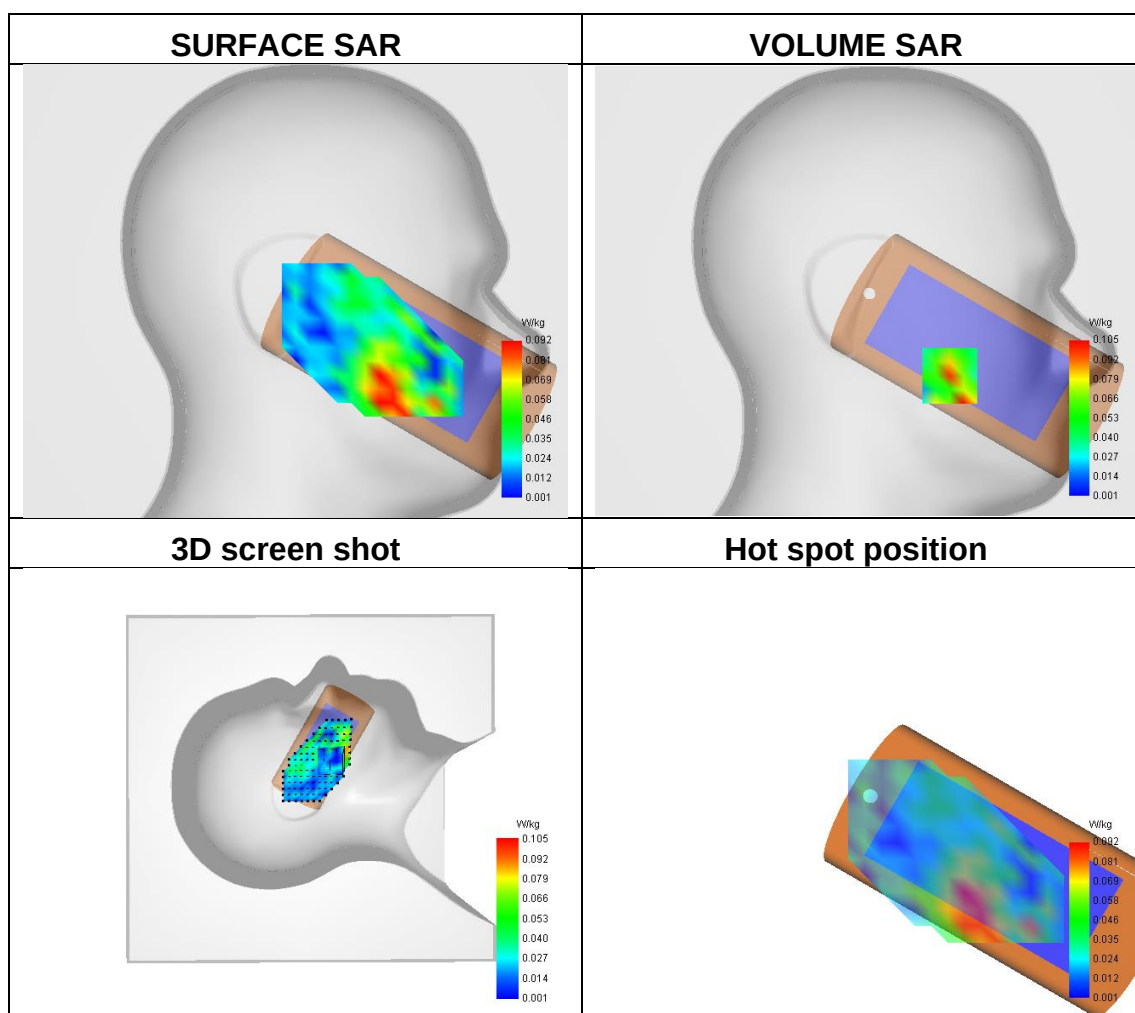




Plot 11:

Test Date	2022-10-14
Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 4
Signal	LTE FDD
Frequency	1726.200
SAR 10g (W/Kg)	0.053
SAR 1g (W/Kg)	0.081

Maximum location: X=-49.00, Y=-49.00 ; SAR Peak: 0.23 W/kg

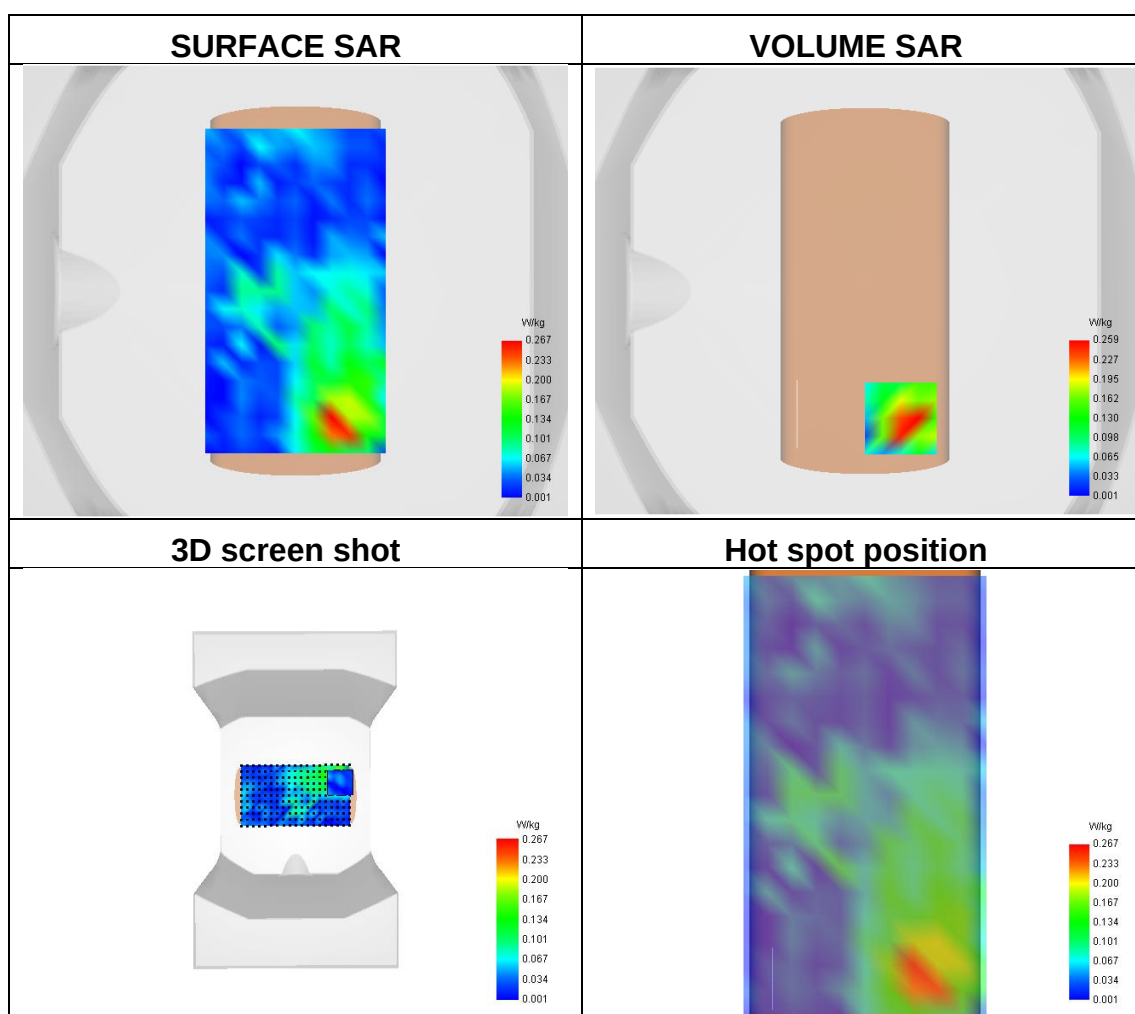




Plot 12:

Test Date	2022-10-14
Area Scan	surf_sam_plan.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 4
Signal	LTE FDD
Frequency	1726.200
SAR 10g (W/Kg)	0.134
SAR 1g (W/Kg)	0.263

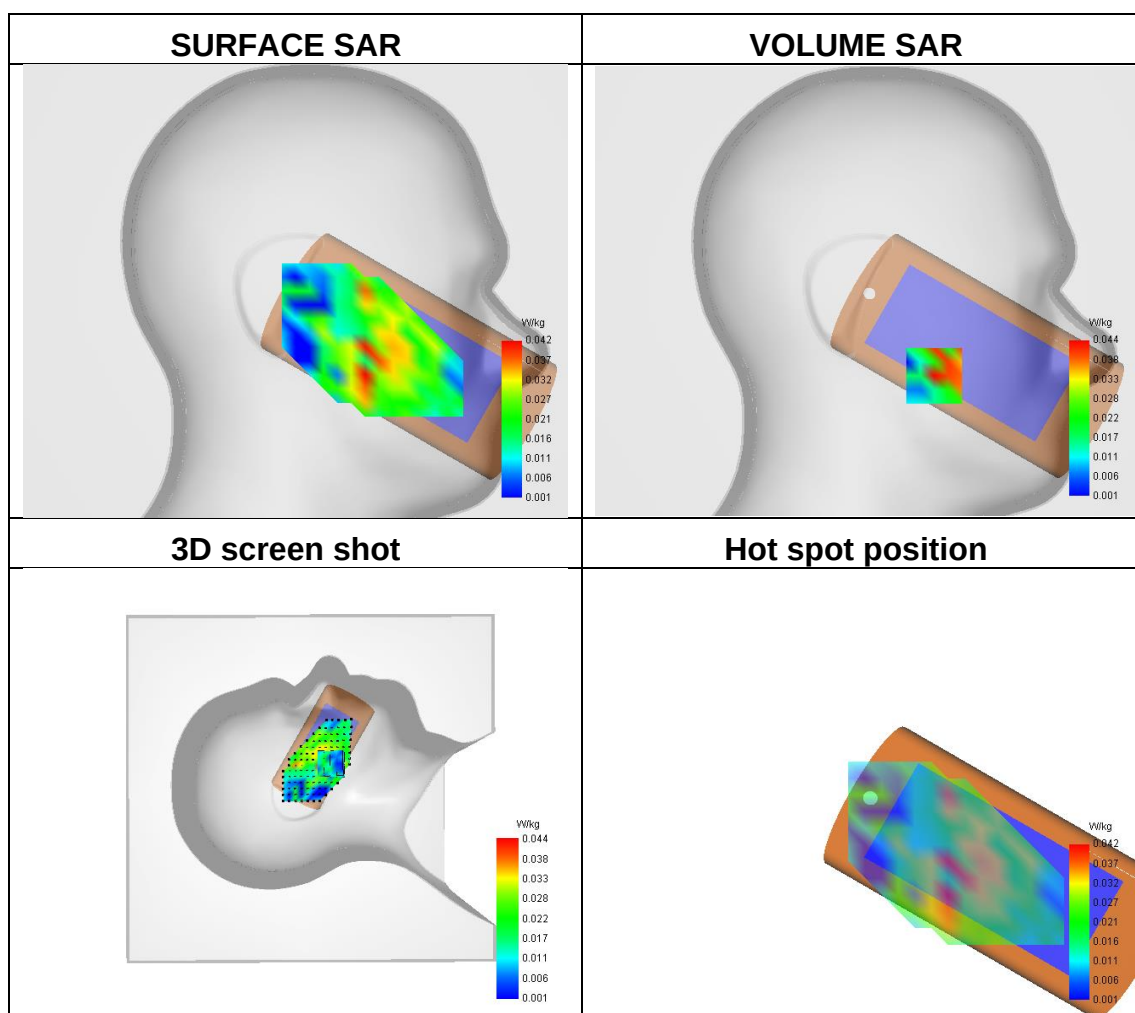
Maximum location: X=16.00, Y=-57.00 ; SAR Peak: 0.51 W/kg



Plot 13:

Test Date	2022-10-13
Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 5
Signal	LTE FDD
Frequency	834.700
SAR 10g (W/Kg)	0.026
SAR 1g (W/Kg)	0.045

Maximum location: X=-40.00, Y=-49.00 ; SAR Peak: 0.10 W/kg

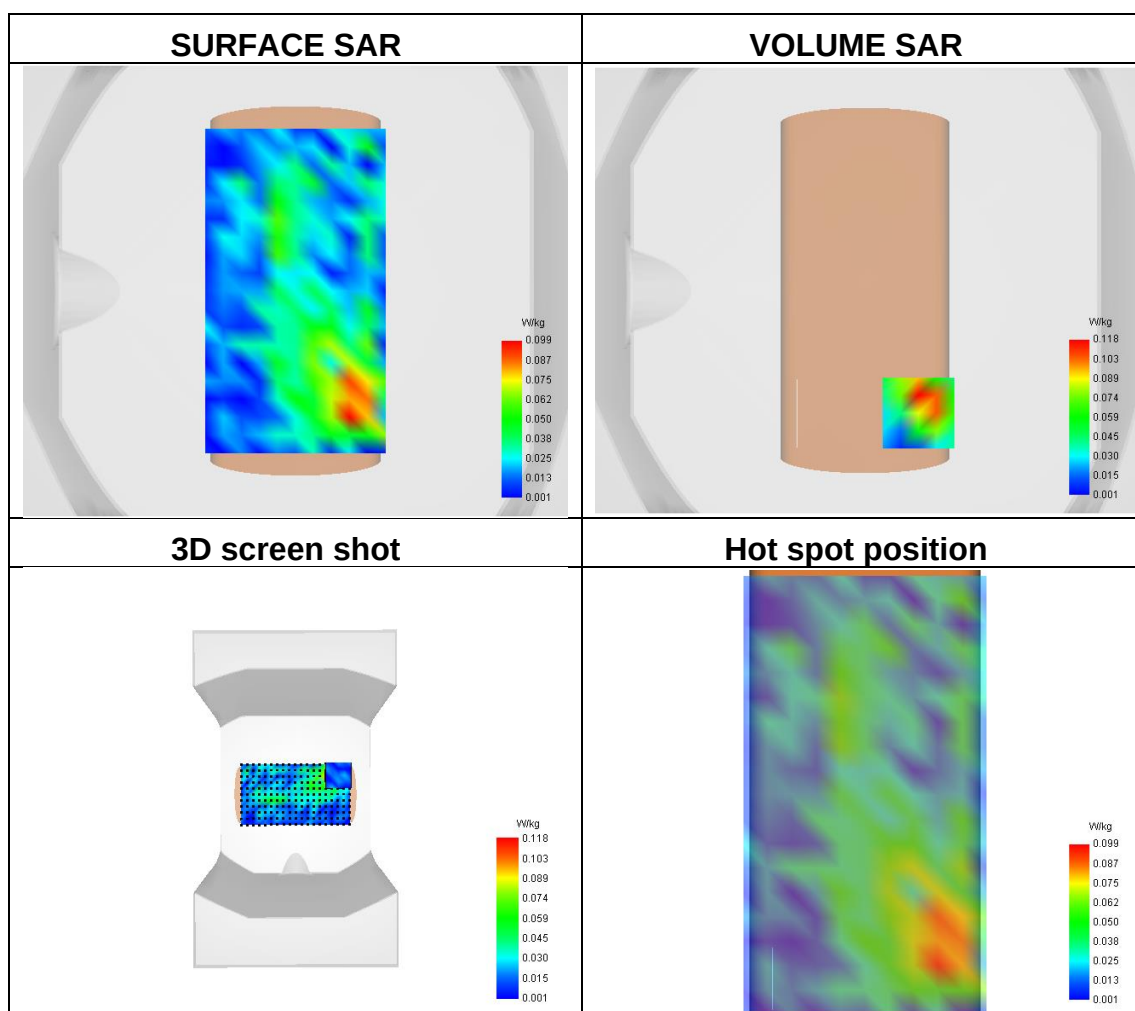




Plot 14:

Test Date	202210-13
Area Scan	surf_sam_plan.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 5
Signal	LTE FDD
Frequency	834.700
SAR 10g (W/Kg)	0.057
SAR 1g (W/Kg)	0.121

Maximum location: X=24.00, Y=-55.00 ; SAR Peak: 0.25 W/kg

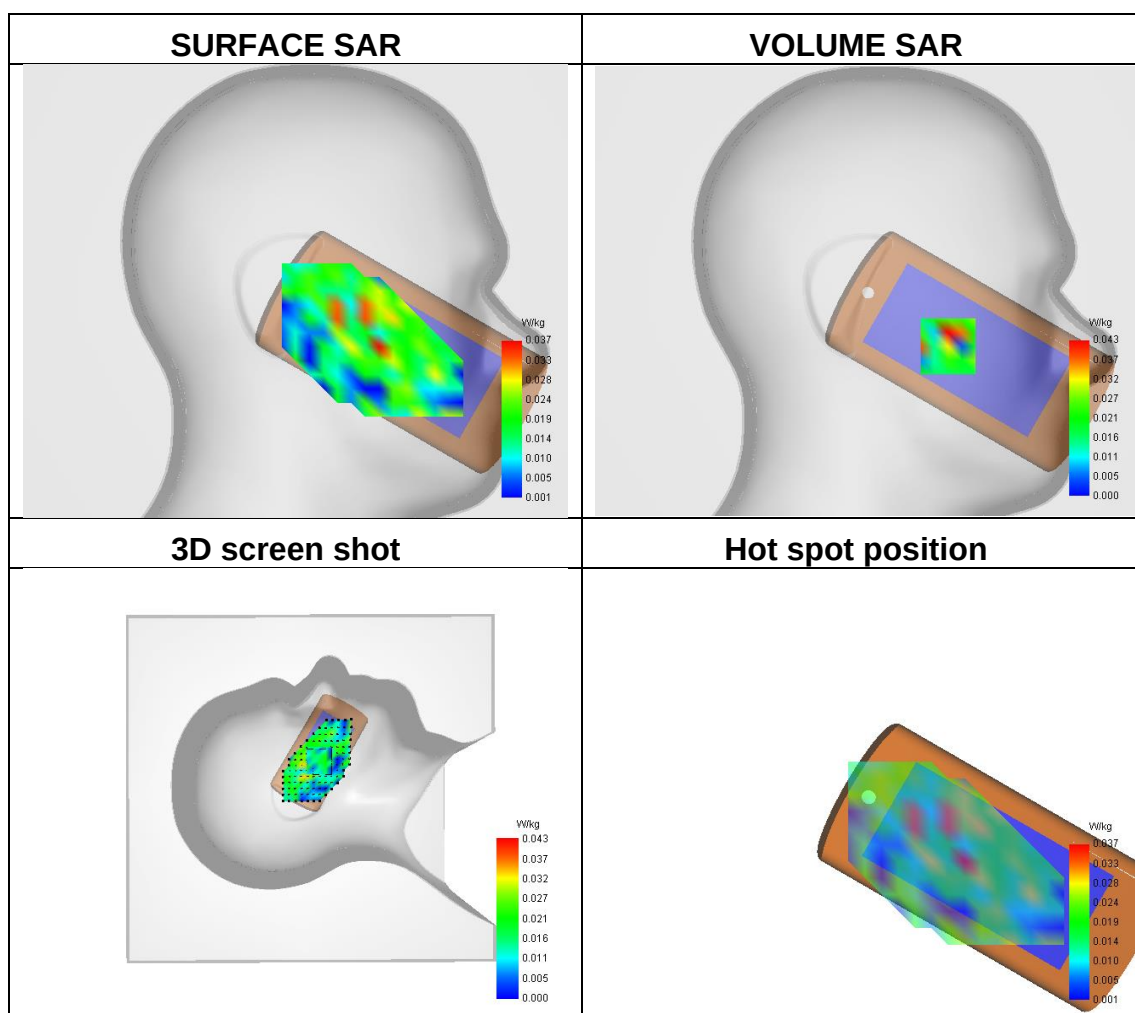




Plot 15:

Test Date	2022-10-13
Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Tilt
Band	LTE band 12
Signal	LTE FDD
Frequency	705.700
SAR 10g (W/Kg)	0.020
SAR 1g (W/Kg)	0.043

Maximum location: X=-48.00, Y=-32.00 ; SAR Peak: 0.10 W/kg

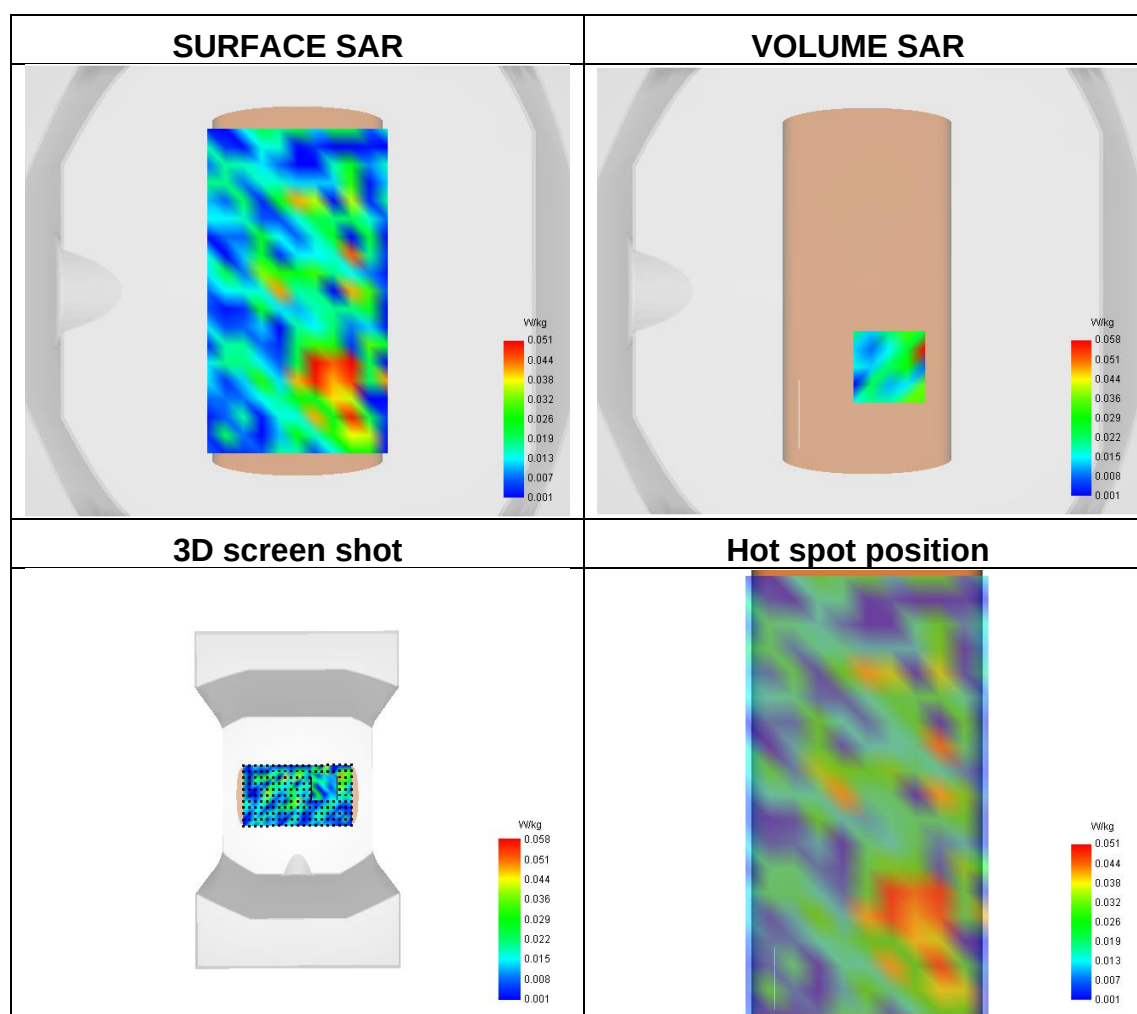




Plot 16:

Test Date	2022-10-13
Area Scan	surf_sam_plan.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 12
Signal	LTE FDD
Frequency	705.700
SAR 10g (W/Kg)	0.021
SAR 1g (W/Kg)	0.044

Maximum location: X=10.00, Y=-34.00 ; SAR Peak: 0.13 W/kg

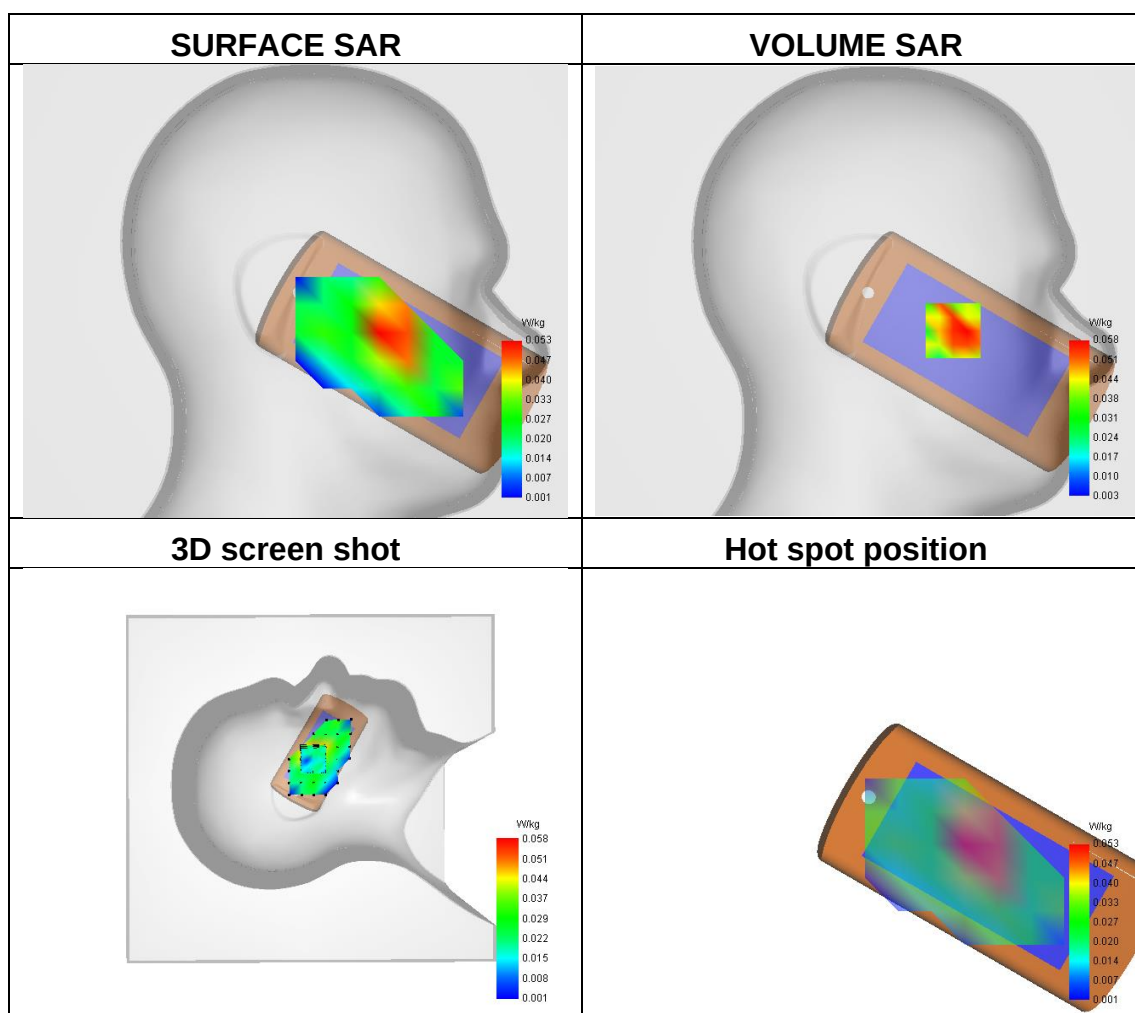




Plot 17:

Test Date	2022-10-13
Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Tilt
Band	LTE band 13
Signal	LTE FDD
Frequency	780.200
SAR 10g (W/Kg)	0.040
SAR 1g (W/Kg)	0.061

Maximum location: X=-51.00, Y=-23.00 ; SAR Peak: 0.12 W/kg

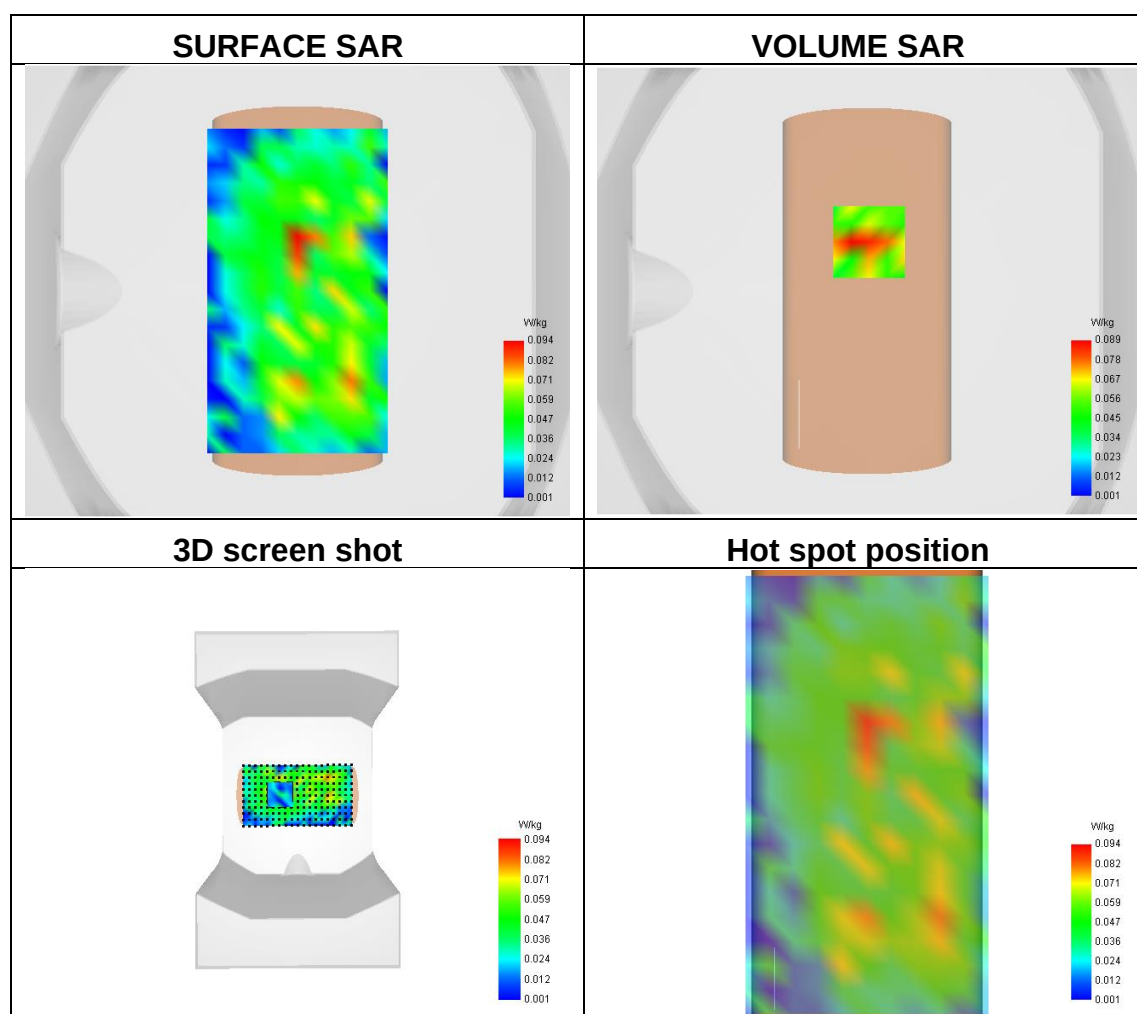




Plot 18:

Test Date	2022.10.13
Area Scan	surf_sam_plan.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 13
Signal	LTE FDD
Frequency	780.200
SAR 10g (W/Kg)	0.050
SAR 1g (W/Kg)	0.090

Maximum location: X=1.00, Y=22.00 ; SAR Peak: 0.20 W/kg

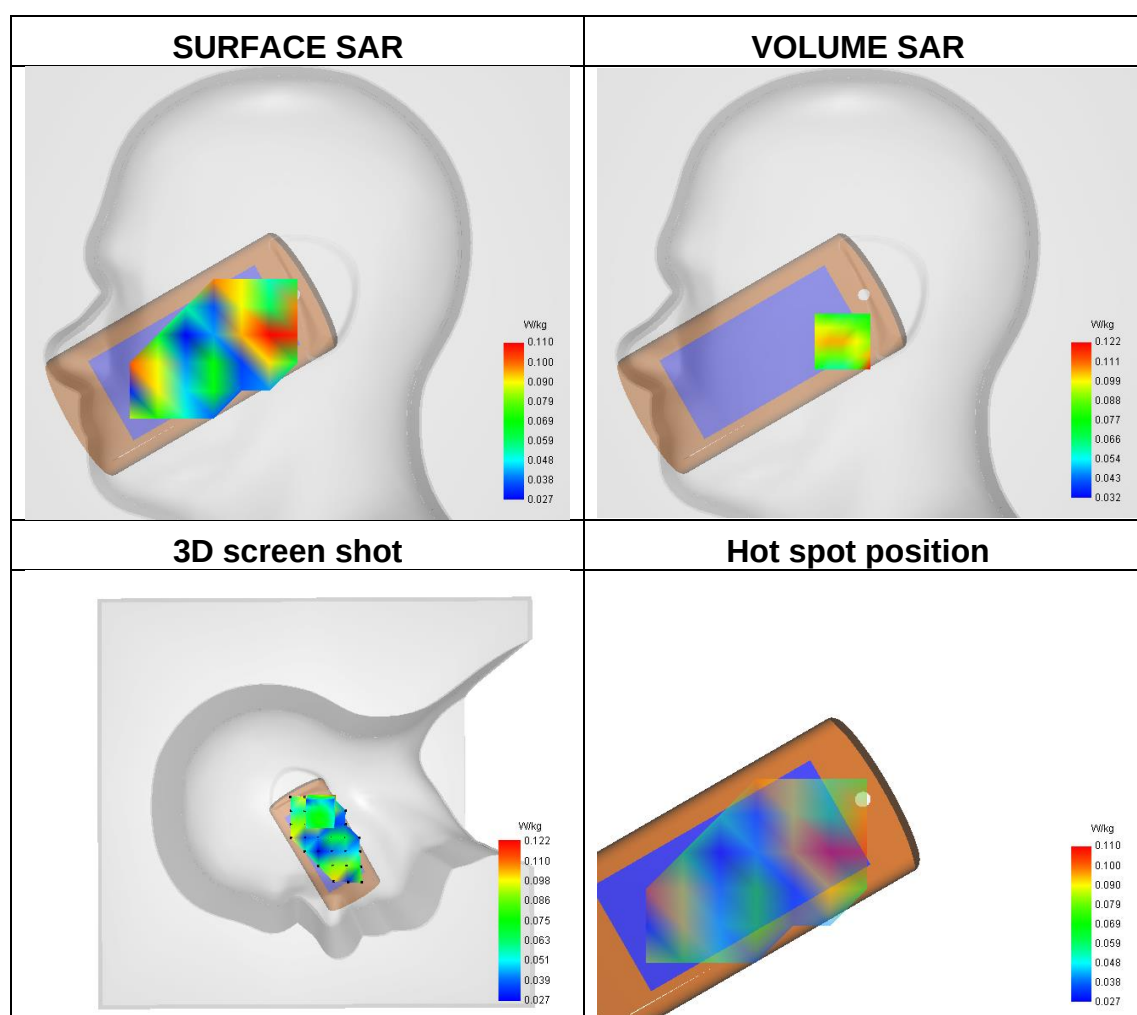




Plot 19:

Test Date	2022.10.29
Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Right head
Device Position	Tilt
Band	IEEE 802.11n ISM
Signal	IEEE 802.11
Frequency	2422.000
SAR 10g (W/Kg)	0.077
SAR 1g (W/Kg)	0.108

Maximum location: X=-14.00, Y=-28.00 ; SAR Peak: 0.19 W/kg

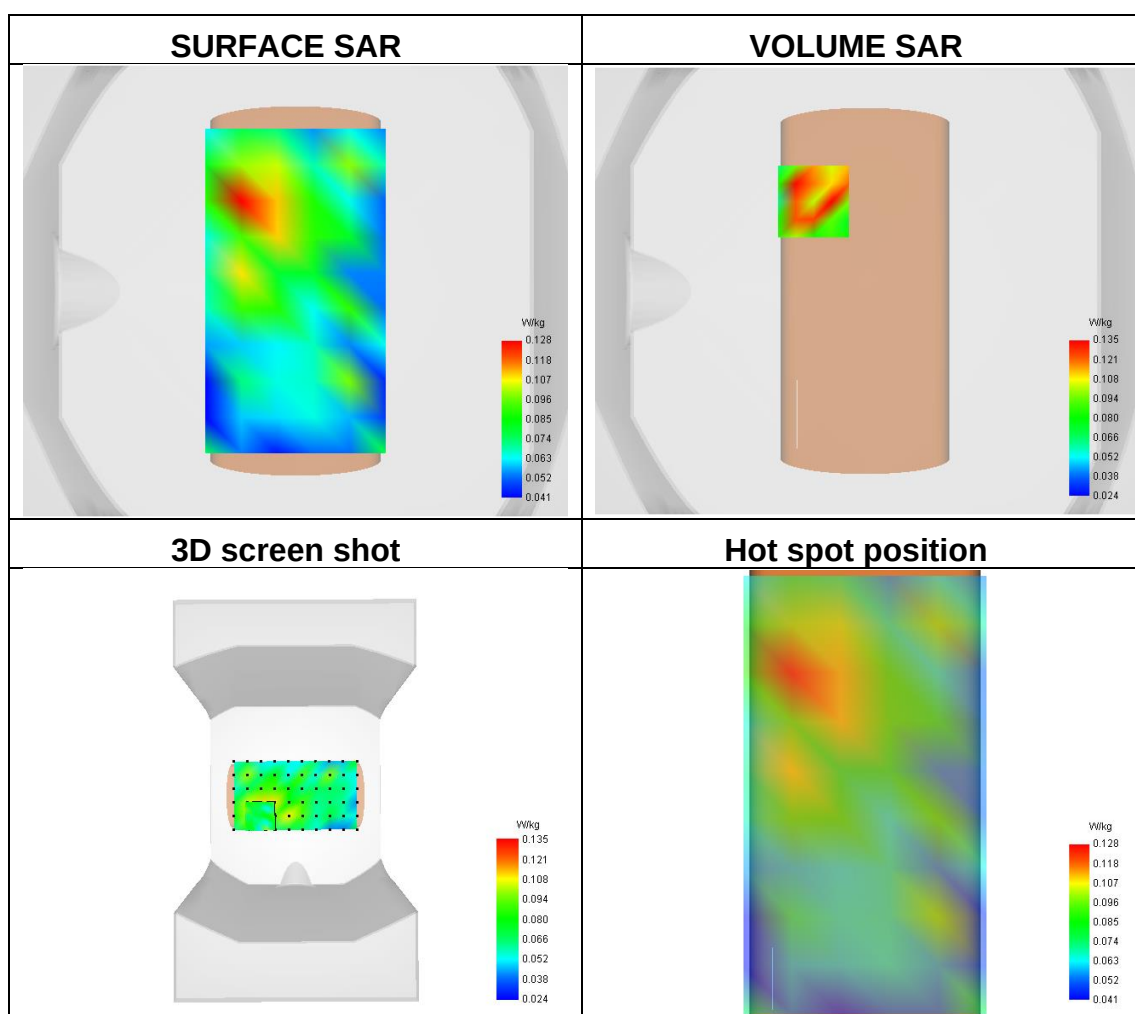




Plot 20:

Test Date	2022.10.29
Area Scan	surf_sam_plan.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11n ISM
Signal	IEEE 802.11
Frequency	2422.000
SAR 10g (W/Kg)	0.022
SAR 1g (W/Kg)	0.049

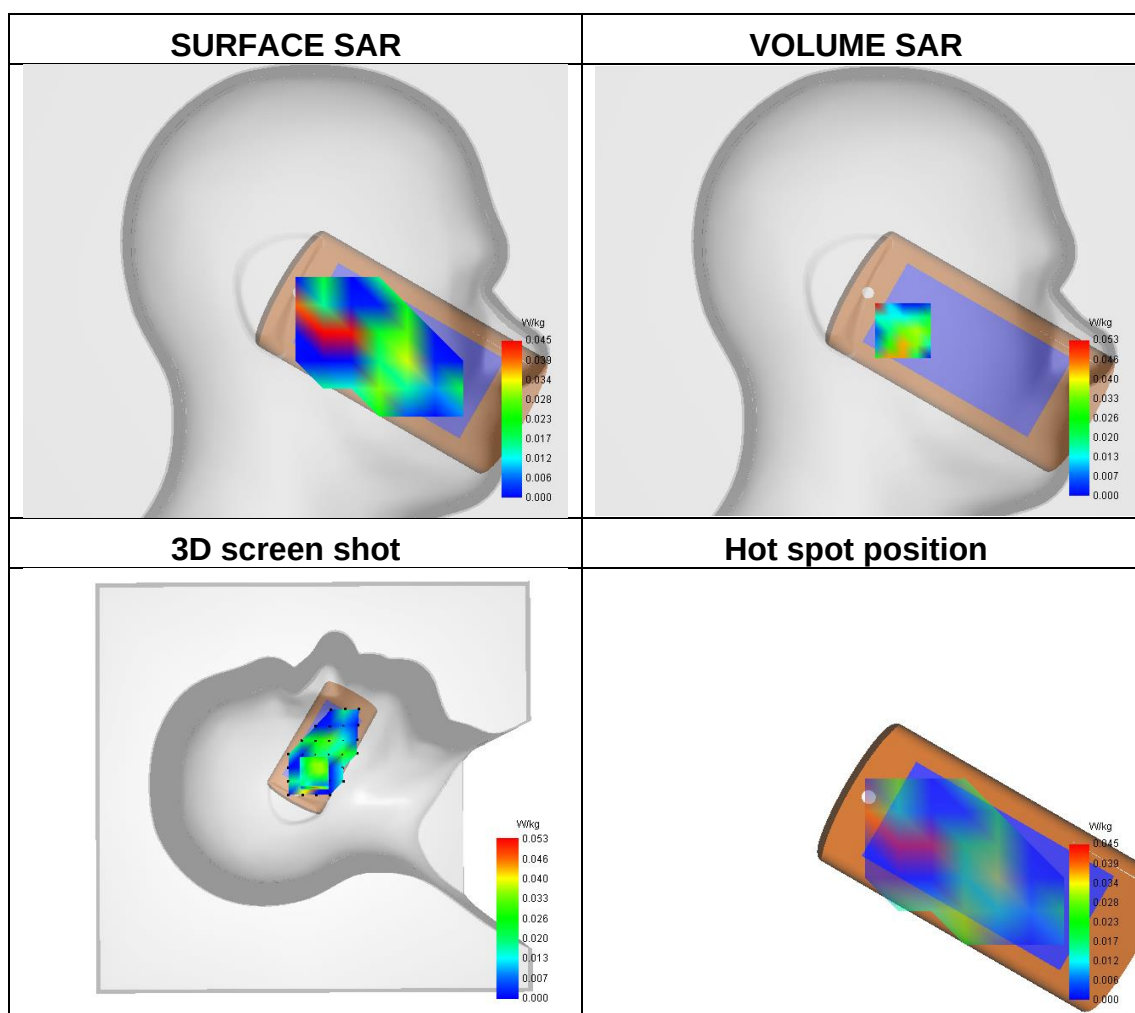
Maximum location: X=-23.00, Y=40.00 ; SAR Peak: 0.33 W/kg



Plot 21:

Test Date	2022-10-29
Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Tilt
Band	Bluetooth
Signal	Bluetooth
Frequency	2402.000
SAR 10g (W/Kg)	0.040
SAR 1g (W/Kg)	0.061

Maximum location: X=-22.00, Y=-23.00 ; SAR Peak: 0.16 W/kg

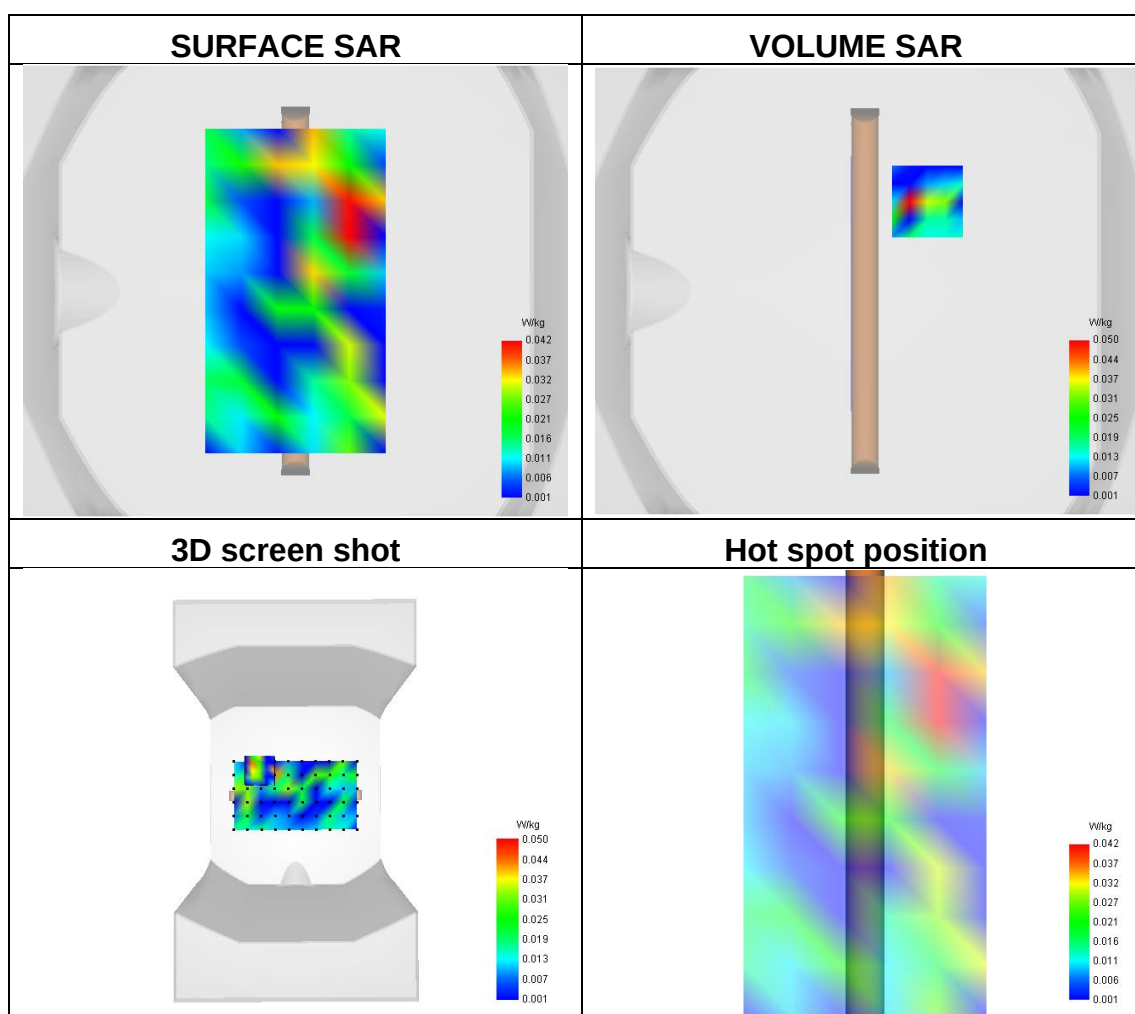




Plot 22:

Test Date	2022-10-29
Area Scan	surf_sam_plan.txt
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	Bluetooth
Signal	Bluetooth
Frequency	2402.000
SAR 10g (W/Kg)	0.015
SAR 1g (W/Kg)	0.042

Maximum location: X=28.00, Y=40.00 ; SAR Peak: 0.13 W/kg





Appendix C. Probe Calibration and Dipole Calibration Report

Refer the appendix Calibration Report.

※※※※※END OF THE REPORT※※※※※