FCC SAR TEST REPORT

Report No.: STS2204008H01

Issued for

SHENZHEN CENTURY XINYANG TECH CO., LTD

3F, North Building, Bantian High-tech industrial Zone, No. 2 of Bell Road, Longgang, Shenzhen, Guangdong, China

Product Name:	Wireless USB Adapter
Brand Name:	N/A
Model Name:	WD-4505AC
Series Model:	N/A
FCC ID:	ZNPWD-4505AC
Test Standard:	ANSI/IEEE Std. C95.1
	FCC 47 CFR Part 2 (2.1093)
	IEEE 1528: 2013
Max. Report SAR (1g):	Body: 0.673 W/kg

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

Applicant's name	:	SHENZHEN CENTURY XINYANG TECH CO., LTD
Address	:	3F, North Building, Bantian High-tech industrial Zone, No. 2 of Bell Road, Longgang, Shenzhen, Guangdong, China
Manufacture's Name	:	SHENZHEN CENTURY XINYANG TECH CO., LTD
Address	:	3F, North Building, Bantian High-tech industrial Zone, No. 2 of Bell Road, Longgang, Shenzhen, Guangdong, China

Product description

Product name	:	Wireless USB Adapter
Brand name	:	N/A
Model name	:	WD-4505AC
Series Model	:	N/A
Standards	:	ANSI/IEEE Std. C95.1-1992 FCC 47 CFR Part 2 (2.1093) IEEE 1528: 2013

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	:	20 Apr. 2022
Date of Issue	:	24 Apr. 2022
Test Result	:	**Pass**

Testing Engineer : Shi fan. long

(Shifan. Long))

Technical Manager : Sean She

(Sean she)

Authorized Signatory : Bovey Yang

(Bovey Yang)

Table of Contents

Revision History

Rev.	Issue Date	Report No.	Effect Page	Contents
00	24 Apr. 2022	STS2204008H01	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	Wireless USB Adapter		
Brand Name	N/A		
Model Name	WD-4505AC		
Series Model	N/A		
Model Difference	N/A		
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 WLAN 802.11n20/n40/ac20/ac40/ac80: 5150 ~ 5250 MHz WLAN 802.11n20/n40/ac20/ac40/ac80: 5470 ~ 5725 MH		
Max. Reported SAR(1g) (Limit:1.6W/kg)	Mode	Mode	Body SAR (W/kg)
	DTS	2.4G WLAN	0.673
	NII	5.2G WLAN	0.495
	NII	5.8G WLAN	0.556
FCC Equipment Class	Part 15 Spread Spectrum Transmitter (DSS) Unlicensed National Information Infrastructure TX(NII)		
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: 802.11n(OFDM):BPSK,QPSK,16-QAM,64-QAM 802.11ac(OFDM):BPSK,QPSK,16-QAM,64-QAM,256-QAM		
Antenna Specification:	WLAN: External antenna.		
Hotspot Mode	Not Support		

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	IEEE Std. 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
4	FCC KDB 447498 D04 v01	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices
5	FCC KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
6	FCC KDB 865664 D02 v01r02	RF Exposure Reporting
7	FCC KDB 447498 D02 v02r01	SAR Procedures for Dongle
8	TCB Workshop November 2019	RF Exposure Procedures

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

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

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

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

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

Population/Uncontrolled Environments:
Are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

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

NOTE

GENERAL POPULATION/UNCONTROLLED EXPOSURE

PARTIAL BODY LIMIT

1.6 W/kg

3. SAR Measurement System

3.1 Definition of Specific Absorption Rate (SAR)

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

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

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

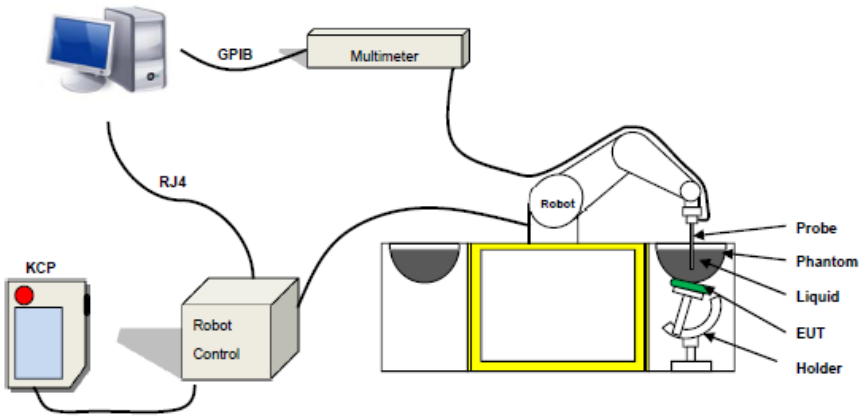
SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

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

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

3.2 SAR System

MVG SAR System Diagram:



Comosar is a system that is able to determine the SAR distribution inside a phantom of human being according to different standards. The Comosar system consists of the following items:
- Main computer to control all the system
- 6 axis robot
- Data acquisition system
- Miniature E-field probe
- Phone holder
- Head simulating tissue

The following figure shows the system.

The EUT under test operating at the maximum power level is placed in the phone holder, under the phantom, which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The 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 41/18 EPGO334 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

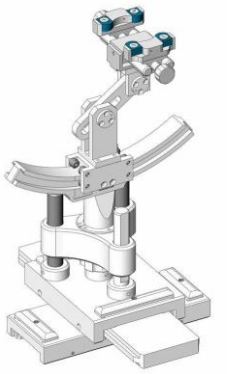
3.2.2 Phantom

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.

SN 32/14 SAM115

SN 32/14 SAM116

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

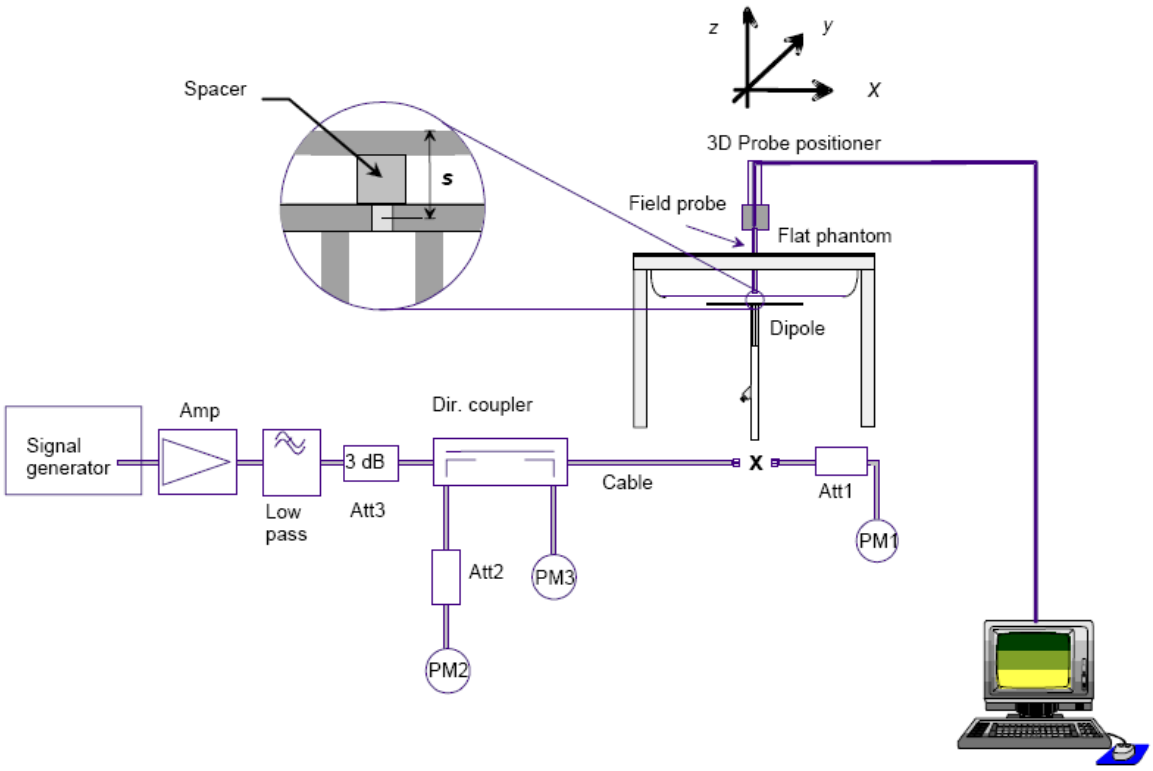
Date	Ambient		Simulating Liquid		Parameters	Target	Measured	Deviation %	Limited %
	Temp. [°C]	Humidity %	Frequency	Temp. [°C]					
2022-04-20	23.8	44	2412 MHz	23.5	Permittivity	39.26	38.78	-1.22	±5
					Conductivity	1.77	1.83	3.39	±5
2022-04-20	22.1	47	2437 MHz	21.8	Permittivity	39.2	38.93	-0.74	±5
					Conductivity	1.8	1.84	2.79	±5
2022-04-20	22.2	44	2450 MHz	22.0	Permittivity	39.2	38.47	-1.86	±5
					Conductivity	1.8	1.83	1.67	±5
2022-04-20	22.5	46	2462 MHz	22.3	Permittivity	39.18	38.97	-0.54	±5
					Conductivity	1.81	1.84	1.66	±5
2022-04-20	23.7	42	5180 MHz	23.5	Permittivity	36.02	34.94	-3.00	±5
					Conductivity	4.64	4.57	-1.51	±5
2022-04-20	21.6	53	5200 MHz	21.3	Permittivity	36	36.45	1.25	±5
					Conductivity	4.66	4.65	-0.21	±5
2022-04-20	23.7	46	5745 MHz	23.4	Permittivity	35.37	36.12	2.12	±5
					Conductivity	5.21	5.18	-0.58	±5
2022-04-20	23.1	55	5800 MHz	22.8	Permittivity	35.3	34.81	-1.39	±5
					Conductivity	5.27	5.29	0.38	±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)	(%)	(%)
2022-04-20	2450	100	5.245	52.45	54.70	-4.11	10
2022-04-20	5200	100	15.898	158.98	159.49	-0.32	10
2022-04-20	5800	100	18.125	181.25	183.06	-0.99	10

Note: The tolerance limit of System validation ±10%.

6. SAR Evaluation Procedures

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

- 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 Test Position

According to KDB 447498 D02, USB connector orientations on laptop computers, which is tested for SAR compliance in body-worn accessory and other use configurations described in the following subsections.

7.1 Dongle with External Swivel Antennas

General guidance for dongles can be found in FCC KDB Publication 447498 D02 For Dongles with a single external Swivel antenna the following guidance should be applied:
– Test the Horizontal Up and Horizontal Down positions of the dongle with the antenna connected in straight mode at a 5mm distance to the SAR phantom.
– The testing of the antenna tip is not necessary.
– If the two measured SAR levels are similar, then additionally test the Horizontal Up position with the antenna connected at 90 degrees, perpendicular to the phantom (antenna pointing down and away from the phantom).
– A 5mm separation distance to the phantom would again apply. With these 3 test positions, SAR testing conditions for this dongle will be satisfied unless the following occurs:
– If the SAR levels for the Horizontal Up and Horizontal Down positions of the dongle in antenna straight mode are not similar, then the dipole antenna is not symmetrical and the Vertical Front and Vertical Back positions in antenna straight mode also need to be tested at a 5mm distance to the SAR phantom. If the dongle has multiple, independent swivel antennas, the guidance above should be applied to each antenna

Horizontal-Up Horizontal-Down Vertical-Front Vertical-Back

Note: These are USB connector orientations on laptop computers; USB dongles have the reverse configuration for plugging into the corresponding laptop computers.

8. Uncertainty

8.1 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.

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

9. Conducted Power Measurement

9.1 Test Result

2.4GWIFI:

2.4GWIFI				
Mode	Channel Number	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
802.11b	1	2412	12.73	18.75
	6	2437	12.52	17.86
	11	2462	12.6	18.20
802.11g	1	2412	11.19	13.15
	6	2437	10.95	12.45
	11	2462	10.09	10.21
802.11 n-HT20	1	2412	10.11	10.26
	6	2437	10.4	10.96
	11	2462	9.99	9.98
802.11 n-HT40	3	2422	9.74	9.42
	6	2437	9.31	8.53
	9	2452	9.67	9.27

5.2G WLAN:

5.2G WLAN				
Mode	Channel Number	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
802.11 n-HT20	36	5180	9.025	7.99
	40	5200	9.014	7.97
	48	5240	8.45	7.00
802.11 n-HT40	38	5190	7.951	6.24
	46	5230	7.782	6.00
802.11ac-VHT20	36	5180	8.816	7.61
	40	5200	8.589	7.23
	48	5240	8.398	6.92
802.11ac-VHT40	38	5190	7.882	6.14
	46	5230	7.628	5.79
802.11ac-VHT80	42	5210	6.408	4.37

5.8G WLAN:

5.8G WLAN				
Mode	Channel Number	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
802.11 n-HT20	149	5745	8.401	6.92
	157	5785	8.331	6.81
	165	5825	8.132	6.50
802.11 n-HT40	151	5755	7.832	6.07
	159	5795	7.641	5.81
802.11ac-VHT20	149	5745	8.225	6.65
	157	5785	8.316	6.79
	165	5825	8.002	6.31
802.11ac-VHT40	151	5755	7.632	5.80
	159	5795	7.551	5.69
802.11ac-VHT80	155	5775	6.211	4.18

9.2 Tune-up Power

2.4G WLAN(AVG)	
Mode	2.4G WLAN(AVG)
802.11b	12±1dBm
802.11g	10.5±1dBm
802.11n(HT 20)	9.5±1dBm
802.11n(HT 40)	9±1dBm

5.2G WLAN(AVG)	
Mode	5.2G WLAN(AVG)
802.11 n-HT20	8.5±1dBm
802.11 n-HT40	7±1dBm
802.11 ac-VHT20	8±1dBm
802.11 ac-VHT40	7±1dBm
802.11 ac-VHT80	5.5±1dBm

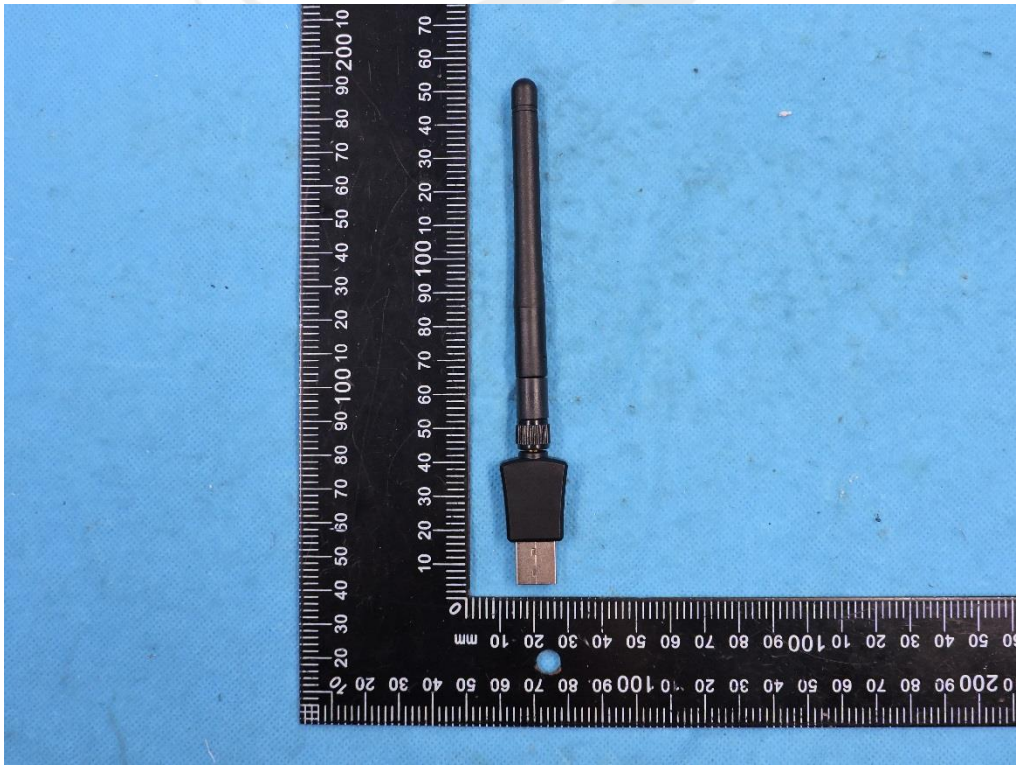
5.8G WLAN(AVG)	
Mode	5.8G WLAN(AVG)
802.11 n-HT20	8±1dBm
802.11 n-HT40	7±1dBm
802.11 ac-VHT20	7.5±1dBm
802.11 ac-VHT40	7±1dBm
802.11 ac-VHT80	5.5±1dBm

10. EUT and Test Setup Photo

10.1 EUT Photo

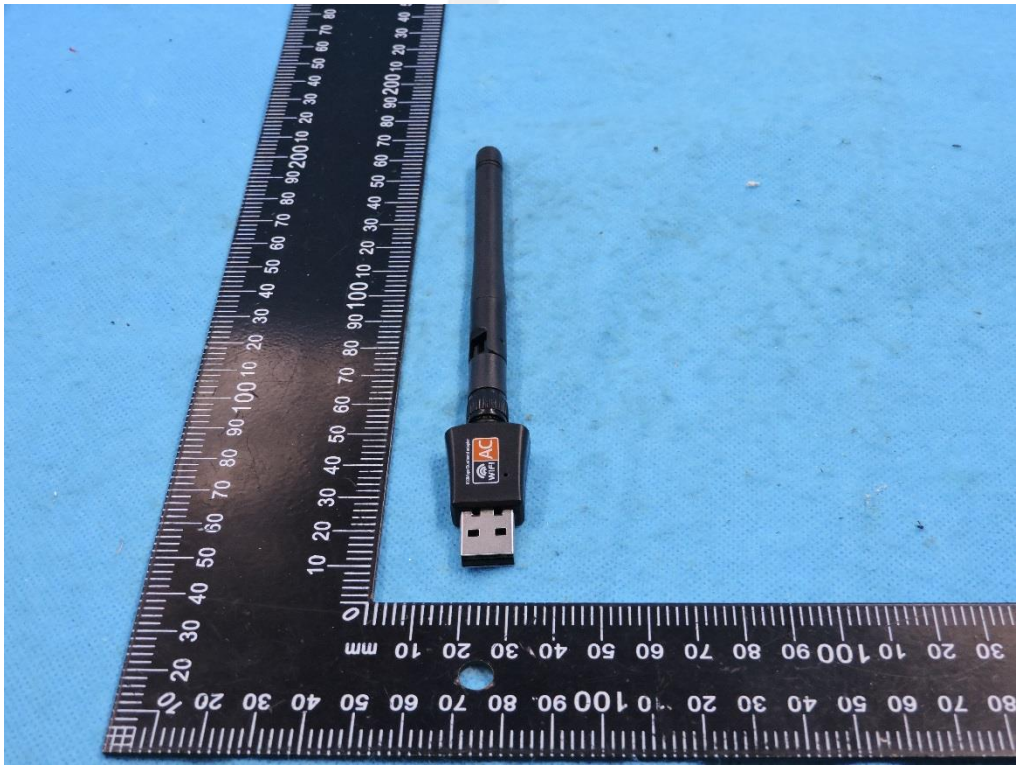
Front side

Back side

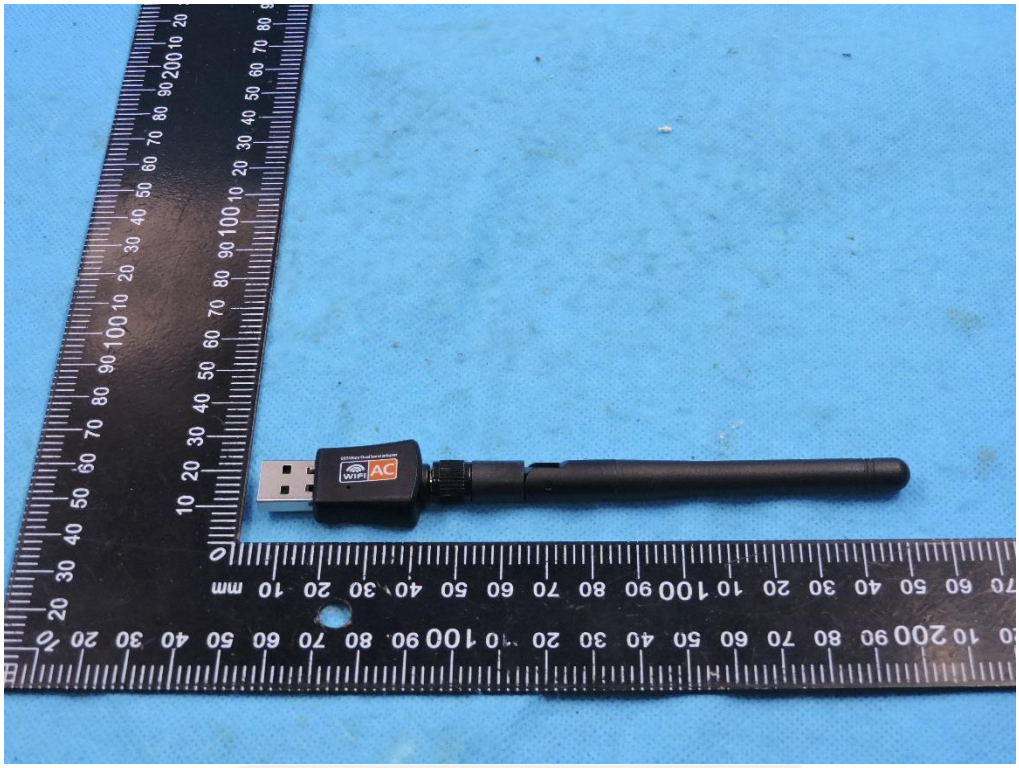


Top side

Bottom side



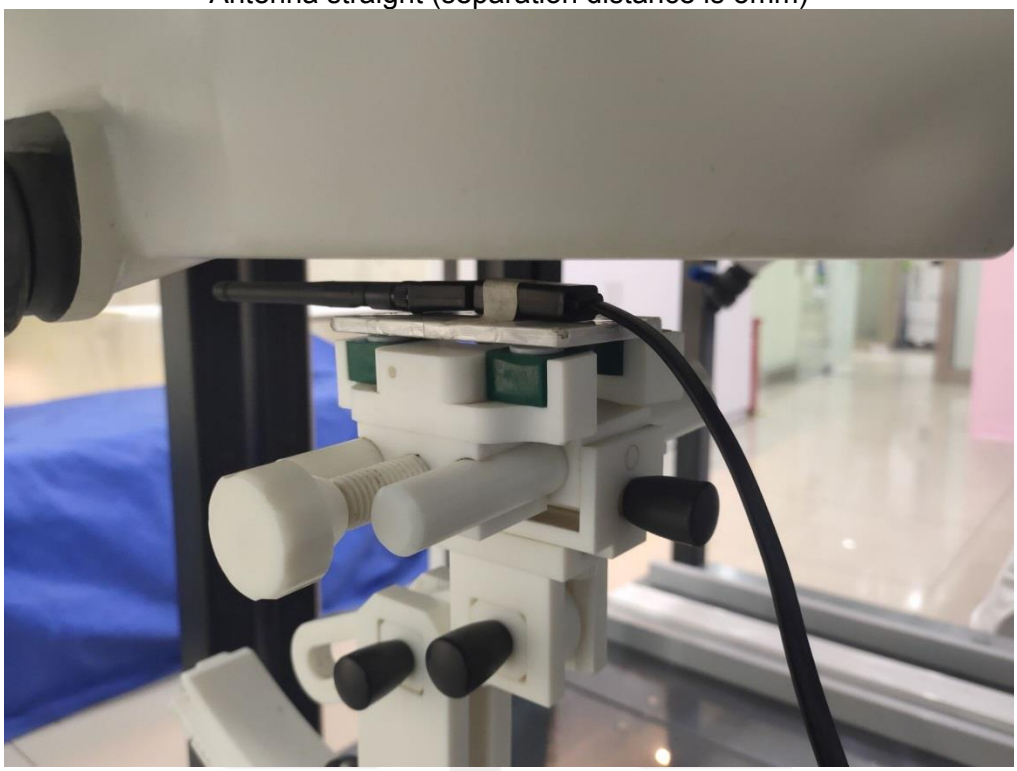
Left side



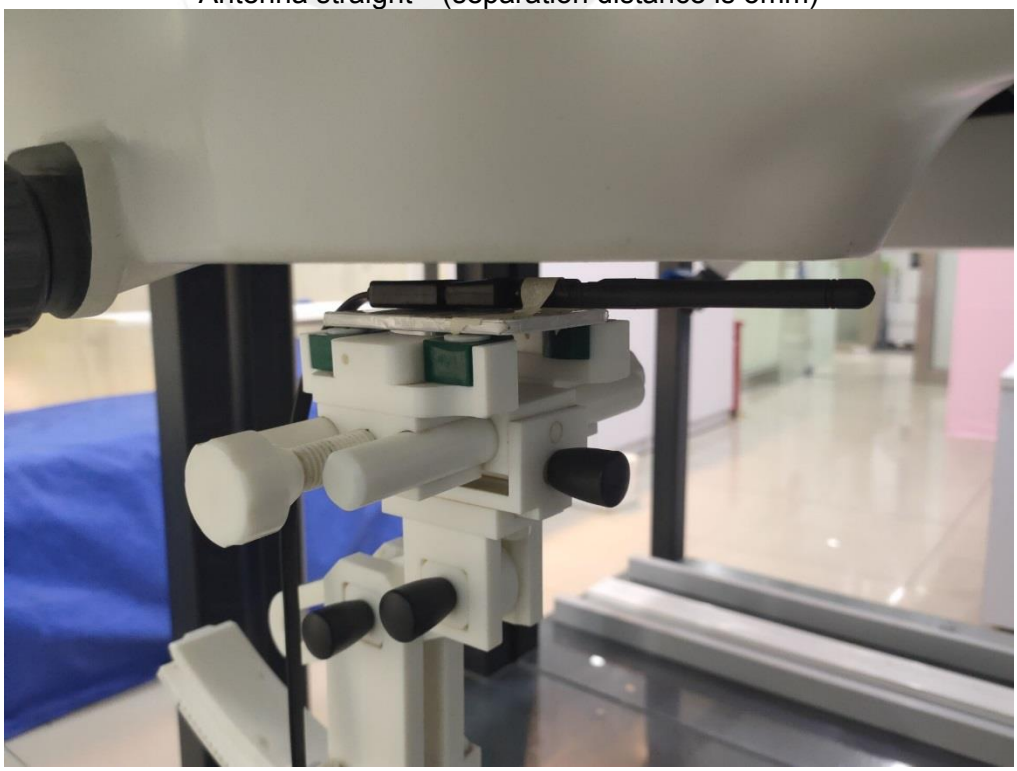
Right side

10.2 Setup Photo

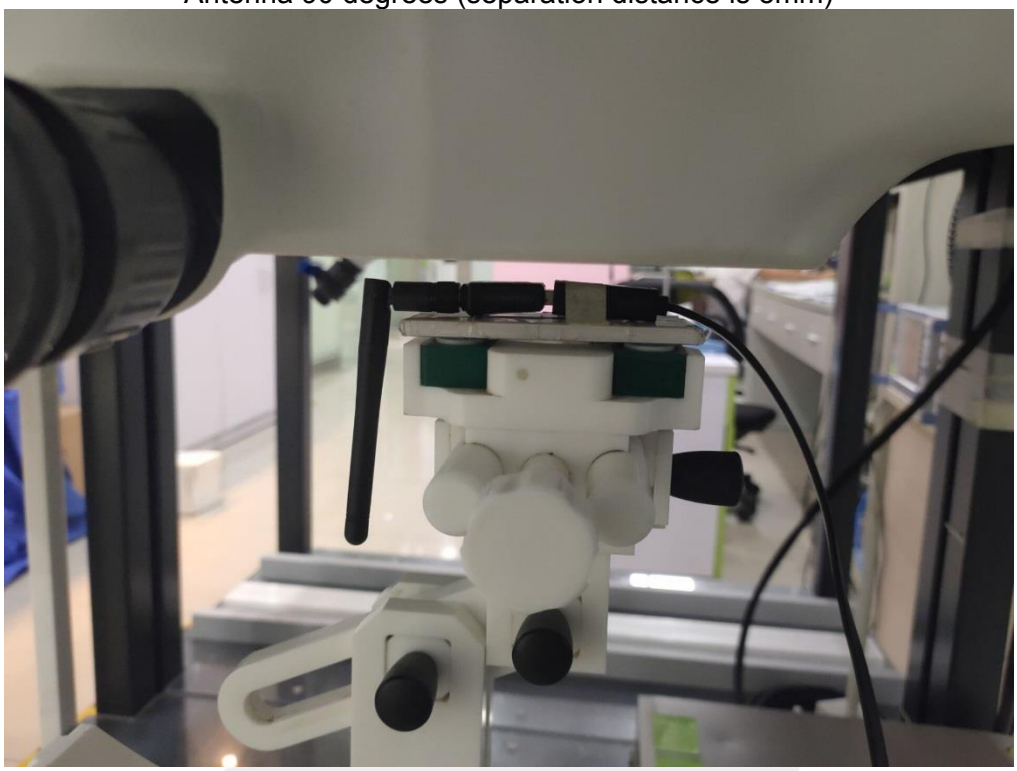
Horizontal- Up
Antenna straight (separation distance is 5mm)



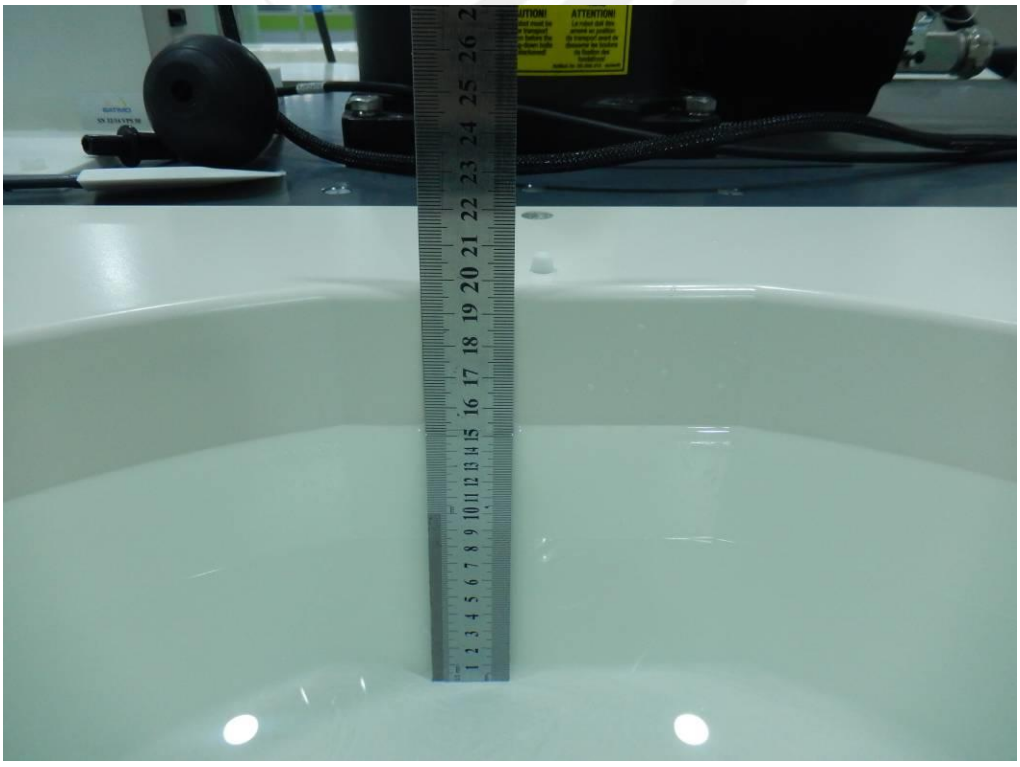
Horizontal- Down
Antenna straight (separation distance is 5mm)



Horizontal- Up
Antenna 90 degrees (separation distance is 5mm)



Liquid depth (15 cm)



11. SAR Result Summary

11.1 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	Horizontal- Up Antenna straight	2412	0.632	2.77	13.00	12.73	**0.673**	**1**
		Horizontal- Up Antenna straight	2437	0.548	3.23	13.00	12.52	0.612	/
		Horizontal- Up Antenna straight	2462	0.606	2.29	13.00	12.60	0.664	/
		Horizontal- Down Antenna straight	2412	0.600	-2.24	13.00	12.73	0.638	/
		Horizontal- Up Antenna 90 degrees	2412	0.032	-3.60	13.00	12.73	0.034	**/**
5.2GHz WLAN	802.11 n-HT20	Horizontal- Up Antenna straight	5180	0.444	3.75	9.50	9.03	**0.495**	**2**
		Horizontal- Down Antenna straight	5180	0.431	-1.66	9.50	9.03	0.481	/
		Horizontal- Up Antenna 90 degrees	5180	0.112	-0.49	9.50	9.03	0.125	**/**
5.8GHz WLAN	802.11 n-HT20	Horizontal- Up Antenna straight	5745	0.484	-3.05	9.00	8.40	**0.556**	**3**
		Horizontal- Down Antenna straight	5745	0.462	-1.19	9.00	8.40	0.530	/
		Horizontal- Up Antenna 90 degrees	5745	0.121	1.25	9.00	8.40	0.139	/

Note:

1. The test separation of all above table is 5mm.
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 **0.472** W/Kg for Head)
4. Per KDB865664 D01, Repeated measurement is not required when the original highest measured SAR is <0.80 W/kg
5. Antenna straight Horizontal-Up and Horizontal-Down measure similar SAR levels, then additionally test the Horizontal Up position with the antenna connected at 90 degrees, perpendicular to the phantom (antenna pointing down and away from the phantom), without testing the vertical front and vertical back positions.

12. 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	MVG	SWG5500	SN 13/14 WGA32	2020.07.14	2023.07.13
E-Field Probe	MVG	SSE2	SN 07/21 EPGO352	2022.02.28	2023.02.27
Dielectric Probe Kit	MVG	SCLMP	SN 32/14 OCPG67	2021.11.23	2022.11.22
Antenna	MVG	ANTA3	SN 07/13 ZNTA52	N/A	N/A
Phantom1	MVG	SAM	SN 32/14 SAM115	N/A	N/A
Phantom2	MVG	SAM	SN 32/14 SAM116	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	2021.09.29	2022.09.28
Multi Meter	Keithley	Multi Meter 2000	4050073	2021.10.08	2022.10.07
Signal Generator	Agilent	N5182A	MY50140530	2021.09.30	2022.09.29
Wireless Communication Test Set	Agilent	8960-E5515C	MY48360751	2021.09.30	2022.09.29
Wireless Communication Test Set	R&S	CMW500	117239	2021.09.30	2022.09.29
Power Amplifier	DESAY	ZHL-42W	9638	2021.10.09	2022.10.08
Power Meter	R&S	NRP	100510	2021.09.29	2022.09.28
Power Sensor	R&S	NRP-Z11	101919	2021.09.29	2022.09.28
Temperature hygrometer	SuWei	SW-108	N/A	2021.10.09	2022.10.08
Thermograph	Elitech	RC-4	S/N EF7176501537	2021.10.09	2022.10.08

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

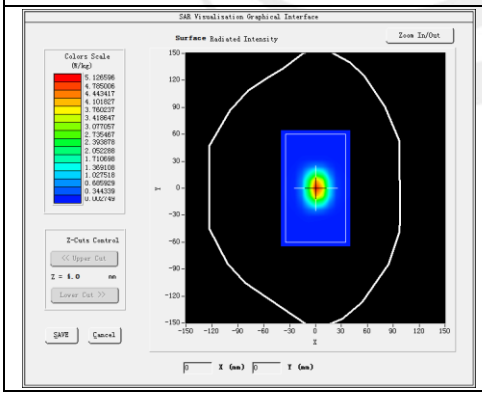
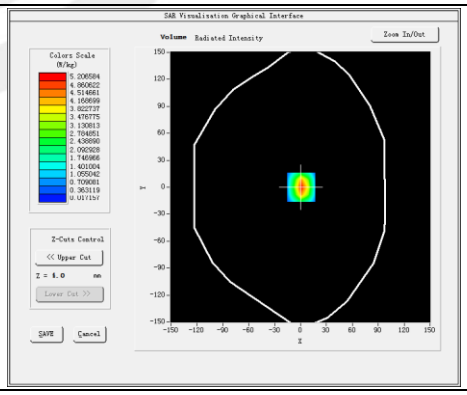
Appendix A. System Validation Plots

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: 2022-04-20

Experimental conditions.

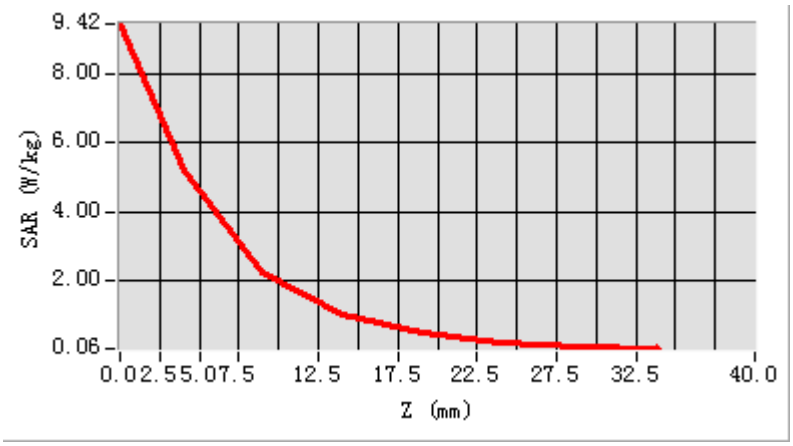
Device Position	Validation plane
Band	2450 MHz
Channels	-
Signal	CW
Frequency (MHz)	2450
Relative permittivity	38.47
Conductivity (S/m)	1.83
Probe	SN 07/21 EPGO352
ConvF	1.75
Crest factor:	1:1

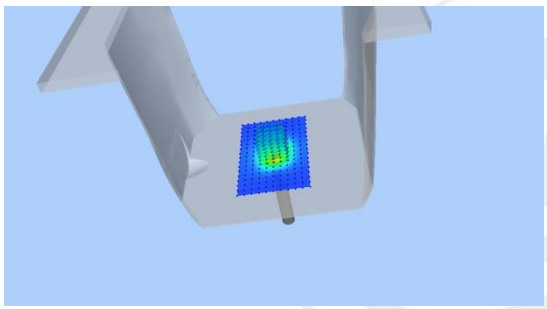
SURFACE SAR	VOLUME SAR
	

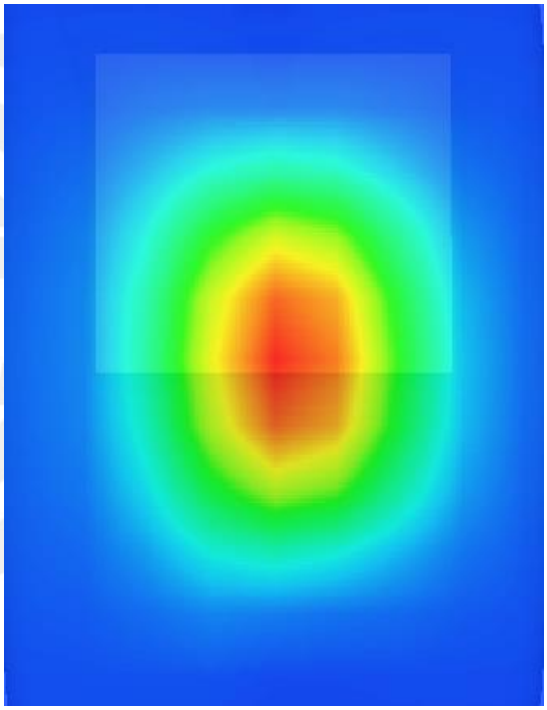
Maximum location: X=1.00, Y=0.00

SAR 10g (W/Kg)	2.370318
SAR 1g (W/Kg)	5.244705

Z Axis Scan


9.42
8.00
6.00
4.00
2.00
0.06
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)



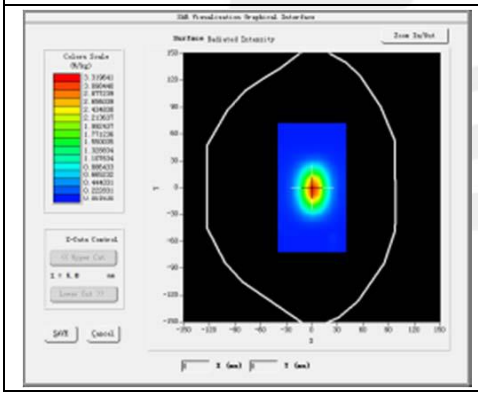
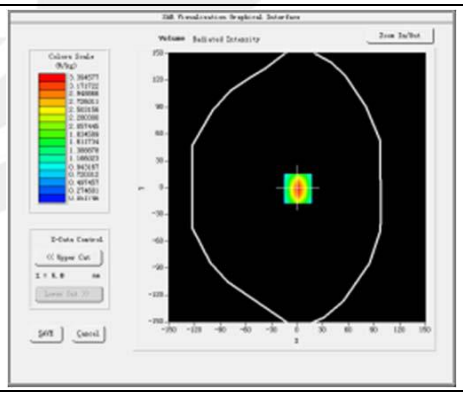


System Performance Check Data (5200MHz)

Type: Dipole measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm
Date of measurement: 2022-04-20

Experimental conditions.

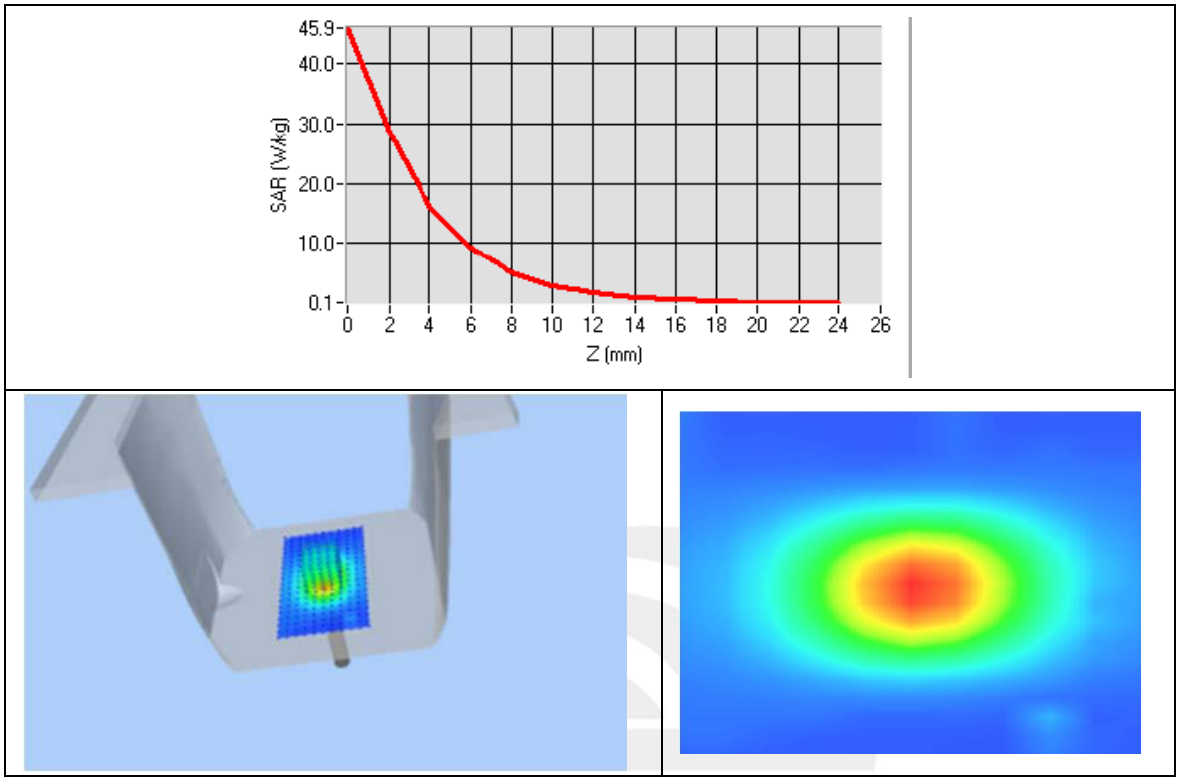
Device Position	Validation plane
Band	5200 MHz
Channels	-
Signal	CW
Frequency (MHz)	5200
Relative permittivity	36.45
Conductivity (S/m)	4.65
Probe	SN 07/21 EPGO352
ConvF	1.65
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

Maximum location: X=7.00, Y=2.00

SAR 10g (W/Kg)	5.705365
SAR 1g (W/Kg)	15.897982

Z Axis Scan

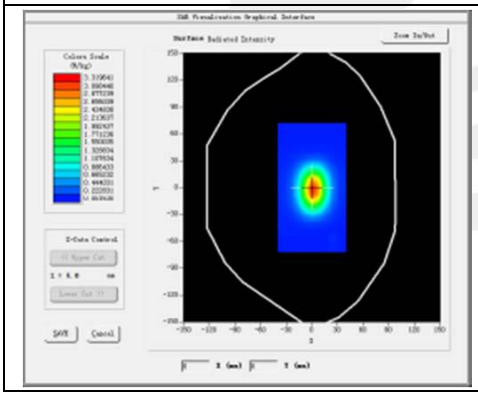
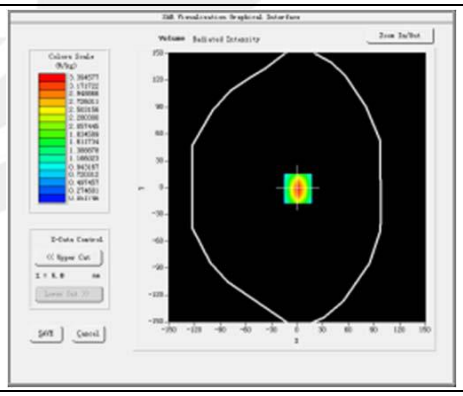


System Performance Check Data (5800MHz)

Type: Dipole measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm
Date of measurement: 2022-04-20

Experimental conditions.

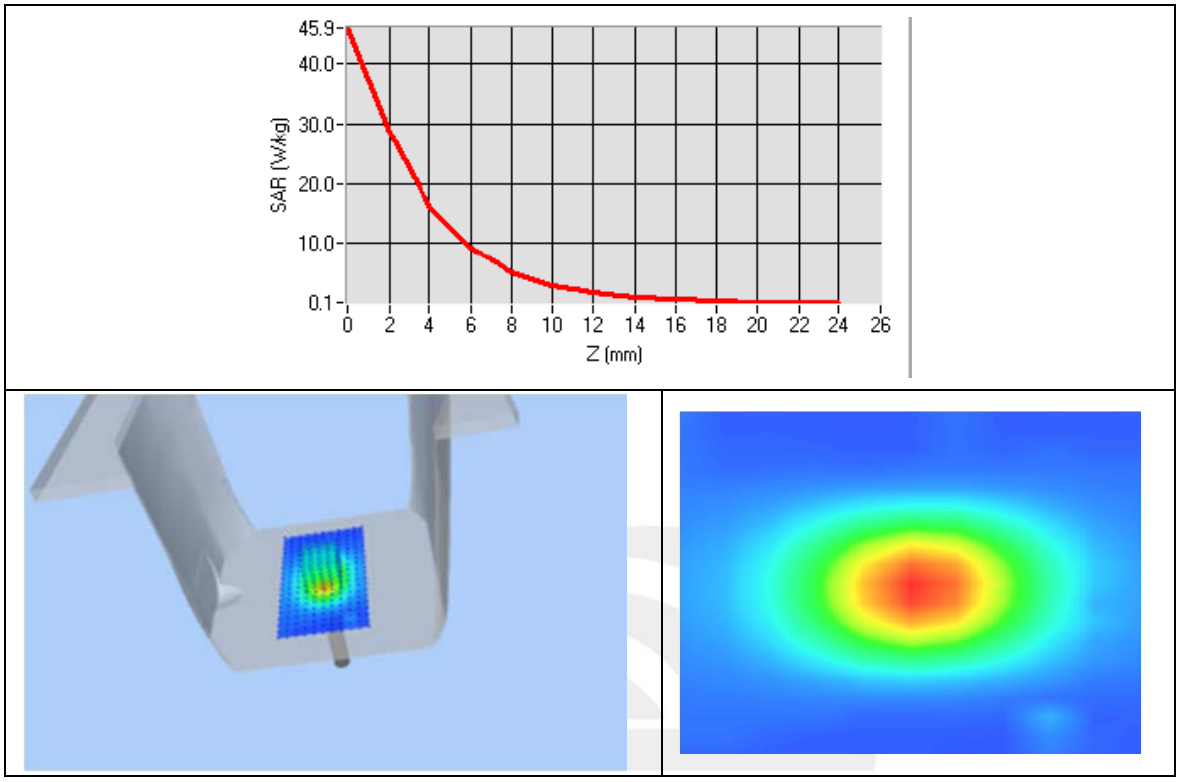
Device Position	Validation plane
Band	5200 MHz
Channels	-
Signal	CW
Frequency (MHz)	5800
Relative permittivity	34.81
Conductivity (S/m)	5.29
Probe	SN 07/21 EPGO352
ConvF	1.65
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

Maximum location: X=7.00, Y=2.00

SAR 10g (W/Kg)	6.153356
SAR 1g (W/Kg)	18.125113

Z Axis Scan



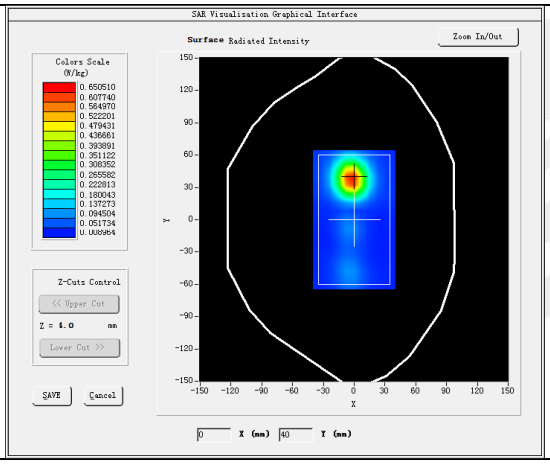
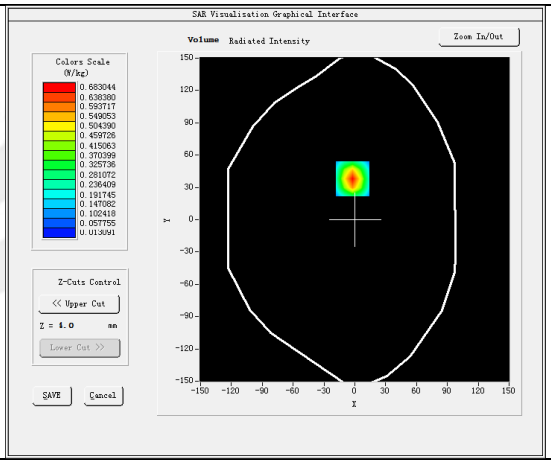
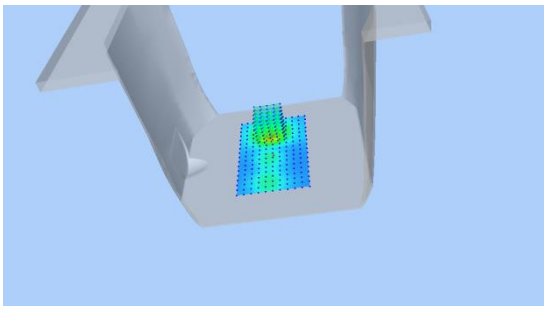
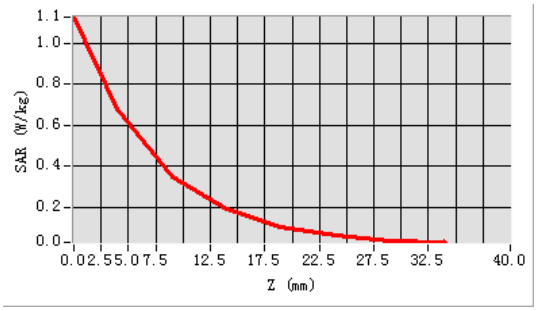
Appendix B. SAR Test Plots

Plot 1: DUT: Wireless USB Adapter; EUT Model: WD-4505AC

Test Date	2022-04-20
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	Horizontal- Up
Band	IEEE 802.11b ISM
Signal	IEEE802.b (Crest factor: 1.0)
Frequency (MHz)	2412
Relative permittivity (real part)	38.78
Conductivity (S/m)	1.83

Maximum location: X=-2.00, Y=38.00
SAR Peak: 1.12 W/kg

SAR 10g (W/Kg)	0.298466
SAR 1g (W/Kg)	0.632417

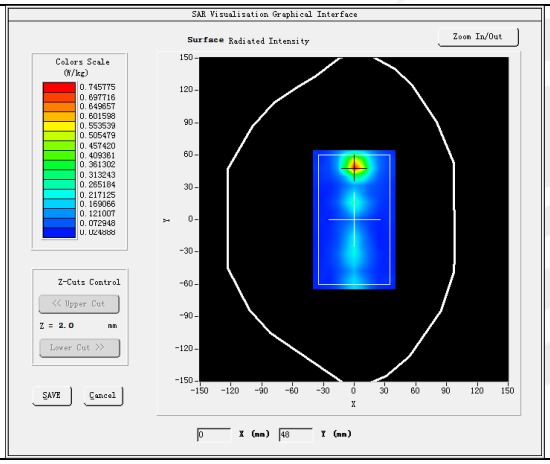
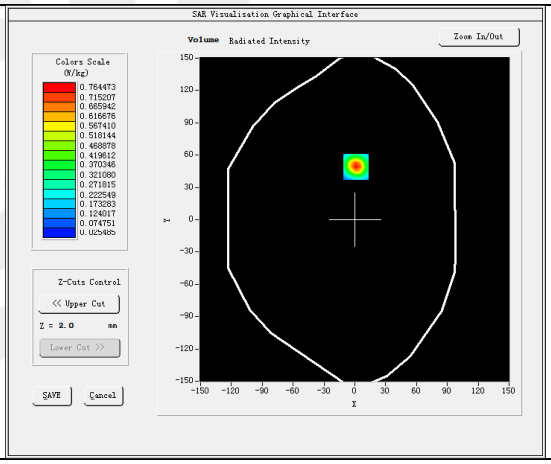
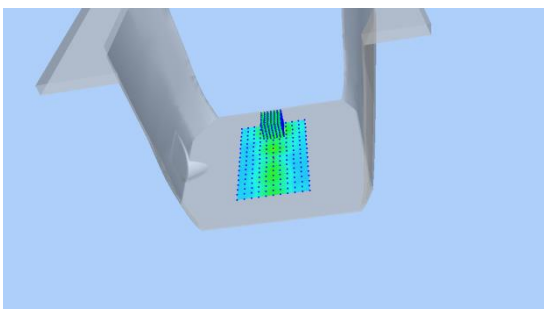
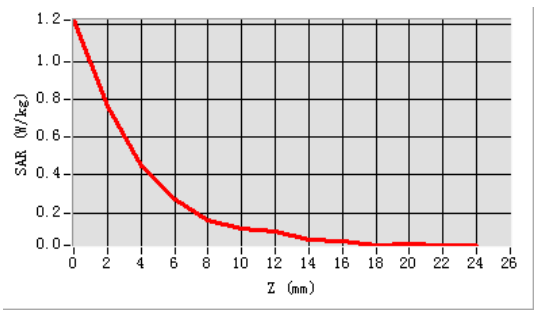
SURFACE SAR	VOLUME SAR
	
3D	**Z AZxis Scan**
	

Plot 2: DUT: Wireless USB Adapter; EUT Model: WD-4505AC

Test Date	2022-04-20
Probe	SN 07/21 EPGO352
Area Scan	dx=8mm, dy=8mm, h= 5.00 mm
Zoom Scan	7x7x12, dx=4mm, dy=4mm, dz=2mm, Complete/ndx=8mm, dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Horizontal- Up
Band	IEEE 802.11a ISM
Signal	IEEE802. n-HT20 (Crest factor: 1.0)
Frequency (MHz)	5180
Relative permittivity (real part)	34.94
Conductivity (S/m)	4.57

Maximum location: X=1.00, Y=49.00
SAR Peak: 1.27 W/kg

SAR 10g (W/Kg)	0.165894
SAR 1g (W/Kg)	0.443959

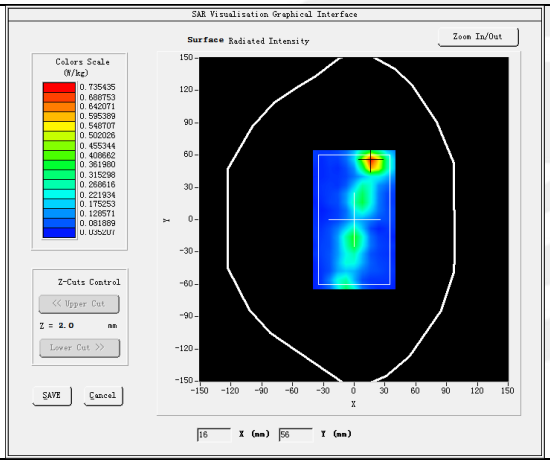
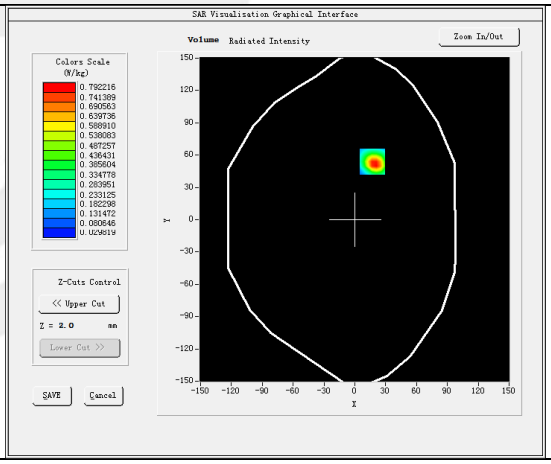
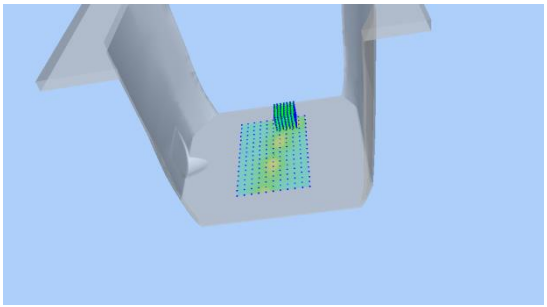
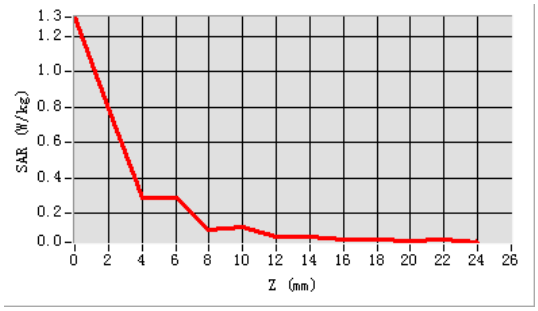
SURFACE SAR	VOLUME SAR
	
3D	**Z Axis Scan**
	

Plot 3: DUT: Wireless USB Adapter; EUT Model: WD-4505AC

Test Date	2022-04-20
Probe	SN 07/21 EPGO352
Area Scan	dx=8mm, dy=8mm, h= 5.00 mm
Zoom Scan	7x7x12, dx=4mm, dy=4mm, dz=2mm, Complete/ndx=8mm, dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Horizontal- Up
Band	IEEE 802.11a ISM
Signal	IEEE802. n-HT20 (Crest factor: 1.0)
Frequency (MHz)	5745
Relative permittivity (real part)	36.12
Conductivity (S/m)	5.18

Maximum location: X=17.00, Y=54.00
SAR Peak: 1.37 W/kg

SAR 10g (W/Kg)	0.186106
SAR 1g (W/Kg)	0.484386

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※※※※※