SAR TEST REPORT

Product Name: bikefinder Gen2

Model Name: BFG2

FCC ID: 2ATRU-BFG2

Issued For	:	BikeFinder AS Veritasveien 25, 4007 Stavanger, Postbox 4004, 4092 Stavanger, Stavanger, Norway
Issued By	:	Shenzhen LGT Test Service Co., Ltd. Room 205, Building 13, Zone B, Chen Hsong Industrial Park, No.177 Renmin West Road, Jinsha Community, Kengzi Street, Pingshan New District, Shenzhen, China

Report Number:	LGT23E006HA01
Sample Received Date:	May. 19, 2023
Date of Test:	May 21, 2023 ~ May 22, 2023
Date of Issue:	June 05, 2023
Max. SAR (10g):	Limbs: 0.299 W/kg

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Revision History

Rev.	Issue Date	Contents
00	June 05, 2023	Initial Issue

TEST REPORT CERTIFICATION

Applicant	BikeFinder AS
Address	Veritasveien 25, 4007 Stavanger, Postbox 4004, 4092 Stavanger, Stavanger, Norway
Manufacture	BikeFinder AS
Address	Veritasveien 25, 4007 Stavanger, Postbox 4004, 4092 Stavanger, Stavanger, Norway
Product Name	BikeFinder AS
Trademark	bikefinder , fahrradfinden
Model Name	BFG2
Sample Status:	Normal

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

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SHENZHEN LGT TEST SERVICE CO., LTD.

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	bikefinder Gen2	
Trademark	bikefinder , fahrradfinden	
Model Name	BFG2	
Series Model	N/A	
Model Difference	N/A	
Device Category	Portable	
Product stage	Production unit	
RF Exposure Environment	General Population / Uncontrolled	
Hardware Version	1.0.0	
Software Version	10.3.2	
Frequency Range	LTE Cat-M1 TX Frequency: Band 2:1850~1910MHz Band 4:1710~1755MHz Band 5:824~849MHz Band 12:699~716MHz Band 13:777~787MHz Band 25:1850~1915MHz Band 26:814~824/824~849MHz Band 66:1710~1780MHz LTE NB1 TX Frequency: Band 2:1850~1910MHz Band 4:1710~1755MHz Band 5:824~849MHz Band 12:699~716MHz Band 17:704~716MHz Band 25:1850~1915MHz Band 26:814~824/824~849MHz Band 66:1710~1780MHz 2.4G WIFI 802.11b/g/n: 2412~2462MHz BLE: 2402~2480MHz	
Max. Reported SAR(10g): (Limit: 4W/kg) Test distance:0mm	Mode	Limbs (W/kg))
	Cat-M1 Band 4	0.092
	Cat-M1 Band 5	0.108
	Cat-M1 Band 12	0.084
	Cat-M1 Band 13	0.101
	Cat-M1 Band 25	0.071
	Cat-M1 Band 26	0.061
	Cat-M1 Band 66	0.084
	NB1 Band 5	0.299
	NB1 Band 12	0.178
	NB1 Band 25	0.242
	NB1 Band 26	0.158
	NB1 Band 66	0.221

	2.4G WLAN	0.012
	BLE	0.010
10-g Sum SAR		0.309
Battery:	Capacity: 650mAh 2.47Wh Rated Voltage: 3.8V	
Operating Mode:	LTE Cat-M1: QPSK, 16QAM LTE-NB1: π/2-BPSK, π/4-QPSK 2.4G WIFI: 802.11b(DSSS):CCK,DQPSK,DBPSK 802.11g(OFDM):BPSK,QPSK,16-QAM,64-QAM 802.11n(OFDM):BPSK,QPSK,16-QAM,64-QAM BLE: GFSK	
Antenna Specification	LTE: LDS Antenna 2.4G WIFI/BLE: PCB Antenna	
Operating Mode	Maximum continuous output	
SIM Card	Internal single SIM Card.	
Hotspot Mode	Not Support	
DTM Mode	Not Support	

NOTE:

1. Cat-M1 Band 2 is completely included in band 25, band 26(824-849) is completely included in band 5, so the channels of band 25 and band 5 were tested to give conformity to the assigned block.
2. NB1 Band 2 is completely included in band 25, Band 4 is completely included in band 66, band 17 is completely included in band 12, band 26(824-849) is completely included in band 5, so the channels of band 25, band 12, band 5 and band 66 were tested to give conformity to the assigned block.
3. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power

1.2 Test Environment

Ambient conditions in the SAR laboratory:

Items	Required
Temperature (℃)	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 648474 D04 v01r03	SAR Evaluation Considerations for Wireless Handsets
6	FCC KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
7	FCC KDB 865664 D02 v01r02	RF Exposure Reporting
8	FCC KDB 941225 D05 v02r05	SAR for LTE Devices
9	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 Limbs LIMIT 4 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:

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

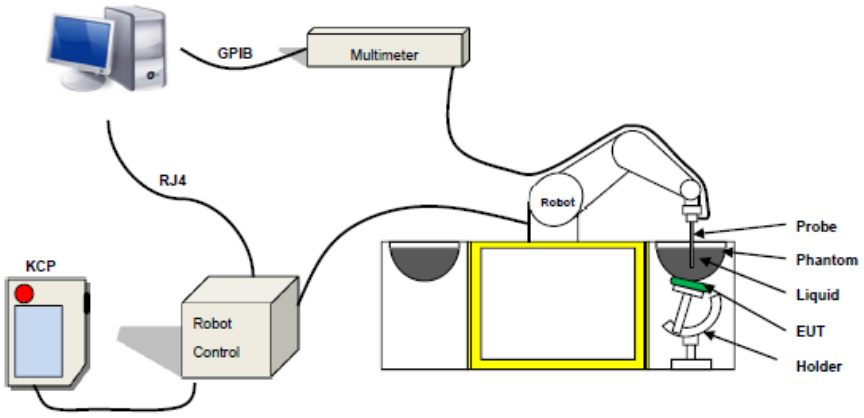
SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

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

Where: σ is the conductivity of the tissue;
ρ is the mass density of the tissue and E is the RMS electrical field strength.

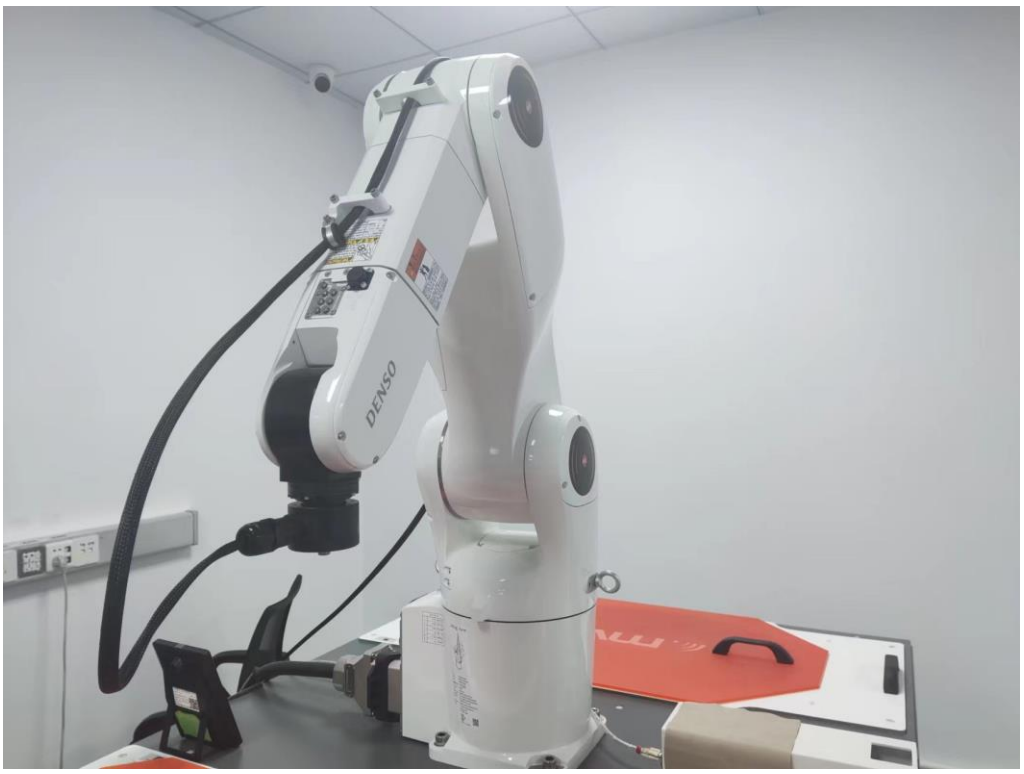
3.2 SAR System

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°

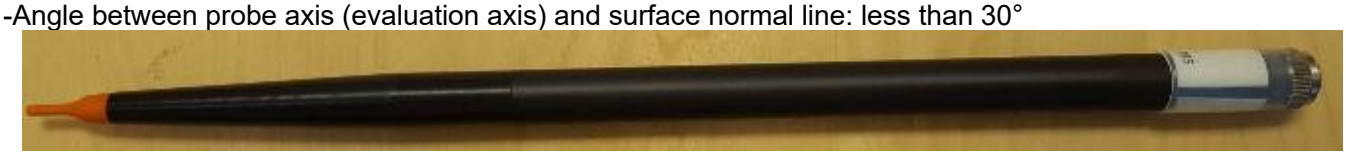


Figure 1-MVG COMOSAR Dosimetric E field Probe

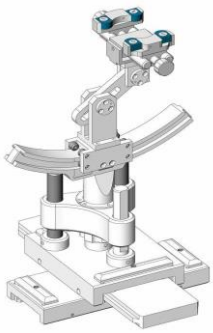
3.2.2 Phantom

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 ± 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 of 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	εr	σ 10g S/m
300	45.3	0.87
450	43.5	0.87
750	41.9	0.89
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
1800 to 2000	40.0	1.40
2100	39.8	1.49
2450	39.2	1.80
2600	39.0	1.96
3000	38.5	2.40
3500	37.9	2.91
4000	37.4	3.43
4500	36.8	3.94
5000	36.2	4.45
5200	36.0	4.66
5400	35.8	4.86
5600	35.5	5.07
5800	35.3	5.27

LIQUID MEASUREMENT RESULTS

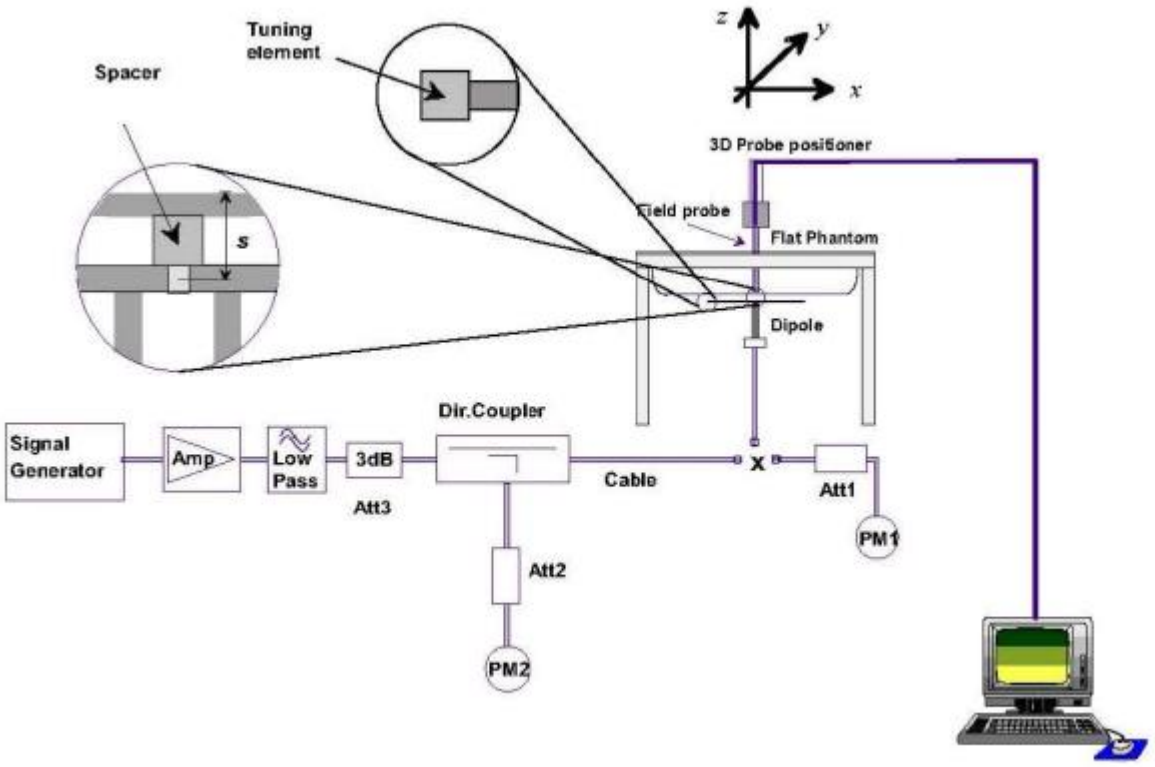
Date	Ambient		Simulating Liquid		Parameters	Target	Measured	Deviation %	Limited %
	Temp. [°C]	Humidity %	Frequency (MHz)	Temp. [°C]					
2023-05-21	22.6	46	750	22.3	Permittivity	41.90	42.66	1.81	±5
					Conductivity	0.89	0.86	-3.37	±5
2023-05-21	22.7	46	835	22.4	Permittivity	41.50	41.00	-1.20	±5
					Conductivity	0.90	0.89	-1.11	±5
2023-05-22	23	40	1800	22.7	Permittivity	40.00	40.59	1.48	±5
					Conductivity	1.40	1.44	2.86	±5
2023-05-22	23.1	40	1900	22.8	Permittivity	40.00	40.41	1.02	±5
					Conductivity	1.40	1.37	-2.14	±5
2023-05-22	23.1	41	2450	22.9	Permittivity	39.20	39.87	1.71	±5
					Conductivity	1.80	1.83	1.67	±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 ±10 %.

Date	Freq.	Power	Tested Value	Normalized SAR	Target SAR	Tolerance	Limit
	(MHz)	(mW)	(W/Kg)	(W/kg)	1g(W/kg)	(%)	(%)
2023-05-21	750	100	0.863	8.63	8.27	4.35	10
2023-05-21	835	100	1.037	10.37	9.75	6.36	10
2023-05-22	1800	100	3.798	37.98	39.06	-2.76	10
2023-05-22	1900	100	4.103	41.03	40.85	0.44	10
2023-05-22	2450	100	4.966	49.66	54.28	-8.51	10

Note:

1. The tolerance limit of System validation ±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 to16 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

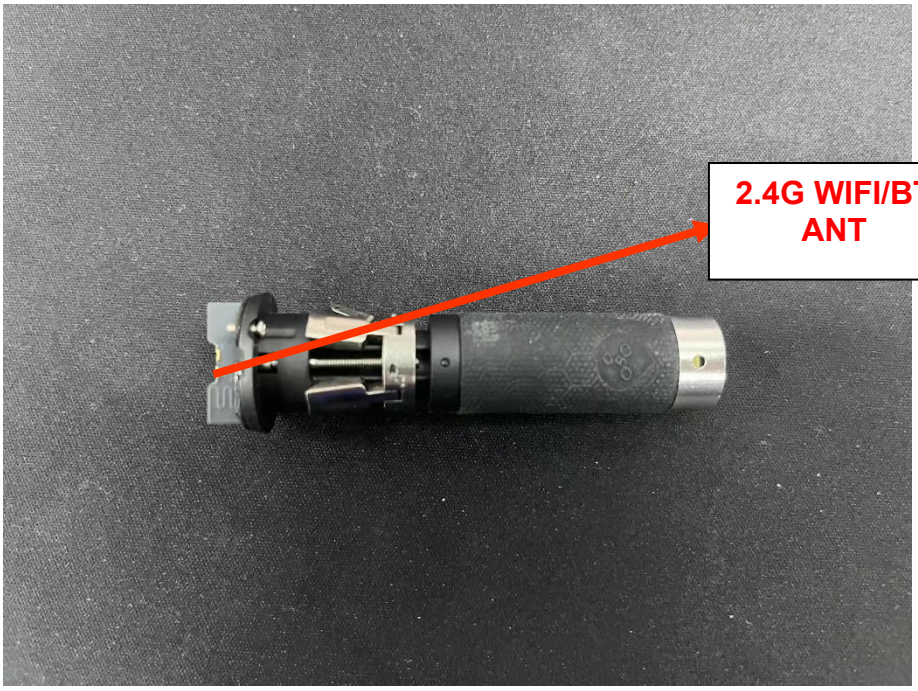
First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan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

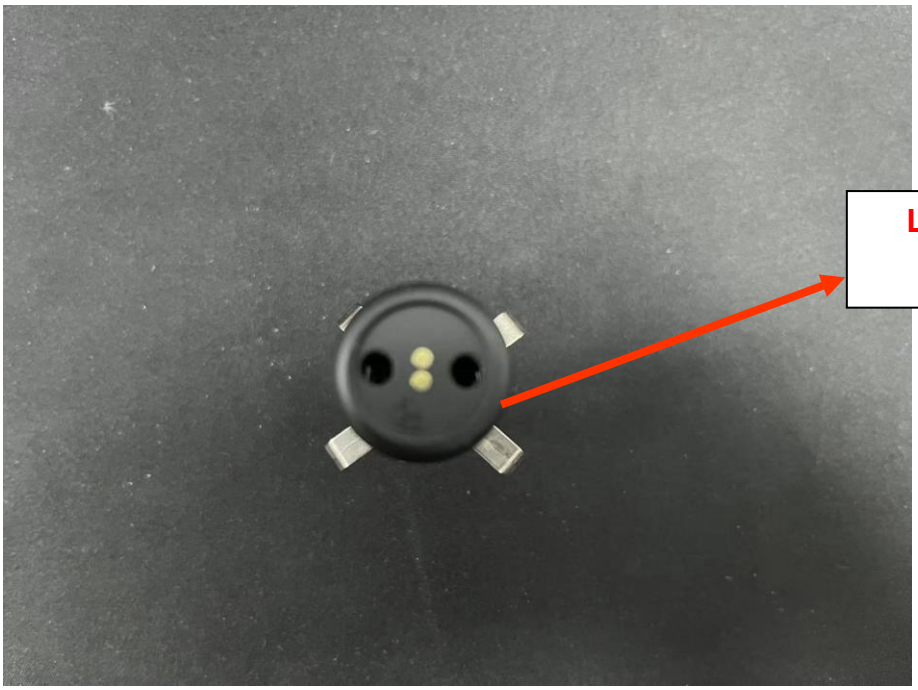
When the 1-g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.

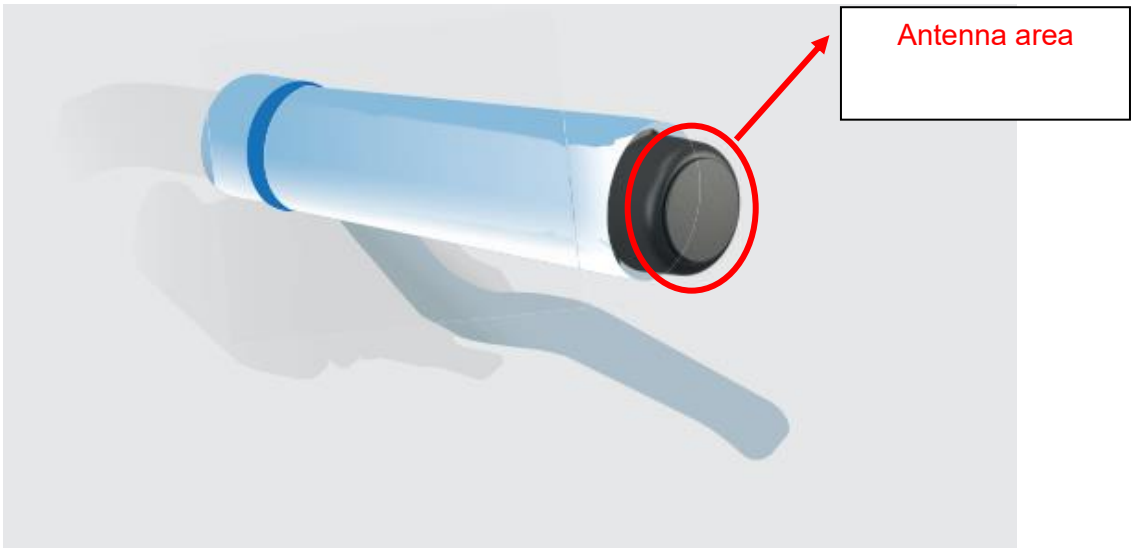
7. EUT Antenna Location Sketch

It is a bikefinder Gen2, support LTE CAT-M,NB1, WIFI and BT mode.

Transmitter Antenna







Antenna Separation Distance(cm)						
ANT	Back Side	Front Side	Left Side	Right Side	Top Side	Bottom Side
WWAN	≤0.5	≤0.5	>25	≤0.5	≤0.5	≤0.5
WIFI BT	≤0.5	≤0.5	>25	≤0.5	≤0.5	≤0.5

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

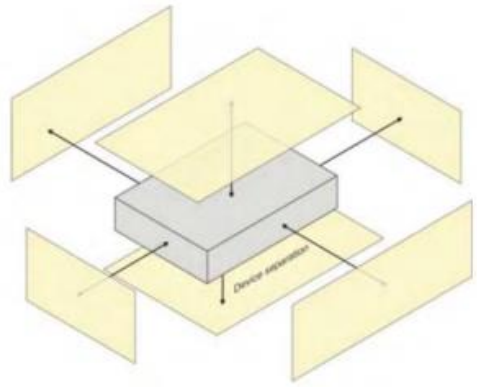
2. This device is fixed on the bicycle handlebars and the direction is fixed. Considering the power, antenna spacing and human contact, we test the side at the top of the antenna position corresponding to LTE and BT, WiFi functions.

8. EUT Test Position

This EUT was tested in 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 form 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	√3	0.07	1	0.07	∞
LIN	Probe linearity and detection limit	R	1.91	√3	1.10	1	1.10	∞
BBS	Broadband signal	R	0.15	√3	0.09	1	0.09	∞
ISO	Probe isotropy	R	0.18	√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/δ	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	cε, cσ	4.40	∞
LIQ(T_c)	Temperature effects (medium)	R	2.9	√3	1.67	cε, cσ	1.67	∞
EPS	Shell permittivity	R	3.4	√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	√3	2.07	1	2.07	∞
TAS	Time-average SAR	R	1.73	√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	√3	0.66	1	0.66	
u(ΔSAR)	Combined uncertainty						9.53	
U	Expanded uncertainty and effective degrees of freedom					U =	19.06	

10. Conducted Power Measurement

10.1 Test Result:

2.4G WLAN

2.4GWIFI				
Mode	Channel Number	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
802.11b	1	2412	11.15	13.03
	6	2437	10.30	10.72
	11	2462	9.31	8.53
802.11g	1	2412	10.75	11.89
	6	2437	9.50	8.91
	11	2462	8.46	7.01
802.11 n-HT20	1	2412	9.46	8.83
	6	2437	8.56	7.18
	11	2462	7.47	5.58
802.11 n-HT40	3	2422	8.69	7.40
	6	2437	7.93	6.21
	9	2452	7.46	5.57

BLE

BLE				
Mode	Channel Number	Frequency (MHz)	Average Power (dBm)	Output Power (mW)
GFSK(1Mbps)	0	2402	2.12	1.63
	19	2440	1.04	1.27
	39	2480	-1.30	0.74
GFSK(2Mbps)	0	2402	2.99	1.99
	19	2440	1.96	1.57
	39	2480	-0.19	0.96

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 $\leqslant$ 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 ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is $\leqslant$ 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 ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is $\leqslant$ 1.45 W/kg; Per KDB 941225 D05, smaller bandwidth SAR testing is not required.

CAT-M

Band 4

BW (MHz)	UL Channel	Frequency (MHz)	RB Size	RB offset	Modulation	Conduction AVG Power(dBm)
5	19975	1712.5	1	0	QPSK	22.1
			6	0		21.24
			1	0	16-QAM	22.27
			5	0		20.34
	20175	1732.5	1	0	QPSK	22.27
			6	0		21.25
			1	0	16-QAM	22.32
			5	0		20.3
	20375	1752.5	1	0	QPSK	22.19
			6	0		21.27
			1	0	16-QAM	22.23
			5	0		20.29

Band 5

BW (MHz)	UL Channel	Frequency (MHz)	RB Size	RB offset	Modulation	Conduction AVG Power(dBm)
3	20415	825.5	1	0	QPSK	22.97
			6	0		20.75
			1	0	16-QAM	21.89
			5	0		21.08
	20525	836.5	1	0	QPSK	22.99
			6	0		21.07
			1	0	16-QAM	21.86
			5	0		20.99
	20635	847.5	1	0	QPSK	22.99
			6	0		21.08
			1	0	16-QAM	21.73
			5	0		20.33

Band 12

BW (MHz)	UL Channel	Frequency (MHz)	RB Size	RB offset	Modulation	Conduction AVG Power(dBm)
10	23060	704	1	0	QPSK	22.65
			6	0		21.65
			1	0	16-QAM	21.58
			5	0		21.67
	23095	707.5	1	0	QPSK	22.74
			6	0		21.73
			1	0	16-QAM	21.62
			5	0		21.68
	23130	711	1	0	QPSK	22.7
			6	0		21.71
			1	0	16-QAM	21.67
			5	0		21.71

Band 13

BW (MHz)	UL Channel	Frequency (MHz)	RB Size	RB offset	Modulation	Conduction AVG Power(dBm)
5	23205	779.5	1	0	QPSK	22.53
			6	0		21.6
			1	0	16-QAM	22.61
			5	0		20.68
	23230	782	1	0	QPSK	22.54
			6	0		21.67
			1	0	16-QAM	22.62
			5	0		20.57
	23255	784.5	1	0	QPSK	22.49
			6	0		21.62
			1	0	16-QAM	22.6
			5	0		20.65

Band 25

BW (MHz)	UL Channel	Frequency (MHz)	RB Size	RB offset	Modulation	Conduction AVG Power(dBm)
3	26055	1851.5	1	0	QPSK	22.86
			6	0		20.91
			1	0	16-QAM	21.52
			5	0		20.91
	26365	1882.5	1	0	QPSK	22.99
			6	0		21.14
			1	0	16-QAM	21.99
			5	0		20.08
	26675	1913.5	1	0	QPSK	22.98
			6	0		21.28
			1	0	16-QAM	21.94
			5	0		21.22

Band 26(814-824)

BW (MHz)	UL Channel	Frequency (MHz)	RB Size	RB offset	Modulation	Conduction AVG Power(dBm)
5	26715	816.5	1	0	QPSK	22.84
			6	0		22.06
			1	0	16-QAM	21.83
			5	0		21.05
	26765	821.5	1	0	QPSK	22.84
			6	0		21.93
			1	0	16-QAM	21.85
			5	0		20.87

Cross-rule channel 824MHz

BW (MHz)	UL Channel	Frequency (MHz)	RB Size	RB offset	Modulation	Conduction AVG Power(dBm)
1.4	26790	824	1	0	QPSK	22.98
			6	0		21.06
			1	0	16-QAM	21.87
			5	0		21.14

Band 66

BW (MHz)	UL Channel	Frequency (MHz)	RB Size	RB offset	Modulation	Conduction AVG Power(dBm)
5	131997	1712.5	1	0	QPSK	22.77
			6	0		21.79
			1	0	16-QAM	21.68
			5	0		20.72
	132322	1745	1	0	QPSK	22.88
			6	0		21.93
			1	0	16-QAM	21.83
			5	0		20.87
	132647	1777.5	1	0	QPSK	22.88
			6	0		21.82
			1	0	16-QAM	21.77
			5	0		20.83

NB1

Band 5

UL Channel	UL Channel	Modulation	Subcarrier Space (KHz)	RB Configure	AVG Power(dBm)
20402	824.2	π/2-BPSK	3.75	1#0	23.12
				1#47	23.04
			15	1#0	23.12
				1#11	23.11
		π/4-QPSK	3.75	1#0	23.14
				1#47	23.07
			15	1#0	23.17
				1#11	23.16
				3#0	22.99
				3#6	23.31
				6#0	22.31
				6#6	22.38
				12#0	21.37
20525	836.5	π/2-BPSK	3.75	1#0	23.05
				1#47	22.98
			15	1#0	23.04
				1#11	23
		π/4-QPSK	3.75	1#0	23.04
				1#47	22.96
			15	1#0	23.03
				1#11	22.99
				3#0	22.71
				3#6	23.16
				6#0	21.8
				6#6	21.81
				12#0	20.78
20648	848.8	π/2-BPSK	3.75	1#0	23.01
				1#47	23.04
			15	1#0	23.15
				1#11	23.1
		π/4-QPSK	3.75	1#0	23
				1#47	23.03
			15	1#0	23.18
				1#11	23.1
				3#0	22.98
				3#6	23.34
				6#0	22.23
				6#6	22.31
				12#0	21.27

Band 12

UL Channel	UL Channel	Modulation	Subcarrier Space (KHz)	RB Configure	AVG Power(dBm)
23012	699.2	π/2-BPSK	3.75	1#0	22.84
				1#47	22.79
			15	1#0	22.95
				1#11	22.95
		π/4-QPSK	3.75	1#0	22.9
				1#47	22.81
			15	1#0	22.86
				1#11	22.94
				3#0	22.83
				3#6	23.19
				6#0	22.03
				6#6	22.13
				12#0	21.14
23095	707.5	π/2-BPSK	3.75	1#0	23.01
				1#47	23.11
			15	1#0	23.16
				1#11	23.13
		π/4-QPSK	3.75	1#0	23.01
				1#47	23.09
			15	1#0	23.15
				1#11	23.1
				3#0	22.97
				3#6	23.17
				6#0	21.97
				6#6	21.98
				12#0	20.95
23178	715.8	π/2-BPSK	3.75	1#0	22.85
				1#47	22.86
			15	1#0	22.83
				1#11	22.82
		π/4-QPSK	3.75	1#0	22.81
				1#47	22.85
			15	1#0	22.9
				1#11	22.86
				3#0	22.71
				3#6	23.16
				6#0	22.03
				6#6	22.09
				12#0	21.18

Band 25

UL Channel	UL Channel	Modulation	Subcarrier Space (KHz)	RB Configure	AVG Power(dBm)
264042	1850.2	π/2-BPSK	3.75	1#0	23.02
				1#47	22.96
			15	1#0	22.97
				1#11	22.95
		π/4-QPSK	3.75	1#0	22.98
				1#47	22.91
			15	1#0	23.05
				1#11	22.96
				3#0	22.96
				3#6	23.31
				6#0	22.18
				6#6	22.31
				12#0	21.28
26365	1882.5	π/2-BPSK	3.75	1#0	22.48
				1#47	22.45
			15	1#0	22.42
				1#11	22.36
		π/4-QPSK	3.75	1#0	22.45
				1#47	22.44
			15	1#0	22.4
				1#11	22.25
				3#0	21.3
				3#6	21.29
				6#0	21.37
				6#6	19.91
				12#0	19.91
26688	1914.8	π/2-BPSK	3.75	1#0	23.28
				1#47	23.32
			15	1#0	23.3
				1#11	23.3
		π/4-QPSK	3.75	1#0	23.29
				1#47	23.34
			15	1#0	23.4
				1#11	23.33
				3#0	23.25
				3#6	23.89
				6#0	22.49
				6#6	22.61
				12#0	21.51

Band 26(814-824)

UL Channel	UL Channel	Modulation	Subcarrier Space (KHz)	RB Configure	AVG Power(dBm)
26692	814.2	π/2-BPSK	3.75	1#0	23.02
				1#47	22.96
			15	1#0	22.99
				1#11	23.01
		π/4-QPSK	3.75	1#0	22.95
				1#47	22.93
			15	1#0	22.98
				1#11	22.96
				3#0	22.88
				3#6	22.86
				6#0	22.20
				6#6	22.24
				12#0	21.21
26788	823.8	π/2-BPSK	3.75	1#0	23.01
				1#47	22.69
			15	1#0	22.78
				1#11	22.79
		π/4-QPSK	3.75	1#0	22.75
				1#47	22.69
			15	1#0	22.80
				1#11	22.96
				3#0	21.96
				3#6	22.01
				6#0	21.01
				6#6	20.91
				12#0	21.21

Cross-rule channel 824MHz

UL Channel	UL Channel	Modulation	Subcarrier Space (KHz)	RB Configure	AVG Power(dBm)
26790	824	π/2-BPSK	3.75	1#0	23.14
				1#47	23.12
			15	1#0	23.14
				1#11	23.11
		π/4-QPSK	3.75	1#0	23.12
				1#47	23.15
			15	1#0	23.16
				1#11	23.17
				3#0	22.64
				3#6	23.16
				6#0	21.94
				6#6	21.97
				12#0	21.04

Band 66

UL Channel	UL Channel	Modulation	Subcarrier Space (KHz)	RB Configure	AVG Power(dBm)
131974	1710.2	π/2-BPSK	3.75	1#0	22.96
				1#47	22.92
			15	1#0	22.98
				1#11	22.96
		π/4-QPSK	3.75	1#0	22.99
				1#47	22.9
			15	1#0	22.99
				1#11	22.96
				3#0	22.83
				3#6	23.31
				6#0	22.2
				6#6	22.29
				12#0	21.19
132322	1745	π/2-BPSK	3.75	1#0	22.75
				1#47	22.69
			15	1#0	22.75
				1#11	22.73
		π/4-QPSK	3.75	1#0	22.74
				1#47	22.66
			15	1#0	22.73
				1#11	22.72
				3#0	22.4
				3#6	22.46
				6#0	21.55
				6#6	21.54
				12#0	20.54
132670	1779.8	π/2-BPSK	3.75	1#0	23.11
				1#47	23.03
			15	1#0	23.12
				1#11	23.16
		π/4-QPSK	3.75	1#0	23.12
				1#47	23.1
			15	1#0	23.13
				1#11	23.1
				3#0	22.98
				3#6	23.39
				6#0	22.21
				6#6	22.38
				12#0	21.26

Tune up power

Cat-M

RB Size	RB offset	Modulation	Band 4	Band 5	Band 12
1	0	QPSK	21.5±1dBm	22.5±1dBm	22±1dBm
6	0		20.5±1dBm	20.5±1dBm	21±1dBm
1	0	16-QAM	21.4±1dBm	21±1dBm	21±1dBm
5	0		19.5±1dBm	20.5±1dBm	21±1dBm

RB Size	RB offset	Modulation	Band 13	Band 25	B26(814-824)
1	0	QPSK	22±1dBm	22.5±1dBm	22±1dBm
6	0		21±1dBm	20.5±1dBm	21.5±1dBm
1	0	16-QAM	21.7±1dBm	21.5±1dBm	21±1dBm
5	0		20±1dBm	20.5±1dBm	20.5±1dBm

RB Size	RB offset	Mode	Cross-rule channel 824MHz	Band 66
1	0	QPSK	22.5±1dBm	22±1dBm
6	0		20.5±1dBm	21±1dBm
1	0	16-QAM	21±1dBm	21±1dBm
5	0		20.5±1dBm	20±1dBm

NB

Subcarrier Space (KHz)	RB Configure	Modulation	Band 5	Band 12	Band 25
3.75	1#0	π/2-BPSK	22.5±1dBm	22.5±1dBm	22.5±1dBm
	1#47		22.5±1dBm	22.5±1dBm	22.5±1dBm
15	1#0		22.5±1dBm	22.5±1dBm	22.5±1dBm
	1#11		22.5±1dBm	22.5±1dBm	22.5±1dBm
3.75	1#0	π/4-QPSK	22.5±1dBm	22.5±1dBm	22.5±1dBm
	1#47		22.5±1dBm	22.5±1dBm	22.5±1dBm
15	1#0		22.5±1dBm	22.5±1dBm	23±1dBm
	1#11		22.5±1dBm	22.5±1dBm	22.5±1dBm
	3#0		22.5±1dBm	22±1dBm	22.5±1dBm
	3#6		22.5±1dBm	22.5±1dBm	23±1dBm
	6#0		21.5±1dBm	22.5±1dBm	21.5±1dBm
	6#6		21.5±1dBm	21.5±1dBm	22±1dBm
	12#0		20.5±1dBm	20.5±1dBm	21±1dBm

Subcarrier Space (KHz)	RB Configure	Modulation	B26(814-824)	Cross-rule channel 824MHz	Band 66
3.75	1#0	π/2-BPSK	22.5±1dBm	22.5±1dBm	22.5±1dBm
	1#47		22±1dBm	22.5±1dBm	22.5±1dBm
15	1#0		22.5±1dBm	22.5±1dBm	22.5±1dBm
	1#11		22.5±1dBm	22.5±1dBm	22.5±1dBm
3.75	1#0	π/4-QPSK	22±1dBm	22.5±1dBm	22.5±1dBm
	1#47		22±1dBm	22.5±1dBm	22.5±1dBm
15	1#0		22±1dBm	22.5±1dBm	22.5±1dBm
	1#11		22±1dBm	22.5±1dBm	22.5±1dBm
	3#0		22±1dBm	22±1dBm	22.5±1dBm
	3#6		22±1dBm	22.5±1dBm	22.5±1dBm
	6#0		21.5±1dBm	21±1dBm	21.5±1dBm
	6#6		21.5±1dBm	21±1dBm	21.5±1dBm
	12#0		20.5±1dBm	20.5±1dBm	20.5±1dBm

2.4G WLAN

Mode	2.4G WIFI
802.11b	10.5±1dBm
802.11g	10±1dBm
802.11 n-HT20	9±1dBm
802.11 n-HT40	8±1dBm

BLE

Mode	BLE
GFSK(1Mbps)	1.5±1dBm
GFSK(2Mbps)	2±1dBm

11. EUT and Test Setup Photo

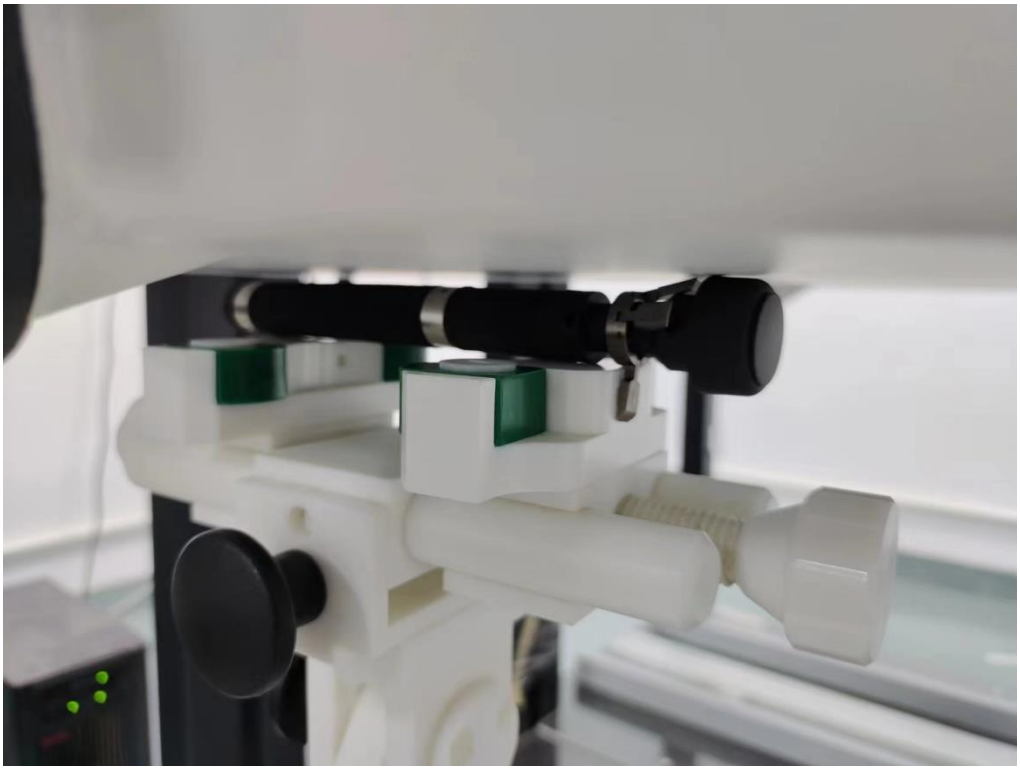
11.1 EUT Photos

LTE Antenna Top side

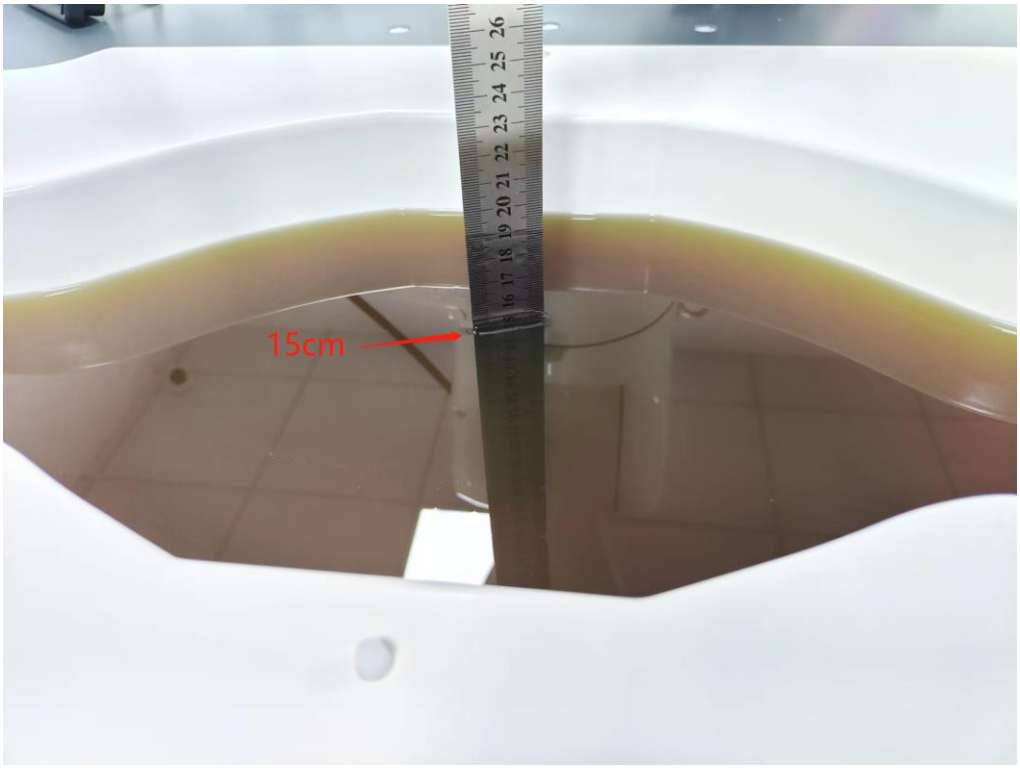
BT/WIFI Antenna Top side

11.2 Setup Photos

Top side (separation distance is 0mm)



Liquid depth (15 cm)



12. SAR Result Summary

12.1 Limbs SAR

Band	Mode	Test Position	Freq.	SAR (10g) (W/kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Scaled SAR (W/Kg)	Meas.No.
CAT-M band 4	QPSK, 5MHz BW, 1RB Offset 0	Top Side	1732.5	0.087	-0.22	22.50	22.27	**0.092**	**1**
	QPSK, 5MHz BW, 6RB Offset 0	Top Side	1752.5	0.065	-1.16	21.50	21.27	0.069	/
CAT-M band 5	QPSK, 3MHz BW, 1RB Offset 0	Top Side	825.5	0.083	2.78	23.50	22.97	0.094	/
			836.5	0.096	-1.96	23.50	22.99	**0.108**	**2**
			847.5	0.080	-2.11	23.50	22.99	0.090	/
	QPSK, 3MHz BW, 6RB Offset 0	Top Side	847.5	0.073	-0.87	21.50	21.08	**0.080**	/
CAT-M band 12	QPSK, 10MHz BW, 1RB Offset 0	Top Side	707.5	0.079	3.81	23.00	22.74	**0.084**	**3**
	QPSK, 10MHz BW, 6RB Offset 0	Top Side	707.5	0.053	1.88	22.00	21.73	0.056	/
CAT-M band 13	QPSK, 5MHz BW, 1RB Offset 0	Top Side	782	0.091	-0.40	23.00	22.54	**0.101**	**4**
	QPSK, 5MHz BW, 6RB Offset 0	Top Side	784.5	0.075	2.71	22.00	21.67	0.081	/
CAT-M band 25	QPSK, 3MHz BW, 1RB Offset 0	Top Side	1882.5	0.063	-2.01	23.50	22.99	**0.071**	**5**
	QPSK, 3MHz BW, 6RB Offset 0	Top Side	1882.5	0.052	3.95	21.50	21.14	0.056	/
CAT-M band 26	QPSK, 1.4MHz BW, 1RB Offset 0	Top Side	824	0.054	0.39	23.50	22.98	**0.061**	**6**
	QPSK, 1.4MHz BW, 6RB Offset 0	Top Side	824	0.043	-3.34	21.50	21.06	0.048	/
CAT-M band 66	QPSK, 5MHz BW, 1RB Offset 0	Top Side	1777.5	0.082	0.58	23.00	22.88	**0.084**	**7**
	QPSK, 5MHz BW, 6RB Offset 0	Top Side	1777.5	0.073	-0.65	22.00	21.93	0.074	/
NB band 5	π/4-QPSK 15K sub carrier, 1#0	Top Side	848.8	0.207	2.57	23.50	23.18	0.223	/
	π/4-QPSK 15K sub carrier, 3#6	Top Side	824.2	0.279	3.00	23.50	23.31	0.291	/
		Top Side	836.5	0.264	-0.74	23.50	23.16	0.285	/
		Top Side	848.8	0.288	-3.91	23.50	23.34	**0.299**	**8**
NB band 12	π/4-QPSK 15K sub carrier, 1#0	Top Side	707.5	0.151	-2.28	23.50	23.15	0.164	/
	π/4-QPSK 15K sub carrier, 3#6	Top Side	699.2	0.166	3.00	23.50	23.19	**0.178**	**9**

NB band 25	π/4-QPSK 15K sub carrier, 1#0	Top Side	1914.8	0.204	0.21	23.50	23.40	0.209	/
	π/4-QPSK 15K sub carrier, 3#6	Top Side	1914.8	0.236	0.10	24.00	23.89	**0.242**	**10**
NB band 26	π/4-QPSK 15K sub carrier, 1#0	Top Side	824	0.142	2.83	23.50	23.16	0.154	/
	π/4-QPSK 15K sub carrier, 1#11	Top Side	824	0.146	-1.15	23.50	23.17	**0.158**	**11**
NB band 66	π/4-QPSK 15K sub carrier, 1#0	Top Side	1779.8	0.197	1.49	23.50	23.13	0.215	/
	π/4-QPSK 15K sub carrier, 3#6	Top Side	1779.8	0.215	-3.89	23.50	23.39	**0.221**	**12**
2.4G WLAN	802.11b	Top Side	2412	0.011	2.22	11.50	11.15	**0.012**	**13**
BLE	GFSK	Top Side	2402	0.01	-1.03	3.00	2.99	**0.010**	**14**

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. Per KDB 248227- When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg. (The highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power was 0.011 W/Kg for Limbs)

12.2 Simultaneous Multi-band Transmission Evaluation

Application Simultaneous Transmission information:

Position	Simultaneous State
Limbs	1. LTE + 2.4G WLAN
	2. 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 · Pant / Pth [W/kg].
   Pant is maximum time-averaged power or effective radiated power (ERP), whichever is greater, and *Pth* is defined in Formula KDB 447498 (B.2).

Simultaneous Mode	Position	Mode	Max. 10-g SAR (W/kg)	10-g Sum SAR (W/kg)
LTE Cat -M1 + 2.4G WLAN	Body	LTE Cat -M1	0.108	0.120
		2.4G WLAN	0.012	
LTE Cat -M1 + Bluetooth	Body	LTE Cat -M1	0.108	0.118
		Bluetooth	0.010	
LTE NB1 + 2.4G WLAN	Body	LTE NB1	0.299	0.311
		2.4G WLAN	0.012	
LTE NB1 + Bluetooth	Body	LTE NB1	0.299	0.309
		Bluetooth	0.010	

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 10g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR-10g 4 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR 10g is greater than the SAR limit (SAR-10g 4 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
750MHz Dipole	MVG	DIP0G750	SN 06/22 DIP0G750-638	2022.02.11	2025.02.10
835MHz Dipole	MVG	DIP0G835	SN 06/22 DIP0G835-639	2022.02.11	2025.02.10
1800MHz Dipole	MVG	DIP1G800	SN 06/22 DIP1G800-640	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

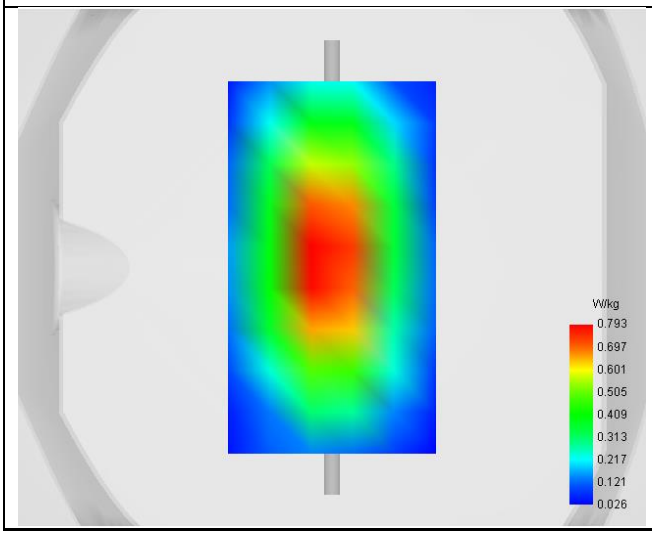
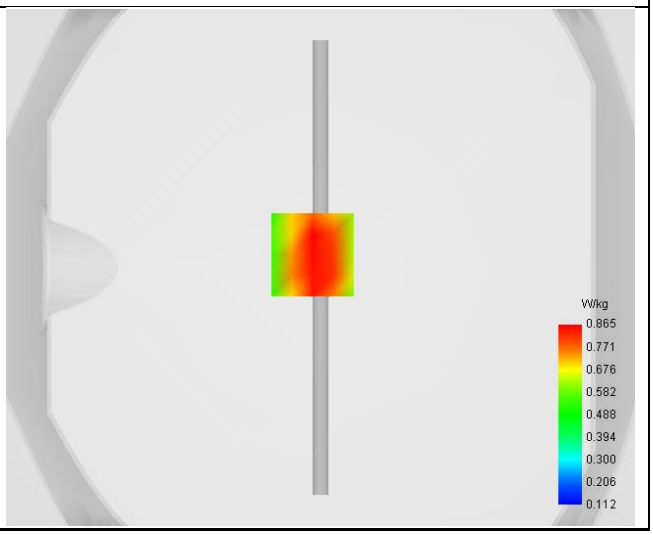
Appendix A. System Validation Plots

System Performance Check Data (750MHz)

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2023-05-21

Experimental conditions.

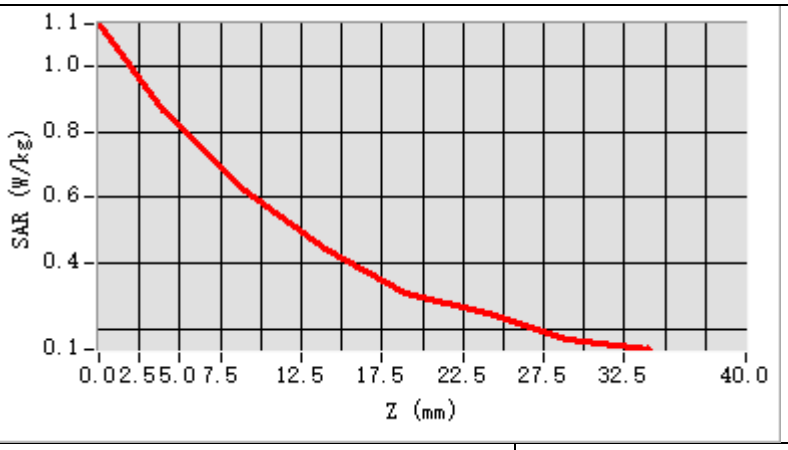
Phantom	Validation plane
Device Position	Dipole
Band	CW750
Channels	Middle
Signal	CW
Frequency (MHz)	750.000
Relative permittivity	42.66
Conductivity (S/m)	0.86
Probe	SN 04/22 EPGO364
ConvF	1.69
Crest factor:	1:1

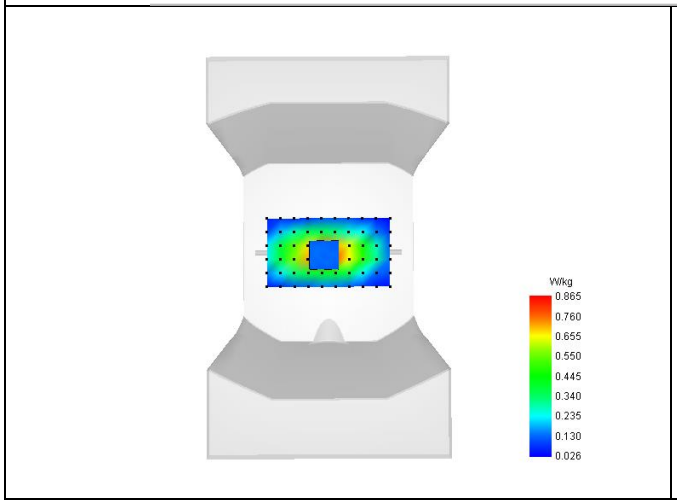
SURFACE SAR	VOLUME SAR
	

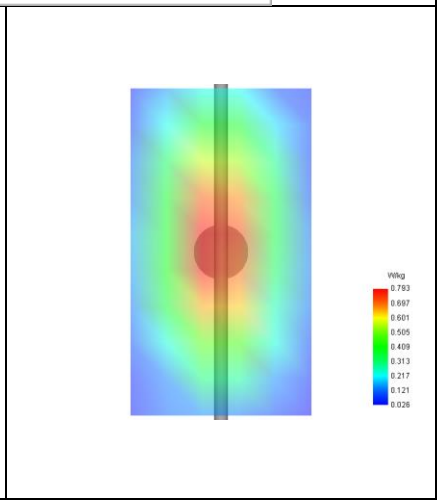
Maximum location: X=5.00, Y=9.00 ; SAR Peak: 1.52 W/kg

SAR 10g (W/Kg)	0.574
SAR 1g (W/Kg)	0.863

Z Axis Scan


1.1
1.0
0.8
0.6
0.4
0.1
SAR (W/kg)
0.0 2.5 5.0 7.5 12.5 17.5 22.5 27.5 32.5 40.0
Z (mm)


W/kg
0.865
0.760
0.655
0.550
0.445
0.340
0.235
0.130
0.026

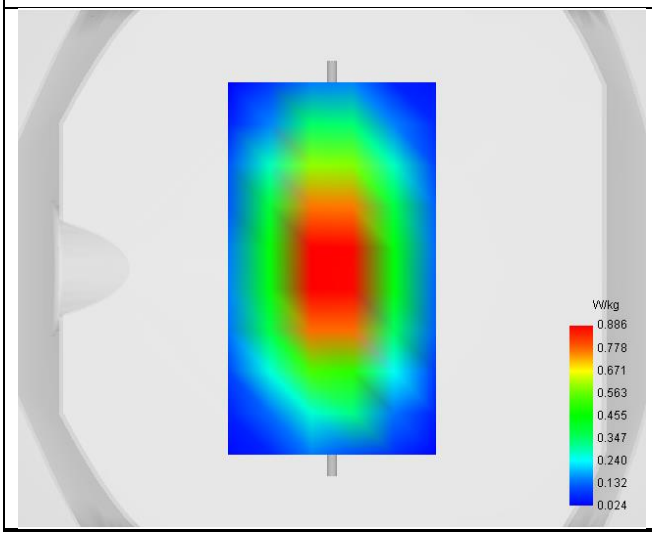
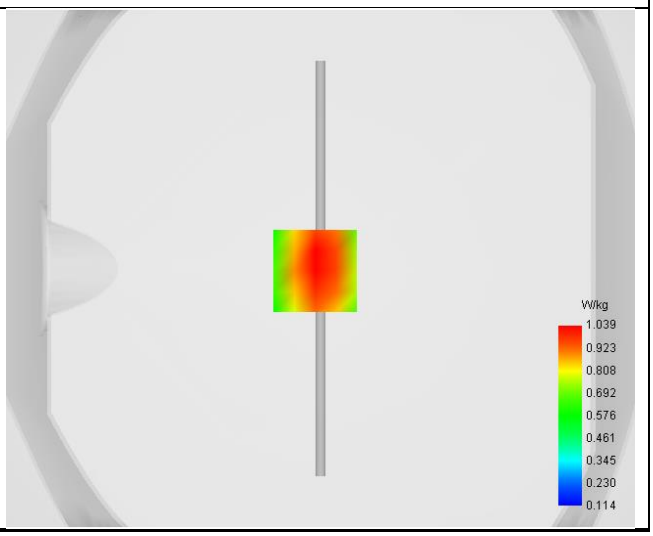

W/kg

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: 2023-05-21

Experimental conditions.

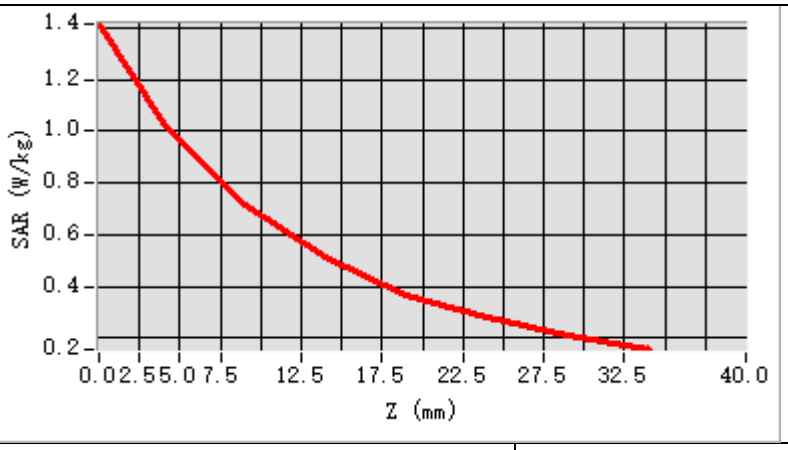
Phantom	Validation plane
Device Position	Dipole
Band	CW835
Channels	Middle
Signal	CW
Frequency (MHz)	835.000
Relative permittivity	41.00
Conductivity (S/m)	0.89
Probe	SN 04/22 EPGO364
ConvF	1.72
Crest factor:	1:1

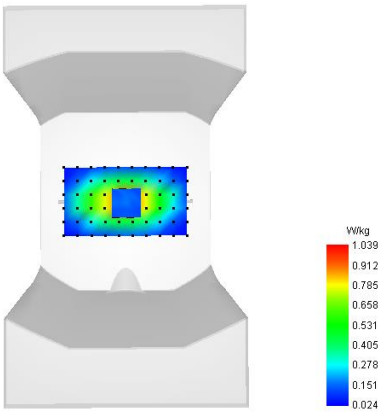
SURFACE SAR	VOLUME SAR
	

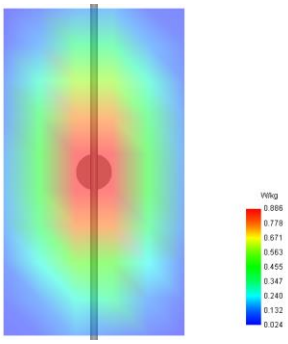
Maximum location: X=5.00, Y=5.00 ; SAR Peak: 1.45 W/kg

SAR 10g (W/Kg)	0.623
SAR 1g (W/Kg)	1.037

Z Axis Scan


1.4
1.2
1.0
0.8
0.6
0.4
0.2
SAR (W/kg)
0.0 2.5 5.0 7.5 12.5 17.5 22.5 27.5 32.5 40.0
Z (mm)


W/kg
1.039
0.912
0.785
0.658
0.531
0.405
0.278
0.151
0.024

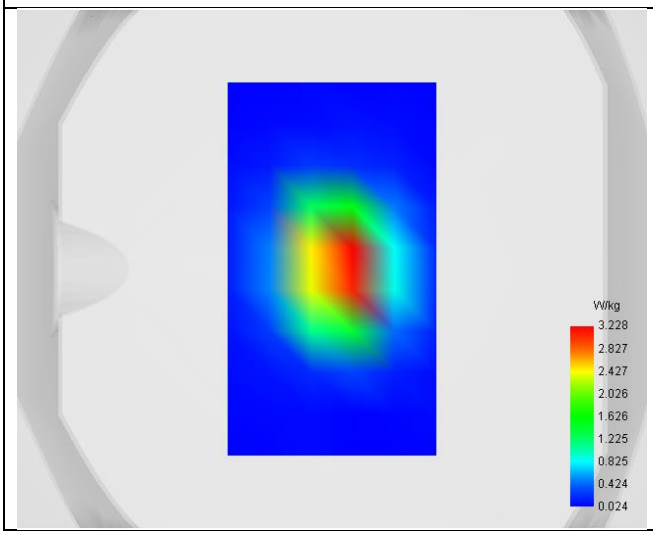
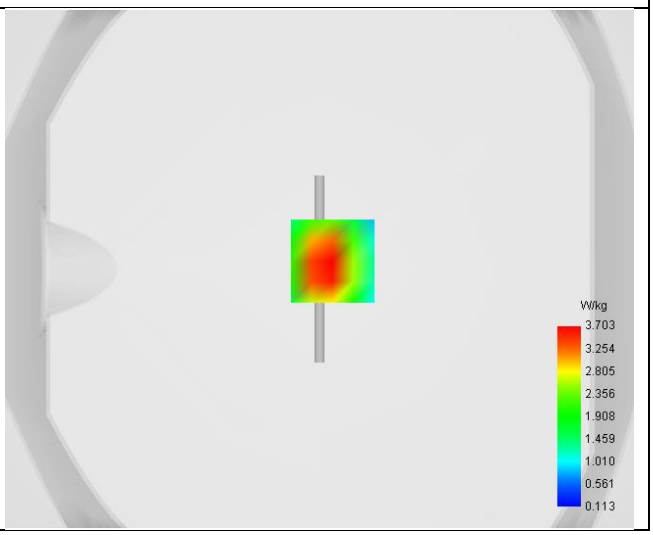


System Performance Check Data (1800MHz)

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm, dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2023-05-22

Experimental conditions.

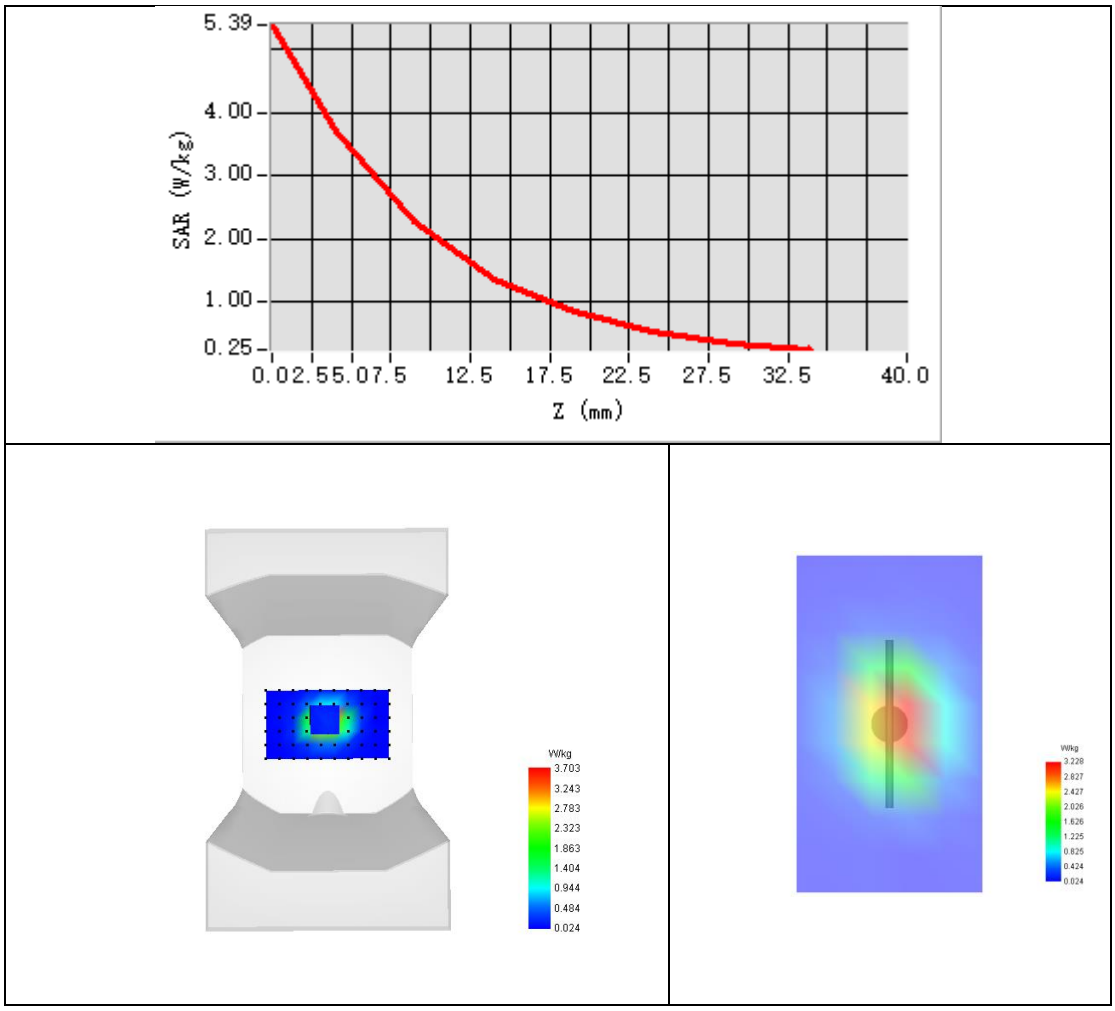
Phantom	Validation plane
Device Position	Dipole
Band	CW1800
Channels	Middle
Signal	CW
Frequency (MHz)	1800.000
Relative permittivity	40.59
Conductivity (S/m)	1.44
Probe	SN 04/22 EPGO364
ConvF	1.95
Crest factor:	1:1

SURFACE	VOLUME SAR
	

Maximum location: X=3.00, Y=3.00 ; SAR Peak: 6.84 W/kg

SAR 10g (W/Kg)	1.960
SAR 1g (W/Kg)	3.798

Z Axis Scan

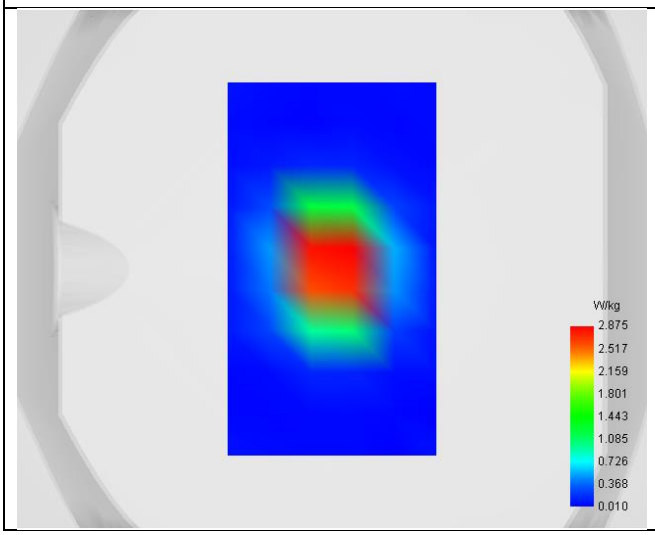
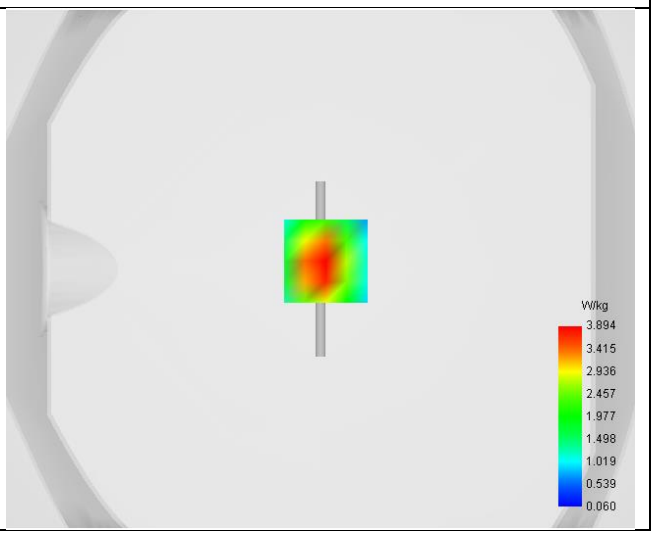

5.39
4.00
3.00
2.00
1.00
0.25
SAR (W/kg)
0.0 2.5 5.0 7.5 12.5 17.5 22.5 27.5 32.5 40.0
Z (mm)
W/kg
3.703
3.243
2.783
2.323
1.863
1.404
0.944
0.484
0.024
W/kg

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: 2023-05-22

Experimental conditions.

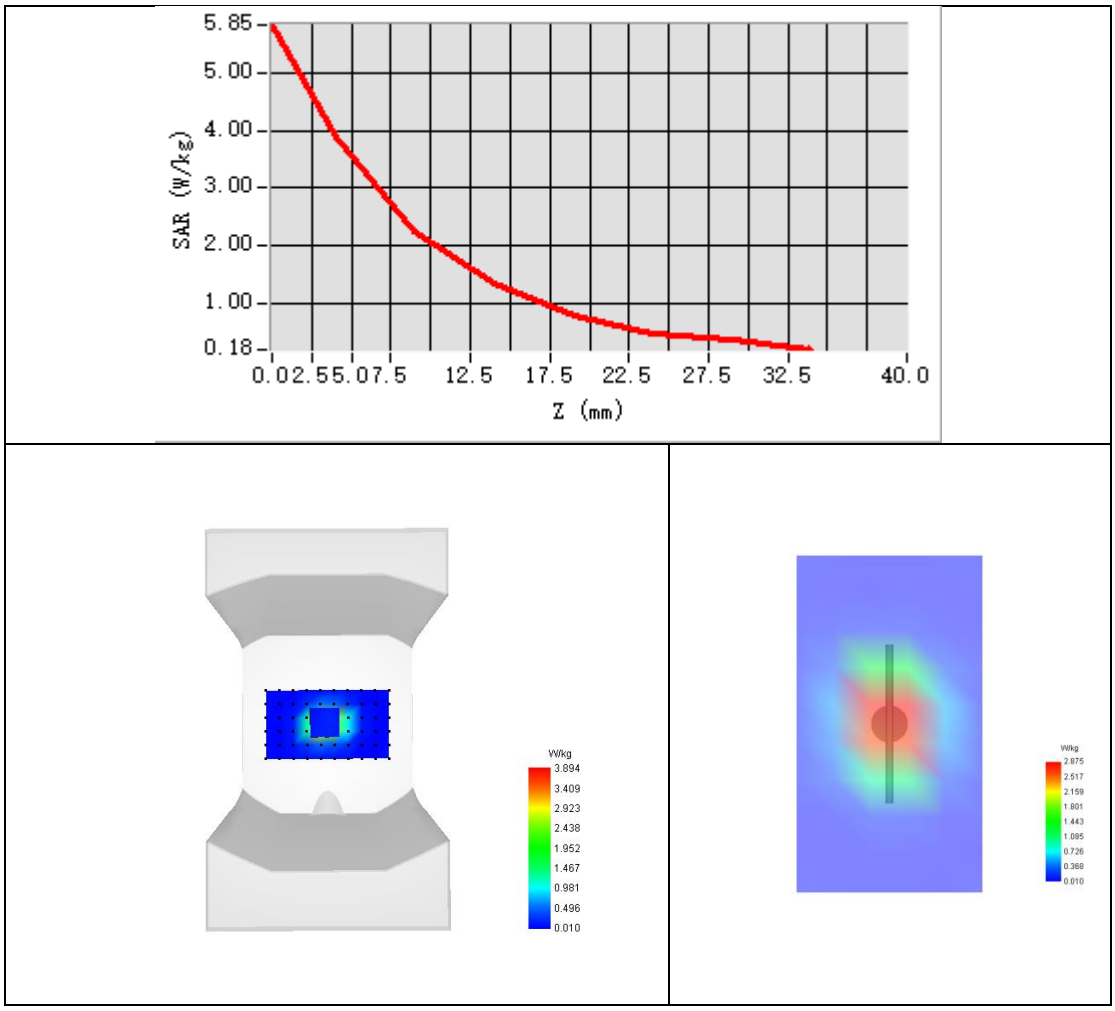
Phantom	Validation plane
Device Position	Dipole
Band	CW1900
Channels	Middle
Signal	CW
Frequency (MHz)	1900.000
Relative permittivity	40.41
Conductivity (S/m)	1.37
Probe	SN 04/22 EPGO364
ConvF	2.25
Crest factor:	1:1

SURFACE	VOLUME SAR
	

Maximum location: X=5.00, Y=1.00 ; SAR Peak: 6.89 W/kg

SAR 10g (W/Kg)	2.112
SAR 1g (W/Kg)	4.103

Z Axis Scan

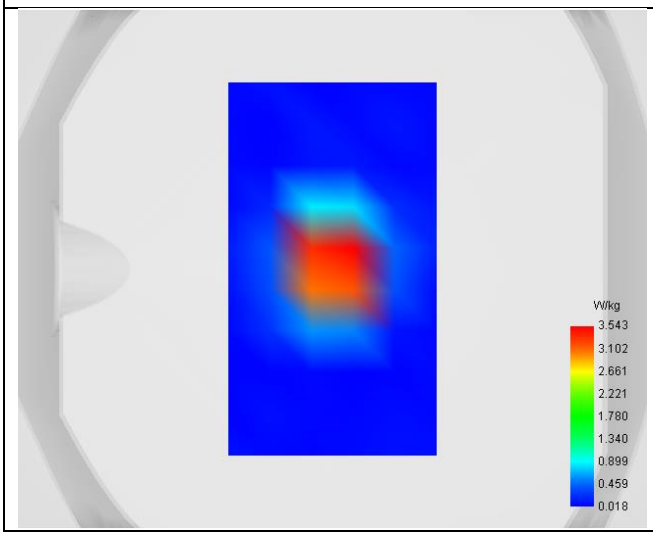
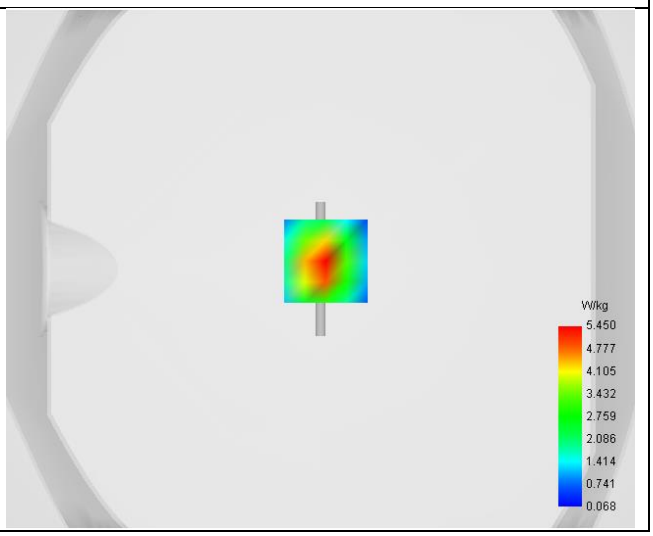

5.85
5.00
4.00
3.00
2.00
1.00
0.18
SAR (W/kg)
0.0 2.5 5.0 7.5 12.5 17.5 22.5 27.5 32.5 40.0
Z (mm)
W/kg
3.894
3.409
2.923
2.438
1.952
1.467
0.981
0.496
0.010
W/kg
2.875
2.517
2.159
1.801
1.443
1.085
0.726
0.368
0.010

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: 2023-05-22

Experimental conditions.

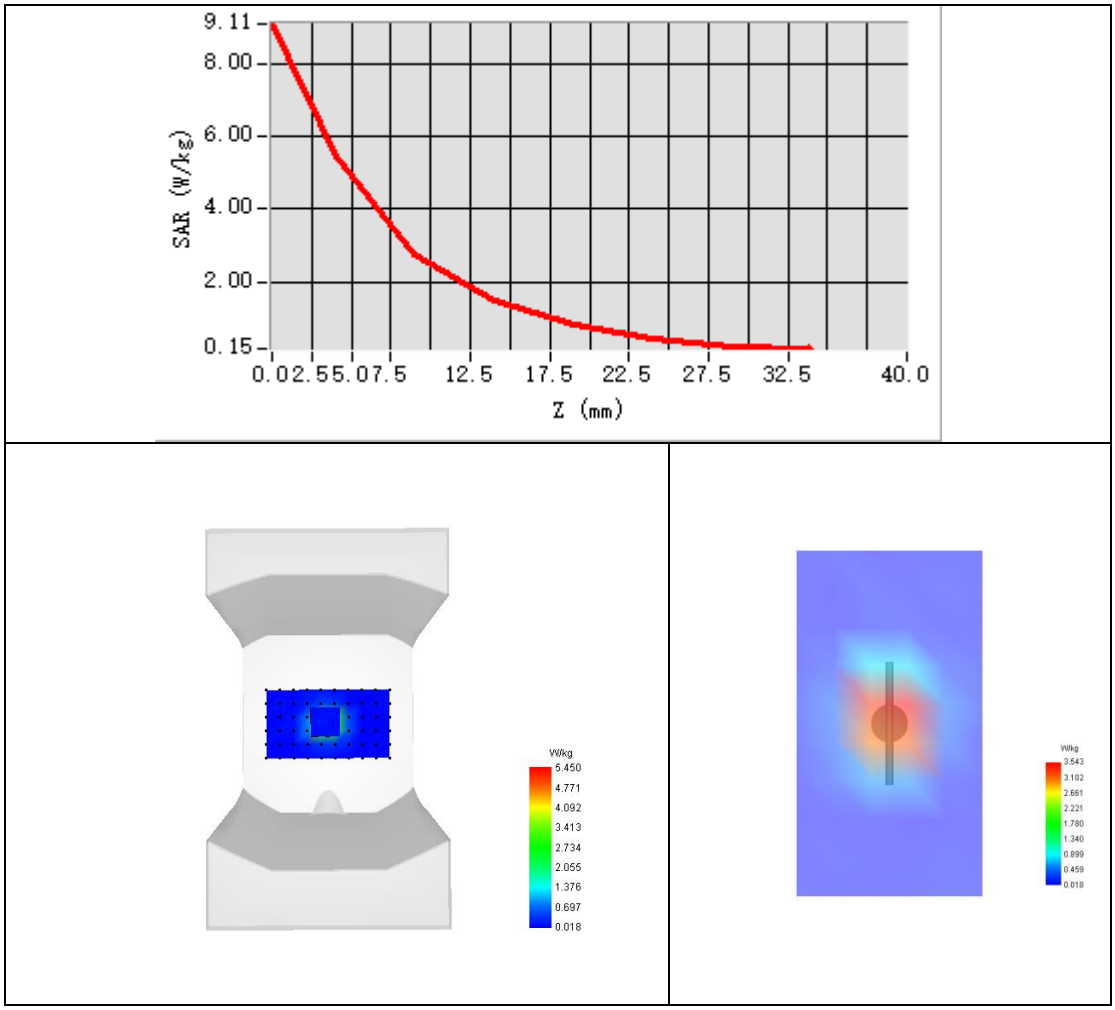
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Channels	Middle
Signal	CW
Frequency (MHz)	2450.000
Relative permittivity	39.87
Conductivity (S/m)	1.83
Probe	SN 04/22 EPGO364
ConvF	2.33
Crest factor:	1:1

SURFACE	VOLUME SAR
	

Maximum location: X=5.00, Y=3.00 ; SAR Peak: 8.39 W/kg

SAR 10g (W/Kg)	2.375
SAR 1g (W/Kg)	4.966

Z Axis Scan

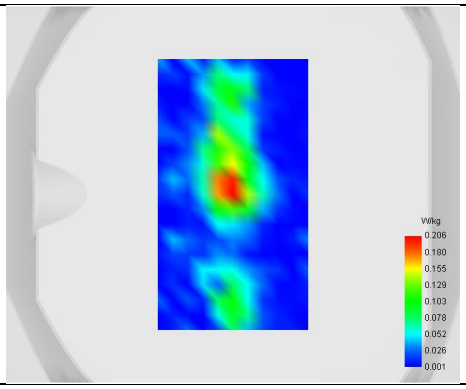
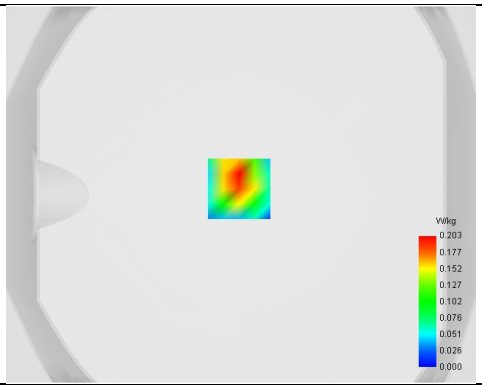
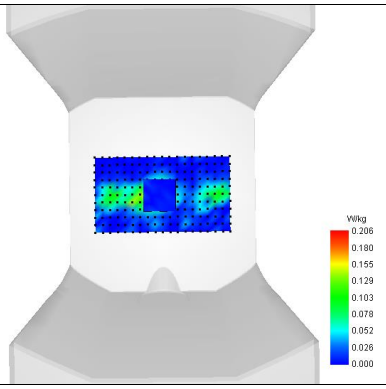
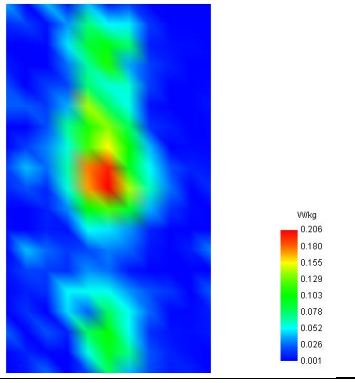
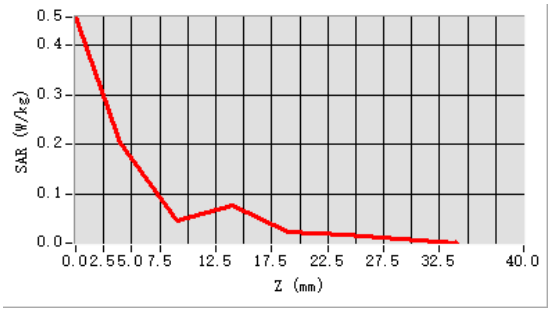

9.11
8.00
6.00
4.00
2.00
0.15
SAR (W/kg)
0.0 2.5 5.0 7.5 12.5 17.5 22.5 27.5 32.5 40.0
Z (mm)
W/kg
5.450
4.771
4.092
3.413
2.734
2.055
1.376
0.697
0.018
W/kg
3.543
3.102
2.661
2.221
1.780
1.340
0.899
0.459
0.018

Appendix B. SAR Test Plots

Plot 1:

Test Date	2023-05-22
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	CAT-M LTE band 4
Signal	LTE FDD
Frequency	1732.5
SAR 10g (W/Kg)	0.087
SAR 1g (W/Kg)	0.184

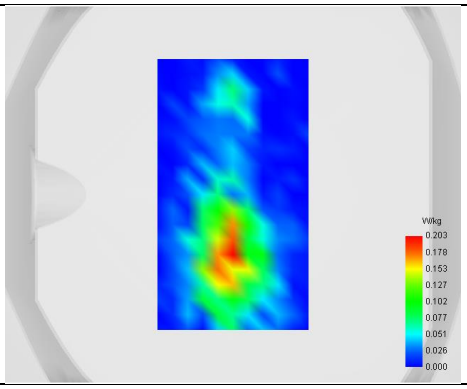
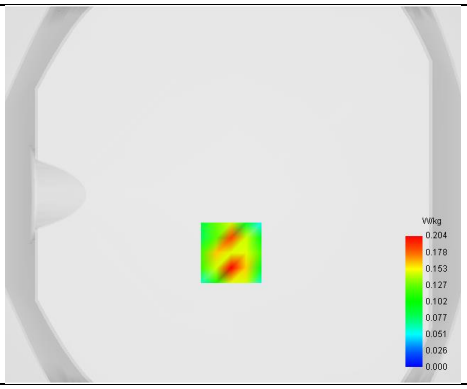
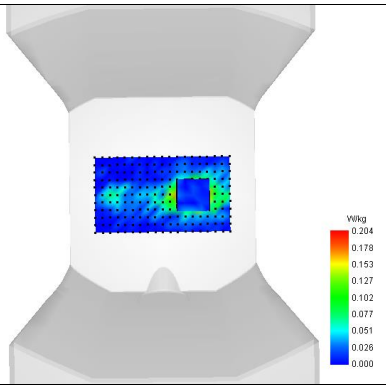
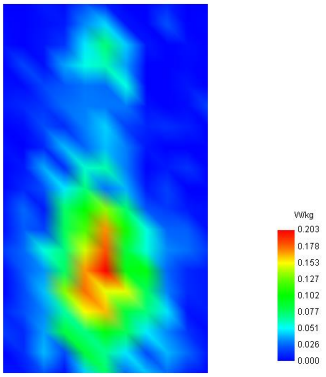
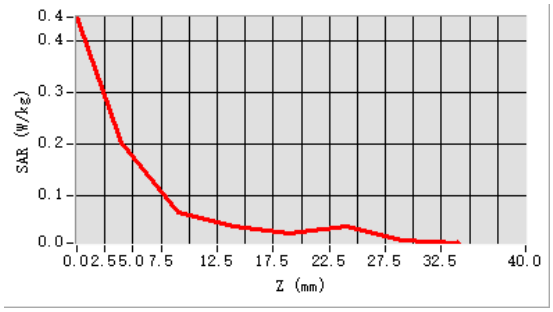
Maximum location: X=-1.00, Y=3.00 ; SAR Peak: 0.35 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 2:

Test Date	2023-05-21
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	CAT-M LTE band 5
Signal	LTE FDD
Frequency	836.5
SAR 10g (W/Kg)	0.096
SAR 1g (W/Kg)	0.186

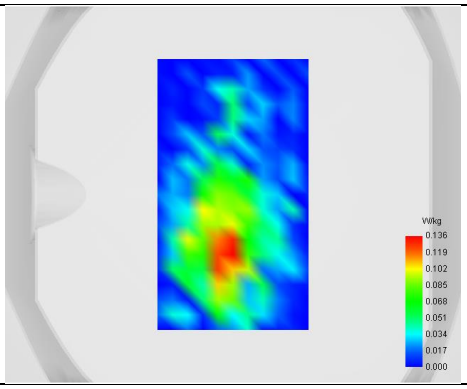
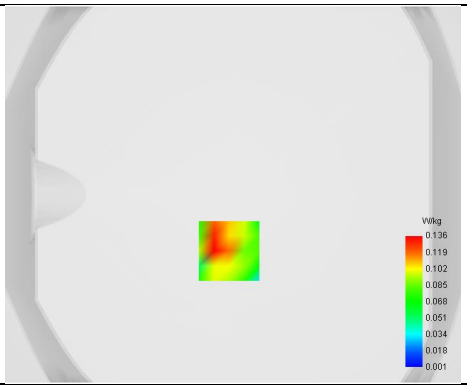
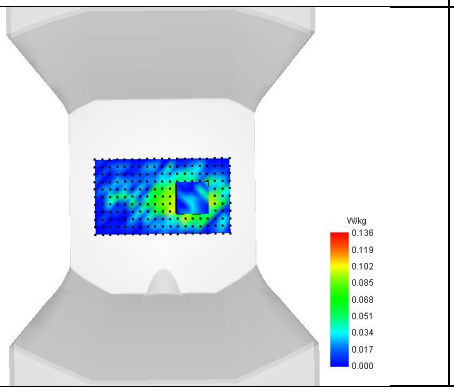
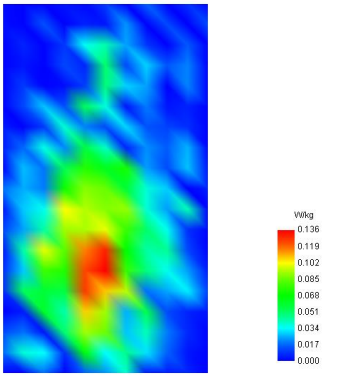
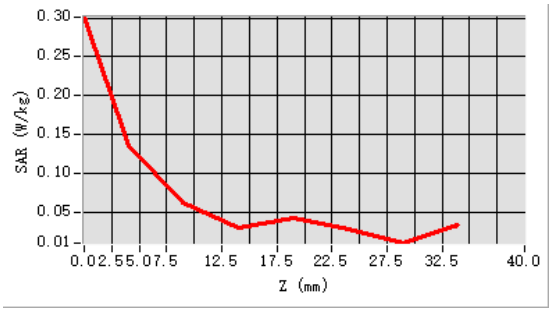
Maximum location: X=-1.00, Y=-31.00 ; SAR Peak: 0.39 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 3:

Test Date	2023-05-21
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	CAT-M LTE band 12
Signal	LTE FDD
Frequency	707.5
SAR 10g (W/Kg)	0.079
SAR 1g (W/Kg)	0.133

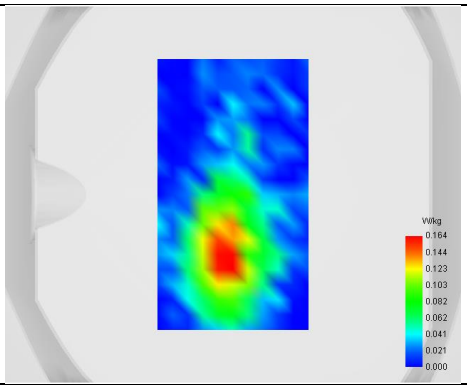
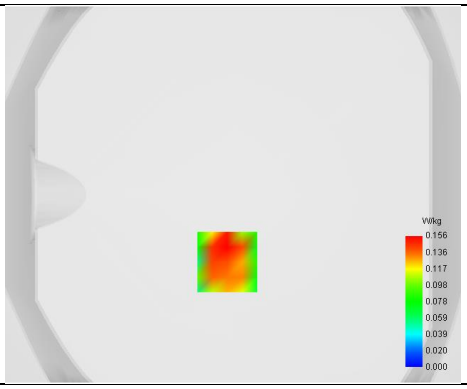
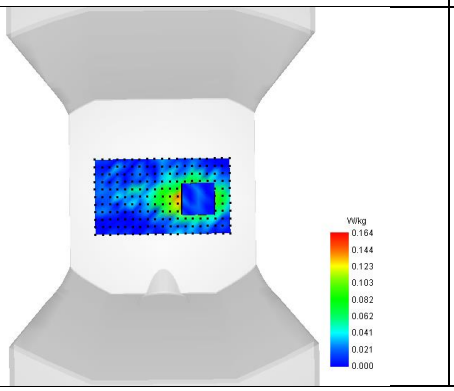
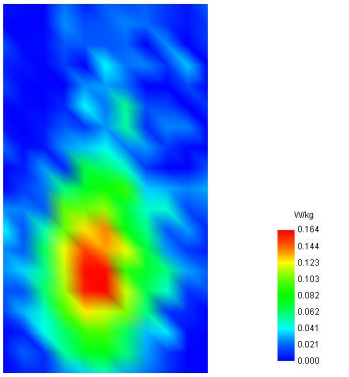
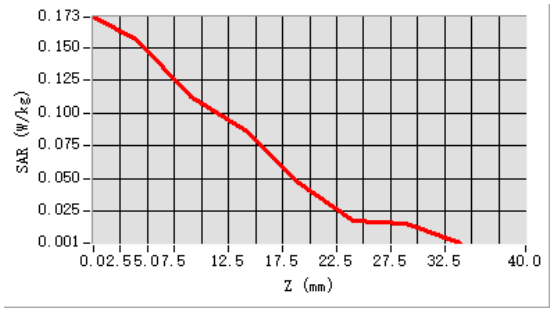
Maximum location: X=-2.00, Y=-30.00 ; SAR Peak: 0.24 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 4:

Test Date	2023-05-21
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	CAT-M LTE band 13
Signal	LTE FDD
Frequency	782
SAR 10g (W/Kg)	0.091
SAR 1g (W/Kg)	0.154

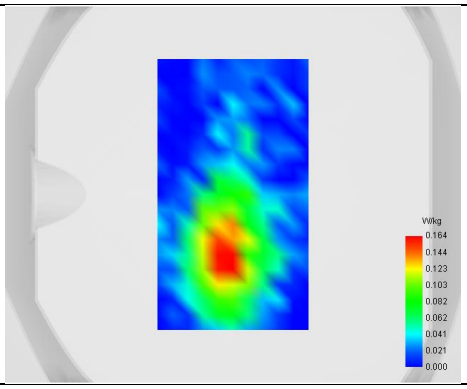
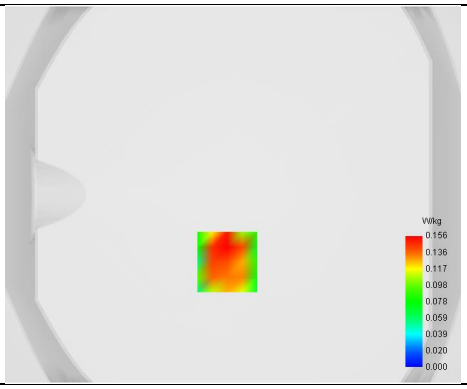
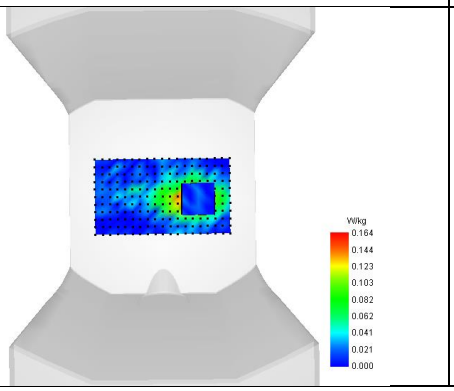
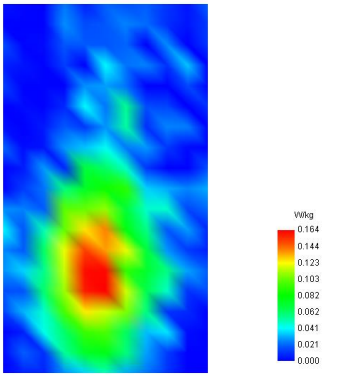
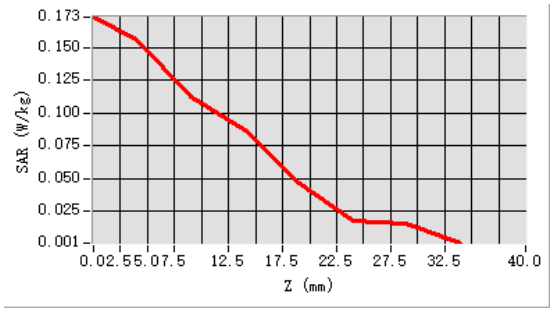
Maximum location: X=-3.00, Y=-36.00 ; SAR Peak: 0.25 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 5:

Test Date	2023-05-21
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	CAT-M LTE band 13
Signal	LTE FDD
Frequency	782
SAR 10g (W/Kg)	0.091
SAR 1g (W/Kg)	0.154

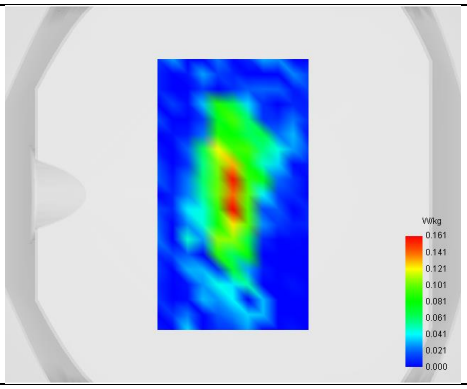
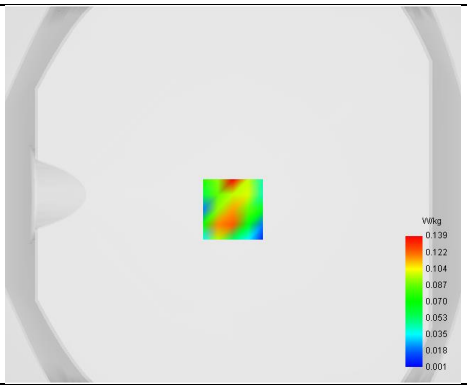
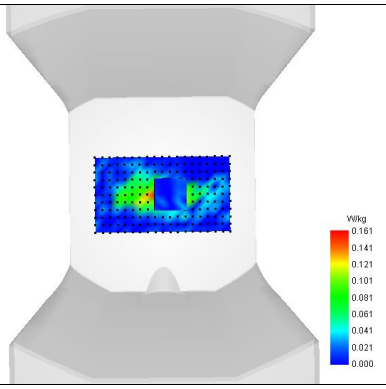
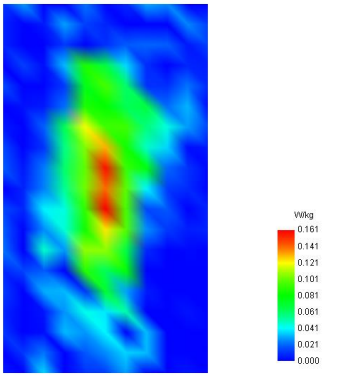
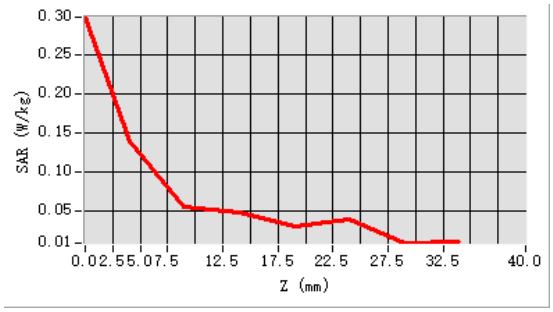
Maximum location: X=-3.00, Y=-36.00 ; SAR Peak: 0.25 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 6:

Test Date	2023-05-22
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	CAT-M LTE band 25
Signal	LTE FDD
Frequency	1882.5
SAR 10g (W/Kg)	0.063
SAR 1g (W/Kg)	0.113

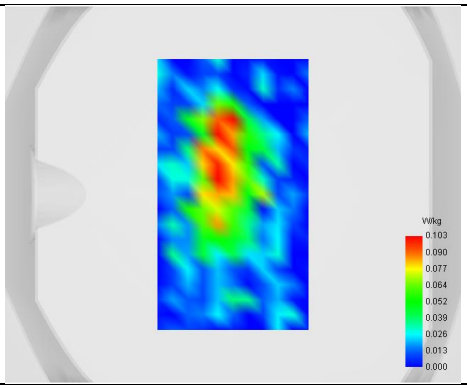
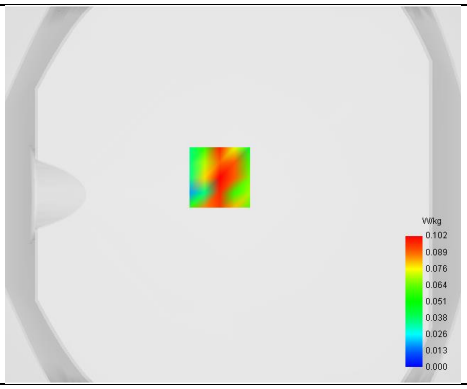
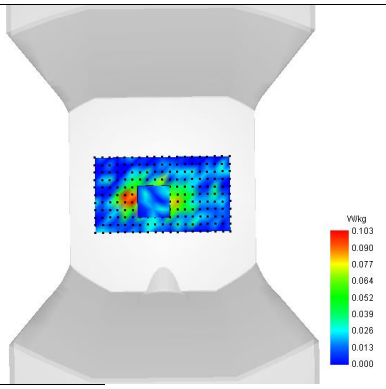
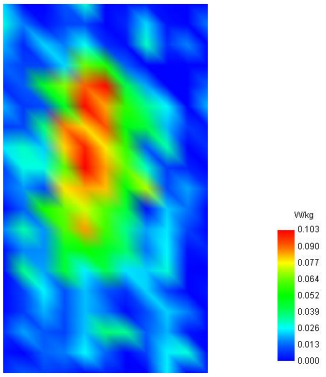
Maximum location: X=0.00, Y=-8.00 ; SAR Peak: 0.23 W/kg

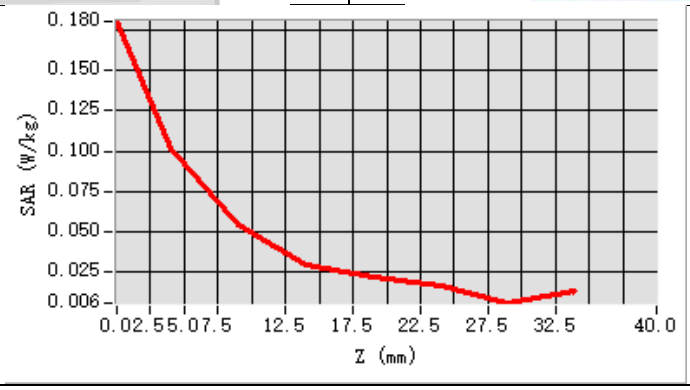
SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 7:

Test Date	2023-05-21
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	CAT-M LTE band 26
Signal	LTE FDD
Frequency	824
SAR 10g (W/Kg)	0.054
SAR 1g (W/Kg)	0.097

Maximum location: X=-7.00, Y=9.00 ; SAR Peak: 0.19 W/kg

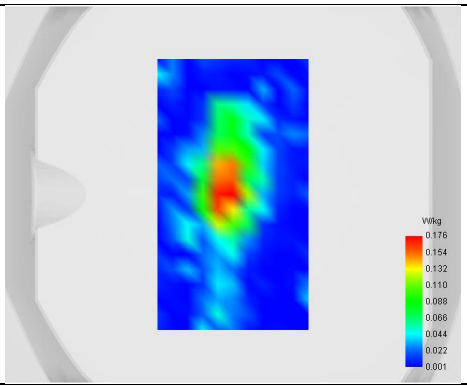
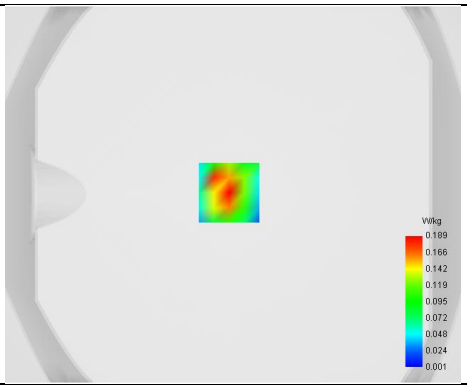
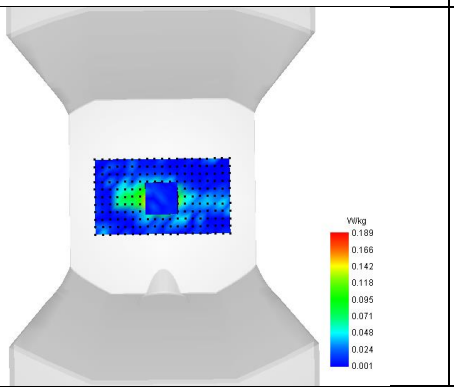
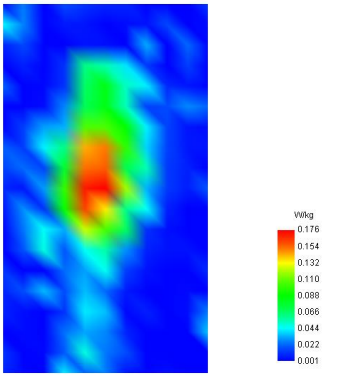
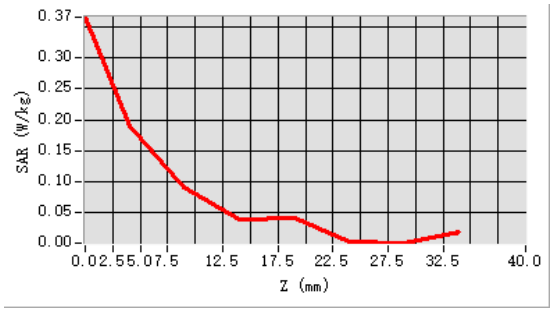
SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	



Plot 8:

Test Date	2023-05-22
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	CAT-M LTE band 66
Signal	LTE FDD
Frequency	1777.5
SAR 10g (W/Kg)	0.082
SAR 1g (W/Kg)	0.183

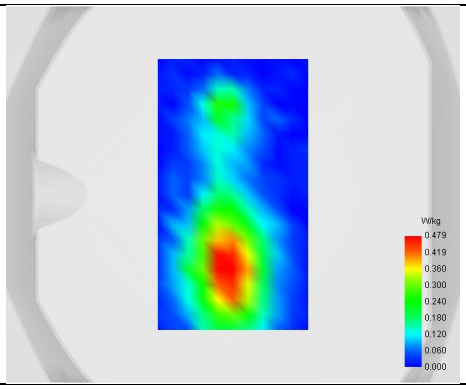
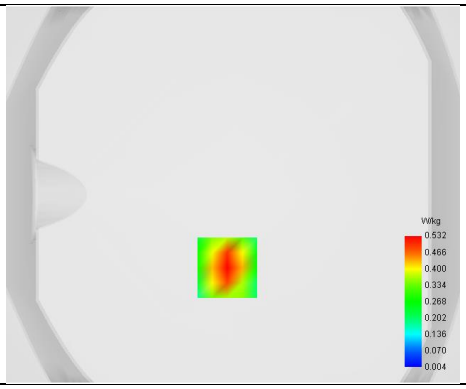
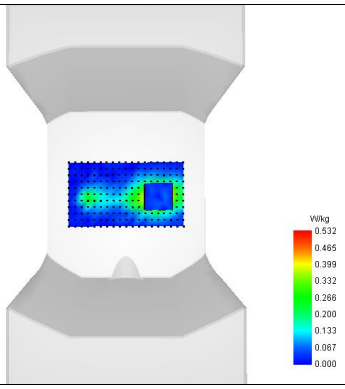
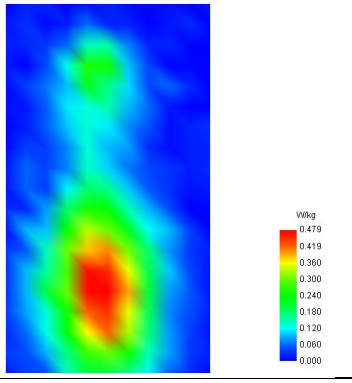
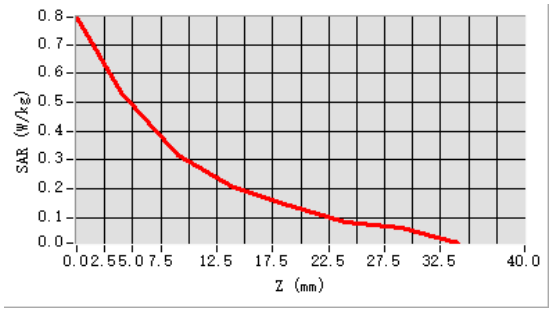
Maximum location: X=-2.00, Y=1.00 ; SAR Peak: 0.39 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 9:

Test Date	2023-05-21
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	NB LTE band 5
Signal	LTE FDD
Frequency	848.8
SAR 10g (W/Kg)	0.288
SAR 1g (W/Kg)	0.501

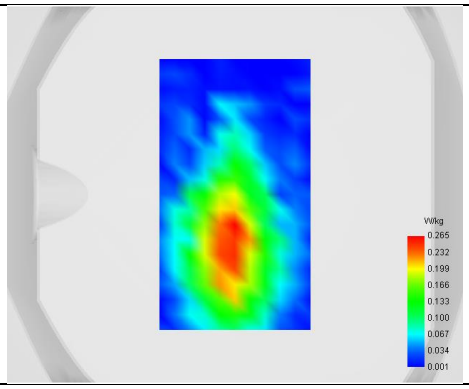
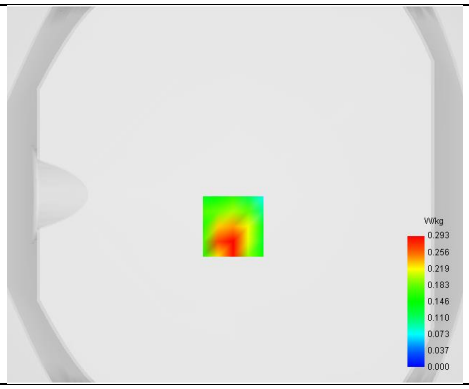
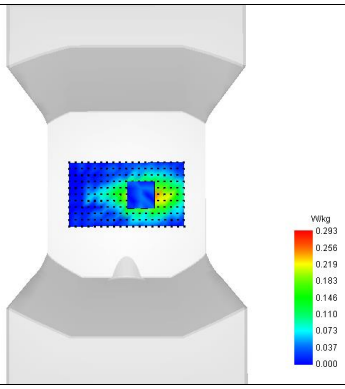
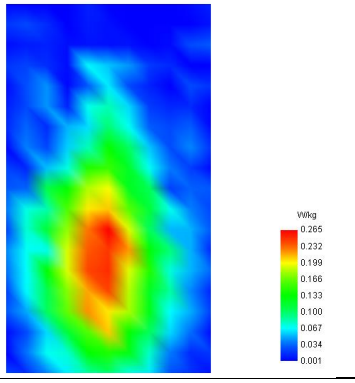
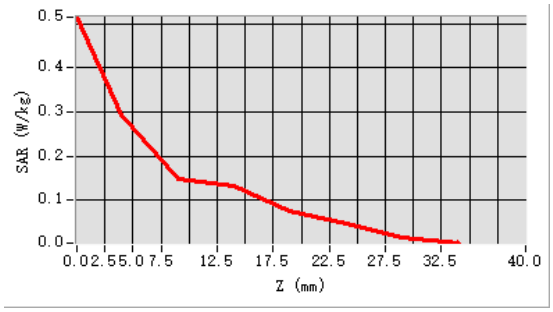
Maximum location: X=-3.00, Y=-39.00 ; SAR Peak: 0.80 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 10:

Test Date	2023-05-21
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	NB LTE band 12
Signal	LTE FDD
Frequency	699.2
SAR 10g (W/Kg)	0.166
SAR 1g (W/Kg)	0.299

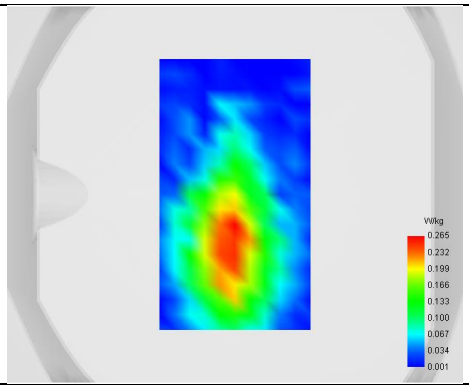
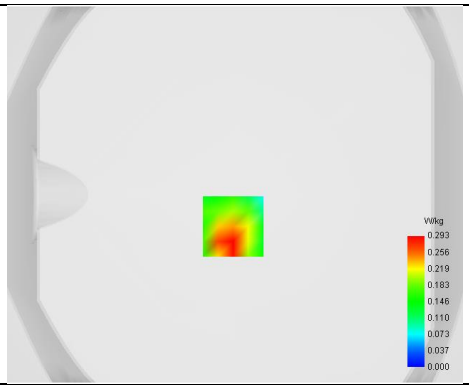
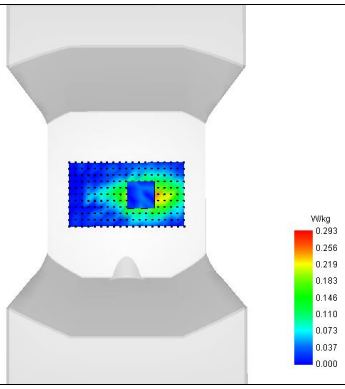
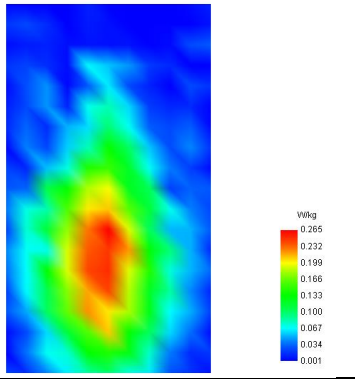
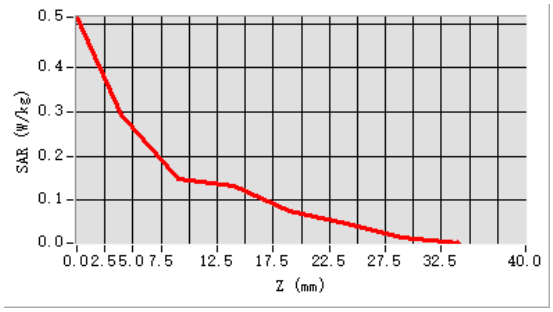
Maximum location: X=-1.00, Y=-17.00 ; SAR Peak: 0.45 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 11:

Test Date	2023-05-21
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	NB LTE band 12
Signal	LTE FDD
Frequency	699.2
SAR 10g (W/Kg)	0.166
SAR 1g (W/Kg)	0.299

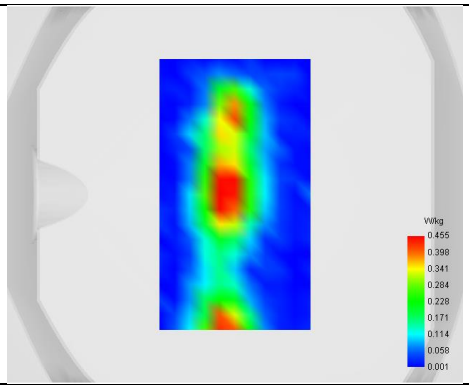
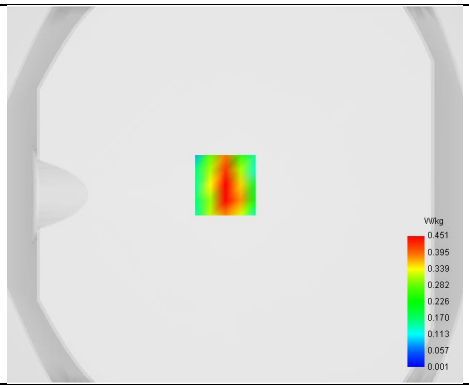
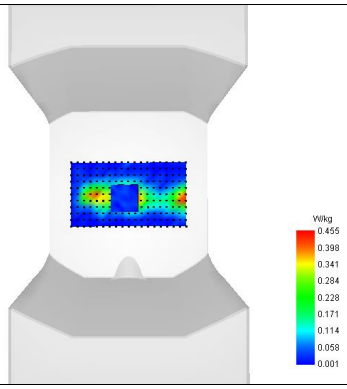
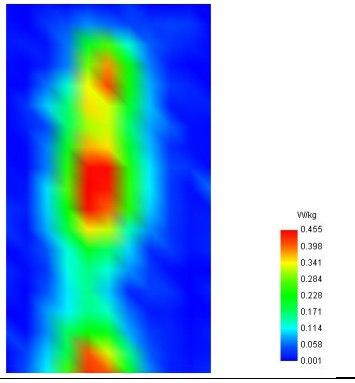
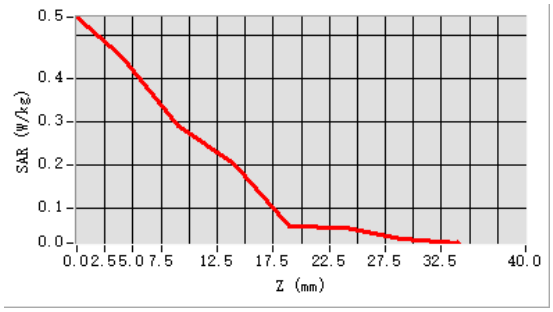
Maximum location: X=-1.00, Y=-17.00 ; SAR Peak: 0.45 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 12:

Test Date	2023-05-22
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	NB LTE band 25
Signal	LTE FDD
Frequency	1914.8
SAR 10g (W/Kg)	0.236
SAR 1g (W/Kg)	0.419

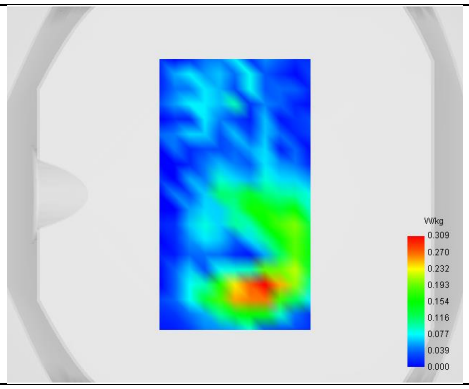
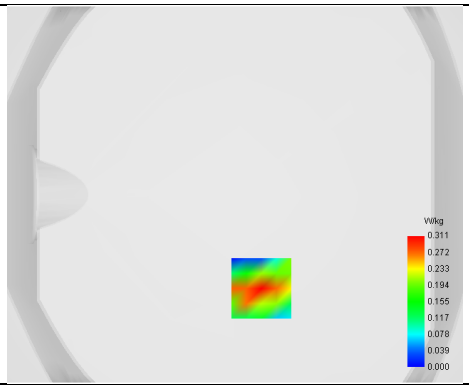
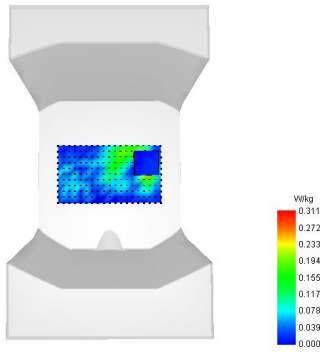
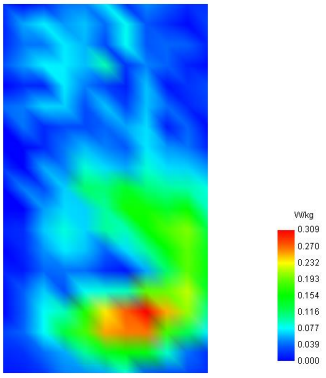
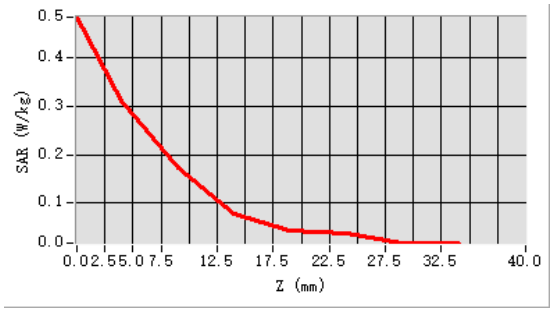
Maximum location: X=-5.00, Y=5.00 ; SAR Peak: 0.62 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 13:

Test Date	2023-05-21
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	NB LTE band 26
Signal	LTE FDD
Frequency	824
SAR 10g (W/Kg)	0.146
SAR 1g (W/Kg)	0.278

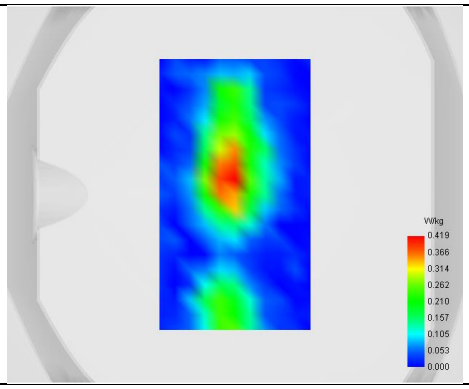
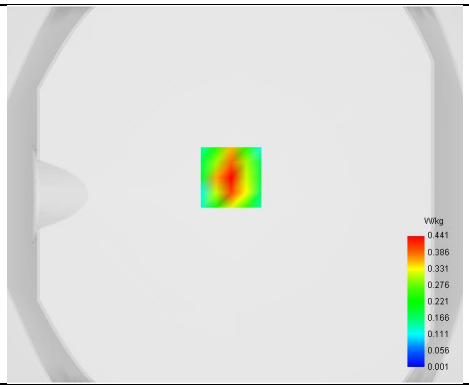
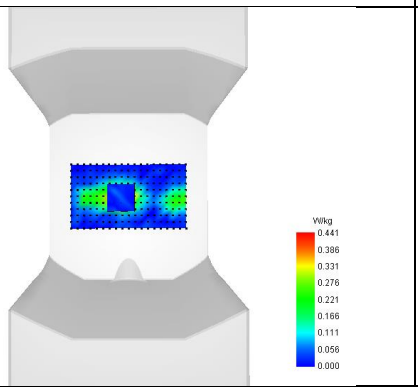
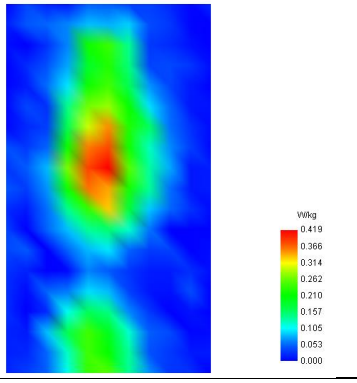
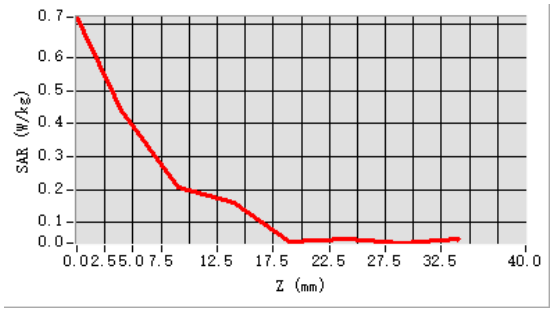
Maximum location: X=14.00, Y=-50.00 ; SAR Peak: 0.51 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 14:

Test Date	2023-05-23
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	NB LTE band 66
Signal	LTE FDD
Frequency	1779.8
SAR 10g (W/Kg)	0.215
SAR 1g (W/Kg)	0.423

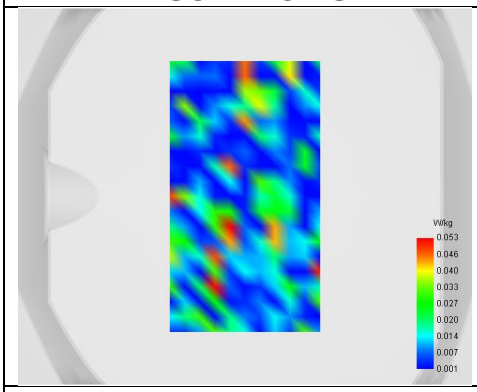
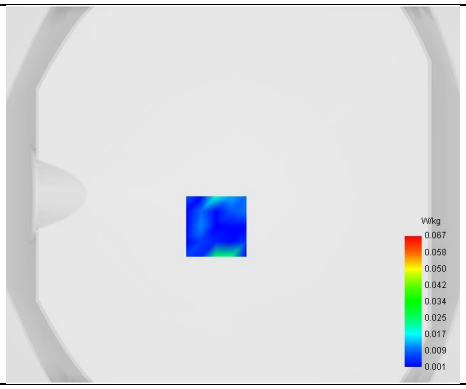
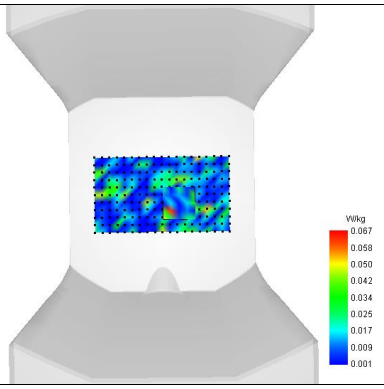
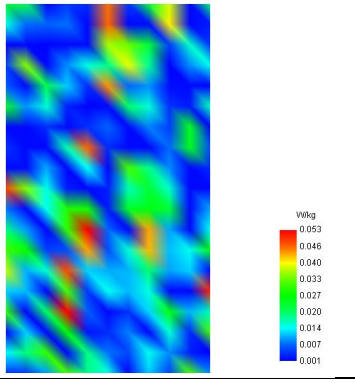
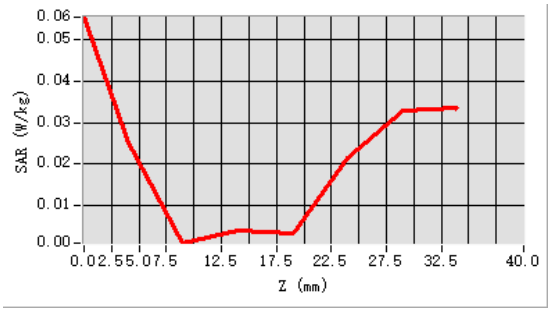
Maximum location: X=-2.00, Y=9.00 ; SAR Peak: 0.75 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 15:

Test Date	2023-05-22
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	2.4G_WIFI
Signal	IEEE 802.11b
Frequency	2412
SAR 10g (W/Kg)	0.011
SAR 1g (W/Kg)	0.013

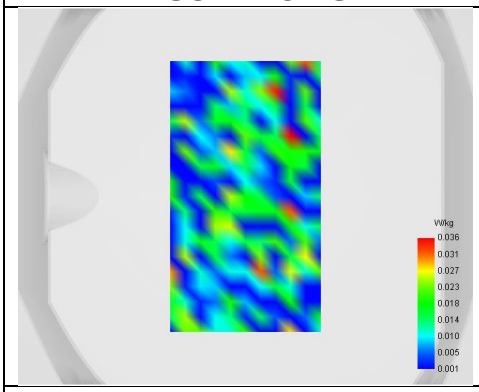
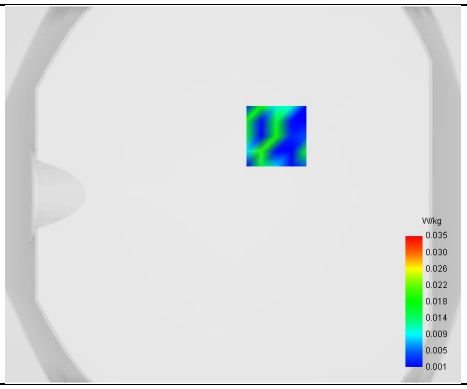
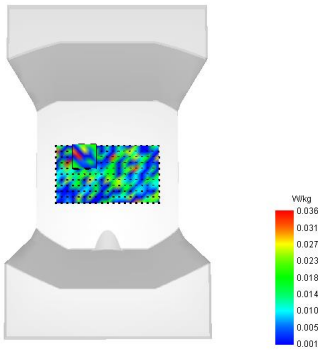
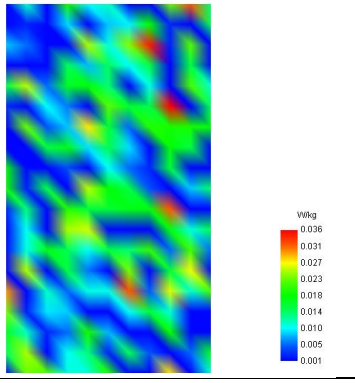
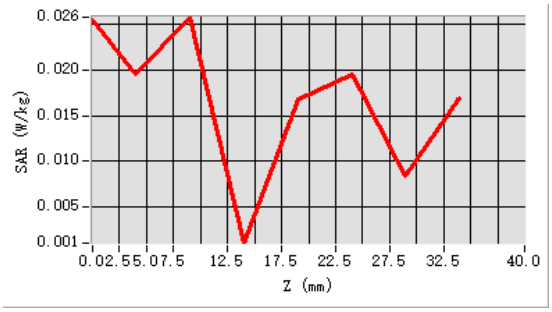
Maximum location: X=-9.00, Y=-17.00 ; SAR Peak: 0.06 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Plot 16:

Test Date	2023-05-22
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Top Side
Band	BLE
Signal	GFSK
Frequency	2402
SAR 10g (W/Kg)	0.010
SAR 1g (W/Kg)	0.013

Maximum location: X=23.00, Y=31.00 ; SAR Peak: 0.05 W/kg

SURFACE SAR	VOLUME SAR
	
3D screen shot	**Hot spot position**
	
	

Appendix C. Probe Calibration and Dipole Calibration Report

Refer the appendix Calibration Report.

※※※※※END OF THE REPORT※※※※※