FCC SAR EVALUATION REPORT

In accordance with the requirements of
FCC 47 CFR Part 2(2.1093), ANSI/IEEE C95.1-1992 and
IEEE Std 1528-2013

Product Name :	Pet Tracker
Brand Name :	N/A
Model Name :	EV-206M
Family Model :	N/A
Report No. :	S21052701601001
FCC ID :	2AUMJEV206MA21

Prepared for

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TEST RESULT CERTIFICATION

Applicant's name	Shenzhen Eview GPS Technology
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Manufacturer's Name	Shenzhen Eview GPS Technology
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Product description

Product name	Pet Tracker
Brand Name	N/A
Model and/or type reference	EV-206M
Family Model	N/A
Standards	FCC 47 CFR Part 2(2.1093) ANSI/IEEE C95.1-1992 IEEE Std 1528-2013 Published RF exposure KDB procedures

This device described above has been tested by Shenzhen NTEK. In accordance with the measurement methods and procedures specified in IEEE Std 1528-2013 and KDB 865664 D01. Testing has shown that this device is capable of compliance with localized specific absorption rate (SAR) specified in FCC 47 CFR Part 2(2.1093) and ANSI/IEEE C95.1-1992. 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.

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Date of Test

Date (s) of performance of tests	May 19, 2021 ~ May 20, 2021
Date of Issue	May 28, 2021
Test Result	**Pass**

Prepared By (Test Engineer) : Cheng Jiawen

(Cheng Jiawen)

Approved By (Lab Manager) : Alex

(Alex Li)

※ ※ Revision History ※ ※

REV.	DESCRIPTION	ISSUED DATE	REMARK
Rev.1.0	Initial Test Report Release	May 28, 2021	Cheng Jiawen

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1. General Information

1.1. RF exposure limits

(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.

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).

General Population/Uncontrolled Environments:

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

NOTE

TRUNK LIMIT

1.6 W/kg

APPLIED TO THIS EUT

1.2. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for EV-206M are as follows.

RF Exposure Conditions		Equipment Class -Highest Reported SAR (W/kg)			
		PCB	DTS	NII	DSS
1-g Body (Separation distance of 0mm)		0.067	N/A	N/A	N/A
Max Simultaneous Tx	Body	0.254	0.254	N/A	N/A

Note: The Max Simultaneous Tx is calculated based on the same configuration and test position.

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR Part 2(2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE Std 1528-2013 & KDB 865664 D01.

1.3. EUT Description

Device Information			
Product Name	Pet Tracker		
Brand Name	N/A		
Model Name	EV-206M		
Family Model	N/A		
FCC ID	2AUMJEV206MA21		
Device Phase	Identical Prototype		
Exposure Category	General population / Uncontrolled environment		
Antenna Type	PIFA Antenna		
Battery Information	DC 3.7V, 240mAh		
Device Operating Configurations			
Supporting Mode(s)	e-MTC Band 2/4/12/13, NB-Iot Band 2/4/12/13, WLAN 2.4G, BT		
Test Modulation	e-MTC(QPSK/16QAM), NB-Iot(BPSK/QPSK), WLAN(DSSS/OFDM), BT(GFSK)		
Device Class	Cat NB1; Cat M1		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	e-MTC Band 2	1850-1910	1930-1990
	e-MTC Band 4	1710-1755	2110-2155
	e-MTC Band 12	699-716	729-746
	e-MTC Band 13	777-787	746-756
	NB-Iot Band 2	1850-1910	1930-1990
	NB-Iot Band 4	1710-1755	2110-2155
	NB-Iot Band 12	699-716	729-746

	NB-lot Band 13	777-787	746-756
	WLAN 2.4G	2412-2462	
	BT	2402-2480	
Power Class	3, tested with power control all Max.(e-MTC Band 2)		
	3, tested with power control all Max.(e-MTC Band 4)		
	3, tested with power control all Max.(e-MTC Band 12)		
	3, tested with power control all Max.(e-MTC Band 13)		
	3, tested with power control all Max.(NB-lot Band 2)		
	3, tested with power control all Max.(NB-lot Band 4)		
	3, tested with power control all Max.(NB-lot Band 12)		
	3, tested with power control all Max.(NB-lot Band 13)		

1.4. Test specification(s)

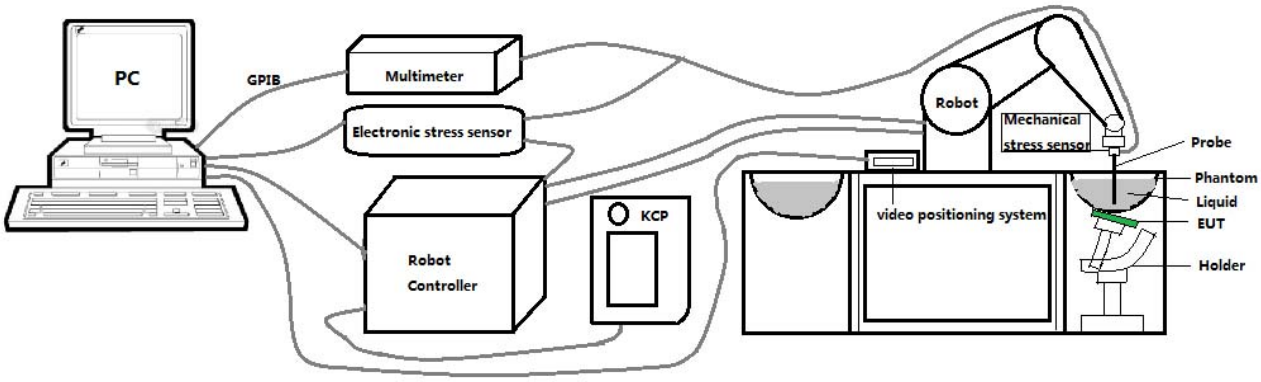
FCC 47 CFR Part 2(2.1093)
ANSI/IEEE C95.1-1992
IEEE Std 1528-2013
KDB 865664 D01 SAR measurement 100 MHz to 6 GHz
KDB 865664 D02 RF Exposure Reporting
KDB 447498 D01 General RF Exposure Guidance
KDB 248227 D01 802.11 Wi-Fi SAR

1.5. Ambient Condition

Ambient temperature	20°C – 24°C
Relative Humidity	30% – 70%

2. SAR Measurement System

2.1. SATIMO SAR Measurement Set-up Diagram



These measurements were performed with the automated near-field scanning system OPENSAR from SATIMO. The system is based on a high precision robot (working range: 901 mm), which positions the probes with a positional repeatability of better than ±0.03 mm. The SAR measurements were conducted with dosimetric probe (manufactured by SATIMO), designed in the classical triangular configuration and optimized for dosimetric evaluation.

The first step of the field measurement is the evaluation of the voltages induced on the probe by the device under test. Probe diode detectors are nonlinear. Below the diode compression point, the output voltage is proportional to the square of the applied E-field; above the diode compression point, it is linear to the applied E-field. The compression point depends on the diode, and a calibration procedure is necessary for each sensor of the probe.

The Keithley multimeter reads the voltage of each sensor and send these three values to the PC. The corresponding E field value is calculated using the probe calibration factors, which are stored in the working directory. This evaluation includes linearization of the diode characteristics. The field calculation is done separately for each sensor. Each component of the E field is displayed on the "Dipole Area Scan Interface" and the total E field is displayed on the "3D Interface"

2.2. Robot

The SATIMO SAR system uses the high precision robots from KUKA. For the 6-axis controller system, the robot controller version (KUKA) from KUKA is used. The KUKA robot series have many features that are important for our application:

- High precision (repeatability ±0.03 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

2.3. E-Field Probe

This E-field detection probe is composed of three orthogonal dipoles linked to special Schottky diodes with low detection thresholds. The probe allows the measurement of electric fields in liquids such as the one defined in the IEEE and CENELEC standards.

For the measurements the Specific Dosimetric E-Field Probe SN 08/16 EPGO287 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter : 2.5 mm
- Distance between probe tip and sensor center: 1 mm
- Distance between sensor center and the inner phantom surface: 2 mm (repeatability better than ±1 mm).
- Probe linearity: ±0.08 dB
- Axial isotropy: ±0.01 dB
- Hemispherical Isotropy: ±0.01 dB
- Calibration range: 650MHz to 5900MHz for head & body simulating liquid.
- Lower detection limit: 8mW/kg

Angle between probe axis (evaluation axis) and surface normal line: less than 30°.

2.3.1. E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than ±10%. The spherical isotropy shall be evaluated and within ±0.25dB. The sensitivity parameters (Norm X, Norm Y, and Norm Z), the diode compression parameter (DCP) and the conversion factor (Conv F) of the probe are tested. The calibration data can be referred to appendix D of this report.

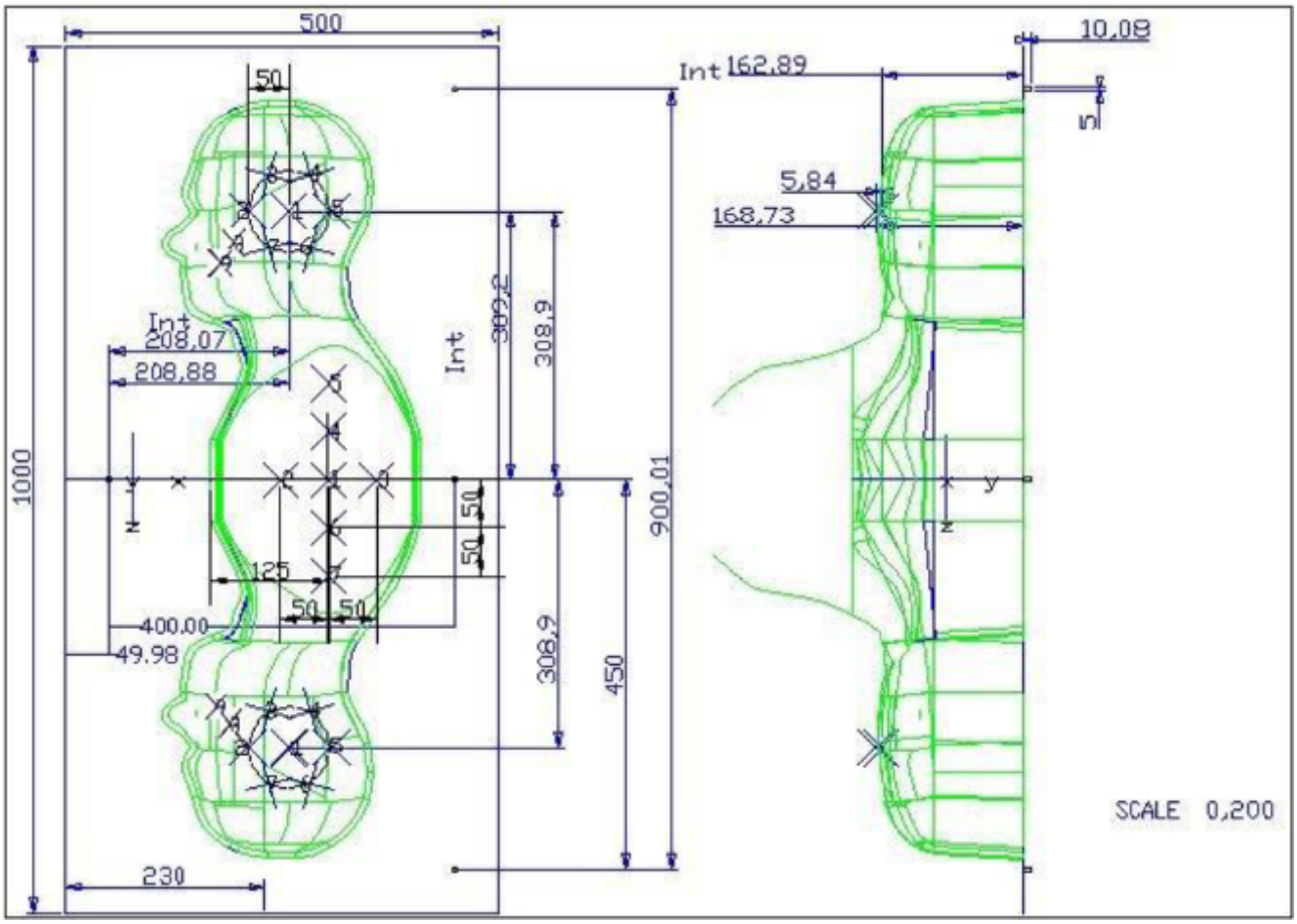
2.4. SAM phantoms

Photo of SAM phantom SN 16/15 SAM119

The SAM phantom is used to measure the SAR relative to people exposed to electro-magnetic field radiated by mobile phones.

2.4.1. Technical Data

Serial Number	Shell thickness	Filling volume	Dimensions	Positionner Material	Permittivity	Loss Tangent
SN 16/15 SAM119	2 mm ±0.2 mm	27 liters	Length:1000 mm Width:500 mm Height:200 mm	Gelcoat with fiberglass	3.4	0.02

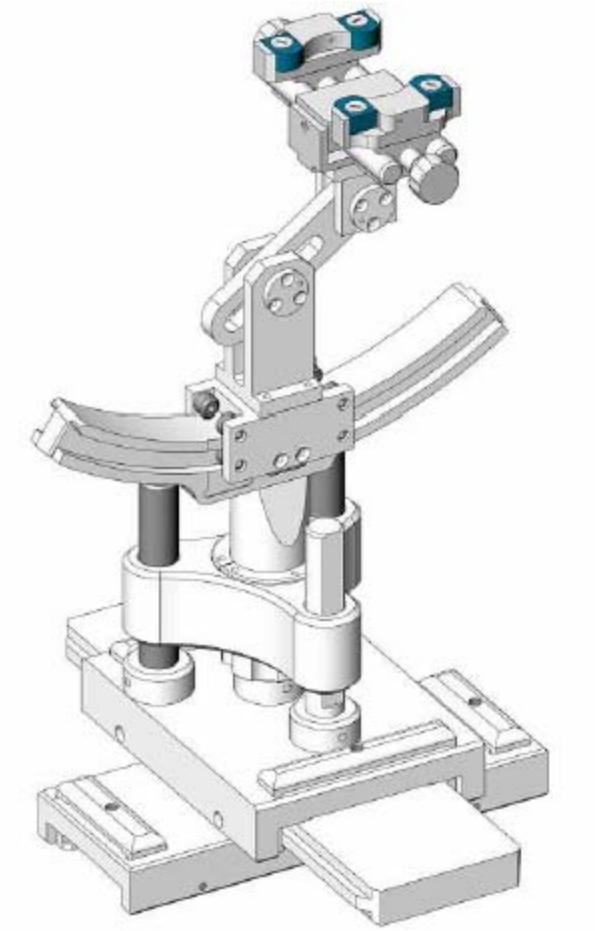


Serial Number	Left Head(mm)		Right Head(mm)		Flat Part(mm)	
SN 16/15 SAM119	2	2.02	2	2.08	1	2.09
	3	2.05	3	2.06	2	2.06
	4	2.07	4	2.07	3	2.08
	5	2.08	5	2.08	4	2.10
	6	2.05	6	2.07	5	2.10
	7	2.05	7	2.05	6	2.07
	8	2.07	8	2.06	7	2.07
	9	2.08	9	2.06	-	-

The test, based on ultrasonic system, allows measuring the thickness with an accuracy of 10 µm.

2.5. Device Holder

The positioning system allows obtaining cheek and tilting position with a very good accuracy. In compliance with CENELEC, the tilt angle uncertainty is lower than 1 degree.



Serial Number	Holder Material	Permittivity	Loss Tangent
SN 16/15 MSH100	Delrin	3.7	0.005

2.6. Test Equipment List

This table gives a complete overview of the SAR measurement equipment.
Devices used during the test described are marked ☒

	Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
					Last Cal.	Due Date
☒	MVG	E FIELD PROBE	SSE2	SN 08/16 EPGO287	Mar. 01, 2021	Feb. 28, 2022
☒	MVG	750 MHz Dipole	SID750	SN 03/15 DIP 0G750-355	Mar. 01, 2021	Feb. 28, 2024
☐	MVG	835 MHz Dipole	SID835	SN 03/15 DIP 0G835-347	Mar. 01, 2021	Feb. 28, 2024
☐	MVG	900 MHz Dipole	SID900	SN 03/15 DIP 0G900-348	Mar. 01, 2021	Feb. 28, 2024
☒	MVG	1800 MHz Dipole	SID1800	SN 03/15 DIP 1G800-349	Mar. 01, 2021	Feb. 28, 2024
☒	MVG	1900 MHz Dipole	SID1900	SN 03/15 DIP 1G900-350	Mar. 01, 2021	Feb. 28, 2024
☐	MVG	2000 MHz Dipole	SID2000	SN 03/15 DIP 2G000-351	Mar. 01, 2021	Feb. 28, 2024
☐	MVG	2450 MHz Dipole	SID2450	SN 03/15 DIP 2G450-352	Mar. 01, 2021	Feb. 28, 2024
☐	MVG	2600 MHz Dipole	SID2600	SN 03/15 DIP 2G600-356	Mar. 01, 2021	Feb. 28, 2024
☐	MVG	5000 MHz Dipole	SWG5500	SN 13/14 WGA 33	Mar. 01, 2021	Feb. 28, 2024
☒	MVG	Liquid measurement Kit	SCLMP	SN 21/15 OCPG 72	NCR	NCR
☒	MVG	Power Amplifier	N.A	AMPLISAR_28/14_003	NCR	NCR
☒	KEITHLEY	Millivoltmeter	2000	4072790	NCR	NCR
☐	R&S	Universal radio communication tester	CMU200	117858	Jul. 13, 2020	Jul. 12, 2021
☐	R&S	Wideband radio communication tester	CMW500	103917	Jul. 13, 2020	Jul. 12, 2021
☒	Anritsu	Radio Communication Analyzer	MT8821C	SN 6262186364	Oct. 13, 2020	Oct. 12, 2021

☐	Anritsu	Radio Communication Test Station	MT8000A	SN 6262192315	Oct. 13, 2020	Oct. 12, 2021
☒	HP	Network Analyzer	8753D	3410J01136	Jul. 13, 2020	Jul. 12, 2021
☒	Agilent	PSG Analog Signal Generator	E8257D	MY51110112	Jul. 13, 2020	Jul. 12, 2021
☒	Agilent	Power meter	E4419B	MY45102538	Jul. 13, 2020	Jul. 12, 2021
☒	Agilent	Power sensor	E9301A	MY41495644	Jul. 13, 2020	Jul. 12, 2021
☒	Agilent	Power sensor	E9301A	US39212148	Jul. 13, 2020	Jul. 12, 2021
☒	MCLI/USA	Directional Coupler	CB11-20	0D2L51502	Jul. 17, 2020	Jul. 16, 2023

3. SAR Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.

(b) Read the WWAN RF power level from the base station simulator.

(c) For Wi-Fi/BT power measurement, use engineering software to configure EUT Wi-Fi/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band.

(d) Connect EUT RF port through RF cable to the power meter, and measure Wi-Fi/BT output power.

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT Wi-Fi/BT continuously transmission, at maximum RF power, in the highest power channel.

(b) Place the EUT in the positions as Appendix A demonstrates.

(c) Set scan area, grid size and other setting on the OPENSAR software.

(d) Measure SAR results for the highest power channel on each testing position.

(e) Find out the largest SAR result on these testing positions of each band.

(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg.

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement

(b) Area scan

(c) Zoom scan

(d) Power drift measurement

3.1. Power Reference

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

3.2. Area scan & Zoom scan

The area scan is a 2D scan to find the hot spot location on the DUT. The zoom scan is a 3D scan

above the hot spot to calculate the 1g and 10g SAR value.

Measurement of the SAR distribution with a grid of 8 to 16 mm * 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.

From the scanned SAR distribution, identify the position of the maximum SAR value, in addition identify the positions of any local maxima with SAR values within 2 dB of the maximum value that will not be within the zoom scan of other peaks; additional peaks shall be measured only when the primary peak is within 2 dB of the SAR compliance limit (e.g., 1 W/kg for 1,6 W/kg 1 g limit, or 1,26 W/kg for 2 W/kg, 10 g limit).

Area scan & Zoom scan scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

3.3. Description of interpolation/extrapolation scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimise measurements errors, but the highest local SAR will occur at the surface of the phantom.
An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1 mm step.
The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1 gram requires a very fine resolution in the three dimensional scanned data array.

3.4. Volumetric Scan

The volumetric scan consists to a full 3D scan over a specific area. This 3D scan is useful form multi Tx SAR measurement. Indeed, it is possible with OpenSAR to add, point by point, several volumetric scan to calculate the SAR value of the combined measurement as it is define in the standard IEEE1528 and IEC62209.

3.5. Power Drift

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In OpenSAR measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in V/m. If the power drifts more than ±5%, the SAR will be retested.

4. System Verification Procedure

4.1. Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% of weight)	Head Tissue									
Frequency Band (MHz)	750	835	900	1800	1900	2000	2450	2600	5200	5800
Water	34.40	34.40	34.40	55.36	55.36	57.87	57.87	57.87	65.53	65.53
NaCl	0.79	0.79	0.79	0.35	0.35	0.16	0.16	0.16	0.00	0.00
1,2-Propanediol	64.81	64.81	64.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Triton X-100	0.00	0.00	0.00	30.45	30.45	19.97	19.97	19.97	24.24	24.24
DGBE	0.00	0.00	0.00	13.84	13.84	22.00	22.00	22.00	10.23	10.23

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. For head SAR testing, the liquid depth from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm.

Photo of Liquid depth for Head Position	Photo of Liquid depth for Body Position
	

4.1.1. Tissue Dielectric Parameter Check Results

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine of the dielectric parameter are within the tolerances of the specified target values. The measured conductivity and relative permittivity should be within ±5% of the target values.

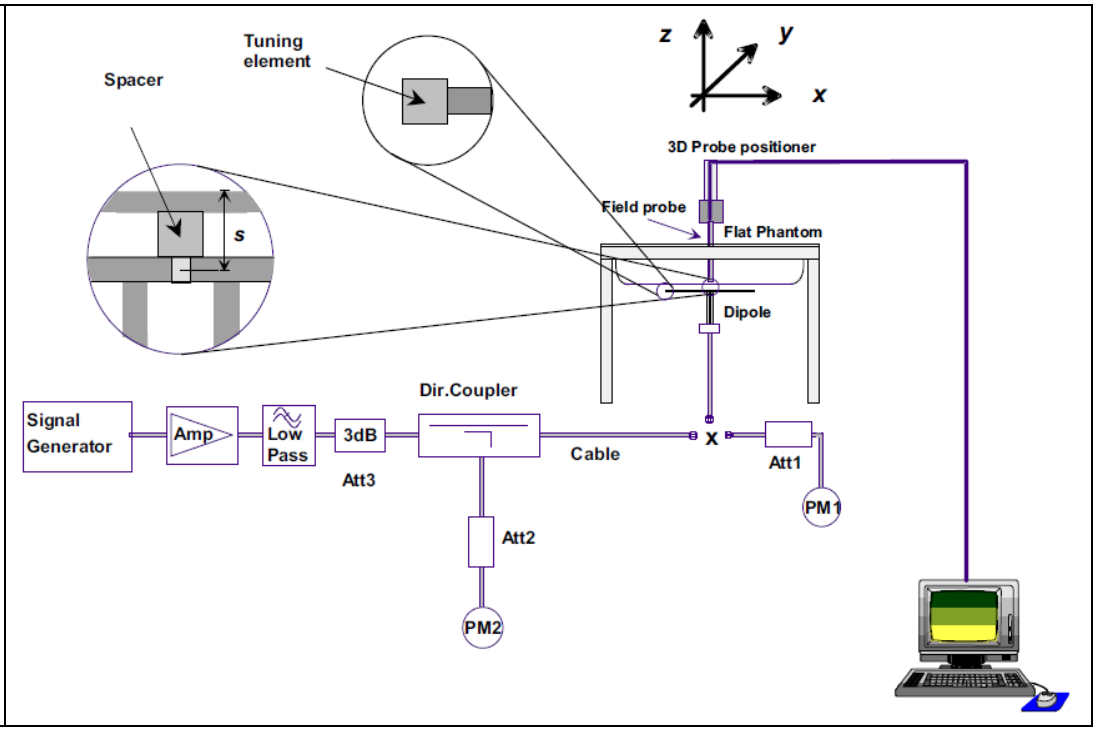
Tissue Type	Measured Frequency (MHz)	Target Tissue		Measured Tissue		Liquid Temp.	Test Date
		εr (±5%)	σ (S/m) (±5%)	εr	σ (S/m)		
Head 750	750	41.96 (39.86~44.06)	0.89 (0.85~0.93）	40.83	0.89	21.3 °C	May 19, 2021
Head 1800	1800	40.00 (38.00~42.00)	1.40 (1.33~1.47)	40.04	1.40	21.3 °C	May 20, 2021
Head 1900	1900	40.00 (38.00~42.00)	1.40 (1.33~1.47)	38.94	1.43	21.4°C	May 20, 2021

NOTE: The dielectric parameters of the tissue-equivalent liquid should be measured under similar ambient conditions and within 2 °C of the conditions expected during the SAR evaluation to satisfy protocol requirements.

4.2. System Verification Procedure

The system verification is performed for verifying the accuracy of the complete measurement system and performance of the software. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. It is fed with a power of 100mW (below 5GHz) or 100mW (above 5GHz). To adjust this power a power meter is used. The power sensor is connected to the cable before the system verification to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the system verification to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test (result on plot).

The system verification is shown as below picture:



4.2.1. System Verification Results

Comparing to the original SAR value provided by SATIMO, the verification data should be within its specification of ±10%. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance verification can meet the variation criterion and the plots can be referred to Appendix B of this report.

System Verification	Target SAR (1W) (±10%)		Measured SAR (Normalized to 1W)		Liquid Temp.	Test Date
	1-g (W/Kg)	10-g (W/Kg)	1-g (W/Kg)	10-g (W/Kg)		
750MHz	8.53 (7.68~9.38)	5.56 (5.01~6.11)	8.70	5.51	21.3 °C	May 19, 2021
1800MHz	37.96 (34.17~41.75)	19.81 (17.83~21.79)	39.10	20.72	21.3 °C	May 20, 2021
1900MHz	40.37 (36.34~44.40)	20.48 (18.44~22.52)	37.68	19.47	21.4°C	May 20, 2021

5. SAR Measurement variability and uncertainty

5.1. SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
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 ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

5.2. SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

6. RF Exposure Positions

6.1. Body-worn device

This device can be wear on the neck of pets. A typical example of a body-worn device is a mobile phone, wireless enabled PDA or other battery operated wireless device with the ability to transmit while mounted on a person's body using a carry accessory approved by the wireless device manufacturer. The device shall be positioned as intended at the distance to the outer surface of the phantom that corresponds to the specified distance (See figure 6.1). Adjust the distance between the device surface and the flat phantom to 0mm.

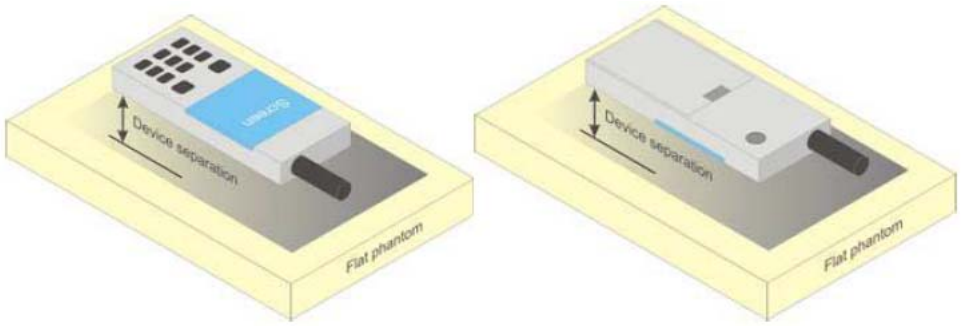


Figure 6.1 – Test positions for Body-worn device

7. RF Output Power

7.1. e-MTC Conducted Power

Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		18607/1850.7	18900/1880	19193/1909.3
e-MTC Band 2	1.4MHz	QPSK	1	0	22.50	21.49	21.80	22.11
			1	5	22.50	21.42	22.19	21.62
			6	0	19.50	19.03	19.13	19.20
		16QAM	1	0	21.00	20.47	20.75	20.73
			1	5	21.00	20.18	20.33	20.49
			6	0	19.50	19.04	19.14	19.21
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		18615/1851.5	18900/1880	19185/1908.5
e-MTC Band 2	3MHz	QPSK	1	0	22.50	21.68	21.68	22.08
			1	5	22.50	21.21	21.48	21.50
			6	0	19.50	19.02	19.12	19.19
		16QAM	1	0	21.00	20.39	20.54	20.82
			1	5	21.00	20.19	20.33	20.48
			6	0	19.50	19.02	19.13	19.19
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		18625/1852.5	18900/1880	19175/1907.5
e-MTC Band 2	5MHz	QPSK	1	0	22.50	21.34	21.77	22.01
			1	5	22.50	21.13	21.48	21.25
			6	0	20.50	20.00	20.29	19.93
		16QAM	1	0	22.50	21.72	21.88	22.32
			1	5	22.50	21.58	21.67	21.40
			6	0	20.50	20.01	20.30	20.31
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		18650/1855	18900/1880	19150/1905
e-MTC Band	10MHz	QPSK	1	0	22.00	21.54	21.82	21.94
			1	5	22.00	21.05	21.33	21.20

2			6	0	20.50	20.09	20.04	20.26
		16QAM	1	0	22.50	21.71	22.29	22.22
			1	5	22.50	21.47	21.54	21.33
			6	0	20.50	20.00	20.04	20.27
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		18675/1857.5	18900/1880	19125/1902.5
e-MTC Band 2	15MHz	QPSK	1	0	22.50	21.36	21.67	22.12
			1	5	22.50	21.17	21.30	21.00
			6	0	21.50	20.95	21.41	21.19
		16QAM	1	0	23.00	21.77	22.21	22.82
			1	5	23.00	21.48	21.53	21.73
			6	0	21.50	20.29	21.41	21.36
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		18700/1860	18900/1880	19100/1900
e-MTC Band 2	20MHz	QPSK	1	0	22.50	21.17	21.75	22.09
			1	5	22.50	20.95	21.38	21.33
			6	0	21.50	21.02	21.45	20.67
		16QAM	1	0	23.00	21.54	22.23	22.91
			1	5	23.00	22.00	21.94	21.73
			6	0	21.50	21.02	21.44	21.34

Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		19957/1710.7	20175/1732.5	20393/1754.3
e-MTC Band 4	1.4MHz	QPSK	1	0	22.00	21.84	21.30	21.45
			1	5	22.00	21.64	21.09	21.32
			6	0	20.00	19.63	19.17	19.16
		16QAM	1	0	21.00	20.69	20.14	20.43
			1	5	21.00	20.48	19.91	20.29
			6	0	20.00	19.63	19.17	19.26
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		19965/1711.5	20175/1732.5	20385/1753.5
e-MTC	3MHz	QPSK	1	0	22.00	21.55	21.48	21.33

Band 4			1	5	22.00	21.44	21.40	21.12
			6	0	20.00	19.53	19.10	19.16
		16QAM	1	0	21.00	20.53	20.22	20.31
			1	5	21.00	20.43	20.03	20.09
			6	0	20.00	19.54	19.10	19.16
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		19975/1712.5	20175/1732.5	20375/1752.5
e-MTC Band 4	5MHz	QPSK	1	0	22.00	21.71	21.41	21.35
			1	5	22.00	21.08	21.12	21.30
			6	0	20.50	20.20	20.00	20.45
		16QAM	1	0	22.50	22.12	21.61	21.61
			1	5	22.50	21.43	21.42	21.54
			6	0	20.50	20.25	20.00	20.36
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20000/1715	20175/1732.5	20350/1750
e-MTC Band 4	10MHz	QPSK	1	0	22.00	21.78	21.39	21.29
			1	5	22.00	21.33	21.10	21.19
			6	0	21.50	21.19	19.95	20.44
		16QAM	1	0	22.00	21.24	21.84	21.82
			1	5	22.00	20.78	21.33	21.66
			6	0	22.00	21.56	20.01	20.26
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20025/1717.5	20175/1732.5	20325/1747.5
e-MTC Band 4	15MHz	QPSK	1	0	22.00	21.72	21.27	21.19
			1	5	22.00	20.96	21.08	21.06
			6	0	21.50	20.90	21.19	21.16
		16QAM	1	0	22.00	21.96	21.78	21.70
			1	5	22.00	21.70	21.33	21.54
			6	0	21.50	21.28	21.19	21.16
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20050/1720	20175/1732.5	20300/1745
e-MTC	20MHz	QPSK	1	0	22.00	21.83	21.47	21.17

Band 4			1	5	22.00	21.64	21.04	21.12
			6	0	22.00	21.71	21.13	21.23
		16QAM	1	0	22.00	21.99	21.85	21.65
			1	5	22.00	21.85	21.28	21.54
			6	0	22.00	21.55	21.12	21.15

Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		23017/699.7	23095/707.5	23173/715.3
e-MTC Band 12	1.4MHz	QPSK	1	0	21.50	21.16	21.38	21.28
			1	5	21.50	20.99	21.19	20.79
			6	0	19.50	19.20	19.38	19.04
		16QAM	1	0	20.50	20.23	20.34	19.89
			1	5	20.50	20.06	20.23	19.85
			6	0	19.50	19.00	19.18	19.05
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		23025/700.5	23095/707.5	23165/714.5
e-MTC Band 12	3MHz	QPSK	1	0	22.00	21.30	21.64	21.24
			1	5	22.00	20.96	21.32	20.85
			6	0	19.50	19.32	19.41	19.11
		16QAM	1	0	21.00	20.29	20.53	20.13
			1	5	21.00	20.03	20.27	19.91
			6	0	19.50	19.24	19.11	19.02
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		23035/701.5	23095/707.5	23155/713.5
e-MTC Band 12	5MHz	QPSK	1	0	22.00	21.78	21.44	21.53
			1	5	22.00	21.11	21.29	21.14
			6	0	21.00	20.26	20.50	19.99
		16QAM	1	0	22.00	21.99	21.69	21.76
			1	5	22.00	21.65	21.78	21.48
			6	0	20.50	20.19	20.34	20.00
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		23060/704	23095/707.5	23130/711

e-MTC Band 12	10MHz	QPSK	1	0	22.00	21.84	21.63	21.72
			1	5	22.00	21.08	21.15	21.11
			6	0	20.50	20.23	20.41	20.38
		16QAM	1	0	22.50	22.00	22.05	21.77
			1	5	22.50	21.41	21.49	21.43
			6	0	20.50	20.24	20.25	20.09

Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		23205/779.5	23230/782	23255/784.5
e-MTC Band 13	5MHz	QPSK	1	0	22.00	21.79	21.51	21.42
			1	5	22.00	21.42	21.40	20.74
			6	0	20.50	20.22	20.47	19.68
		16QAM	1	0	22.50	22.12	21.80	21.59
			1	5	22.50	21.37	21.67	21.22
			6	0	20.50	20.22	20.28	19.87

Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)
			RB Size	RB Offset		23230/782
e-MTC Band 13	10MHz	QPSK	1	0	22.00	21.51
			1	5	22.00	21.05
			6	0	20.50	20.23
		16QAM	1	0	22.00	21.88
			1	5	22.00	21.24
			6	0	20.50	20.12

7.2. NB-Iot Conducted Power

Band	Mode	SCS	Modulation	Tones	Tune-up	Channel/Frequency(MHz)		
						18601/1850.1	18876/1877.6	19199/1909.9
NB-Iot Band 2	Stand-Alone	3.75kHz	BPSK	1@0	23.00	22.78	22.78	23.00
				1@47	23.00	22.71	22.76	22.89
			QPSK	1@0	23.00	22.55	22.65	22.83
				1@47	23.00	22.57	22.60	22.99
		15kHz	BPSK	1@0	23.00	22.92	22.65	22.55
				1@11	23.00	22.55	22.56	22.61
				3@3	22.50	22.04	22.18	22.15
			QPSK	1@0	23.00	22.46	22.13	22.72

				1@11	23.00	22.38	22.20	22.66
				3@3	22.50	22.10	22.21	22.18

Band	Mode	SCS	Modulation	Tones	Tune-up	Channel/Frequency(MHz)		
						19951/1710.1	20175/1732.5	20399/1754.9
NB-lot Band 4	Stand-Alone	3.75kHz	BPSK	1@0	22.50	22.30	22.07	21.71
				1@47	22.50	22.26	21.84	21.70
			QPSK	1@0	22.50	22.34	21.91	21.76
				1@47	22.50	22.23	21.87	21.63
		15kHz	BPSK	1@0	23.00	22.56	21.66	21.60
				1@11	23.00	22.54	21.81	21.01
				3@3	22.50	22.08	21.79	21.79
			QPSK	1@0	22.50	22.13	21.77	20.51
				1@11	22.50	22.25	21.72	20.57
				3@3	22.50	22.10	21.83	21.79

Band	Mode	SCS	Modulation	Tones	Tune-up	Channel/Frequency(MHz)		
						23011/699.1	23095/707.5	23179/715.9
NB-lot Band 12	Stand-Alone	3.75kHz	BPSK	1@0	22.50	21.90	22.07	21.98
				1@47	22.50	21.90	22.02	21.92
			QPSK	1@0	22.50	21.94	22.10	22.05
				1@47	22.50	21.89	22.03	21.98
		15kHz	BPSK	1@0	22.00	21.66	21.75	21.80
				1@11	22.00	21.64	21.76	21.68
				3@3	22.00	21.72	21.87	21.88
			QPSK	1@0	22.00	21.75	21.88	21.88
				1@11	22.00	21.70	21.81	21.75
				3@3	22.00	21.81	21.81	21.82

Band	Mode	SCS	Modulation	Tones	Tune-up	Channel/Frequency(MHz)		
						23181/777.1	23230/782	23279/786.9
NB-lot Band 13	Stand-Alone	3.75kHz	BPSK	1@0	22.50	22.39	22.19	21.93
				1@47	22.50	22.38	22.14	21.98
			QPSK	1@0	22.50	22.40	22.00	21.88
				1@47	22.50	22.35	22.17	21.98
		15kHz	BPSK	1@0	23.00	22.52	22.03	21.77
				1@11	23.00	22.48	21.90	21.75
				3@3	22.50	22.22	22.05	21.84
			QPSK	1@0	23.00	22.51	21.97	21.83
				1@11	23.00	22.42	21.84	21.75
				3@3	22.50	22.24	22.09	21.93

7.3. WLAN & BT Conducted Power

Mode	Channel	Frequency (MHz)	Tune-up	Average Output Power (dBm)
802.11b	1	2412	6.00	5.55
	6	2437	6.00	5.37
	11	2462	6.00	5.21
802.11g	1	2412	6.50	6.14
	6	2437	6.50	6.06
	11	2462	6.50	6.01
802.11n HT20	1	2412	6.50	6.07
	6	2437	6.50	6.01
	11	2462	6.50	6.00

NOTE: Power measurement results of WLAN 2.4G.

	Channel	Tune-up	Average Output Power (dBm)
BLE	0CH	-4.00	-5.18
	19CH	-4.00	-5.23
	39CH	-4.00	-4.75

NOTE: Power measurement results of BT.

8. Stand-alone SAR test exclusion

Refer to 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)]·[$\sqrt{f_{(GHZ)}}$] ≤ 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.

Mode	P_{max} (dBm)	P_{max} (mW)	Distance (mm)	f (GHz)	Calculation Result	SAR Exclusion threshold	SAR test exclusion
Bluetooth	-4.00	0.40	5	2.480	0.13	3	Yes
WLAN 2.4G	6.50	4.47	5	2.462	1.4	3	Yes

NOTE: Standalone SAR test exclusion for Bluetooth.

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:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] * [$\sqrt{f_{(GHZ)}}$/x] W/kg for test separation distances ≤ 50mm, where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.

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

Mode	Position	P_{max} (dBm)	P_{max} (mW)	Distance (mm)	f (GHz)	x	Estimated SAR (W/Kg)
Bluetooth	Body	-4.00	0.40	5	2.48	7.5	0.017
WLAN 2.4G	Body	6.50	4.47	5	2.48	7.5	0.187

NOTE: Estimated SAR calculation for Bluetooth.

9. SAR Results

9.1. SAR measurement Result

9.1.1. SAR measurement Result of e-MTC Band 2

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date
			1g	10g					
Front Side	18900/1880	20M 16QAM(1,0)	0.010	0.009	2.33	22.23	23.00	0.012	2021/5/20
Back Side	18900/1880	20M 16QAM(1,0)	0.008	0.007	1.43	22.23	23.00	0.010	2021/5/20
The edge surface close to ANT	18900/1880	20M 16QAM(1,0)	0.014	0.011	-1.33	22.23	23.00	0.017	2021/5/20

NOTE: Body SAR test results of e-MTC Band 2

9.1.2. SAR measurement Result of NB-lot Band 2

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date
			1g	10g					
Front Side	18876/1877.6	Stand-Alone 3.75kHz QPSK 1@0	0.021	0.017	2.19	22.65	23.00	0.023	2021/5/20
Back Side	18876/1877.6	Stand-Alone 3.75kHz QPSK 1@0	0.015	0.010	0.77	22.65	23.00	0.016	2021/5/20
The edge surface close to ANT	18876/1877.6	Stand-Alone 3.75kHz QPSK 1@0	0.030	0.018	-4.90	22.65	23.00	0.033	2021/5/20

NOTE: Body SAR test results of NB-lot Band 2

9.1.3. SAR measurement Result of e-MTC Band 4

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date
			1g	10g					
Front Side	20175/1732.5	5M 16QAM(1,0)	0.013	0.011	1.67	21.61	22.50	0.016	2021/5/20
Back Side	20175/1732.5	5M 16QAM(1,0)	0.009	0.008	1.24	21.61	22.50	0.011	2021/5/20
The edge surface	20175/1732.5	5M 16QAM(1,0)	0.018	0.012	-3.16	21.61	22.50	0.022	2021/5/20

close to ANT									

NOTE: Body SAR test results of e-MTC Band 4

9.1.4. SAR measurement Result of NB-Iot Band 4

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date
			1g	10g					
Front Side	20175/1732.5	Stand-Alone 15kHz BPSK 1@11	0.026	0.017	-3.27	21.81	23.00	0.034	2021/5/20
Back Side	20175/1732.5	Stand-Alone 15kHz BPSK 1@11	0.018	0.015	1.34	21.81	23.00	0.024	2021/5/20
The edge surface close to ANT	20175/1732.5	Stand-Alone 15kHz BPSK 1@11	0.051	0.024	2.73	21.81	23.00	0.067	2021/5/20

NOTE: Body SAR test results of NB-Iot Band 4

9.1.5. SAR measurement Result of e-MTC Band 12

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date
			1g	10g					
Front Side	23095/707.5	10M 16QAM(1,0)	0.015	0.010	0.09	22.05	22.50	0.017	2021/5/19
Back Side	23095/707.5	10M 16QAM(1,0)	0.010	0.008	1.25	22.05	22.50	0.011	2021/5/19
The edge surface close to ANT	23095/707.5	10M 16QAM(1,0)	0.017	0.011	-0.97	22.05	22.50	0.019	2021/5/19

NOTE: Body SAR test results of e-MTC Band 12

9.1.6. SAR measurement Result of NB-Iot Band 12

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date
			1g	10g					
Front Side	23095/707.5	Stand-Alone 3.75kHz QPSK 1@0	0.020	0.017	1.34	22.10	22.50	0.022	2021/5/19
Back Side	23095/707.5	Stand-Alone 3.75kHz QPSK 1@0	0.015	0.012	0.87	22.10	22.50	0.016	2021/5/19
The edge surface close to ANT	23095/707.5	Stand-Alone 3.75kHz QPSK 1@0	0.028	0.016	2.76	22.10	22.50	0.031	2021/5/19

NOTE: Body SAR test results of NB-Iot Band 12

9.1.7. SAR measurement Result of e-MTC Band 13

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date
			1g	10g					
Front Side	23230/782	5M 16QAM(1,0)	0.019	0.015	0.55	21.80	22.50	0.022	2021/5/19
Back Side	23230/782	5M 16QAM(1,0)	0.016	0.014	-3.09	21.80	22.50	0.019	2021/5/19
The edge surface close to ANT	23230/782	5M 16QAM(1,0)	0.024	0.014	-4.34	21.80	22.50	0.028	2021/5/19

NOTE: Body SAR test results of e-MTC Band 13

9.1.8. SAR measurement Result of NB-Iot Band 13

Test Position of Body with	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date
			1g	10g					

0mm									
Front Side	23230/782	Stand-Alone 15kHz QPSK 1@0	0.043	0.022	1.10	21.97	23.00	0.055	2021/5/19
Back Side	23230/782	Stand-Alone 15kHz QPSK 1@0	0.035	0.017	0.48	21.97	23.00	0.044	2021/5/19
The edge surface close to ANT	23230/782	Stand-Alone 15kHz QPSK 1@0	0.050	0.025	-2.87	21.97	23.00	0.063	2021/5/19

NOTE: Hotspot SAR test results of NB-lot Band 13

9.2. Simultaneous Transmission Analysis

Per KDB 447498 D01, simultaneous transmission SAR is compliant if,

1) Scalar SAR summation < 1.6W/kg.

2) SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (min. separation distance, mm), and the peak separation distance is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan. If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		WWAN	DTS			
Body	Front Side	0.055	0.187	0.242	N/A	N/A
	Back Side	0.044	0.187	0.231	N/A	N/A
	The edge surface close to ANT	0.067	0.187	0.254	N/A	N/A

10. Appendix A. Photo documentation

Refer to appendix Test Setup photo---SAR

11. Appendix B. System Check Plots

Table of contents
MEASUREMENT 1 System Performance Check - 750MHz
MEASUREMENT 2 System Performance Check - 1800MHz
MEASUREMENT 3 System Performance Check - 1900MHz

MEASUREMENT 1

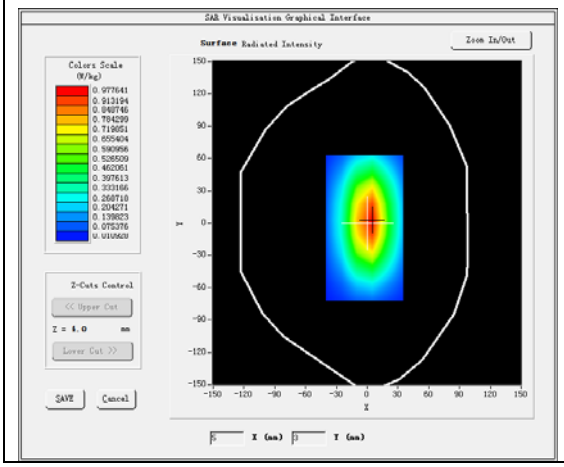
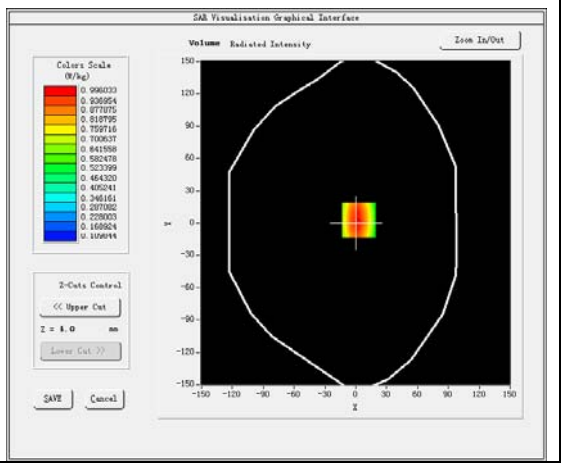
Date of measurement: 19/5/2021

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW750
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

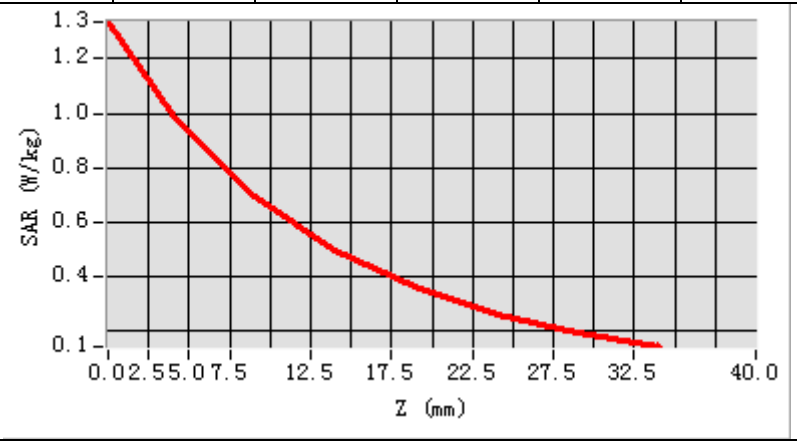
Frequency (MHz)	750.000000
Relative permittivity (real part)	40.832582
Relative permittivity (imaginary part)	21.424935
Conductivity (S/m)	0.892706
Variation (%)	0.230021

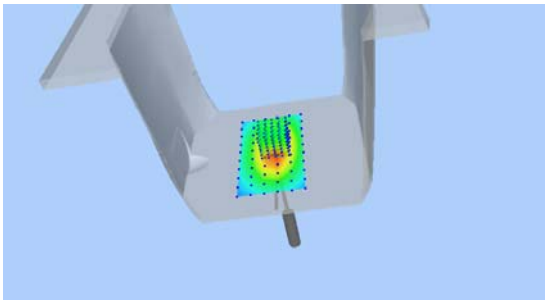
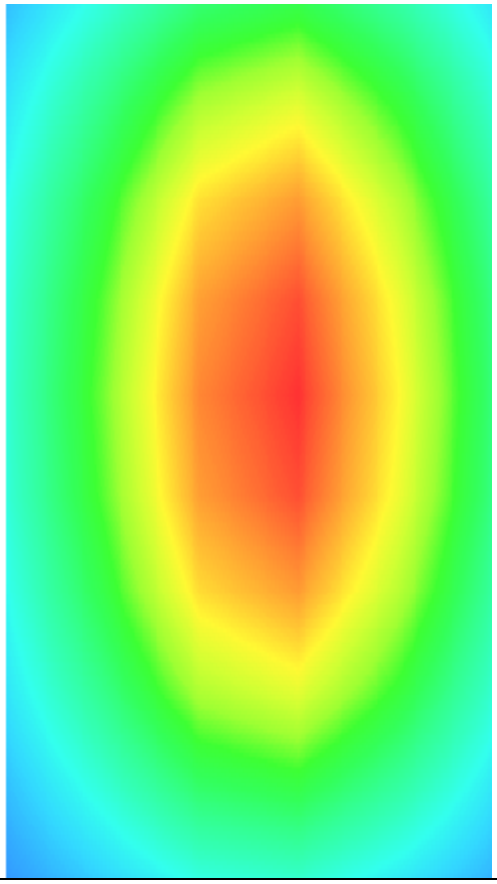
SURFACE SAR	VOLUME SAR
	

Maximum location: X=3.00, Y=3.00
SAR Peak: 1.34 W/kg

SAR 10g (W/Kg)	0.550549
SAR 1g (W/Kg)	0.870409

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.3354	0.9960	0.6971	0.4984	0.3613	0.2638	0.1931



3D screen shot	Hot spot position
	

MEASUREMENT 2

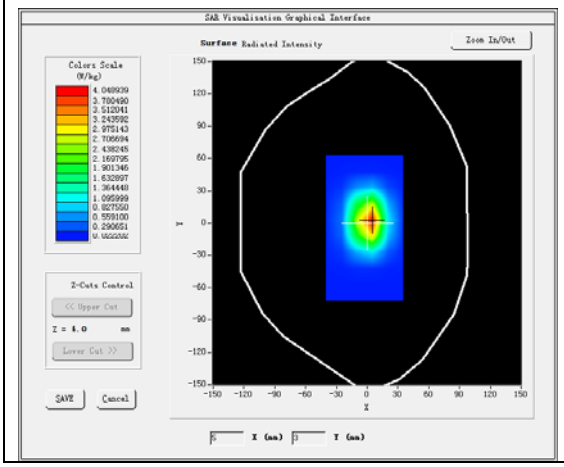
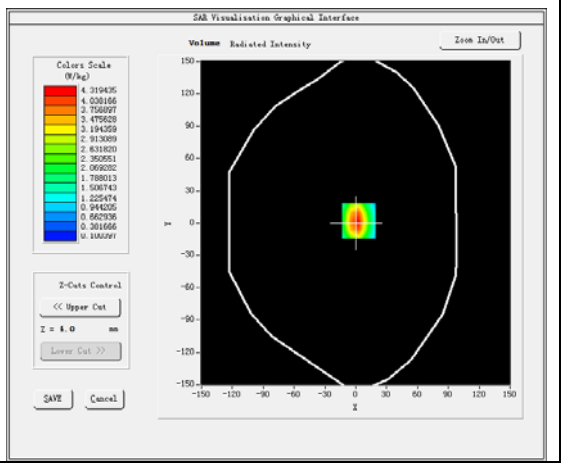
Date of measurement: 20/5/2021

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW1800
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

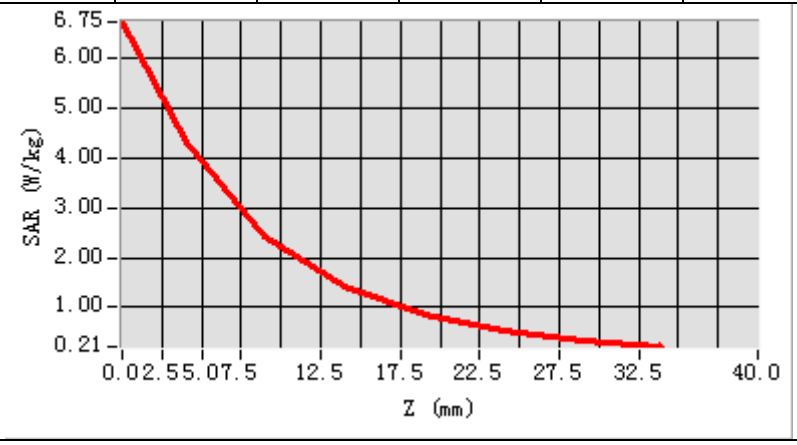
Frequency (MHz)	1800.000000
Relative permittivity (real part)	40.042658
Relative permittivity (imaginary part)	13.967681
Conductivity (S/m)	1.396768
Variation (%)	-0.510000

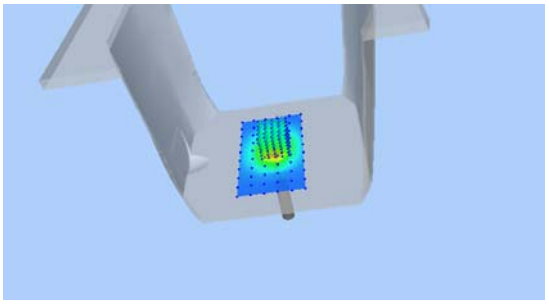
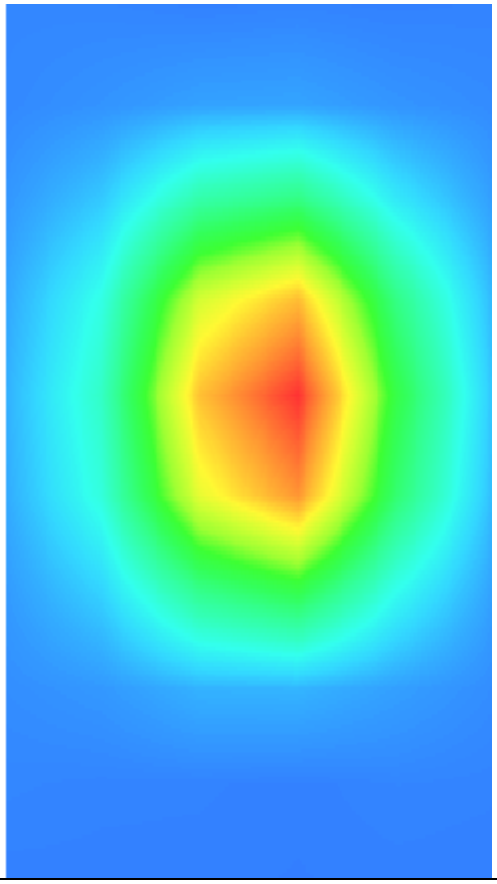
SURFACE SAR	VOLUME SAR
	

Maximum location: X=3.00, Y=2.00
SAR Peak: 6.82 W/kg

SAR 10g (W/Kg)	2.072403
SAR 1g (W/Kg)	3.910112

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.7450	4.3182	2.4341	1.4220	0.8557	0.5211	0.3260



3D screen shot	Hot spot position
	

MEASUREMENT 3

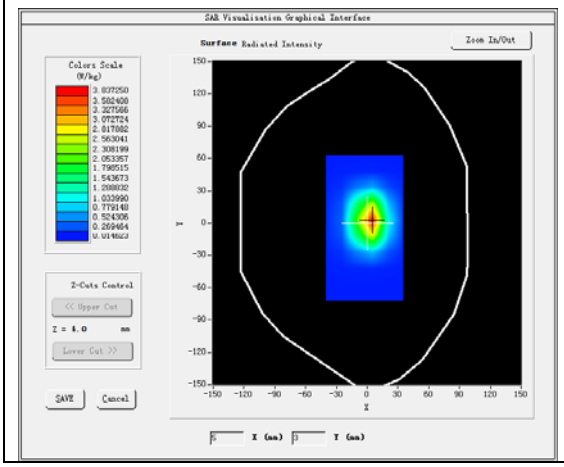
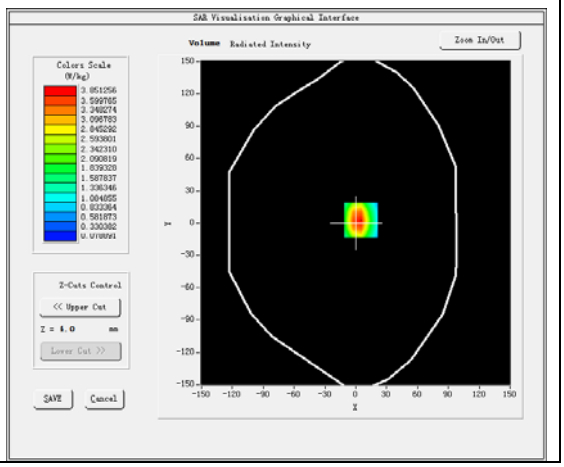
Date of measurement: 20/5/2021

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW1900
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

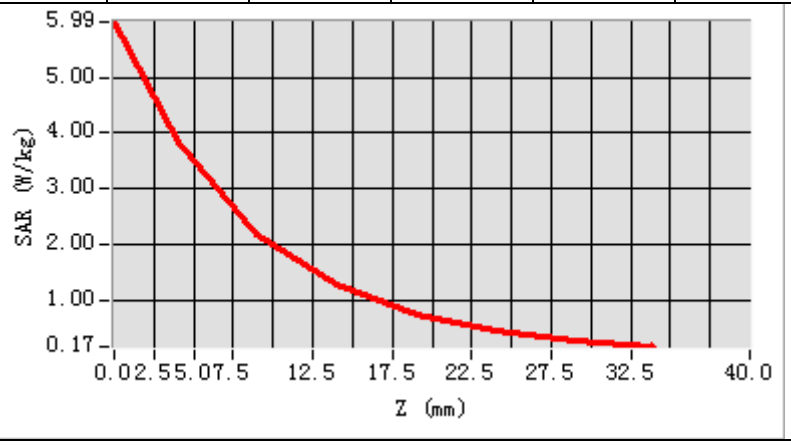
Frequency (MHz)	1900.000000
Relative permittivity (real part)	38.941482
Relative permittivity (imaginary part)	13.592402
Conductivity (S/m)	1.434754
Variation (%)	-0.310000

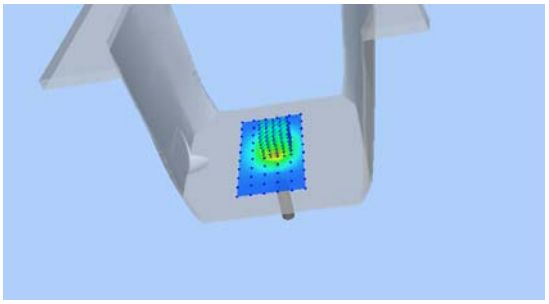
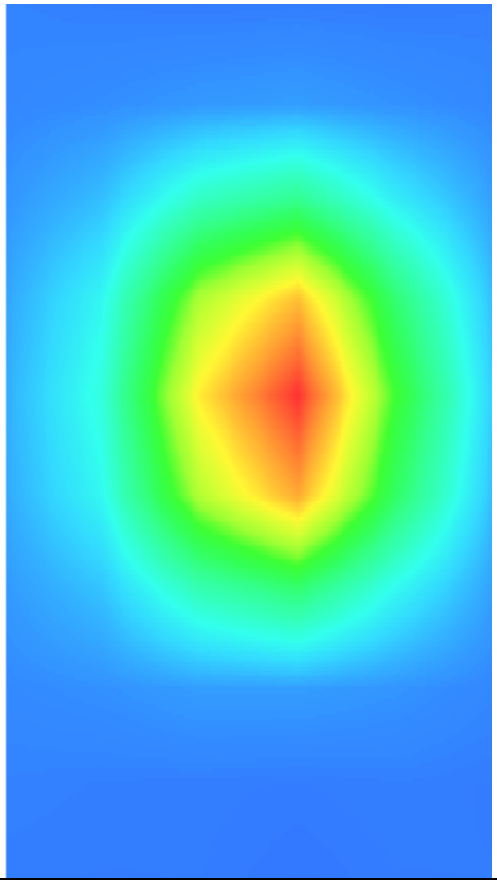
SURFACE SAR	VOLUME SAR
	

Maximum location: X=5.00, Y=3.00
SAR Peak: 6.19 W/kg

SAR 10g (W/Kg)	1.947324
SAR 1g (W/Kg)	3.768405

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	5.9905	3.8513	2.1751	1.2701	0.7518	0.4536	0.2787



3D screen shot	Hot spot position
	

12. Appendix C. Plots of High SAR Measurement

Table of contents
MEASUREMENT 1 e-MTC Band 2
MEASUREMENT 2 NB-lot Band 2
MEASUREMENT 3 e-MTC Band 4
MEASUREMENT 4 NB-lot Band 4
MEASUREMENT 5 e-MTC Band 12
MEASUREMENT 6 NB-lot Band 12
MEASUREMENT 7 e-MTC Band 13
MEASUREMENT 8 NB-lot Band 13

MEASUREMENT 1

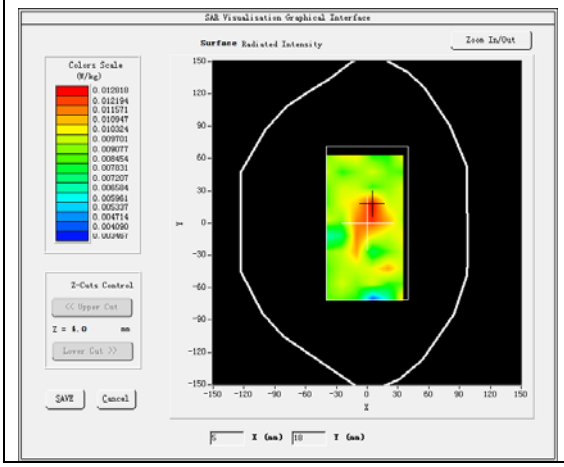
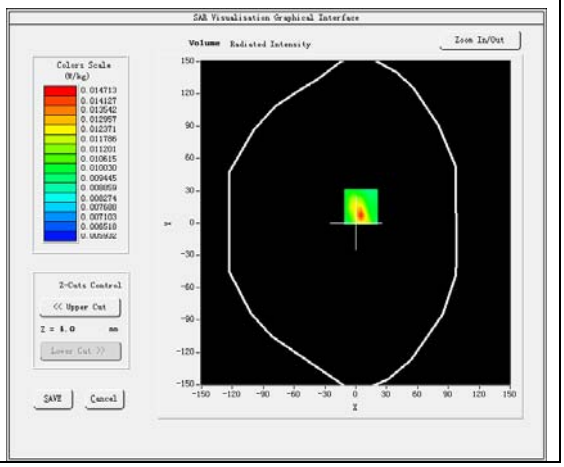
Date of measurement: 20/5/2021

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 2 Cat M1
Channels	Middle
Signal	LTE (Crest factor: 1.0)

B. SAR Measurement Results

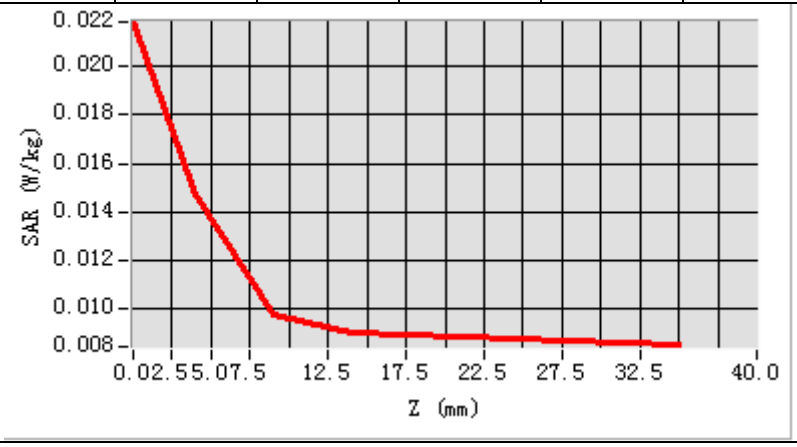
Frequency (MHz)	1880.000000
Relative permittivity (real part)	39.036381
Relative permittivity (imaginary part)	13.613952
Conductivity (S/m)	1.421523
Variation (%)	-1.330000

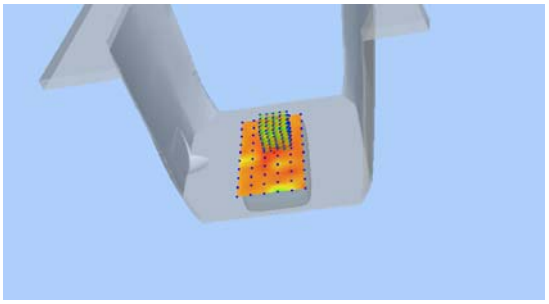
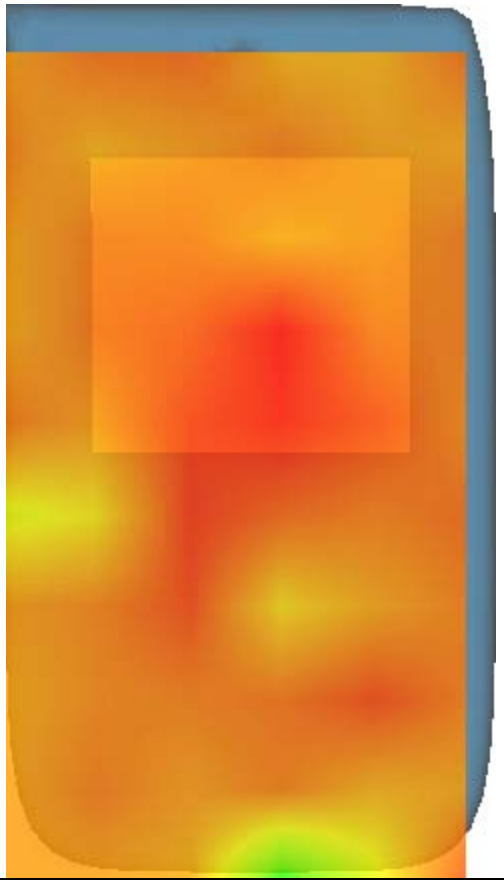
SURFACE SAR	VOLUME SAR
	

Maximum location: X=5.00, Y=15.00
SAR Peak: 0.02 W/kg

SAR 10g (W/Kg)	0.010681
SAR 1g (W/Kg)	0.014229

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0218	0.0147	0.0097	0.0090	0.0087	0.0084	0.0080



3D screen shot	Hot spot position
	

MEASUREMENT 2

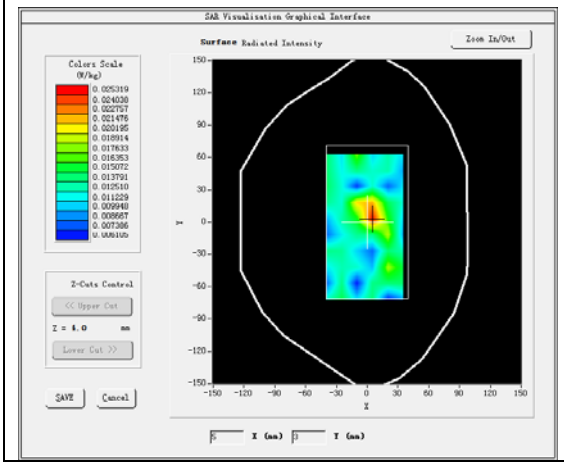
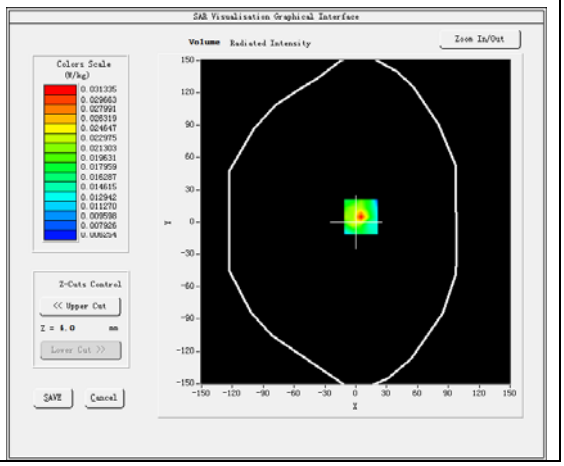
Date of measurement: 20/5/2021

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 2 Cat NB1
Channels	Middle
Signal	LTE (Crest factor: 1.0)

B. SAR Measurement Results

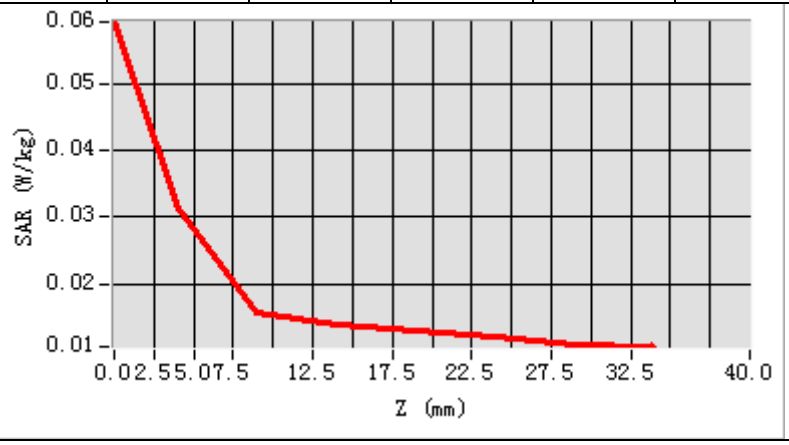
Frequency (MHz)	1877.600000
Relative permittivity (real part)	38.998082
Relative permittivity (imaginary part)	13.635902
Conductivity (S/m)	1.422376
Variation (%)	-4.900000

SURFACE SAR	VOLUME SAR
	

Maximum location: X=5.00, Y=5.00
SAR Peak: 0.06 W/kg

SAR 10g (W/Kg)	0.017885
SAR 1g (W/Kg)	0.029788

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0591	0.0313	0.0159	0.0142	0.0131	0.0123	0.0111



3D screen shot	Hot spot position