S T S L A B

FCC SAR TEST REPORT

Report No.:STS2305335H01

Issued for

SHENZHEN FCAR TECHNOLOGY CO.,LTD

8th floor, Chuangyi Building, No. 3025 Nanhai Ave., Nanshan, Shenzhen, Guangdong, China 518060

Product Name:	Tire Tread Depth Gauge
Brand:	FCAR
Model Number:	TR100
Series Model(s):	N/A
FCC ID:	2AJDD
Test Standard:	ANSI/IEEE Std. C95.1
	FCC 47 CFR Part 2 (2.1093)
	IEC/IEEE 62209-1528
Max. Report SAR (10g):	Body: 1.307 W/kg

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ShenZhen STS Test Services Co.,Ltd.
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Test Report Certification

Applicant's name ....:	SHENZHEN FCAR TECHNOLOGY CO.,LTD
Address ....:	8th floor, Chuangyi Building, No. 3025 Nanhai Ave., Nanshan, Shenzhen, Guangdong, China 518060
Manufacture's Name ....:	SHENZHEN FCAR TECHNOLOGY CO.,LTD
Address ....:	8th floor, Chuangyi Building, No. 3025 Nanhai Ave., Nanshan, Shenzhen, Guangdong, China 518060

Product description

Product name ....:	Tire Tread Depth Gauge
Brand name ....:	FCAR
Model name ....:	TR100
Series Model..........................:	N/A
Standards ....:	ANSI/IEEE Std. C95.1-1992 FCC 47 CFR Part 2 (2.1093) IEC/IEEE 62209-1528

The device was tested by Shenzhen STS Test Services Co., Ltd. in accordance with the measurement methods and procedures specified in KDB 865664 The test results in this report apply only to the tested sample of the stated device/equipment. Other similar device/equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of Test

Date (s) of performance of tests ....:	05 Jun. 2023 ~ 07 Jun. 2023
Date of Issue ....:	09 Jun. 2023
Test Result...:	**Pass**

Testing Engineer :

(Shifan. Long)

Technical Manager :

(Sean she)

Authorized Signatory :

(Bovey Yang)

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Revision History

Rev.	Issue Date	Report No.	Effect Page	Contents
00	09 Jun. 2023	STS2305335H01	ALL	Initial Issue

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	Tire Tread Depth Gauge	
Brand Name	FCAR	
Model Name	TR100	
Series Model	N/A	
Model Difference	N/A	
Battery	Rated Voltage:3.7V Charge Limit Voltage:5V Capacity: 3200mAh	
Device Category	Portable	
Product stage	Production unit	
RF Exposure Environment	General Population / Uncontrolled	
Hardware Version	N/A	
Software Version	N/A	
Frequency Range	WLAN802.11b/g/n20: 2412 MHz ~ 2462 MHz WLAN 802.11n40: 2422 MHz ~ 2452 MHz 5.2G WLAN 802.11a/n20/n40/ac20/ac40/ac80: 5150 to 5250 MHz 5.8G WLAN 802.11a/n20/n40/ac20/ac40/ac80: 5725 to 5875 MHz	
Max. Reported SAR(10g): (Limit:4.0W/kg)	Mode	Body(W/Kg)
	2.4GHz WLAN 802.11b	0.746
	2.4GHz WLAN 802.11g	0.622
	5.2GHz WLAN	1.307
	5.8GHz WLAN	0.470
FCC Equipment Class	Unlicensed National Information Infrastructure TX (NII) Digital Transmission System (DTS)	
Operating Mode	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 5G WLAN: 802.11a(OFDM):BPSK,QPSK,16-QAM,64-QAM 802.11n(OFDM):BPSK,QPSK,16-QAM,64-QAM 802.11ac(OFDM):BPSK,QPSK,16-QAM,64-QAM,256-QAM	
Antenna Specification	FPC Antenna	
Hotspot Mode	Not Support	
DTM Mode	Not Support	

Note:
1. 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

ShenZhen STS Test Services Co.,Ltd.

A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao’an District, Shenzhen, Guang Dong, China

FCC test Firm Registration No.: 625569

IC Registration No.: 12108A

A2LA Certificate No.: 4338.01

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	IEC/IEEE 62209-1528	Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Part 1528: Human models, instrumentation, and procedures (Frequency range of 4 MHz to 10 GHz)
4	FCC KDB 447498 D01 v06	Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
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 648474 D04 v01r03	SAR Evaluation Considerations for Wireless Handsets
8	FCC KDB 248227 D01 Wi-Fi SAR v02r02	SAR Considerations for 802.11 Devices

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

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

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

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

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

Population/Uncontrolled Environments:

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

Occupational/Controlled Environments:

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

NOTE

GENERAL POPULATION/UNCONTROLLED EXPOSURE

PARTIAL BODY LIMIT

4.0W/kg

3. SAR Measurement System

3.1 Definition of Specific Absorption Rate (SAR)

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.
The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

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

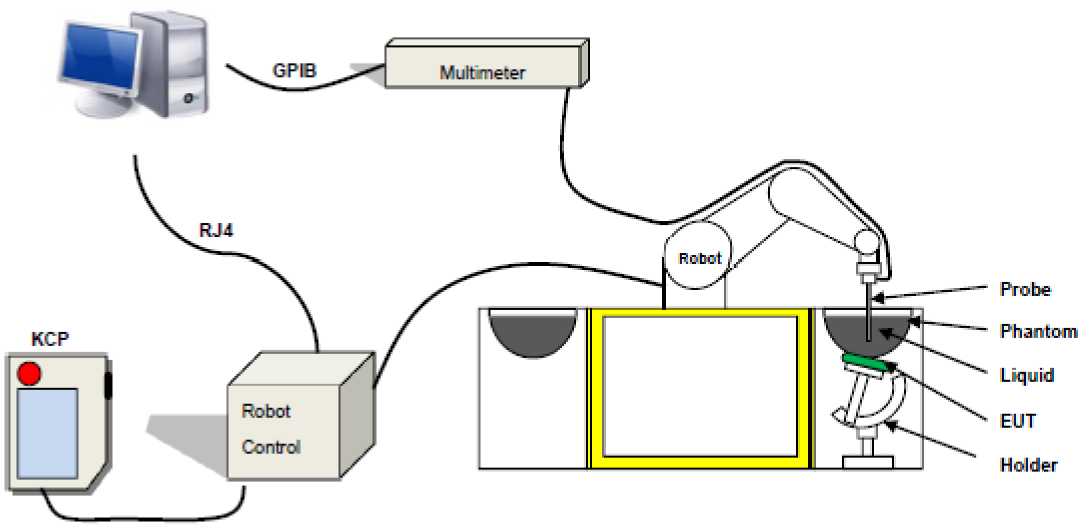
SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

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

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

3.2 SAR System

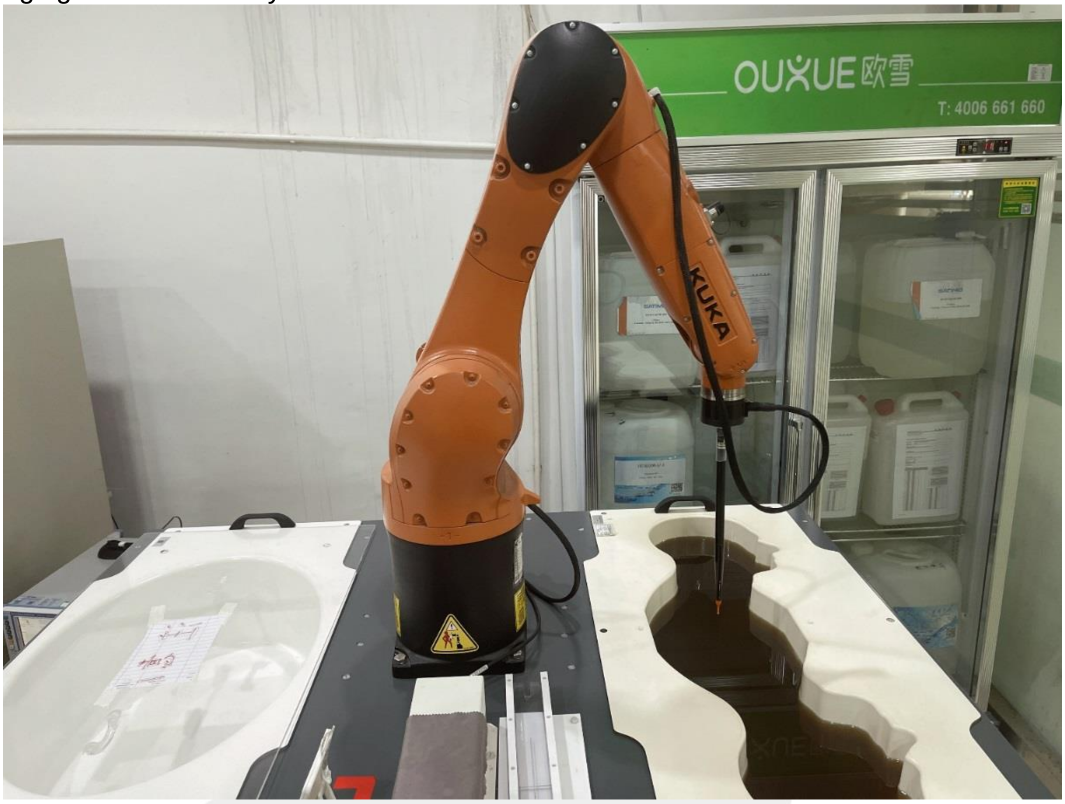
MVG SAR System Diagram:



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

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

The following figure shows the system.



The EUT under test operating at the maximum power level is placed in the phone holder, under the phantom, which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The Open SAR software computes the results to give a SAR value in a 1g or 10g mass.

3.2.1 Probe

For the measurements the Specific Dosimetric E-Field Probe SN 07/21 EPGO352 with following specifications is used

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

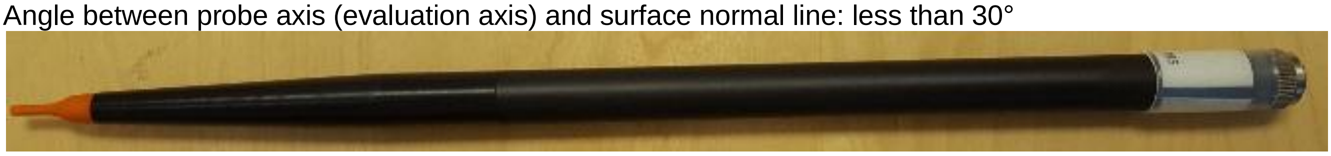


Figure 1-MVG COMOSAR Dosimetric E field Dipole

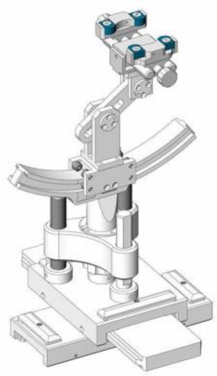
3.2.2 Phantom

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 32/14 SAM115

Figure-SN 21/21 ELLI48

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 head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

Head Tissue

Frequency (MHz)	cellulose	DGBE	HEC	NaCl	Preventol	Sugar	X100	Water	Conductivity	Permittivity
	%	%	%	%	%	%	%	%	σ	εr
750	0.2	/	/	1.4	0.2	57.0	/	41.1	0.89	41.9
835	0.2	/	/	1.4	0.2	57.9	/	40.3	0.90	41.5
900	0.2	/	/	1.4	0.2	57.9	/	40.3	0.97	41.5
1800	/	44.5	/	0.3	/	/	30.45	55.2	1.4	40.0
1900	/	44.5	/	0.3	/	/	30.45	55.2	1.4	40.0
2000	/	44.5	/	0.3	/	/	/	55.2	1.4	40.0
2450	/	44.9	/	0.1	/	/	/	55.0	1.80	39.2
2600	/	45.0	/	0.1	/	/	/	54.9	1.96	39.0

Body Tissue

Frequency (MHz)	cellulose	DGBE	HEC	NaCl	Preventol	Sugar	X100	Water	Conductivity	Permittivity
	%	%	%	%	%	%	%	%	σ	εr
750	0.2	/	/	0.9	0.1	47.2	/	51.7	0.96	55.5
835	0.2	/	/	0.9	0.1	48.2	/	50.8	0.97	55.2
900	0.2	/	/	0.9	0.1	48.2	/	50.8	1.05	55.0
1800	/	29.4	/	0.4	/	/	30.45	70.2	1.52	53.3
1900	/	29.4	/	0.4	/	/	30.45	70.2	1.52	53.3
2000	/	29.4	/	0.4	/	/	/	70.2	1.52	53.3
2450	/	31.3	/	0.1	/	/	/	68.6	1.95	52.7
2600	/	31.7	/	0.1	/	/	/	68.2	2.16	52.3

Tissue dielectric parameters for head and body phantoms

Frequency	εr		σ S/m	
	Head	Body	Head	Body
300	45.3	58.2	0.87	0.92
450	43.5	56.7	0.87	0.94
900	41.5	55.0	0.97	1.05
1450	40.5	54.0	1.20	1.30
1800	40.0	53.3	1.40	1.52
2450	39.2	52.7	1.80	1.95
3000	38.5	52.0	2.40	2.73
5800	35.3	48.2	5.27	6.00

LIQUID MEASUREMENT RESULTS

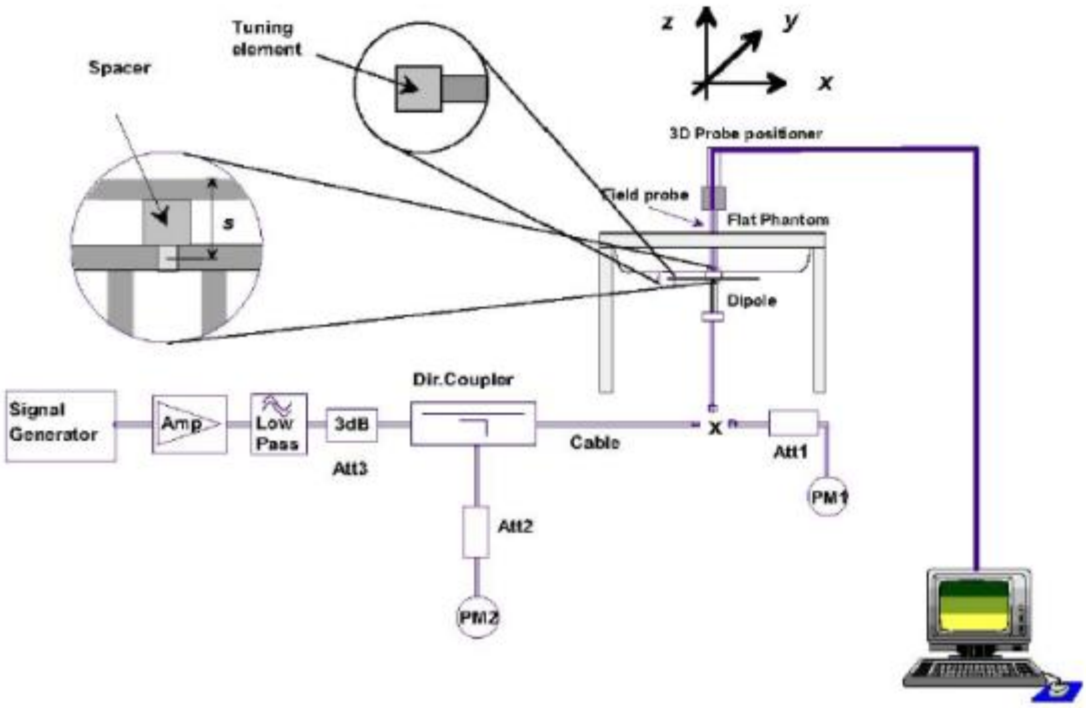
Date	Ambient		Simulating Liquid		Parameters	Target	Measured	Deviation %	Limited %
	Temp. [°C]	Humidity %	Frequency (MHz)	Temp. [°C]					
2023-06-05	23.4	57	2412	23.2	Permittivity	39.27	40.29	2.60	±5
					Conductivity	1.77	1.75	-0.92	±5
2023-06-05	23.5	57	2437	23.2	Permittivity	39.22	39.64	1.06	±5
					Conductivity	1.79	1.84	2.88	±5
2023-06-05	23.6	57	2450	23.4	Permittivity	39.20	39.01	-0.48	±5
					Conductivity	1.80	1.78	-1.11	±5
2023-06-06	21.1	53	5200	20.8	Permittivity	36.00	36.09	0.25	±5
					Conductivity	4.66	4.67	0.21	±5
2023-06-06	21.1	53	5210	20.9	Permittivity	35.99	37.06	2.97	±5
					Conductivity	4.67	4.62	-1.08	±5
2023-06-07	22.2	58	5775	21.9	Permittivity	35.33	36.03	2.00	±5
					Conductivity	5.24	5.20	-0.83	±5
2023-06-07	22.2	58	5800	21.8	Permittivity	35.30	35.51	0.59	±5
					Conductivity	5.27	5.35	1.52	±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)	(%)	(%)
2023-06-05	2450	100	5.601	56.01	54.70	2.39	10
2023-06-06	5200	100	15.386	153.86	158.49	-2.92	10
2023-06-07	5800	100	17.520	175.20	183.06	-4.29	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

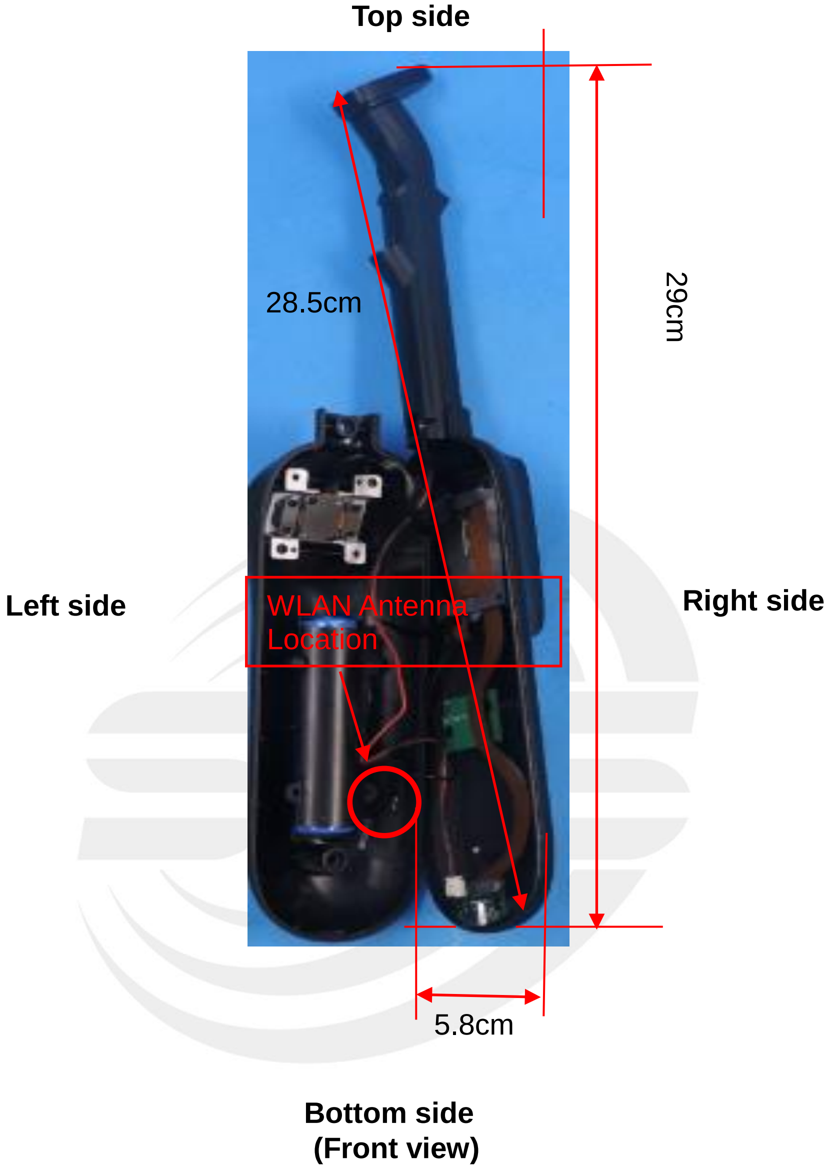
- Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface
- Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible 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 D01v01r01 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 Tire Tread Depth Gauge, support WLAN mode.



Antenna Separation Distance(cm)						
ANT	Back Side	Front Side	Left Side	Right Side	Top Side	Bottom Side
WLAN	⩽0.5	⩽0.5	4	⩽0.5	5	2.7

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 WLAN SAR evaluation of Maximum power (dBm) summing tolerance.

Exposure Position	Wireless Interface	2.4G WLAN	5.2G WLAN	5.8G WLAN
	Calculated Frequency(GHz)	2.437	5.21	5.775
	Maximum Turn-up power (dBm)	14	18	17
	Maximum rated power(mW)	25.12	63.10	50.12
Back Side	Separation distance (cm)	⩽0.5	⩽0.5	⩽0.5
	exclusion threshold(mW)	2.76	1.50	1.38
	Testing required?	YES	YES	YES
Front Side	Separation distance (cm)	⩽0.5	⩽0.5	⩽0.5
	exclusion threshold(mW)	2.76	1.50	1.38
	Testing required?	YES	YES	YES
Left Side	Separation distance (cm)	4	4	4
	exclusion threshold(mW)	143.54	110.07	106.18
	Testing required?	NO	NO	NO
Right Side	Separation distance (cm)	⩽0.5	⩽0.5	⩽0.5
	exclusion threshold(mW)	2.76	1.50	1.38
	Testing required?	YES	YES	YES
Top Side	Separation distance (cm)	25	25	25
	exclusion threshold(mW)	4676.78	4852.17	4876.44
	Testing required?	NO	NO	NO
Bottom Side	Separation distance (cm)	2.7	2.7	2.7
	exclusion threshold(mW)	68.00	48.87	46.73
	Testing required?	NO	YES	YES

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 D01, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.

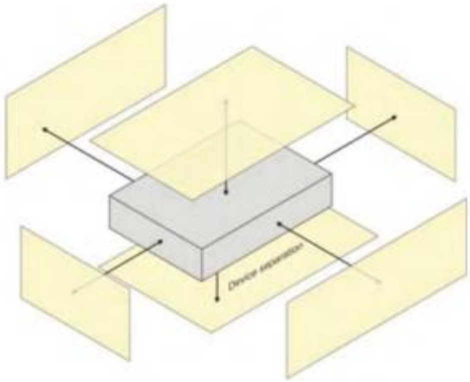
3. per KDB 447498 D01, standalone SAR test exclusion threshold is applied; if the distance of the antenna to the user is <25mm,25mm is user to determine SAR exclusion threshold
4. per KDB 447498 D01, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distance ≤50mm are determined by:
   [(max.power of channel, including tune-up tolerance, Mw)/(min. test separation distance, mm)]*[√f(GHZ))≤3.0 for 1-g SAR and≤7.5 for10-g extremity SAR ,f(GHz) is the RF channel transmit frequency in GHz. Power and distance are rounded to the nearest mW and mm before calculation. The result is rounded to one decimal place for comparison
   For <50mm distance, we just calculate mW of the exclusion threshold value(3.0)to do compare
5. per KDB 447498 D01, at 100 MHz to 6GHz and for test separation distances >50mm, the SAR test exclusion threshold is determined according to the following
   a)[threshold at 50mm in step 1]+(test separation distance -50mm)*(f (MHz)/150)]Mw, at 100 MHz to 1500 MHz
   b) [threshold at 50mm in step1]+(test separation distance -50mm) *10]mW at＞1500MHz and≤6GHz
6. 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.
7. 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 Front Side, Back Side, Bottom Side and Right Side.

8.1 Body-worn Position Conditions

Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. When the same wireless transmission configuration is used for testing body-worn accessory and hotspot mode SAR, respectively, in voice and data mode, SAR results for the most conservative *test separation distance* configuration may be used to support both SAR conditions. When the *reported* SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest *reported* SAR configuration for that wireless mode and frequency band should be repeated for the body-worn accessory with a headset attached to the handset.



9. 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)	5.72	2	2.86	1	2.86	∞
CF_{drift}	Probe calibration drift	R	0.15	√3	0.09	1	0.09	∞
LIN	Probe linearity and detection limit	R	1.27	√3	0.73	1	0.73	∞
BBS	Broadband signal	R	0.12	√3	0.07	1	0.07	∞
ISO	Probe isotropy	R	0.16	√3	0.09	1	0.09	∞
DAE	Other probe and data acquisition errors	N	2.4	1	2.40	1	2.40	∞
AMB	RF ambient and noise	N	3.51	1	3.51	1	3.51	∞
Δ_{xyz}	Probe positioning errors	N	1.2	1	1.20	2/δ	1.20	
DAT	Data processing errors	N	2.1	1	2.10	1	2.10	∞
Phantom and device (DUT or validation antenna) errors								
LIQ(σ)	Measurement of phantom conductivity(σ)	N	4.1	1	4.1	c_ε, c_σ	4.10	∞
$LIQ(T_c)$	Temperature effects (medium)	R	2.7	√3	1.56	c_ε, c_σ	1.56	∞
EPS	Shell permittivity	R	2.1	√3	1.21	See 8.4.2.3	0.30	∞
DIS	Distance between the radiating element of the DUT and the phantom medium	N	0.7	1	0.7	2	1.40	∞
D_{xyz}	Repeatability of positioning the DUT or source against the phantom	N	1.2	1	1.2	1	1.20	5
H	Device holder effects	N	3.8	1	3.8	1	3.80	
MOD	Effect of operating mode on probe sensitivity	R	3.42	√3	1.97	1	1.97	∞
TAS	Time-average SAR	R	1.8	√3	1.04	1	1.04	∞
RF_{drift}	Variation in SAR due to drift in output of DUT	N	4.5	1	4.5	1	4.50	
VAL	Validation antenna uncertainty (validation measurement only)	N	1.4	1	1.4	1	1.40	
P_{in}	Uncertainty in accepted power (validation measurement only)	N	2.4	1	2.4	1	2.40	
Corrections to the SAR result (if applied)								
C(ε′,σ)	Phantom deviation from target (ε′,σ))	N	3.7	1	3.7	1	3.70	
C(R)	SAR scaling	R	1.8	√3	1.04	1	1.04	
u(ΔSAR)	Combined uncertainty						10.84	
U	Expanded uncertainty and effective degrees of freedom					U =	21.68	

10. Conducted Power Measurement

10.1 Test Result

2.4G WLAN

2.4GWIFI				
Mode	Channel Number	Frequency (MHz)	Average Power (dBm)	Output Power (mW)
802.11b	1	2412	13.39	21.83
	7	2437	13.59	22.86
	11	2462	12.46	17.62
802.11g	1	2412	20.55	113.50
	7	2437	19.22	83.56
	11	2462	17.63	57.94
802.11 n-HT20	1	2412	17.83	60.67
	7	2437	19.62	91.62
	11	2462	17.38	54.70
802.11 n-HT40	3	2422	12.82	19.14
	6	2437	17.34	54.20
	9	2452	18.71	74.30

5G WLAN

5.2G WLAN				
Mode	Channel Number	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
802.11a20	36	5180	14.64	29.11
	40	5200	14.09	25.64
	48	5240	14.20	26.30
802.11 n-HT20	36	5180	14.00	25.12
	40	5200	14.78	30.06
	48	5240	13.66	23.23
802.11 n-HT40	38	5190	10.97	12.50
	46	5230	10.84	12.13
802.11ac-VHT20	36	5180	15.52	35.65
	40	5200	15.37	34.43
	48	5240	15.32	34.04
802.11ac-VHT40	38	5190	15.59	36.22
	46	5230	16.86	48.53
802.11ac-VHT80	42	5210	17.71	59.02

5.8G WLAN				
Mode	Channel Number	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
802.11a20	149	5745	13.15	20.65
	157	5785	13.83	24.15
	165	5825	13.87	24.38
802.11 n-HT20	149	5745	11.14	13.00
	157	5785	13.83	24.15
	165	5825	14.44	27.80
802.11 n-HT40	151	5755	12.28	16.90
	159	5795	13.85	24.27
802.11ac-VHT20	149	5745	15.12	32.51
	157	5785	14.72	29.65
	165	5825	15.89	38.82
802.11ac-VHT40	151	5755	15.74	37.50
	159	5795	16.25	42.17
802.11ac-VHT80	155	5775	16.57	45.39

11. EUT And Test Setup Photo

11.1 EUT Photo

Front side

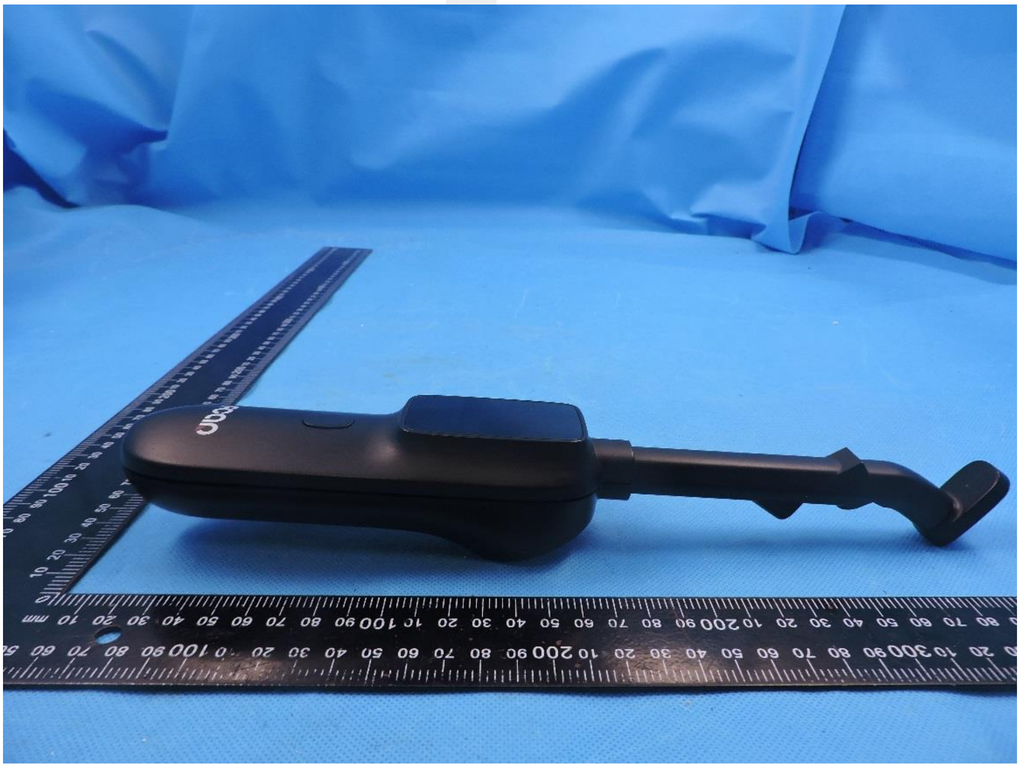
Back side

Top side

Bottom side

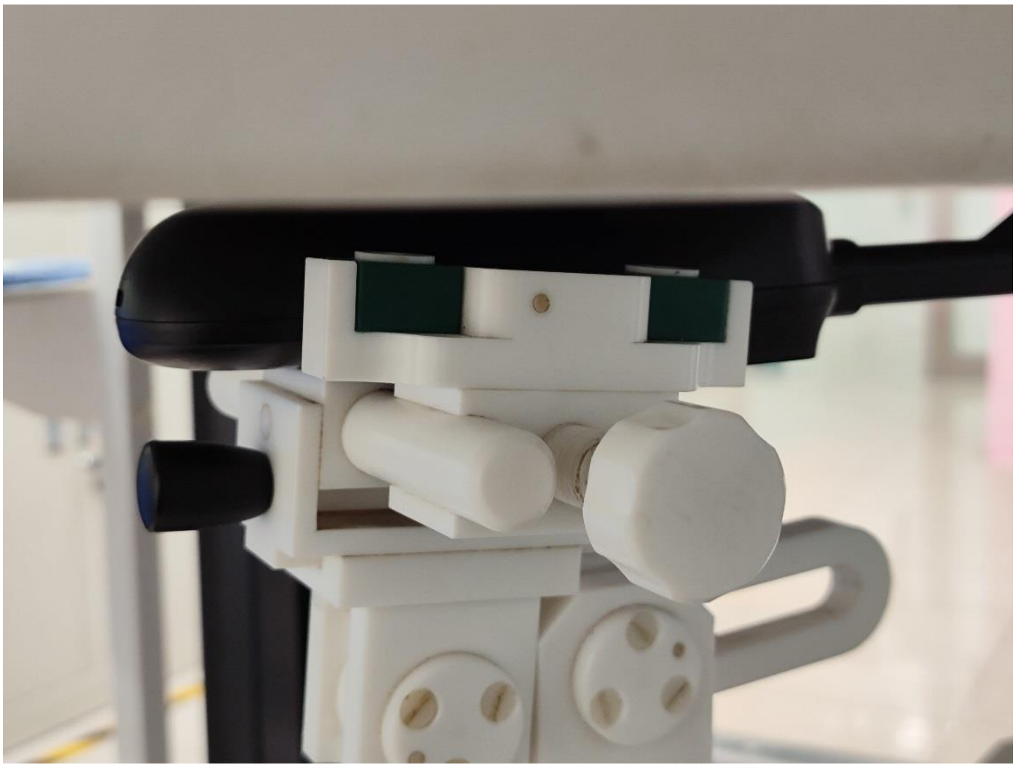
Left side

Right side

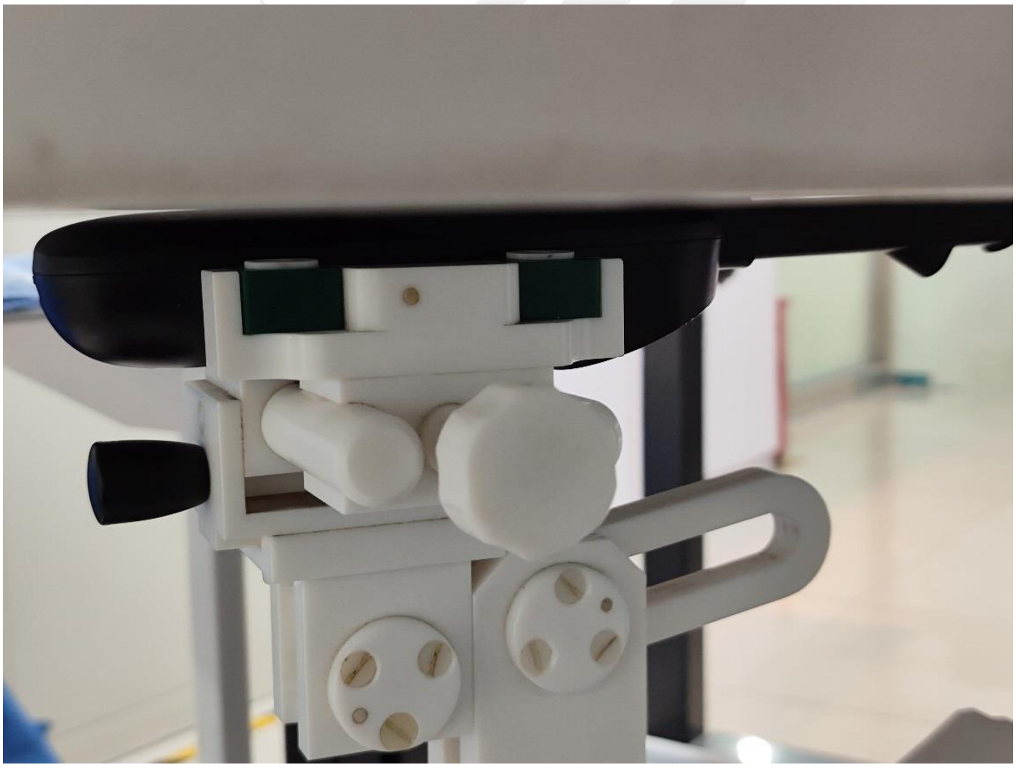


11.2 Setup Photo

Body Back Side (separation distance is 0mm)



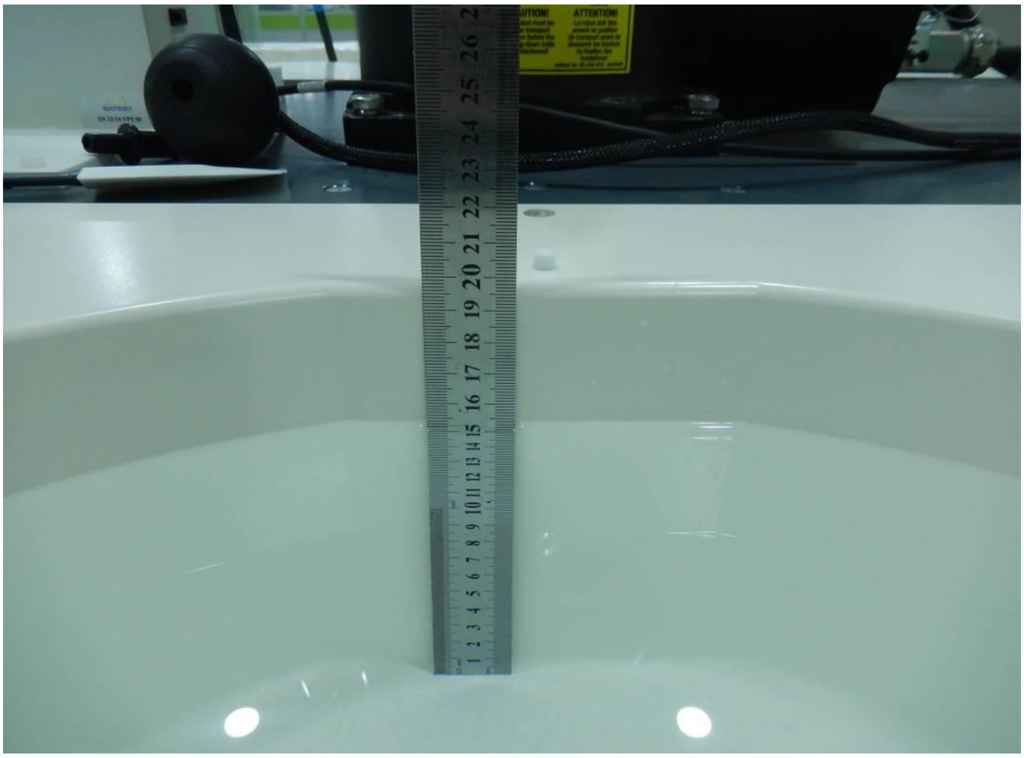
Body Front Side (separation distance is 0mm)



Body Right Side (separation distance is 0mm)

Body Bottom Side (separation distance is 0mm)

Liquid depth (15 cm)



12. SAR Result Summary

12.1 Body-worn SAR

Band	Model	Test Position	Freq.	SAR (10g) (W/kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Scaled SAR (W/Kg)	Meas.No.
2.4GHz WLAN	802.11b	Front Side	2437	0.332	-3.07	14.00	13.59	0.365	/
		Back Side	2437	0.665	-2.81	14.00	13.59	0.731	/
		Right Side	2437	0.679	2.98	14.00	13.59	**0.746**	**1**
2.4GHz WLAN	802.11g	Front Side	2412	0.432	-2.75	21.00	20.55	0.479	/
		Back Side	2412	0.455	-1.35	21.00	20.55	0.505	/
		Right Side	2412	0.561	0.55	21.00	20.55	**0.622**	**2**
5.2GHz WLAN	802.11ac-VHT80	Front Side	5210	0.775	-3.71	18.00	17.71	0.829	/
		Back Side	5210	0.689	3.76	18.00	15.59	1.200	/
		Back Side	5210	0.923	-2.67	18.00	16.68	1.251	/
		Back Side	5210	1.223	3.02	18.00	17.71	**1.307**	**3**
		Right Side	5210	0.993	3.59	18.00	17.71	1.062	/
		Bottom Side	5210	0.359	-0.18	18.00	17.71	0.384	/
5.8GHz WLAN	802.11ac-VHT80	Front Side	5775	0.255	-3.39	17.00	16.57	0.282	/
		Back Side	5775	0.426	-1.87	17.00	16.57	**0.470**	**4**
		Right Side	5775	0.420	-2.11	17.00	16.57	0.464	/
		Bottom Side	5775	0.109	3.16	17.00	16.57	0.120	/

Note:

1. The test separation of all above table is 0mm.
2. Per KDB 447498 D01, 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. For WWAN: Scaled SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor

13. Equipment List

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
2450MHzDipole	MVG	SID2450	SN 30/14 DIP2G450-335	2020.07.14	2023.07.13
Waveguide	SATIMO	SWG5500	SN 13/14 WGA32	2020.07.14	2023.07.13
E-Field Probe	MVG	SSE2	SN 07/21 EPGO352	2023.02.24	2024.02.23
Dielectric Probe Kit	MVG	SCLMP	SN 32/14 OCPG67	2022.11.15	2023.11.14
Antenna	MVG	ANTA3	SN 07/13 ZNTA52	N/A	N/A
Phantom1	MVG	SAM	SN 32/14 SAM115	N/A	N/A
Phantom3	MVG	SAM	SN 21/21 ELLI48	N/A	N/A
Phone holder	MVG	N/A	SN 32/14 MSH97	N/A	N/A
Laptop holder	MVG	N/A	SN 32/14 LSH29	N/A	N/A
Attenuator	Agilent	99899	DC-18GHz	N/A	N/A
Directional coupler	Narda	4226-20	3305	N/A	N/A
Network Analyzer	Agilent	8753ES	US38432810	2022.09.28	2023.09.27
Multi Meter	Keithley	Multi Meter 2000	4050073	2022.09.29	2023.09.28
Signal Generator	Agilent	N5182A	MY50140530	2022.09.28	2023.09.27
Wireless Communication Test Set	Agilent	8960-E5515C	MY48360751	2022.09.28	2023.09.27
Wireless Communication Test Set	R&S	CMW500	156324	2022.09.29	2023.09.28
Power Amplifier	DESAY	ZHL-42W	9638	2022.10.08	2023.10.07
Power Meter	R&S	NRP	100510	2022.09.28	2023.09.27
Power Sensor	R&S	NRP-Z11	101919	2022.09.28	2023.09.27
Power Sensor	Keysight	U2021XA	MY56280002	2022.09.29	2023.09.28
Temperature hygrometer	SuWei	SW-108	N/A	2022.09.30	2023.09.29
Thermograph	Elitech	RC-4	S/N EF7176501537	2022.09.30	2023.09.29

Note:
Per KDB 865664 D01, Dipole SAR Validation Verification, STS LAB has adopted 3 years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:
1. There is no physical damage on the dipole
2. System validation with specific dipole is within 10% of calibrated value
Return-loss in within 20% of calibrated measurement

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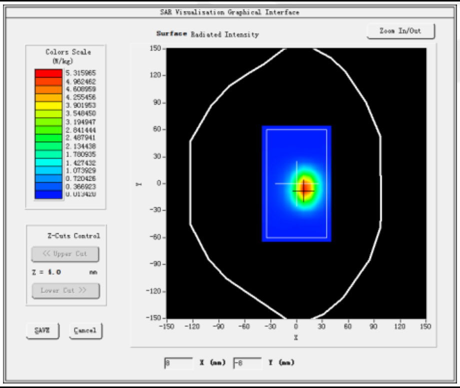
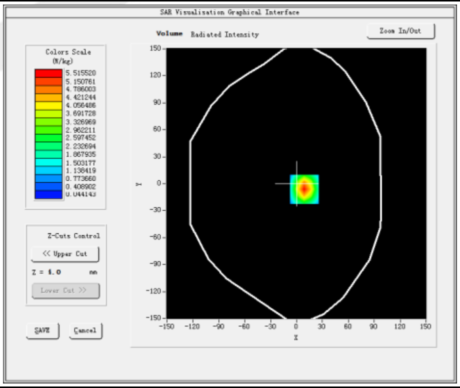
Appendix A. System Validation Plots

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: 2023-06-05

Experimental conditions.

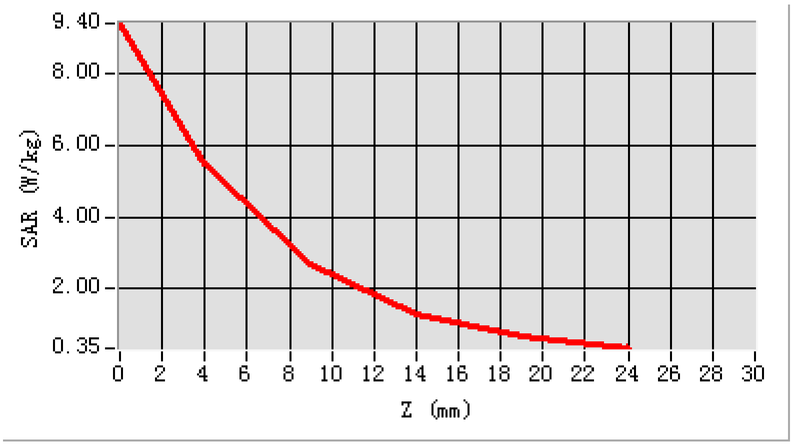
Device Position	Validation plane
Band	2450 MHz
Channels	-
Signal	CW
Frequency (MHz)	2450
Relative permittivity	39.01
Conductivity (S/m)	1.78
Probe	SN 07/21 EPGO352
ConvF	1.75
Crest factor	1:1

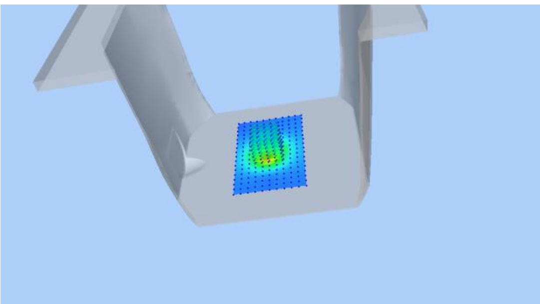
SURFACE SAR	VOLUME SAR
	

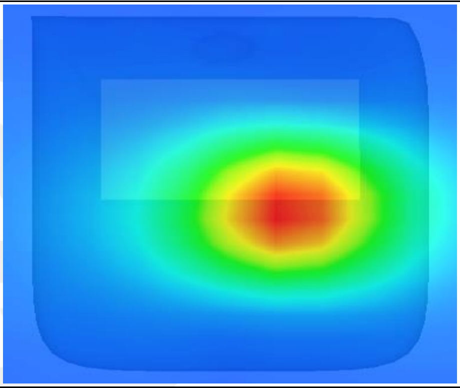
Maximum location: X=1.00, Y=0.00

SAR 10g (W/Kg)	2.498583
SAR 1g (W/Kg)	5.600657

Z Axis Scan


9.40
8.00
6.00
4.00
2.00
0.35
SAR (W/kg)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
Z (mm)



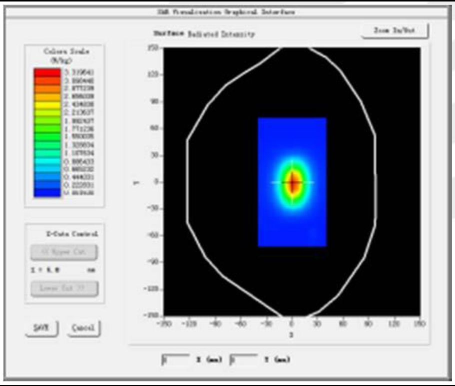
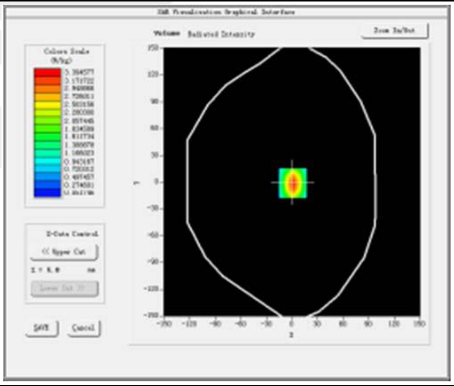


System Performance Check Data(5200MHz)

Type: Dipole measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm
Date of measurement: 2023-06-05

Experimental conditions.

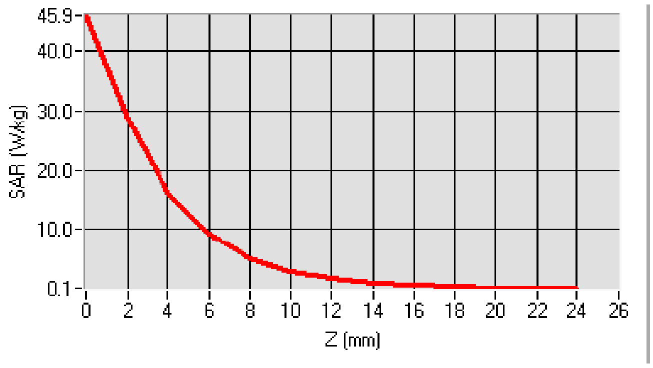
Device Position	Validation plane
Band	5200 MHz
Channels	-
Signal	CW
Frequency (MHz)	5200
Relative permittivity	36.09
Conductivity (S/m)	4.67
Probe	SN 07/21 EPGO352
ConvF	1.47
Crest factor:	1:1

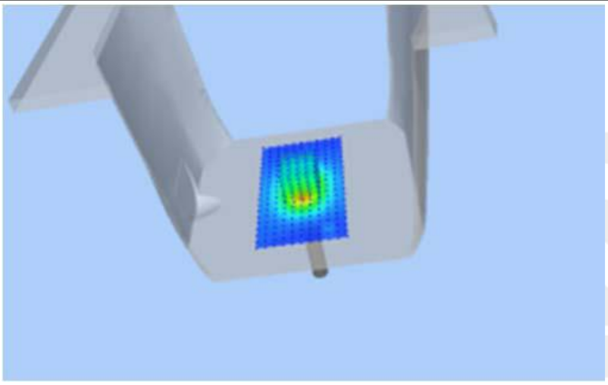
SURFACE SAR	VOLUME SAR
	

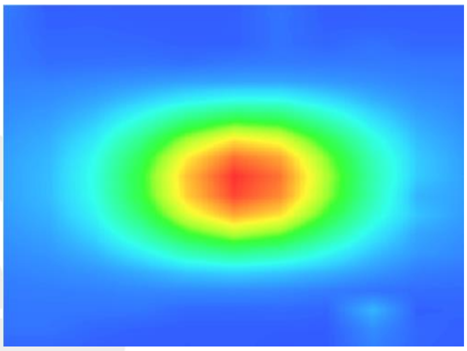
Maximum location: X=7.00, Y=2.00

SAR 10g (W/Kg)	6.054095
SAR 1g (W/Kg)	15.385857

Z Axis Scan





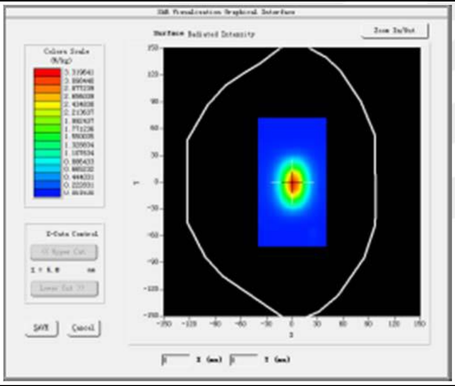
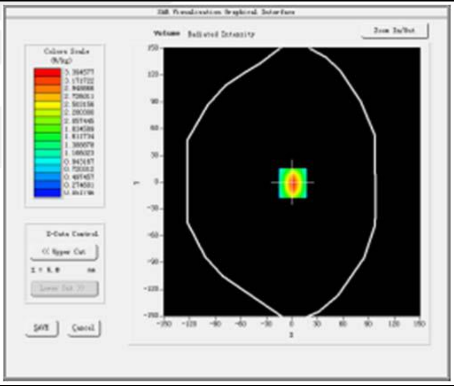


System Performance Check Data(5800MHz)

Type: Dipole measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm
Date of measurement: 2023-06-07

Experimental conditions.

Device Position	Validation plane
Band	5800 MHz
Channels	-
Signal	CW
Frequency (MHz)	5800
Relative permittivity	35.51
Conductivity (S/m)	5.35
Probe	SN 07/21 EPGO352
ConvF	1.64
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

Maximum location: X=7.00, Y=2.00

SAR 10g (W/Kg)	6.153425
SAR 1g (W/Kg)	17.520490

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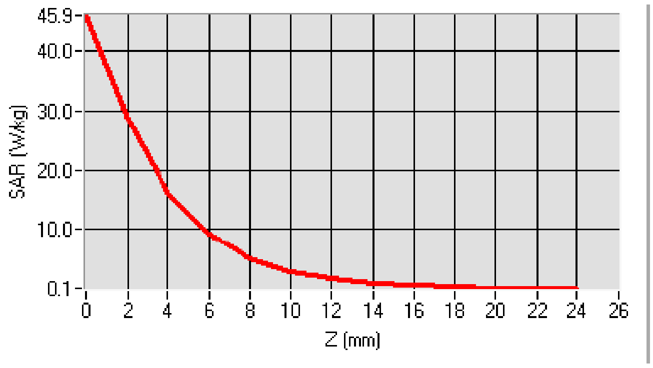
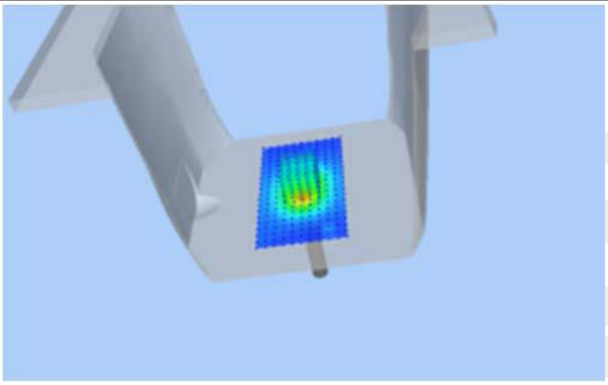
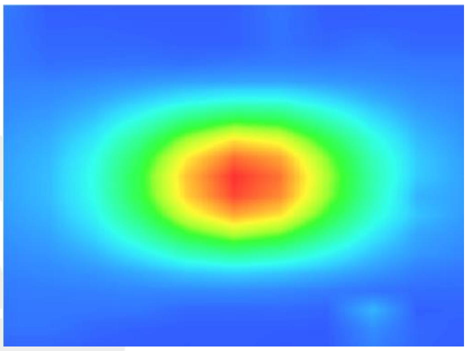
Z Axis Scan







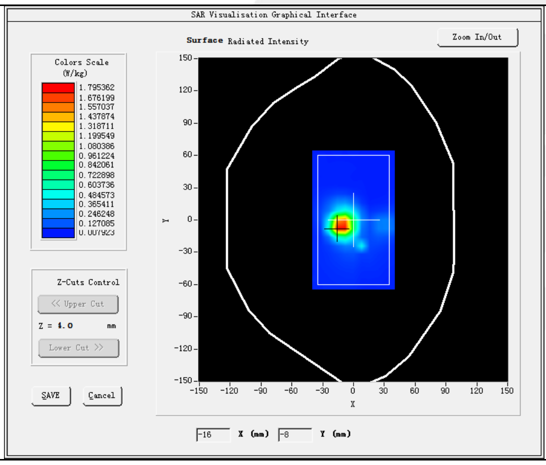
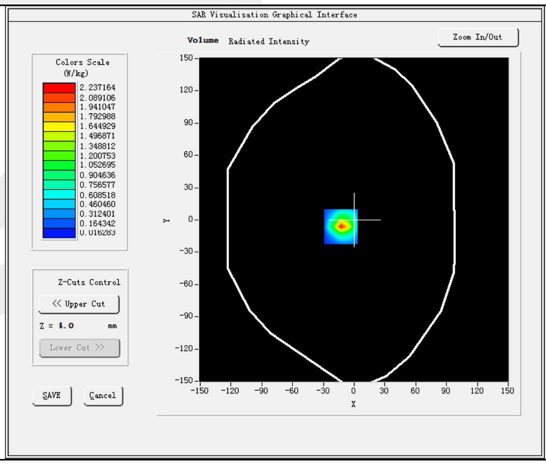
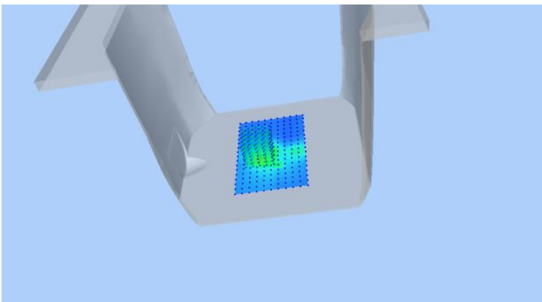
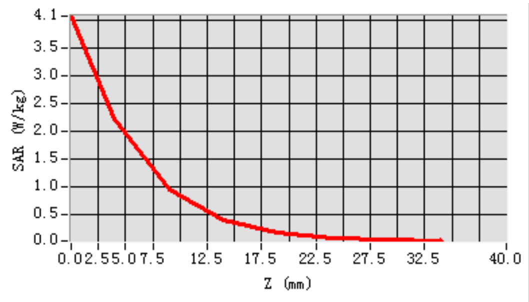
Appendix B. SAR Test Plots

Plot 1: DUT: Tire Tread Depth Gauge EUT Model: TR100

Test Date	2023-06-05
Probe	SN 07/21 EPGO352
Area Scan	dx=8mm, dy=8mm, h= 5.00 mm
Zoom Scan	5x5x7,dx=8mm, dy=8mm, dz=5mm, Complete/ndx=8mm, dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Right Side
Band	IEEE 802.11b
Signal	IEEE802.11b (Crest factor: 1.0)
Frequency (MHz)	2437
Relative permittivity (real part)	39.64
Conductivity (S/m)	1.84

Maximum location: X=-13.00, Y=-6.00
SAR Peak: 4.09 W/kg

SAR 10g (W/Kg)	0.679397
SAR 1g (W/Kg)	1.918840

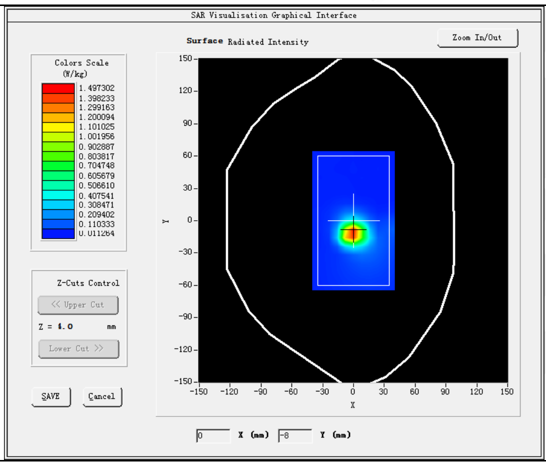
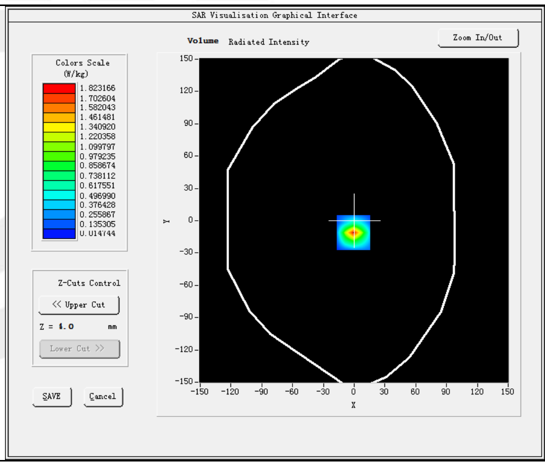
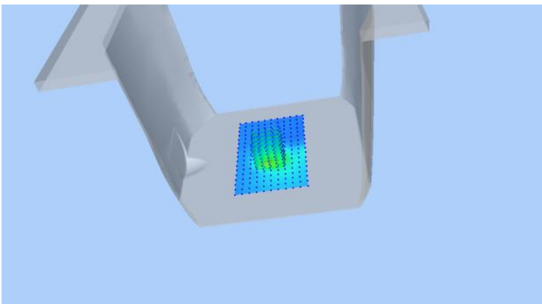
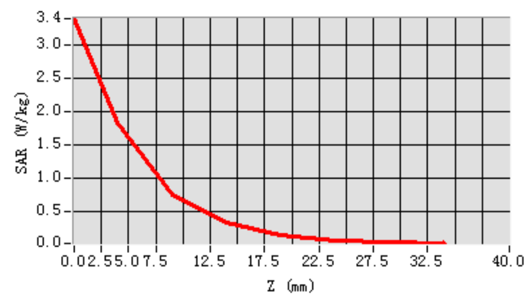
SURFACE SAR	VOLUME SAR
	
3D	**Z Axis Scan**
	

Plot 2: DUT: Tire Tread Depth Gauge EUT Model: TR100

Test Date	2023-06-05
Probe	SN 07/21 EPGO352
Area Scan	dx=8mm, dy=8mm, h= 5.00 mm
Zoom Scan	5x5x7,dx=8mm, dy=8mm, dz=5mm, Complete/ndx=8mm, dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Right Side
Band	IEEE 802.11g
Signal	IEEE802.11a (Crest factor: 1.0)
Frequency (MHz)	2412
Relative permittivity (real part)	40.29
Conductivity (S/m)	1.75

Maximum location: X=-1.00, Y=-11.00
SAR Peak: 3.32 W/kg

SAR 10g (W/Kg)	0.561373
SAR 1g (W/Kg)	1.545891

SURFACE SAR	VOLUME SAR
	
3D	**Z Axis Scan**
	

Plot 4: DUT: Tire Tread Depth Gauge EUT Model: TR100

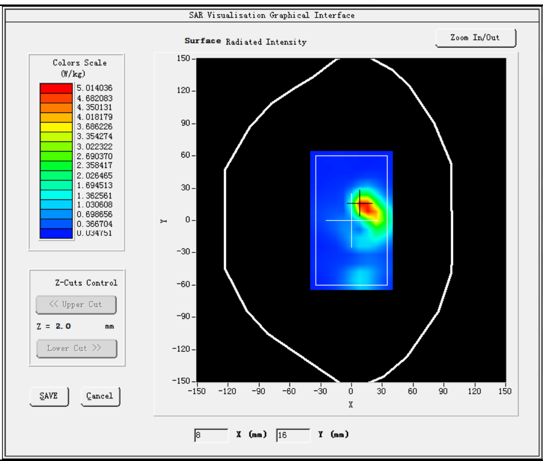
Test Date	2023-06-06
Probe	SN 07/21 EPGO352
Area Scan	dx=8mm, dy=8mm, h= 5.00 mm
Zoom Scan	5x5x7,dx=8mm, dy=8mm, dz=5mm, Complete/ndx=8mm, dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Back Side
Band	IEEE 802.11ac-VHT80
Signal	IEEE802.11ac (Crest factor: 1.0)
Frequency (MHz)	5210
Relative permittivity (real part)	37.06
Conductivity (S/m)	4.62

Maximum location: X=11.00, Y=14.00

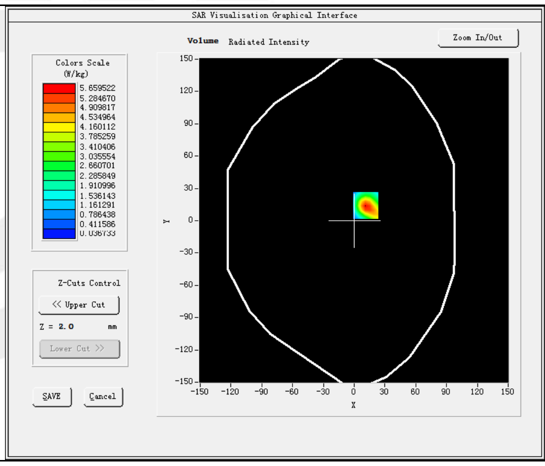
SAR Peak: 9.25 W/kg

SAR 10g (W/Kg)	1.223403
SAR 1g (W/Kg)	3.321896

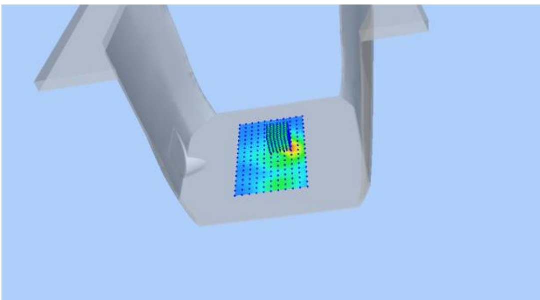
SURFACE SAR



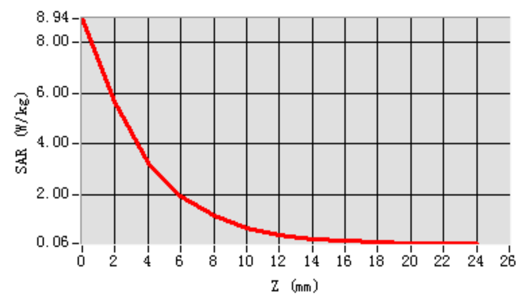
VOLUME SAR



3D



Z Axis Scan



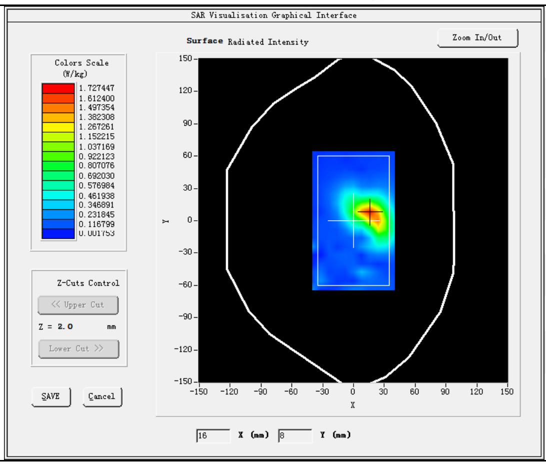
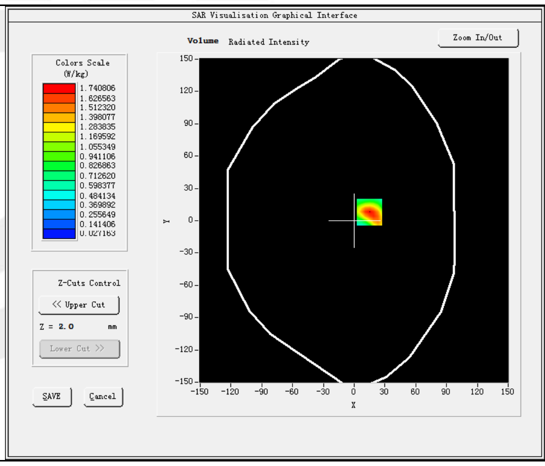
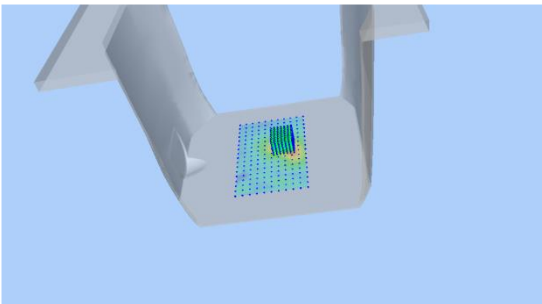
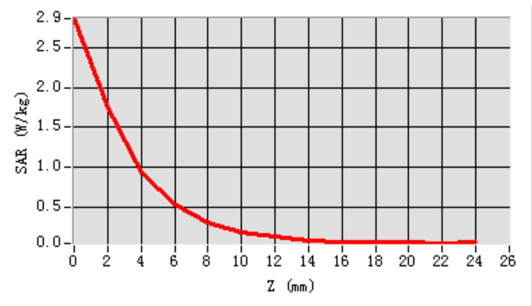
Plot 5: DUT: Tire Tread Depth Gauge EUT Model: TR100

Test Date	2023-06-07
Probe	SN 07/21 EPGO352
Area Scan	dx=8mm, dy=8mm, h= 5.00 mm
Zoom Scan	5x5x7,dx=8mm, dy=8mm, dz=5mm, Complete/ndx=8mm, dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Back Side
Band	IEEE 802.11ac-VHT80
Signal	IEEE802.11ac (Crest factor: 1.0)
Frequency (MHz)	5775
Relative permittivity (real part)	36.03
Conductivity (S/m)	5.20

Maximum location: X=15.00, Y=8.00

SAR Peak: 2.98 W/kg

SAR 10g (W/Kg)	0.425851
SAR 1g (W/Kg)	1.022882

SURFACE SAR	VOLUME SAR
	
3D	**Z Axis Scan**
	

Appendix C. Probe Calibration And Dipole Calibration Report

Refer the appendix Calibration Report.

※※※※※END OF THE REPORT※※※※※