



SAR TEST REPORT

Product Name: TABLET

Model Name: TAB_PRO23, T-1000, T-900, T-500.

FCC ID: 2BCQ3-TABPRO23

Issued For : A3 MOBILE SAS

CRA 20 13 58 OFIC 509 BOGOTA, 110111 COLOMBIA

Issued By : Shenzhen LGT Test Service Co., Ltd.

Room 205, Building 13, Zone B, Chen Hsiong Industrial Park,
No.177 Renmin West Road, Jinsha Community, Kengzi
Street, Pingshan New District, Shenzhen, China

Report Number: LGT23H078HA01

Sample Received Date: Aug. 30, 2023

Date of Test: Sept. 01, 2023 ~ Sept. 07, 2023

Date of Issue: Sept. 08, 2023

Max. SAR (1g): Body:1.038 W/kg

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Revision History

Rev.	Issue Date	Contents
00	Sept. 08, 2023	Initial Issue



TEST REPORT CERTIFICATION

Applicant A3 MOBILE SAS
Address CRA 20 13 58 OFIC 509 BOGOTA, 110111 COLOMBIA

Manufacture Shenzhen Jinhengzhi Technology Co., Ltd.
Address 3307, TOWER A, WORLD TRADE PLAZA, FUTIAN, SHENZHEN, CHINA

Product Name TABLET
Trademark FLY
Model Name TAB_PRO23, T-1000, T-900, T-500.
Sample number LGT2308069-1

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
ANSI/IEEE Std. C95.1-1992 FCC 47 CFR Part 2 (2.1093) IEEE 1528: 2013	PASS

Prepared by:

Zane Shan

Zane Shan
Engineer

Approved by:

Vita Li

Vita Li
Manager





1. General Information

Environmental evaluation measurements of specific absorption rate (SAR) distributions in emulated human head and body tissues exposed to radio frequency (RF) radiation from wireless portable devices for compliance with the rules and regulations of the U.S. Federal Communications Commission (FCC).

1.1 EUT Description

Product Name	TABLET	
Trademark	FLY	
Model Name	TAB_PRO23	
Series Model	T-1000, T-900, T-500.	
Model Difference	Only different in model name.	
Device Category	Portable	
Product stage	Production unit	
RF Exposure Environment	General Population / Uncontrolled	
Hardware Version	B863B_V3.0X	
Software Version	FLY TECHNOLOGY-TAB_PRO23-9365DAH3N91BOE-8525-230822	
Frequency Range	GSM 850: 824 ~ 849 MHz PCS 1900: 1850 ~ 1910 MHz WCDMA Band II: 1850 ~ 1910 MHz WCDMA Band V: 824 ~ 849 MHz WLAN 802.11b/g/n20: 2412 MHz ~ 2462 MHz Bluetooth: 2402 ~ 2480 MHz	
Max. Reported SAR(1g): (Limit:1.6W/kg) Test distance: 0mm	Mode	Body Worn and Hotspot(W/kg))
	GSM 850	1.038
	PCS 1900	0.823
	WCDMA Band II	0.505
	WCDMA Band V	0.509
	2.4G WLAN	0.288
	Bluetooth	0.091
1-g Sum SAR	1.326	
Battery	Rated Voltage:3.85V Capacity: 5000mAh	
Operating Mode:	GSM: GSM Voice; GPRS Class 12 WCDMA: RMC, HSDPA, HSUPA Release 6 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 BLE: GFSK	
Antenna Specification	GSM/WCDMA: PIFA Antenna Bluetooth: PIFA Antenna WLAN: PIFA Antenna	
Operating Mode	Maximum continuous output	



SIM Card	Only support single SIM Card.
Hotspot Mode	Support
DTM Mode	Not Support



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
Accreditation Certificate	FCC Registration No.: 746540
	A2LA Certificate No.: 6727.01
	IC Registration No.: CN0136



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 D06 v02r01	Hotspot Mode SAR
9	FCC KDB 248227 D01 Wi-Fi SAR v02r02	SAR Considerations for 802.11 Devices
10	FCC KDB 616217 D04 SAR for laptop and tablets v01r02	SAR Evaluation Considerations For Laptop, Notebook, Netbook And Tablet Computers

(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:

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

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

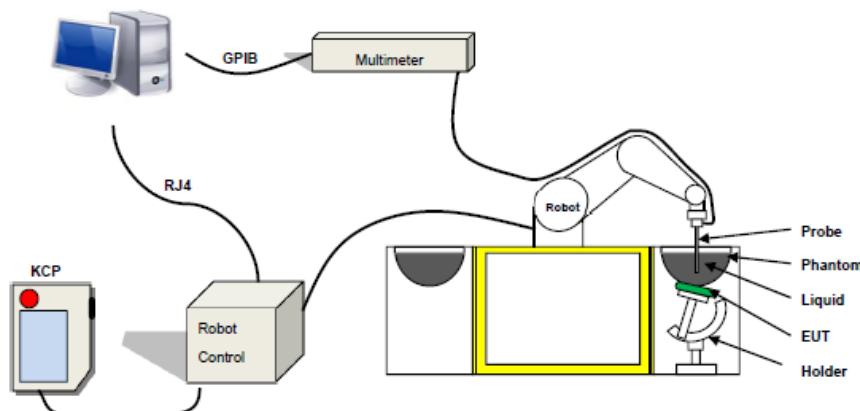
$$\text{SAR} = \frac{\sigma E^2}{\rho}$$

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: 600 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.

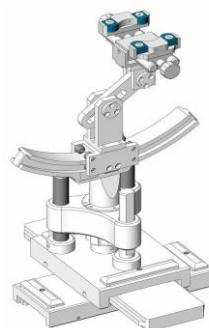


Figure-SN 06/22 SAM 148



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 $\pm 20\%$. 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 $\pm 5\%$) 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]					
2023-09-01	24	48	835	23.7	Permittivity	41.50	41.41	-0.22	±5
					Conductivity	0.90	0.92	2.22	±5
2023-09-04	20.4	58	1900	20.1	Permittivity	40.25	41.06	2.01	±5
					Conductivity	1.3	1.35	3.85	±5
2023-09-07	23.2	40	2450	22.9	Permittivity	39.20	39.63	1.10	±5
					Conductivity	1.80	1.78	-1.11	±5

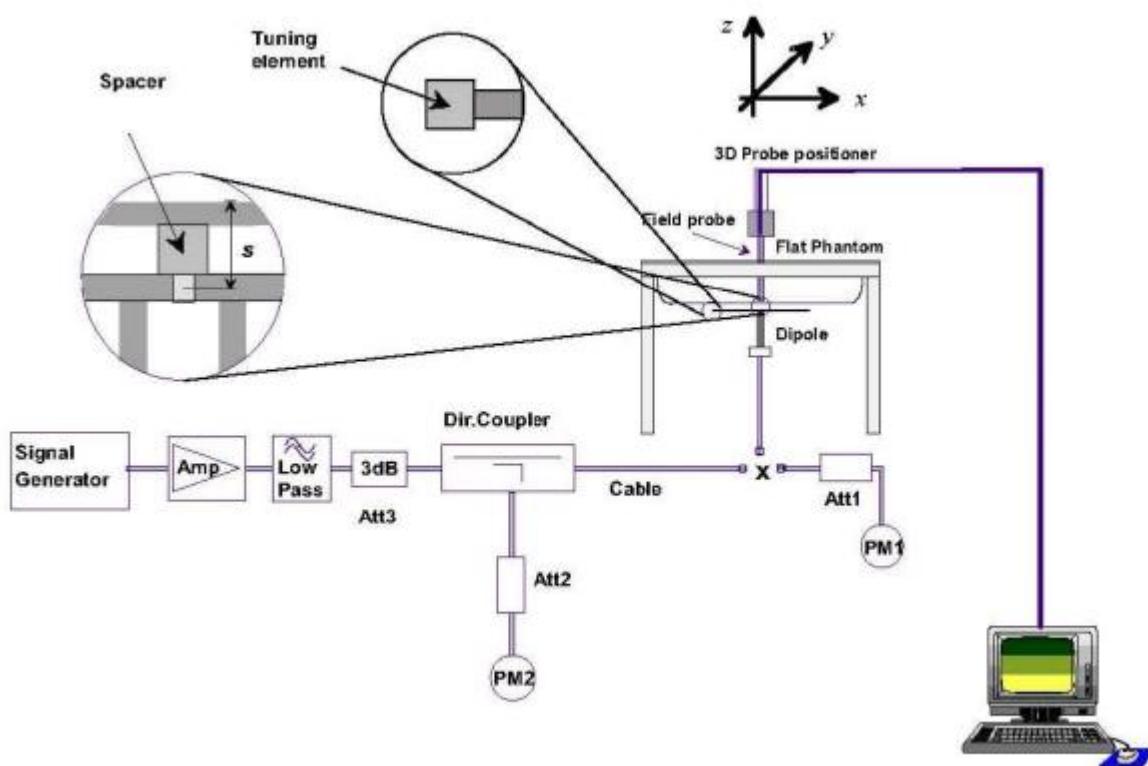


5. SAR System Validation

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	Tested Value	Normalized SAR	Target SAR	Tolerance	Limit
	(MHz)	(mW)	(W/Kg)	(W/kg)	1g(W/kg)	(%)	(%)
2023-09-01	835	100	0.998	9.98	9.75	2.36	10
2023-09-04	1900	100	4.067	40.67	40.85	-0.44	10
2023-09-07	2450	100	5.430	54.30	54.28	0.04	10

Note:

1. The tolerance limit of System validation $\pm 10\%$.
2. The dipole input power (forward power) was 100 mW.
3. The results are normalized to 1 W input power.



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

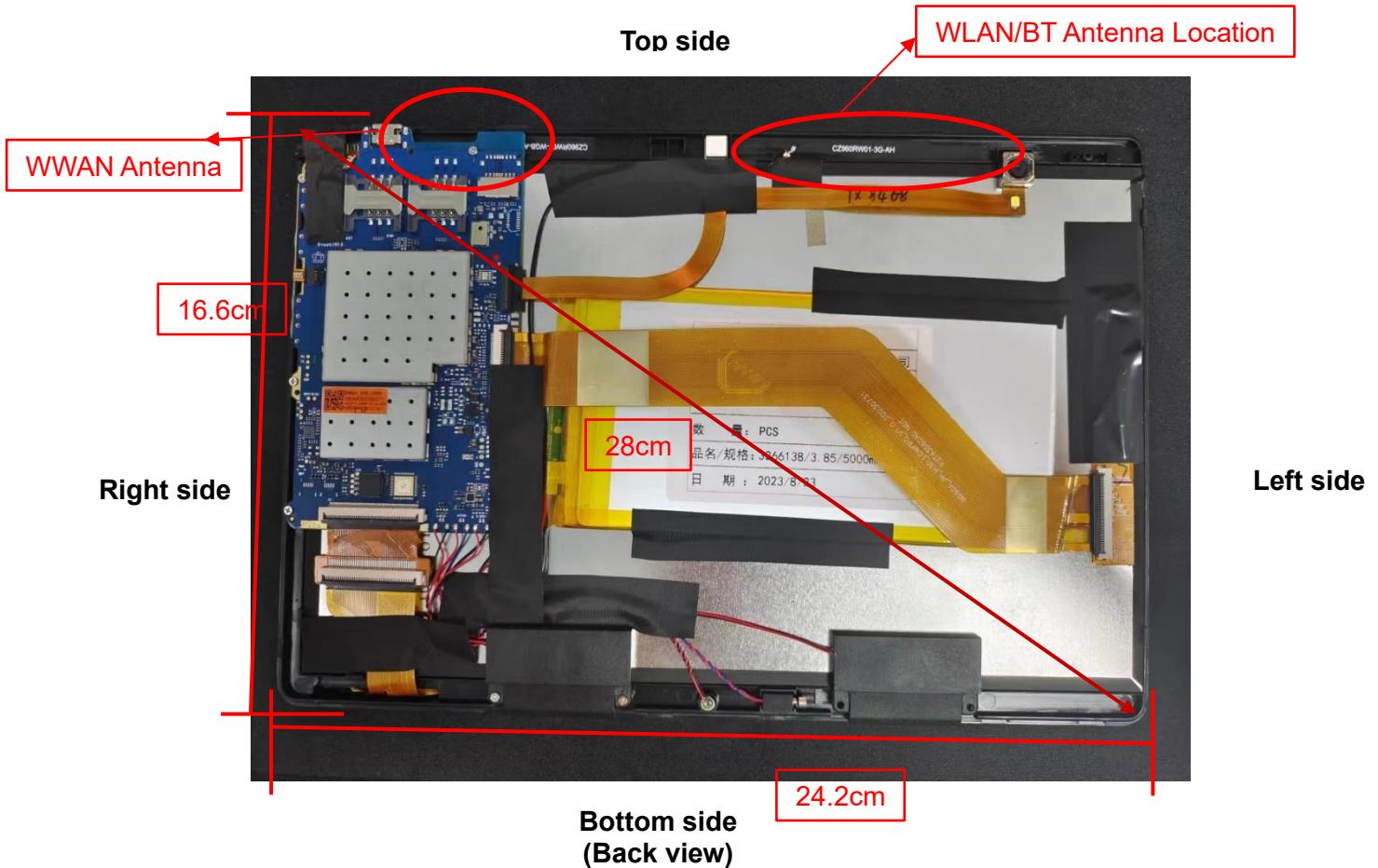
First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan 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 Antenna Location Sketch

It is a TABLET, support GSM/WCDMA /WLAN/BT mode.



Antenna Separation Distance(cm)						
ANT	Back Side	Front Side	Left Side	Right Side	Top Side	Bottom Side
WLAN/BT	≤0.5	≤0.5	15.6	5.8	≤0.5	15.4
WWAN	≤0.5	≤0.5	4.7	12.5	≤0.5	15.4

Note 1: The antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report.



7.1 SAR test exclusion consider table

The WWAN/WLAN/BT SAR evaluation of Maximum power (dBm) summing tolerance.

	Wireless Interface	GSM850	PCS1900	WCDMA II
Exposure Position	Calculated Frequency(GHz)	0.8242	1.8502	1.88
	Maximum Turn-up power (dBm)	30	26.5	23.5
	Maximum rated power(mW)	1000.00	446.68	223.87
	Separation distance (cm)	0.5	0.5	0.5
Back Side	exclusion threshold(mW)	9.42	3.44	3.39
	Testing required?	YES	YES	YES
	Separation distance (cm)	0.5	0.5	0.5
Front Side	exclusion threshold(mW)	9.42	3.44	3.39
	Testing required?	YES	YES	YES
	Separation distance (cm)	4.7	4.7	4.7
Left Edge	exclusion threshold(mW)	219.62	212.69	211.62
	Testing required?	YES	YES	YES
	Separation distance (cm)	12.5	12.5	12.5
Right Edge	exclusion threshold(mW)	868.49	1287.95	1285.85
	Testing required?	YES	NO	NO
	Separation distance (cm)	0.5	0.5	0.5
Top Edge	exclusion threshold(mW)	9.42	3.44	3.39
	Testing required?	YES	YES	YES
	Separation distance (cm)	15.4	15.4	15.4
Bottom Edge	exclusion threshold(mW)	1164.45	1891.17	1889.46
	Testing required?	NO	NO	NO



Exposure Position	Wireless Interface	WCDMA V	BT	2.4G WLAN
	Calculated Frequency (GHz)	0.8466	2.437	2.441
	Maximum Turn-up power (dBm)	23	9.5	6
	Maximum rated power(mW)	199.53	8.91	3.98
Back Side	Separation distance (cm)	0.5	0.5	0.5
	exclusion threshold(mW)	9.07	2.76	2.75
	Testing required?	YES	YES	YES
Front Side	Separation distance (cm)	0.5	0.5	0.5
	exclusion threshold(mW)	9.07	2.76	2.75
	Testing required?	YES	YES	YES
Left Edge	Separation distance (cm)	4.7	15.6	15.6
	exclusion threshold(mW)	219.96	1908.07	1907.90
	Testing required?	NO	NO	NO
Right Edge	Separation distance (cm)	12.5	5.8	5.8
	exclusion threshold(mW)	884.80	290.90	290.77
	Testing required?	NO	NO	NO
Top Edge	Separation distance (cm)	0.5	0.5	0.5
	exclusion threshold(mW)	9.07	2.76	2.75
	Testing required?	YES	YES	YES
Bottom Edge	Separation distance (cm)	15.4	15.4	15.4
	exclusion threshold(mW)	1190.65	1861.83	1861.66
	Testing required?	NO	NO	NO

Note:

1. maximum power is the source-based time-average power and represents the maximum RF output power among production units.
2. Per KDB 447498 D04, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
3. Per KDB 447498 D04, if the maximum time-averaged power available does not exceed 1 mW. This stand-alone SAR exemption test.



4. Per KDB 447498 D04, the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

5. Per KDB 447498 D04, An alternative to the SAR-based exemption is using below table and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in below table to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).



RF Source frequency (MHz)	Threshold ERP(watts)
0.3-1.34	1,920 R^2 .
1.34-30	3,450 R^2/f^2 .
30-300	3.83 R^2 .
300-1,500	0.0128 R^2f .
1,500-100,000	19.2 R^2 .

Per KDB 248227 D01, choose the highest output power channel to test SAR and determine further SAR exclusion 8. for each frequency band ,testing at higher data rates and higher order modulations is not required when the maximum average output power for each of each of these configurations is less than 1/4db higher than those measured at the lower data rate than 11b mode ,thus the SAR can be excluded.

6. Per KDB 616217 D04, SAR evaluation for the front surface of tablet display screens are generally not necessary.

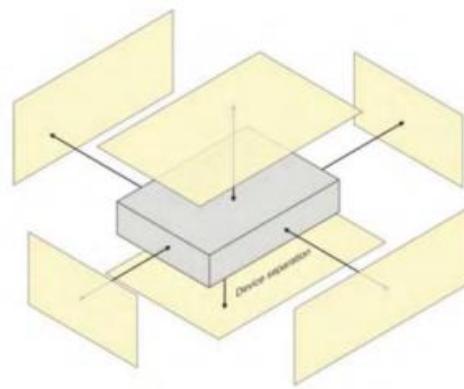


8. EUT Test Position

This EUT was tested in Back Side, Left Side and Top Side.

8.1 Body-worn Position Conditions

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





9. Uncertainty

9.1 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in IEEE 1528: 2013. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Symbol	Uncertainty Component	Prob. Dist.	Unc. $a(x_i)$	Div. q_i	$u(x_i) = a(x_i)/q_i$	C_i	$u(y) = C_i * u(x_i)$	v_i
Measurement system errors								
CF	Probe calibration	N ($k = 2$)	5.8	2	2.90	1	2.90	∞
CF _{drift}	Probe calibration drift	R	0.12	$\sqrt{3}$	0.07	1	0.07	∞
LIN	Probe linearity and detection limit	R	1.91	$\sqrt{3}$	1.10	1	1.10	∞
BBS	Broadband signal	R	0.15	$\sqrt{3}$	0.09	1	0.09	∞
ISO	Probe isotropy	R	0.18	$\sqrt{3}$	0.10	1	0.10	∞
DAE	Other probe and data acquisition errors	N	2.7	1	2.70	1	2.70	∞
AMB	RF ambient and noise	N	1.73	1	1.73	1	1.73	∞
Δ_{xyz}	Probe positioning errors	N	0.81	1	0.81	$2/\delta$	0.81	
DAT	Data processing errors	N	2.5	1	2.50	1	2.50	∞
Phantom and device (DUT or validation antenna) errors								
LIQ(σ)	Measurement of phantom conductivity(σ)	N	4.4	1	4.4	$c\epsilon, c\sigma$	4.40	∞
LIQ(T_c)	Temperature effects (medium)	R	2.9	$\sqrt{3}$	1.67	$c\epsilon, c\sigma$	1.67	∞
EPS	Shell permittivity	R	3.4	$\sqrt{3}$	1.96	See 8.4.2.3	0.49	∞
DIS	Distance between the radiating element of the DUT and the phantom medium	N	0.8	1	0.8	2	1.60	∞
D_{xyz}	Repeatability of positioning the DUT or source against the phantom	N	1.5	1	1.5	1	1.50	5
H	Device holder effects	N	3	1	3	1	3.00	
MOD	Effect of operating mode on probe sensitivity	R	3.59	$\sqrt{3}$	2.07	1	2.07	∞
TAS	Time-average SAR	R	1.73	$\sqrt{3}$	1.00	1	1.00	∞
RF _{drift}	Variation in SAR due to drift in output of DUT	N	2.89	1	2.89	1	2.89	
VAL	Validation antenna uncertainty (validation measurement only)	N	1.45	1	1.45	1	1.45	
P _{in}	Uncertainty in accepted power (validation measurement only)	N	2.5	1	2.5	1	2.50	
Corrections to the SAR result (if applied)								
C(ϵ', σ)	Phantom deviation from target (ϵ', σ)	N	2.31	1	2.31	1	2.31	
C(R)	SAR scaling	R	1.15	$\sqrt{3}$	0.66	1	0.66	
u(Δ SAR)	Combined uncertainty						9.53	
U	Expanded uncertainty and effective degrees of freedom					U =	19.06	



10. Conducted Power Measurement

10.1 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)	32.40	32.41	32.33	29.84	29.49	29.09
GPRS (GMSK, 1-Slot)	32.45	32.45	32.39	29.62	29.62	29.16
GPRS (GMSK, 2-Slot)	31.99	31.91	31.76	29.08	28.80	28.38
GPRS (GMSK, 3-Slot)	30.44	30.37	30.31	27.34	27.05	26.59
GPRS (GMSK, 4-Slot)	29.46	29.29	29.16	26.26	25.95	25.47

Remark: GPRS, CS4 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)	23.37	23.38	23.30	20.81	20.46	20.06
GPRS (GMSK, 1-Slot)	23.42	23.42	23.36	20.59	20.59	20.13
GPRS (GMSK, 2-Slot)	25.97	25.89	25.74	23.06	22.78	22.36
GPRS (GMSK, 3-Slot)	26.18	26.11	26.05	23.08	22.79	22.33
GPRS (GMSK, 4-Slot)	26.45	26.28	26.15	23.25	22.94	22.46

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	9262	9400	9538
Frequency (MHz)	1852.4	1880	1907.6	1852.4	1880	1907.6
RMC 12.2Kbps	22.33	23.31	23.37	21.54	22.61	22.74
HSDPA Subtest-1	20.57	21.37	20.57	19.59	20.69	20.85
HSDPA Subtest-2	20.57	21.46	21.47	19.62	20.72	20.87
HSDPA Subtest-3	20.61	21.44	21.46	19.59	20.76	20.80
HSDPA Subtest-4	20.59	21.46	21.43	19.59	20.71	20.88
HSUPA Subtest-1	21.05	21.92	21.95	20.06	21.24	21.29
HSUPA Subtest-2	21.09	21.35	21.90	19.57	21.14	21.26
HSUPA Subtest-3	21.04	21.93	21.88	19.60	21.14	21.21
HSUPA Subtest-4	20.57	21.35	21.39	19.56	20.74	20.78
HSUPA Subtest-5	21.57	22.37	22.38	20.54	21.74	21.79

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)	Output Power (dBm)	Output Power (mW)
802.11b	1	2412	8.10	6.46
	6	2437	9.05	8.04
	11	2462	7.57	5.71
802.11g	1	2412	5.51	3.56
	6	2437	5.90	3.89
	11	2462	4.48	2.81
802.11 n-HT20	1	2412	5.00	3.16
	6	2437	5.43	3.49
	11	2462	4.05	2.54

Bluetooth

BT				
Mode	Channel Number	Frequency (MHz)	Average Power (dBm)	Output Power (mW)
GFSK(1Mbps)	0	2402	0.14	1.03
	39	2441	4.59	2.88
	78	2480	4.36	2.73
$\pi/4$ -QPSK(2Mbps)	0	2402	4.02	2.52
	39	2441	5.21	3.32
	78	2480	4.97	3.14
8DPSK(3Mbps)	0	2402	4.48	2.81
	39	2441	5.58	3.61
	78	2480	5.37	3.44

BLE

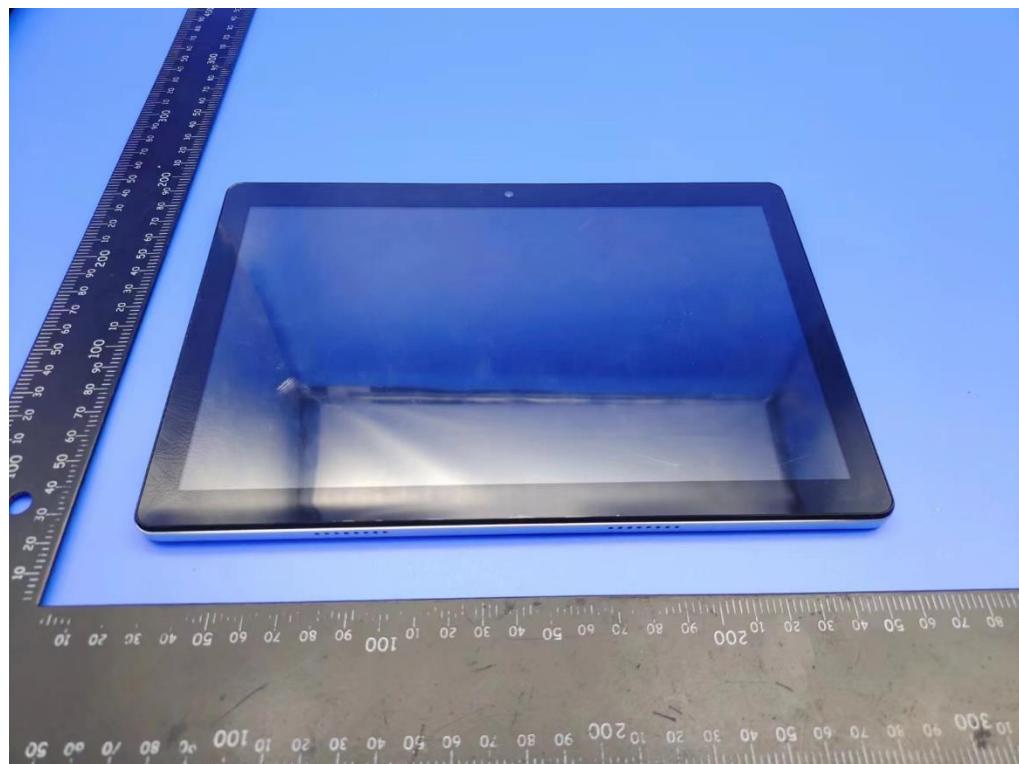
BLE				
Mode	Channel Number	Frequency (MHz)	Average Power (dBm)	Output Power (mW)
GFSK(1Mbps)	0	2402	-7.59	0.17
	19	2440	-6.38	0.23
	39	2480	-5.43	0.29



11. EUT and Test Setup Photo

11.1 EUT Photos

Front side

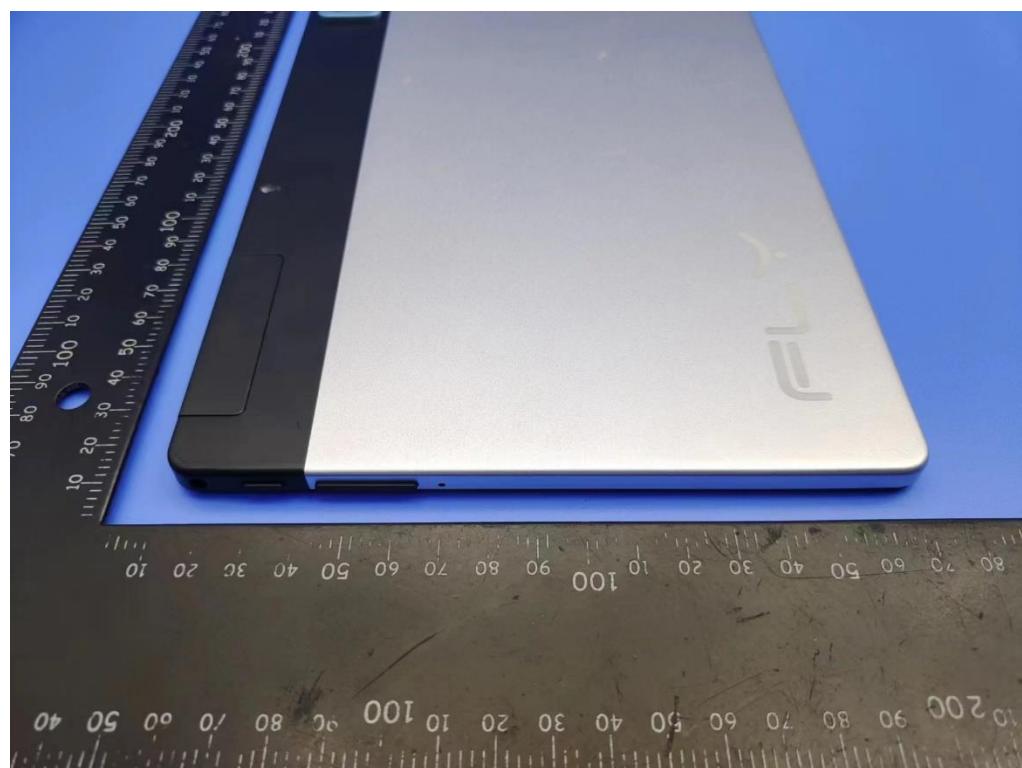


Back side





Right Edge



Left Edge

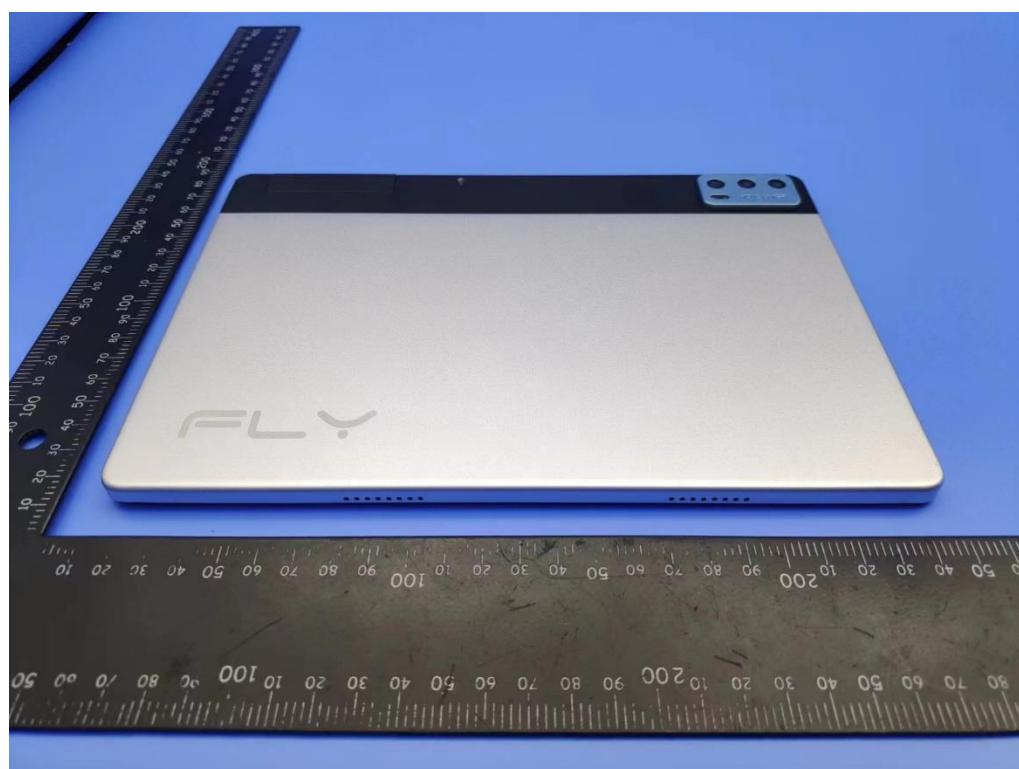




Top Edge



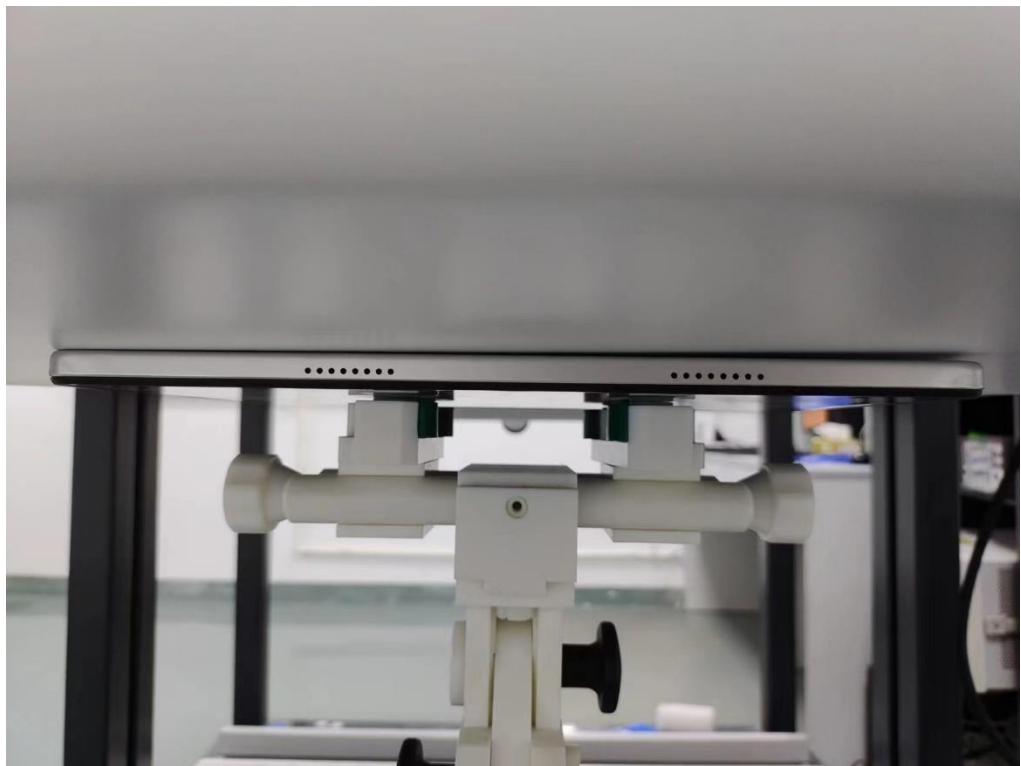
Bottom Edge





11.2 Setup Photos

Body Back side (separation distance 0mm)



Body Left side (separation distance is 0mm)

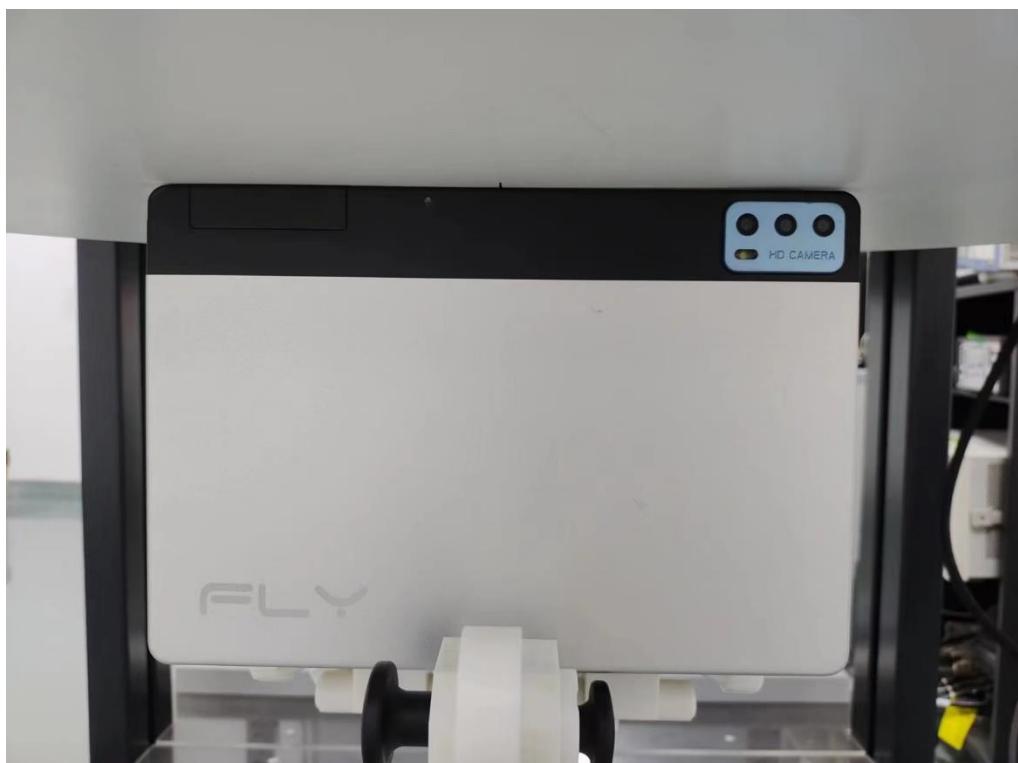




Body Right side (separation distance is 0mm)

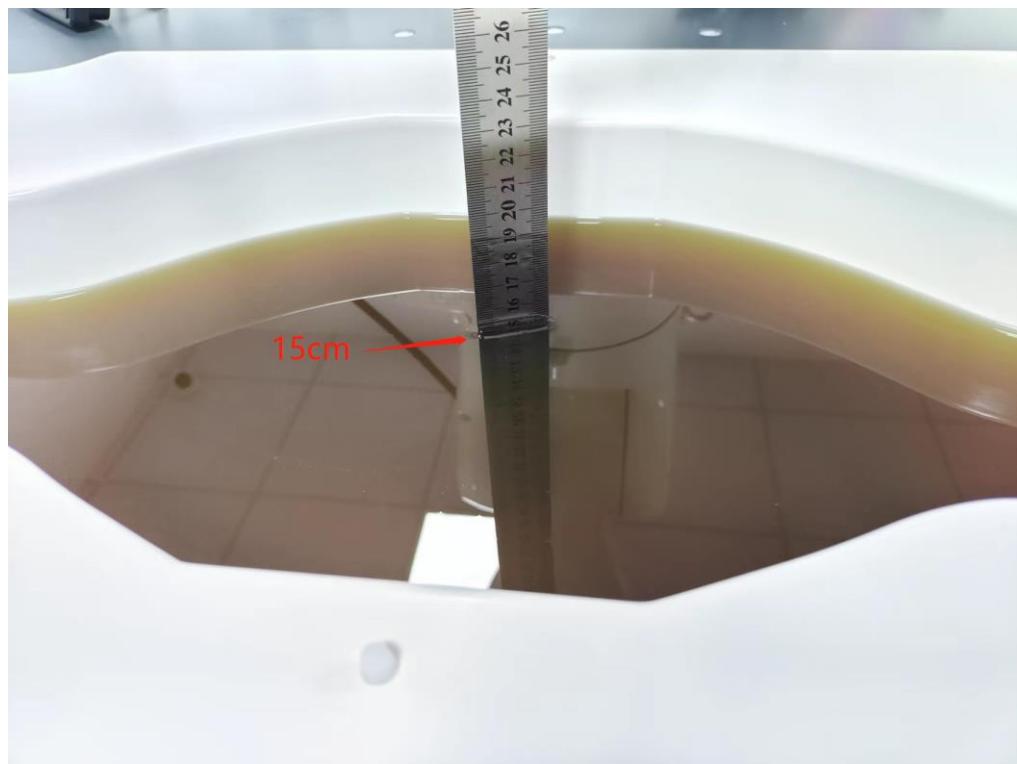


Body Top side (separation distance is 0mm)





Liquid depth (15 cm)





12. SAR Result Summary

12.1 Body-worn and Hotspot SAR

Band	Model	Test Position	Freq.	SAR (1g) (W/kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Scaled SAR (W/Kg)	Meas.No.
GSM850	GPRS Data-4 Slot	Back Side	824.2	0.917	3.49	30.00	29.46	1.038	1
		Back Side	836.6	0.793	1.49	30.00	29.29	0.934	/
		Back Side	848.8	0.735	-0.77	30.00	29.16	0.892	/
		Left Side	824.2	0.368	0.46	30.00	29.46	0.417	/
		Right Side	824.2	0.163	3.32	30.00	29.46	0.185	/
		Top Side	824.2	0.525	3.01	30.00	29.46	0.595	/
PCS 1900	GPRS Data-4 Slot	Back Side	1850.2	0.661	-0.52	26.50	26.26	0.699	/
		Left Side	1850.2	0.254	0.02	26.50	26.26	0.268	/
		Top Side	1850.2	0.779	-0.77	26.50	26.26	0.823	2
		Top Side	1880	0.643	1.21	26.50	25.95	0.730	/
		Top Side	1909.8	0.512	3.07	26.50	25.47	0.649	/
WCDMA Band II	RMC	Back Side	1880	0.433	-2.79	23.50	23.31	0.452	/
		Left Side	1880	0.102	1.14	23.50	23.31	0.107	/
		Top Side	1880	0.483	-1.53	23.50	23.31	0.505	3
WCDMA Band V	RMC	Back Side	846.6	0.479	1.47	23.00	22.74	0.509	4
		Left Side	846.6	0.181	1.42	23.00	22.74	0.192	/
		Top Side	846.6	0.369	2.36	23.00	22.74	0.392	/
2.4GHz WLAN	802.11b	Back Side	2437	0.260	1.76	9.50	9.05	0.288	5
		Top Side	2437	0.155	-1.73	9.50	9.05	0.172	/
BT	8DPSK	Back Side	2441	0.080	3.84	6.00	5.58	0.088	/
		Top Side	2441	0.083	-3.17	6.00	5.58	0.091	6

Note:

1. The test separation of all above table is 0mm.
2. 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
3. When the user enables the personal Wireless router functions for the handsets, actual operations include simultaneous transmission of both the Wi-Fi transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. The "Portable Hotspot" feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.



Repeated SAR

Band	Mode	Test Position	Freq.	Result 1g (W/Kg)	Power Drift (%)	Max. Turn-up Power (dBm)	Meas. Output Power (dBm)	Scaled SAR (W/Kg)	Meas. No.
GSM 850	GPRS Data-4 Slot	Back Side	824.2	0.874	2.46	30	29.46	0.990	-
		Back Side	836.6	0.770	-2.62	30	29.29	0.907	-
		Back Side	848.8	0.723	1.69	30	29.16	0.878	-
GSM1900	GPRS Data-4 Slot	Bottom Side	1850.2	0.767	1.52	26.5	26.26	0.811	-
		Bottom Side	1880	0.614	-0.06	26.5	25.95	0.697	-
		Bottom Side	1909.8	0.495	-0.46	26.5	25.47	0.628	-

Repeated SAR measurement

Band	Mode	Test Position	Freq.	Original Measured SAR 1g(W/kg)	1 st Repeated SAR 1g	Ratio
GSM 850	GPRS Data-4 Slot	Back Side	824.2	0.917	0.874	1.049
		Back Side	836.6	0.793	0.770	1.029
		Back Side	848.8	0.735	0.723	1.016
GSM1900	GPRS Data-4 Slot	Top Side	1850.2	0.779	0.767	1.016
		Top Side	1880	0.643	0.614	1.047
		Top Side	1909.8	0.512	0.495	1.034

Note:

1. Per KDB 865664 D01, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8\text{W/Kg}$.
2. Per KDB 865664 D01, if the ratio of largest to smallest SAR for the original and first repeated measurement is ≤ 1.2 and the measured SAR $< 1.45\text{W/Kg}$, only one repeated measurement is required.
3. Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is $\geq 1.45\text{W/Kg}$.
4. The ratio is the difference in percentage between original and repeated measured SAR.



Simultaneous Multi-band Transmission Evaluation:

Application Simultaneous Transmission information:

Position	Simultaneous State
Body	1. GSM + 2.4GHz WLAN
	2. GSM + Bluetooth
	3. WCDMA + 2.4GHz WLAN
	4. WCDMA + 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	Body	GSM	1.038	1.326
		2.4G WLAN	0.288	
GSM + Bluetooth	Body	GSM	1.038	1.129
		Bluetooth	0.091	
WCDMA + 2.4G WLAN	Body	WCDMA	0.509	0.797
		2.4G WLAN	0.288	
WCDMA + Bluetooth	Body	WCDMA	0.509	0.600
		Bluetooth	0.091	

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.



13. Equipment List

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
835MHz Dipole	MVG	DIP0G835	SN 06/22 DIP0G835-639	2022.02.11	2025.02.10
1900MHz Dipole	MVG	DIP1G900	SN 06/22 DIP1G900-641	2022.02.11	2025.02.10
2450MHz Dipole	MVG	DIP2G450	SN 06/22 DIP2G450-645	2022.02.11	2025.02.10
E-Field Probe	MVG	EPGO364	SN 04/22 EPGO364	2023.02.10	2024.02.09
Liquid Calibration Kit	MVG	OCPG 87	SN 06/22 OCPG87	2023.02.10	2024.02.09
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	2023.03.27	2024.03.26
Multi Meter	Keithley	DMM6500	DMM6500	2023.03.27	2024.03.26
Signal Generator	Keithley	N5182B	MY59100717	2023.04.07	2024.04.06
Wireless Communication Test Set	R&S	CMW500	137737	2023.04.14	2024.04.13
Power Sensor	R&S	Z11	116184	2023.03.27	2024.03.26
Temperature hygrometer	N/A	ST-W2318	N/A	2023.04.24	2024.04.23
Thermograph	N/A	TP101	N/A	2023.04.25	2024.04.24



Appendix A. System Validation Plots

System Performance Check Data (835MHz)

Type: Phone measurement (Complete)

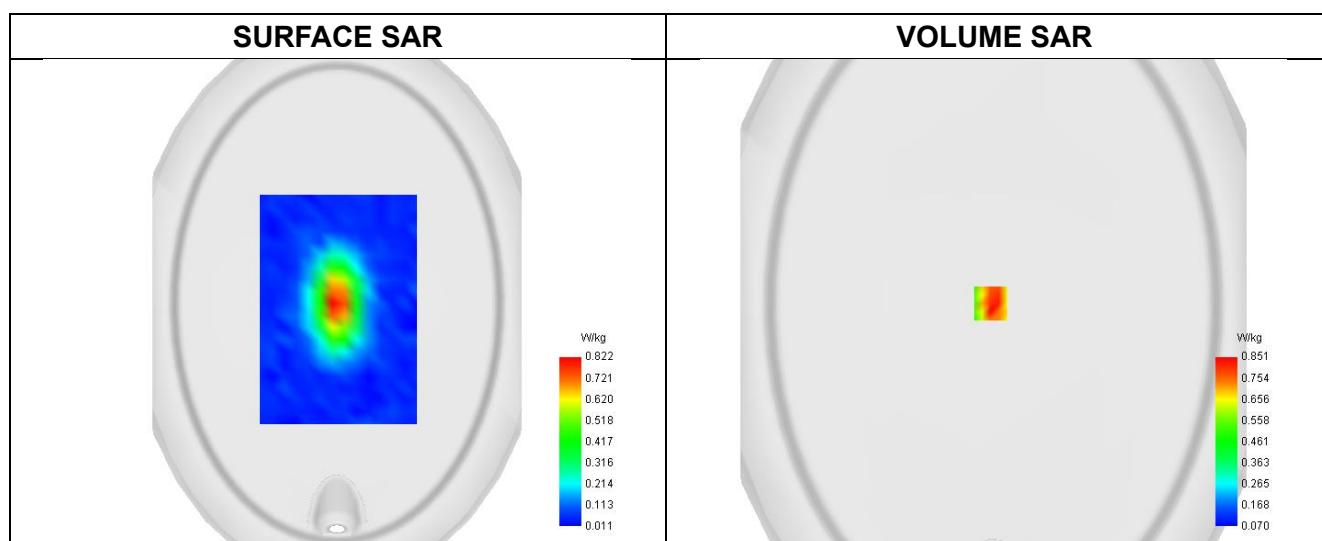
Area scan resolution: dx=8mm,dy=8mm

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

Date of measurement: 2023-09-01

Experimental conditions.

Phantom	Validation plane
Device Position	Dipole
Band	CW835
Channels	Middle
Signal	CW
Frequency (MHz)	835.000
Relative permittivity	41.41
Conductivity (S/m)	0.92
Probe	SN 04/22 EPGO364
ConvF	1.72
Crest factor:	1:1

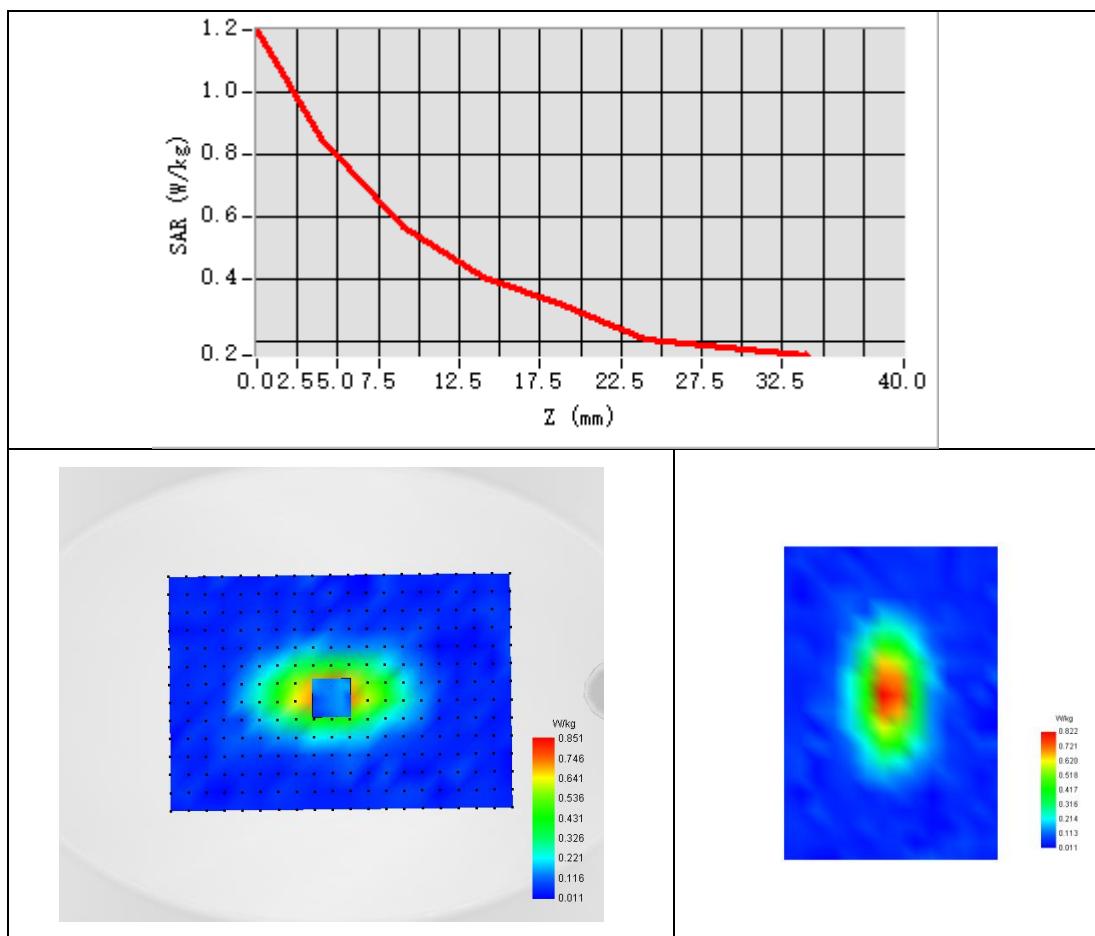


Maximum location: X=-3.00, Y=0.00 ; SAR Peak: 1.22 W/kg

SAR 10g (W/Kg)	0.604
SAR 1g (W/Kg)	0.998



Z Axis Scan





System Performance Check Data (1900MHz)

Type: Phone measurement (Complete)

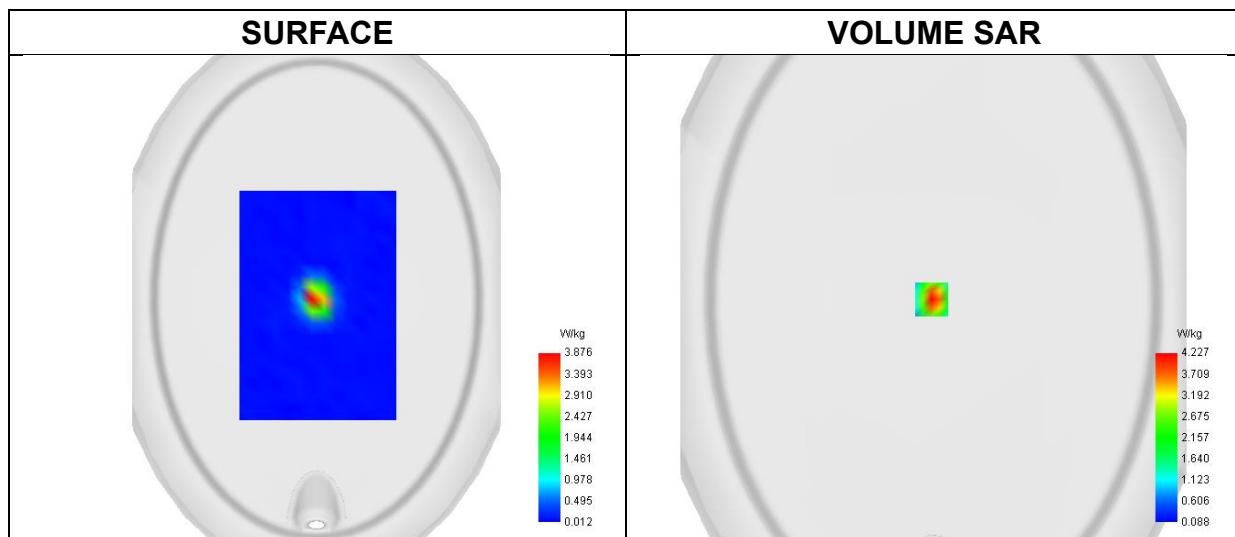
Area scan resolution: dx=8mm, dy=8mm

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

Date of measurement: 2023-09-04

Experimental conditions.

Phantom	Validation plane
Device Position	Dipole
Band	CW1900
Channels	Middle
Signal	CW
Frequency (MHz)	1900.000
Relative permittivity	41.06
Conductivity (S/m)	1.35
Probe	SN 04/22 EPGO364
ConvF	2.25
Crest factor:	1:1

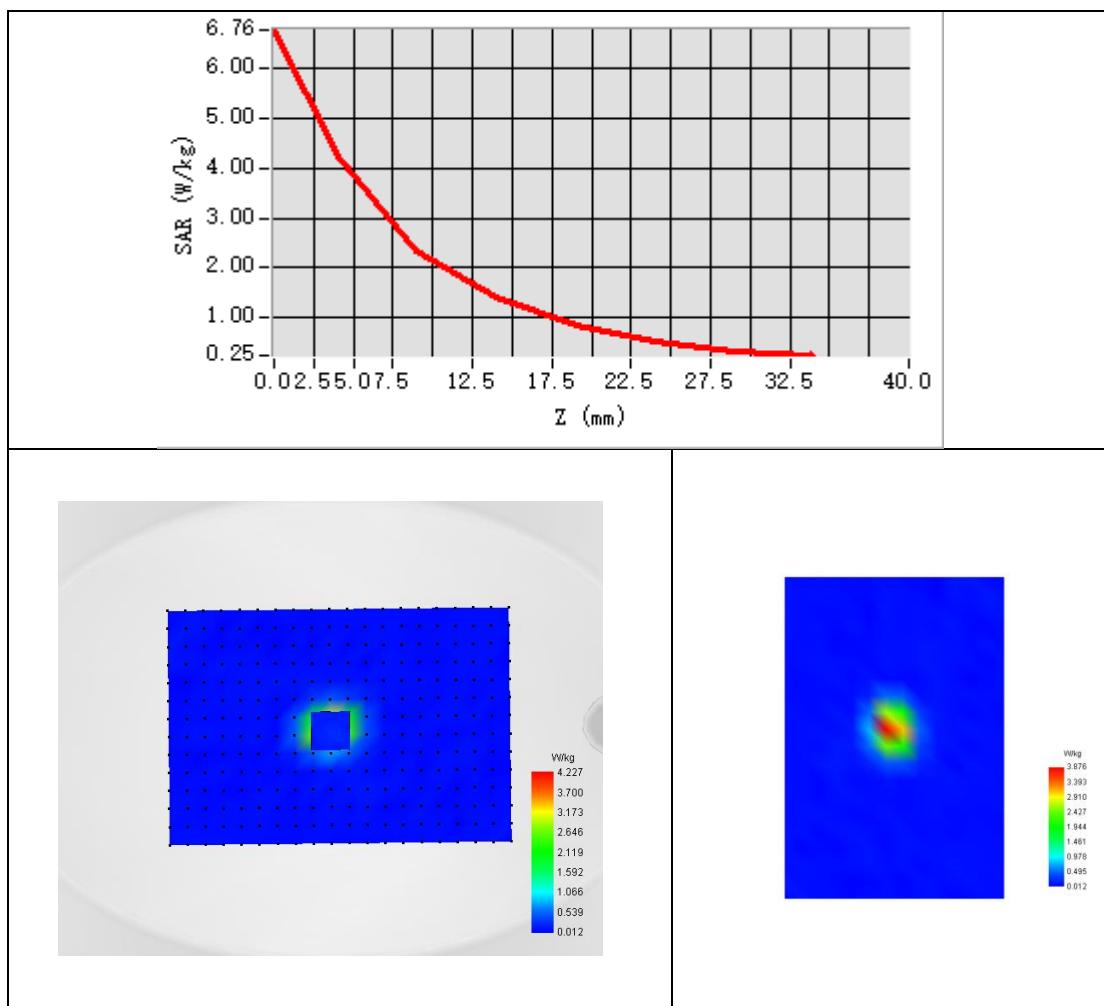


Maximum location: X=-2.00, Y=0.00 ; SAR Peak: 6.85 W/kg

SAR 10g (W/Kg)	2.047
SAR 1g (W/Kg)	4.067



Z Axis Scan





System Performance Check Data (2450MHz)

Type: Phone measurement (Complete)

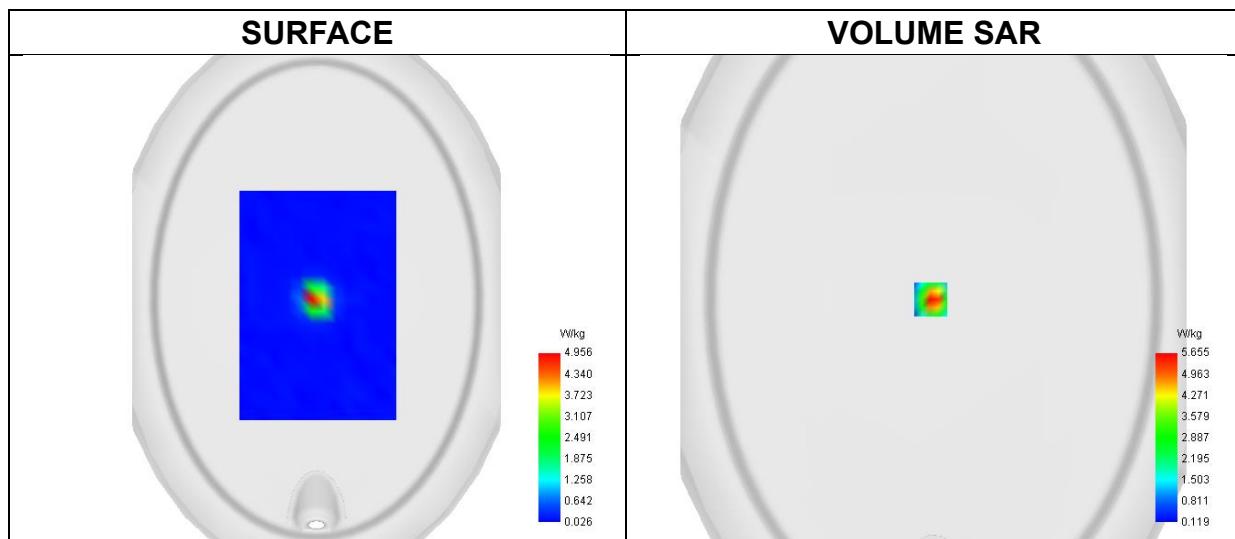
Area scan resolution: dx=8mm, dy=8mm

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

Date of measurement: 2023-09-07

Experimental conditions.

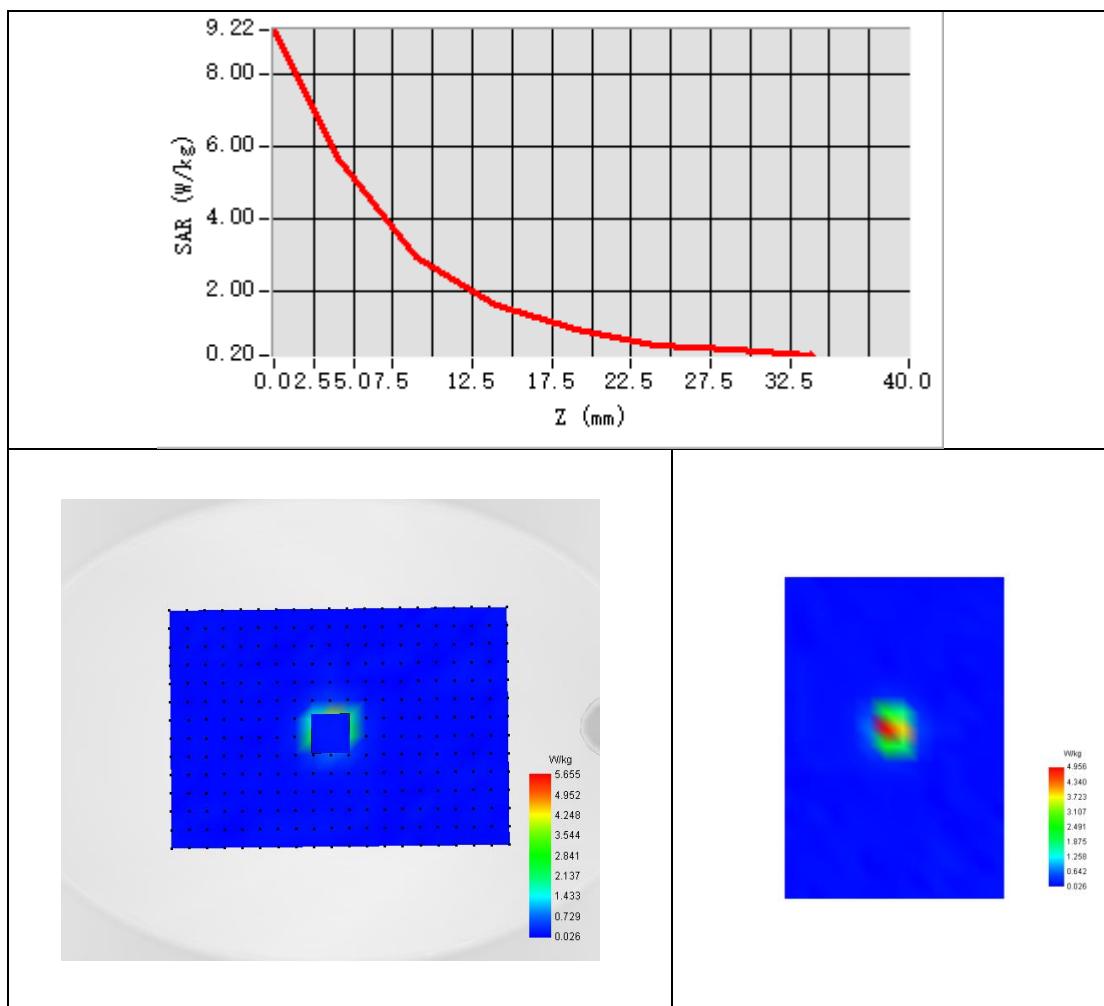
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Channels	Middle
Signal	CW
Frequency (MHz)	2450.000
Relative permittivity	39.63
Conductivity (S/m)	1.78
Probe	SN 04/22 EPGO364
ConvF	2.33
Crest factor:	1:1



SAR 10g (W/Kg)	2.362
SAR 1g (W/Kg)	5.430



Z Axis Scan



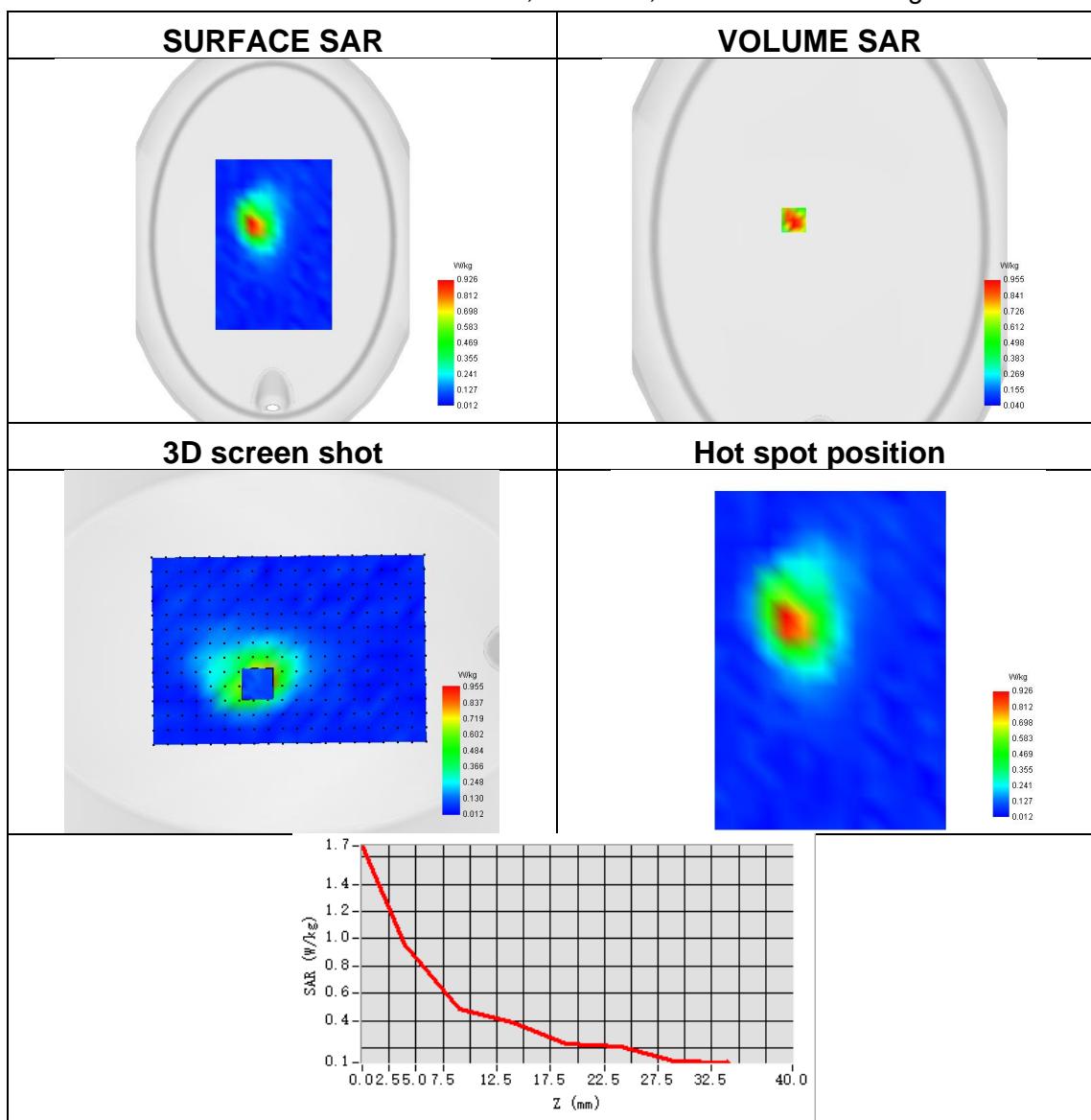


Appendix B. SAR Test Plots

Plot 1:

Test Date	2023-09-01
ConvF	1.72
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5mm
Phantom	ELLI
Device Position	Back Side
Band	GPRS850
Signal	TDMA (GPRS)
Frequency	824.2
Relative permittivity	41.41
Conductivity (S/m)	0.92
SAR 10g (W/Kg)	0.544
SAR 1g (W/Kg)	0.917

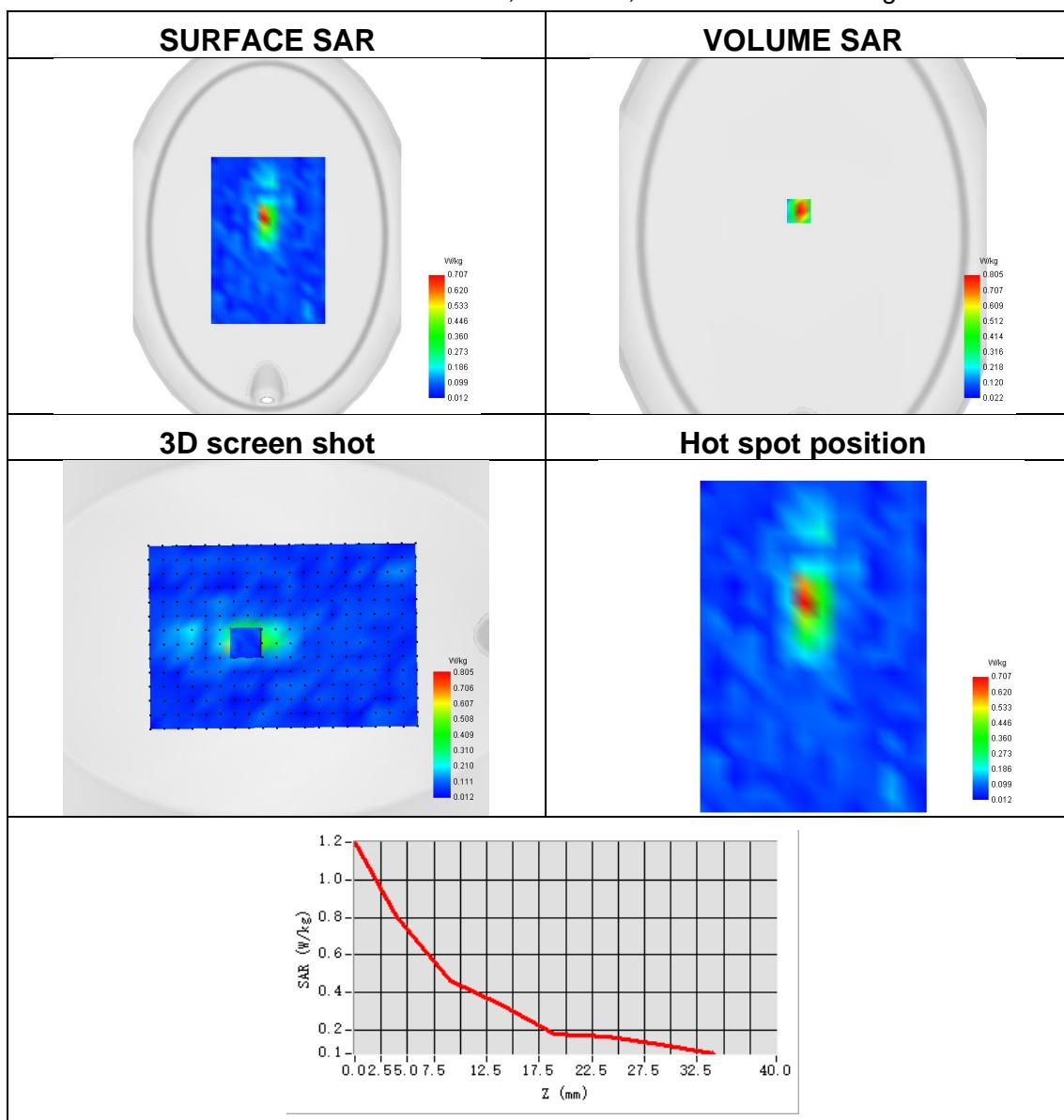
Maximum location: X=-34.00, Y=26.00 ; SAR Peak: 1.44 W/kg



**Plot 2:**

Test Date	2023-09-04
ConvF	2.25
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5mm
Phantom	ELLI
Device Position	Top Side
Band	GPRS1900
Signal	TDMA (GPRS)
Frequency	1850.2
Relative permittivity	41.06
Conductivity (S/m)	1.35
SAR 10g (W/Kg)	0.406
SAR 1g (W/Kg)	0.779

Maximum location: X=-5.00, Y=33.00 ; SAR Peak: 1.32 W/kg

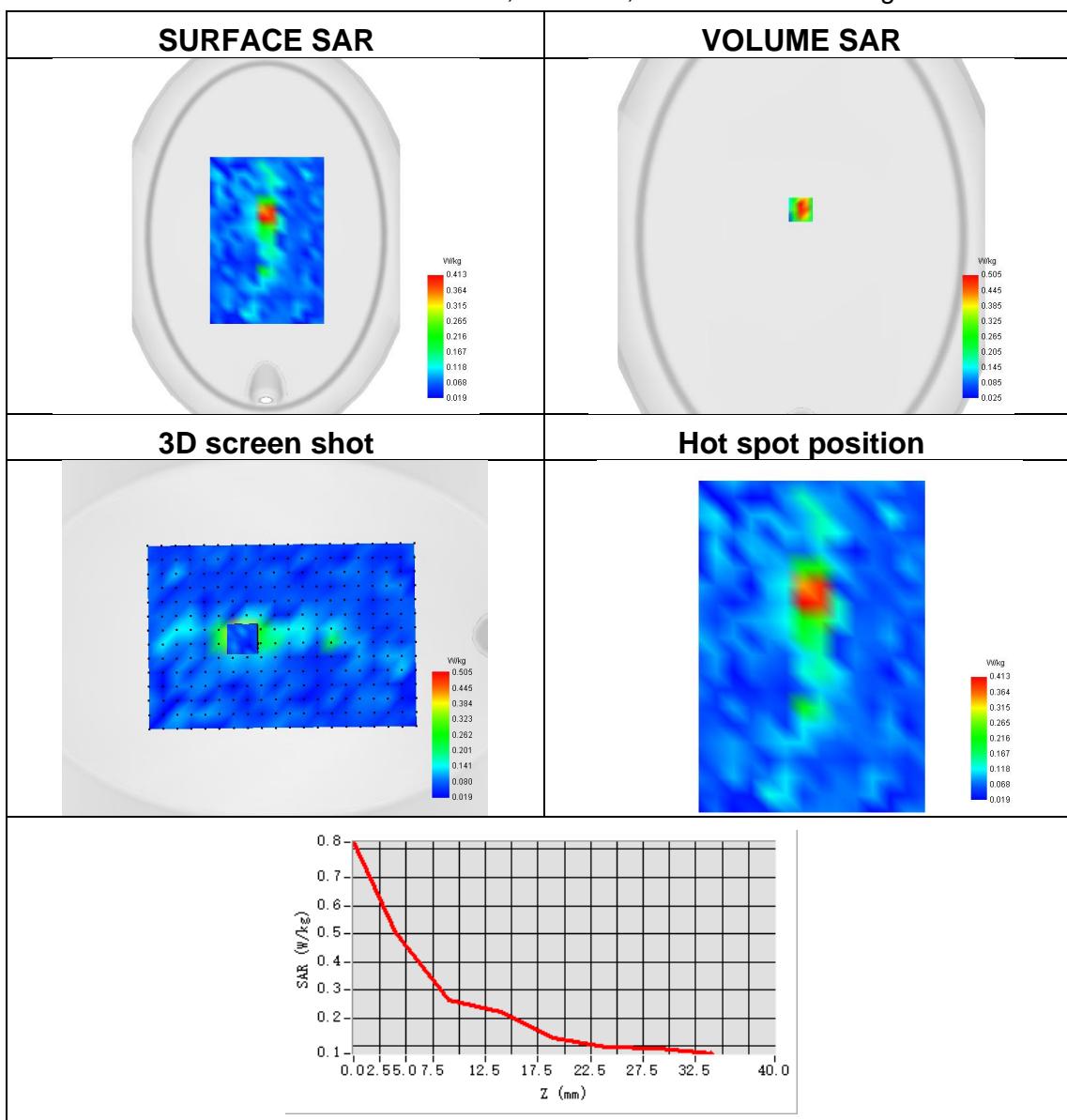




Plot 3:

Test Date	2023-09-04
ConvF	2.25
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5mm
Phantom	ELLI
Device Position	Top Side
Band	Band 2 (1900)
Signal	WCDMA
Frequency	1880
Relative permittivity	41.06
Conductivity (S/m)	1.35
SAR 10g (W/Kg)	0.277
SAR 1g (W/Kg)	0.483

Maximum location: X=-1.00, Y=35.00 ; SAR Peak: 0.76 W/kg

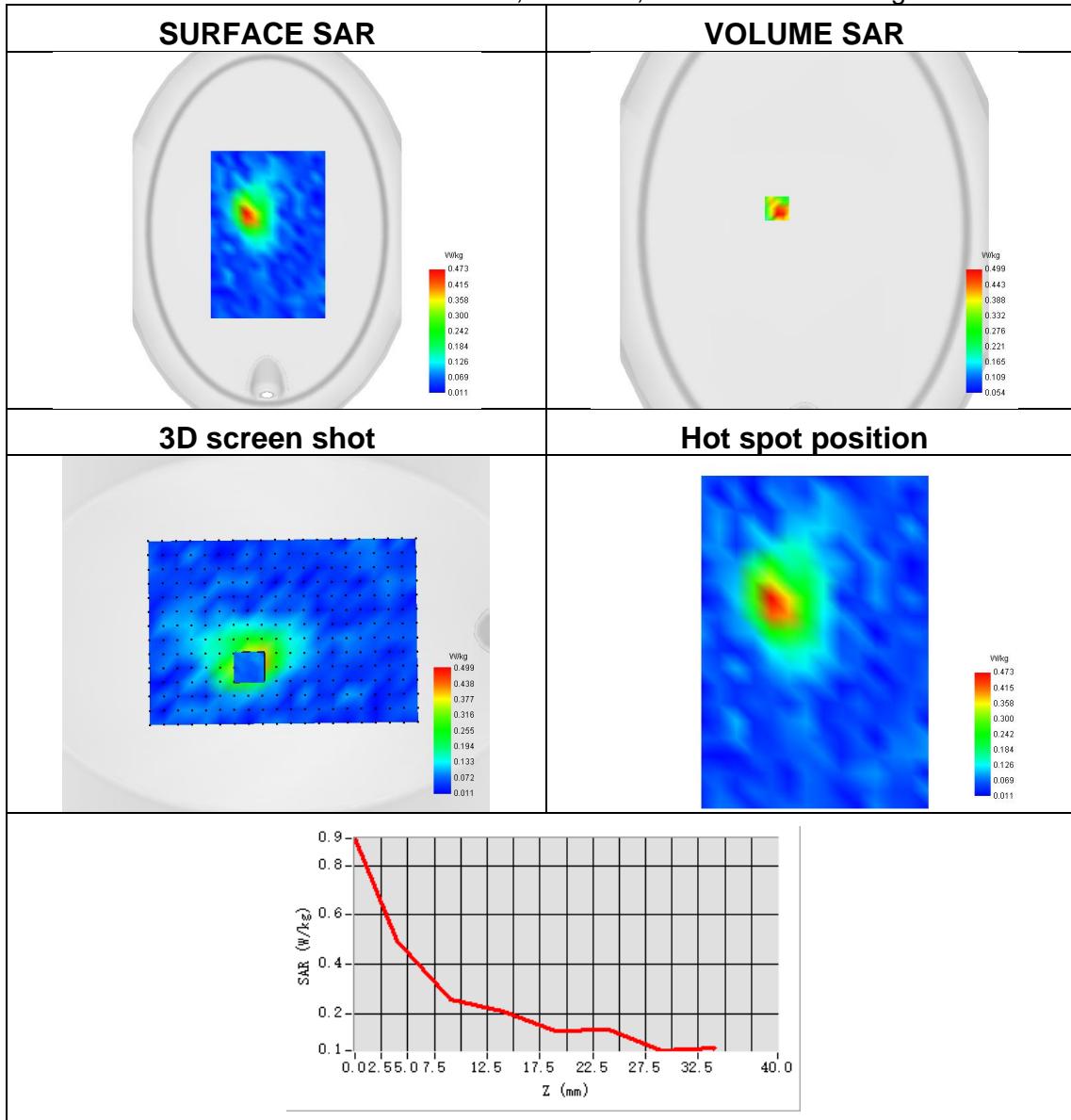




Plot 4:

Test Date	2023-09-01
ConvF	1.72
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5mm
Phantom	ELLI
Device Position	Back Side
Band	Band 5 (850)
Signal	WCDMA
Frequency	846.6
Relative permittivity	41.41
Conductivity (S/m)	0.92
SAR 10g (W/Kg)	0.293
SAR 1g (W/Kg)	0.479

Maximum location: X=-36.00, Y=29.00 ; SAR Peak: 0.75 W/kg

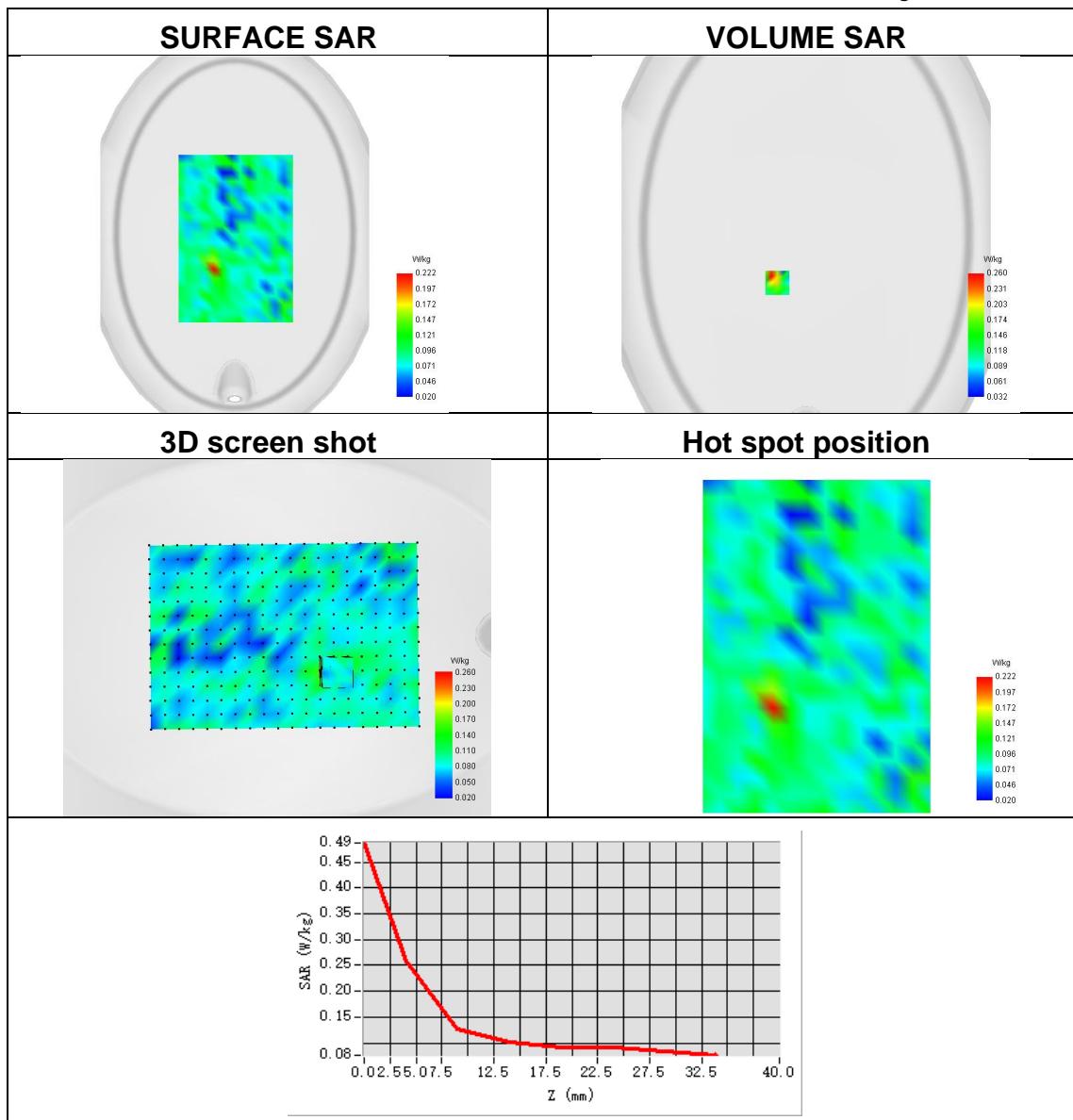




Plot 5:

Test Date	2023-09-07
ConvF	2.33
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5mm
Phantom	ELLI
Device Position	Back Side
Band	ISM
Signal	IEEE 802.11 b
Frequency	2437
Relative permittivity	39.63
Conductivity (S/m)	1.78
SAR 10g (W/Kg)	0.118
SAR 1g (W/Kg)	0.260

Maximum location: X=-38.00, Y=-64.00 ; SAR Peak: 0.54 W/kg

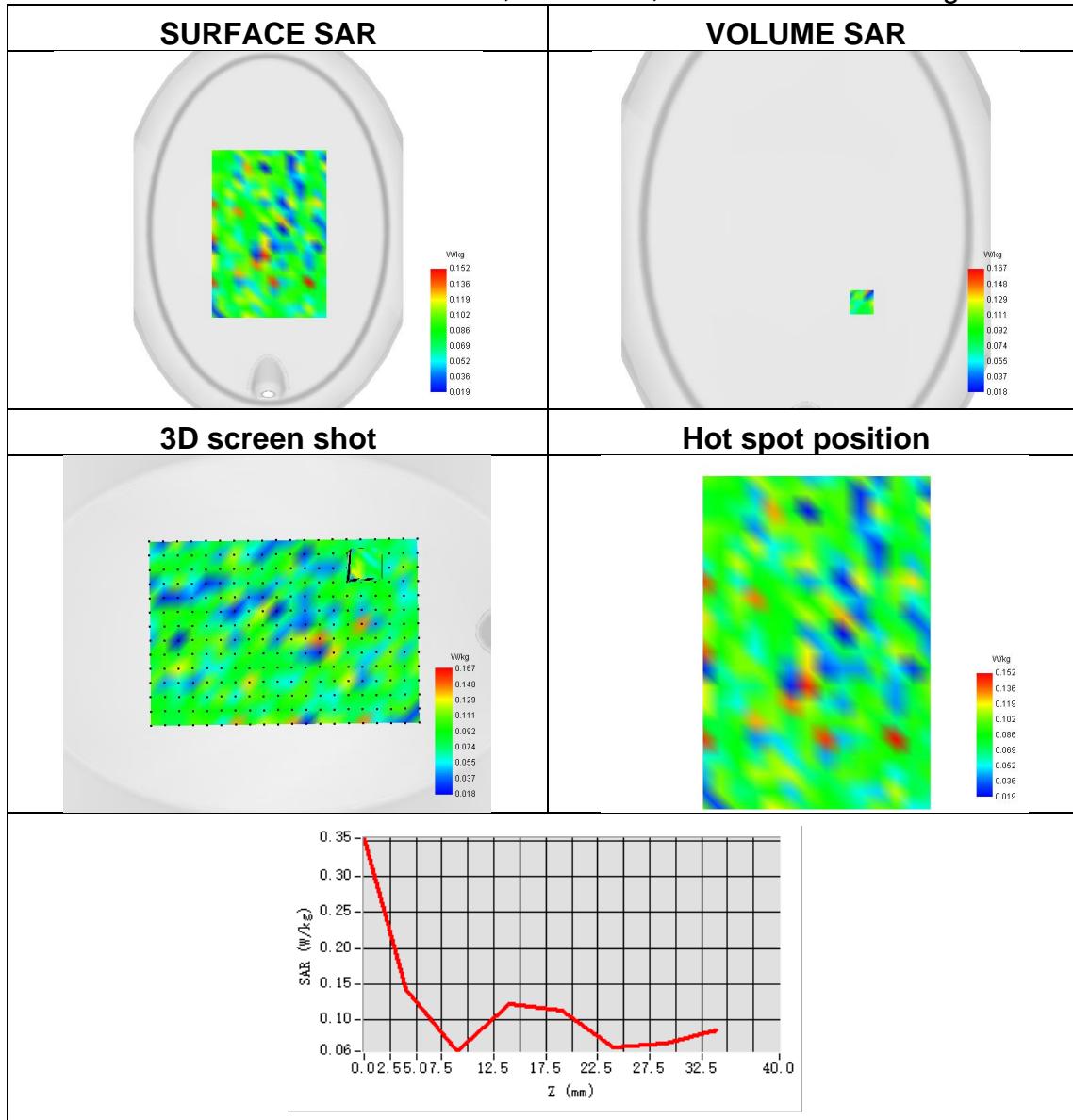




Plot 6:

Test Date	2023-09-07
ConvF	2.33
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5mm
Phantom	ELLI
Device Position	Top Side
Band	Bluetooth
Signal	Bluetooth
Frequency	2441
Relative permittivity	39.63
Conductivity (S/m)	1.78
SAR 10g (W/Kg)	0.057
SAR 1g (W/Kg)	0.083

Maximum location: X=74.00, Y=-96.00 ; SAR Peak: 0.28 W/kg





Appendix C. Probe Calibration and Dipole Calibration Report

Refer the appendix Calibration Report.

※※※※END OF THE REPORT※※※※