



FCC SAR TEST REPORT

Report No.: STS2112062H01

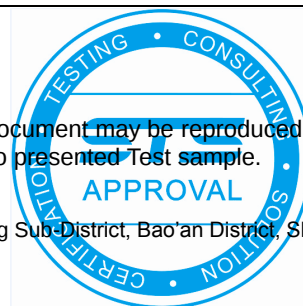
Issued for

Pitpatpet Ltd

5 Brooklands Avenue, Cambridge, CB2 8BB, United Kingdom

Product Name:	Dog GPS Tracker
Brand Name:	PitPat
Model Name:	PP04
Series Model:	N/A
FCC ID:	2AGYZ-PP04
Test Standard:	ANSI/IEEE Std. C95.1
	FCC 47 CFR Part 2 (2.1093)
	IEEE 1528: 2013
Max. Report SAR (1g):	Body: 0.791 W/kg

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Test Report Certification

Applicant's name : Pitpatpet Ltd

Address : 5 Brooklands Avenue, Cambridge, CB2 8BB, United Kingdom

Manufacturer's Name : Pitpatpet Ltd

Address : 5 Brooklands Avenue, Cambridge, CB2 8BB, United Kingdom

Product description

Product name : Dog GPS Tracker

Brand name : PitPat

Model name : PP04

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 : 19 Apr. 2022

Date of Issue..... : 25 Apr. 2022

Test Result..... : **Pass**

Testing Engineer :

Shi fan-long

(Shifan. Long)

Technical Manager :

Sean She

(Sean she)

Authorized Signatory :

Bovey Yang

(Bovey Yang)





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**Revision History**

Rev.	Issue Date	Report No.	Effect Page	Contents
00	25 Apr. 2022	STS2112062H01	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	Dog GPS Tracker		
Brand Name	PitPat		
Model Name	PP04		
Series Model	N/A		
Model Difference	N/A		
Battery	Rated Voltage: DC 3.8V Charge Limit Voltage: DC 4.2V Capacity:550mAh		
Device Category	Portable		
Product stage	Production unit		
RF Exposure Environment	General Population / Uncontrolled		
Hardware Version	R1.00		
Software Version	R1.00		
Frequency Range	CAT-M Band 2:1850~1910MHz CAT-M Band 4:1710~1755MHz CAT-M Band 5:824~849MHz CAT-M Band 12:699~716MHz CAT-M Band 13:777~787MHz		
Max. Reported SAR(1g): (Limit:1.6W/kg)	Band	Mode	Body Worn (W/kg)
	PCT	CAT-M FDD Band 2	0.522
	PCT	CAT-M FDD Band 4	0.791
	PCT	CAT-M FDD Band 5	0.361
	PCT	CAT-M FDD Band 12	0.210
	PCT	CAT-M FDD Band 13	0.254
FCC Equipment Class	PCS Licensed Transmitter worn on body (PCT)		
Operating Mode:	CAT-M Band: QPSK, 16QAM		
Antenna Specification:	CAT-M Band: PCB Antenna		
SIM Card	SIM 1 and SIM 2 is a chipset unit and tested as single chipset, SIM 1 is used to tested.		
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 (°C)	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 941225 D05 v02r05	SAR for LTE Devices
8	FCC KDB 648474 D04 v01r03	SAR Evaluation Considerations for Wireless Handsets

(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

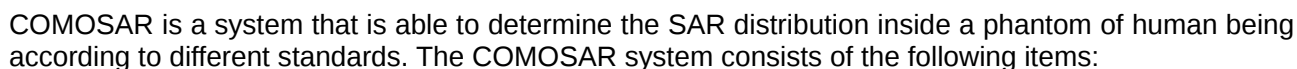
3.1 Definition of Specific Absorption Rate (SAR)

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

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

MVG SAR System Diagram:



- 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 EPG0352 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.

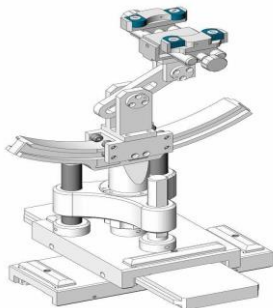
SN 32/14 SAM115



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. 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 σ	Permittivity ϵ_r
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 σ	Permittivity ϵ_r
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	ϵ_r		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**

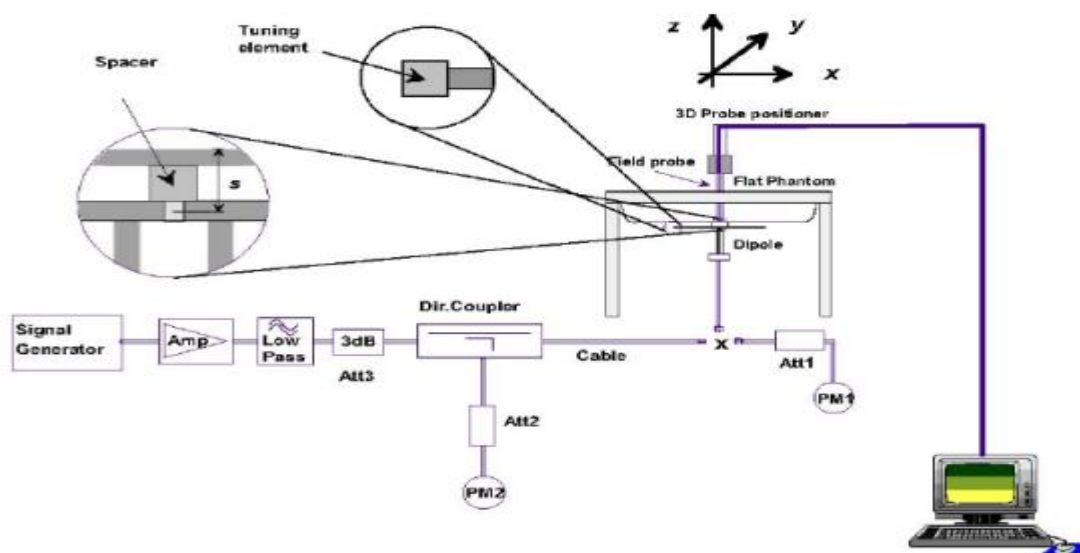
Date	Ambient		Simulating Liquid		Parameters	Target	Measured	Deviation %	Limited %
	Temp. [°C]	Humidity %	Frequency	Temp. [°C]					
2022-04-19	20.7	45	707.5 MHz	20.4	Permittivity	42.13	42.18	0.12	±5
					Conductivity	0.89	0.90	1.12	±5
2022-04-19	21.5	59	750 MHz	21.2	Permittivity	41.9	40.89	-2.41	±5
					Conductivity	0.89	0.87	-2.25	±5
2022-04-19	21.4	57	782 MHz	21.1	Permittivity	41.75	42.14	0.93	±5
					Conductivity	0.89	0.90	1.12	±5
2022-04-19	21.2	40	829 MHz	20.9	Permittivity	41.53	42.54	2.43	±5
					Conductivity	0.9	0.93	3.33	±5
2022-04-19	20.6	58	835 MHz	20.4	Permittivity	41.5	43.39	4.55	±5
					Conductivity	0.9	0.91	1.11	±5
2022-04-19	20.5	44	1720 MHz	20.1	Permittivity	40.11	40.87	1.89	±5
					Conductivity	1.35	1.36	0.74	±5
2022-04-19	21.0	51	1732.5 MHz	20.7	Permittivity	40.1	40.82	1.80	±5
					Conductivity	1.36	1.35	-0.74	±5
2022-04-19	23.5	54	1754.3 MHz	23.2	Permittivity	40.07	40.12	0.12	±5
					Conductivity	1.37	1.40	2.19	±5
2022-04-19	21.3	44	1800 MHz	21.0	Permittivity	40	39.47	-1.31	±5
					Conductivity	1.4	1.39	-0.80	±5
2022-04-19	22.0	47	1860 MHz	21.7	Permittivity	40	39.90	-0.25	±5
					Conductivity	1.4	1.36	-2.86	±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)	(%)	(%)
2022-04-19	750	100	0.845	8.45	8.49	-0.47	10
2022-04-19	835	100	0.962	9.62	9.63	-0.10	10
2022-04-19	1800	100	3.784	37.84	38.31	-1.23	10

Note:

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



6. SAR Evaluation Procedures

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

The following steps are used for each test position

- Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface
- Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
- Measurement of the SAR distribution with a grid of 8 to 16mm * 8 to 16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
- Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

➤ Area Scan& Zoom Scan

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

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

7. EUT Antenna Location Sketch

It is a Dog GPS Tracker, support CAT-M 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	4.2	≤0.5	≤0.5	0.8

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



7.1 SAR test exclusion consider table

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

Exposure Position	Wireless Interface	CAT-M Band 2	CAT-M Band 4	CAT-M Band 5	CAT-M Band 12	CAT-M Band 13
	Calculated Frequency(GHz)	1.86	1.72	0.829	0.7075	0.782
	Maximum Turn-up power (dBm)	24	24	24	24	24
	Maximum rated power(mW)	251.19	251.19	251.19	251.19	251.19
Back Side	Separation distance (cm)	≤0.5	≤0.5	≤0.5	≤0.5	≤0.5
	exclusion threshold(mW)	3.42	3.64	9.34	7.42	10.14
	Testing required?	YES	YES	YES	YES	YES
Front Side	Separation distance (cm)	≤0.5	≤0.5	≤0.5	≤0.5	≤0.5
	exclusion threshold(mW)	3.42	3.64	9.34	11.67	10.14
	Testing required?	YES	YES	YES	YES	YES
Left Side	Separation distance (cm)	4.2	4.2	4.2	4.2	4.2
	exclusion threshold(mW)	172.59	177.23	187.49	187.99	187.67
	Testing required?	YES	YES	YES	YES	YES
Right Side	Separation distance (cm)	≤0.5	≤0.5	≤0.5	≤0.5	≤0.5
	exclusion threshold(mW)	3.42	3.64	9.34	11.67	10.14
	Testing required?	YES	YES	YES	YES	YES
Top Side	Separation distance (cm)	≤0.5	≤0.5	≤0.5	≤0.5	≤0.5
	exclusion threshold(mW)	3.42	3.64	9.34	11.67	10.14
	Testing required?	YES	YES	YES	YES	YES
Bottom Side	Separation distance (cm)	0.8	0.8	0.8	0.8	0.8
	exclusion threshold(mW)	8.13	8.59	18.12	21.56	19.31
	Testing required?	YES	YES	YES	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 D04, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
3. Per KDB 447498 D04, if the maximum time-averaged power available does not exceed 1 mW. This stand-alone SAR exemption test.

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

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

Where

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

and

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

d = the separation distance (cm);

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

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



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.



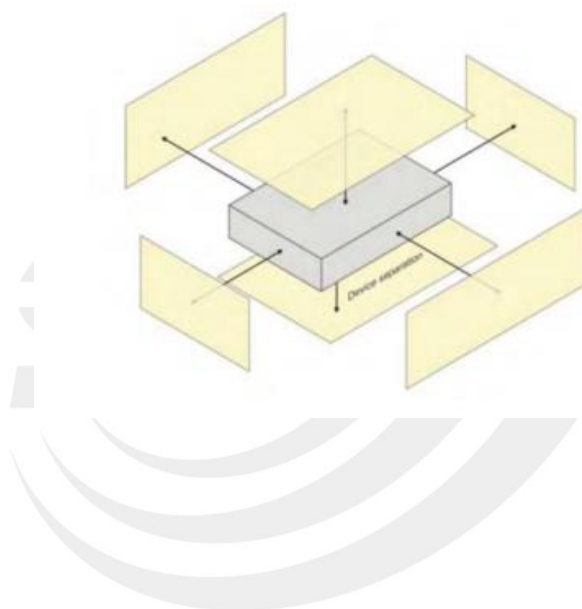
8. EUT Test Position

This EUT was tested in Front Back Left Right Bottom Top Face.

8.1 Body-worn Position Conditions

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 $> 1.2 \text{ W/kg}$, 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. 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.

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



10. Conducted Power Measurement

10.1 Test Result

CAT-M Conducted Power

CAT-M Band 2

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	NB Index	Modulation	Power (dBm)
Band2	1.4	18607	1	#0	0	QPSK	22.37
Band2	1.4	18607	6	#0	0	QPSK	21.54
Band2	1.4	18607	1	#0	0	QAM16	22.49
Band2	1.4	18607	6	#0	0	QAM16	21.53
Band2	1.4	18900	1	#0	0	QPSK	23.39
Band2	1.4	18900	6	#0	0	QPSK	21.43
Band2	1.4	18900	1	#0	0	QAM16	22.09
Band2	1.4	18900	6	#0	0	QAM16	21.32
Band2	1.4	19193	1	#Max	0	QPSK	23.22
Band2	1.4	19193	6	#Max	0	QPSK	21.33
Band2	1.4	19193	1	#Max	0	QAM16	22.11
Band2	1.4	19193	6	#Max	0	QAM16	21.32
Band2	3	18615	1	#0	0	QPSK	23.43
Band2	3	18615	6	#0	0	QPSK	21.53
Band2	3	18615	1	#0	0	QAM16	22.19
Band2	3	18615	6	#0	0	QAM16	21.41
Band2	3	18900	1	#0	0	QPSK	23.35
Band2	3	18900	6	#0	0	QPSK	21.47
Band2	3	18900	1	#0	0	QAM16	22.12
Band2	3	18900	6	#0	0	QAM16	21.35
Band2	3	19185	1	#Max	1	QPSK	23.22
Band2	3	19185	6	#Max	1	QPSK	21.38
Band2	3	19185	1	#Max	1	QAM16	22.16
Band2	3	19185	6	#Max	1	QAM16	21.37
Band2	5	18625	1	#0	0	QPSK	23.37
Band2	5	18625	6	#0	0	QPSK	22.48
Band2	5	18625	1	#0	0	QAM16	22.36
Band2	5	18625	6	#0	0	QAM16	22.29
Band2	5	18900	1	#0	0	QPSK	23.25
Band2	5	18900	6	#0	0	QPSK	22.47
Band2	5	18900	1	#0	0	QAM16	22.36
Band2	5	18900	6	#0	0	QAM16	22.25



Band2	5	19175	1	#Max	3	QPSK	23.2
Band2	5	19175	6	#Max	3	QPSK	22.43
Band2	5	19175	1	#Max	3	QAM16	22.29
Band2	5	19175	6	#Max	3	QAM16	22.13
Band2	10	18650	1	#0	0	QPSK	23.32
Band2	10	18650	4	#0	0	QPSK	23.51
Band2	10	18650	1	#0	0	QAM16	22.36
Band2	10	18650	4	#0	0	QAM16	22.6
Band2	10	18900	1	#0	0	QPSK	23.27
Band2	10	18900	4	#0	0	QPSK	23.52
Band2	10	18900	1	#0	0	QAM16	22.36
Band2	10	18900	4	#0	0	QAM16	22.51
Band2	10	19150	1	#Max	7	QPSK	23.18
Band2	10	19150	4	#Max	7	QPSK	23.34
Band2	10	19150	1	#Max	7	QAM16	22.26
Band2	10	19150	4	#Max	7	QAM16	22.4
Band2	15	18675	1	#0	7	QPSK	23.34
Band2	15	18675	6	#0	7	QPSK	23.43
Band2	15	18675	1	#0	0	QAM16	22.45
Band2	15	18675	6	#0	0	QAM16	23.27
Band2	15	18900	1	#0	7	QPSK	23.34
Band2	15	18900	6	#0	7	QPSK	23.42
Band2	15	18900	1	#0	0	QAM16	22.27
Band2	15	18900	6	#0	0	QAM16	23.2
Band2	15	19125	1	#Max	11	QPSK	23.17
Band2	15	19125	6	#Max	11	QPSK	23.39
Band2	15	19125	1	#Max	11	QAM16	22.22
Band2	15	19125	6	#Max	1	QAM16	23.15
Band2	20	18700	1	#0	0	QPSK	23.33
Band2	20	18700	6	#0	0	QPSK	23.48
Band2	20	18700	1	#0	0	QAM16	22.42
Band2	20	18700	6	#0	0	QAM16	23.24
Band2	20	18900	1	#0	0	QPSK	23.28
Band2	20	18900	6	#0	0	QPSK	23.44
Band2	20	18900	1	#0	0	QAM16	22.3
Band2	20	18900	6	#0	0	QAM16	23.12
Band2	20	19100	1	#Max	15	QPSK	23.17
Band2	20	19100	6	#Max	15	QPSK	23.4



Band2	20	19100	1	#Max	15	QAM16	22.24
Band2	20	19100	6	#Max	15	QAM16	23.1

CAT-M Band 4

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	NB Index	Modulation	Power (dBm)
Band4	1.4	19957	1	#0	0	QPSK	22.19
Band4	1.4	19957	6	#0	0	QPSK	21.54
Band4	1.4	19957	1	#0	0	QAM16	22.23
Band4	1.4	19957	6	#0	0	QAM16	21.39
Band4	1.4	20175	1	#0	0	QPSK	23.36
Band4	1.4	20175	6	#0	0	QPSK	21.52
Band4	1.4	20175	1	#0	0	QAM16	22.23
Band4	1.4	20175	6	#0	0	QAM16	21.39
Band4	1.4	20393	1	#Max	0	QPSK	23.29
Band4	1.4	20393	6	#Max	0	QPSK	21.51
Band4	1.4	20393	1	#Max	0	QAM16	22.23
Band4	1.4	20393	6	#Max	0	QAM16	21.38
Band4	3	19965	1	#0	0	QPSK	23.44
Band4	3	19965	6	#0	0	QPSK	21.54
Band4	3	19965	1	#0	0	QAM16	22.26
Band4	3	19965	6	#0	0	QAM16	21.39
Band4	3	20175	1	#0	0	QPSK	23.39
Band4	3	20175	6	#0	0	QPSK	21.54
Band4	3	20175	1	#0	0	QAM16	22.26
Band4	3	20175	6	#0	0	QAM16	21.29
Band4	3	20385	1	#Max	1	QPSK	23.3
Band4	3	20385	6	#Max	1	QPSK	21.51
Band4	3	20385	1	#Max	1	QAM16	22.24
Band4	3	20385	6	#Max	1	QAM16	21.38
Band4	5	19975	1	#0	0	QPSK	23.32
Band4	5	19975	6	#0	0	QPSK	22.46
Band4	5	19975	1	#0	0	QAM16	22.38
Band4	5	19975	6	#0	0	QAM16	22.23
Band4	5	20175	1	#0	0	QPSK	23.34
Band4	5	20175	6	#0	0	QPSK	22.55
Band4	5	20175	1	#0	0	QAM16	22.37
Band4	5	20175	6	#0	0	QAM16	22.21



Band4	5	20375	1	#Max	3	QPSK	23.29
Band4	5	20375	6	#Max	3	QPSK	22.45
Band4	5	20375	1	#Max	3	QAM16	22.39
Band4	5	20375	6	#Max	3	QAM16	22.22
Band4	10	20000	1	#0	0	QPSK	23.3
Band4	10	20000	4	#0	0	QPSK	23.55
Band4	10	20000	1	#0	0	QAM16	22.4
Band4	10	20000	4	#0	0	QAM16	22.57
Band4	10	20175	1	#0	0	QPSK	23.26
Band4	10	20175	4	#0	0	QPSK	23.52
Band4	10	20175	1	#0	0	QAM16	22.39
Band4	10	20175	4	#0	0	QAM16	22.6
Band4	10	20350	1	#Max	7	QPSK	23.24
Band4	10	20350	4	#Max	7	QPSK	23.39
Band4	10	20350	1	#Max	7	QAM16	22.32
Band4	10	20350	4	#Max	7	QAM16	22.44
Band4	15	20025	1	#0	7	QPSK	23.31
Band4	15	20025	6	#0	7	QPSK	23.45
Band4	15	20025	1	#0	0	QAM16	22.4
Band4	15	20025	6	#0	0	QAM16	23.27
Band4	15	20175	1	#0	7	QPSK	23.31
Band4	15	20175	6	#0	7	QPSK	23.52
Band4	15	20175	1	#0	0	QAM16	22.32
Band4	15	20175	6	#0	0	QAM16	23.29
Band4	15	20325	1	#Max	11	QPSK	23.3
Band4	15	20325	6	#Max	11	QPSK	23.49
Band4	15	20325	1	#Max	11	QAM16	22.25
Band4	15	20325	6	#Max	1	QAM16	23.38
Band4	20	20050	1	#0	0	QPSK	23.29
Band4	20	20050	6	#0	0	QPSK	23.47
Band4	20	20050	1	#0	0	QAM16	22.37
Band4	20	20050	6	#0	0	QAM16	23.25
Band4	20	20175	1	#0	0	QPSK	23.29
Band4	20	20175	6	#0	0	QPSK	23.41
Band4	20	20175	1	#0	0	QAM16	22.33
Band4	20	20175	6	#0	0	QAM16	23.2
Band4	20	20300	1	#Max	15	QPSK	23.31
Band4	20	20300	6	#Max	15	QPSK	23.43



Band4	20	20300	1	#Max	15	QAM16	22.26
Band4	20	20300	6	#Max	15	QAM16	23.2

CAT-M Band 5

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	NB Index	Modulation	Power (dBm)
Band5	1.4	20407	1	#0	0	QPSK	23.4
Band5	1.4	20407	6	#0	0	QPSK	21.53
Band5	1.4	20407	1	#0	0	QAM16	22.56
Band5	1.4	20407	6	#0	0	QAM16	21.58
Band5	1.4	20525	1	#0	0	QPSK	23.45
Band5	1.4	20525	6	#0	0	QPSK	21.52
Band5	1.4	20525	1	#0	0	QAM16	22.31
Band5	1.4	20525	6	#0	0	QAM16	21.34
Band5	1.4	20643	1	#Max	0	QPSK	23.22
Band5	1.4	20643	6	#Max	0	QPSK	21.33
Band5	1.4	20643	1	#Max	0	QAM16	22.21
Band5	1.4	20643	6	#Max	0	QAM16	21.32
Band5	3	20415	1	#0	0	QPSK	23.43
Band5	3	20415	6	#0	0	QPSK	21.49
Band5	3	20415	1	#0	0	QAM16	22.25
Band5	3	20415	6	#0	0	QAM16	21.37
Band5	3	20525	1	#0	0	QPSK	23.4
Band5	3	20525	6	#0	0	QPSK	21.45
Band5	3	20525	1	#0	0	QAM16	22.25
Band5	3	20525	6	#0	0	QAM16	21.33
Band5	3	20635	1	#Max	1	QPSK	23.25
Band5	3	20635	6	#Max	1	QPSK	21.25
Band5	3	20635	1	#Max	1	QAM16	22.12
Band5	3	20635	6	#Max	1	QAM16	21.23
Band5	5	20425	1	#0	0	QPSK	23.35
Band5	5	20425	6	#0	0	QPSK	22.45
Band5	5	20425	1	#0	0	QAM16	23.14
Band5	5	20425	6	#0	0	QAM16	22.43
Band5	5	20525	1	#0	0	QPSK	23.43
Band5	5	20525	6	#0	0	QPSK	22.53
Band5	5	20525	1	#0	0	QAM16	23.12
Band5	5	20525	6	#0	0	QAM16	22.4



Band5	5	20625	1	#Max	3	QPSK	23.34
Band5	5	20625	6	#Max	3	QPSK	22.44
Band5	5	20625	1	#Max	3	QAM16	23.05
Band5	5	20625	6	#Max	3	QAM16	22.31
Band5	10	20450	1	#0	0	QPSK	23.37
Band5	10	20450	4	#0	0	QPSK	23.62
Band5	10	20450	1	#0	0	QAM16	23.16
Band5	10	20450	4	#0	0	QAM16	22.62
Band5	10	20525	1	#0	0	QPSK	23.39
Band5	10	20525	4	#0	0	QPSK	23.6
Band5	10	20525	1	#0	0	QAM16	23.14
Band5	10	20525	4	#0	0	QAM16	22.58
Band5	10	20600	1	#Max	7	QPSK	23.22
Band5	10	20600	4	#Max	7	QPSK	23.4
Band5	10	20600	1	#Max	7	QAM16	22.9
Band5	10	20600	4	#Max	7	QAM16	22.46



CAT-M Band 12

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	NB Index	Modulation	Power (dBm)
Band12	1.4	23017	1	#0	0	QPSK	23.64
Band12	1.4	23017	6	#0	0	QPSK	21.62
Band12	1.4	23017	1	#0	0	QAM16	22.75
Band12	1.4	23017	6	#0	0	QAM16	21.5
Band12	1.4	23095	1	#0	0	QPSK	23.59
Band12	1.4	23095	6	#0	0	QPSK	21.67
Band12	1.4	23095	1	#0	0	QAM16	22.33
Band12	1.4	23095	6	#0	0	QAM16	21.53
Band12	1.4	23173	1	#Max	0	QPSK	23.59
Band12	1.4	23173	6	#Max	0	QPSK	21.6
Band12	1.4	23173	1	#Max	0	QAM16	22.36
Band12	1.4	23173	6	#Max	0	QAM16	21.59
Band12	3	23025	1	#0	0	QPSK	23.61
Band12	3	23025	6	#0	0	QPSK	21.63
Band12	3	23025	1	#0	0	QAM16	22.38
Band12	3	23025	6	#0	0	QAM16	21.5
Band12	3	23095	1	#0	0	QPSK	23.62
Band12	3	23095	6	#0	0	QPSK	21.65
Band12	3	23095	1	#0	0	QAM16	22.33
Band12	3	23095	6	#0	0	QAM16	21.58
Band12	3	23165	1	#Max	1	QPSK	23.65
Band12	3	23165	6	#Max	1	QPSK	21.61
Band12	3	23165	1	#Max	1	QAM16	22.77
Band12	3	23165	6	#Max	1	QAM16	21.65
Band12	5	23035	1	#0	0	QPSK	23.62
Band12	5	23035	6	#0	0	QPSK	22.66
Band12	5	23035	1	#0	0	QAM16	23.38
Band12	5	23035	6	#0	0	QAM16	22.6
Band12	5	23095	1	#0	0	QPSK	23.55
Band12	5	23095	6	#0	0	QPSK	22.6
Band12	5	23095	1	#0	0	QAM16	23.32
Band12	5	23095	6	#0	0	QAM16	22.52
Band12	5	23155	1	#Max	3	QPSK	23.64
Band12	5	23155	6	#Max	3	QPSK	22.69
Band12	5	23155	1	#Max	3	QAM16	23.27



Band12	5	23155	6	#Max	3	QAM16	22.45
Band12	10	23060	1	#0	0	QPSK	23.59
Band12	10	23060	4	#0	0	QPSK	23.7
Band12	10	23060	1	#0	0	QAM16	23.36
Band12	10	23060	4	#0	0	QAM16	22.75
Band12	10	23095	1	#0	0	QPSK	23.47
Band12	10	23095	4	#0	0	QPSK	23.74
Band12	10	23095	1	#0	0	QAM16	23.36
Band12	10	23095	4	#0	0	QAM16	22.75
Band12	10	23130	1	#Max	7	QPSK	23.5
Band12	10	23130	4	#Max	7	QPSK	23.72
Band12	10	23130	1	#Max	7	QAM16	23.27
Band12	10	23130	4	#Max	7	QAM16	22.79



CAT-M Band 13

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	NB Index	Modulation	Power (dBm)
Band13	5	23205	1	#0	0	QPSK	23.39
Band13	5	23205	6	#0	0	QPSK	22.41
Band13	5	23205	1	#0	0	QAM16	23.07
Band13	5	23205	6	#0	0	QAM16	22.28
Band13	5	23230	1	#0	0	QPSK	23.29
Band13	5	23230	6	#0	0	QPSK	22.26
Band13	5	23230	1	#0	0	QAM16	23.27
Band13	5	23230	6	#0	0	QAM16	22.32
Band13	5	23255	1	#Max	3	QPSK	23.34
Band13	5	23255	6	#Max	3	QPSK	22.3
Band13	5	23255	1	#Max	3	QAM16	23.1
Band13	5	23255	6	#Max	3	QAM16	22.27
Band13	10	23230	1	#0	0	QPSK	23.43
Band13	10	23230	4	#0	0	QPSK	23.34
Band13	10	23230	1	#0	0	QAM16	23.29
Band13	10	23230	4	#0	0	QAM16	22.46

General Note:

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

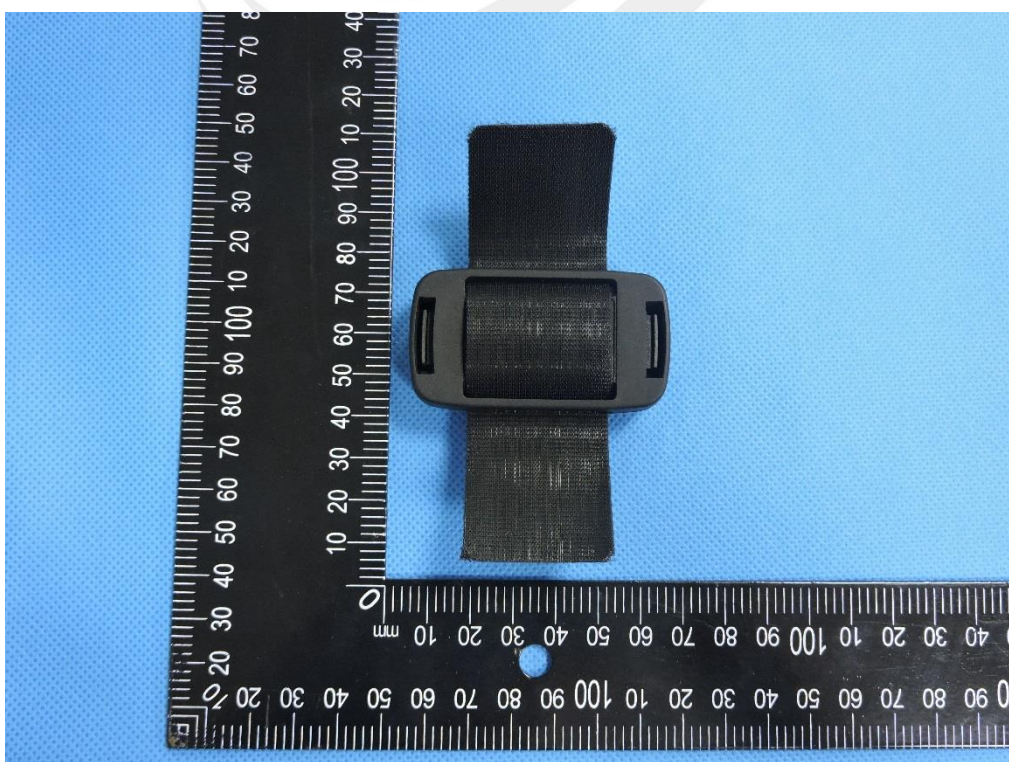
11. EUT and Test Setup Photo

11.1 EUT Photo

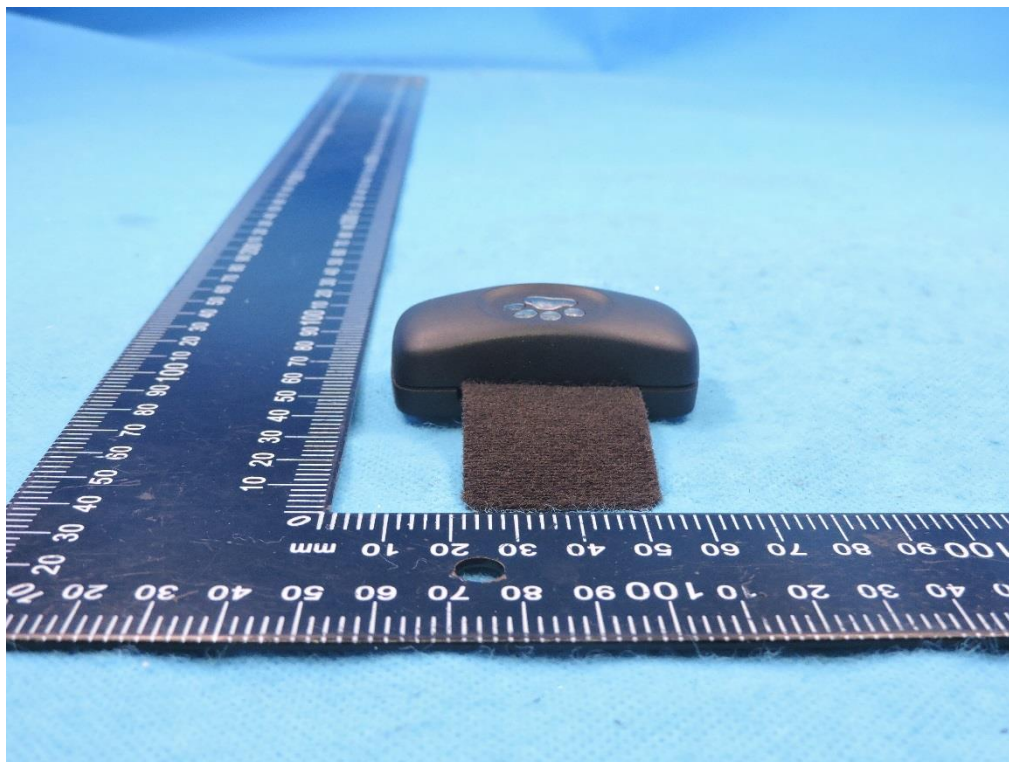
Front side



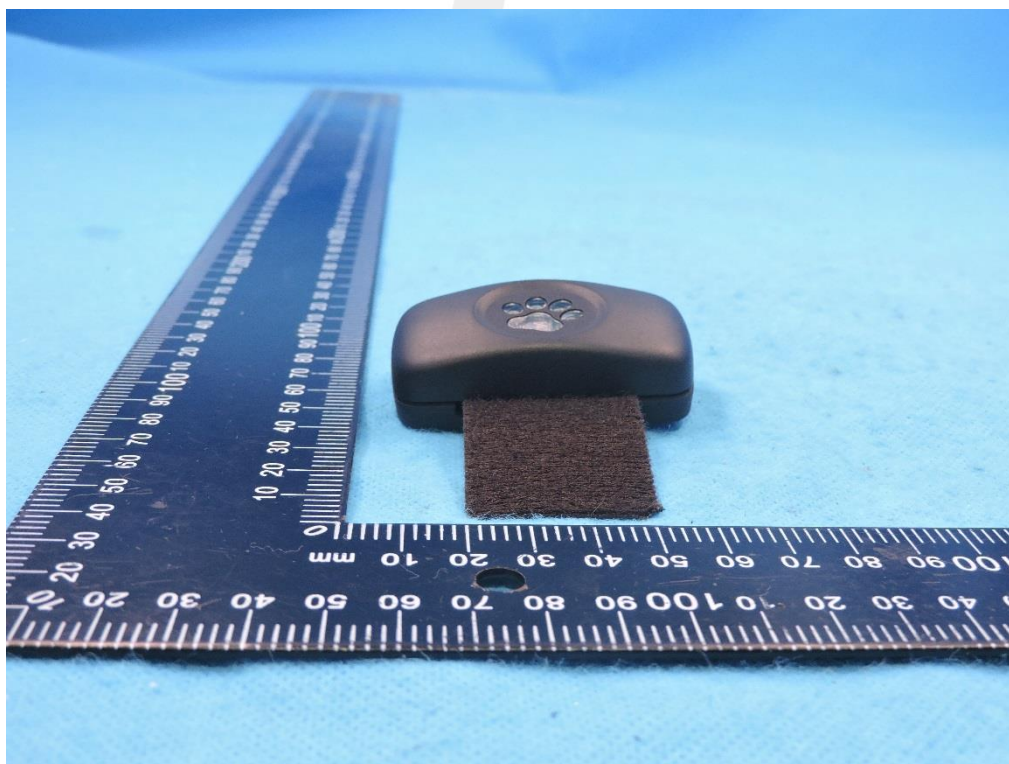
Back side



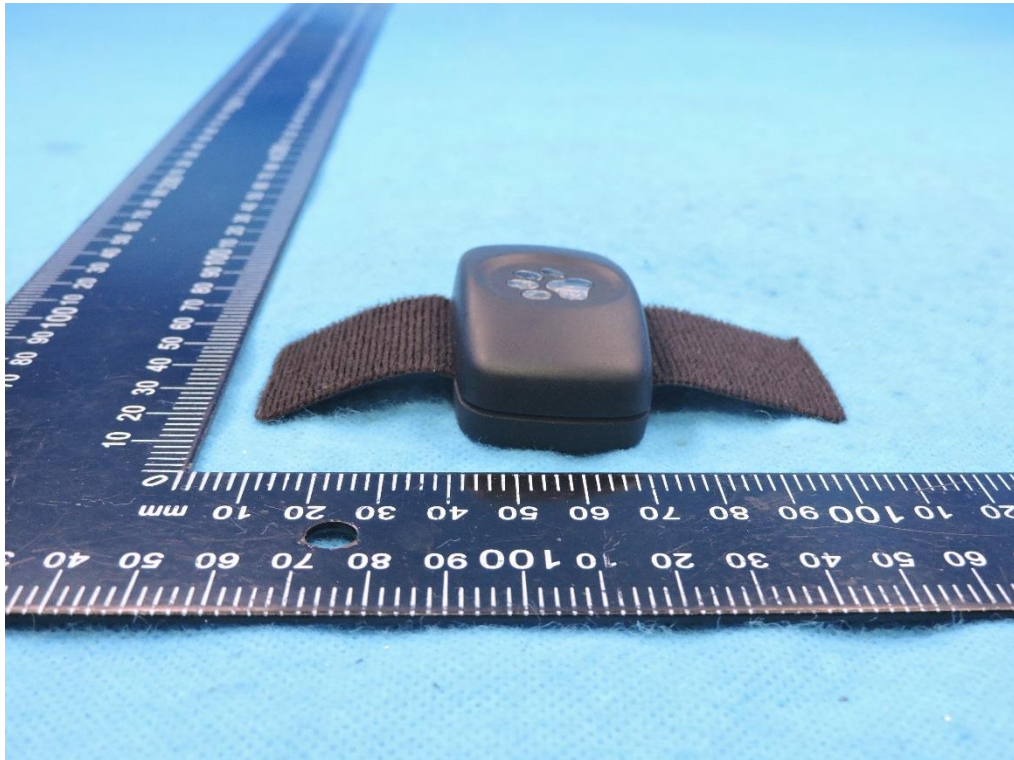
Top side



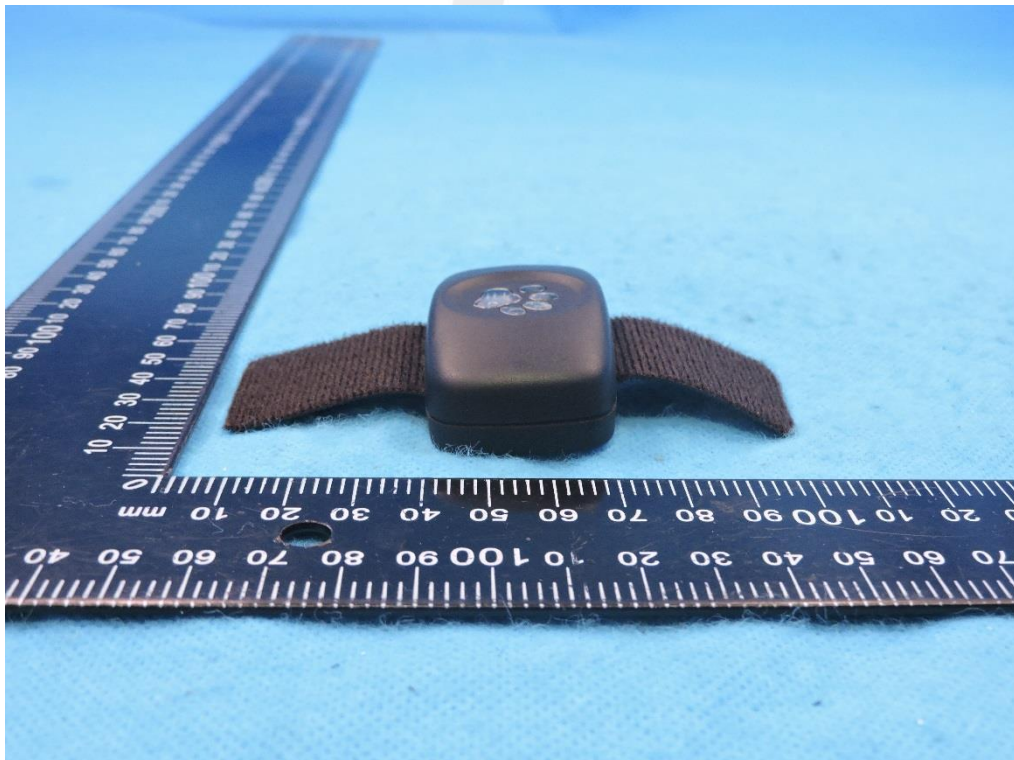
Bottom side



Left side

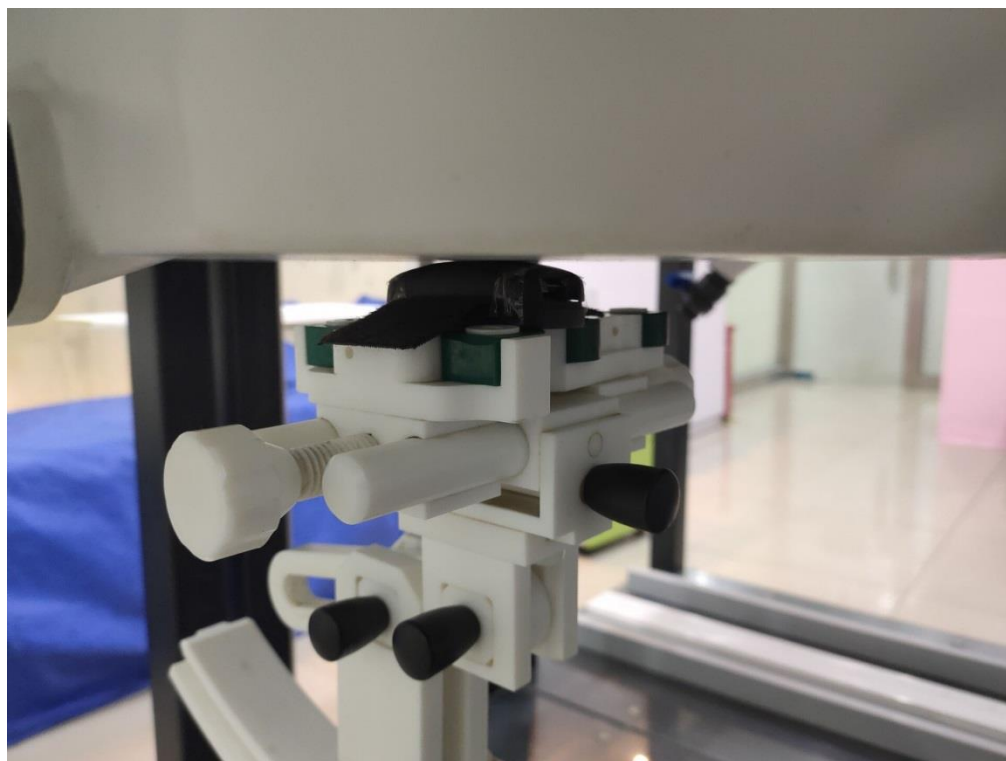


Right side

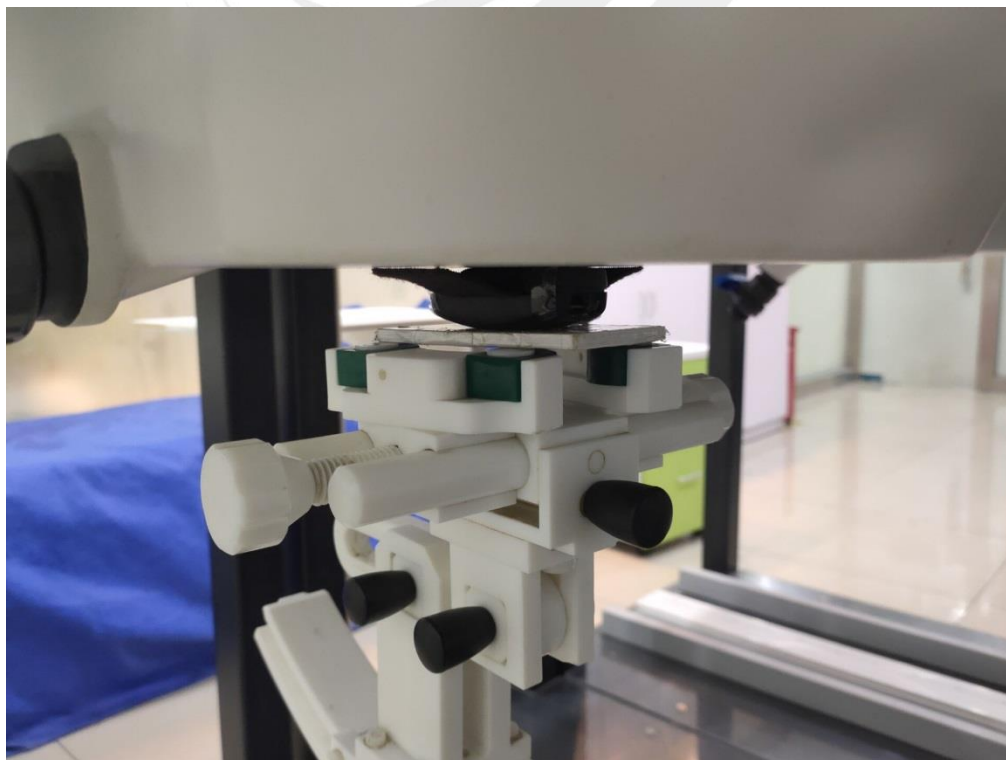


11.2 Setup Photo

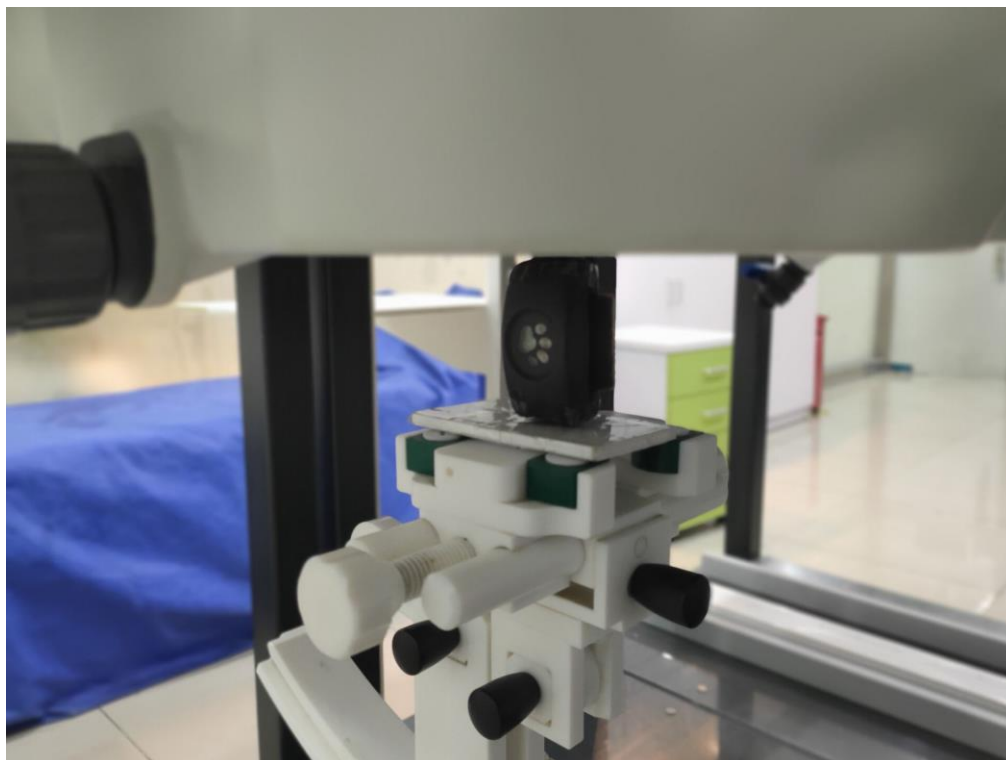
Body Front side(separation distance is 0mm)



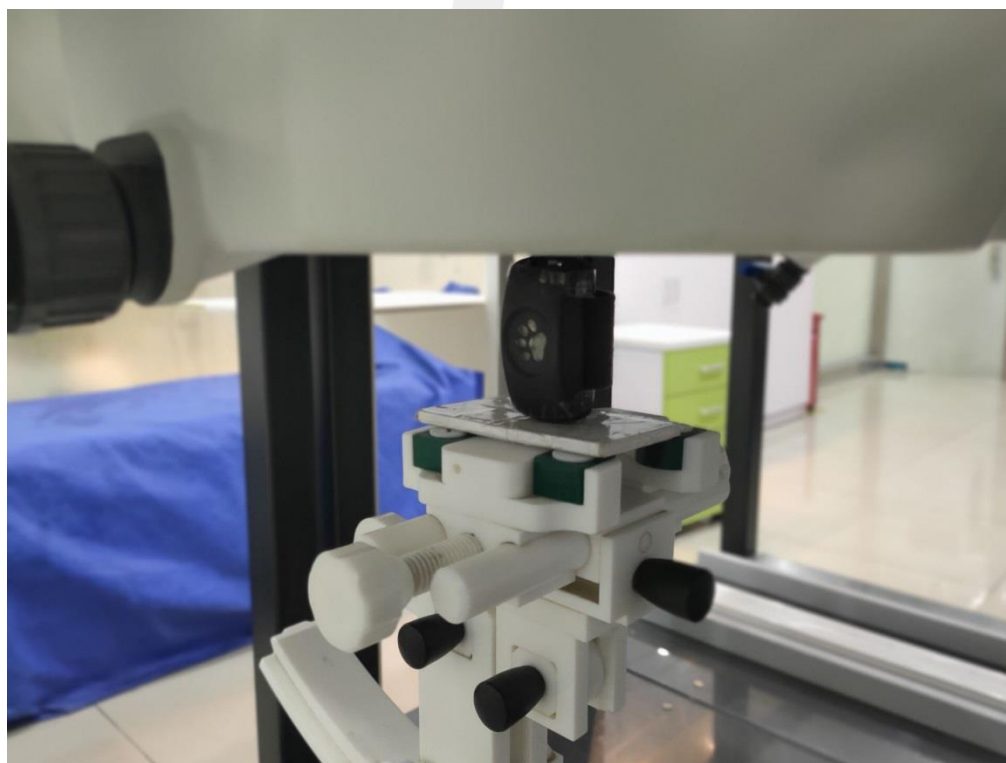
Body Back side(separation distance is 0mm)



Body Left side(separation distance is 0mm)



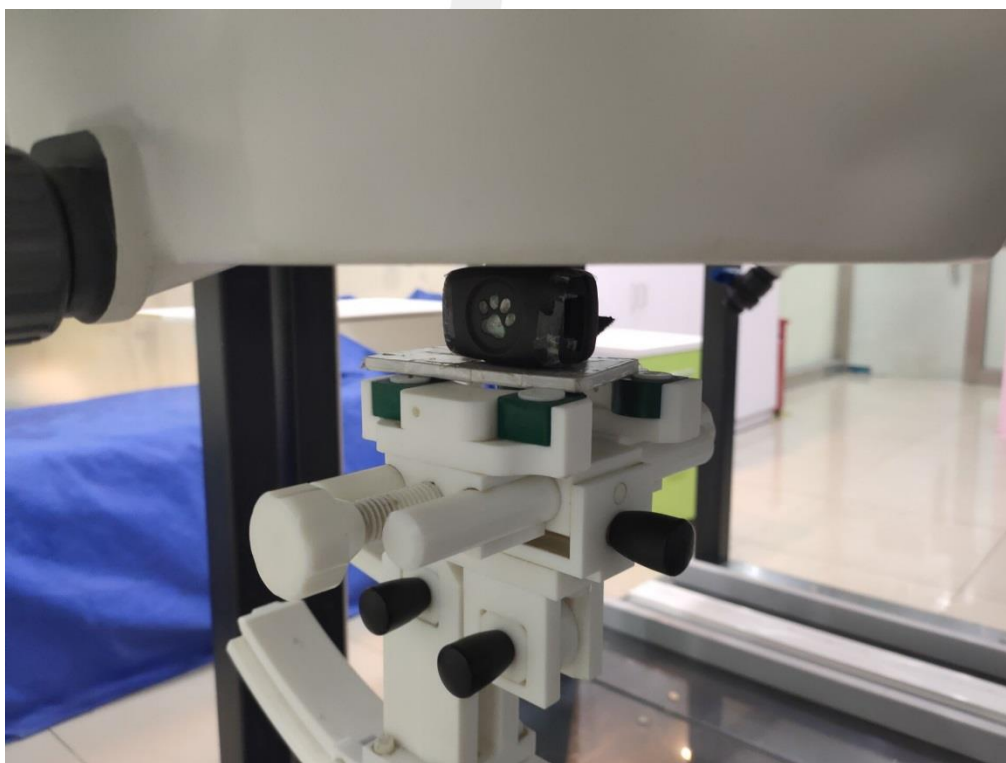
Body Right side(separation distance is 0mm)



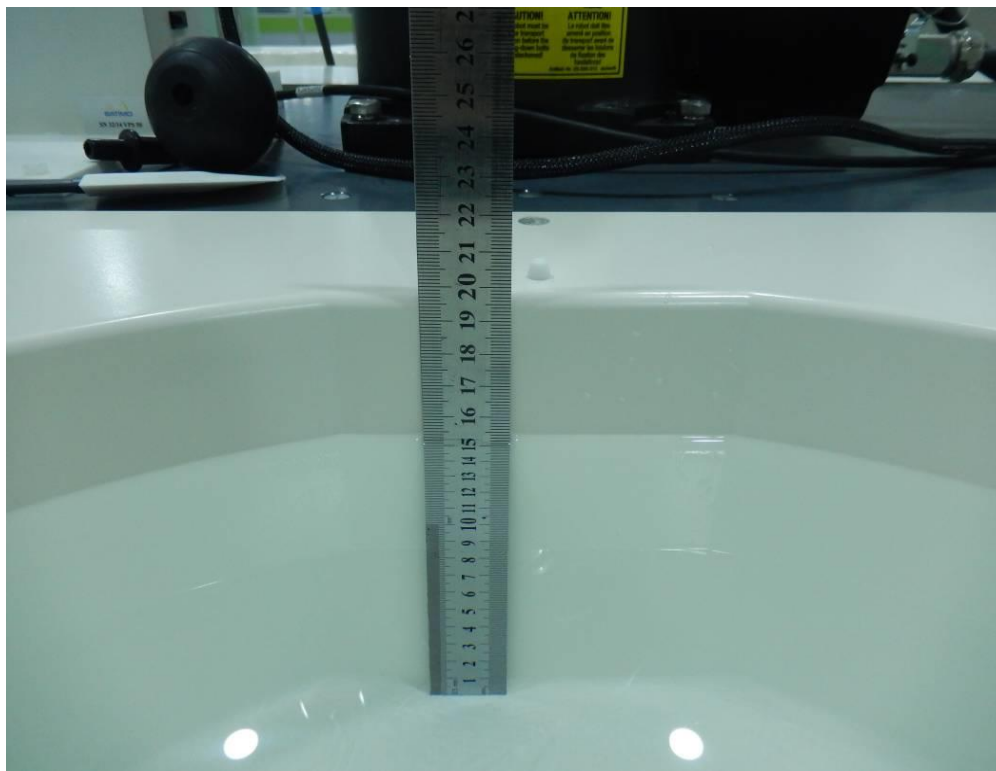
Body Bottom side(separation distance is 0mm)



Body Top side(separation distance is 0mm)



Liquid depth (15 cm)





12. SAR Result Summary

12.2 Body-worn SAR

Band	BW (MHz)	Mod.	RB Size	RB offset	Test Position	Freq.	Result 1g (W/Kg)	Power Drift(%)	Max. Turn-up Power(dBm)	Meas. Output Power(dBm)	Scaled SAR (W/Kg)	Meas.No.
CAT-M Band 2	20M	QPSK	1	0	Front side	1860	0.463	3.72	24	23.48	0.522	1
			6	0	Front side	1860	0.412	3.65	24	23.24	0.491	/
			1	0	Back Side	1860	0.368	3.06	24	23.48	0.415	/
			6	0	Back Side	1860	0.325	-1.74	24	23.24	0.387	/
			1	0	Left Side	1860	0.135	-3.78	24	23.48	0.152	/
			6	0	Left Side	1860	0.124	3.01	24	23.24	0.148	/
			1	0	Right Side	1860	0.254	-1.08	24	23.48	0.286	/
			6	0	Right Side	1860	0.241	-1.14	24	23.24	0.287	/
			1	0	Bottom Side	1860	0.158	-2.28	24	23.48	0.178	/
			6	0	Bottom Side	1860	0.147	-1.85	24	23.24	0.175	/
			1	0	Top Side	1860	0.244	3.45	24	23.48	0.275	/
			6	0	Top Side	1860	0.231	-0.52	24	23.24	0.275	/
CAT-M Band 4	20M	QPSK	1	0	Front side	1720	0.700	-2.32	24	23.47	0.791	2
			1	0	Front side	1732.5	0.658	-1.01	24	23.41	0.754	/
			1	0	Front side	1754.3	0.666	-1.43	24	23.43	0.759	/
			6	0	Front side	1720	0.624	-3.16	24	23.25	0.742	/
			1	0	Back Side	1720	0.578	3.47	24	23.47	0.653	/
			6	0	Back Side	1720	0.514	-0.63	24	23.25	0.611	/
			1	0	Left Side	1720	0.265	2.72	24	23.47	0.299	/
			6	0	Left Side	1720	0.241	3.48	24	23.25	0.286	/
			1	0	Right Side	1720	0.388	3.25	24	23.47	0.438	/
			6	0	Right Side	1720	0.365	-0.75	24	23.25	0.434	/
			1	0	Bottom Side	1720	0.274	-0.70	24	23.47	0.310	/
			6	0	Bottom Side	1720	0.260	-2.84	24	23.25	0.309	/
			1	0	Top Side	1720	0.240	-0.61	24	23.47	0.271	/
			6	0	Top Side	1720	0.213	3.00	24	23.25	0.253	/
CAT-M Band 5	10M	QPSK	1	0	Front side	829	0.331	-2.53	24	23.62	0.361	3
			4	0	Front side	829	0.288	-2.90	24	23.16	0.349	/
			1	0	Back Side	829	0.242	3.03	24	23.62	0.264	/
			4	0	Back Side	829	0.230	2.53	24	23.16	0.279	/
			1	0	Left Side	829	0.121	-2.09	24	23.62	0.132	/
			4	0	Left Side	829	0.111	-0.89	24	23.16	0.135	/
			1	0	Right Side	829	0.214	-2.51	24	23.62	0.234	/
			4	0	Right Side	829	0.206	3.72	24	23.16	0.250	/
			1	0	Bottom Side	829	0.154	2.10	24	23.62	0.168	/
			4	0	Bottom Side	829	0.144	0.34	24	23.16	0.175	/
			1	0	Top Side	829	0.104	1.54	24	23.62	0.114	/
			4	0	Top Side	829	0.098	2.51	24	23.16	0.119	/



CAT-M Band 12	10M	QPSK	1	0	Front side	707.5	0.198	-0.71	24	23.74	0.210	4
			4	0	Front side	707.5	0.171	-3.54	24	23.36	0.198	/
			1	0	Back Side	707.5	0.169	-0.16	24	23.74	0.179	/
			4	0	Back Side	707.5	0.155	2.64	24	23.36	0.180	/
			1	0	Left Side	707.5	0.119	-0.36	24	23.74	0.126	/
			4	0	Left Side	707.5	0.100	-3.98	24	23.36	0.116	/
			1	0	Right Side	707.5	0.138	3.17	24	23.74	0.147	/
			4	0	Right Side	707.5	0.124	0.24	24	23.36	0.144	/
			1	0	Bottom Side	707.5	0.144	-1.99	24	23.74	0.153	/
			4	0	Bottom Side	707.5	0.132	3.86	24	23.36	0.153	/
			1	0	Top Side	707.5	0.123	1.91	24	23.74	0.131	/
			4	0	Top Side	707.5	0.111	1.33	24	23.36	0.129	/
CAT-M Band 13	10M	QPSK	1	0	Front side	782	0.250	0.46	23.5	23.43	0.254	5
			4	0	Front side	782	0.223	-1.55	23.5	23.29	0.234	/
			1	0	Back Side	782	0.214	-2.83	23.5	23.43	0.217	/
			4	0	Back Side	782	0.202	-2.27	23.5	23.29	0.212	/
			1	0	Left Side	782	0.118	0.01	23.5	23.43	0.120	/
			4	0	Left Side	782	0.103	0.89	23.5	23.29	0.108	/
			1	0	Right Side	782	0.169	2.57	23.5	23.43	0.172	/
			4	0	Right Side	782	0.153	-3.84	23.5	23.29	0.161	/
			1	0	Bottom Side	782	0.121	0.52	23.5	23.43	0.123	/
			4	0	Bottom Side	782	0.118	-0.66	23.5	23.29	0.124	/
			1	0	Top Side	782	0.136	-0.71	23.5	23.43	0.138	/
			4	0	Top Side	782	0.127	3.91	23.5	23.29	0.133	/

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. 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
750MHz Dipole	MVG	SID750	SN 30/14 DIP0G750-331	2020.07.14	2023.07.13
835MHz Dipole	MVG	SID835	SN 30/14 DIP0G835-332	2020.07.14	2023.07.13
1800MHz Dipole	MVG	SID1800	SN 30/14 DIP1G800-329	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 (750MHz)

Type: Phone measurement (Complete)

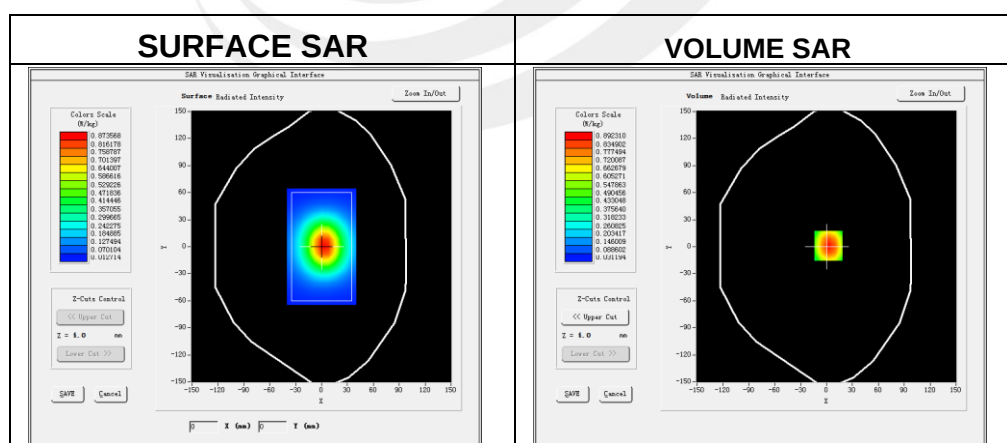
Area scan resolution: dx=8mm, dy=8mm

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

Date of measurement: 2022-04-19

Experimental conditions

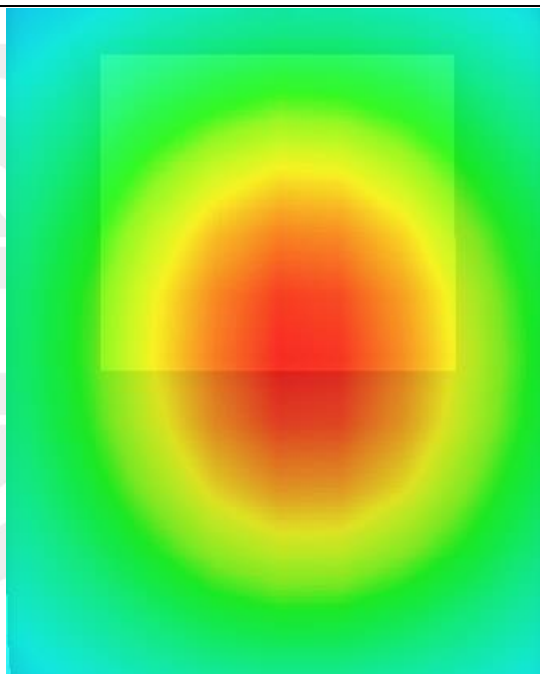
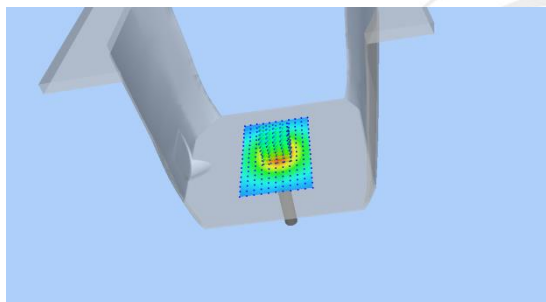
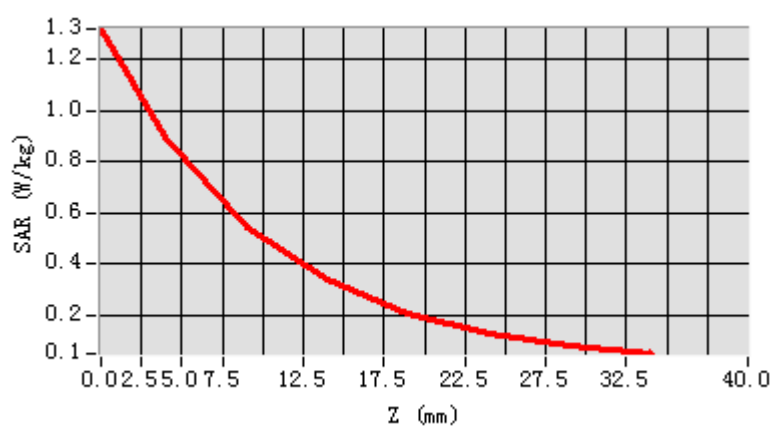
Phantom	Validation plane
Device Position	-
Band	750MHz
Channels	-
Signal	CW
Frequency (MHz)	750MHz
Relative permittivity	40.89
Conductivity (S/m)	0.87
Probe	SN 07/21 EPG0352
ConvF	1.58
Crest factor	1:1



Maximum location: X=2.00, Y=1.00

SAR 10g (W/Kg)	0.555858
SAR 1g (W/Kg)	0.845180

Z Axis Scan



**System Performance Check Data (835MHz)**

Type: Phone measurement (Complete)

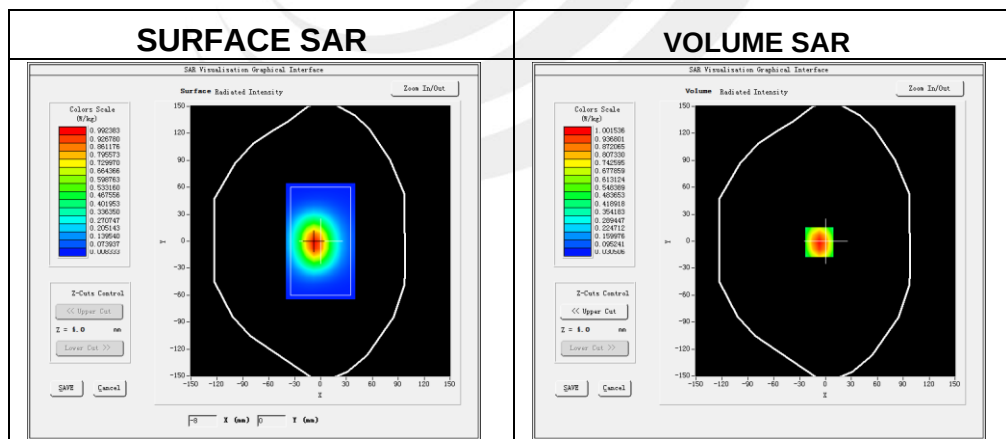
Area scan resolution: dx=8mm, dy=8mm

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

Date of measurement: 2022-04-19

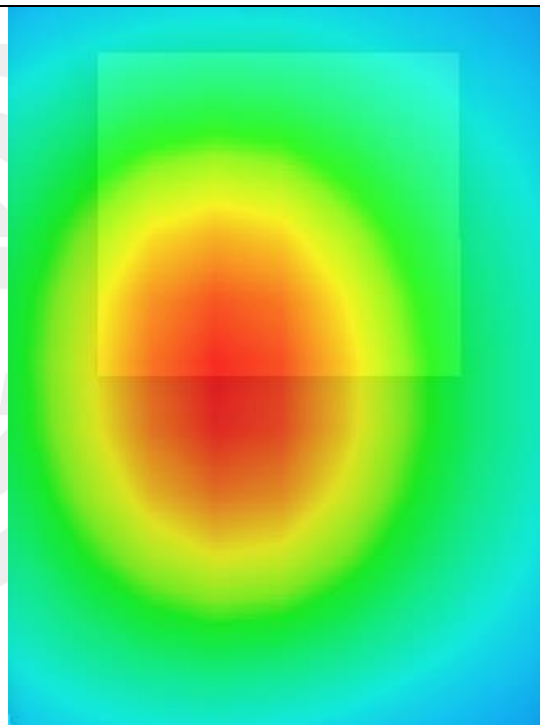
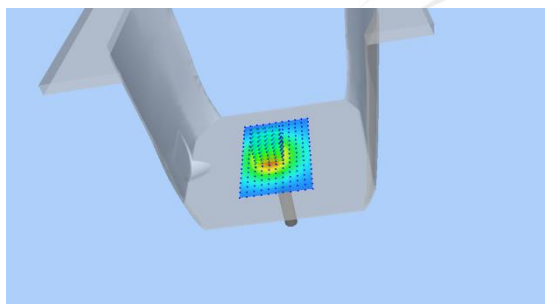
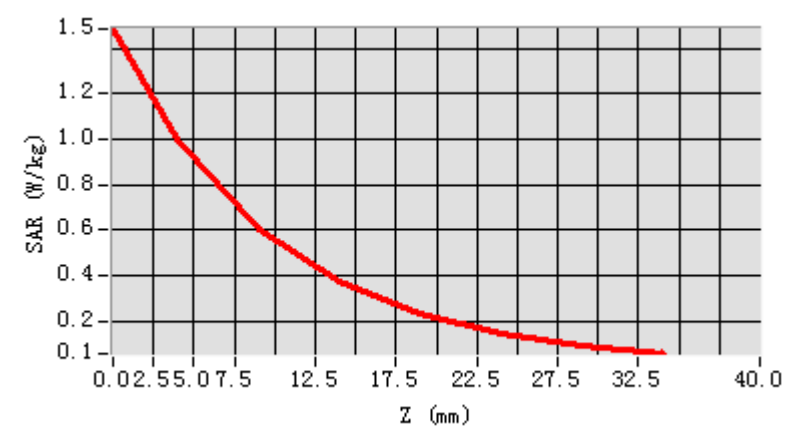
Experimental conditions

Phantom	Validation plane
Device Position	-
Band	835MHz
Channels	-
Signal	CW
Frequency (MHz)	835MHz
Relative permittivity	43.39
Conductivity (S/m)	0.91
Probe	SN 07/21 EPG0352
ConvF:	1.57
Crest factor:	1:1

**Maximum location: X=-7.00, Y=-1.00**

SAR 10g (W/Kg)	0.592350
SAR 1g (W/Kg)	0.961834

Z Axis Scan





System Performance Check Data(1800MHz)

Type: Phone measurement (Complete)

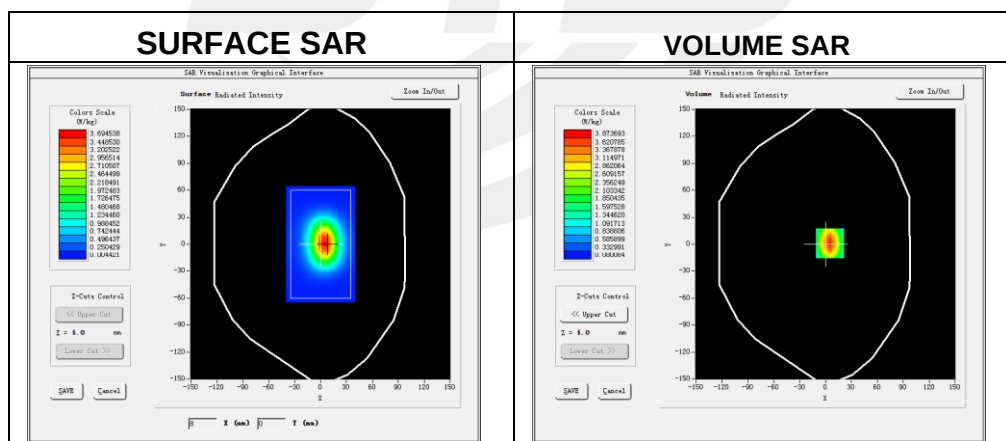
Area scan resolution: dx=8mm, dy=8mm

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

Date of measurement: 2022-04-19

Experimental conditions.

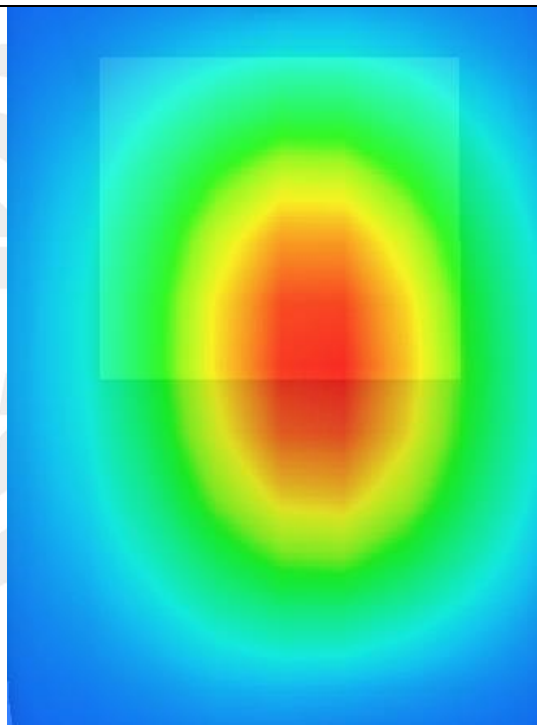
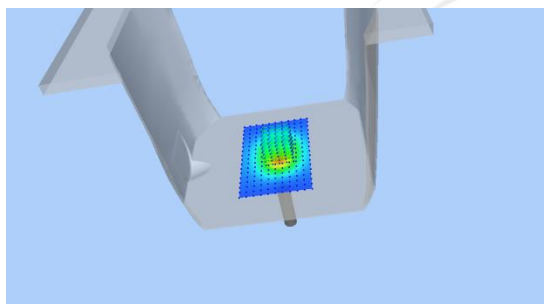
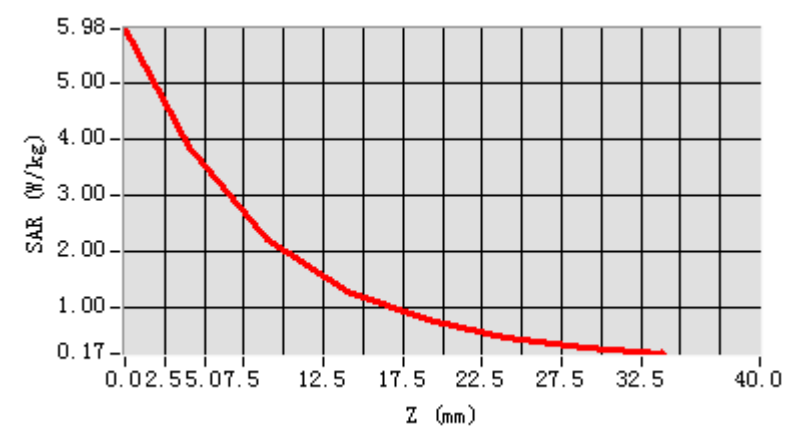
Phantom	Validation plane
Device Position	-
Band	1800MHz
Channels	-
Signal	CW
Frequency (MHz)	1800MHz
Relative permittivity	39.47
Conductivity (S/m)	1.39
Probe	SN 07/21 EPGO352
ConvF	1.60
Crest factor:	1:1



Maximum location: X=5.00, Y=1.00

SAR 10g (W/Kg)	2.022273
SAR 1g (W/Kg)	3.784202

Z Axis Scan



Appendix B. SAR Test Plots

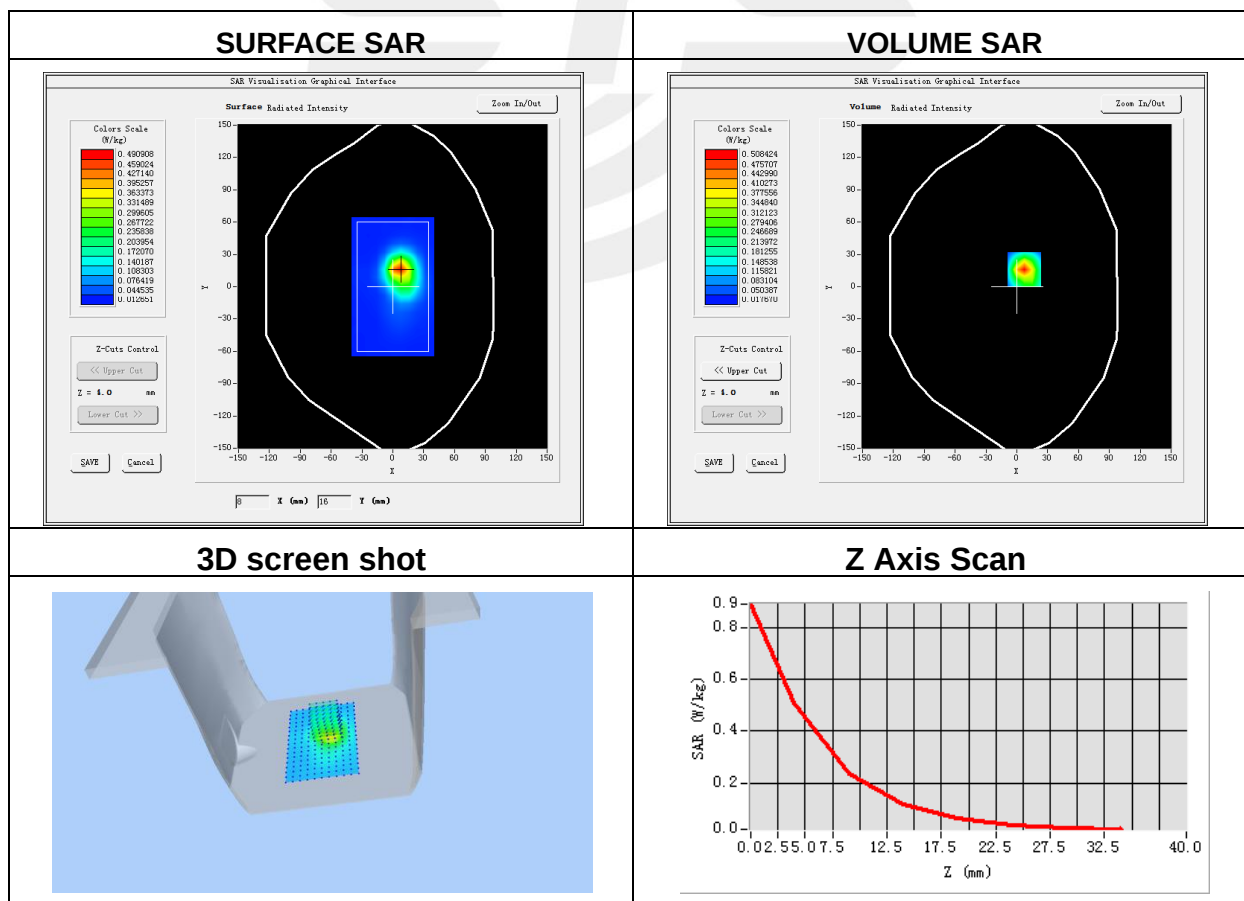
Plot 1: DUT: Dog GPS Tracker; EUT Model: PP04

Test Date	2022-04-19
Probe	SN 07/21 EPG0352
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	Front side
Band	CAT-M Band 2(RB 1)
Signal	CAT-M (Crest factor: 1.0)
Frequency (MHz)	1860
Relative permittivity (real part)	39.90
Conductivity (S/m)	1.36

Maximum location: X=7.00, Y=16.00

SAR Peak: 0.88 W/kg

SAR 10g (W/Kg)	0.205440
SAR 1g (W/Kg)	0.462560





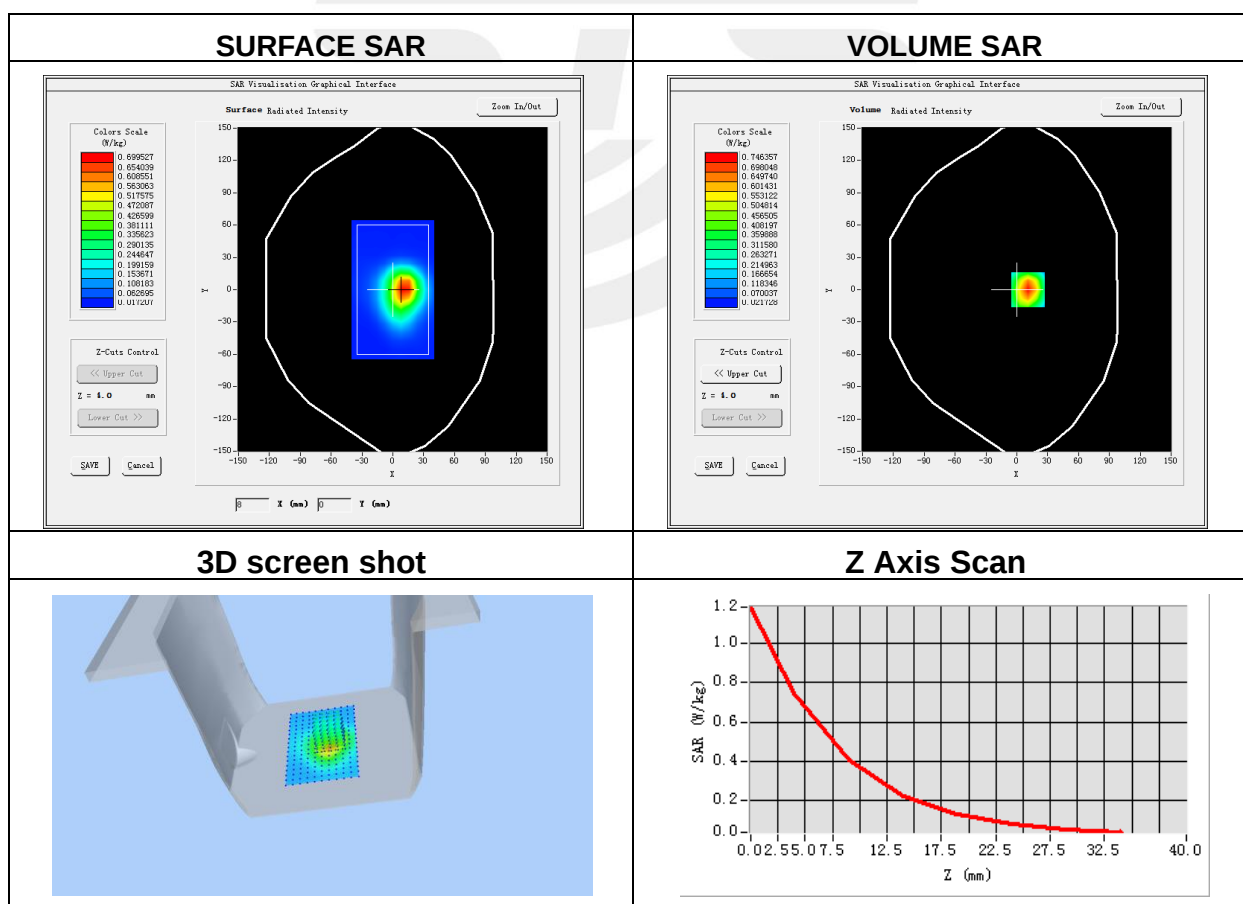
Plot 2: DUT: Dog GPS Tracker; EUT Model: PP04

Test Date	2022-04-19
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	Front side
Band	CAT-M Band 4 (RB 1)
Signal	CAT-M (Crest factor: 1.0)
Frequency (MHz)	1720
Relative permittivity (real part)	40.87
Conductivity (S/m)	1.36

Maximum location: X=11.00, Y=0.00

SAR Peak: 1.21 W/kg

SAR 10g (W/Kg)	0.358470
SAR 1g (W/Kg)	0.699531



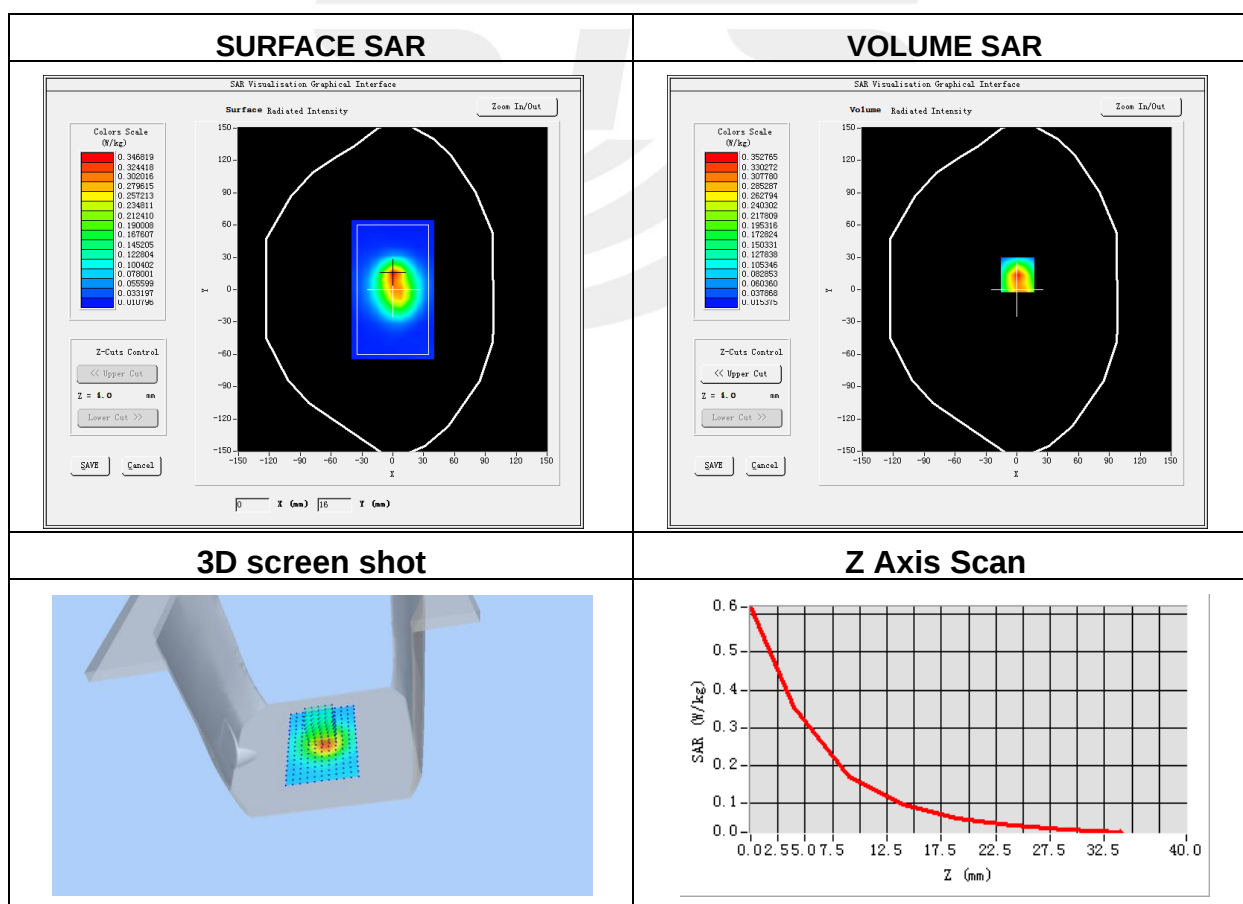
Plot 3: DUT: Dog GPS Tracker; EUT Model: PP04

Test Date	2022-04-19
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	Front side
Band	CAT-M Band 5 (RB 1)
Signal	CAT-M (Crest factor: 1.0)
Frequency (MHz)	829
Relative permittivity (real part)	42.54
Conductivity (S/m)	0.93

Maximum location: X=1.00, Y=14.00

SAR Peak: 0.61 W/kg

SAR 10g (W/Kg)	0.169674
SAR 1g (W/Kg)	0.331109



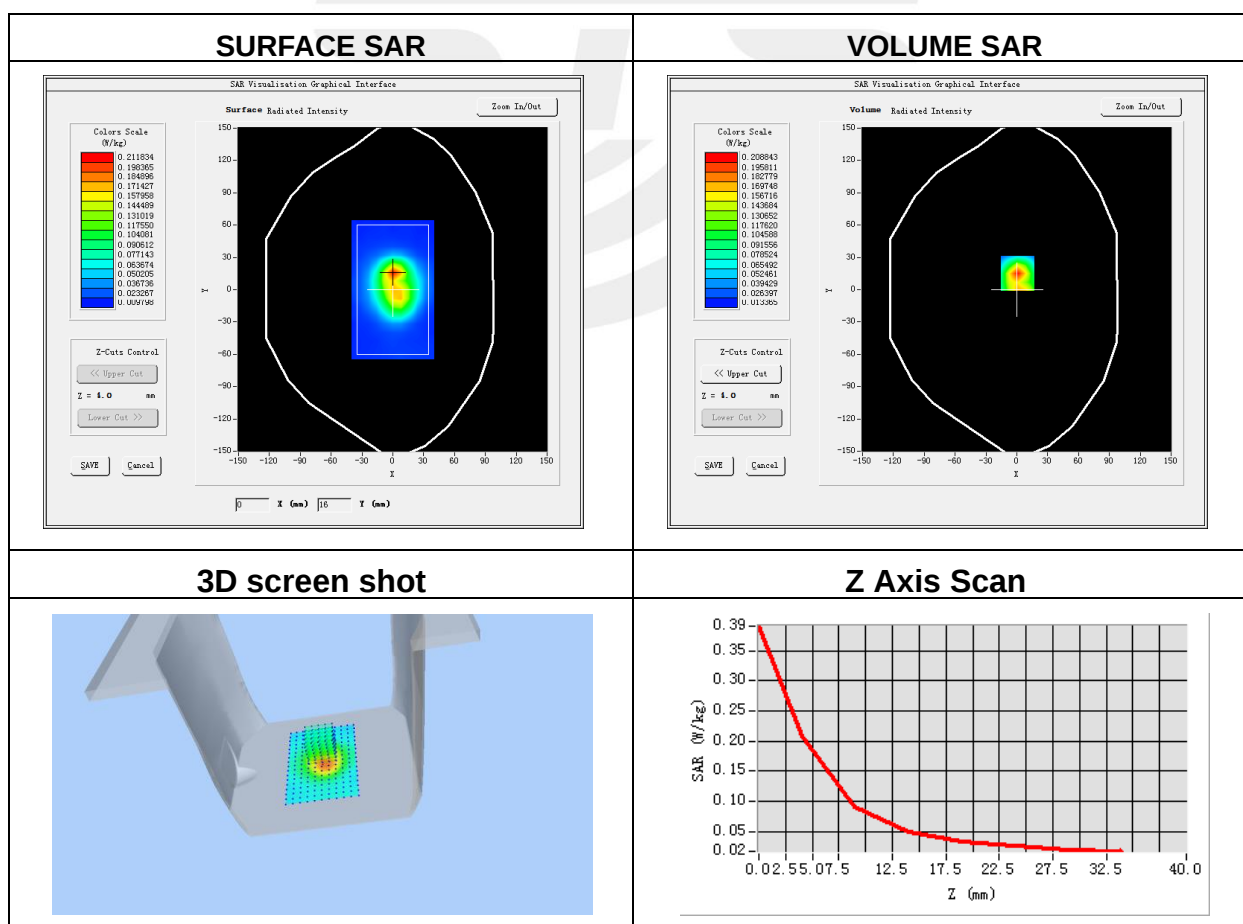
Plot 4: DUT: Dog GPS Tracker; EUT Model: PP04

Test Date	2022-04-19
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	Front side
Band	CAT-M Band 12 (RB 1)
Signal	CAT-M (Crest factor: 1.0)
Frequency (MHz)	707.5
Relative permittivity (real part)	42.18
Conductivity (S/m)	0.90

Maximum location: X=1.00, Y=15.00

SAR Peak: 0.39 W/kg

SAR 10g (W/Kg)	0.095599
SAR 1g (W/Kg)	0.198080





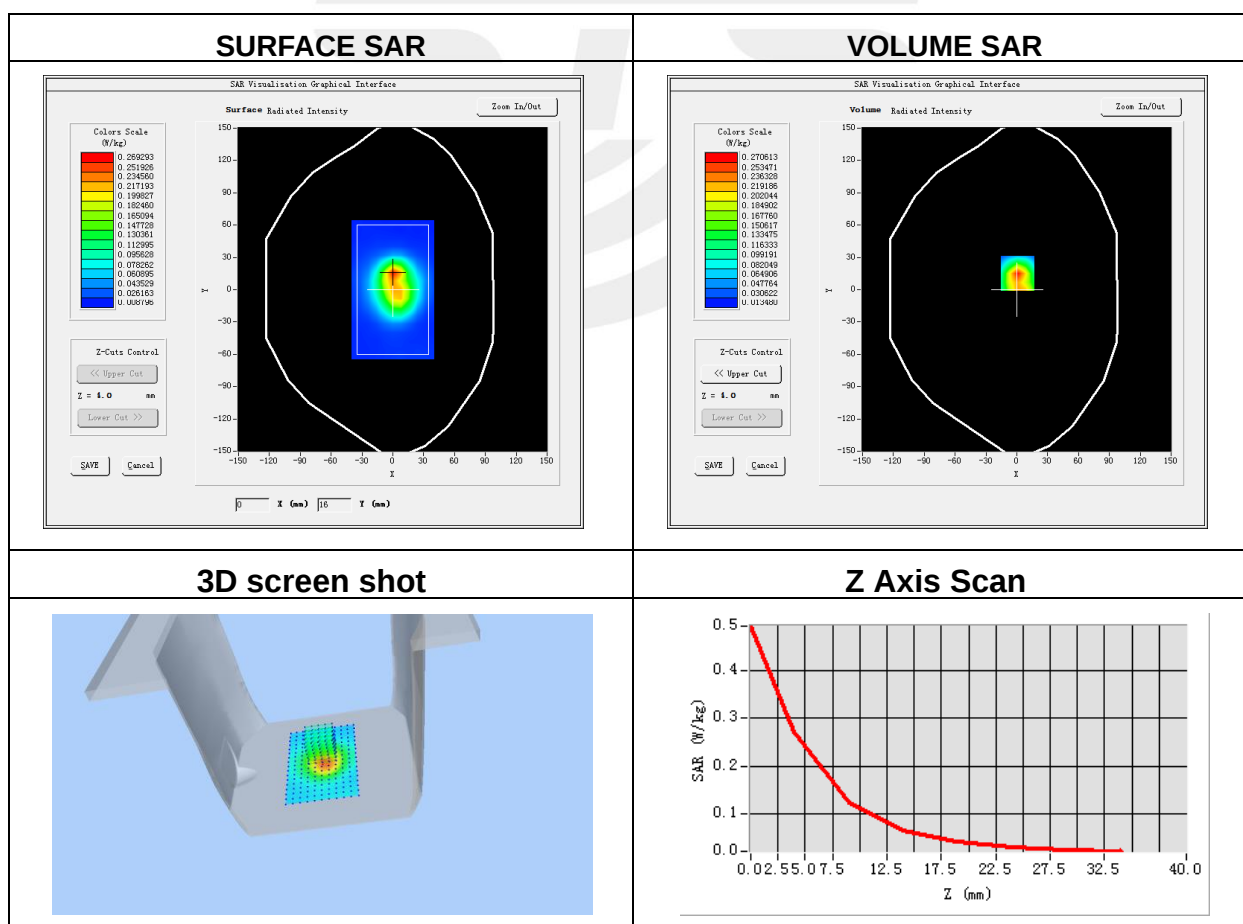
Plot 5: DUT: Dog GPS Tracker; EUT Model: PP04

Test Date	2022-04-19
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	Front Side
Band	CAT-M Band 13 (RB 1)
Signal	CAT-M (Crest factor: 1.0)
Frequency (MHz)	782
Relative permittivity (real part)	42.14
Conductivity (S/m)	0.90

Maximum location: X=1.00, Y=15.00

SAR Peak: 0.48 W/kg

SAR 10g (W/Kg)	0.123749
SAR 1g (W/Kg)	0.250157





Appendix C. Probe Calibration and Dipole Calibration Report

Refer the appendix Calibration Report.

※※※※END OF THE REPORT※※※※

