FCC SAR TEST REPORT

Report No.: STS1908268H01

Issued for

Certified Safety, Inc.

1177 Butler Rd, League City, TX 77573

Product Name:	LoRa/3G tracker
Brand Name:	Certified Safety
Model Name:	VIS-HL01
Series Model:	N/A
FCC ID:	N/A
Test Standard:	ANSI/IEEE Std. C95.1
	FCC 47 CFR Part 2 (2.1093)
	IEEE 1528: 2013
Max. Report SAR (1g):	Body: 0.943 W/kg

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Test Report Certification

Applicant's name ....: Certified Safety, Inc.

Address ....: 1177 Butler Rd, League City, TX 77573

Manufacture's Name ....: iTraq Inc

Address ....: 7554 185th Ave NE, Suite 200, Redmond, WA 98052 USA

Product description

Product name ....: LoRa/3G tracker

Brand name ....: Certified Safety

Model name ....: VIS-HL01

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 ....: 26 Aug. 2019~27 Aug. 2019

Date of Issue ....: 28 Aug. 2019

Test Result..: **Pass**

Testing Engineer :

(Aaron Bu)

Technical Manager :

(Jason Lu)

Authorized Signatory :

(Vita Li)

Table of Contents

Revision History

Rev.	Issue Date	Report No.	Effect Page	Contents
00	28 Aug. 2019	STS1908268H01	ALL	Initial Issue
Note: **Format version** of the report -V01				

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	LoRa/3G tracker		
Brand Name	Certified Safety		
Model Name	VIS-HL01		
Series Model	N/A		
FCC ID	N/A		
Model Difference	N/A		
Battery	Rated Voltage: 4.2V; Charge Limit: 3.7V; Capacity: 2000mAh		
Device Category	Portable		
Product stage	Production unit		
RF Exposure Environment	General Population / Uncontrolled		
Hardware Version	2.0.2		
Software Version	12		
Frequency Range	GSM 850:824.2~848.8MHz GSM 1900:1850.2~1909.8MHz WCDMA Band II:1852.4~1907.6MHz WCDMA Band V:826.4~846.6MHz WLAN 802.11b/g/n(HT20):2412~2462MHz Bluetooth:2402~2480MHz LoRa:915MHz		
Max. Reported SAR(1g): (Limit:1.6W/kg)	Band	Mode	Body Worn (W/kg)
	PCB	GSM 850	0.389
	PCB	GSM 1900	0.781
	PCB	WCDMA Band II	0.943
	PCB	WCDMA Band V	0.072
	DTS	2.4G WLAN [Note]	0.166
	DTS	Bluetooth [Note]	0.017
	DTS	LoRa [Note]	0.161
1-g Sum SAR			1.109
FCC Equipment Class	PCS Licensed Transmitter Digital Transmission System (DTS)		
Operating Mode:	GSM: GPRS; EGPRS Class 12; WCDMA:RMC,HSDPA,HSUPA Release 6; WLAN: 802.11 b/g/n(HT20); BLE LoRa		
Antenna Specification:	GSM,WCDMA: PIFA Antenna BT,WLAN: PCB Antenna		
Note: 1. Bluetooth,2.4G WLAN SAR was estimated 2. 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	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 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 941225 D01 v03r01	SAR Measurement Procedures for 3G Devices
8	FCC KDB 941225 D06 v02r01	Hotspot Mode SAR
9	FCC KDB 648474 D04 v01r03	SAR Evaluation Considerations for Wireless Handsets
10	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
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:

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

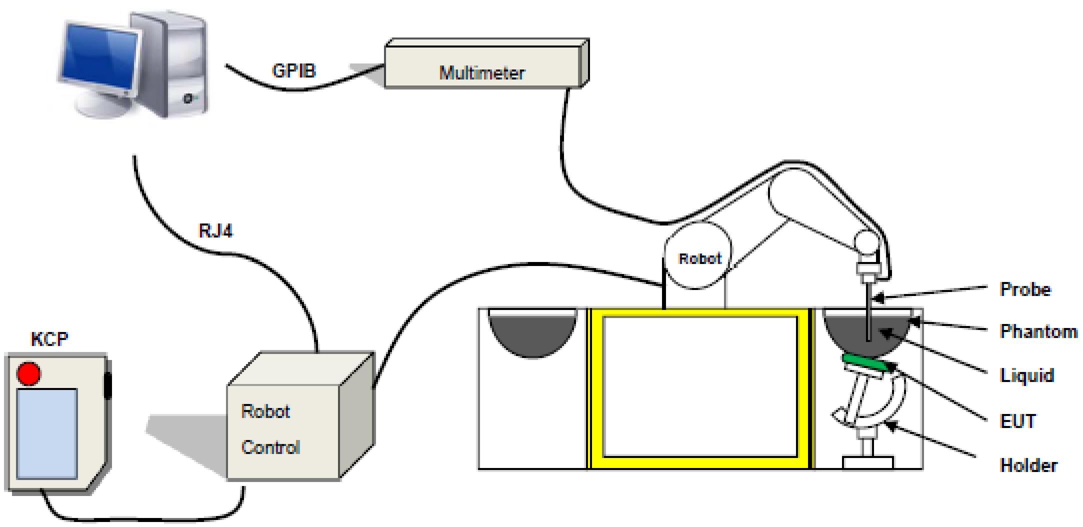
SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

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

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 OpenSAR 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 14/16 EP309 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter: 5 mm
- Length of Individual Dipoles: 4.5 mm
- Maximum external diameter: 8 mm
- Distance between dipole/probe extremity: 8 mm (repeatability better than +/- 2.7mm)
- Probe linearity: 0±2.27%(±0.10dB)
- Axial Isotropy: ＜0.10 dB
- Spherical Isotropy: ＜0.10 dB
- Calibration range: 400 MHz to 3 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

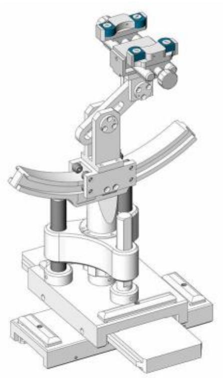
3.2.2 Phantom

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 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

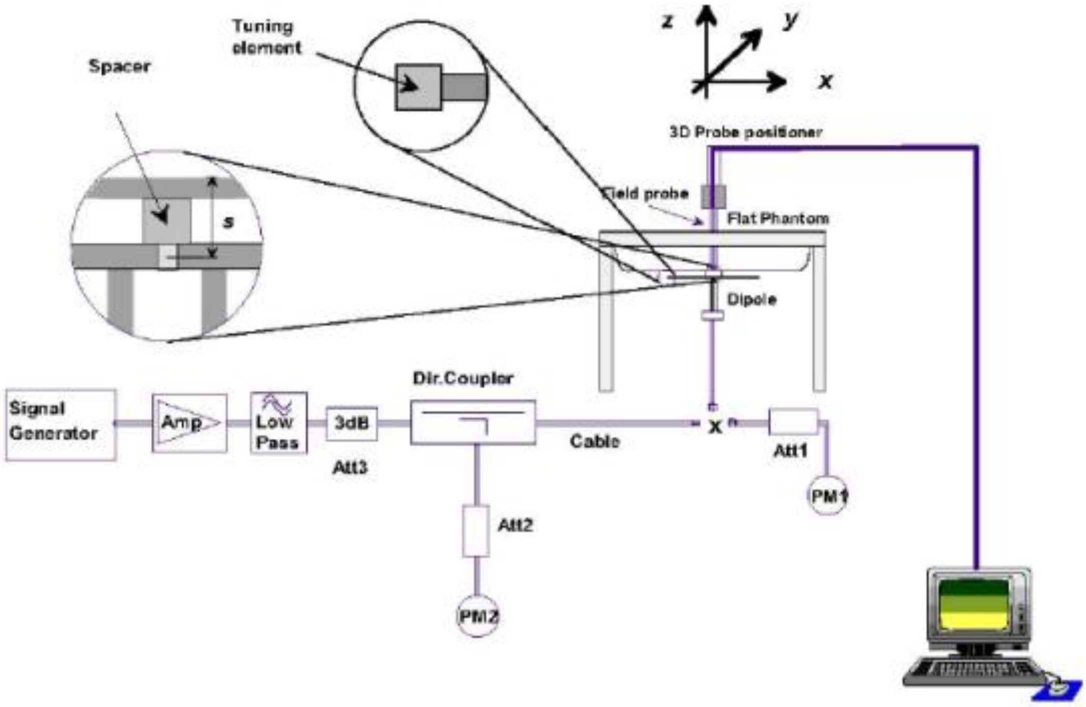
Date	Ambient condition		Body Simulating Liquid		Parameters	Target	Measured	Deviation [%]	Limited [%]
	Temp. [°C]	Humidity [%]	Frequency	Temp. [°C]					
2019-08-26	23.4	52	835 MHz	23.2	Permittivity:	55.20	56.17	1.76	± 5
					Conductivity	0.97	0.99	2.06	± 5
2019-08-27	23.1	50	1900 MHz	22.8	Permittivity:	53.30	54.42	2.10	± 5
					Conductivity	1.52	1.55	1.97	± 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 %.

Freq.(MHz)	Power(mW)	Tested Value (W/Kg)	Normalized SAR (W/kg)	Target(W/Kg)	Tolerance(%)	Date
835 Body	100	0.967	9.67	9.56	1.15	2019-08-26
1900 Body	100	4.017	40.17	39.70	1.18	2019-08-27

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.

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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.

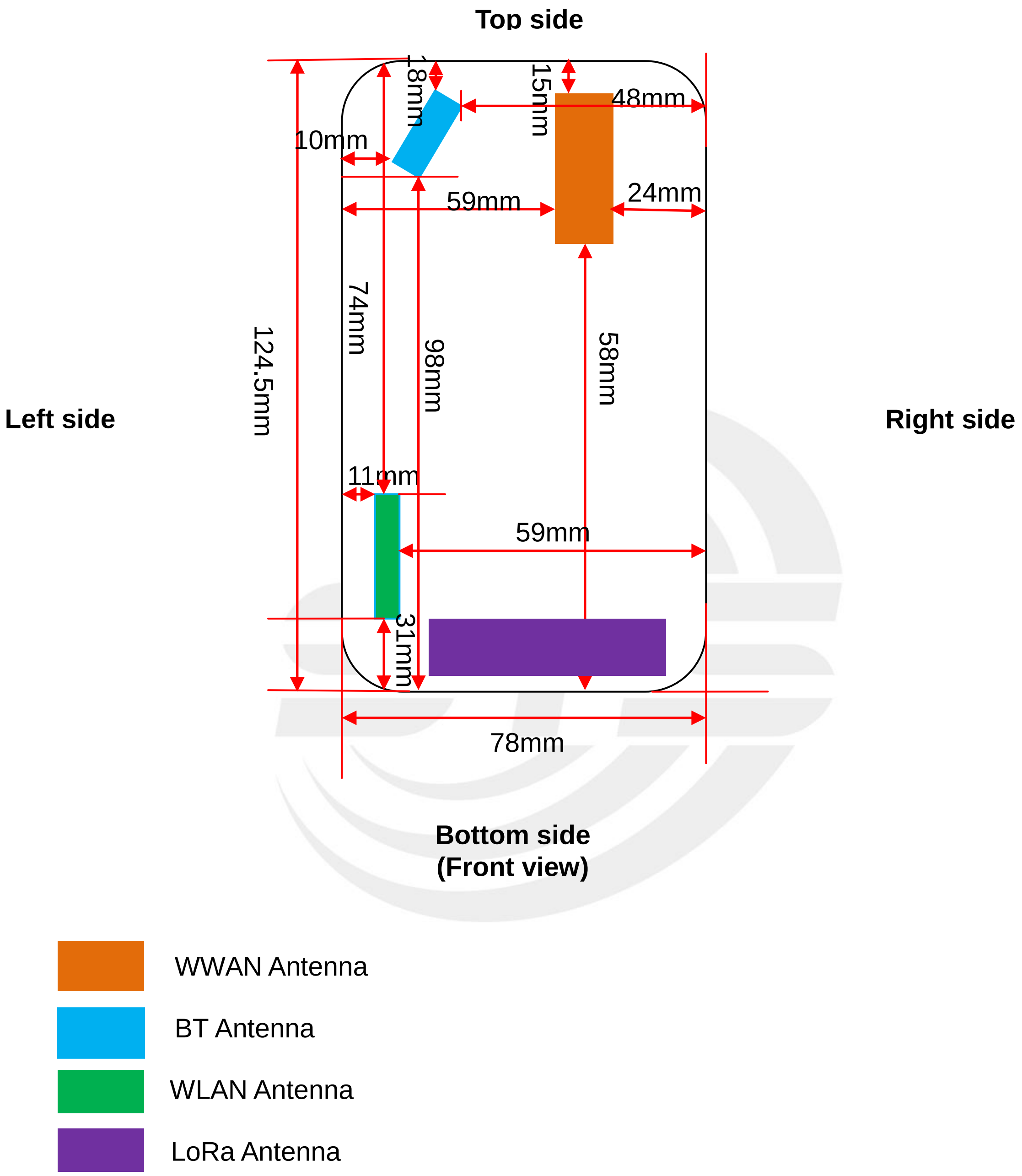
Area Scan& Zoom Scan:

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 LoRa/3G tracker, support GSM/WCDMA mode.



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

According with FCC KDB 447498 D01, appendix A, <SAR test exclusion thresholds for 100MHz ~ 6GHz and≤50mm＞table, this device SAR test configurations consider as following:

Band	Test position configurations					
	Front	**Back**	**Right edge**	**Left edge**	**Top edge**	**Bottom edge**
WWAN	＜5mm	16mm	24mm	59mm	15mm	58mm
	Yes	Yes	Yes	No	Yes	No
WLAN	8mm	10mm	59mm	11mm	74mm	31mm
	Yes	Yes	No	Yes	No	No
BT	8mm	10mm	48mm	10mm	8mm	98mm
	Yes	Yes	No	Yes	Yes	No
LoRa	8mm	10mm	15mm	15mm	93mm	7mm
	Yes	Yes	Yes	Yes	No	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 <5mm, 5mm 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

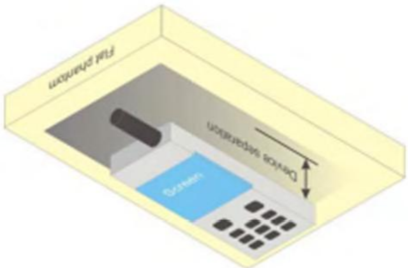
   b) [threshold at 50mm in step1]+(test separation distance -50mm) *10]mW at＞1500MHz and≤6GHz
6. Per KDB 447498 D02, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/ HSUPA/DC-HSDPA output power is<0.25db higher than RMC 12.2Kbps,or reported SAR with RMC 12.2kbps setting is ≤1.2W/Kg, HSDPA/HSUPA/DC-HSDPA SAR evaluation can be excluded.
7. 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

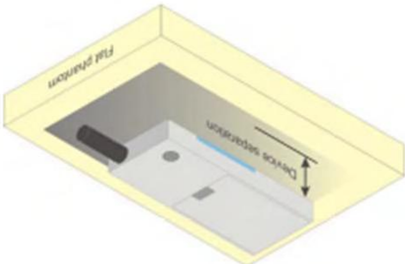
and higher order modulations is not required when the maximum average output power for each of each of these configurations is less than 1/4db higher than those measured at the lower data rate than 11b mode ,thus the SAR can be excluded.

8. EUT Test Position

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.





9.1 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	5.831	N	1	1	1	5.83	5.83	∞
Axial Isotropy	0.695	R	√3	√0.5	√0.5	0.28	0.28	∞
Hemispherical Isotropy	1.045	R	√3	√0.5	√0.5	0.43	0.43	∞
Boundary effect	1.0	R	√3	1	1	0.58	0.58	∞
Linearity	0.685	R	√3	1	1	0.40	0.40	∞
System detection limits	1.0	R	√3	1	1	0.58	0.58	∞
Modulation response	3.0	R	√3	1	1	1.73	1.73	∞
Readout Electronics	0.021	N	1	1	1	0.021	0.021	∞
Response Time	0	R	√3	1	1	0	0	∞
Integration Time	1.4	R	√3	1	1	0.81	0.81	∞
RF ambient conditions-Noise	3.0	R	√3	1	1	1.73	1.73	∞
RF ambient conditions-reflections	3.0	R	√3	1	1	1.73	1.73	∞
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	2.6	N	1	1	1	2.6	2.6	∞
Device holder uncertainty	3	N	1	1	1	3	3	∞
SAR drift measurement	5	R	√3	1	1	2.89	2.89	∞
SAR scaling	5	R	√3	1	1	2.89	2.89	∞
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	1.9	N	1	1	0.84	1.90	1.60	∞
Liquid conductivity（temperature uncertainty）	2.5	R	√3	0.78	0.71	1.13	1.02	∞
Liquid conductivity（measured）	4	N	1	0.78	0.71	3.12	2.84	M
Liquid permittivity（temperature uncertainty）	2.5	R	√3	0.23	0.26	0.33	0.38	∞
Liquid permittivity（measured）	5	N	1	0.23	0.26	1.15	1.30	M
Combined Standard Uncertainty		RSS				9.79	9.59	
Expanded Uncertainty (95% Confidence interval)		K=2				19.58	19.18	

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9.2 System validation Uncertainty

Uncertainty Component	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	vi
Measurement System								
Probe calibration	5.831	N	1	1	1	5.83	5.83	∞
Axial Isotropy	0.695	R	$\sqrt{3}$	1	1	0.40	0.40	∞
Hemispherical Isotropy	1.045	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	0.685	R	$\sqrt{3}$	1	1	0.40	0.40	∞
System detection limits	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation response	3.0	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Readout Electronics	0.021	N	1	1	1	0.021	0.021	∞
Response Time	0.0	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Integration Time	1.4	R	$\sqrt{3}$	0	0	0.00	0.00	∞
RF ambient conditions-Noise	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient conditions-reflections	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
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	∞
System validation source								
Deviation of experimental dipole from numerical dipole	5.0	N	1	1	1	5.00	5.00	∞
Input power and SAR drift measurement	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Other source contribution Uncertainty	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Phantom and set-up								
Phantom uncertainty（shape and thickness uncertainty）	4.0	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	1.9	N	1	1	0.84	1.90	1.60	∞
Liquid conductivity（temperature uncertainty）	2.5	R	$\sqrt{3}$	0.78	0.71	1.13	1.02	∞
Liquid conductivity（measured）	4	N	1	0.78	0.71	3.12	2.84	M
Liquid permittivity（temperature uncertainty）	2.5	R	$\sqrt{3}$	0.23	0.26	0.33	0.38	∞
Liquid permittivity（measured）	5	N	1	0.23	0.26	1.15	1.30	M
Combined Standard Uncertainty		RSS				9.718	9.517	
Expanded Uncertainty (95% Confidence interval)		K=2				19.44	19.04	

10. Conducted Power Measurement

10.1 Test Result

Burst Average Power (dBm)						
Band	GSM 850			PCS 1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880.0	1909.8
GSM(GMSK, 1-Slot)	-	-	-	-	-	-
GPRS (GMSK, 1-Slot)	33.58	33.38	34.63	29.25	29.27	29.33
GPRS (GMSK, 2-Slot)	30.99	31.02	31.15	27.10	27.66	27.36
GPRS (GMSK, 3-Slot)	28.11	27.96	27.84	26.52	26.45	26.12
GPRS (GMSK, 4-Slot)	26.18	26.19	26.06	25.00	25.36	25.17
EGPRS(8PSK, 1-Slot)	27.86	27.71	28.94	25.35	25.34	25.43
EGPRS(8PSK, 2-Slot)	26.85	26.63	26.12	24.02	24.13	24.26
EGPRS(8PSK, 3-Slot)	25.09	25.46	25.39	23.45	23.18	23.66
EGPRS(8PSK, 4-Slot)	25.16	25.00	25.49	23.36	23.74	23.25
Remark: GPRS, CS4 coding scheme. EGPRS, MCS5 coding scheme. Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 5 working link Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 5 working link						

Fram- Average Power(dBm)						
Band	GSM 850			PCS 1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880.0	1909.8
GSM(GMSK, 1-Slot)	-	-	-	-	-	-
GPRS (GMSK, 1-Slot)	24.55	24.35	25.60	20.22	20.24	20.30
GPRS (GMSK, 2-Slot)	24.97	25.00	25.13	21.08	21.64	21.34
GPRS (GMSK, 3-Slot)	23.85	23.70	23.58	22.26	22.19	21.86
GPRS (GMSK, 4-Slot)	23.17	23.18	23.05	21.99	22.35	22.16
EGPRS(8PSK, 1-Slot)	18.83	18.68	19.91	16.32	16.31	16.40
EGPRS(8PSK, 2-Slot)	20.83	20.61	20.10	18.00	18.11	18.24
EGPRS(8PSK, 3-Slot)	20.83	21.20	21.13	19.19	18.92	19.40
EGPRS(8PSK, 4-Slot)	22.15	21.99	22.48	20.35	20.73	20.24
Remark : 1. SAR testing was performed on the maximum frame-averaged power mode. 2. The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below: Frame-averaged power = Burst averaged power (1 Tx Slot) – 9.03 dB Frame-averaged power = Burst averaged power (2 Tx Slots) – 6.02 dB Frame-averaged power = Burst averaged power (3 Tx Slots) - 4.26 dB Frame-averaged power = Burst averaged power (4 Tx Slots) – 3.01 dB						

WCDMA

Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4183	4233	9262	9400	9538
Frequency (MHz)	826.4	836.6	846.6	1852.4	1880.0	1907.6
AMR 12.2Kbps	23.75	23.48	24.73	21.96	22.13	22.15
RMC 12.2Kbps	23.93	23.66	24.89	22.03	22.29	22.31
HSDPA Subtest-1	22.63	22.05	23.18	22.01	22.32	22.31
HSDPA Subtest-2	22.83	22.55	23.66	20.96	21.20	21.25
HSDPA Subtest-3	22.57	22.22	23.53	20.64	20.89	20.95
HSDPA Subtest-4	22.26	21.96	23.21	20.56	20.60	20.65
HSUPA Subtest-1	22.93	22.59	23.82	21.27	21.44	21.39
HSUPA Subtest-2	23.82	23.48	24.78	22.31	22.39	22.30
HSUPA Subtest-3	21.53	21.21	22.44	20.02	20.08	20.11
HSUPA Subtest-4	23.76	23.42	24.69	22.32	22.28	22.29
HSUPA Subtest-5	22.90	22.59	23.79	21.25	21.39	21.27

According to 3GPP 25.101 sub-clause 6.2.2 , the maximum output power is allowed to be reduced by following the table.

Table 6.1A: UE maximum output power with HS-DPCCH and E-DCH

UE Transmit Channel Configuration	CM(db)	MPR(db)
For all combinations of ,DPDCH,DPCCH HS-DPDCH,E-DPDCH and E-DPCCH	0⩽ CM⩽3.5	MAX(CM-1,0)
Note: CM=1 for βc/βd=12/15, βhs/ βc=24/15.For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.		

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done .However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a compensation for the power back-off by increasing the gain of TX_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

WLAN

Mode	Channel Number	Frequency (MHz)	Average Power (dBm)
802.11b	1	2412	8.74
	6	2437	8.65
	11	2462	8.42
802.11g	1	2412	8.29
	6	2437	8.13
	11	2462	8.24
802.11n(HT 20)	1	2412	7.98
	6	2437	7.45
	11	2462	8.04

BLE

Mode	Channel Number	Frequency (MHz)	Average Power (dBm)
GFSK(1Mbps)	0	2402	-2.259
	19	2440	-2.178
	39	2480	-2.423

LoRa

Mode	Frequency (MHz)	**Peak Power (dBm)**
LoRa	915	10.777

10.2 Tune-up Power

Mode	GSM850(AVG)	GSM1900(AVG)
GSM/PCS	-	-
GPRS (1 Slot)	34±1dBm	29±1dBm
GPRS (2 Slot)	31±1dBm	27±1dBm
GPRS (3 Slot)	28±1dBm	26±1dBm
GPRS (4 Slot)	26±1dBm	24.4±1dBm
EDGE (1 Slot)	28±1dBm	25±1dBm
EDGE (2 Slot)	26±1dBm	24±1dBm
EDGE (3 Slot)	25±1dBm	23±1dBm
EDGE (4 Slot)	25±1dBm	23±1dBm

Mode	WCDMA Band V(AVG)	WCDMA Band II(AVG)
AMR	24±1dBm	22±1dBm
RMC	24±1dBm	22±1dBm
HSDPA Subtest-1	23±1dBm	22±1dBm
HSDPA Subtest-2	23±1dBm	21±1dBm
HSDPA Subtest-3	23±1dBm	20±1dBm
HSDPA Subtest-4	22.3±1dBm	20±1dBm
HSUPA Subtest-1	23±1dBm	21±1dBm
HSUPA Subtest-2	24±1dBm	22±1dBm
HSUPA Subtest-3	22±1dBm	20±1dBm
HSUPA Subtest-4	24±1dBm	22±1dBm
HSUPA Subtest-5	23±1dBm	21±1dBm

Mode	WLAN(AVG)
IEEE 802.11b	8±1dBm
IEEE 802.11g	8±1dBm
IEEE 802.11n(HT 20)	8±1dBm

Mode	BLE(AVG)
GFSK	-2±1dBm

Mode	Peak Power
LoRa	10±1dBm

10.3 SAR Test Exclusions Applied

Per FCC KDB 447498D01, the 1-g SAR and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm 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 for 10-g extremity SAR, where:

- 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

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

$$\frac{Max\ Power\ of\ Channel\ (mW)}{Test\ Separation\ Dist\ (mm)} * \sqrt{Frequency(GHz)} \leq 3.0$$

Based on the maximum conducted power of **Bluetooth Body** (rounded to the nearest mW) and the antenna to user separation distance,

Bluetooth Body SAR was not required; [0.794/10)* √2.480] = **0.13** < 3.0.

Based on the maximum conducted power of **2.4 GHz WLAN Body** (rounded to the nearest mW) and the antenna to user separation distance,

2.4 GHz WLAN SAR was not required; [(7.943/10)* √2.462] = **1.25** < 3.0.

Based on the maximum conducted power of **LoRa Body** (rounded to the nearest mW) and the antenna to user separation distance,

LoRa SAR was not required; [(7.943/10)* √0.915] = **1.20** < 3.0.

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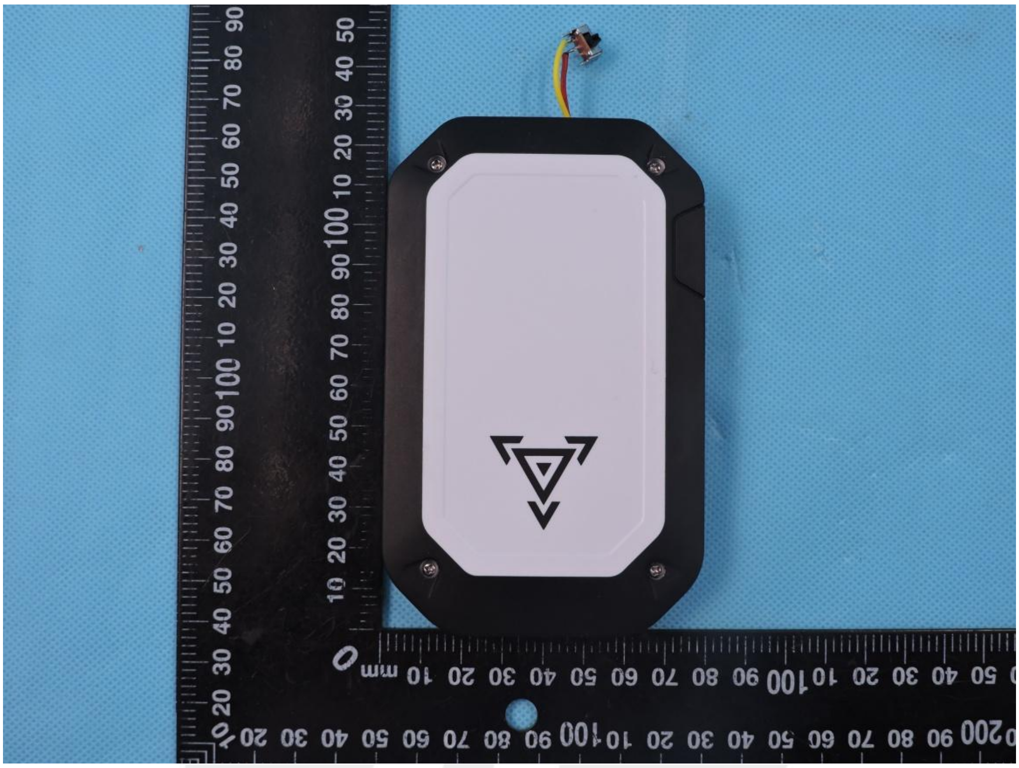
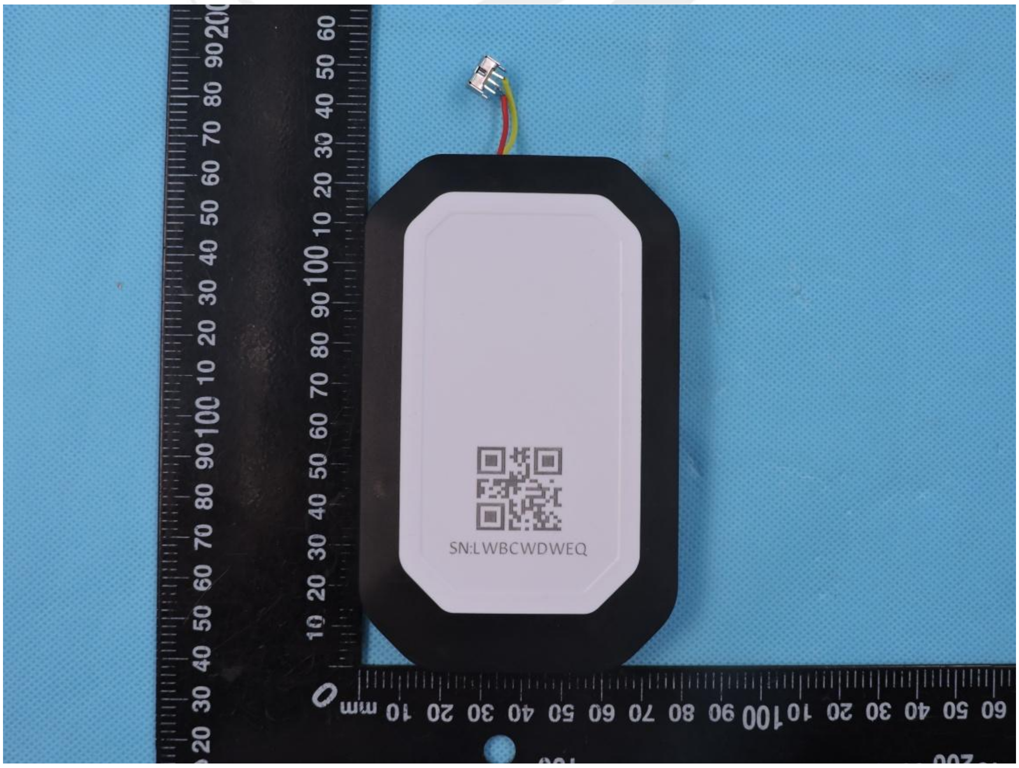
11. EUT And Test Setup Photo

11.1 EUT Photo

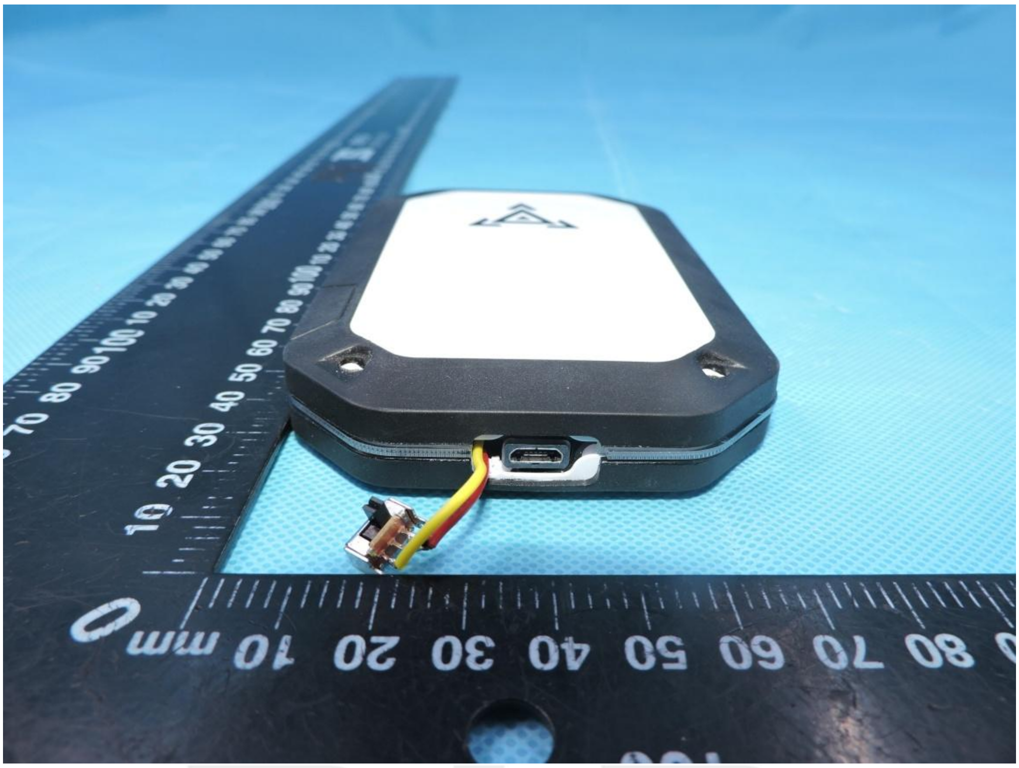
Front side



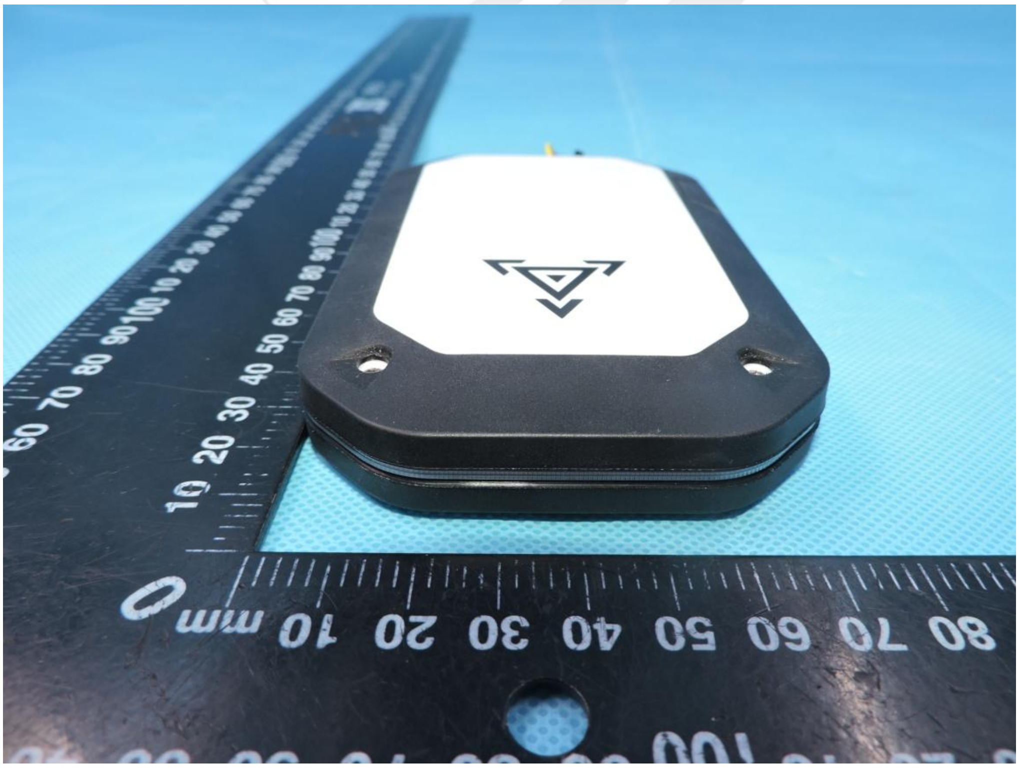
Back side



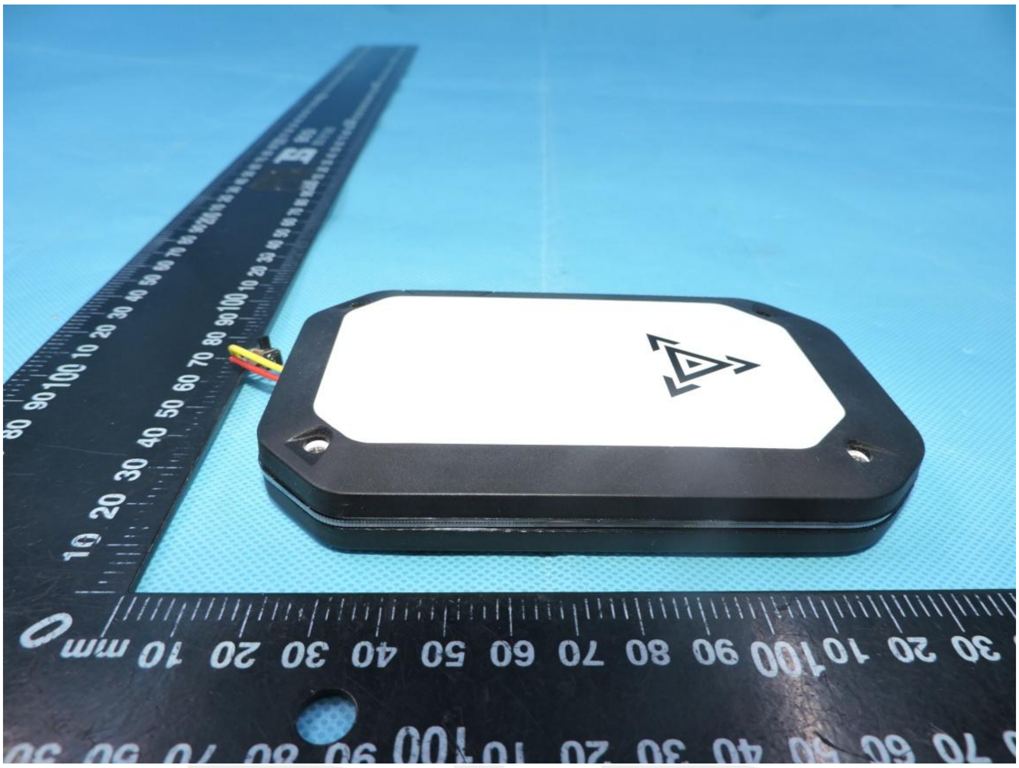
Top Edge



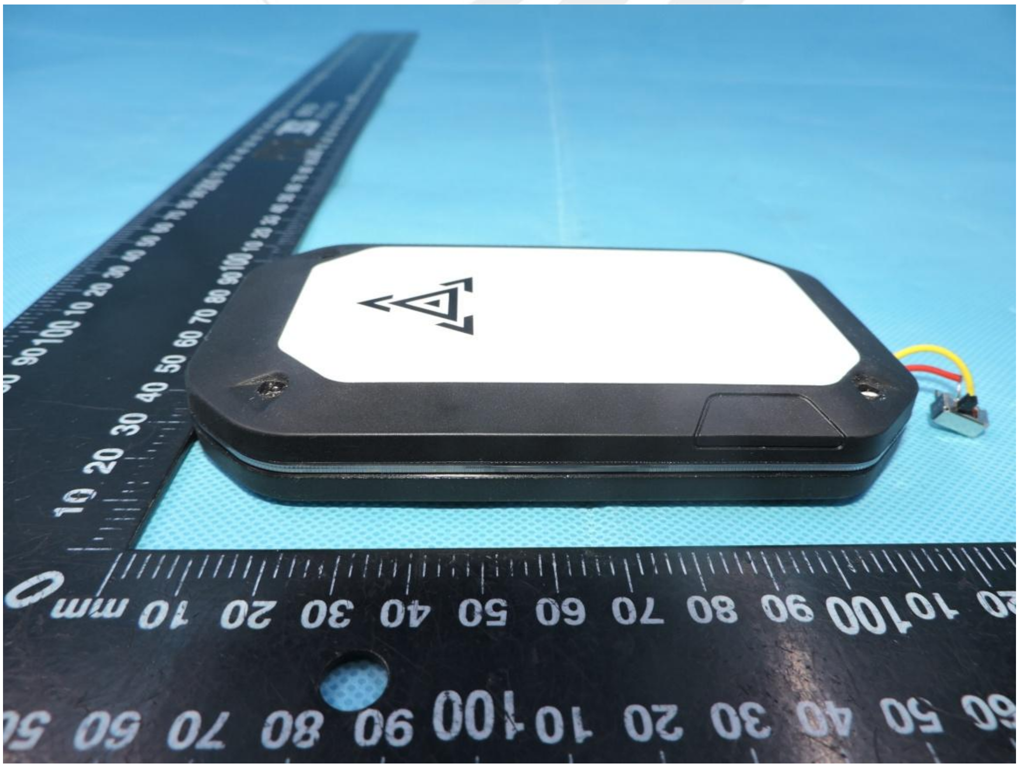
Bottom Edge



Left Edge

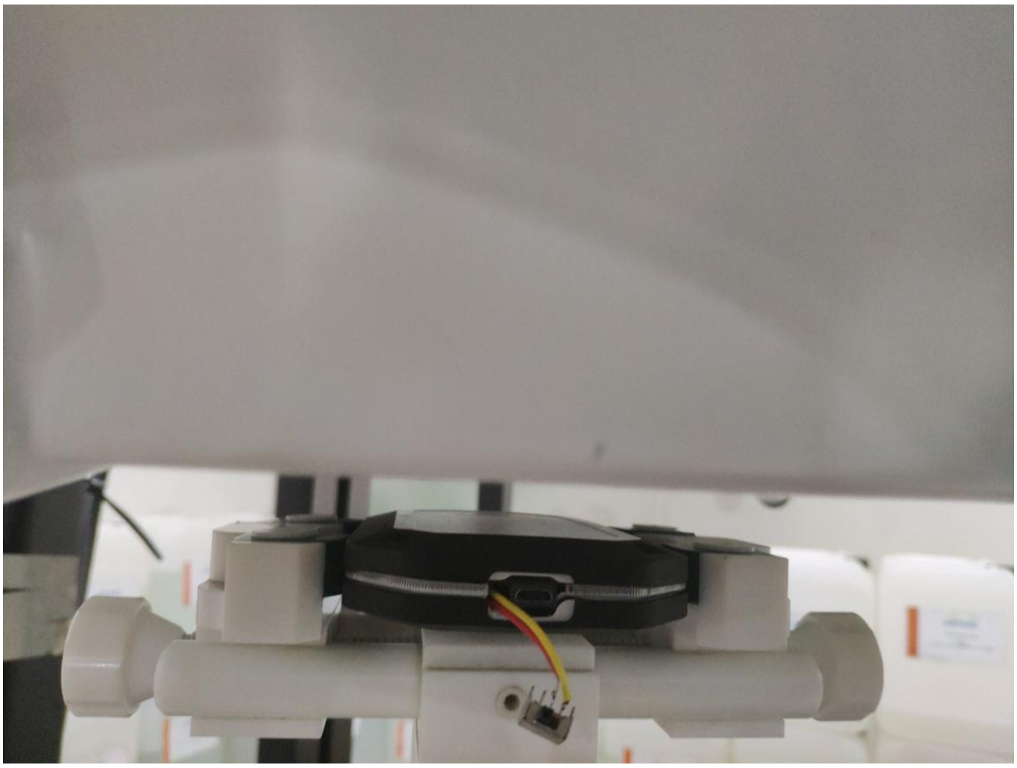


Right Edge

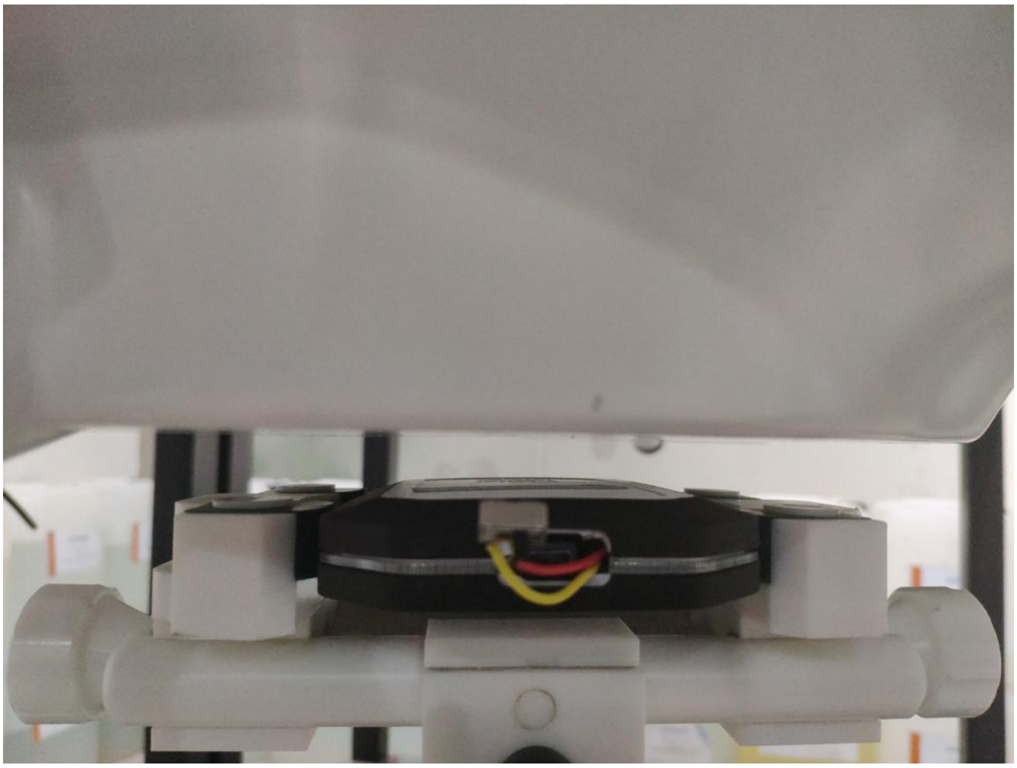


11.2 Setup Photo

Body Front side(separation distance is 10mm)



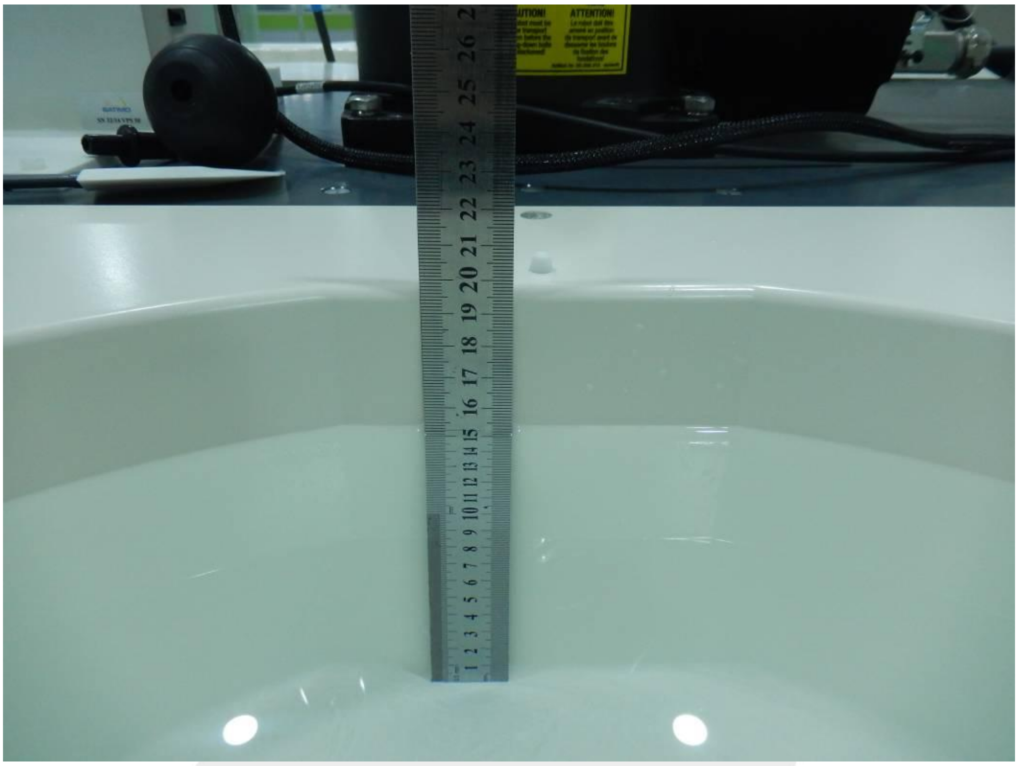
Body Back side(separation distance is 10mm)



Right Edge(separation distance is 10mm)

Top Edge(separation distance is 10mm)

Liquid depth (15 cm)



12. SAR Result Summary

12.1 Body-worn and Hotspot SAR

Band	Mode	Test Position	Ch.	Result 1g (W/Kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Scaled SAR (W/Kg)	Meas. No.
GSM 850	GPRS Data-1 Slot	Front side	251	0.357	2.58	35	34.63	**0.389**	1
		Back side	251	0.114	-0.44	35	34.63	0.124	/
		Right side	251	0.051	-3.14	35	34.63	0.056	/
		Top side	251	0.067	3.23	35	34.63	0.073	/
GSM1900	GPRS Data-4 Slot	Front side	661	0.774	3.25	25.4	25.36	**0.781**	2
		Back side	661	0.159	-0.71	25.4	25.36	0.160	/
		Right side	661	0.040	-0.76	25.4	25.36	0.040	/
		Top side	661	0.063	0.52	25.4	25.36	0.064	/
WCDMA II	HSUPA Subtest-2	Front side	9262	0.765	-2.34	23	22.31	0.897	/
		Front side	9400	0.819	-2.74	23	22.39	**0.943**	3
		Front side	9538	0.748	0.81	23	22.30	0.879	/
		Back side	9400	0.214	-3.03	23	22.39	0.246	/
		Right side	9400	0.086	3.63	23	22.39	0.099	/
		Top side	9400	0.112	1.75	23	22.39	0.129	/
WCDMA V	RMC	Front side	4233	0.070	2.70	25	24.89	**0.072**	4
		Back side	4233	0.032	-3.02	25	24.89	0.033	/
		Right side	4233	0.010	-1.22	25	24.89	0.010	/
		Top side	4233	0.013	1.24	25	24.89	0.013	/

Note:

1. The test separation of all above table is 10mm.
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
3. Per KDB865664 D01, Repeated measurement is not required when the original highest measured SAR is <0.80 W/kg

Repeated SAR

Band	Mode	Test Position	Channel	Result 1g (W/Kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Scaled SAR (W/Kg)	Meas. No.
WCDMA II	HSUPA Subtest-2	Front side	9400	0.805	-1.36	23	22.39	0.926	/

11.3 repeated SAR measurement

Band	Mode	Test Position	Channel	Original Measured SAR 1g(mW/g)	1 st Repeated SAR 1g	Ratio	Original Measured SAR 1g(mW/g)	2nd Repeated SAR 1g	Ratio
WCDMA II	HSUPA Subtest-2	Front side	9400	0.819	0.805	1.02	/	/	/

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

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Simultaneous Multi-band Transmission Evaluation:

Application Simultaneous Transmission information:

Position	Simultaneous state
Body	1. GSM + WLAN
	2. GSM + Bluetooth
	3. WCDMA + WLAN
	4. WCDMA + Bluetooth
	5. GSM + LoRa
	6. WCDMA + LoRa

NOTE:

1. Bluetooth, LoRa and WLAN can't simultaneous transmission at the same time.
2. For simultaneous transmission at head and body exposure position, 2 transmitters simultaneous transmission was the worst state.
3. Based upon KDB 447498 D01, BT SAR is excluded as below table.
4. If the test separation distance is <5mm, 5mm is used for excluded SAR calculation.
5. For minimum test separation distance≦50mm,Bluetooth standalone SAR is excluded according to [(max. power of channel, including tune-up tolerance, mW)/ (min. test separation distance, mm) ·[√f (GHz) /x] ≦3.0 for 1-g SAR and ≦7.5 for 10-g extremity SAR
6. The reported SAR summation is calculated based on the same configuration and test position.
7. KDB 447498 / 4.3.2 (2) when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
   a) (max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f (GHz) /x] W/kg for test separation distances≤ 50 mm;
   Where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.
   b) 0.4W/Kg for 1-g SAR and 1.0W/Kg for 10-g SAR, when the separation distance is >50mm.

Estimated SAR		Maximum Power		Antenna to user(mm)	Frequency(GHz)	Stand alone SAR(1g) [W/kg]
		dBm	mW			
BT	Body	-1	0.794	10	2.480	0.017
2.4G WLAN	Body	9	7.943	10	2.462	0.166
LoRa	Body	11	12.589	100	0.915	0.161

Simultaneous Mode	Position	Mode	Max. 1-g SAR (W/kg)	1-g Sum SAR (W/kg)
GSM + WLAN	Body	GSM Data	0.781	0.947
		WLAN	0.166	
GSM + Bluetooth	Body	GSM Data	0.781	0.798
		Bluetooth	0.017	
GSM + LoRa	Body	GSM Data	0.781	0.942
		LoRa	0.161	
WCDMA + WLAN	Body	WCDMA RMC	0.943	1.109
		WLAN	0.166	
WCDMA + Bluetooth	Body	WCDMA RMC	0.943	0.960
		Bluetooth	0.017	
WCDMA + LoRa	Body	WCDMA RMC	0.943	0.955
		LoRa	0.161	

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna.

When the sum of SAR 1g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR-1g 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR 1g is greater than the SAR limit (SAR-1g 1.6 W/kg), SAR test exclusion is determined by the SPLSR.

13. Equipment List

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
835MHz Dipole	MVG	SID835	SN 30/14 DIP0G835-332	2017.08.15	2020.08.14
1900MHz Dipole	MVG	SID1900	SN 30/14 DIP1G900-333	2017.08.15	2020.08.14
E-Field Probe	MVG	SSE5	SN 14/16 EP309	2018.12.13	2019.12.12
Dielectric Probe Kit	MVG	SCLMP	SN 32/14 OCPG67	2018.12.01	2019.11.30
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	2019.03.02	2020.03.01
Multi Meter	Keithley	Multi Meter 2000	4050073	2018.10.13	2019.10.12
Signal Generator	Agilent	N5182A	MY50140530	2018.10.16	2019.10.15
Wireless Communication Test Set	Agilent	8960-E5515C	MY48360751	2018.10.16	2019.10.15
Wireless Communication Test Set	R&S	CMW500	117239	2018.10.13	2019.10.12
Power Amplifier	DESAY	ZHL-42W	9638	2018.10.13	2019.10.12
Power Meter	R&S	NRP	100510	2018.10.26	2019.10.25
Power Meter	Agilent	E4418B	GB43312526	2018.10.26	2019.10.25
Power Sensor	R&S	NRP-Z11	101919	2018.10.13	2019.10.12
Power Sensor	Agilent	E9301A	MY41497725	2018.10.13	2019.10.12
hygrothermograph	MiEO	HH660	N/A	2018.10.11	2019.10.10
Thermograph	Elitech	RC-4	S/N EF7176501537	2018.10.15	2019.10.14

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

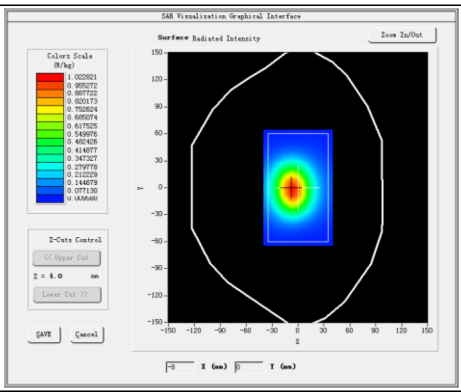
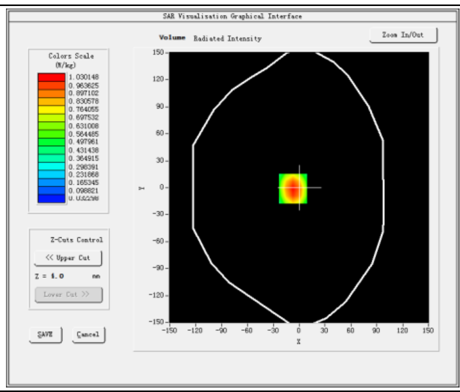
Appendix A. System Validation Plots

System Performance Check Data (835MHz Body)

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2019-08-26

Experimental conditions.

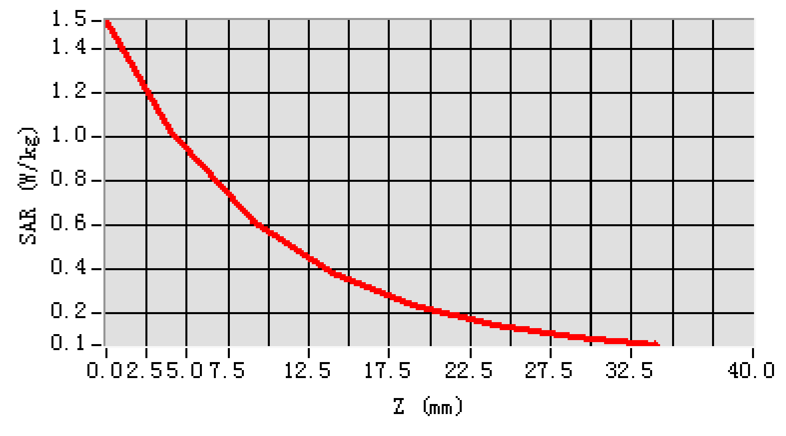
Probe	
Phantom	Validation plane
Device Position	-
Band	835MHz
Channels	-
Signal	CW
Frequency (MHz)	835MHz
Relative permittivity	56.17
Conductivity (S/m)	0.99
Power drift (%)	1.12
Probe	SN 14/16 EP309
ConvF:	5.90
Crest factor:	1:1

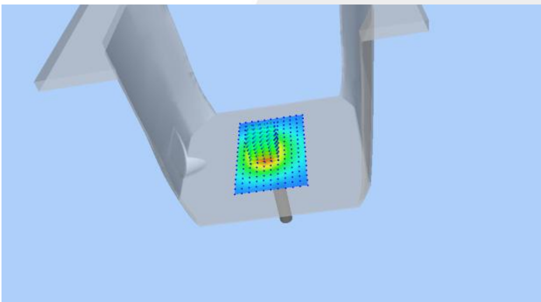
SURFACE SAR	VOLUME SAR
	

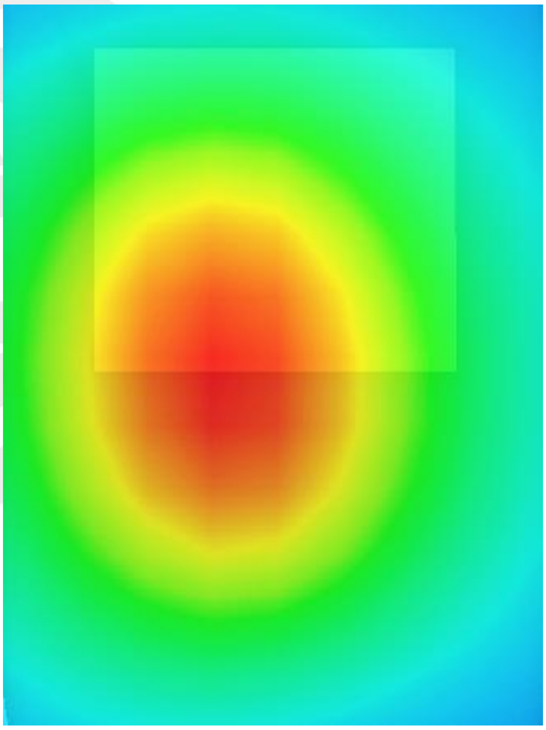
Maximum location: X=-7.00, Y=-1.00

SAR 10g (W/Kg)	0.654138
SAR 1g (W/Kg)	0.967042

Z Axis Scan


SAR (W/kg)
1.5
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.1
0.0 2.5 5.0 7.5 12.5 17.5 22.5 27.5 32.5 40.0
Z (mm)



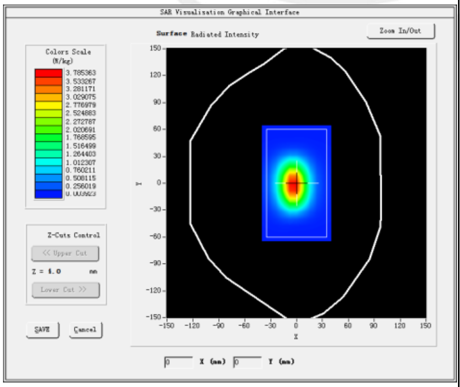
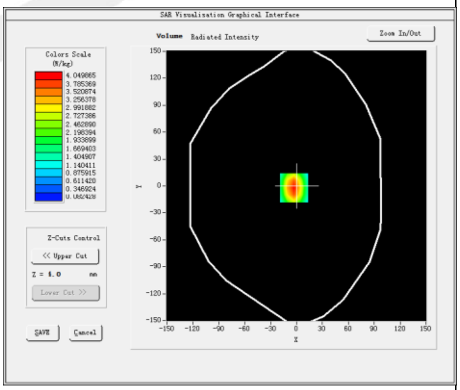


System Performance Check Data (1900MHz Body)

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2019-08-27

Experimental conditions.

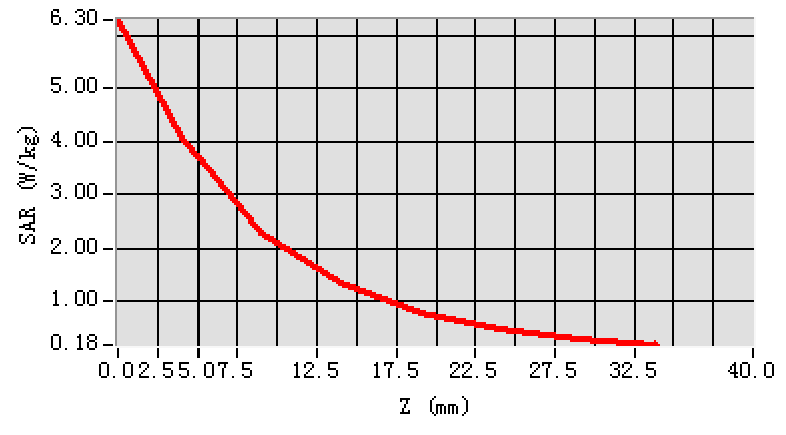
Device Position	-
Band	1900MHz
Channels	-
Signal	CW
Frequency (MHz)	1900
Relative permittivity	54.42
Conductivity (S/m)	1.55
Power drift (%)	-2.17
Probe	SN 14/16 EP309
ConvF:	5.67
Crest factor:	1:1

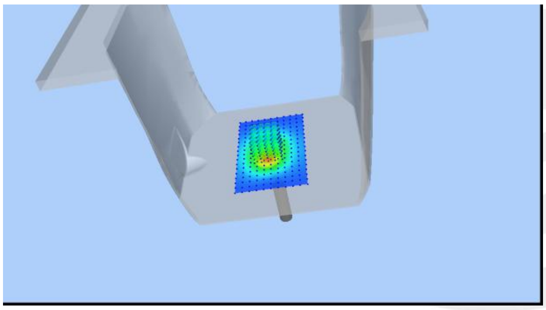
SURFACE SAR	VOLUME SAR
	

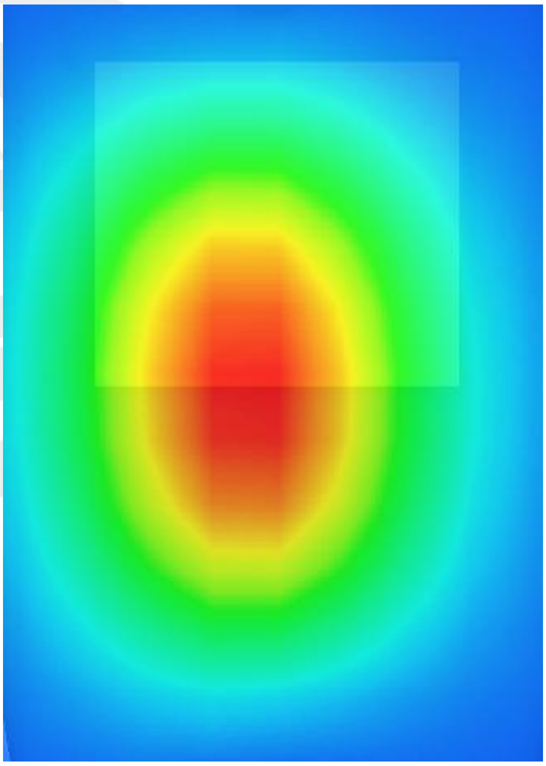
Maximum location: X=-3.00, Y=-2.00

SAR 10g (W/Kg)	2.017385
SAR 1g (W/Kg)	4.016899

Z Axis Scan


6.30
5.00
4.00
3.00
2.00
1.00
0.18
SAR (W/kg)
0.0 2.5 5.0 7.5 12.5 17.5 22.5 27.5 32.5 40.0
Z (mm)





Appendix B. SAR Test Plots

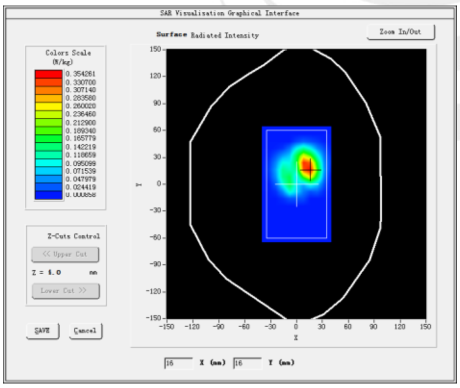
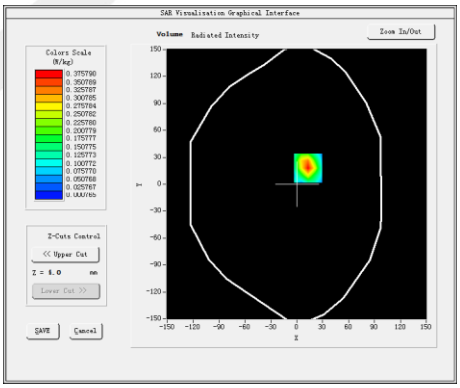
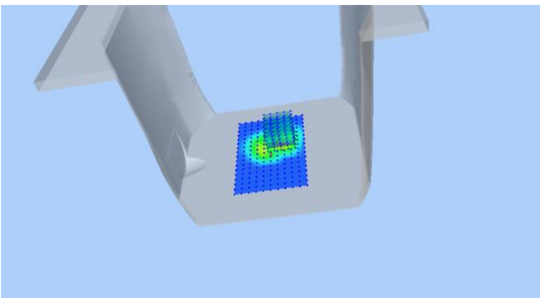
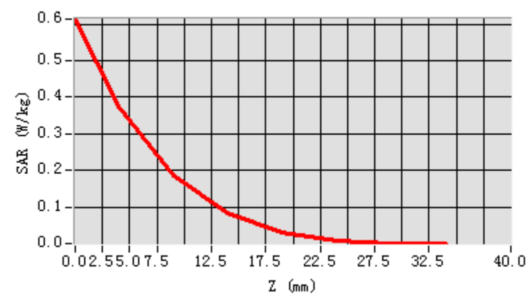
Plot 1: DUT: LoRa/3G tracker; EUT Model: VIS-HL01

Test Date	2019-08-26
Probe	SN 14/16 EP309
ConvF	5.90
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	Body Front side
Band	GPRS 850
Channels	High
Signal	Duty Cycle: 2.00 (Crest factor: 2.0)
Frequency (MHz)	848.8
Relative permittivity (real part)	55.20
Conductivity (S/m)	0.97
Variation (%)	2.58

Maximum location: X=13.00, Y=18.00

SAR Peak: 0.73 W/kg

SAR 10g (W/Kg)	0.152588
SAR 1g (W/Kg)	0.357153

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

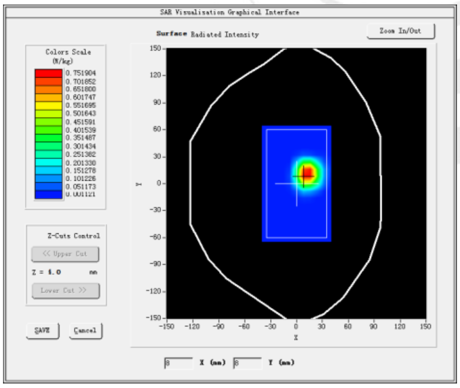
Plot 2: DUT: LoRa/3G tracker; EUT Model: VIS-HL01

Test Date	2019-08-27
Probe	SN 14/16 EP309
ConvF	5.67
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	Body Front side
Band	GPRS 1900
Channels	Middle
Signal	Duty Cycle: 2.00 (Crest factor: 2.0)
Frequency (MHz)	1880.0
Relative permittivity (real part)	53.30
Conductivity (S/m)	1.52
Variation (%)	3.25

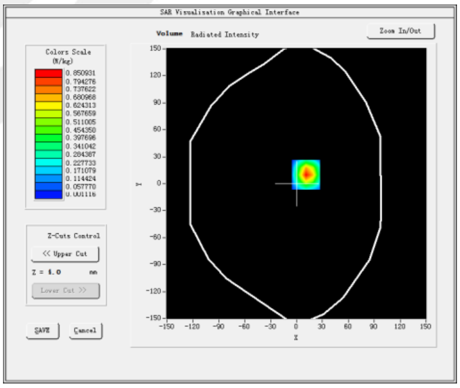
Maximum location: X=11.00, Y=10.00
SAR Peak:1.39 W/kg

SAR 10g (W/Kg)	0.329972
SAR 1g (W/Kg)	0.773951

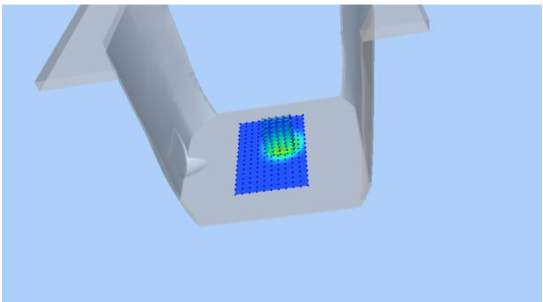
SURFACE SAR



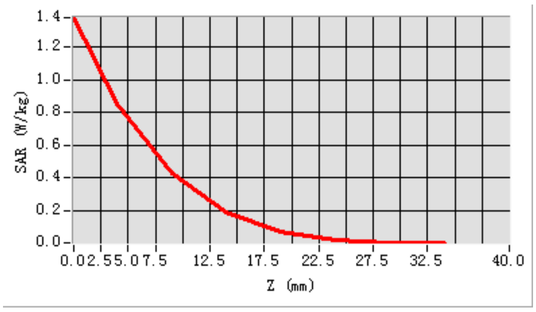
VOLUME SAR



3D screen shot



Z Axis Scan

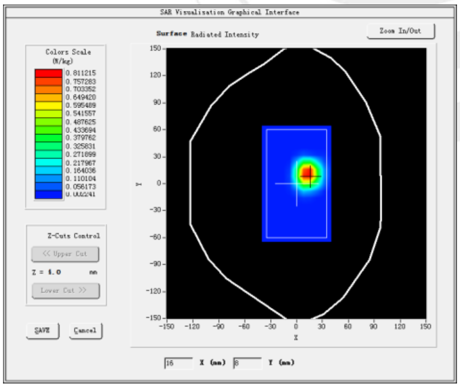
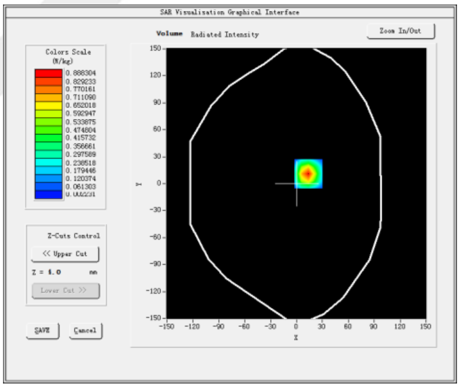
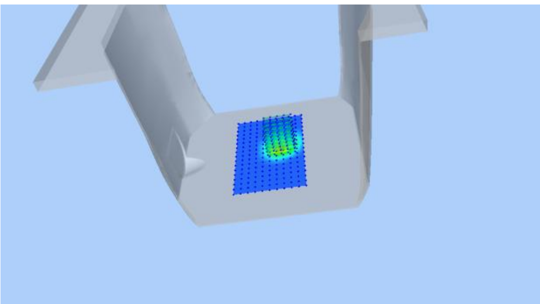
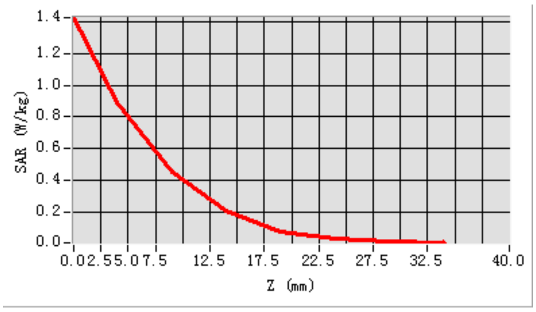


Plot 3: DUT: LoRa/3G tracker; EUT Model: VIS-HL01

Test Date	2019-08-27
Probe	SN 14/16 EP309
ConvF	5.67
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	Body Front side
Band	WCDMA II
Channels	Middle
Signal	WCDMA (Crest factor: 1.0)
Frequency (MHz)	1880.0
Relative permittivity (real part)	53.30
Conductivity (S/m)	1.52
Variation (%)	-2.74

Maximum location: X=14.00, Y=11.00
SAR Peak: 1.44 W/kg

SAR 10g (W/Kg)	0.351839
SAR 1g (W/Kg)	0.818683

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

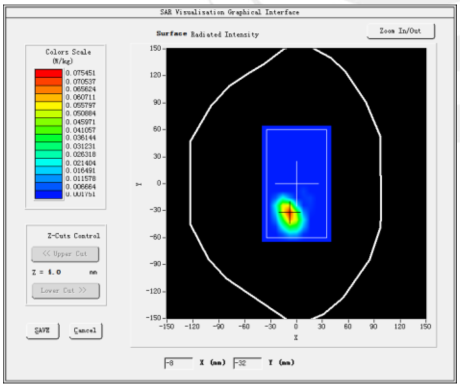
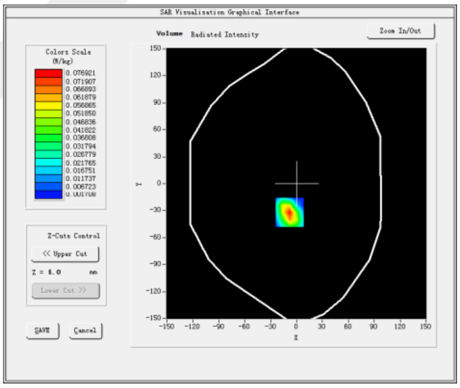
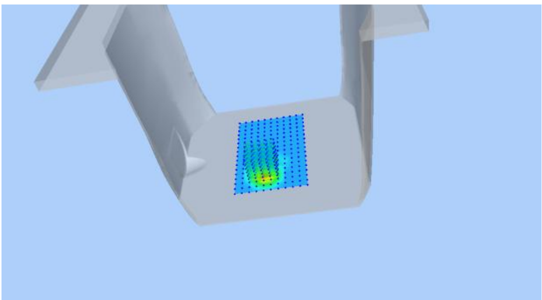
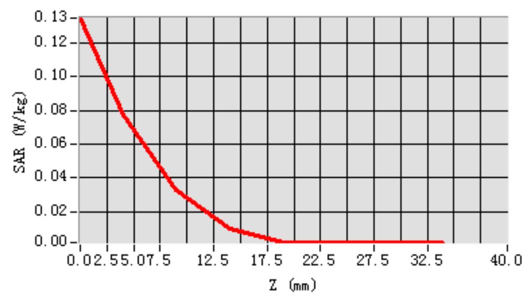
Plot 4: DUT: LoRa/3G tracker; EUT Model: VIS-HL01

Test Date	2019-08-26
Probe	SN 14/16 EP309
ConvF	5.90
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	Body Front side
Band	WCDMA V
Channels	High
Signal	WCDMA (Crest factor: 1.0)
Frequency (MHz)	846.6
Relative permittivity (real part)	55.20
Conductivity (S/m)	0.97
Variation (%)	2.70

Maximum location: X=-8.00, Y=-32.00

SAR Peak: 0.14 W/kg

SAR 10g (W/Kg)	0.028078
SAR 1g (W/Kg)	0.070014

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

Appendix C. Probe Calibration And Dipole Calibration Report

Refer the appendix Calibration Report.

※※※※※END OF THE REPORT※※※※※

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