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 : Touch Smart QUICKTAB PLUS

Trademark : Touch Smart

Model Name : Touch Smart QUICKTAB PLUS

Family Model : N/A

Report No. : STR191029001001E

FCC ID : 2ABFV-QTP2019

Prepared for

PC Smart S.A.

Carrera 116 no.15-25, Bogota, Colombia

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name .....: PC Smart S.A.

Address.....: Carrera 116 no.15-25, Bogota, Colombia

Manufacturer's Name.....: PC Smart S.A.

Address.....: Carrera 116 no.15-25, Bogota, Colombia

Product description

Product name.....: Touch Smart QUICKTAB PLUS

Trademark .....: Touch Smart

Model Name .....: Touch Smart QUICKTAB PLUS

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 .....: Aug. 20, 2019 ~ Aug. 31, 2019

Date of Issue .....: Oct. 31, 2019

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

Note: All test data of this report are based on the original test report STR190814001001E, dated by 2019-09-05.

Prepared By (Test Engineer) : Cheng Jiawen

(Cheng Jiawen)

Approved By (Lab Manager) : Sam Chen

(Sam Chen)

※ ※ Revision History ※ ※

REV.	DESCRIPTION	ISSUED DATE	REMARK
Rev.1.0	Initial Test Report Release	Sep. 05, 2019	Cheng Jiawen
Rev.1.1	Update the trade mark and model name	Oct. 31, 2019	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

HEAD AND 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 Touch Smart QUICKTAB PLUS are as follows.

Band	Max Reported SAR Value(W/kg)			
	1-g Head	1-g Body-Worn (Separation distance of 10mm)	1-g Hotspot (Separation distance of 10mm)	Max Simultaneous Tx
GSM 850	0.523	0.659	0.659	1.400
GSM 1900	0.345	0.555	0.596	
WCDMA Band 2	0.314	0.521	0.521	
WCDMA Band 5	0.309	0.344	0.344	
LTE Band 4	0.451	0.788	0.788	
LTE Band 7	0.380	0.809	0.809	
WLAN 2.4G	0.719	0.242	0.242	
WLAN 5.2G	0.360	0.481	0.481	
WLAN 5.8G	0.380	0.809	0.809	

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	Touch Smart QUICKTAB PLUS
Trade Name	Touch Smart
Model Name	Touch Smart QUICKTAB PLUS
Family Model	N/A
FCC ID	2ABFV-QTP2019
Device Phase	Identical Prototype
Exposure Category	General population / Uncontrolled environment
Antenna	PIFA Antenna
Battery Information	DC 3.8V, 4050mAh
Device Operating Configurations	
Supporting Mode(s)	GSM 850/1900, WCDMA Band 2/5, LTE Band 4/7, WLAN 2.4G/5.2G/5.8G, Bluetooth
Test Modulation	GSM(GMSK/8PSK), WCDMA(QPSK), LTE(QPSK/16QAM), WLAN(DSSS/OFDM), Bluetooth(GFSK, π/4-DQPSK, 8DPSK)

Device Class	B		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM 850	824-849	869-894
	GSM 1900	1850-1910	1930-1990
	WCDMA Band 2	1850-1910	1930-1990
	WCDMA Band 5	824-849	869-894
	LTE Band 4	1710-1755	2110-2155
	LTE Band 7	2500-2570	2620-2690
	WLAN 2.4G	2412-2462	
	WLAN 5.2G	5180-5240	
	WLAN 5.8G	5745-5825	
	Bluetooth	2402-2480	
GPRS Multislot Class(12)	Max Number of Timeslots in Uplink	4	
	Max Number of Timeslots in Downlink	4	
	Max Total Timeslot	5	
EDGE Multislot Class(12)	Max Number of Timeslots in Uplink	4	
	Max Number of Timeslots in Downlink	4	
	Max Total Timeslot	5	
Power Class	4, tested with power level 5(GSM 850)		
	1, tested with power level 0(GSM 1900)		
	3, tested with power control ~~a~~ll 1"(WCDMA Band 2)		
	3, tested with power control ~~a~~ll 1"(WCDMA Band 5)		
	3, tested with power control all Max.(LTE Band 4)		
	3, tested with power control all Max.(LTE Band 7)		
Test Channels (low-mid-high)	128-189-251(GSM 850)		
	512-661-810(GSM 1900)		
	9262-9400-9538(WCDMA Band 2)		
	4132-4182-4233(WCDMA Band 5)		
	19957-20175-20393(LTE Band 4 BW=1.4MHz)		
	19965-20175-20385(LTE Band 4 BW=3MHz)		
	19975-20175-20375(LTE Band 4 BW=5MHz)		
	20000-20175-20350(LTE Band 4 BW=10MHz)		
	20025-20175-20325(LTE Band 4 BW=15MHz)		
	20050-20175-20300(LTE Band 4 BW=20MHz)		
	20775-21100-21425(LTE Band 7 BW=5MHz)		
	20800-21100-21400(LTE Band 7 BW=10MHz)		
	20825-21100-21375(LTE Band 7 BW=15MHz)		
	20850-21100-21350(LTE Band 7 BW=20MHz)		
	1-3-6-9-11(WLAN 2.4G)		
	36-38-40-46-48(WLAN 5.2G)		

	149-151-157-159-165(WLAN 5.8G)

1.4. Test specification(s)

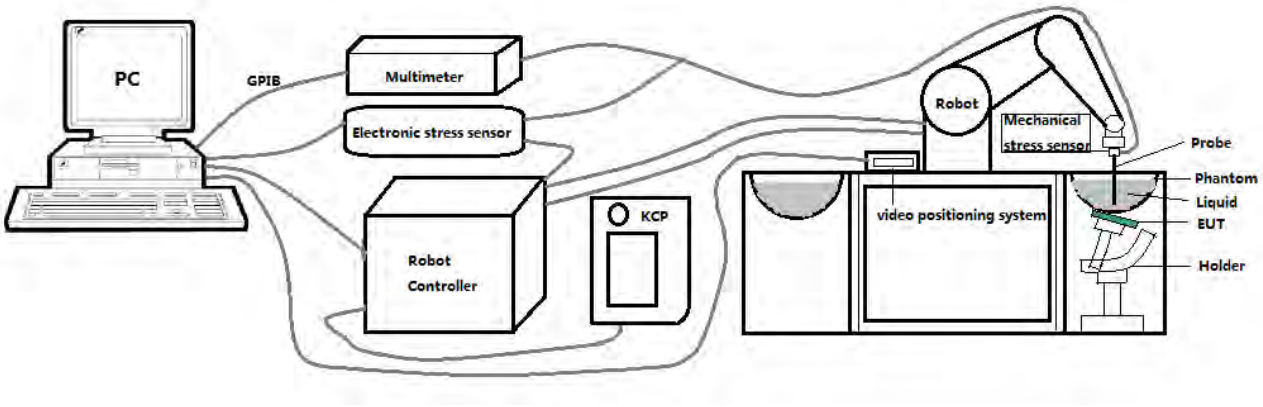
FCC 47 CFR Part 2(2.1093)
ANSI/IEEE C95.1-1992
IEEE Std 1528-2013
KDB 865664 D01 SAR measurement 100 MHz to 6 GHz
KDB 865664 D02 RF Exposure Reporting
KDB 447498 D01 General RF Exposure Guidance
KDB 248227 D01 802.11 Wi-Fi SAR
KDB 941225 D01 3G SAR Procedures
KDB 941225 D05 SAR for LTE Devices
KDB 941225 D06 Hotspot SAR
KDB 648474 D04 Handset SAR

1.5. Ambient Condition

Ambient temperature	20°C – 24℃
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: 0.06 dB
- Hemispherical Isotropy: 0.08 dB
- Calibration range: 650MHz to 5900MHz for head & body simulating liquid.
- Lower detection limit: 7mW/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.

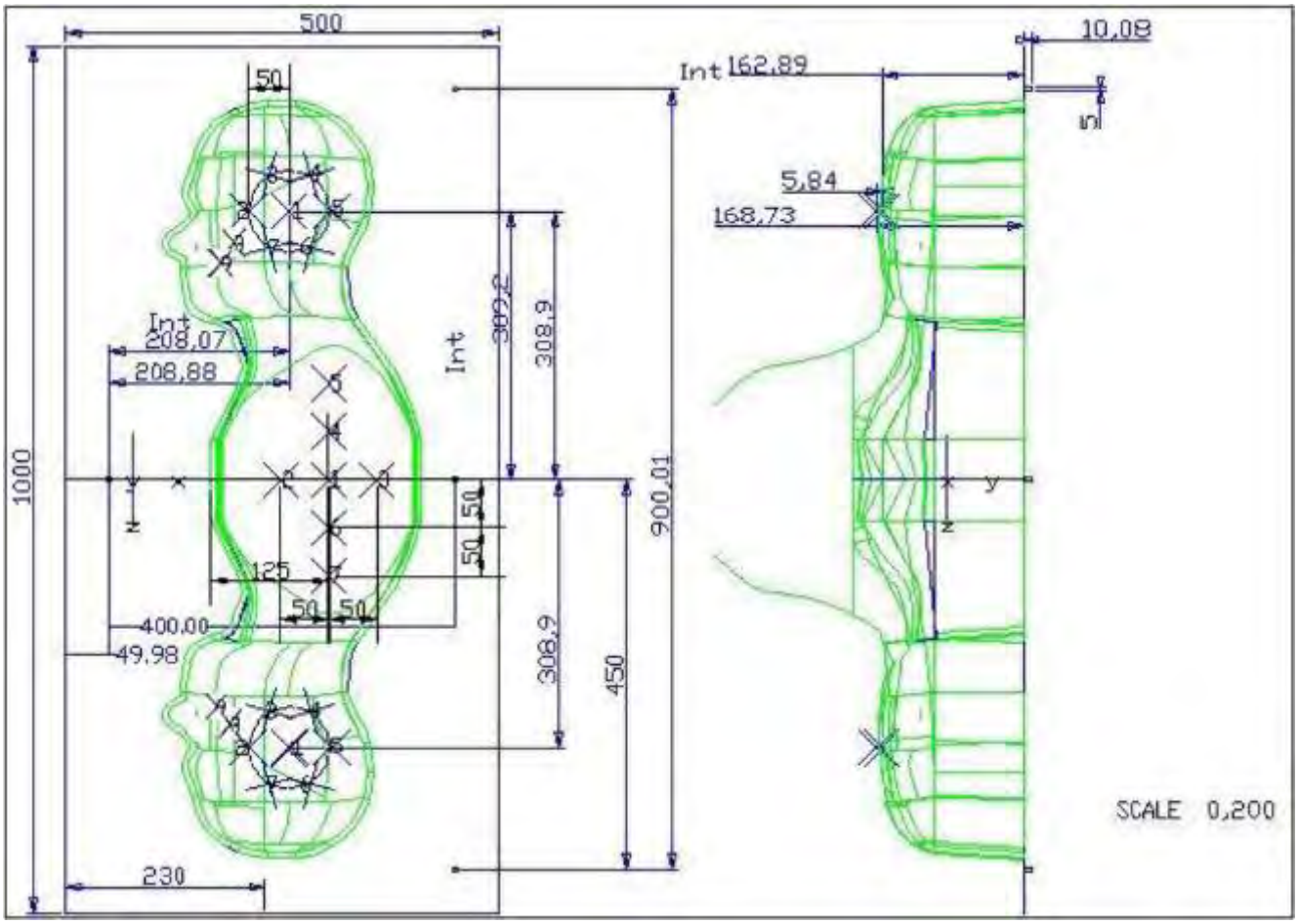
2.4. SAM phantoms

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

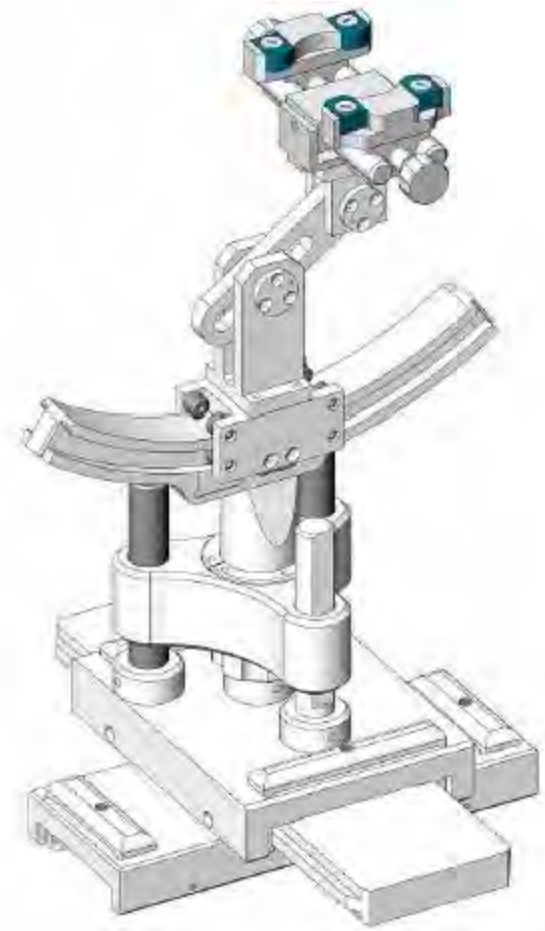


Serial Number	Left Head(mm)		Right Head(mm)		Flat Part(mm)	
SN 16/15 SAM119	2	2.02	2	2.08	1	2.09
	3	2.05	3	2.06	2	2.06
	4	2.07	4	2.07	3	2.08
	5	2.08	5	2.08	4	2.10
	6	2.05	6	2.07	5	2.10
	7	2.05	7	2.05	6	2.07
	8	2.07	8	2.06	7	2.07
	9	2.08	9	2.06	-	-

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	Sep. 17, 2018	Sep. 16, 2019
☐	MVG	750 MHz Dipole	SID750	SN 03/15 DIP 0G750-355	Apr. 19, 2018	Apr. 18, 2021
☒	MVG	835 MHz Dipole	SID835	SN 03/15 DIP 0G835-347	Apr. 19, 2018	Apr. 18, 2021
☐	MVG	900 MHz Dipole	SID900	SN 03/15 DIP 0G900-348	Apr. 19, 2018	Apr. 18, 2021
☒	MVG	1800 MHz Dipole	SID1800	SN 03/15 DIP 1G800-349	Apr. 19, 2018	Apr. 18, 2021
☒	MVG	1900 MHz Dipole	SID1900	SN 03/15 DIP 1G900-350	Apr. 19, 2018	Apr. 18, 2021
☐	MVG	2000 MHz Dipole	SID2000	SN 03/15 DIP 2G000-351	Apr. 19, 2018	Apr. 18, 2021
☒	MVG	2450 MHz Dipole	SID2450	SN 03/15 DIP 2G450-352	Apr. 19, 2018	Apr. 18, 2021
☒	MVG	2600 MHz Dipole	SID2600	SN 03/15 DIP 2G600-356	Apr. 19, 2018	Apr. 18, 2021
☒	MVG	5000 MHz Dipole	SWG5500	SN 13/14 WGA 33	Apr. 19, 2018	Apr. 18, 2021
☒	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	Aug. 06, 2019	Aug. 05, 2020
☒	R&S	Wideband radio communication tester	CMW500	103917	Oct. 08, 2018	Oct. 07, 2019
☒	HP	Network Analyzer	8753D	3410J01136	Aug. 06, 2019	Aug. 05, 2020
☒	Agilent	PSG Analog Signal Generator	E8257D	MY51110112	Aug. 06, 2019	Aug. 05, 2020

☒	Agilent	Power meter	E4419B	MY45102538	Aug. 06, 2019	Aug. 05, 2020
☒	Agilent	Power sensor	E9301A	MY41495644	Aug. 06, 2019	Aug. 05, 2020
☒	Agilent	Power sensor	E9301A	US39212148	Aug. 06, 2019	Aug. 05, 2020
☒	MCLI/USA	Directional Coupler	CB11-20	0D2L51502	Aug. 06, 2019	Aug. 05, 2020

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 WLAN/Bluetooth power measurement, use engineering software to configure EUT WLAN/Bluetooth 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 WLAN/Bluetooth output power.

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/Bluetooth 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.

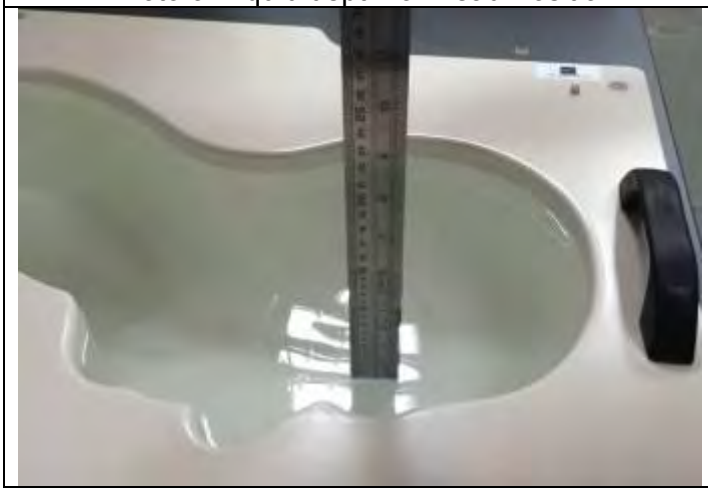
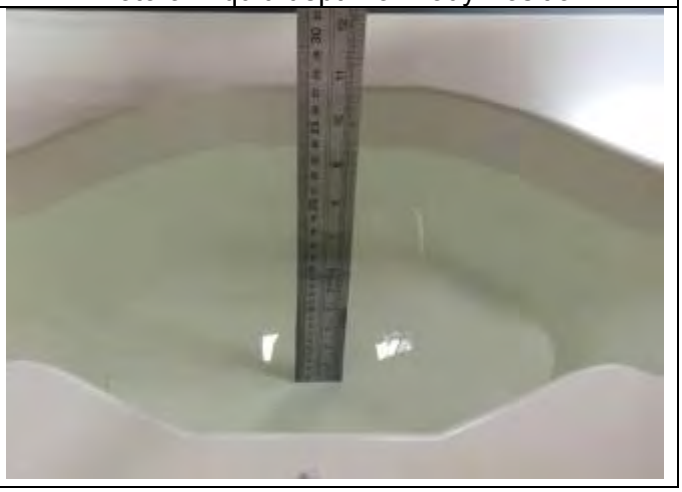
4. System Verification Procedure

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
Ingredients (% of weight)	Body Tissue									
Frequency Band (MHz)	750	835	900	1800	1900	2000	2450	2600	5200	5800
Water	50.30	50.30	50.30	69.91	69.91	71.88	71.88	71.88	79.54	79.54
NaCl	0.60	0.60	0.60	0.13	0.13	0.16	0.16	0.16	0.00	0.00
1,2-Propanediol	49.10	49.10	49.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Triton X-100	0.00	0.00	0.00	9.99	9.99	19.97	19.97	19.97	11.24	11.24
DGBE	0.00	0.00	0.00	19.97	19.97	7.99	7.99	7.99	9.22	9.22

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.

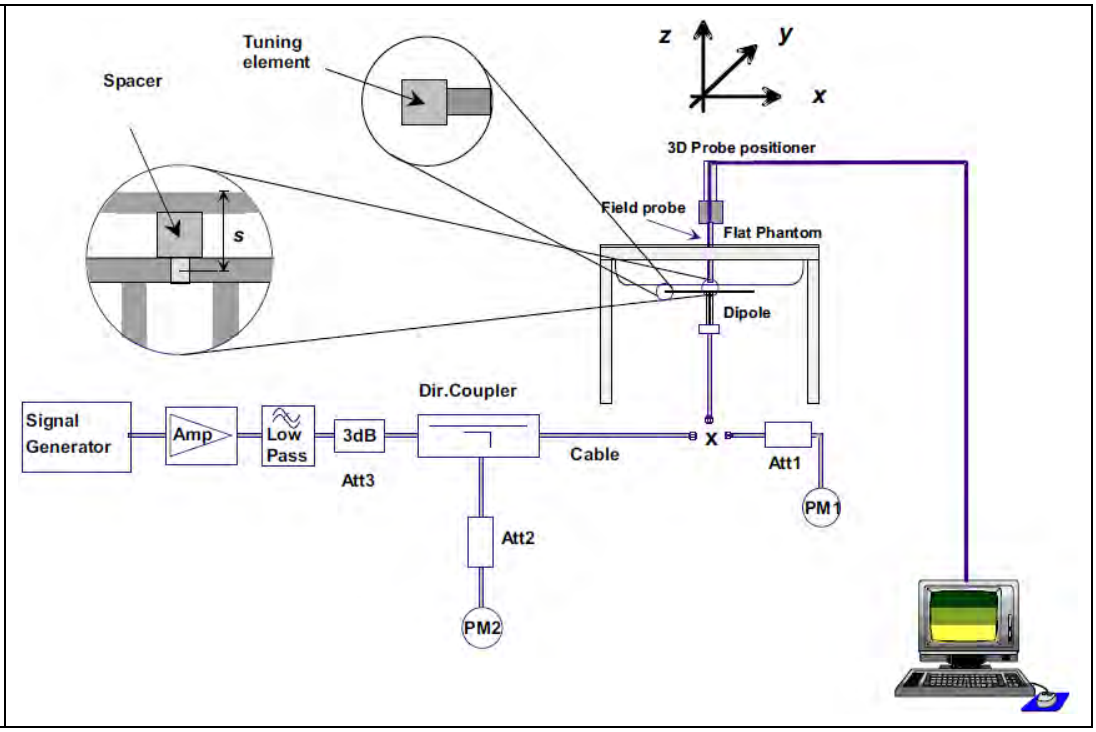
Tissue Type	Measured Frequency (MHz)	Target Tissue		Measured Tissue		Liquid Temp.	Test Date
		εr (±5%)	σ (S/m) (±5%)	εr	σ (S/m)		
Head 850	835	41.50 (39.43~43.57)	0.90 (0.86~0.94)	40.68	0.93	21.4 °C	Aug. 20, 2019
Body 850	835	55.20 (52.44~57.96)	0.97 (0.92~1.01)	54.33	1.01	21.2 °C	Aug. 22, 2019
Head 1800	1800	40.00 (38.00~42.00)	1.40 (1.33~1.47)	38.56	1.40	21.2 °C	Aug. 21, 2019
Body 1800	1800	53.30 (50.64~55.96)	1.52 (1.44~1.59)	53.24	1.56	21.2 °C	Aug. 21, 2019
Head 1900	1900	40.00 (38.00~42.00)	1.40 (1.33~1.47)	40.91	1.45	21.3 °C	Aug. 20, 2019
Body 1900	1900	53.30 (50.64~55.96)	1.52 (1.44~1.59)	52.66	1.58	21.2 °C	Aug. 21, 2019
Head 2450	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	38.93	1.84	21.2 °C	Aug. 28, 2019
Body 2450	2450	52.70 (50.07~55.33)	1.95 (1.85~2.04)	52.27	2.02	21.3 °C	Aug. 29, 2019
Head 2600	2600	39.00 (37.05~40.95)	1.96 (1.86~2.05)	38.39	2.03	21.2 °C	Aug. 28, 2019
Body 2600	2600	52.50 (49.88~55.13)	2.16 (2.05~2.27)	52.68	2.22	21.3 °C	Aug. 29, 2019
Head 5000	5200	36.00 (34.20~37.80)	4.66 (4.43~4.89)	35.66	4.68	21.3 °C	Aug. 29, 2019
Body 5000	5200	49.00 (46.55~51.45)	5.30 (5.04~5.57)	49.60	5.31	21.4 °C	Aug. 30, 2019
Head 5000	5800	35.30 (33.54~37.07)	5.27 (5.01~5.53)	34.59	5.23	21.4 ℃	Aug. 30, 2019
Body 5000	5800	48.20 (45.79~50.61)	6.00 (5.70~6.30)	48.29	6.09	21.2 °C	Aug. 31, 2019

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)		
835MHz Head	9.56 (8.60~10.51)	6.22 (5.60~6.84)	9.32	6.14	21.4 °C	Aug. 20, 2019
835MHz Body	9.48 (8.53~10.42)	6.29 (5.66~6.91)	9.34	6.18	21.2 °C	Aug. 22, 2019
1800MHz Head	38.40 (34.56~42.24)	20.10 (18.09~22.11)	37.52	20.05	21.2 °C	Aug. 21, 2019
1800MHz Body	37.04 (33.34~40.74)	20.26 (18.23~22.29)	36.34	20.18	21.2 °C	Aug. 21, 2019
1900MHz Head	39.70 (35.73~43.67)	20.50 (18.45~22.55)	38.77	21.21	21.3 °C	Aug. 20, 2019
1900MHz Body	38.43 (34.59~42.27)	20.34 (18.31~22.37)	39.12	21.08	21.2 °C	Aug. 21, 2019
2450MHz Head	52.40 (47.16~57.64)	24.00 (21.60~26.40)	51.83	23.66	21.2 °C	Aug. 28, 2019
2450MHz Body	49.32 (44.39~54.25)	22.89 (20.60~25.17)	48.93	23.64	21.3 °C	Aug. 29, 2019
2600MHz Head	55.30 (49.77~60.83)	24.60 (22.14~27.06)	54.63	24.15	21.2 °C	Aug. 28, 2019
2600MHz Body	52.95 (47.66~58.25)	23.64 (21.28~26.00)	51.88	22.36	21.3 °C	Aug. 29, 2019
5200MHz Head	159.00 (143.10~174.90)	56.90 (51.21~62.59)	156.42	56.87	21.3 °C	Aug. 29, 2019
5200MHz Body	156.85 (141.17~172.54)	55.20 (49.68~60.72)	155.53	55.26	21.4 °C	Aug. 30, 2019
5800MHz Head	181.20 (163.08~199.32)	61.50 (55.35~67.65)	181.37	60.82	21.4 °C	Aug. 30, 2019
5800MHz Body	169.30 (152.37~186.23)	58.49 (52.64~64.34)	165.34	57.63	21.2 °C	Aug. 31, 2019

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. Ear and handset reference point

Figure 6.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled ~~"M~~", the left ear reference point (ERP) is marked ~~"LE~~", and the right ERP is marked ~~"RE~~".

Fig 6.1.1 Front, back, and side views of SAM phantom

6.2. Definition of the cheek position

1. Define two imaginary lines on the handset, the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset: the midpoint of the width w_t of the handset at the level of the acoustic output (point A in Figure 6.2.1 and Figure 6.2.2), and the midpoint of the width w_b of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 6.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 6.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
2. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 6.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
3. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP
4. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
5. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.

6. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 6.2.3. The actual rotation angles should be documented in the test report.

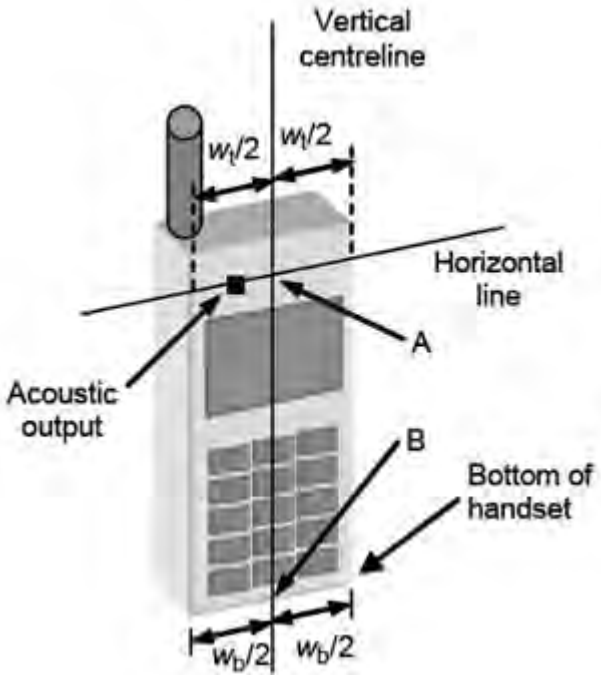


Fig 6.2.1 Handset vertical and horizontal reference lines—~~fi~~xed case

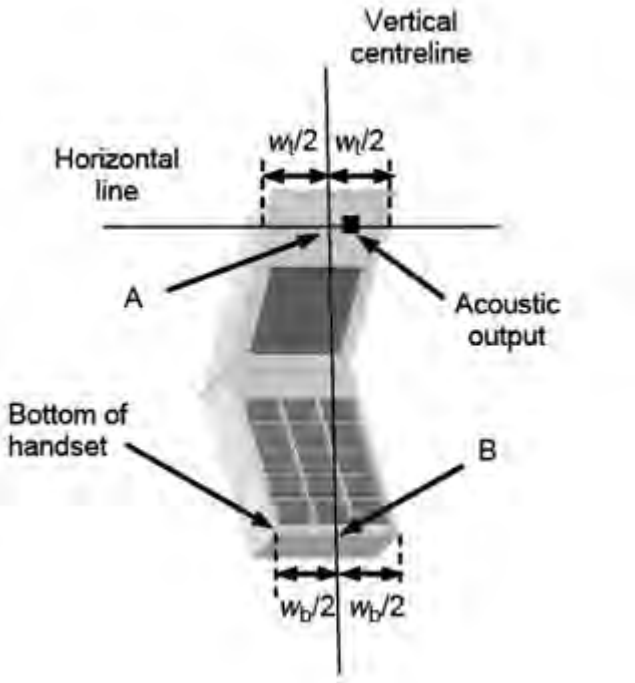


Fig 6.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

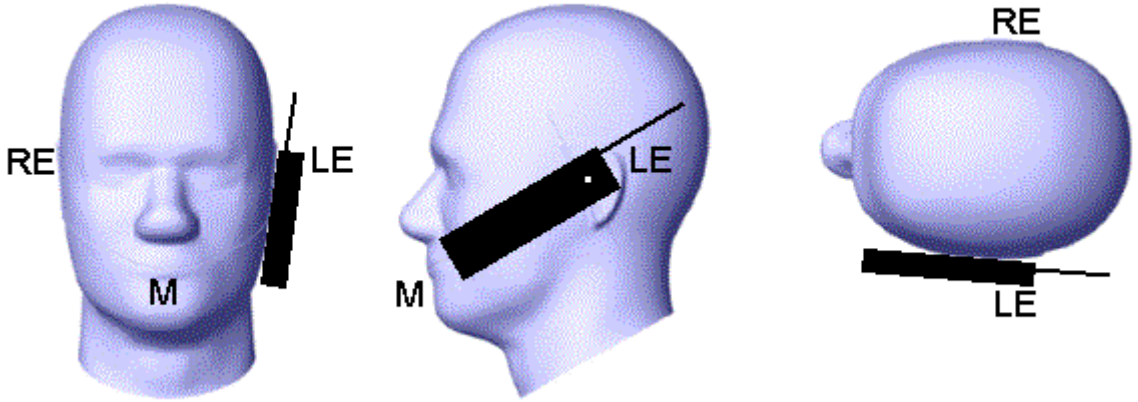


Fig 6.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

6.3. Definition of the tilt position

1. While maintaining the orientation of the handset, retract the handset parallel to the reference plane far enough away from the phantom to enable a rotation of the device by 15 degree.
2. Rotate the Handset around the horizontal line by 15 degree (see Figure 6.3.1).
3. While maintaining the orientation of the handset, move the handset towards the phantom on a line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact is on the pinna. If the contact is at any location other than the pinna, e.g., the antenna with the back of the phantom head, the angle of the handset shall be reduced. In this case, the tilt position is obtained if any part of the handset is in contact with the pinna as well as a second part of the handset is in contact with the phantom, e.g., the antenna with the back of the head.

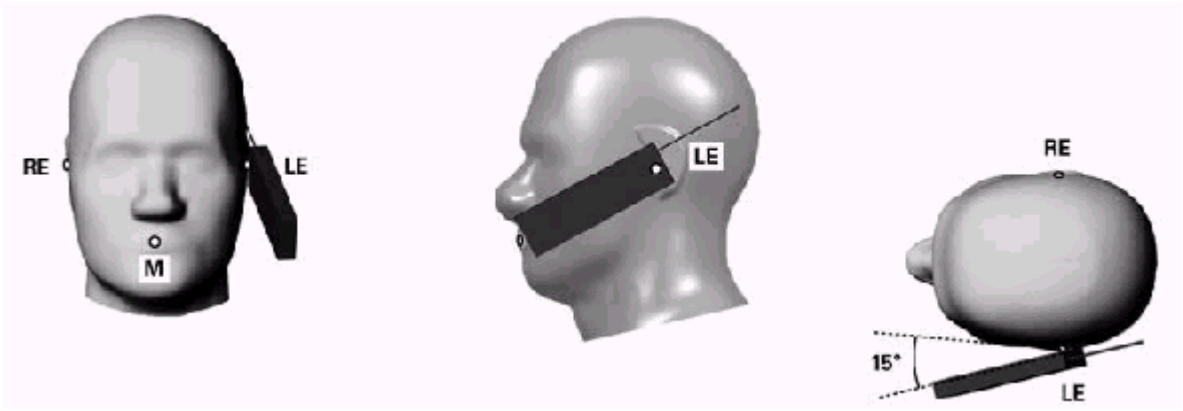


Figure 6.3.1 – Tilt position of the wireless device on the left side of SAM

6.4. Body Worn Accessory

1. Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 6.4.1). Per KDB 648474 D04, 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 FCC KDB 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for 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 that body-worn accessory with a handset attached to the handset.
2. Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest

spacing to the body. Then multiple accessories that contain metallic components are test with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

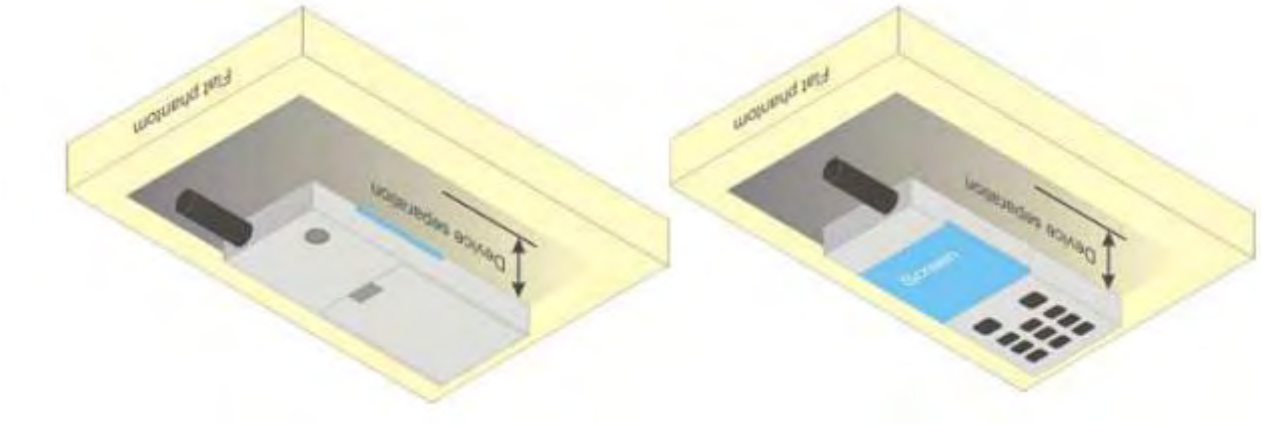


Figure 6.4.1 – Test positions for body-worn devices

6.5. Wireless Router Devices

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WLAN simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined form general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WLAN transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WLAN transmitter according to FCC KDB Publication 447498 D01 publication procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

7. RF Output Power

7.1. GSM Conducted Power

Band GSM850	Burst-Averaged output Power (dBm)				Frame-Averaged output Power (dBm)			
Tx Channel	Tune-up	128	189	251	Tune-up	128	189	251
Frequency (MHz)	(dBm)	824.2	836.4	848.8	(dBm)	824.2	836.4	848.8
GSM (GMSK)	33.00	32.79	32.64	32.51	23.97	23.76	23.61	23.48
GPRS(GMSK, 1 TS)	33.00	32.84	32.67	32.55	23.97	23.81	23.64	23.52
GPRS(GMSK, 2 TS)	33.00	32.16	31.93	31.83	26.98	26.14	25.91	25.81
GPRS(GMSK, 3 TS)	31.00	30.27	30.04	29.98	26.74	26.01	25.78	25.72
GPRS(GMSK, 4 TS)	29.00	28.87	28.68	28.67	25.99	25.86	25.67	25.66
EDGE(GMSK, 1 TS)	27.00	26.51	26.20	26.13	17.97	17.48	17.17	17.10
EDGE(GMSK, 2 TS)	26.00	25.05	25.29	24.61	19.98	19.03	19.27	18.59
EDGE(GMSK, 3 TS)	24.00	23.48	23.13	23.02	19.74	19.22	18.87	18.76
EDGE(GMSK, 4 TS)	23.00	22.48	22.10	21.94	19.99	19.47	19.09	18.93
Band GSM1900	Burst-Averaged output Power (dBm)				Frame-Averaged output Power (dBm)			
Tx Channel	Tune-up	512	661	810	Tune-up	512	661	810
Frequency (MHz)	(dBm)	1850.2	1880.0	1909.8	(dBm)	1850.2	1880.0	1909.8
GSM (GMSK)	30.00	29.17	28.99	28.80	20.97	20.14	19.96	19.77
GPRS(GMSK, 1 TS)	30.00	29.24	29.06	28.89	20.97	20.21	20.03	19.86
GPRS(GMSK, 2 TS)	29.00	28.64	28.44	28.24	22.98	22.62	22.42	22.22
GPRS(GMSK, 3 TS)	27.00	27.00	26.78	26.59	22.74	22.74	22.52	22.33
GPRS(GMSK, 4 TS)	26.00	25.80	25.58	25.37	22.99	22.79	22.57	22.36
EDGE(GMSK, 1 TS)	27.00	26.14	26.34	26.02	17.97	17.11	17.31	16.99
EDGE(GMSK, 2 TS)	26.00	25.18	25.47	25.08	19.98	19.16	19.45	19.06
EDGE(GMSK, 3 TS)	24.00	23.45	23.70	23.44	19.74	19.19	19.44	19.18
EDGE(GMSK, 4 TS)	23.00	22.45	22.74	22.48	19.99	19.44	19.73	19.47

Note: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.
The calculated method are shown as below:
Frame-averaged power = Maximum burst averaged power (1 TS) - 9.03 dB
Frame-averaged power = Maximum burst averaged power (2 TS) - 6.02 dB
Frame-averaged power = Maximum burst averaged power (3 TS) - 4.26 dB
Frame-averaged power = Maximum burst averaged power (4 TS) - 3.01 dB

7.2. WCDMA Conducted Power

Band	WCDMA Band 2			
Tx Channel	Tune-up	9262	9400	9538
Frequency (MHz)		1852.4	1880	1907.6

RMC 12.2Kbps	22.00	21.83	21.68	21.76
HSDPA Subtest-1	21.00	20.52	20.78	20.79
HSDPA Subtest-2	21.00	20.30	20.01	19.99
HSDPA Subtest-3	20.00	19.53	19.50	19.43
HSDPA Subtest-4	20.00	19.50	19.24	19.32
HSUPA Subtest-1	21.00	20.50	20.31	20.24
HSUPA Subtest-2	21.00	20.88	20.69	20.68
HSUPA Subtest-3	20.00	19.65	19.62	19.49
HSUPA Subtest-4	21.00	20.98	20.79	20.79
HSUPA Subtest-5	20.00	19.84	19.94	19.90
Band	WCDMA Band 5			
Tx Channel	Tune-up	4132	4182	4233
Frequency (MHz)		826.4	836.4	846.6
RMC 12.2Kbps	23.00	22.01	22.15	21.91
HSDPA Subtest-1	23.00	21.97	22.19	21.90
HSDPA Subtest-2	23.00	21.99	22.16	21.91
HSDPA Subtest-3	23.00	21.99	22.17	21.89
HSDPA Subtest-4	23.00	21.98	22.15	21.86
HSUPA Subtest-1	21.00	20.90	20.76	20.55
HSUPA Subtest-2	22.00	20.89	21.11	20.86
HSUPA Subtest-3	20.00	19.68	19.73	19.51
HSUPA Subtest-4	22.00	21.00	21.16	20.91
HSUPA Subtest-5	21.00	20.32	20.52	20.27

7.3. LTE Conducted Power

Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		19957/1710.7	20175/1732.5	20393/1754.3
LTE Band 4	1.4MHz	QPSK	1	0	24.00	22.97	23.17	23.34
			1	2	24.00	23.11	23.31	23.47
			1	5	24.00	22.97	23.17	23.29
			3	0	24.00	23.04	23.17	23.40
			3	1	24.00	23.04	23.20	23.40
			3	2	24.00	23.00	23.20	23.39
			6	0	23.00	22.09	22.19	22.43
		16QAM	1	0	23.00	21.88	22.26	22.56
			1	2	23.00	22.05	22.40	22.65
			1	5	23.00	21.82	22.27	22.54
			3	0	23.00	22.21	22.39	22.66
			3	1	23.00	22.23	22.41	22.72
			3	2	23.00	22.27	22.40	22.65
			6	0	22.00	21.19	21.35	21.53
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		19965/1711.5	20175/1732.5	20385/1753.5
LTE Band 4	3MHz	QPSK	1	0	24.00	23.03	23.14	23.39
			1	7	24.00	23.28	23.46	23.67
			1	14	24.00	22.99	23.14	23.40
			8	0	23.00	22.03	22.23	22.47
			8	4	23.00	22.07	22.24	22.54
			8	7	23.00	22.06	22.20	22.46
			15	0	23.00	22.02	22.23	22.42
		16QAM	1	0	23.00	22.50	22.38	22.28
			1	7	23.00	22.73	22.67	22.56
			1	14	23.00	22.47	22.36	22.26
			8	0	22.00	21.04	21.20	21.38
			8	4	22.00	21.07	21.19	21.42
			8	7	22.00	21.02	21.16	21.39
			15	0	22.00	21.03	21.13	21.44
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		

			RB Size	RB Offset		19975/1712.5	20175/1732.5	20375/1752.5
LTE Band 4	5MHz	QPSK	1	0	24.00	22.91	23.04	23.29
			1	12	24.00	23.48	23.49	23.59
			1	24	24.00	22.99	23.11	23.30
			12	0	23.00	21.99	22.19	22.33
			12	6	23.00	22.07	22.22	22.50
			12	11	23.00	22.09	22.20	22.43
			25	0	23.00	22.07	22.21	22.49
		16QAM	1	0	23.00	22.50	22.40	22.64
			1	12	23.00	22.90	22.73	22.96
			1	24	23.00	22.54	22.51	22.59
			12	0	22.00	20.99	21.12	21.37
			12	6	22.00	21.12	21.16	21.53
			12	11	22.00	21.13	21.16	21.46
			25	0	22.00	21.02	21.22	21.39
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20000/1715	20175/1732.5	20350/1750
LTE Band 4	10MHz	QPSK	1	0	24.00	22.97	23.08	23.39
			1	24	24.00	23.17	23.27	23.51
			1	49	24.00	23.07	23.21	23.38
			25	0	23.00	22.00	22.32	22.46
			25	12	23.00	22.15	22.27	22.47
			25	24	23.00	22.25	22.30	22.58
			50	0	23.00	22.12	22.28	22.47
		16QAM	1	0	23.00	22.45	22.27	22.28
			1	24	23.00	22.65	22.43	22.42
			1	49	23.00	22.48	22.44	22.23
			25	0	22.00	20.98	21.27	21.44
			25	12	22.00	21.14	21.24	21.43
			25	24	22.00	21.24	21.25	21.52
			50	0	22.00	21.11	21.31	21.44
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20025/1717.5	20175/1732.5	20325/1747.5
LTE Band	15MHz	QPSK	1	0	24.00	22.89	23.00	23.22
			1	37	24.00	23.35	23.32	23.70

4			1	74	24.00	22.98	23.19	23.23
			36	0	23.00	22.11	22.28	22.47
			36	18	23.00	22.17	22.31	22.53
			36	37	23.00	22.24	22.32	22.54
			75	0	23.00	22.18	22.34	22.56
		16QAM	1	0	23.00	22.35	22.18	22.39
			1	37	23.00	22.75	22.66	22.81
			1	74	23.00	22.38	22.42	22.39
			36	0	22.00	21.10	21.29	21.43
			36	18	22.00	21.19	21.35	21.48
			36	37	22.00	21.24	21.35	21.46
			75	0	22.00	21.11	21.29	21.54

Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20050/1720	20175/1732.5	20300/1745
LTE Band 4	20MHz	QPSK	1	0	24.00	22.73	22.86	22.95
			1	49	24.00	23.20	23.32	23.51
			1	99	24.00	22.90	23.11	23.14
			50	0	23.00	21.92	22.29	22.41
			50	24	23.00	22.20	22.27	22.46
			50	49	23.00	22.16	22.26	22.56
			100	0	23.00	22.07	22.24	22.49
		16QAM	1	0	23.00	22.12	22.06	22.24
			1	49	23.00	22.52	22.53	22.78
			1	99	23.00	22.23	22.37	22.41
			50	0	22.00	20.99	21.22	21.45
			50	24	22.00	21.20	21.24	21.48
			50	49	22.00	21.16	21.19	21.60
			100	0	22.00	21.03	21.22	21.45

Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20775/2502.5	21100/2535	21425/2567.5
LTE Band 7	5MHz	QPSK	1	0	24.00	23.39	23.50	23.58
			1	12	24.00	23.73	23.88	23.91
			1	24	24.00	23.36	23.50	23.58
			12	0	23.00	22.39	22.56	22.65
			12	6	23.00	22.45	22.56	22.64

			12	11	23.00	22.42	22.53	22.62
			25	0	23.00	22.44	22.56	22.70
		16QAM	1	0	24.00	22.82	22.77	22.83
			1	12	24.00	23.19	23.09	23.21
			1	24	24.00	22.83	22.73	22.80
			12	0	22.00	21.40	21.48	21.65
			12	6	22.00	21.44	21.50	21.69
			12	11	22.00	21.38	21.50	21.61
			25	0	22.00	21.36	21.53	21.58

Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20800/2505	21100/2535	21400/2565
LTE Band 7	10MHz	QPSK	1	0	24.00	23.48	23.52	23.62
			1	24	24.00	23.55	23.63	23.77
			1	49	24.00	23.51	23.56	23.70
			25	0	23.00	22.48	22.56	22.71
			25	12	23.00	22.42	22.54	22.71
			25	24	23.00	22.51	22.60	22.66
			50	0	23.00	22.48	22.59	22.64
		16QAM	1	0	23.00	22.74	22.65	22.42
			1	24	23.00	22.86	22.77	22.60
			1	49	23.00	22.82	22.66	22.47
			25	0	22.00	21.40	21.52	21.68
			25	12	22.00	21.41	21.52	21.63
			25	24	22.00	21.46	21.57	21.65
			50	0	22.00	21.46	21.55	21.59

Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20825/2507.5	21100/2535	21375/2562.5
LTE Band 7	15MHz	QPSK	1	0	24.00	23.37	23.49	23.55
			1	37	24.00	23.72	23.79	23.83
			1	74	24.00	23.40	23.46	23.56
			36	0	23.00	22.43	22.56	22.71
			36	18	23.00	22.47	22.58	22.71
			36	37	23.00	22.52	22.61	22.74
			75	0	23.00	22.49	22.62	22.75
		16QAM	1	0	24.00	22.70	22.61	22.64
			1	37	24.00	23.07	22.93	23.01

			1	74	24.00	22.71	22.62	22.66
			36	0	22.00	21.44	21.62	21.63
			36	18	22.00	21.44	21.62	21.65
			36	37	22.00	21.53	21.64	21.65
			75	0	22.00	21.42	21.53	21.73
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20850/2510	21100/2535	21350/2560
LTE Band 7	20MHz	QPSK	1	0	24.00	23.20	23.33	23.43
			1	49	24.00	23.63	23.69	23.77
			1	99	24.00	23.24	23.37	23.47
			50	0	23.00	22.42	22.57	22.65
			50	24	23.00	22.49	22.57	22.66
			50	49	23.00	22.54	22.52	22.57
			100	0	23.00	22.43	22.57	22.62
		16QAM	1	0	23.00	22.45	22.57	22.60
			1	49	23.00	22.87	22.88	22.93
			1	99	23.00	22.50	22.57	22.61
			50	0	22.00	21.43	21.55	21.58
			50	24	22.00	21.49	21.54	21.66
			50	49	22.00	21.51	21.52	21.58
			100	0	22.00	21.43	21.51	21.59

7.4. WLAN & Bluetooth Output Power

7.4.1. Output Power Results Of WLAN

Mode	Channel	Frequency (MHz)	Tune-up	Output Power (dBm)
802.11b	1	2412	15	14.30
	6	2437	15	13.93
	11	2462	15	13.95
802.11g	1	2412	13	12.72
	6	2437	13	11.85
	11	2462	13	11.92
802.11n HT20	1	2412	13	12.13
	6	2437	13	11.84
	11	2462	13	11.87
802.11n HT40	3	2422	12	11.98
	6	2437	12	11.34

	9	2452	12	11.22

NOTE: Power measurement results of WLAN 2.4G.

Mode	Channel	Frequency (MHz)	Tune-up	Output Power (dBm)
802.11a	36	5180	10	9.36
	40	5200	10	8.88
	48	5240	10	9.32
802.11n HT20	36	5180	10	9.18
	40	5200	10	8.79
	48	5240	10	9.23
802.11n HT40	38	5190	10	8.92
	46	5230	10	9.49
802.11ac VHT20	36	5180	8	6.91
	40	5200	8	6.82
	48	5240	8	7.38
802.11ac VHT40	38	5190	8	6.50
	46	5230	8	7.26

NOTE: Power measurement results of WLAN 5.2G.

Mode	Channel	Frequency (MHz)	Tune-up	Output Power (dBm)
802.11a	149	5745	11	9.34
	157	5785	11	9.22
	165	5825	11	10.19
802.11n HT20	149	5745	10	9.55
	157	5785	10	9.40
	165	5825	10	9.88
802.11n HT40	151	5755	10	9.44
	159	5795	10	9.54
802.11ac VHT20	149	5745	8	7.30
	157	5785	8	7.11
	165	5825	8	7.85
802.11ac VHT40	151	5755	8	7.32
	159	5795	8	7.23

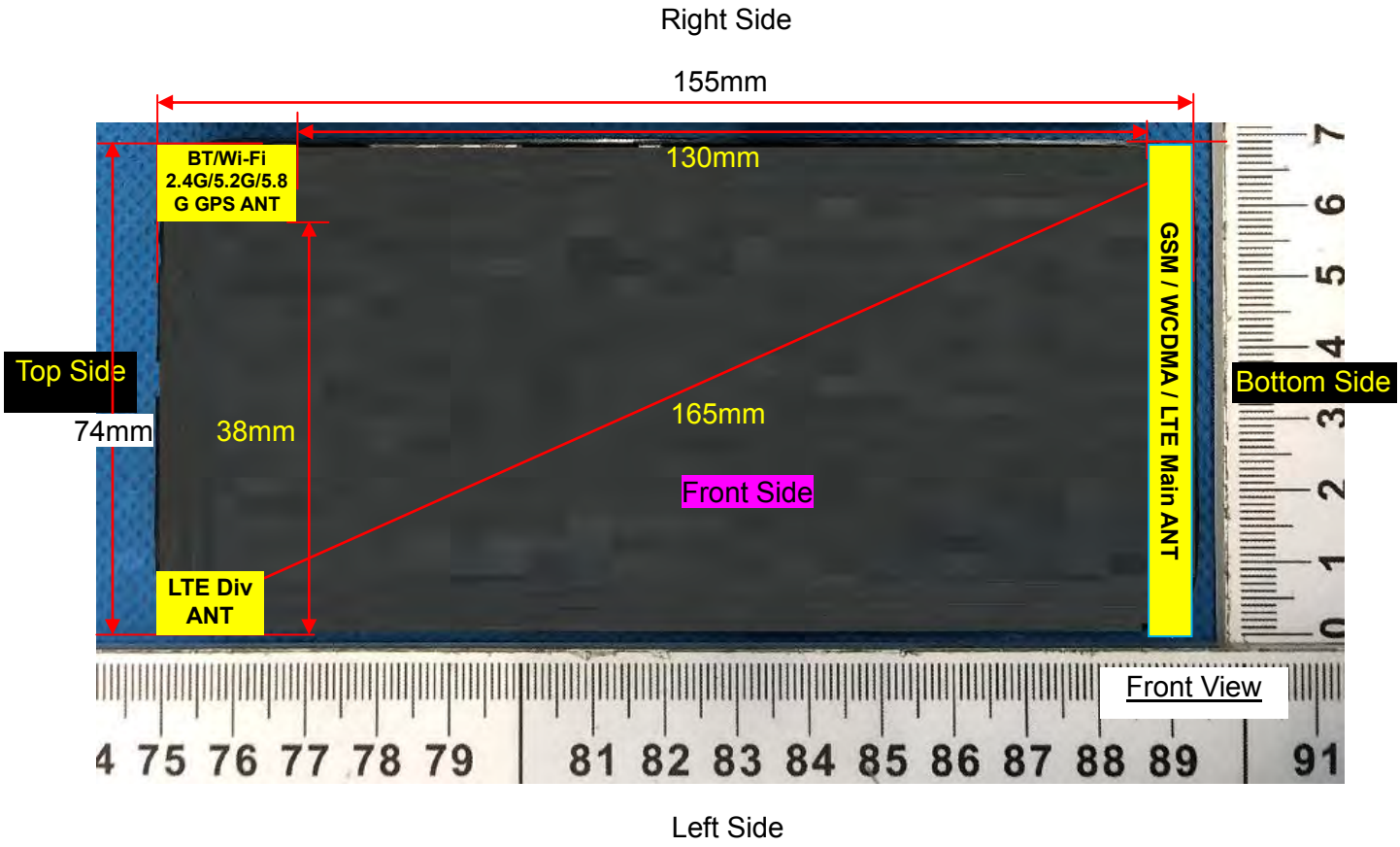
NOTE: Power measurement results of WLAN 5.8G.

7.4.2. Output Power Results Of Bluetooth

	Output Power (dBm)				
BR+EDR	Channel	Tune-up	Data Rates		
			1M	2M	3M
	0CH	5	4.02	3.11	3.28
	39CH	3	2.43	1.75	1.91
	78CH	3	2.87	2.35	2.50

	Channel	Tune-up	Output Power (dBm)
BLE	0CH	5	4.62
	19CH	5	3.06
	39CH	5	3.18

8. Antenna Location



Distance of the Antenna to the EUT surface/edge						
Antennas	Front Side	Back Side	Left Side	Right Side	Top Side	Bottom Side
WWAN Main	≤ 25mm	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm
WLAN & Bluetooth	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	>25mm
Positions for SAR tests						
Antennas	Front Side	Back Side	Left Side	Right Side	Top Side	Bottom Side
WWAN Main	Yes	Yes	Yes	Yes	NO	Yes
WLAN & Bluetooth	Yes	Yes	NO	Yes	Yes	NO

9. 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	5.00	3.16	5	2.480	1.0	3.0	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	Head	5.00	3.16	5	2.480	7.5	0.133
Bluetooth	Body	5.00	3.16	10	2.480	7.5	0.066
Bluetooth	Hotspot	5.00	3.16	10	2.480	7.5	0.066

NOTE: Estimated SAR calculation for Bluetooth

10. SAR Results

10.1. SAR measurement results

10.1.1. SAR measurement Result of GSM850

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Left Cheek	189/836.4	GPRS(GMSK 2TS)	0.409	0.299	3.41	31.93	33.00	0.523
Left Tilt 15 Degree	189/836.4	GPRS(GMSK 2TS)	0.136	0.101	-0.92	31.93	33.00	0.174
Right Cheek	189/836.4	GPRS(GMSK 2TS)	0.405	0.298	-4.92	31.93	33.00	0.518
Right Tilt 15 Degree	189/836.4	GPRS(GMSK 2TS)	0.132	0.096	3.35	31.93	33.00	0.169

NOTE: Head SAR test results of GSM850.

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	189/836.4	GPRS(GMSK 2TS)	0.408	0.310	-0.77	31.93	33.00	0.522
Back Side	189/836.4	GPRS(GMSK 2TS)	0.515	0.386	0.02	31.93	33.00	0.659

NOTE: Body-Worn SAR test results of GSM850

Test Position of Hotspot with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	189/836.4	GPRS(GMSK 2TS)	0.408	0.310	-0.77	31.93	33.00	0.522
Back Side	189/836.4	GPRS(GMSK 2TS)	0.515	0.386	0.02	31.93	33.00	0.659
Left Side	189/836.4	GPRS(GMSK 2TS)	0.245	0.186	-0.76	31.93	33.00	0.313
Right Side	189/836.4	GPRS(GMSK 2TS)	0.382	0.292	4.02	31.93	33.00	0.489
Bottom Side	189/836.4	GPRS(GMSK 2TS)	0.455	0.345	2.84	31.93	33.00	0.582

NOTE: Hotspot SAR test results of GSM850

10.1.2. SAR measurement Result of GSM1900

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Left Cheek	661/1880	GPRS(GMSK 4TS)	0.313	0.186	0.64	25.58	26.00	0.345
Left Tilt 15 Degree	661/1880	GPRS(GMSK 4TS)	0.175	0.112	0.33	25.58	26.00	0.193
Right Cheek	661/1880	GPRS(GMSK 4TS)	0.301	0.178	2.11	25.58	26.00	0.332
Right Tilt 15 Degree	661/1880	GPRS(GMSK 4TS)	0.168	0.105	1.02	25.58	26.00	0.185

NOTE: Head SAR test results of GSM1900

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	661/1880	GPRS(GMSK 4TS)	0.356	0.200	0.20	25.58	26.00	0.392
Back Side	661/1880	GPRS(GMSK 4TS)	0.504	0.271	1.58	25.58	26.00	0.555

NOTE: Body-Worn SAR test results of GSM1900

Test Position of Hotspot with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	661/1880	GPRS(GMSK 4TS)	0.356	0.200	0.20	25.58	26.00	0.392
Back Side	661/1880	GPRS(GMSK 4TS)	0.504	0.271	1.58	25.58	26.00	0.555
Left Side	661/1880	GPRS(GMSK 4TS)	0.211	0.168	1.05	25.58	26.00	0.232
Right Side	661/1880	GPRS(GMSK 4TS)	0.203	0.160	-1.22	25.58	26.00	0.224
Bottom Side	661/1880	GPRS(GMSK 4TS)	0.541	0.294	0.55	25.58	26.00	0.596

NOTE: Hotspot SAR test results of GSM1900

10.1.3. SAR measurement Result of WCDMA Band 2

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Left Cheek	9400/1880	RMC12.2K	0.292	0.179	0.22	21.68	22.00	0.314
Left Tilt 15 Degree	9400/1880	RMC12.2K	0.131	0.080	1.82	21.68	22.00	0.141
Right Cheek	9400/1880	RMC12.2K	0.290	0.177	1.09	21.68	22.00	0.312
Right Tilt 15 Degree	9400/1880	RMC12.2K	0.130	0.078	-1.78	21.68	22.00	0.140

NOTE: Head SAR test results of WCDMA Band 2

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	9400/1880	RMC12.2K	0.325	0.179	-2.21	21.68	22.00	0.350
Back Side	9400/1880	RMC12.2K	0.484	0.264	-0.08	21.68	22.00	0.521

NOTE: Body-Worn SAR test results of WCDMA Band 2

Test Position of Hotspot with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	9400/1880	RMC12.2K	0.325	0.179	-2.21	21.68	22.00	0.350
Back Side	9400/1880	RMC12.2K	0.484	0.264	-0.08	21.68	22.00	0.521
Left Side	9400/1880	RMC12.2K	0.259	0.145	-4.36	21.68	22.00	0.279
Right Side	9400/1880	RMC12.2K	0.407	0.229	-1.93	21.68	22.00	0.438
Bottom Side	9400/1880	RMC12.2K	0.453	0.250	-1.07	21.68	22.00	0.488

NOTE: Hotspot SAR test results of WCDMA Band 2

10.1.4. SAR measurement Result of WCDMA Band 5

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Left Cheek	4182/836.4	RMC12.2K	0.254	0.198	-1.01	22.15	23.00	0.309
Left Tilt 15 Degree	4182/836.4	RMC12.2K	0.153	0.120	-1.03	22.15	23.00	0.186
Right Cheek	4182/836.4	RMC12.2K	0.251	0.198	1.68	22.15	23.00	0.305
Right Tilt 15 Degree	4182/836.4	RMC12.2K	0.150	0.118	4.05	22.15	23.00	0.182

NOTE: Head SAR test results of WCDMA Band 5

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	4182/836.4	RMC12.2K	0.224	0.175	-1.56	22.15	23.00	0.272
Back Side	4182/836.4	RMC12.2K	0.283	0.218	-0.15	22.15	23.00	0.344

NOTE: Body-Worn SAR test results of WCDMA Band 5

Test Position of Hotspot with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	4182/836.4	RMC12.2K	0.224	0.175	-1.56	22.15	23.00	0.272
Back Side	4182/836.4	RMC12.2K	0.283	0.218	-0.15	22.15	23.00	0.344
Left Side	4182/836.4	RMC12.2K	0.153	0.120	-4.09	22.15	23.00	0.186
Right Side	4182/836.4	RMC12.2K	0.184	0.139	-1.99	22.15	23.00	0.224
Bottom Side	4182/836.4	RMC12.2K	0.253	0.194	3.57	22.15	23.00	0.308

NOTE: Hotspot SAR test results of WCDMA Band 5

10.1.5. SAR measurement Result of LTE Band 4

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
1RB								
Left Cheek	20175/1732.5	20M QPSK(1,49)	0.386	0.247	-2.08	23.32	24.00	0.451
Left Tilt 15 Degree	20175/1732.5	20M QPSK(1,49)	0.158	0.101	4.38	23.32	24.00	0.185
Right Cheek	20175/1732.5	20M QPSK(1,49)	0.385	0.246	4.50	23.32	24.00	0.450
Right Tilt 15 Degree	20175/1732.5	20M QPSK(1,49)	0.156	0.100	-4.12	23.32	24.00	0.182
50%RB								
Left Cheek	20175/1732.5	1.4M QPSK(3,1)	0.346	0.229	-1.16	23.20	24.00	0.416
Left Tilt 15	20175/1732.5	1.4M QPSK(3,1)	0.131	0.081	-2.78	23.20	24.00	0.157

Degree								
Right Cheek	20175/1732.5	1.4M QPSK(3,1)	0.342	0.227	1.39	23.20	24.00	0.411
Right Tilt 15 Degree	20175/1732.5	1.4M QPSK(3,1)	0.120	0.076	-1.13	23.20	24.00	0.144

NOTE: Head SAR test results of LTE Band 4

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
1RB								
Front Side	20175/1732.5	20M QPSK(1,49)	0.358	0.220	2.14	23.32	24.00	0.419
Back Side	20175/1732.5	20M QPSK(1,49)	0.674	0.421	-1.03	23.32	24.00	0.788
50%RB								
Front Side	20175/1732.5	1.4M QPSK(3,1)	0.297	0.183	-0.65	23.20	24.00	0.357
Back Side	20175/1732.5	1.4M QPSK(3,1)	0.622	0.398	4.80	23.20	24.00	0.748

NOTE: Body-Worn SAR test results of LTE Band 4

Test Position of Hotspot with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
1RB								
Front Side	20175/1732.5	20M QPSK(1,49)	0.358	0.220	2.14	23.32	24.00	0.419
Back Side	20175/1732.5	20M QPSK(1,49)	0.674	0.421	-1.03	23.32	24.00	0.788
Left Side	20175/1732.5	20M QPSK(1,49)	0.482	0.302	3.12	23.32	24.00	0.564
Right Side	20175/1732.5	20M QPSK(1,49)	0.465	0.279	3.40	23.32	24.00	0.544
Bottom Side	20175/1732.5	20M QPSK(1,49)	0.612	0.384	-4.34	23.32	24.00	0.716
50%RB								
Front Side	20175/1732.	1.4M QPSK(3,1)	0.297	0.183	-0.65	23.20	24.00	0.357

	5							
Back Side	20175/1732.5	1.4M QPSK(3,1)	0.622	0.398	4.80	23.20	24.00	0.748
Left Side	20175/1732.5	1.4M QPSK(3,1)	0.413	0.261	-4.78	23.20	24.00	0.497
Right Side	20175/1732.5	1.4M QPSK(3,1)	0.399	0.232	-1.53	23.20	24.00	0.480
Bottom Side	20175/1732.5	1.4M QPSK(3,1)	0.545	0.340	1.14	23.20	24.00	0.655

NOTE: Hotspot SAR test results of LTE Band 4

10.1.6. SAR measurement Result of LTE Band 7

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
1RB								
Left Cheek	21100/2535	20M QPSK(1,49)	0.354	0.188	1.17	23.69	24.00	0.380
Left Tilt 15 Degree	21100/2535	20M QPSK(1,49)	0.163	0.087	2.64	23.69	24.00	0.175
Right Cheek	21100/2535	20M QPSK(1,49)	0.352	0.187	1.70	23.69	24.00	0.378
Right Tilt 15 Degree	21100/2535	20M QPSK(1,49)	0.161	0.085	1.19	23.69	24.00	0.173
50%RB								
Left Cheek	21100/2535	20M QPSK(50,24)	0.231	0.124	-2.28	22.57	23.00	0.255
Left Tilt 15 Degree	21100/2535	20M QPSK(50,24)	0.106	0.058	1.13	22.57	23.00	0.117
Right Cheek	21100/2535	20M QPSK(50,24)	0.229	0.122	-2.24	22.57	23.00	0.253
Right Tilt 15 Degree	21100/2535	20M QPSK(50,24)	0.105	0.056	1.56	22.57	23.00	0.116

NOTE: Head SAR test results of LTE Band 7

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
1RB								
Front Side	21100/2535	20M QPSK(1,49)	0.416	0.197	-1.13	23.69	24.00	0.447
Back Side	21100/2535	20M QPSK(1,49)	0.753	0.360	-4.20	23.69	24.00	0.809
Back Side	20850/2510	20M QPSK(1,49)	0.568	0.274	-1.21	23.63	24.00	0.619
Back Side	21350/2560	20M QPSK(1,49)	0.622	0.299	-0.25	23.77	24.00	0.656
50%RB								
Front Side	21100/2535	20M QPSK(50,24)	0.272	0.131	-4.50	22.57	23.00	0.300
Back Side	21100/2535	20M QPSK(50,24)	0.489	0.233	1.69	22.57	23.00	0.540
100%RB								
Back Side	21100/2535	20M QPSK(100,0)	0.477	0.229	0.07	22.57	23.00	0.527

NOTE: Body-Worn SAR test results of LTE Band 7

Test Position of Hotspot with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
1RB								
Front Side	21100/2535	20M QPSK(1,49)	0.416	0.197	-1.13	23.69	24.00	0.447
Back Side	21100/2535	20M QPSK(1,49)	0.753	0.360	-4.20	23.69	24.00	0.809
Left Side	21100/2535	20M QPSK(1,49)	0.458	0.213	-3.99	23.69	24.00	0.492
Right Side	21100/2535	20M QPSK(1,49)	0.326	0.156	-2.54	23.69	24.00	0.350
Bottom Side	21100/2535	20M QPSK(1,49)	0.470	0.219	-1.09	23.69	24.00	0.505
Back Side	20850/2510	20M QPSK(1,49)	0.568	0.274	-1.21	23.63	24.00	0.619
Back Side	21350/2560	20M QPSK(1,49)	0.622	0.299	-0.25	23.77	24.00	0.656
50%RB								
Front Side	21100/2535	20M	0.272	0.131	-4.50	22.57	23.00	0.300

		QPSK(50,24)						
Back Side	21100/2535	20M QPSK(50,24)	0.489	0.233	1.69	22.57	23.00	0.540
Left Side	21100/2535	20M QPSK(50,24)	0.297	0.138	4.17	22.57	23.00	0.328
Right Side	21100/2535	20M QPSK(50,24)	0.214	0.103	0.90	22.57	23.00	0.236
Bottom Side	21100/2535	20M QPSK(50,24)	0.305	0.146	4.40	22.57	23.00	0.337
100%RB								
Back Side	21100/2535	20M QPSK(100,0)	0.477	0.229	0.07	22.57	23.00	0.527

NOTE: Hotspot SAR test results of LTE Band 7

10.1.7. SAR measurement Result of WLAN 2.4G

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Left Cheek	1/2412	802.11 b	0.612	0.256	1.39	14.30	15.00	0.719
Left Tilt 15 Degree	1/2412	802.11 b	0.218	0.092	-0.37	14.30	15.00	0.256
Right Cheek	1/2412	802.11 b	0.609	0.255	3.90	14.30	15.00	0.716
Right Tilt 15 Degree	1/2412	802.11 b	0.212	0.089	-0.09	14.30	15.00	0.249

NOTE: Head SAR test results of WLAN 2.4G

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	1/2412	802.11 b	0.146	0.076	2.44	14.30	15.00	0.172
Back Side	1/2412	802.11 b	0.206	0.107	-0.55	14.30	15.00	0.242

NOTE: Body-Worn SAR test results of WLAN 2.4G

Test Position of Hotspot with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	1/2412	802.11 b	0.146	0.076	2.44	14.30	15.00	0.172

Back Side	1/2412	802.11 b	0.206	0.107	-0.55	14.30	15.00	0.242
Right Side	1/2412	802.11 b	0.122	0.064	0.16	14.30	15.00	0.143
Top Side	1/2412	802.11 b	0.164	0.087	-3.26	14.30	15.00	0.193

NOTE: Hotspot SAR test results of WLAN 2.4G

10.1.8. SAR measurement Result of WLAN 5.2G

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Left Cheek	36/5180	802.11a	0.309	0.138	-3.72	9.36	10.00	0.358
Left Tilt 15 Degree	36/5180	802.11a	0.136	0.062	1.35	9.36	10.00	0.158
Right Cheek	36/5180	802.11a	0.311	0.139	2.19	9.36	10.00	0.360
Right Tilt 15 Degree	36/5180	802.11a	0.134	0.061	-1.73	9.36	10.00	0.155

NOTE: Head SAR test results of WLAN 5.2G

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	36/5180	802.11a	0.252	0.115	4.03	9.36	10.00	0.292
Back Side	36/5180	802.11a	0.415	0.190	0.94	9.36	10.00	0.481

NOTE: Body-Worn SAR test results of WLAN 5.2G

Test Position of Hotspot with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	36/5180	802.11a	0.252	0.115	4.03	9.36	10.00	0.292
Back Side	36/5180	802.11a	0.415	0.190	0.94	9.36	10.00	0.481
Right Side	36/5180	802.11a	0.376	0.175	4.75	9.36	10.00	0.436
Top Side	36/5180	802.11a	0.388	0.179	0.14	9.36	10.00	0.450

NOTE: Hotspot SAR test results of WLAN 5.2G

10.1.9. SAR measurement Result of WLAN 5.8G

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

								(W/Kg)
Left Cheek	165/5825	802.11a	0.392	0.162	-1.17	10.19	11.00	0.472
Left Tilt 15 Degree	165/5825	802.11a	0.128	0.053	3.45	10.19	11.00	0.154
Right Cheek	165/5825	802.11a	0.396	0.163	0.99	10.19	11.00	0.477
Right Tilt 15 Degree	165/5825	802.11a	0.125	0.051	1.77	10.19	11.00	0.151

NOTE: Head SAR test results of WLAN 5.8G

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	165/5825	802.11a	0.349	0.158	-3.78	10.19	11.00	0.421
Back Side	165/5825	802.11a	0.491	0.221	3.09	10.19	11.00	0.592

NOTE: Body-Worn SAR test results of WLAN 5.8G

Test Position of Hotspot with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	165/5825	802.11a	0.349	0.158	-3.78	10.19	11.00	0.421
Back Side	165/5825	802.11a	0.491	0.221	3.09	10.19	11.00	0.592
Right Side	165/5825	802.11a	0.225	0.102	-4.31	10.19	11.00	0.271
Top Side	165/5825	802.11a	0.384	0.173	-2.25	10.19	11.00	0.463

NOTE: Hotspot SAR test results of WLAN 5.8G

10.2. SAR Summation Scenario

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
		GSM 850	WLAN 2.4G			
Head	Left Cheek	0.523	0.719	1.242	N/A	N/A
	Left Tilt 15 Degree	0.174	0.256	0.430	N/A	N/A
	Right Cheek	0.518	0.716	1.234	N/A	N/A

	Right Tilt 15 Degree	0.169	0.249	0.418	N/A	N/A
Body-Worn	Front Side	0.522	0.172	0.694	N/A	N/A
	Back Side	0.659	0.242	0.901	N/A	N/A
Hotspot	Front Side	0.522	0.172	0.694	N/A	N/A
	Back Side	0.659	0.242	0.901	N/A	N/A
	Left Side	0.313	N/A	0.313	N/A	N/A
	Right Side	0.489	0.143	0.632	N/A	N/A
	Top Side	N/A	0.193	0.193	N/A	N/A
	Bottom Side	0.582	N/A	0.582	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of GSM850 and WLAN 2.4G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		GSM 1900	WLAN 2.4G			
Head	Left Cheek	0.345	0.719	1.064	N/A	N/A
	Left Tilt 15 Degree	0.193	0.256	0.449	N/A	N/A
	Right Cheek	0.332	0.716	1.047	N/A	N/A
	Right Tilt 15 Degree	0.185	0.249	0.434	N/A	N/A
Body-Worn	Front Side	0.392	0.172	0.564	N/A	N/A
	Back Side	0.555	0.242	0.797	N/A	N/A
Hotspot	Front Side	0.392	0.172	0.564	N/A	N/A
	Back Side	0.555	0.242	0.797	N/A	N/A
	Left Side	0.232	N/A	0.232	N/A	N/A
	Right Side	0.224	0.143	0.367	N/A	N/A
	Top Side	N/A	0.193	0.193	N/A	N/A
	Bottom Side	0.596	N/A	0.596	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of GSM1900 and WLAN 2.4G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		WCDMA Band 2	WLAN 2.4G			
Head	Left Cheek	0.314	0.719	1.033	N/A	N/A
	Left Tilt 15 Degree	0.141	0.256	0.397	N/A	N/A
	Right Cheek	0.312	0.716	1.028	N/A	N/A
	Right Tilt 15 Degree	0.140	0.249	0.389	N/A	N/A
Body-Worn	Front Side	0.350	0.172	0.521	N/A	N/A
	Back Side	0.521	0.242	0.763	N/A	N/A
Hotspot	Front Side	0.350	0.172	0.521	N/A	N/A
	Back Side	0.521	0.242	0.763	N/A	N/A
	Left Side	0.279	N/A	0.279	N/A	N/A

	Right Side	0.438	0.143	0.581	N/A	N/A
	Top Side	N/A	0.193	0.193	N/A	N/A
	Bottom Side	0.488	N/A	0.488	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of WCDMA Band 2 and WLAN 2.4G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		WCDMA Band 5	WLAN 2.4G			
Head	Left Cheek	0.309	0.719	1.028	N/A	N/A
	Left Tilt 15 Degree	0.186	0.256	0.442	N/A	N/A
	Right Cheek	0.305	0.716	1.021	N/A	N/A
	Right Tilt 15 Degree	0.182	0.249	0.432	N/A	N/A
Body-Worn	Front Side	0.272	0.172	0.444	N/A	N/A
	Back Side	0.344	0.242	0.586	N/A	N/A
Hotspot	Front Side	0.272	0.172	0.444	N/A	N/A
	Back Side	0.344	0.242	0.586	N/A	N/A
	Left Side	0.186	N/A	0.186	N/A	N/A
	Right Side	0.224	0.143	0.367	N/A	N/A
	Top Side	N/A	0.193	0.193	N/A	N/A
	Bottom Side	0.308	N/A	0.308	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of WCDMA Band 5 and WLAN 2.4G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band 4	WLAN 2.4G			
Head	Left Cheek	0.451	0.719	1.170	N/A	N/A
	Left Tilt 15 Degree	0.185	0.256	0.441	N/A	N/A
	Right Cheek	0.450	0.716	1.166	N/A	N/A
	Right Tilt 15 Degree	0.182	0.249	0.432	N/A	N/A
Body-Worn	Front Side	0.419	0.172	0.590	N/A	N/A
	Back Side	0.788	0.242	1.030	N/A	N/A
Hotspot	Front Side	0.419	0.172	0.590	N/A	N/A
	Back Side	0.788	0.242	1.030	N/A	N/A
	Left Side	0.564	N/A	0.564	N/A	N/A
	Right Side	0.544	0.143	0.687	N/A	N/A
	Top Side	N/A	0.193	0.193	N/A	N/A
	Bottom Side	0.716	N/A	0.716	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of LTE Band 4 and WLAN 2.4G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band 7	WLAN 2.4G			

Head	Left Cheek	0.380	0.719	1.099	N/A	N/A
	Left Tilt 15 Degree	0.175	0.256	0.431	N/A	N/A
	Right Cheek	0.378	0.716	1.094	N/A	N/A
	Right Tilt 15 Degree	0.173	0.249	0.422	N/A	N/A
Body-Worn	Front Side	0.447	0.172	0.618	N/A	N/A
	Back Side	0.809	0.242	1.051	N/A	N/A
Hotspot	Front Side	0.447	0.172	0.618	N/A	N/A
	Back Side	0.809	0.242	1.051	N/A	N/A
	Left Side	0.492	N/A	0.492	N/A	N/A
	Right Side	0.350	0.143	0.493	N/A	N/A
	Top Side	N/A	0.193	0.193	N/A	N/A
	Bottom Side	0.505	N/A	0.505	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of LTE Band 7 and WLAN 2.4G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		GSM 850	Bluetooth			
Head	Left Cheek	0.523	0.133	0.656	N/A	N/A
	Left Tilt 15 Degree	0.174	0.133	0.307	N/A	N/A
	Right Cheek	0.518	0.133	0.651	N/A	N/A
	Right Tilt 15 Degree	0.169	0.133	0.302	N/A	N/A
Body-Worn	Front Side	0.522	0.066	0.588	N/A	N/A
	Back Side	0.659	0.066	0.725	N/A	N/A
Hotspot	Front Side	0.522	0.066	0.588	N/A	N/A
	Back Side	0.659	0.066	0.725	N/A	N/A
	Left Side	0.313	N/A	0.313	N/A	N/A
	Right Side	0.489	0.066	0.555	N/A	N/A
	Top Side	N/A	0.066	0.066	N/A	N/A
	Bottom Side	0.582	N/A	0.582	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of GSM850 and Bluetooth.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		GSM 1900	Bluetooth			
Head	Left Cheek	0.345	0.133	0.478	N/A	N/A
	Left Tilt 15 Degree	0.193	0.133	0.326	N/A	N/A
	Right Cheek	0.332	0.133	0.465	N/A	N/A
	Right Tilt 15 Degree	0.185	0.133	0.318	N/A	N/A
Body-Worn	Front Side	0.392	0.066	0.458	N/A	N/A
	Back Side	0.555	0.066	0.621	N/A	N/A

Hotspot	Front Side	0.392	0.066	0.458	N/A	N/A
	Back Side	0.555	0.066	0.621	N/A	N/A
	Left Side	0.232	N/A	0.232	N/A	N/A
	Right Side	0.224	0.066	0.290	N/A	N/A
	Top Side	N/A	0.066	0.066	N/A	N/A
	Bottom Side	0.596	N/A	0.596	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of GSM1900 and Bluetooth.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		WCDMA Band 2	Bluetooth			
Head	Left Cheek	0.314	0.133	0.447	N/A	N/A
	Left Tilt 15 Degree	0.141	0.133	0.274	N/A	N/A
	Right Cheek	0.312	0.133	0.445	N/A	N/A
	Right Tilt 15 Degree	0.140	0.133	0.273	N/A	N/A
Body-Worn	Front Side	0.350	0.066	0.416	N/A	N/A
	Back Side	0.521	0.066	0.587	N/A	N/A
Hotspot	Front Side	0.350	0.066	0.416	N/A	N/A
	Back Side	0.521	0.066	0.587	N/A	N/A
	Left Side	0.279	N/A	0.279	N/A	N/A
	Right Side	0.438	0.066	0.504	N/A	N/A
	Top Side	N/A	0.066	0.066	N/A	N/A
	Bottom Side	0.488	N/A	0.488	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of WCDMA Band 2 and Bluetooth.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		WCDMA Band 5	Bluetooth			
Head	Left Cheek	0.309	0.133	0.442	N/A	N/A
	Left Tilt 15 Degree	0.186	0.133	0.319	N/A	N/A
	Right Cheek	0.305	0.133	0.438	N/A	N/A
	Right Tilt 15 Degree	0.182	0.133	0.315	N/A	N/A
Body-Worn	Front Side	0.272	0.066	0.338	N/A	N/A
	Back Side	0.344	0.066	0.410	N/A	N/A
Hotspot	Front Side	0.272	0.066	0.338	N/A	N/A
	Back Side	0.344	0.066	0.410	N/A	N/A
	Left Side	0.186	N/A	0.186	N/A	N/A
	Right Side	0.224	0.066	0.290	N/A	N/A
	Top Side	N/A	0.066	0.066	N/A	N/A
	Bottom Side	0.308	N/A	0.308	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of WCDMA Band 5 and Bluetooth.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band 4	Bluetooth			
Head	Left Cheek	0.451	0.133	0.584	N/A	N/A
	Left Tilt 15 Degree	0.185	0.133	0.318	N/A	N/A
	Right Cheek	0.450	0.133	0.583	N/A	N/A
	Right Tilt 15 Degree	0.182	0.133	0.315	N/A	N/A
Body-Worn	Front Side	0.419	0.066	0.485	N/A	N/A
	Back Side	0.788	0.066	0.854	N/A	N/A
Hotspot	Front Side	0.419	0.066	0.485	N/A	N/A
	Back Side	0.788	0.066	0.854	N/A	N/A
	Left Side	0.564	N/A	0.564	N/A	N/A
	Right Side	0.544	0.066	0.610	N/A	N/A
	Top Side	N/A	0.066	0.066	N/A	N/A
	Bottom Side	0.716	N/A	0.716	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of LTE Band 4 and Bluetooth.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band 7	Bluetooth			
Head	Left Cheek	0.380	0.133	0.513	N/A	N/A
	Left Tilt 15 Degree	0.175	0.133	0.308	N/A	N/A
	Right Cheek	0.378	0.133	0.511	N/A	N/A
	Right Tilt 15 Degree	0.173	0.133	0.306	N/A	N/A
Body-Worn	Front Side	0.447	0.066	0.513	N/A	N/A
	Back Side	0.809	0.066	0.875	N/A	N/A
Hotspot	Front Side	0.447	0.066	0.513	N/A	N/A
	Back Side	0.809	0.066	0.875	N/A	N/A
	Left Side	0.492	N/A	0.492	N/A	N/A
	Right Side	0.350	0.066	0.416	N/A	N/A
	Top Side	N/A	0.066	0.066	N/A	N/A
	Bottom Side	0.505	N/A	0.505	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of LTE Band 7 and Bluetooth.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		GSM 850	WLAN 5.2G			
Head	Left Cheek	0.523	0.358	0.881	N/A	N/A
	Left Tilt 15	0.174	0.158	0.332	N/A	N/A

	Degree					
	Right Cheek	0.518	0.360	0.879	N/A	N/A
	Right Tilt 15 Degree	0.169	0.155	0.324	N/A	N/A
Body-Worn	Front Side	0.522	0.292	0.814	N/A	N/A
	Back Side	0.659	0.481	1.140	N/A	N/A
Hotspot	Front Side	0.522	0.292	0.814	N/A	N/A
	Back Side	0.659	0.481	1.140	N/A	N/A
	Left Side	0.313	N/A	0.313	N/A	N/A
	Right Side	0.489	0.436	0.924	N/A	N/A
	Top Side	N/A	0.450	0.450	N/A	N/A
	Bottom Side	0.582	N/A	0.582	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of GSM850 and WLAN 5.2G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		GSM 1900	WLAN 5.2G			
Head	Left Cheek	0.345	0.358	0.703	N/A	N/A
	Left Tilt 15 Degree	0.193	0.158	0.350	N/A	N/A
	Right Cheek	0.332	0.360	0.692	N/A	N/A
	Right Tilt 15 Degree	0.185	0.155	0.340	N/A	N/A
Body-Worn	Front Side	0.392	0.292	0.684	N/A	N/A
	Back Side	0.555	0.481	1.036	N/A	N/A
Hotspot	Front Side	0.392	0.292	0.684	N/A	N/A
	Back Side	0.555	0.481	1.036	N/A	N/A
	Left Side	0.232	N/A	0.232	N/A	N/A
	Right Side	0.224	0.436	0.659	N/A	N/A
	Top Side	N/A	0.450	0.450	N/A	N/A
	Bottom Side	0.596	N/A	0.596	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of GSM1900 and WLAN 5.2G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		WCDMA Band 2	WLAN 5.2G			
Head	Left Cheek	0.314	0.358	0.672	N/A	N/A
	Left Tilt 15 Degree	0.141	0.158	0.299	N/A	N/A
	Right Cheek	0.312	0.360	0.673	N/A	N/A
	Right Tilt 15 Degree	0.140	0.155	0.295	N/A	N/A
Body-Worn	Front Side	0.350	0.292	0.642	N/A	N/A
	Back Side	0.521	0.481	1.002	N/A	N/A
Hotspot	Front Side	0.350	0.292	0.642	N/A	N/A

	Back Side	0.521	0.481	1.002	N/A	N/A
	Left Side	0.279	N/A	0.279	N/A	N/A
	Right Side	0.438	0.436	0.874	N/A	N/A
	Top Side	N/A	0.450	0.450	N/A	N/A
	Bottom Side	0.488	N/A	0.488	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of WCDMA Band 2 and WLAN 5.2G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		WCDMA Band 5	WLAN 5.2G			
Head	Left Cheek	0.309	0.358	0.667	N/A	N/A
	Left Tilt 15 Degree	0.186	0.158	0.344	N/A	N/A
	Right Cheek	0.305	0.360	0.666	N/A	N/A
	Right Tilt 15 Degree	0.182	0.155	0.338	N/A	N/A
Body-Worn	Front Side	0.272	0.292	0.564	N/A	N/A
	Back Side	0.344	0.481	0.825	N/A	N/A
Hotspot	Front Side	0.272	0.292	0.564	N/A	N/A
	Back Side	0.344	0.481	0.825	N/A	N/A
	Left Side	0.186	N/A	0.186	N/A	N/A
	Right Side	0.224	0.436	0.659	N/A	N/A
	Top Side	N/A	0.450	0.450	N/A	N/A
	Bottom Side	0.308	N/A	0.308	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of WCDMA Band 5 and WLAN 5.2G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band 4	WLAN 5.2G			
Head	Left Cheek	0.451	0.358	0.809	N/A	N/A
	Left Tilt 15 Degree	0.185	0.158	0.342	N/A	N/A
	Right Cheek	0.450	0.360	0.811	N/A	N/A
	Right Tilt 15 Degree	0.182	0.155	0.338	N/A	N/A
Body-Worn	Front Side	0.419	0.292	0.711	N/A	N/A
	Back Side	0.788	0.481	1.269	N/A	N/A
Hotspot	Front Side	0.419	0.292	0.711	N/A	N/A
	Back Side	0.788	0.481	1.269	N/A	N/A
	Left Side	0.564	N/A	0.564	N/A	N/A
	Right Side	0.544	0.436	0.980	N/A	N/A
	Top Side	N/A	0.450	0.450	N/A	N/A
	Bottom Side	0.716	N/A	0.716	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of LTE Band 4 and WLAN 5.2G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band 7	WLAN 5.2G			
Head	Left Cheek	0.380	0.358	0.738	N/A	N/A
	Left Tilt 15 Degree	0.175	0.158	0.333	N/A	N/A
	Right Cheek	0.378	0.360	0.738	N/A	N/A
	Right Tilt 15 Degree	0.173	0.155	0.328	N/A	N/A
Body-Worn	Front Side	0.447	0.292	0.739	N/A	N/A
	Back Side	0.809	0.481	1.290	N/A	N/A
Hotspot	Front Side	0.447	0.292	0.739	N/A	N/A
	Back Side	0.809	0.481	1.290	N/A	N/A
	Left Side	0.492	N/A	0.492	N/A	N/A
	Right Side	0.350	0.436	0.786	N/A	N/A
	Top Side	N/A	0.450	0.450	N/A	N/A
	Bottom Side	0.505	N/A	0.505	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of LTE Band 7 and WLAN 5.2G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		GSM 850	WLAN 5.8G			
Head	Left Cheek	0.523	0.472	0.996	N/A	N/A
	Left Tilt 15 Degree	0.174	0.154	0.328	N/A	N/A
	Right Cheek	0.518	0.477	0.995	N/A	N/A
	Right Tilt 15 Degree	0.169	0.151	0.320	N/A	N/A
Body-Worn	Front Side	0.522	0.421	0.943	N/A	N/A
	Back Side	0.659	0.592	1.251	N/A	N/A
Hotspot	Front Side	0.522	0.421	0.943	N/A	N/A
	Back Side	0.659	0.592	1.251	N/A	N/A
	Left Side	0.313	N/A	0.313	N/A	N/A
	Right Side	0.489	0.271	0.760	N/A	N/A
	Top Side	N/A	0.463	0.463	N/A	N/A
	Bottom Side	0.582	N/A	0.582	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of GSM850 and WLAN 5.8G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		GSM 1900	WLAN 5.8G			
Head	Left Cheek	0.345	0.472	0.817	N/A	N/A
	Left Tilt 15 Degree	0.193	0.154	0.347	N/A	N/A
	Right Cheek	0.332	0.477	0.809	N/A	N/A
	Right Tilt 15 Degree	0.185	0.151	0.336	N/A	N/A

Body-Worn	Front Side	0.392	0.421	0.813	N/A	N/A
	Back Side	0.555	0.592	1.147	N/A	N/A
Hotspot	Front Side	0.392	0.421	0.813	N/A	N/A
	Back Side	0.555	0.592	1.147	N/A	N/A
	Left Side	0.232	N/A	0.232	N/A	N/A
	Right Side	0.224	0.271	0.495	N/A	N/A
	Top Side	N/A	0.463	0.463	N/A	N/A
	Bottom Side	0.596	N/A	0.596	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of GSM1900 and WLAN 5.8G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		WCDMA Band 2	WLAN 5.8G			
Head	Left Cheek	0.314	0.472	0.787	N/A	N/A
	Left Tilt 15 Degree	0.141	0.154	0.295	N/A	N/A
	Right Cheek	0.312	0.477	0.789	N/A	N/A
	Right Tilt 15 Degree	0.140	0.151	0.291	N/A	N/A
Body-Worn	Front Side	0.350	0.421	0.770	N/A	N/A
	Back Side	0.521	0.592	1.113	N/A	N/A
Hotspot	Front Side	0.350	0.421	0.770	N/A	N/A
	Back Side	0.521	0.592	1.113	N/A	N/A
	Left Side	0.279	N/A	0.279	N/A	N/A
	Right Side	0.438	0.271	0.709	N/A	N/A
	Top Side	N/A	0.463	0.463	N/A	N/A
	Bottom Side	0.488	N/A	0.488	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of WCDMA Band 2 and WLAN 5.8G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		WCDMA Band 5	WLAN 5.8G			
Head	Left Cheek	0.309	0.472	0.781	N/A	N/A
	Left Tilt 15 Degree	0.186	0.154	0.340	N/A	N/A
	Right Cheek	0.305	0.477	0.782	N/A	N/A
	Right Tilt 15 Degree	0.182	0.151	0.333	N/A	N/A
Body-Worn	Front Side	0.272	0.421	0.693	N/A	N/A
	Back Side	0.344	0.592	0.936	N/A	N/A
Hotspot	Front Side	0.272	0.421	0.693	N/A	N/A
	Back Side	0.344	0.592	0.936	N/A	N/A
	Left Side	0.186	N/A	0.186	N/A	N/A
	Right Side	0.224	0.271	0.495	N/A	N/A

	Top Side	N/A	0.463	0.463	N/A	N/A
	Bottom Side	0.308	N/A	0.308	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of WCDMA Band 5 and WLAN 5.8G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band 4	WLAN 5.8G			
Head	Left Cheek	0.451	0.472	0.924	N/A	N/A
	Left Tilt 15 Degree	0.185	0.154	0.339	N/A	N/A
	Right Cheek	0.450	0.477	0.927	N/A	N/A
	Right Tilt 15 Degree	0.182	0.151	0.333	N/A	N/A
Body-Worn	Front Side	0.419	0.421	0.839	N/A	N/A
	Back Side	0.788	0.592	1.380	N/A	N/A
Hotspot	Front Side	0.419	0.421	0.839	N/A	N/A
	Back Side	0.788	0.592	1.380	N/A	N/A
	Left Side	0.564	N/A	0.564	N/A	N/A
	Right Side	0.544	0.271	0.815	N/A	N/A
	Top Side	N/A	0.463	0.463	N/A	N/A
	Bottom Side	0.716	N/A	0.716	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of LTE Band 4 and WLAN 5.8G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band 7	WLAN 5.8G			
Head	Left Cheek	0.380	0.472	0.853	N/A	N/A
	Left Tilt 15 Degree	0.175	0.154	0.329	N/A	N/A
	Right Cheek	0.378	0.477	0.855	N/A	N/A
	Right Tilt 15 Degree	0.173	0.151	0.324	N/A	N/A
Body-Worn	Front Side	0.447	0.421	0.867	N/A	N/A
	Back Side	0.809	0.592	1.400	N/A	N/A
Hotspot	Front Side	0.447	0.421	0.867	N/A	N/A
	Back Side	0.809	0.592	1.400	N/A	N/A
	Left Side	0.492	N/A	0.492	N/A	N/A
	Right Side	0.350	0.271	0.621	N/A	N/A
	Top Side	N/A	0.463	0.463	N/A	N/A
	Bottom Side	0.505	N/A	0.505	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of LTE Band 7 and WLAN 5.8G.

11. Appendix A. Photo documentation

Refer to appendix Test Setup photo---SAR

12. Appendix B. System Check Plots

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MEASUREMENT 1 System Performance Check - SID835 - Head
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MEASUREMENT 5 System Performance Check - SID1900 - Head
MEASUREMENT 6 System Performance Check - SID1900 - Body
MEASUREMENT 7 System Performance Check - SID2450 - Head
MEASUREMENT 8 System Performance Check - SID2450 - Body
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MEASUREMENT 11 System Performance Check - SID5200 - Head
MEASUREMENT 12 System Performance Check - SID5200 - Body
MEASUREMENT 13 System Performance Check - SID5800 - Head
MEASUREMENT 14 System Performance Check - SID5800 - Body

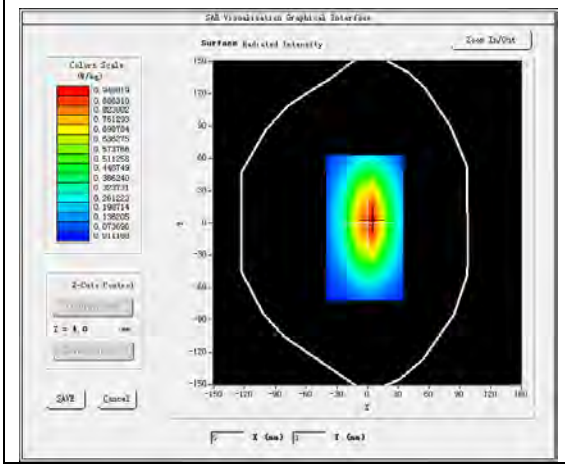
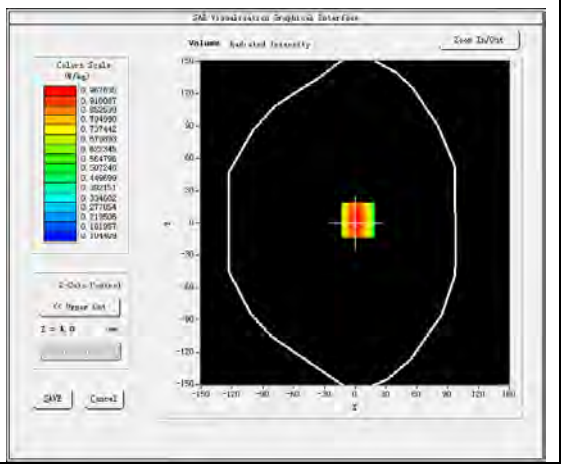
MEASUREMENT 1

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	CW835
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

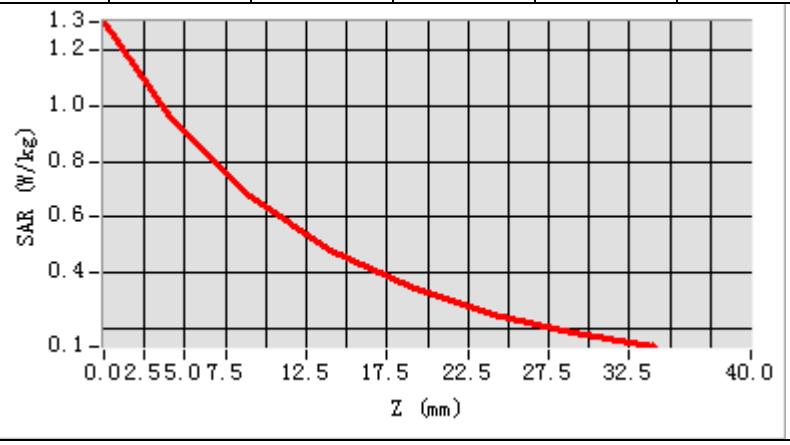
Frequency (MHz)	835.000000
Relative permittivity (real part)	40.679412
Relative permittivity (imaginary part)	20.075628
Conductivity (S/m)	0.931617
Variation (%)	1.690000

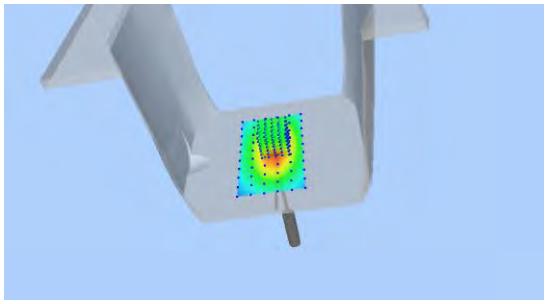
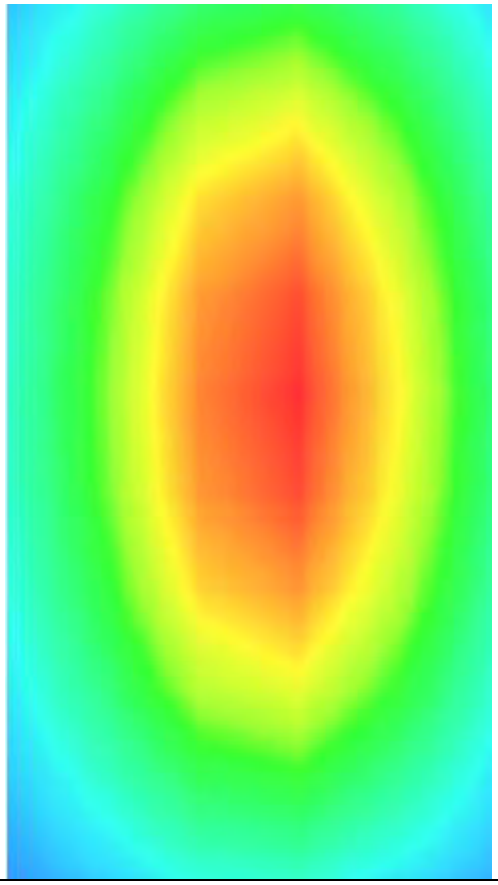
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=3.00, Y=3.00
SAR Peak: 1.30 W/kg

SAR 10g (W/Kg)	0.614492
SAR 1g (W/Kg)	0.931648

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.3006	0.9675	0.6742	0.4820	0.3498	0.2536	0.1861



3D screen shot	Hot spot position
	

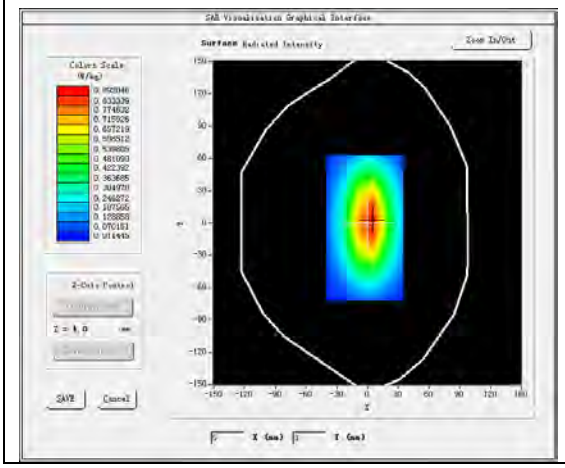
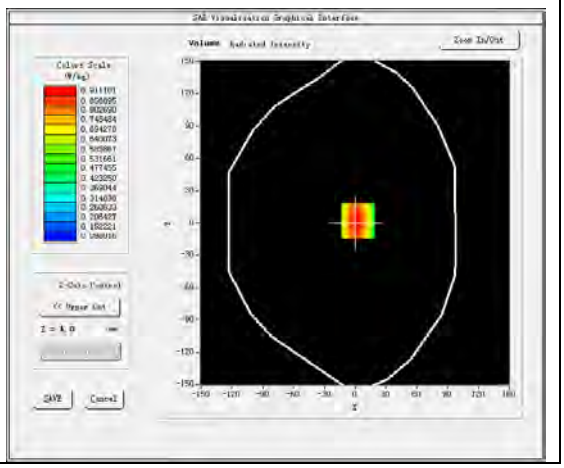
MEASUREMENT 2

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	CW835
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

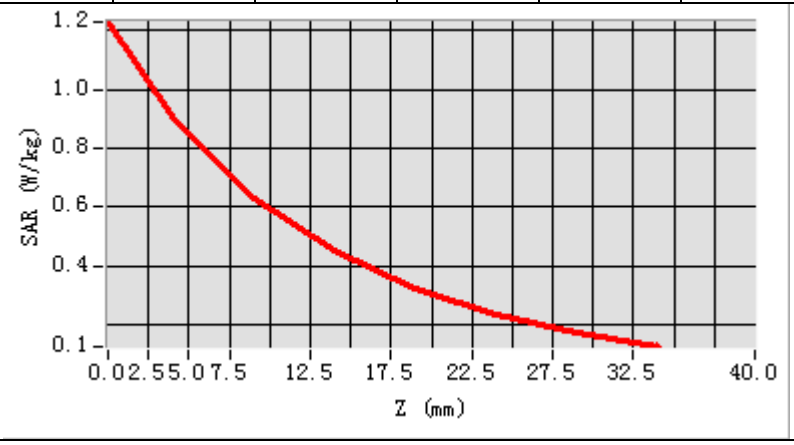
Frequency (MHz)	835.000000
Relative permittivity (real part)	54.332162
Relative permittivity (imaginary part)	21.843428
Conductivity (S/m)	1.011652
Variation (%)	-1.330000

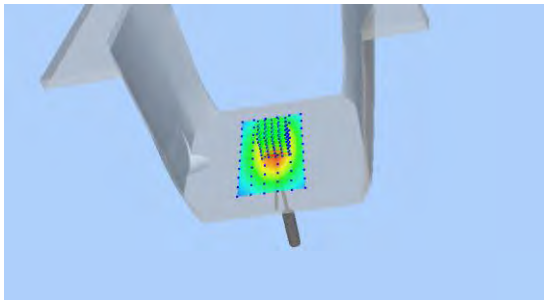
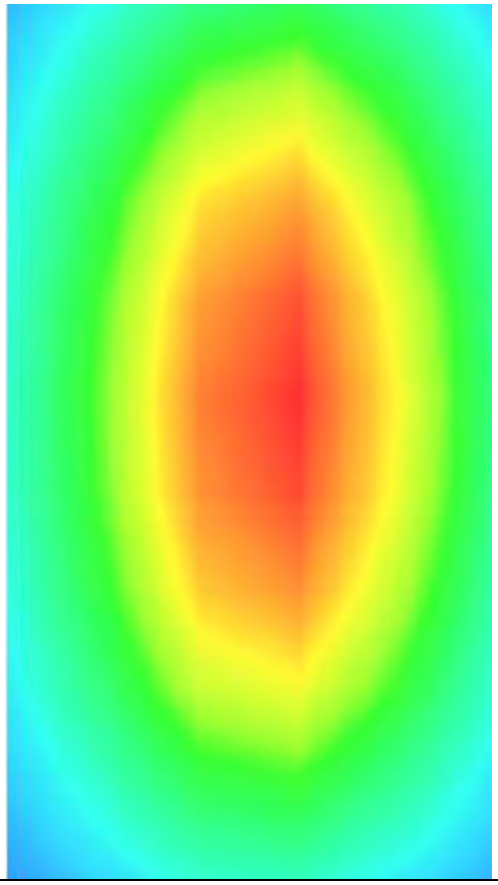
SURFACE SAR	VOLUME SAR
	

Maximum location: X=3.00, Y=2.00
SAR Peak: 1.23 W/kg

SAR 10g (W/Kg)	0.618339
SAR 1g (W/Kg)	0.934152

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.2282	0.9121	0.6342	0.4551	0.3281	0.2386	0.1750



3D screen shot	Hot spot position
	

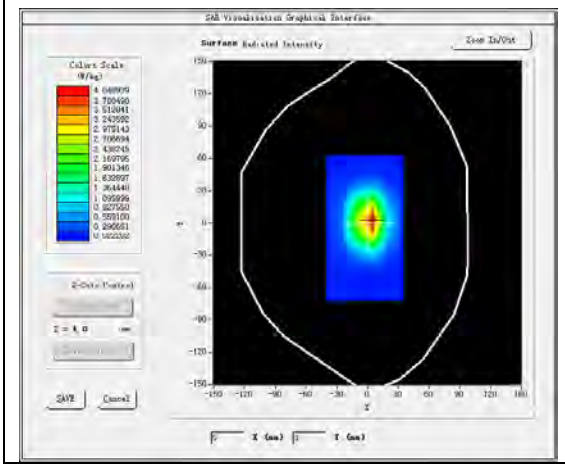
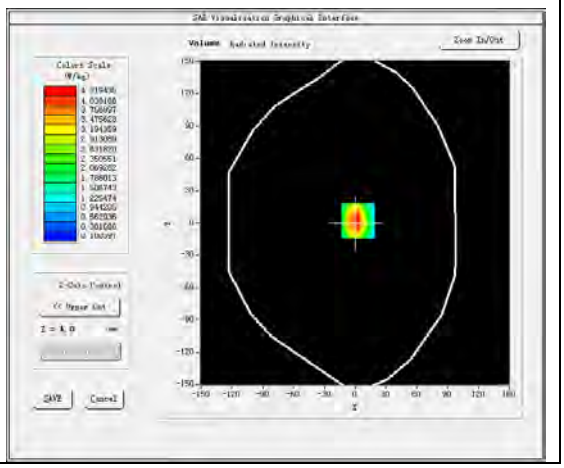
MEASUREMENT 3

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

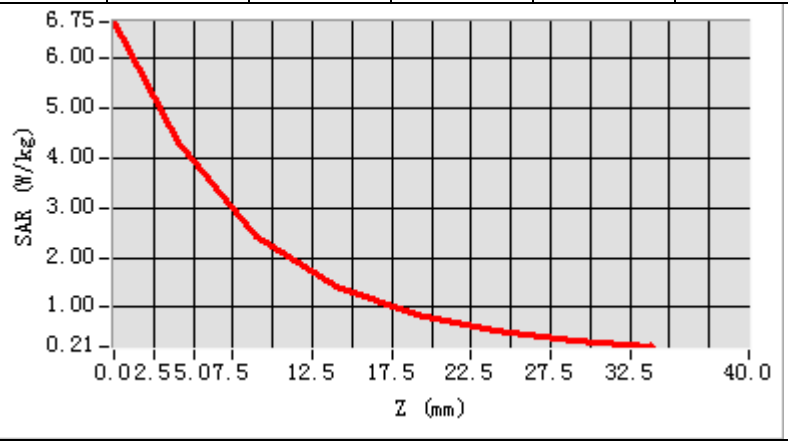
Frequency (MHz)	1800.000000
Relative permittivity (real part)	38.561325
Relative permittivity (imaginary part)	14.032541
Conductivity (S/m)	1.402526
Variation (%)	2.180000

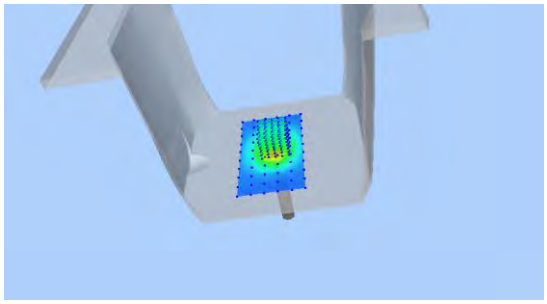
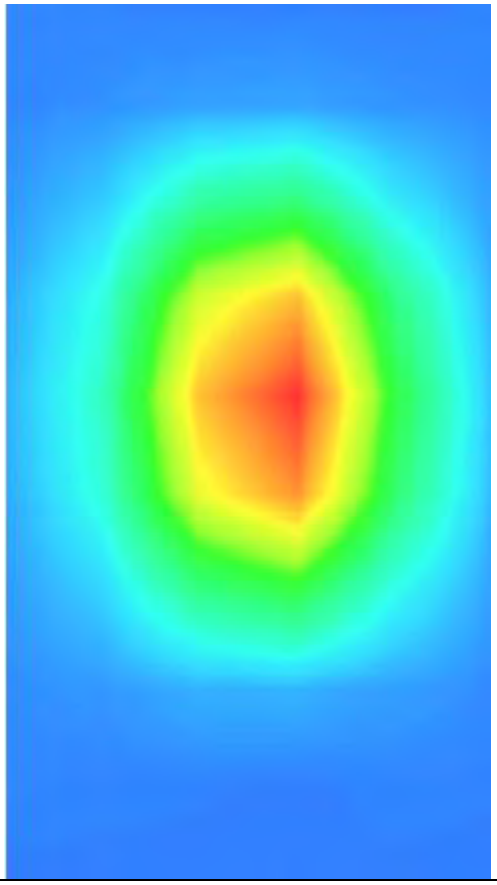
SURFACE SAR	VOLUME SAR
	

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

SAR 10g (W/Kg)	2.005416
SAR 1g (W/Kg)	3.751638

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.7452	4.3183	2.4336	1.4215	0.8552	0.5216	0.3272



3D screen shot	Hot spot position
	

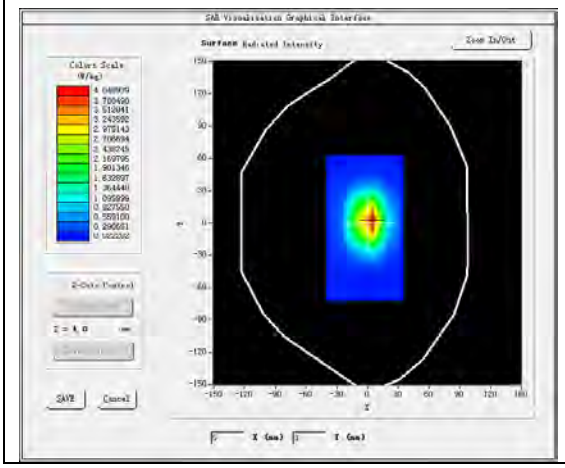
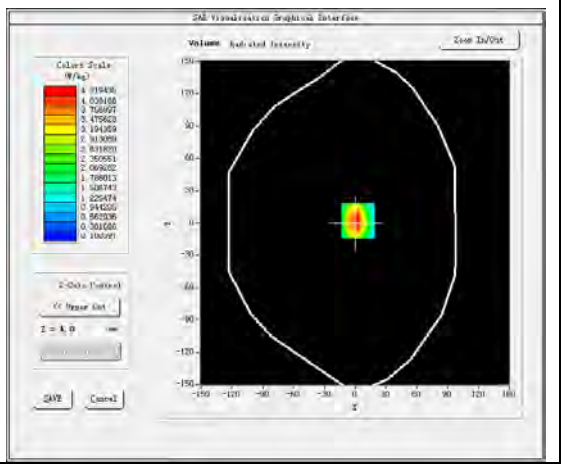
MEASUREMENT 4

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

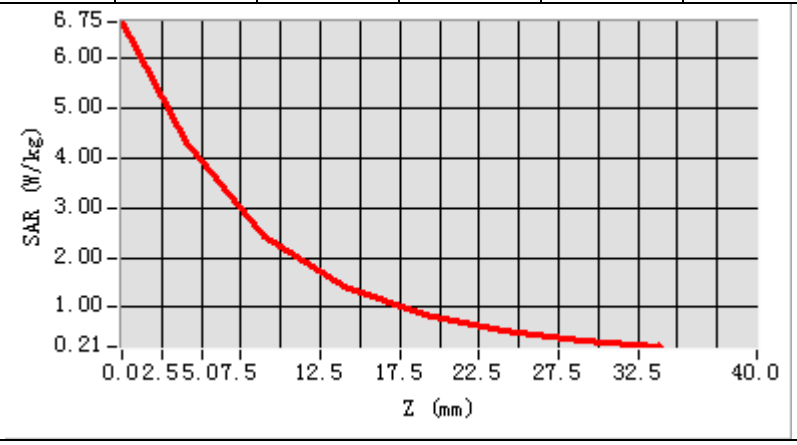
Frequency (MHz)	1800.000000
Relative permittivity (real part)	53.242845
Relative permittivity (imaginary part)	15.601182
Conductivity (S/m)	1.563542
Variation (%)	3.240000

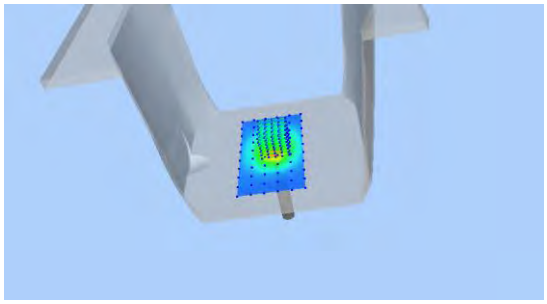
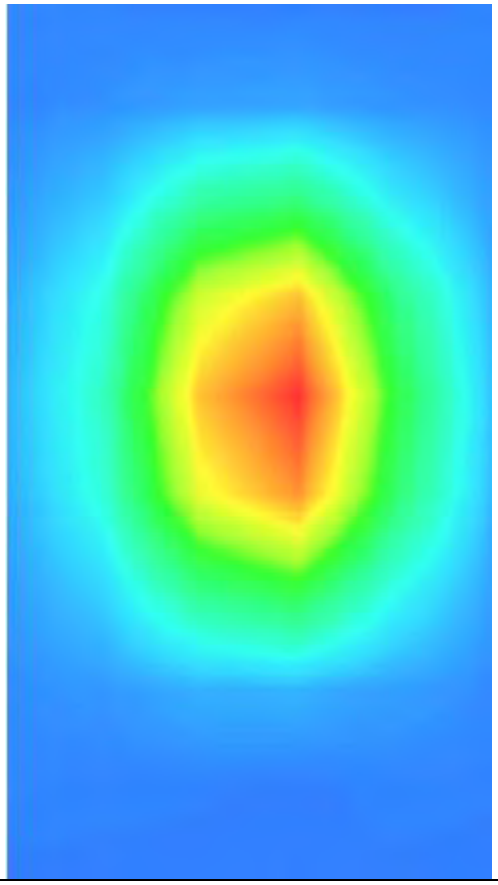
SURFACE SAR	VOLUME SAR
	

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

SAR 10g (W/Kg)	2.018463
SAR 1g (W/Kg)	3.634126

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.7452	4.3178	2.4325	1.4219	0.8555	0.5211	0.3262



3D screen shot	Hot spot position
	

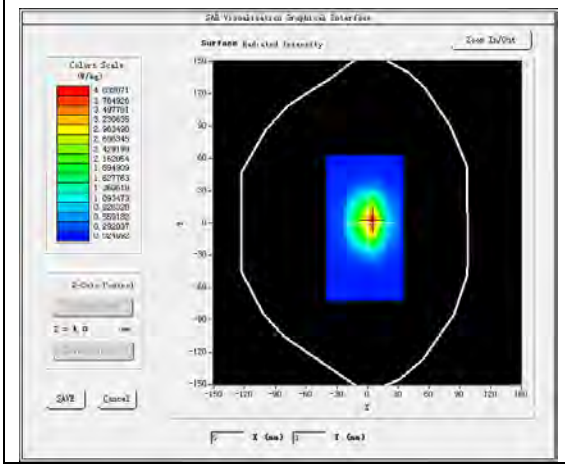
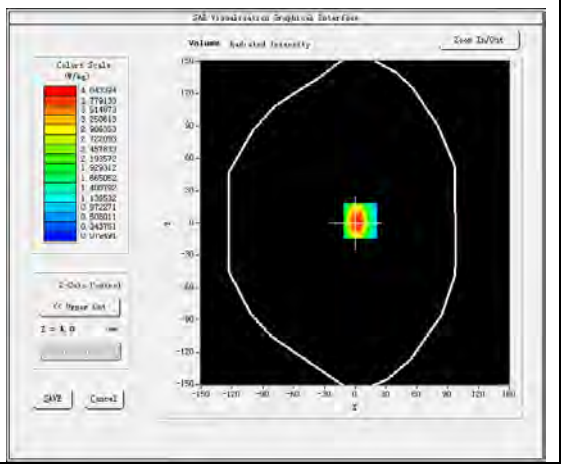
MEASUREMENT 5

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

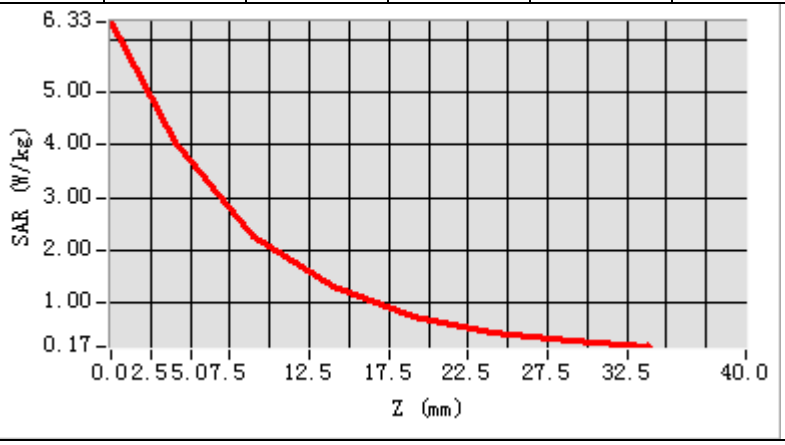
Frequency (MHz)	1900.000000
Relative permittivity (real part)	40.913265
Relative permittivity (imaginary part)	13.78057
Conductivity (S/m)	1.452843
Variation (%)	1.360000

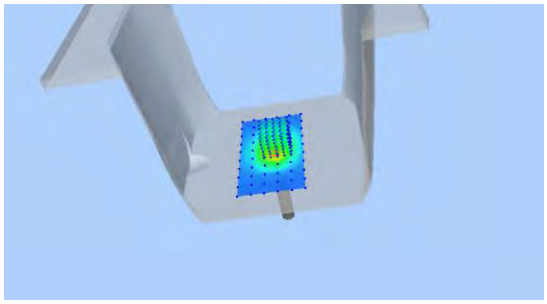
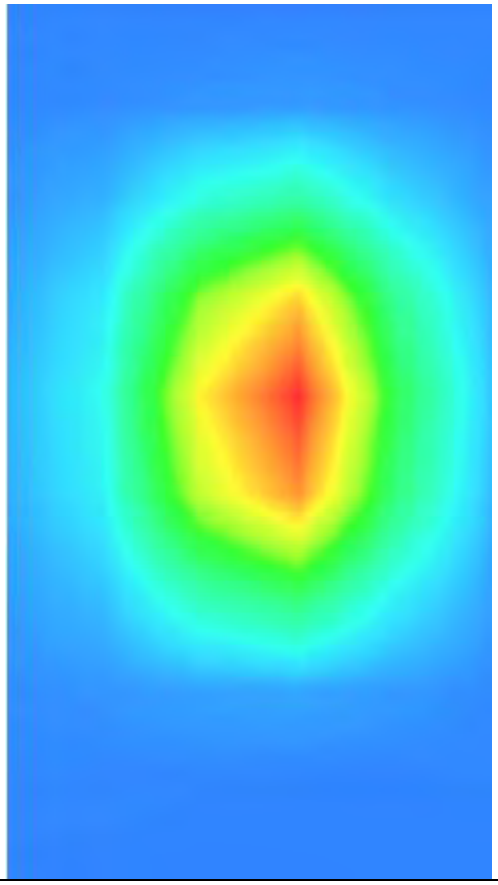
SURFACE SAR	VOLUME SAR
	

Maximum location: X=5.00, Y=2.00
SAR Peak: 6.70 W/kg

SAR 10g (W/Kg)	2.121336
SAR 1g (W/Kg)	3.876982

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.3258	4.0442	2.2611	1.3090	0.7601	0.4560	0.2753



3D screen shot	Hot spot position
	

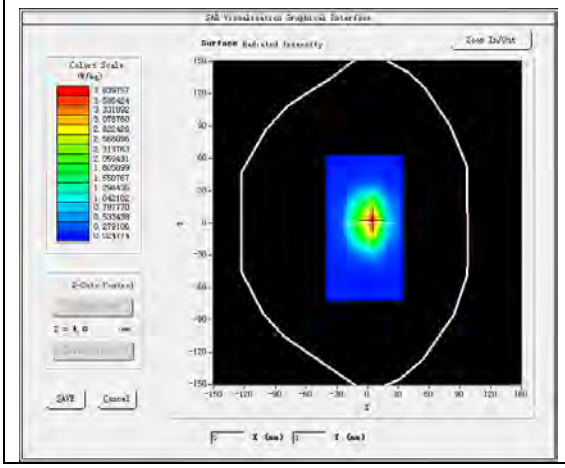
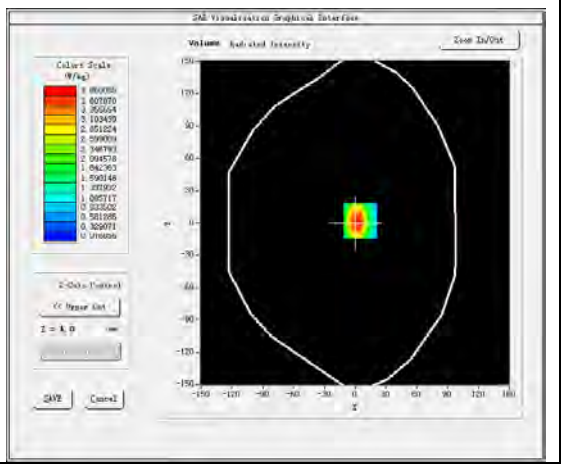
MEASUREMENT 6

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

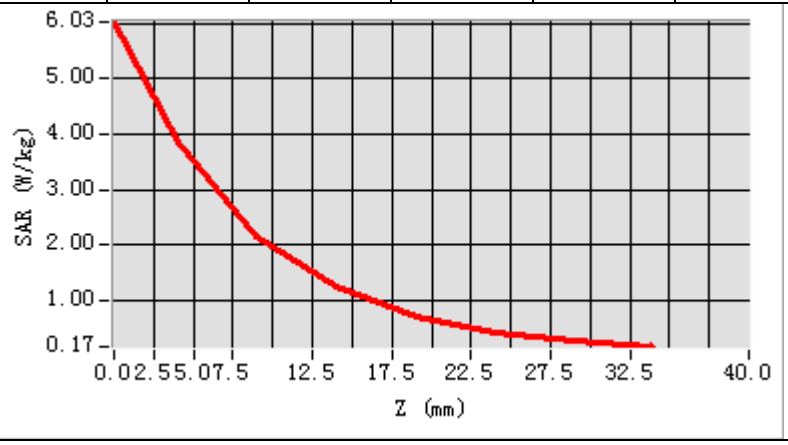
Frequency (MHz)	1900.000000
Relative permittivity (real part)	52.663982
Relative permittivity (imaginary part)	14.983316
Conductivity (S/m)	1.578528
Variation (%)	1.840000

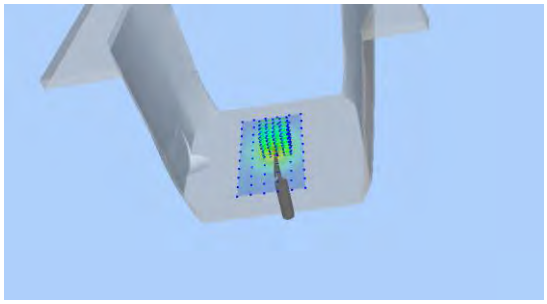
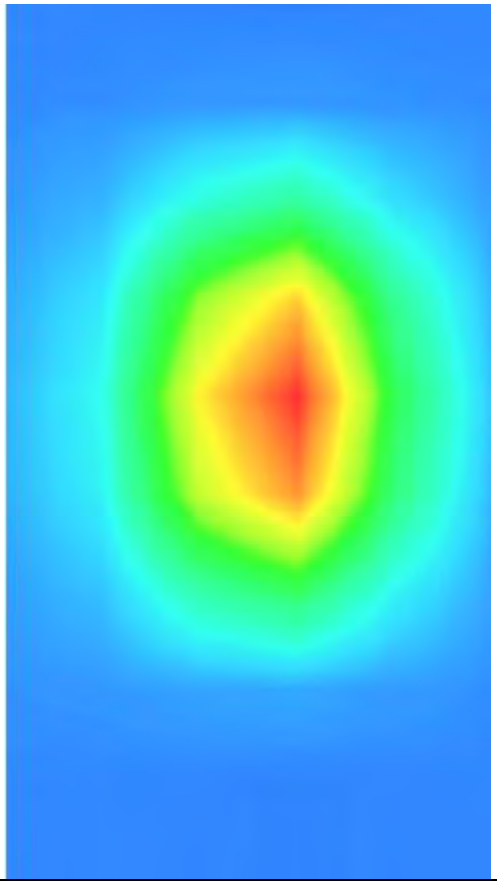
SURFACE SAR	VOLUME SAR
	

Maximum location: X=5.00, Y=2.00
SAR Peak: 6.39 W/kg

SAR 10g (W/Kg)	2.108324
SAR 1g (W/Kg)	3.911634

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.0320	3.8611	2.1622	1.2498	0.7269	0.4365	0.2651



3D screen shot	Hot spot position
	

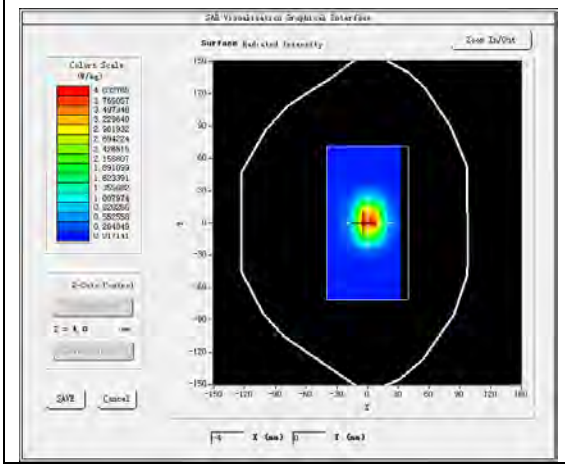
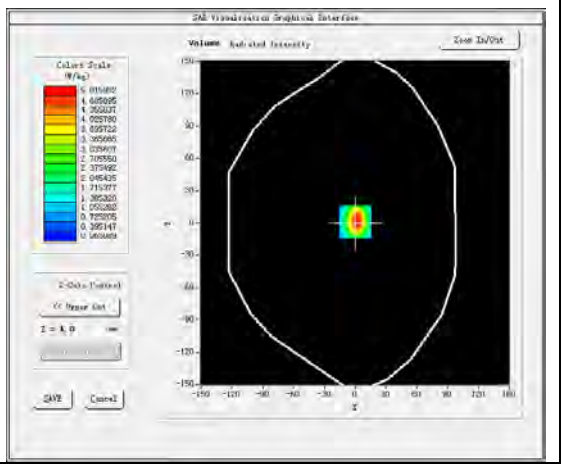
MEASUREMENT 7

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

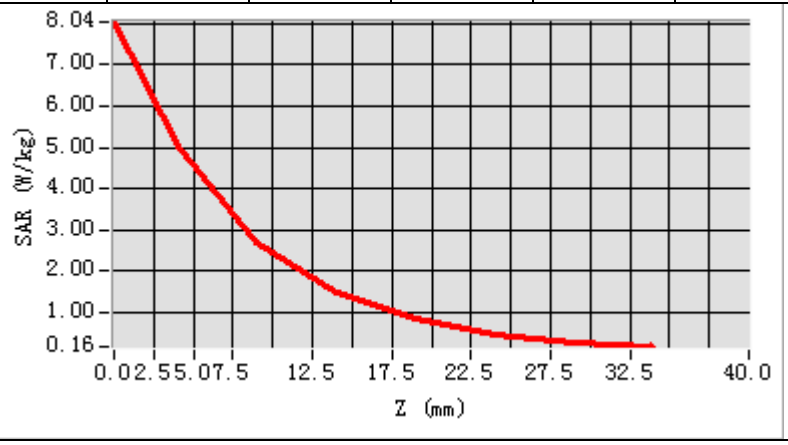
Frequency (MHz)	2450.000000
Relative permittivity (real part)	38.938421
Relative permittivity (imaginary part)	13.552631
Conductivity (S/m)	1.842163
Variation (%)	1.310000

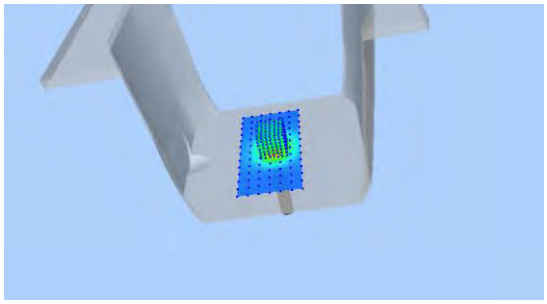
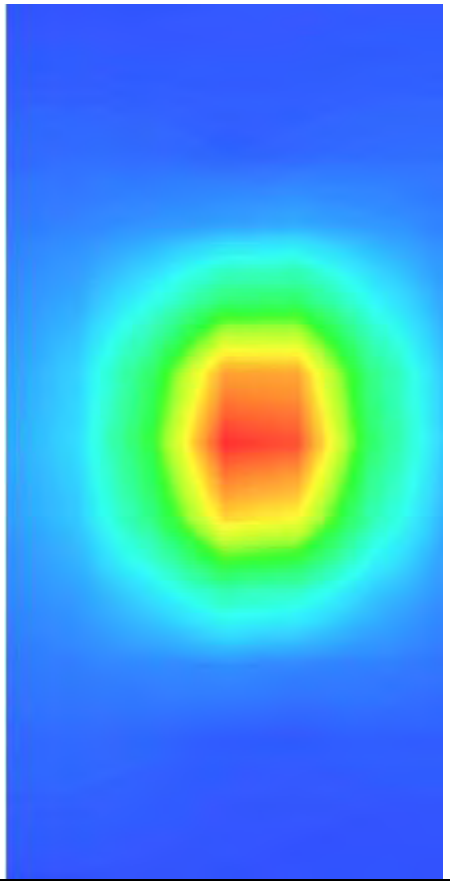
SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=1.00
SAR Peak: 8.14 W/kg

SAR 10g (W/Kg)	2.366248
SAR 1g (W/Kg)	5.183462

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	8.0392	5.0166	2.6980	1.4827	0.8311	0.4676	0.2692



3D screen shot	Hot spot position
	

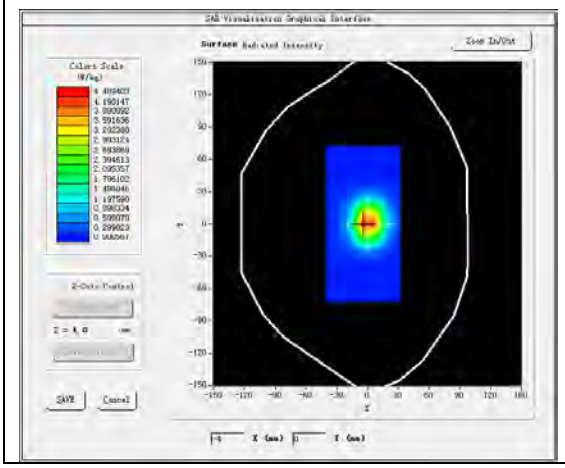
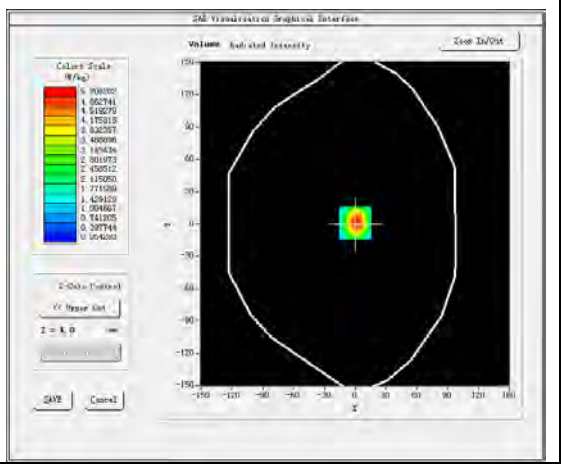
MEASUREMENT 8

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

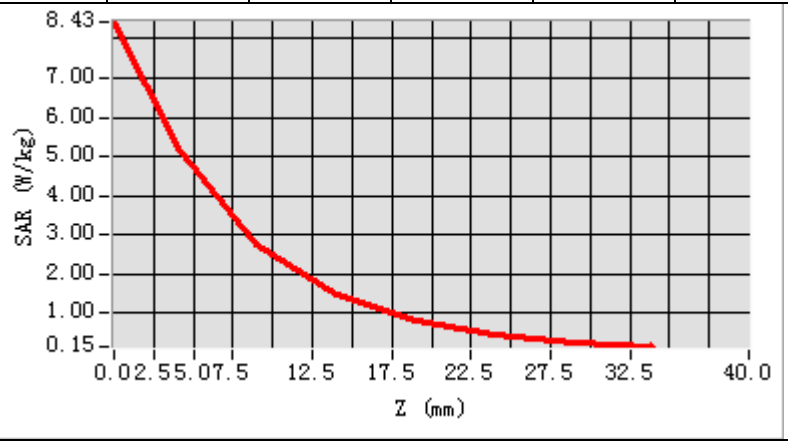
Frequency (MHz)	2450.000000
Relative permittivity (real part)	52.273427
Relative permittivity (imaginary part)	14.874253
Conductivity (S/m)	2.021329
Variation (%)	3.120000

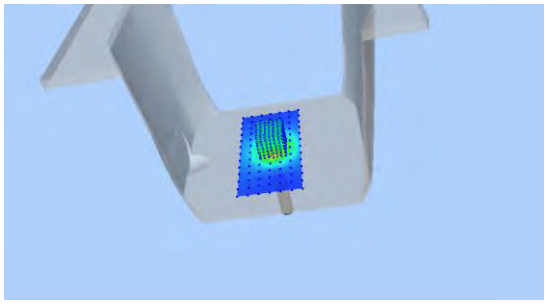
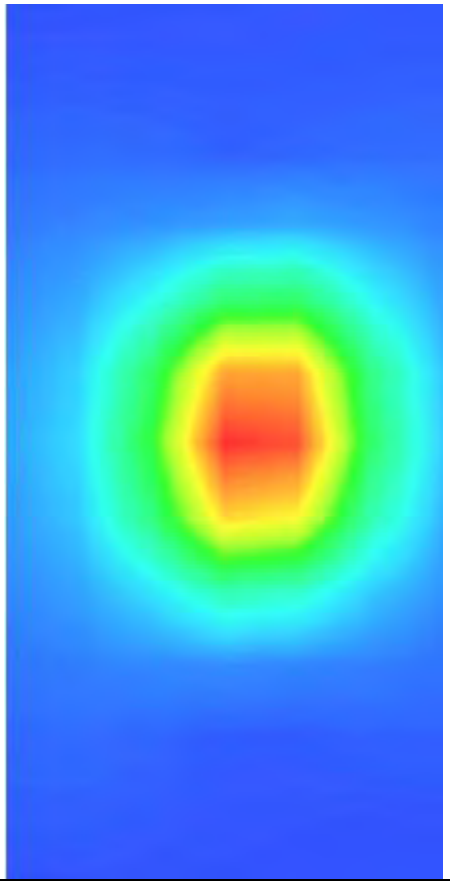
SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=1.00
SAR Peak: 8.46 W/kg

SAR 10g (W/Kg)	2.364252
SAR 1g (W/Kg)	4.893245

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	8.4342	5.2281	2.7555	1.4231	0.8222	0.4375	0.2541



3D screen shot	Hot spot position
	

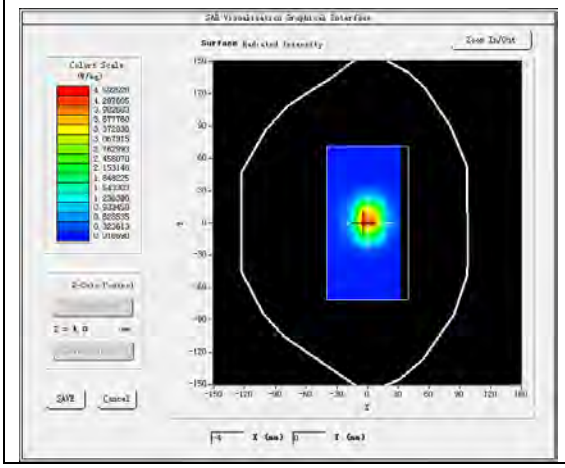
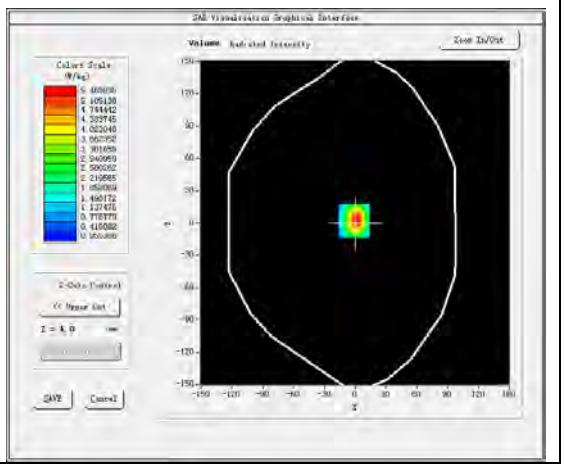
MEASUREMENT 9

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW2600
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

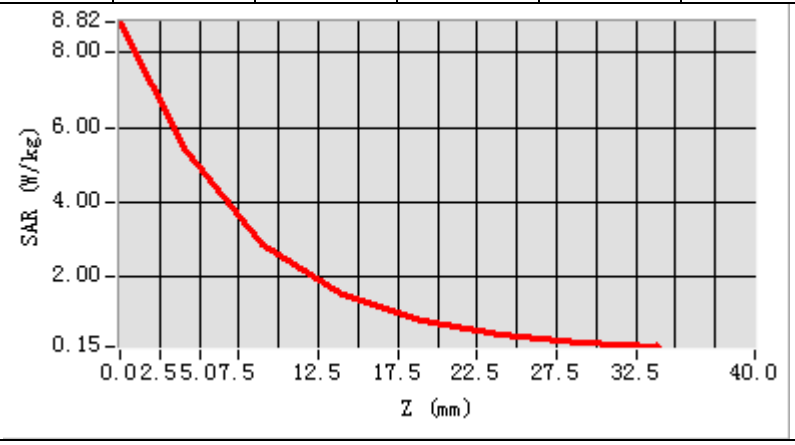
Frequency (MHz)	2600.000000
Relative permittivity (real part)	38.392631
Relative permittivity (imaginary part)	14.058962
Conductivity (S/m)	2.033114
Variation (%)	1.940000

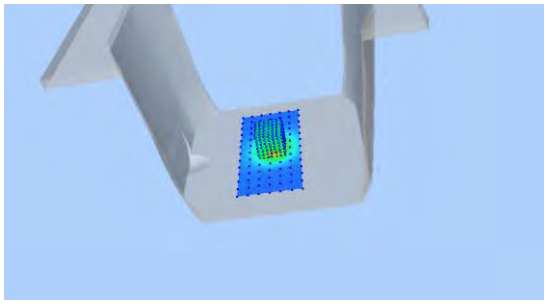
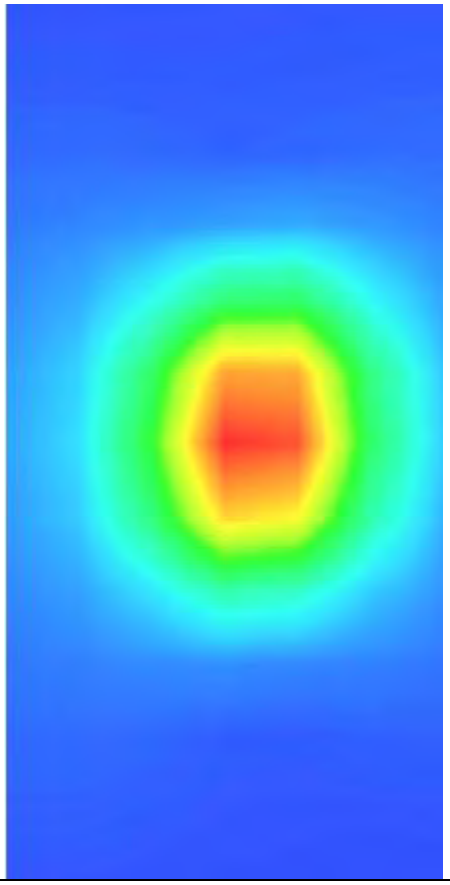
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-1.00, Y=2.00
SAR Peak: 9.07 W/kg

SAR 10g (W/Kg)	2.415252
SAR 1g (W/Kg)	5.462883

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	8.8192	5.4641	2.8988	1.5676	0.8592	0.4722	0.2641



3D screen shot	Hot spot position
	

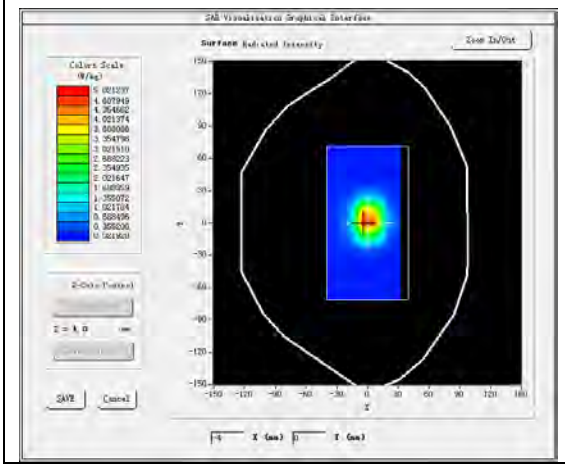
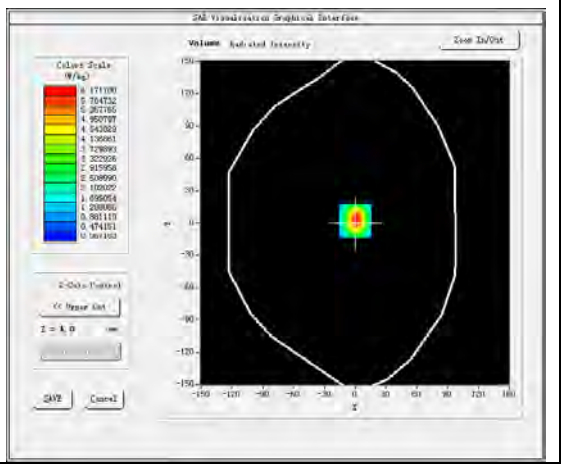
MEASUREMENT 10

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW2600
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

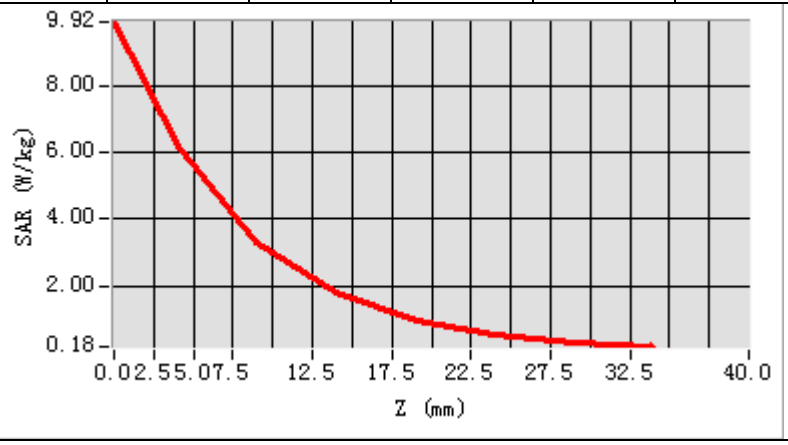
Frequency (MHz)	2600.000000
Relative permittivity (real part)	52.682138
Relative permittivity (imaginary part)	15.354319
Conductivity (S/m)	2.220816
Variation (%)	-1.330000

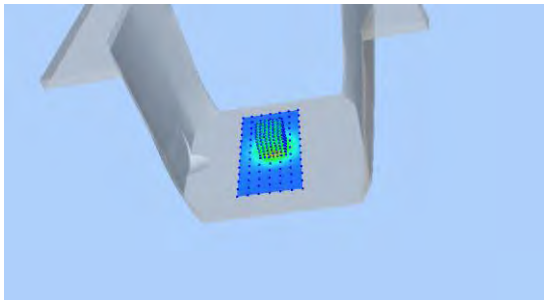
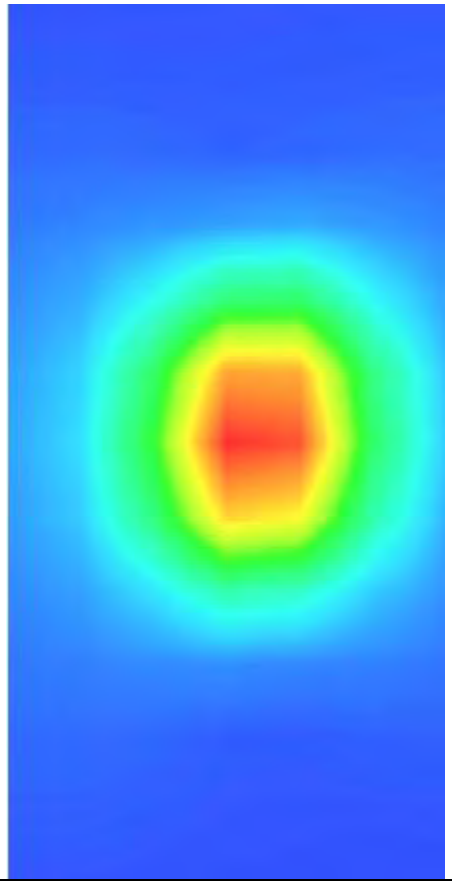
SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=2.00
SAR Peak: 9.99 W/kg

SAR 10g (W/Kg)	2.236452
SAR 1g (W/Kg)	5.188463

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	9.9172	6.1716	3.2975	1.7818	0.9872	0.5460	0.3108



3D screen shot	Hot spot position
	

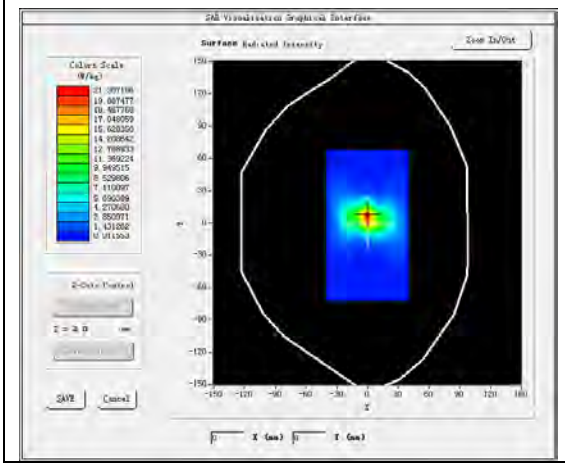
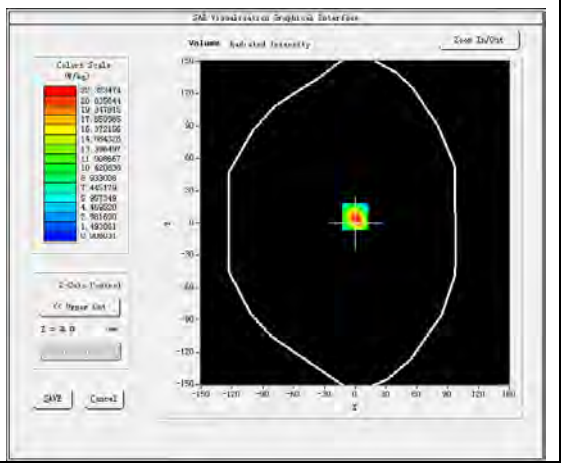
MEASUREMENT 11

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 2.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5200
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

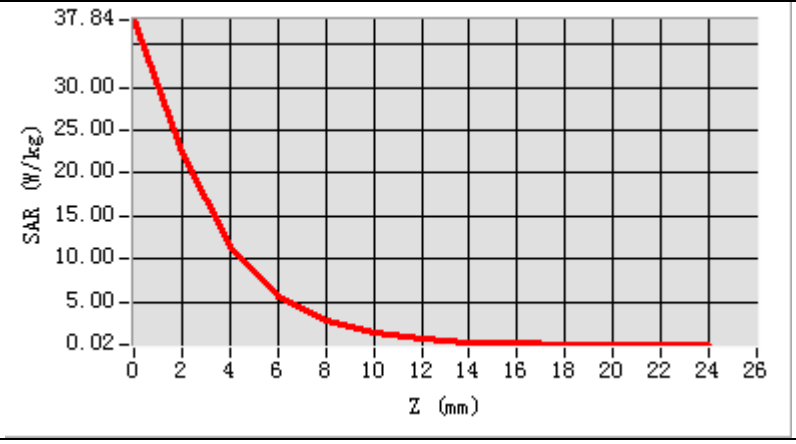
Frequency (MHz)	5200.000000
Relative permittivity (real part)	35.662314
Relative permittivity (imaginary part)	16.188642
Conductivity (S/m)	4.679316
Variation (%)	4.160000

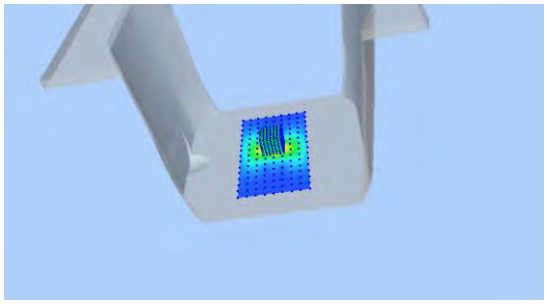
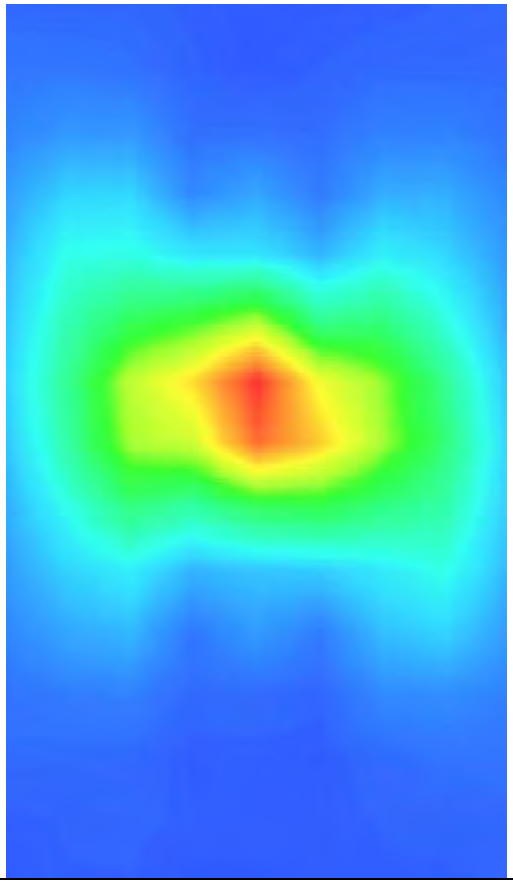
SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=6.00
SAR Peak: 40.06 W/kg

SAR 10g (W/Kg)	5.687495
SAR 1g (W/Kg)	15.641821

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	37.8362	22.3231	11.3780	5.6682	2.8243	1.4086	0.7131	0.3652	0.1863	0.1001	0.0542	0.0312



3D screen shot	Hot spot position
	

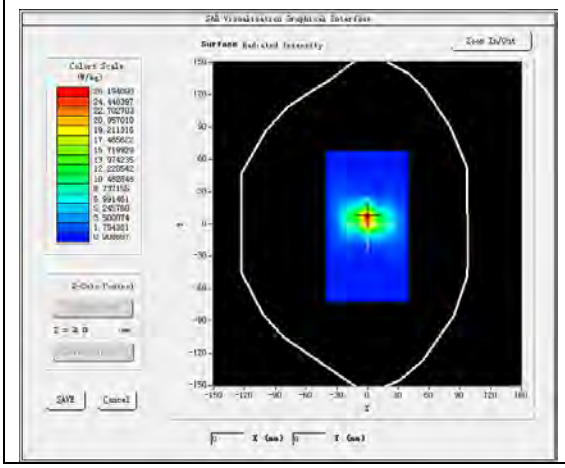
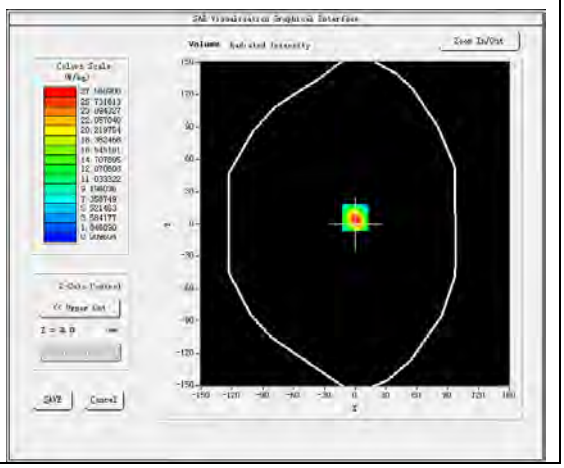
MEASUREMENT 12

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 2.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5200
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

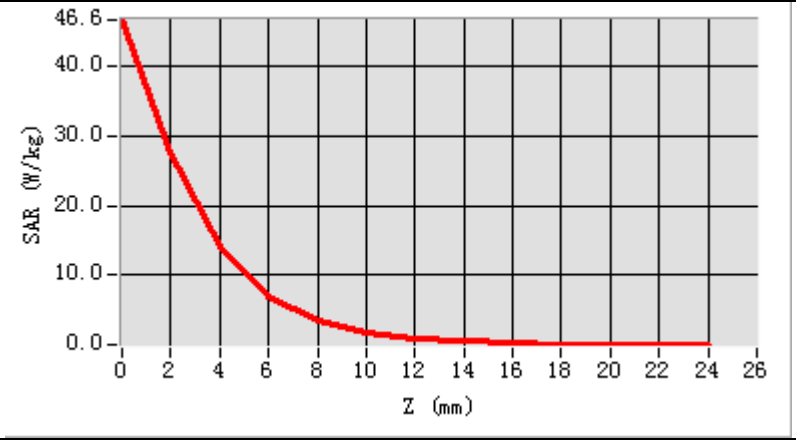
Frequency (MHz)	5200.000000
Relative permittivity (real part)	49.603284
Relative permittivity (imaginary part)	18.382341
Conductivity (S/m)	5.310842
Variation (%)	1.670000

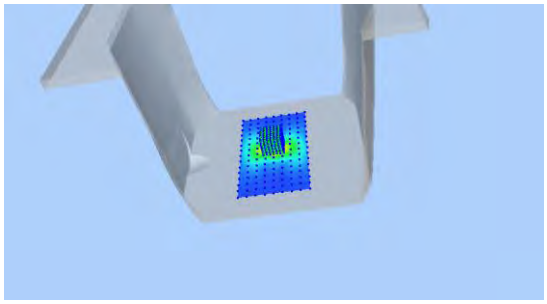
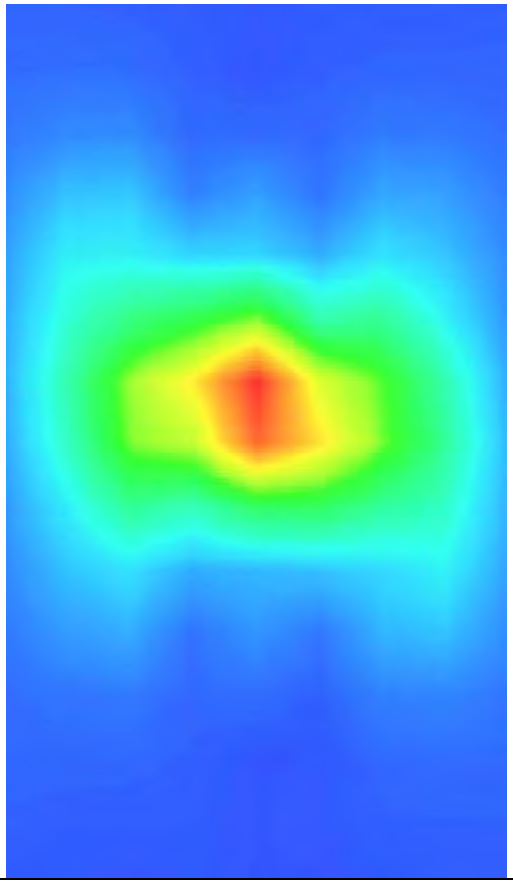
SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=6.00
SAR Peak: 49.61 W/kg

SAR 10g (W/Kg)	5.526384
SAR 1g (W/Kg)	15.552686

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	46.6131	27.5690	14.0609	7.05 82	3.59 43	1.78 60	0.89 81	0.46 08	0.24 42	0.13 86	0.06 15	0.04 63



3D screen shot	Hot spot position
	

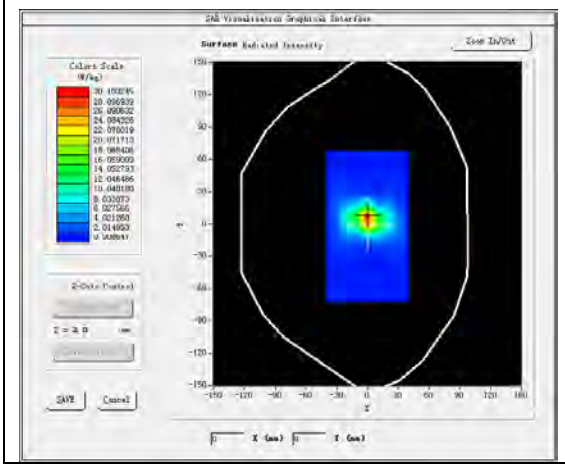
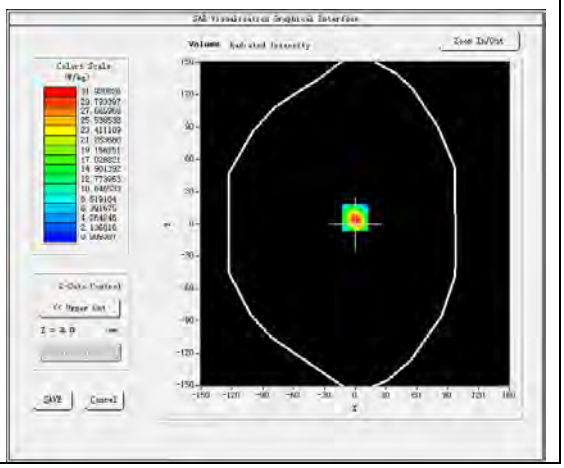
MEASUREMENT 13

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 2.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5800
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

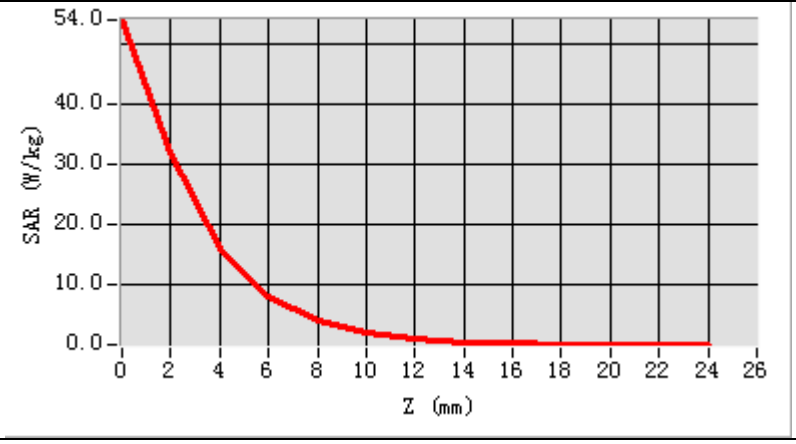
Frequency (MHz)	5800.000000
Relative permittivity (real part)	34.588512
Relative permittivity (imaginary part)	16.243152
Conductivity (S/m)	5.230681
Variation (%)	1.350000

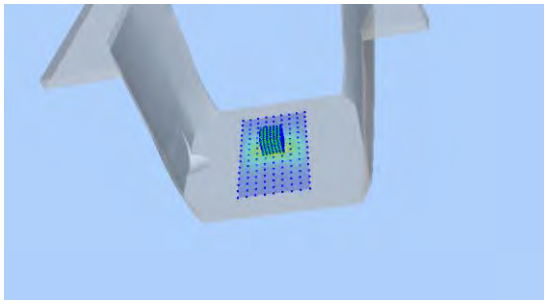
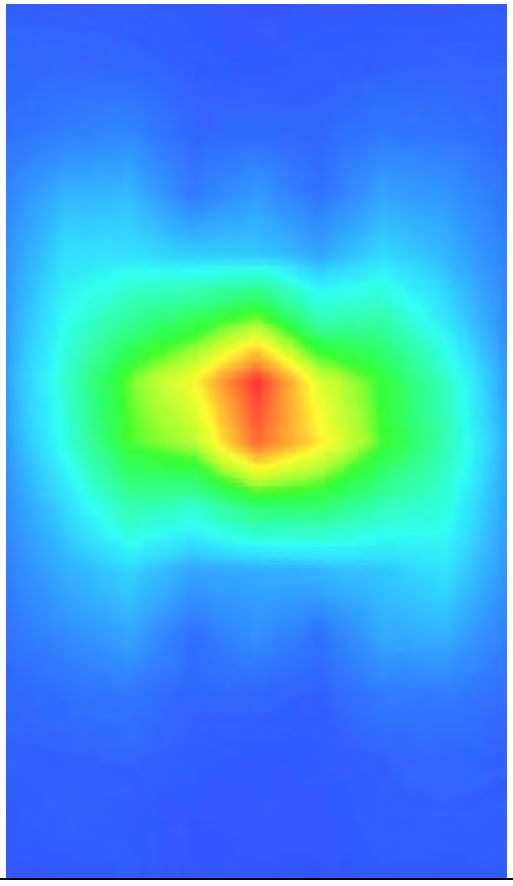
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=0.00, Y=6.00
SAR Peak: 57.37 W/kg

SAR 10g (W/Kg)	6.082495
SAR 1g (W/Kg)	18.136863

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	54.0382	31.9201	16.1706	8.1722	4.0858	2.0551	1.0343	0.5150	0.2758	0.1561	0.0791	0.0472



3D screen shot	Hot spot position
	

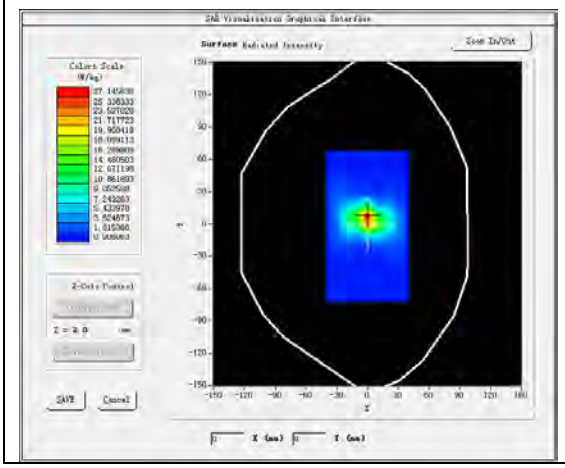
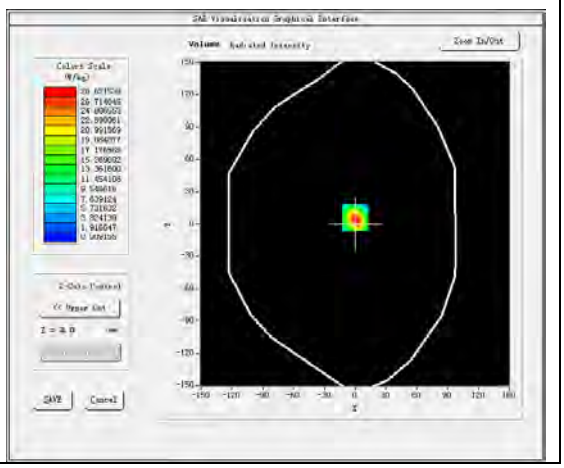
MEASUREMENT 14

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 2.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5800
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

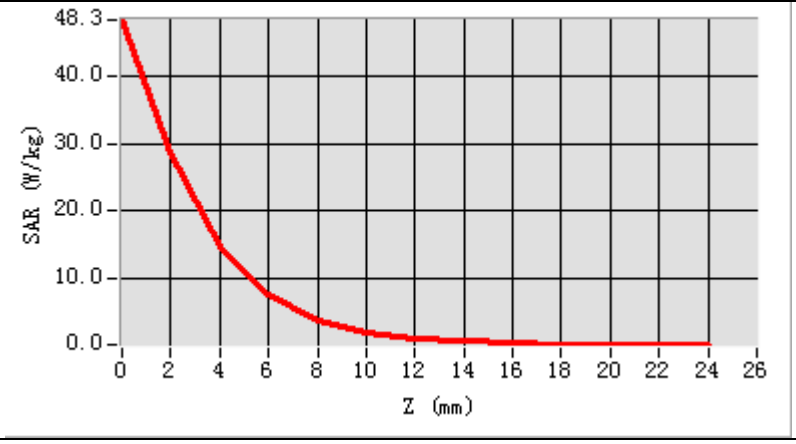
Frequency (MHz)	5800.000000
Relative permittivity (real part)	48.291323
Relative permittivity (imaginary part)	18.901243
Conductivity (S/m)	6.091524
Variation (%)	-1.82000

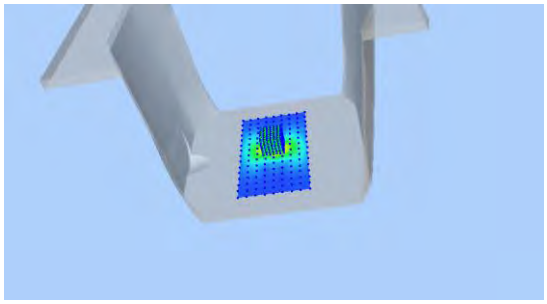
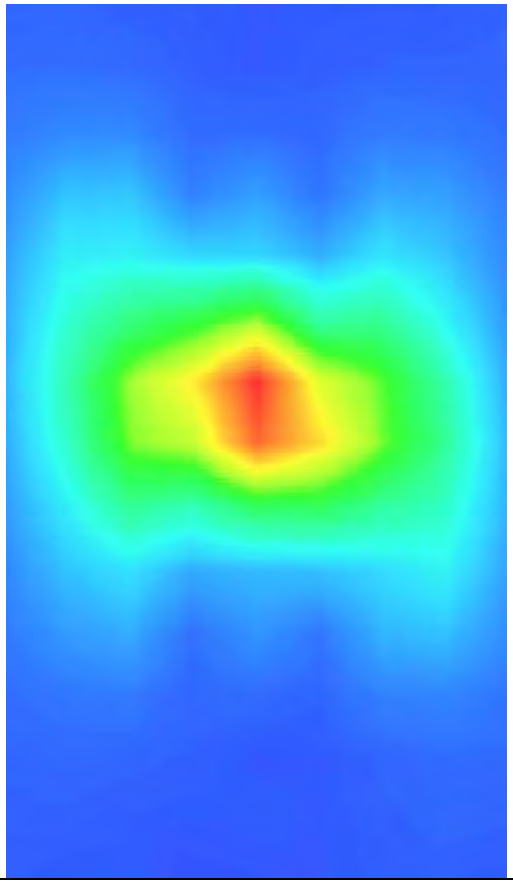
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=0.00, Y=6.00
SAR Peak: 51.30 W/kg

SAR 10g (W/Kg)	5.763384
SAR 1g (W/Kg)	16.534052

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	48.3452	28.6216	14.6550	7.4031	3.6852	1.8342	0.9370	0.4758	0.2531	0.1300	0.0718	0.0502



3D screen shot	Hot spot position
	

13. Appendix C. Plots of High SAR Measurement

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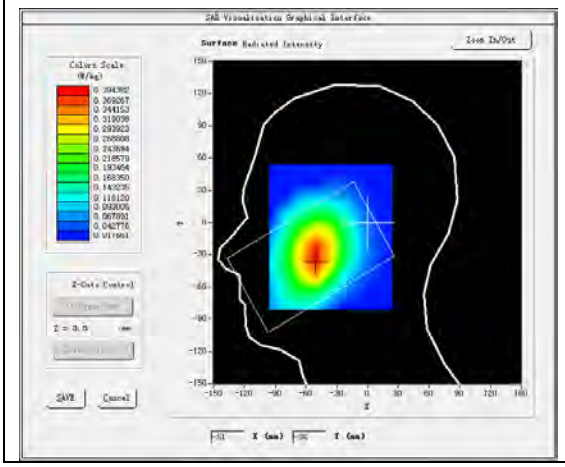
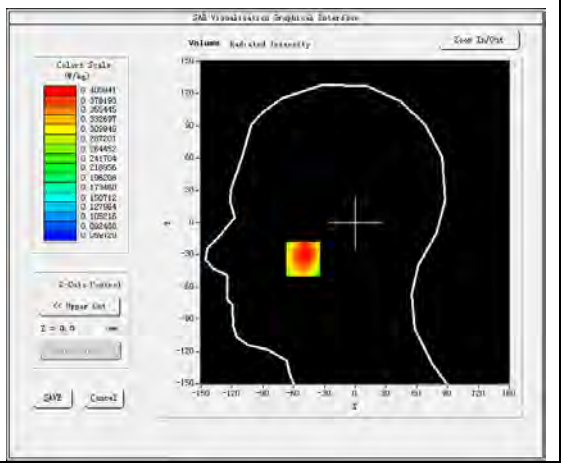
MEASUREMENT 1

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	GSM850
Channels	Middle
Signal	TDMA (Crest factor: 4.0)

B. SAR Measurement Results

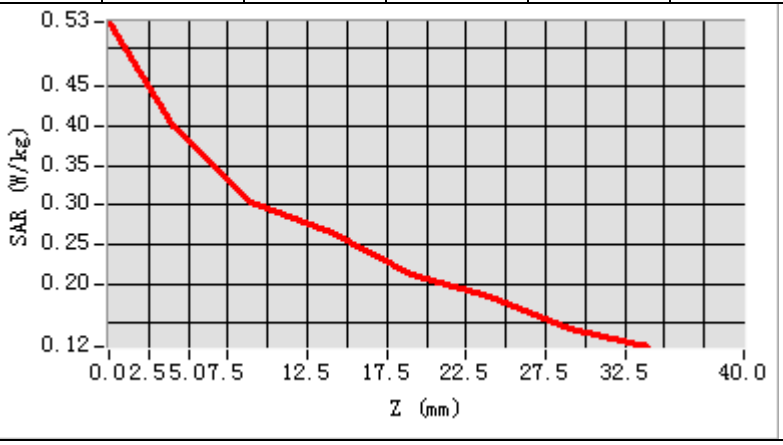
Frequency (MHz)	836.400024
Relative permittivity (real part)	40.590961
Relative permittivity (imaginary part)	20.101540
Conductivity (S/m)	0.934052
Variation (%)	3.410000

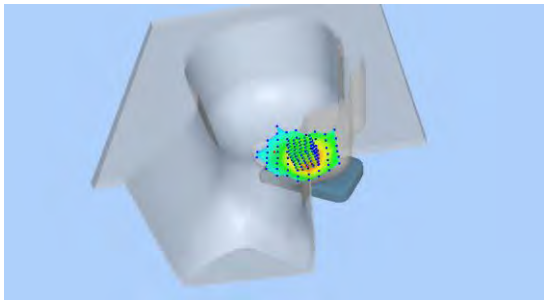
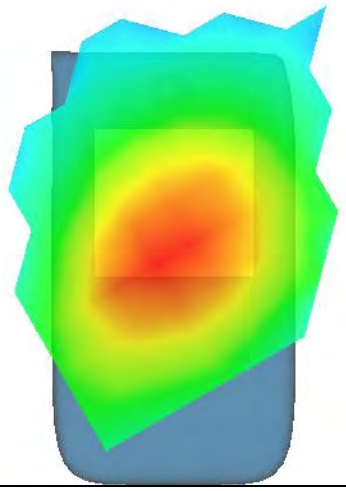
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-51.00, Y=-34.00
SAR Peak: 0.54 W/kg

SAR 10g (W/Kg)	0.299323
SAR 1g (W/Kg)	0.409435

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.5327	0.4009	0.3033	0.2650	0.2120	0.1831	0.1423



3D screen shot	Hot spot position
	

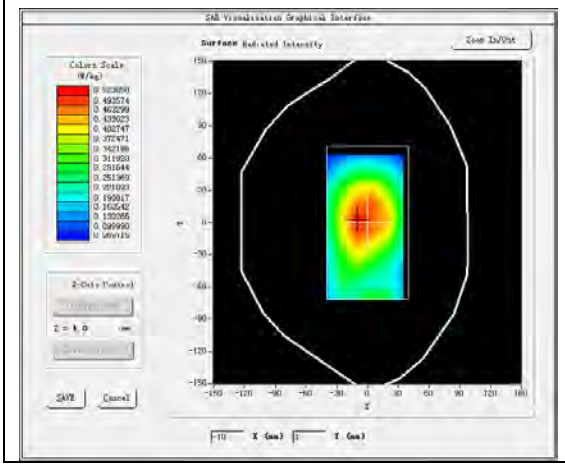
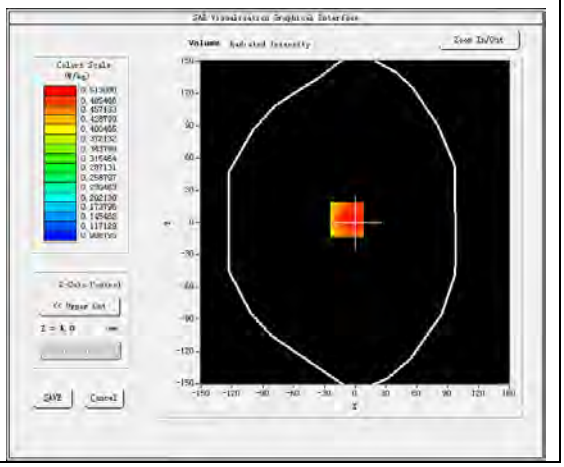
MEASUREMENT 2

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	GSM850
Channels	Middle
Signal	TDMA (Crest factor: 4.0)

B. SAR Measurement Results

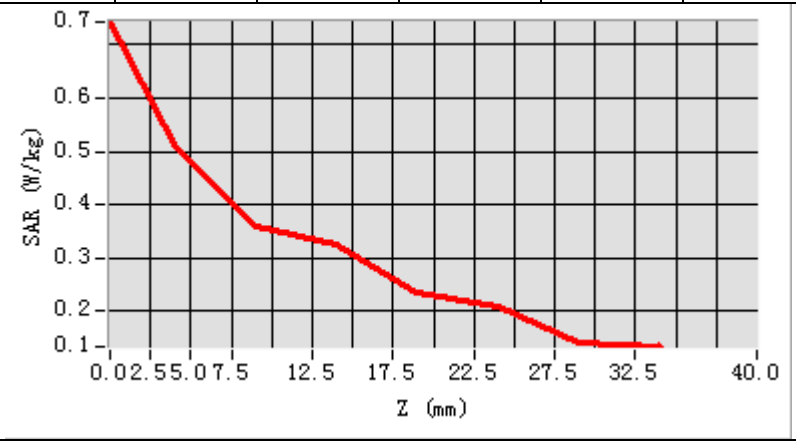
Frequency (MHz)	836.400024
Relative permittivity (real part)	54.339581
Relative permittivity (imaginary part)	21.822741
Conductivity (S/m)	1.014030
Variation (%)	0.020000

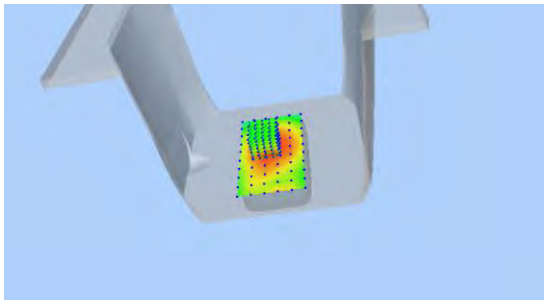
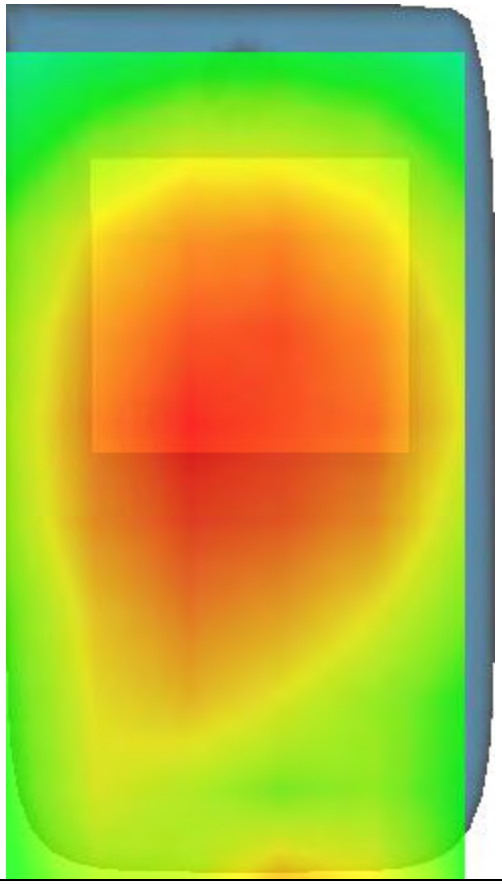
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=-8.00, Y=3.00
SAR Peak: 0.68 W/kg

SAR 10g (W/Kg)	0.385854
SAR 1g (W/Kg)	0.514624

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.7433	0.5138	0.3601	0.3245	0.2349	0.2074	0.1387



3D screen shot	Hot spot position
	

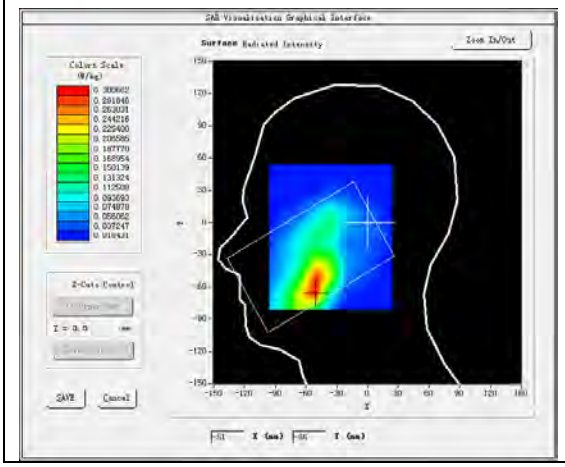
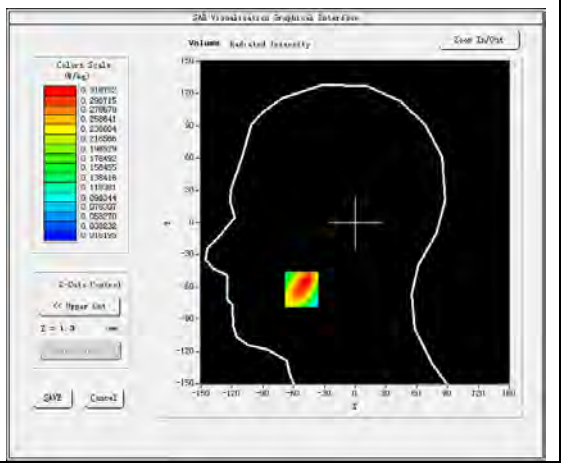
MEASUREMENT 3

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	GSM1900
Channels	Middle
Signal	TDMA (Crest factor: 2.0)

B. SAR Measurement Results

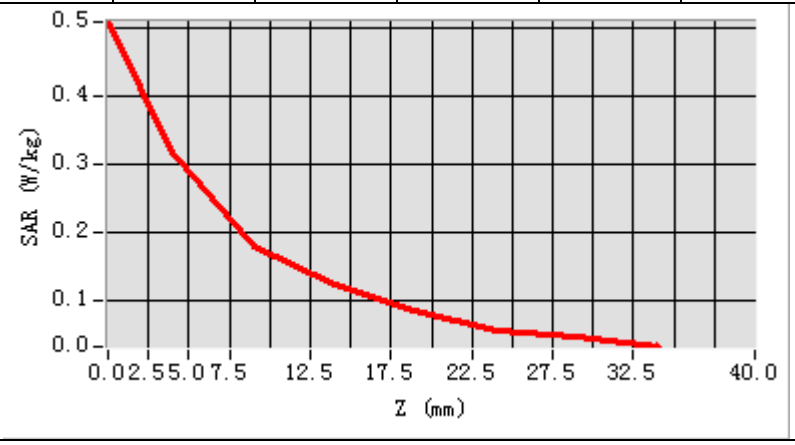
Frequency (MHz)	1880.000000
Relative permittivity (real part)	40.948200
Relative permittivity (imaginary part)	13.724300
Conductivity (S/m)	1.433427
Variation (%)	0.640000

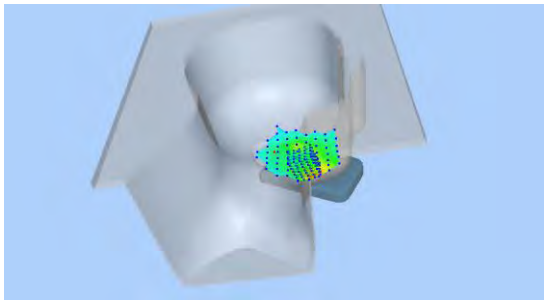
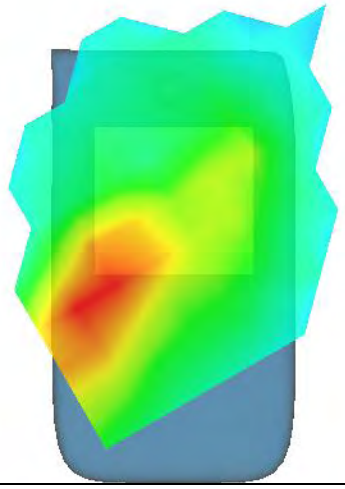
SURFACE SAR	VOLUME SAR
	

Maximum location: X=-52.00, Y=-62.00
SAR Peak: 0.49 W/kg

SAR 10g (W/Kg)	0.185587
SAR 1g (W/Kg)	0.312912

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.5087	0.3188	0.1794	0.1254	0.0872	0.0583	0.0490



3D screen shot	Hot spot position
	

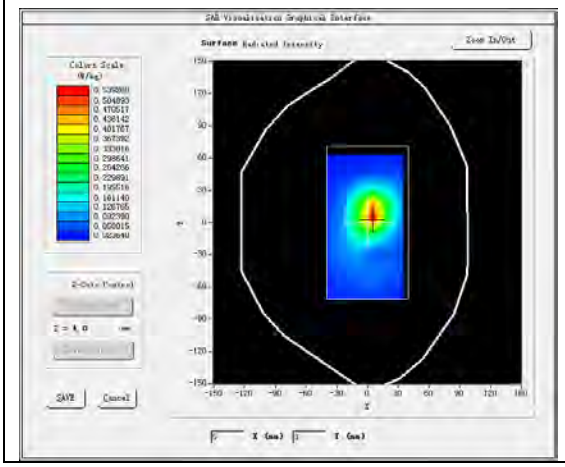
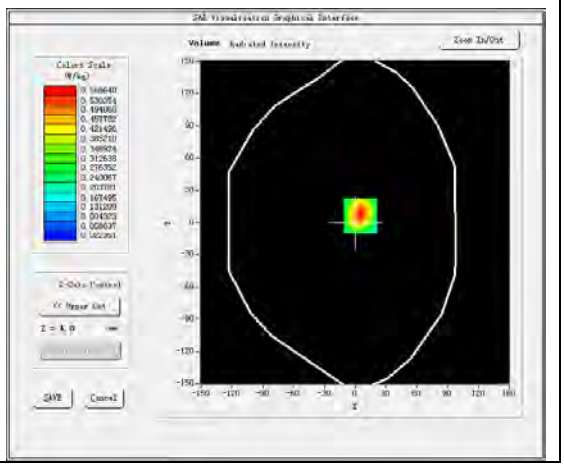
MEASUREMENT 4

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	GSM1900
Channels	Middle
Signal	TDMA (Crest factor: 2.0)

B. SAR Measurement Results

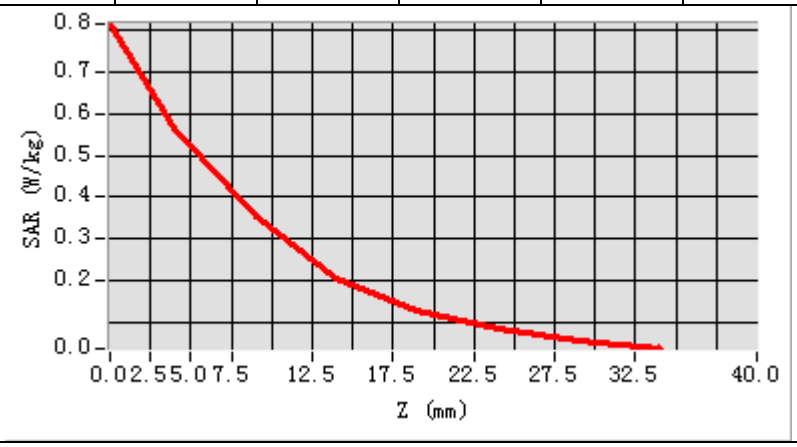
Frequency (MHz)	1880.000000
Relative permittivity (real part)	52.738899
Relative permittivity (imaginary part)	15.067700
Conductivity (S/m)	1.573738
Variation (%)	0.550000

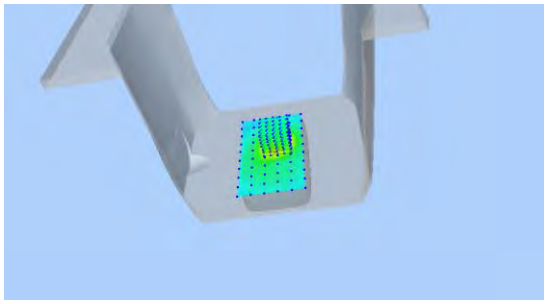
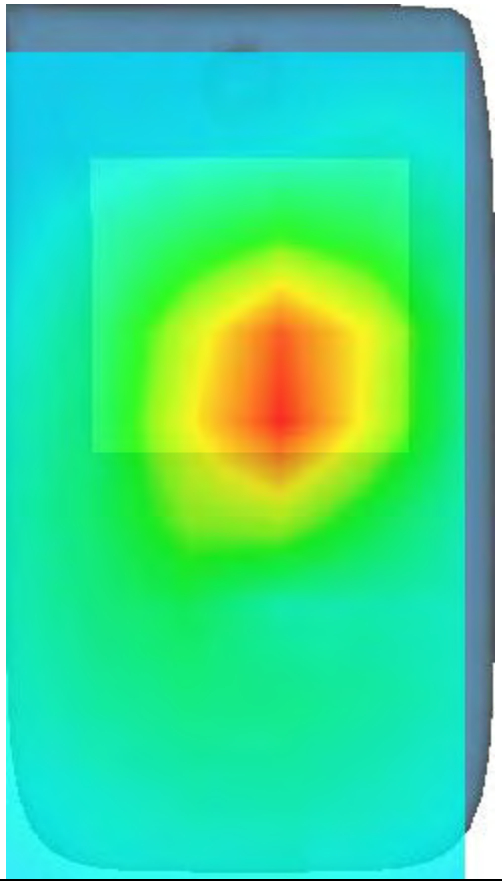
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=5.00, Y=6.00
SAR Peak: 0.85 W/kg

SAR 10g (W/Kg)	0.294431
SAR 1g (W/Kg)	0.540530

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.8131	0.5666	0.3526	0.2056	0.1285	0.0844	0.0555



3D screen shot	Hot spot position
	

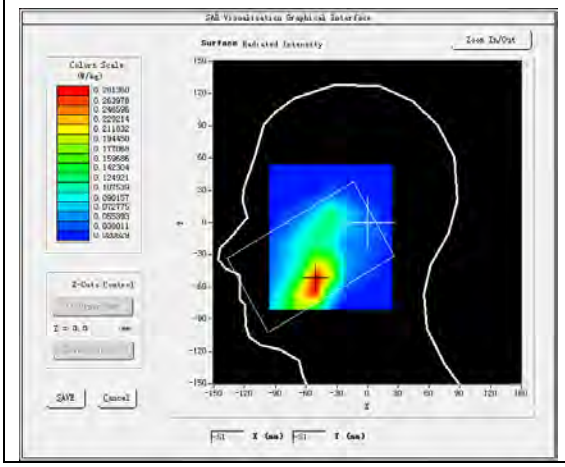
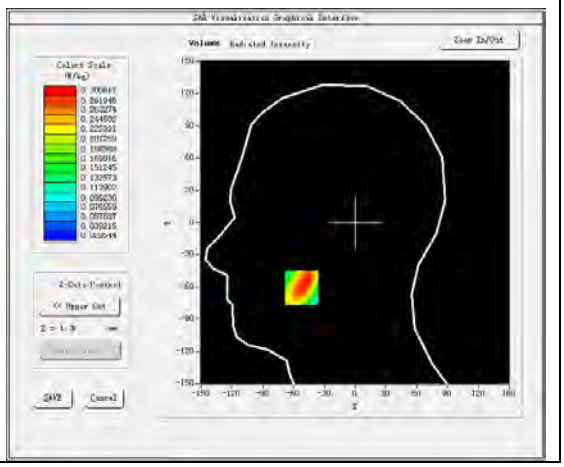
MEASUREMENT 5

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	Band2_WCDMA1900
Channels	Middle
Signal	WCDMA (Crest factor: 1.0)

B. SAR Measurement Results

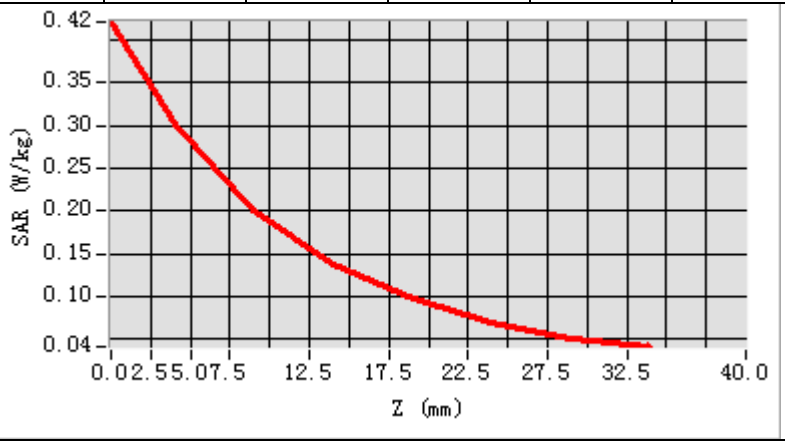
Frequency (MHz)	1880.000000
Relative permittivity (real part)	40.948200
Relative permittivity (imaginary part)	13.724300
Conductivity (S/m)	1.433427
Variation (%)	0.220000

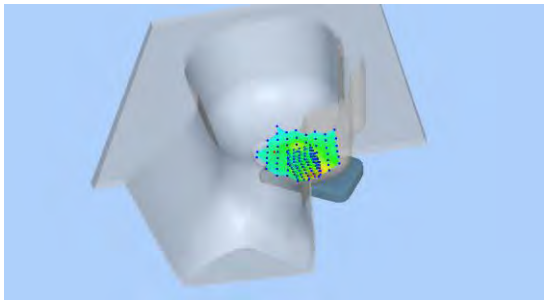
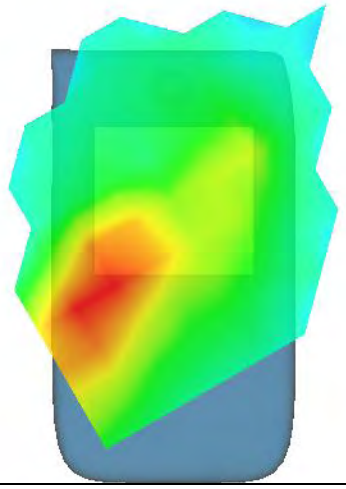
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=-52.00, Y=-61.00
SAR Peak: 0.44 W/kg

SAR 10g (W/Kg)	0.178748
SAR 1g (W/Kg)	0.292221

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.4209	0.3006	0.2000	0.1365	0.0967	0.0690	0.0512



3D screen shot	Hot spot position
	

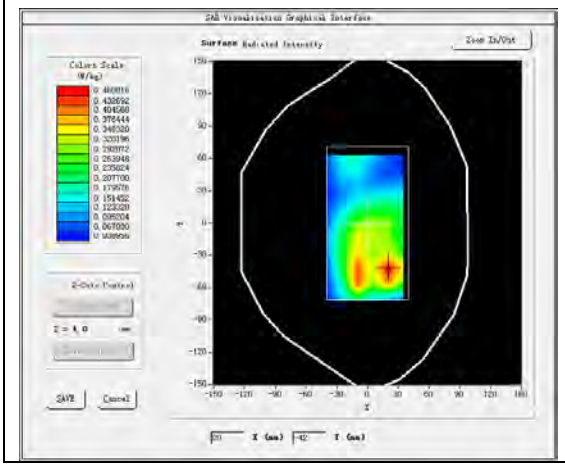
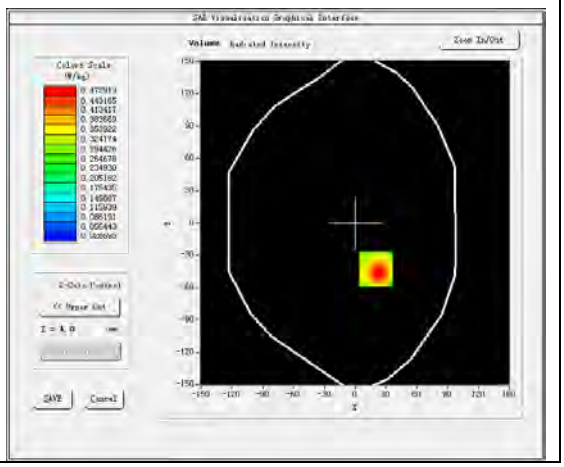
MEASUREMENT 6

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	Band2_WCDMA1900
Channels	Middle
Signal	WCDMA (Crest factor: 1.0)

B. SAR Measurement Results

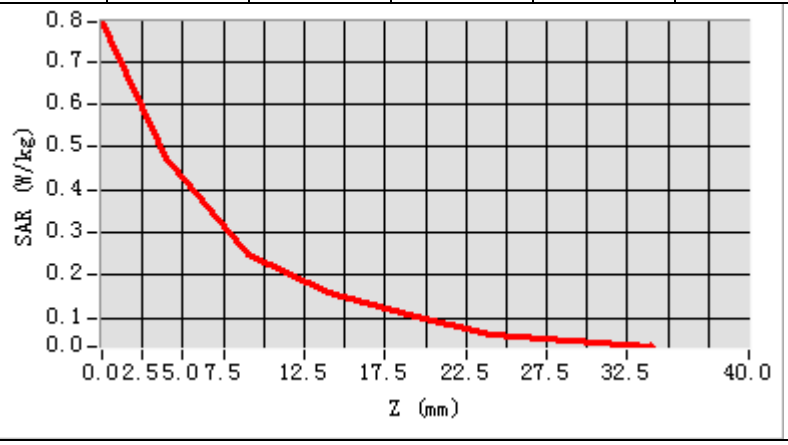
Frequency (MHz)	1880.000000
Relative permittivity (real part)	52.738899
Relative permittivity (imaginary part)	15.067700
Conductivity (S/m)	1.573738
Variation (%)	-0.080000

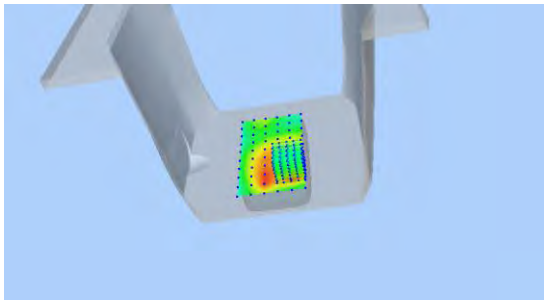
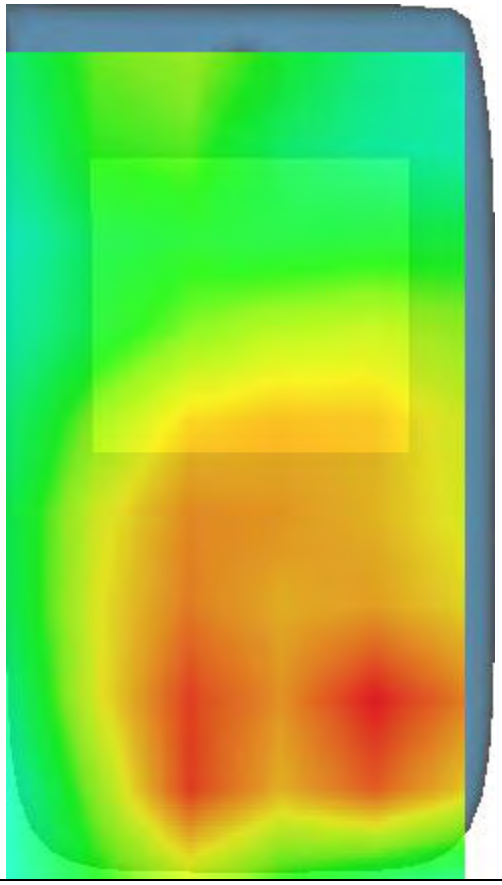
SURFACE SAR	VOLUME SAR
	

Maximum location: X=20.00, Y=-43.00
SAR Peak: 0.77 W/kg

SAR 10g (W/Kg)	0.263935
SAR 1g (W/Kg)	0.484054

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.7926	0.4729	0.2475	0.1573	0.1057	0.0612	0.0479



3D screen shot	Hot spot position
	

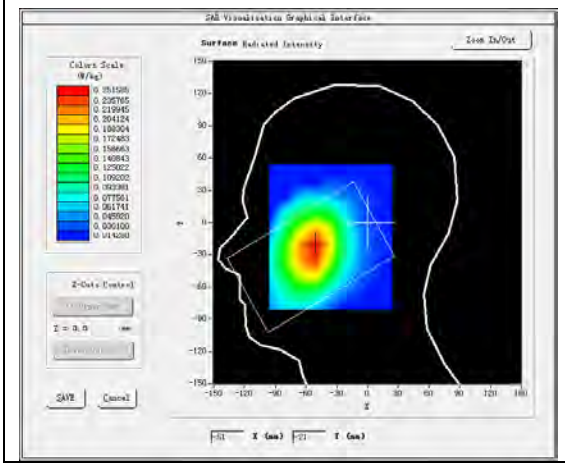
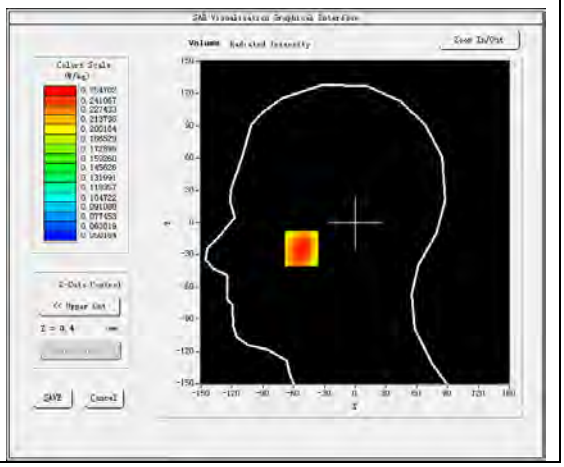
MEASUREMENT 7

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	Band5_WCDMA850
Channels	Middle
Signal	WCDMA (Crest factor: 1.0)

B. SAR Measurement Results

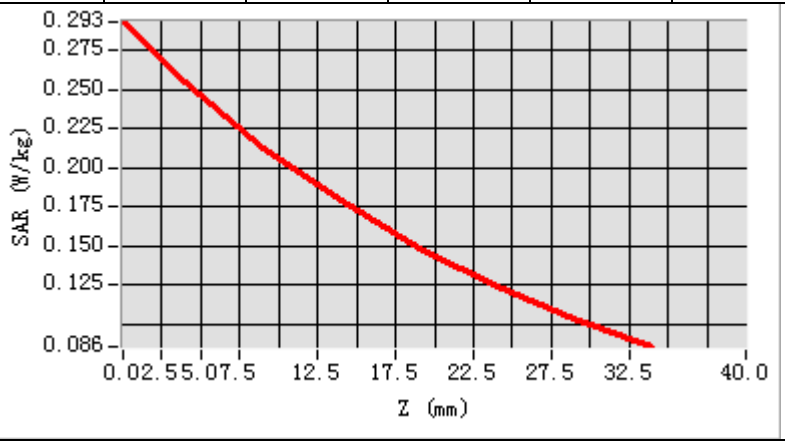
Frequency (MHz)	836.400024
Relative permittivity (real part)	40.590961
Relative permittivity (imaginary part)	20.101540
Conductivity (S/m)	0.934052
Variation (%)	-1.010000

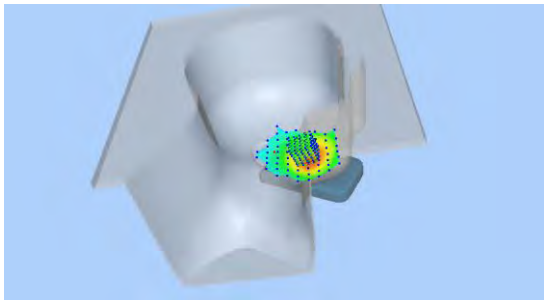
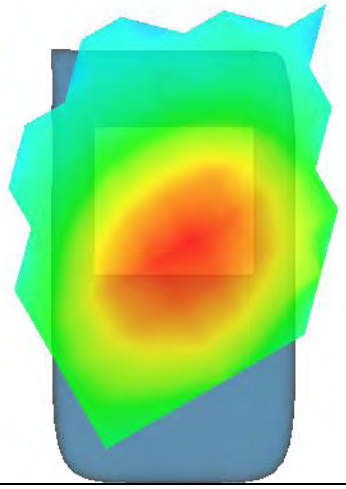
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=-52.00, Y=-24.00
SAR Peak: 0.30 W/kg

SAR 10g (W/Kg)	0.197764
SAR 1g (W/Kg)	0.254196

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.2932	0.2547	0.2127	0.1790	0.1488	0.1239	0.1039



3D screen shot	Hot spot position
	

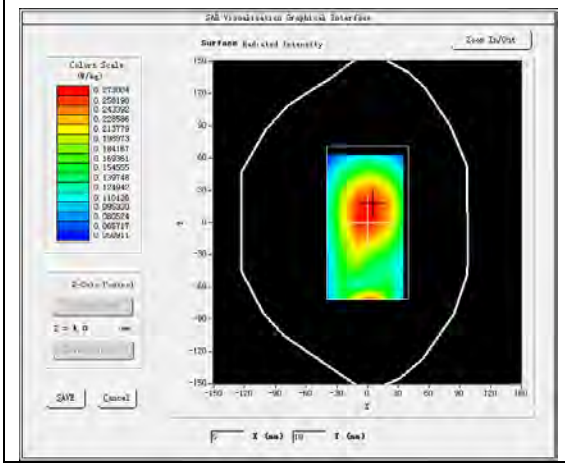
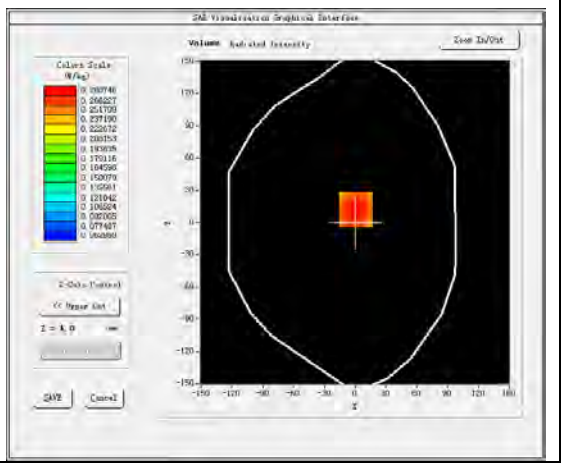
MEASUREMENT 8

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	Band5_WCDMA850
Channels	Middle
Signal	WCDMA (Crest factor: 1.0)

B. SAR Measurement Results

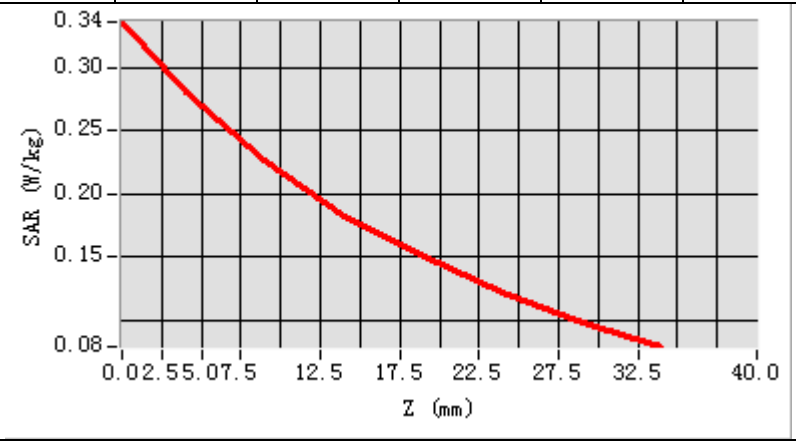
Frequency (MHz)	836.400024
Relative permittivity (real part)	54.339581
Relative permittivity (imaginary part)	21.822741
Conductivity (S/m)	1.014030
Variation (%)	-0.150000

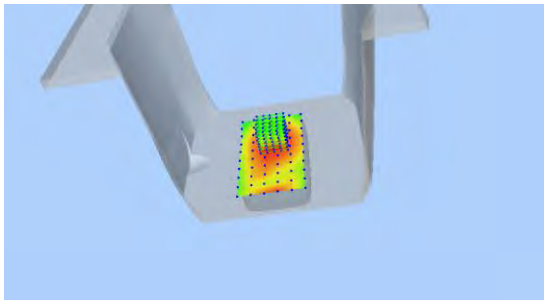
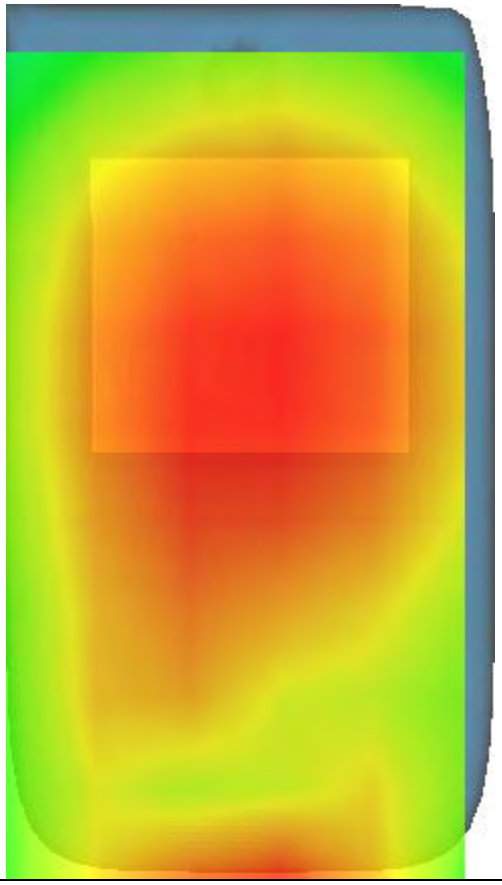
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=1.00, Y=12.00
SAR Peak: 0.34 W/kg

SAR 10g (W/Kg)	0.218248
SAR 1g (W/Kg)	0.283349

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.3360	0.2807	0.2270	0.1828	0.1506	0.1212	0.0979



3D screen shot	Hot spot position
	

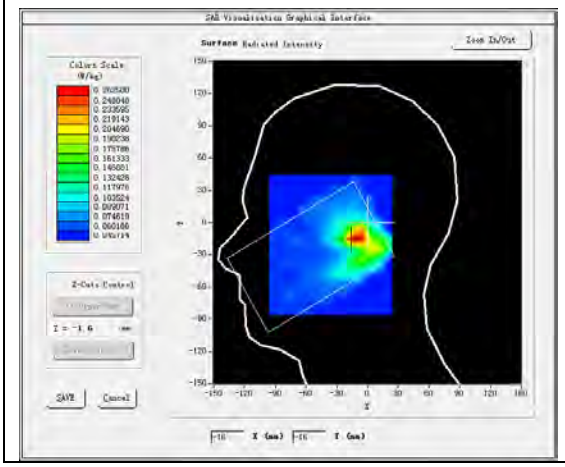
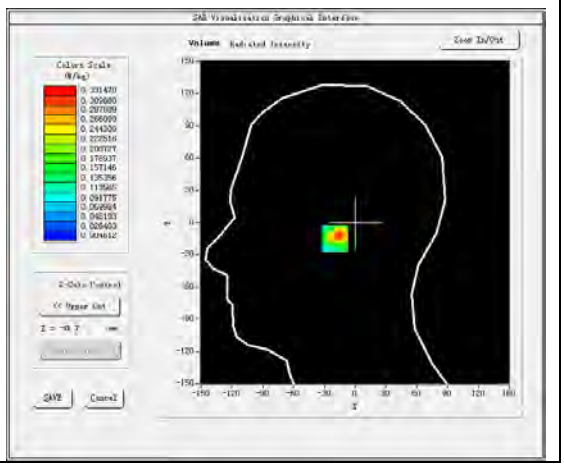
MEASUREMENT 9

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Right head
Device Position	Cheek
Band	IEEE 802.11a U-NII
Channels	Middle
Signal	IEEE802.11a (Crest factor: 1.0)

B. SAR Measurement Results

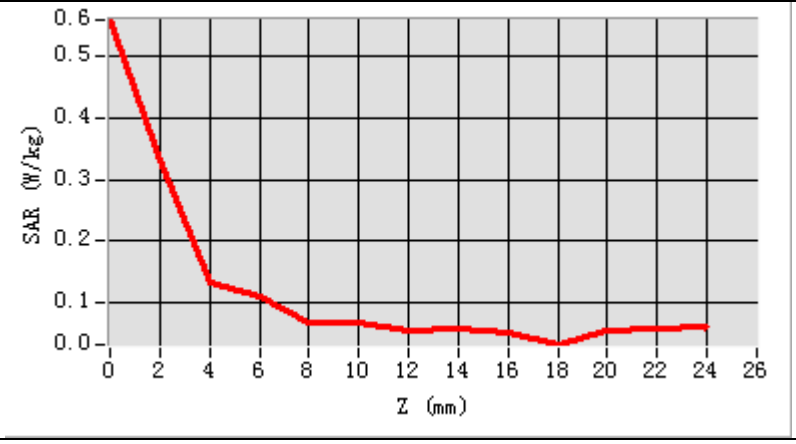
Frequency (MHz)	5180.000000
Relative permittivity (real part)	35.729134
Relative permittivity (imaginary part)	16.203669
Conductivity (S/m)	4.663056
Variation (%)	2.190000

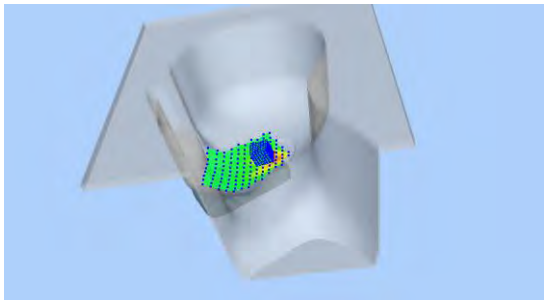
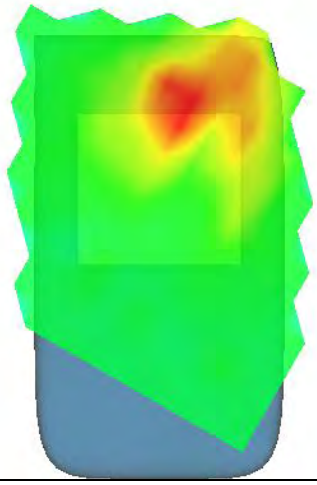
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=-13.00, Y=-15.00
SAR Peak: 0.87 W/kg

SAR 10g (W/Kg)	0.138941
SAR 1g (W/Kg)	0.311183

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	0.5584	0.3315	0.1329	0.1106	0.0688	0.0696	0.0546	0.0591	0.0536	0.0327	0.0549	0.0602



3D screen shot	Hot spot position
	

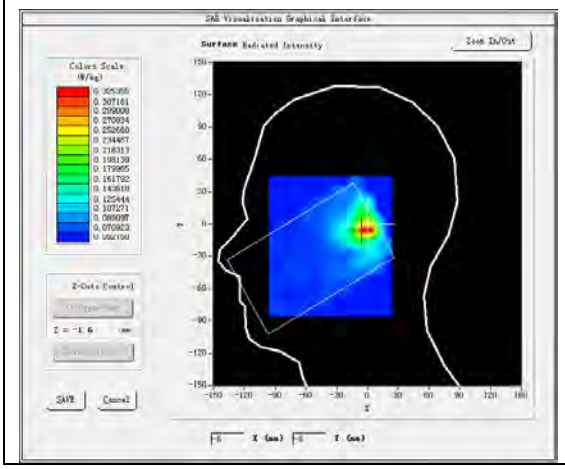
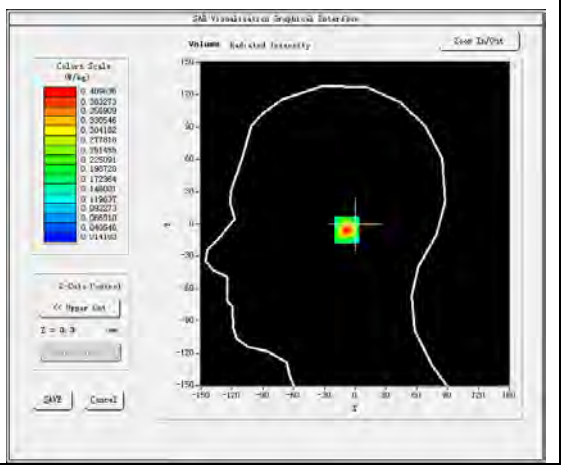
MEASUREMENT 10

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Right head
Device Position	Cheek
Band	IEEE 802.11a U-NII
Channels	Middle
Signal	IEEE802.11a (Crest factor: 1.0)

B. SAR Measurement Results

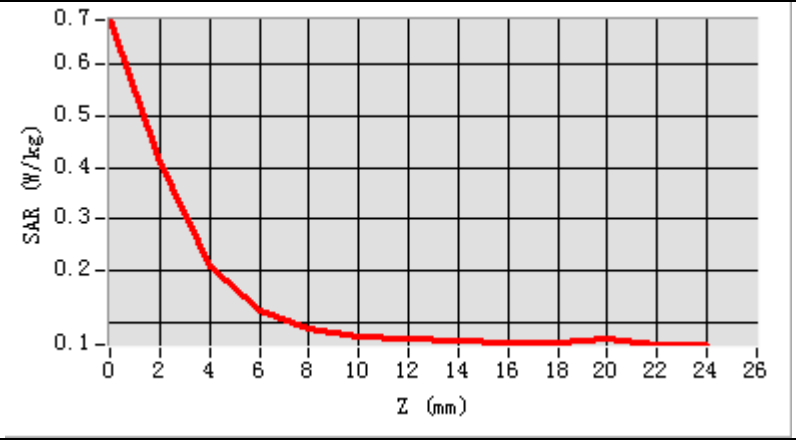
Frequency (MHz)	5825.000000
Relative permittivity (real part)	34.522748
Relative permittivity (imaginary part)	16.220640
Conductivity (S/m)	5.249179
Variation (%)	0.990000

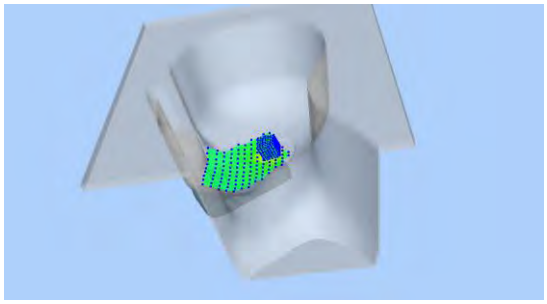
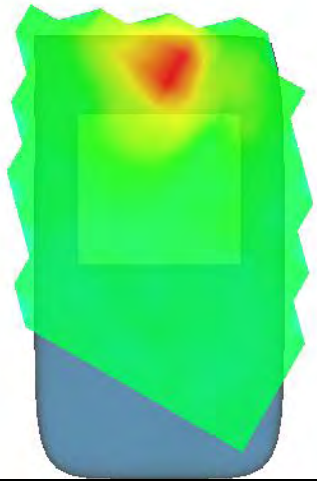
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=-2.00, Y=-5.00
SAR Peak: 1.13 W/kg

SAR 10g (W/Kg)	0.162511
SAR 1g (W/Kg)	0.395508

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	0.6854	0.4096	0.2086	0.1230	0.0897	0.0738	0.0684	0.0646	0.0600	0.0596	0.0684	0.0581



3D screen shot	Hot spot position
	

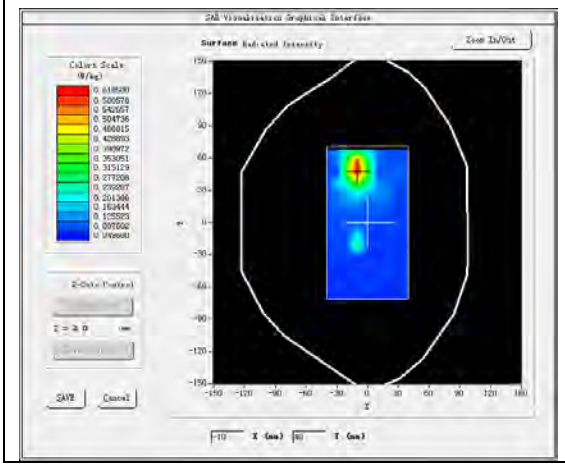
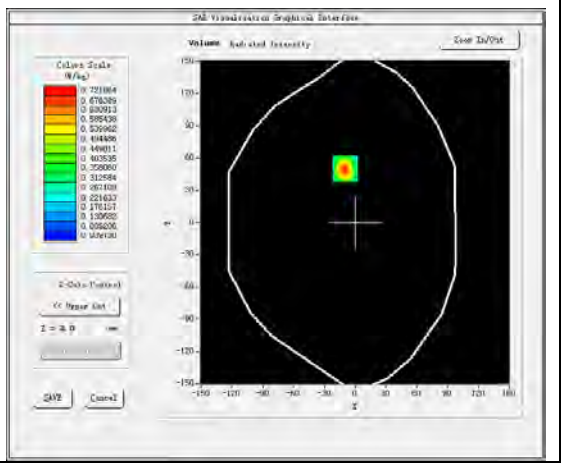
MEASUREMENT 11

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11a U-NII
Channels	Middle
Signal	IEEE802.11a (Crest factor: 1.0)

B. SAR Measurement Results

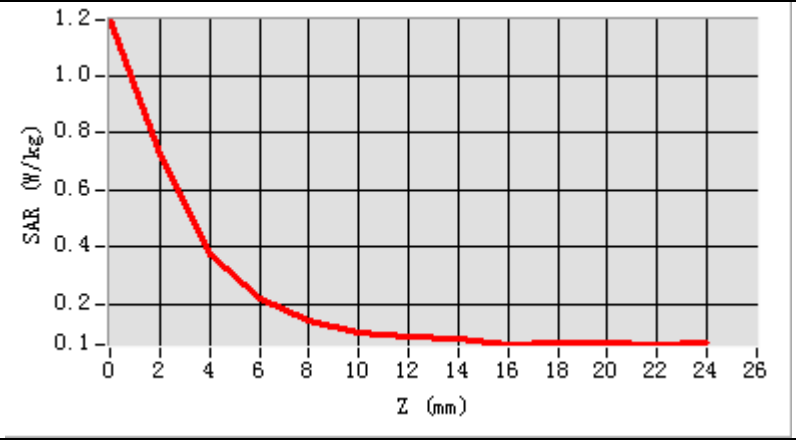
Frequency (MHz)	5180.000000
Relative permittivity (real part)	49.665690
Relative permittivity (imaginary part)	18.387559
Conductivity (S/m)	5.291531
Variation (%)	0.940000

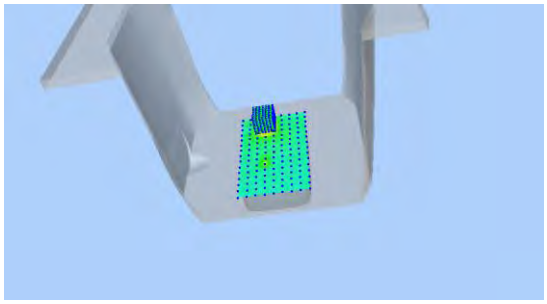
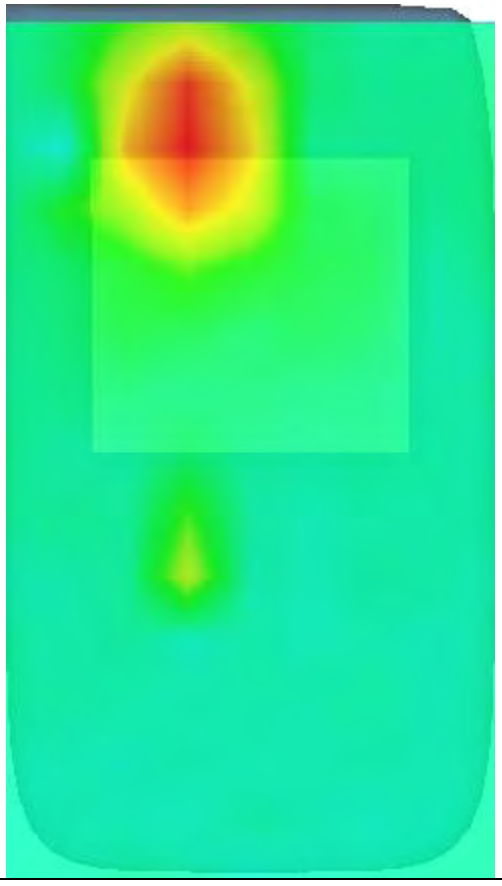
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=-10.00, Y=50.00
SAR Peak: 1.25 W/kg

SAR 10g (W/Kg)	0.189912
SAR 1g (W/Kg)	0.415458

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	1.1934	0.7219	0.3760	0.2232	0.1430	0.1041	0.0869	0.0778	0.0590	0.0688	0.0643	0.0621



3D screen shot	Hot spot position
	

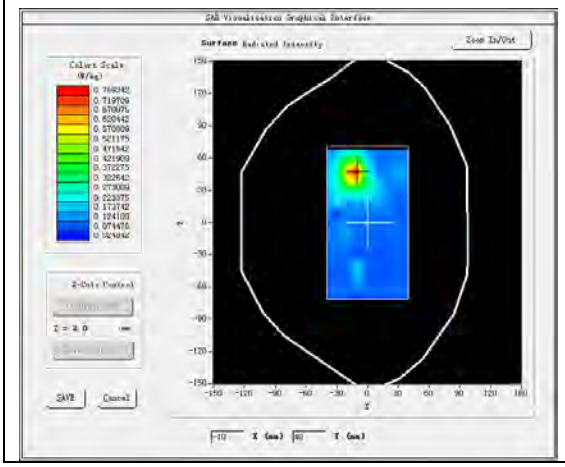
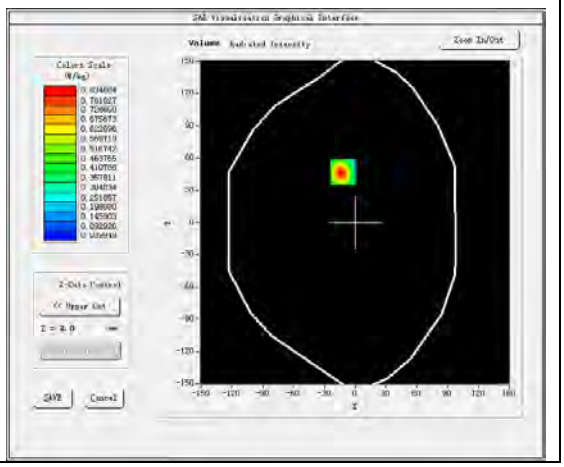
MEASUREMENT 12

A. Experimental conditions.

Area Scan	dx=10mm dy=10mm, h= 5.00 mm
ZoomScan	7x7x12,dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11a U-NII
Channels	Middle
Signal	IEEE802.11a (Crest factor: 1.0)

B. SAR Measurement Results

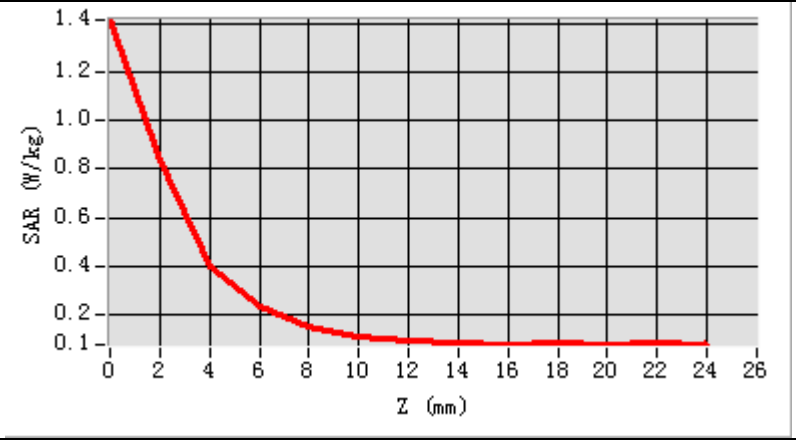
Frequency (MHz)	5825.000000
Relative permittivity (real part)	48.226662
Relative permittivity (imaginary part)	18.882140
Conductivity (S/m)	6.110470
Variation (%)	3.090000

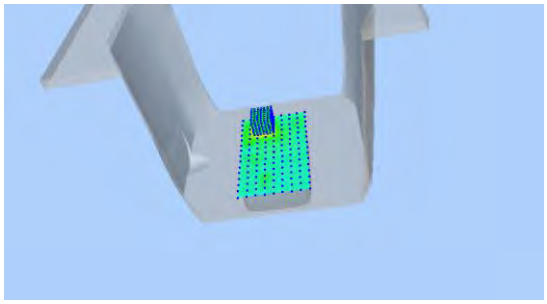
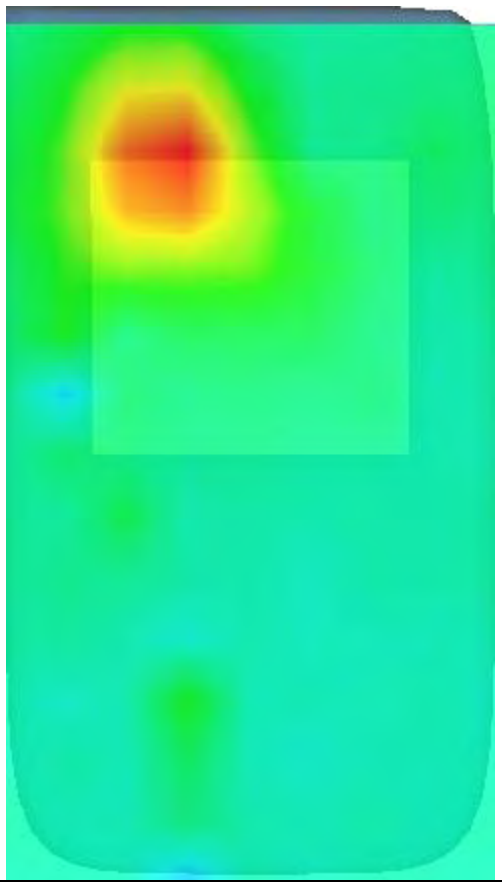
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=-12.00, Y=47.00
SAR Peak: 1.51 W/kg

SAR 10g (W/Kg)	0.220545
SAR 1g (W/Kg)	0.490956

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	1.4184	0.8346	0.4001	0.2275	0.1454	0.1088	0.0883	0.0836	0.0747	0.0801	0.0747	0.0786



3D screen shot	Hot spot position
	

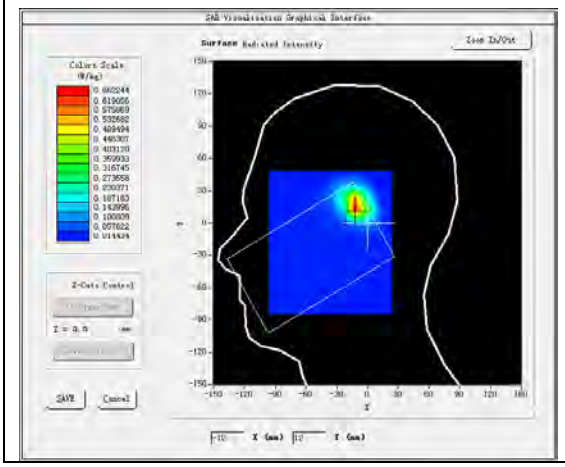
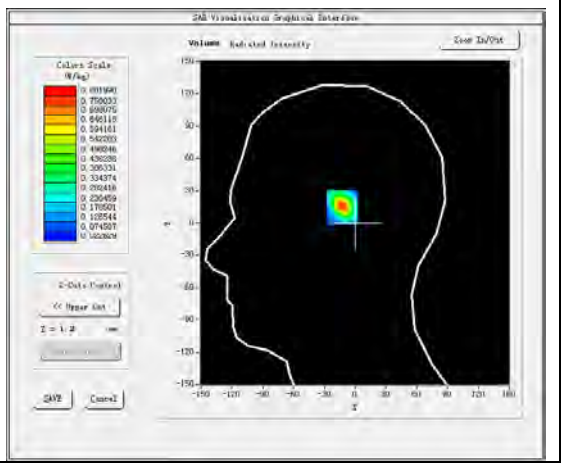
MEASUREMENT 13

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	IEEE 802.11b ISM
Channels	Middle
Signal	IEEE802.11b (Crest factor: 1.0)

B. SAR Measurement Results

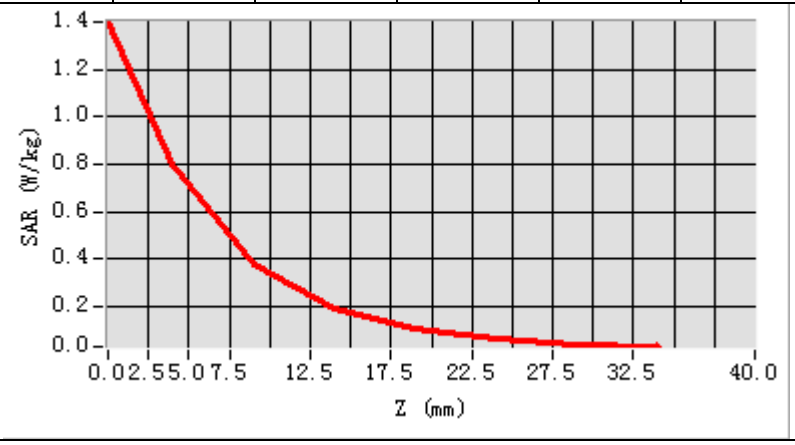
Frequency (MHz)	2412.000000
Relative permittivity (real part)	39.025600
Relative permittivity (imaginary part)	13.501000
Conductivity (S/m)	1.809134
Variation (%)	1.390000

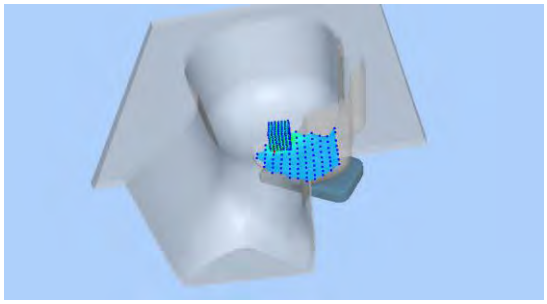
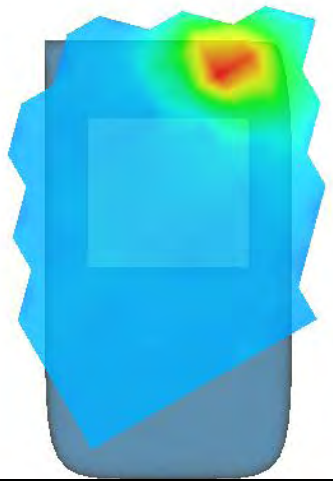
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=-11.00, Y=15.00
SAR Peak: 1.39 W/kg

SAR 10g (W/Kg)	0.256340
SAR 1g (W/Kg)	0.611751

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.3999	0.8020	0.3768	0.1927	0.1044	0.0614	0.0420



3D screen shot	Hot spot position
	

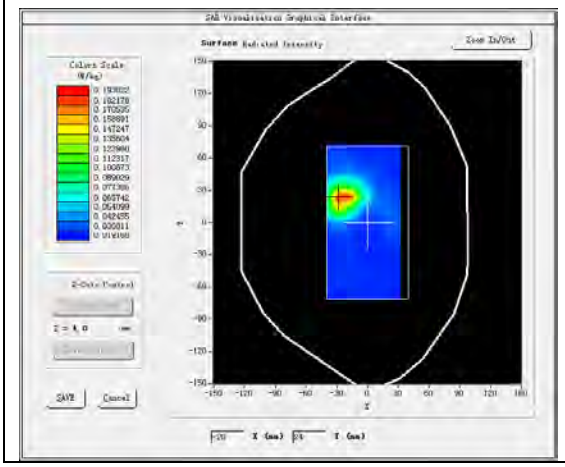
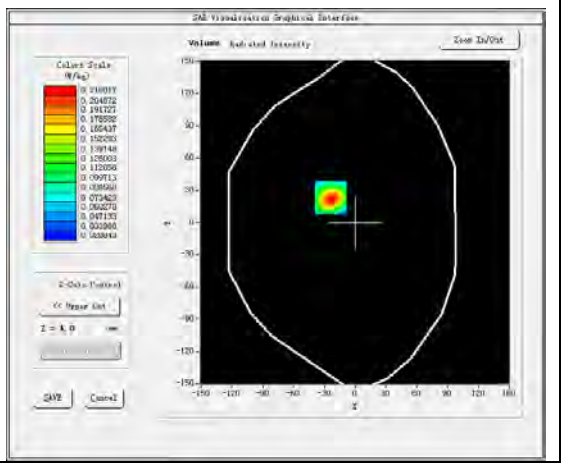
MEASUREMENT 14

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11b ISM
Channels	Middle
Signal	IEEE802.11b (Crest factor: 1.0)

B. SAR Measurement Results

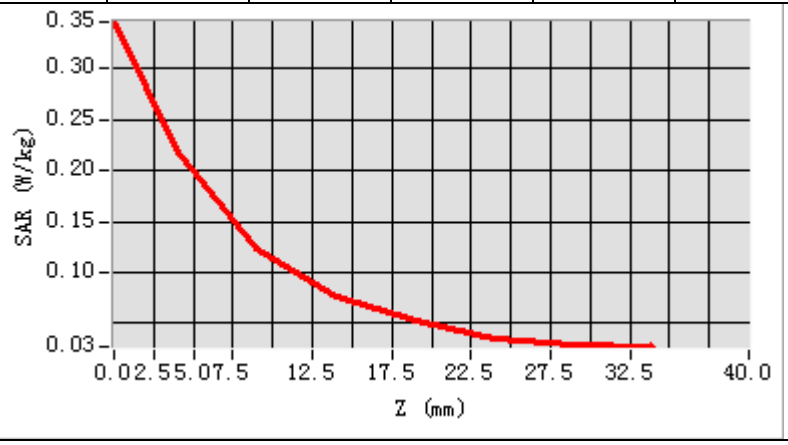
Frequency (MHz)	2412.000000
Relative permittivity (real part)	52.468300
Relative permittivity (imaginary part)	14.721020
Conductivity (S/m)	1.972617
Variation (%)	-5.550000

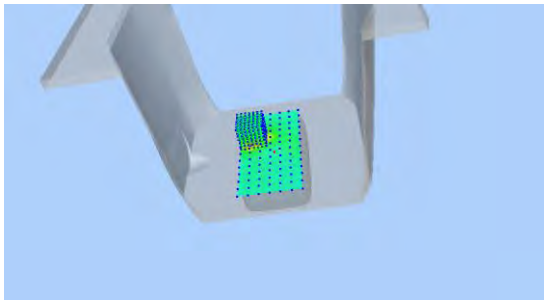
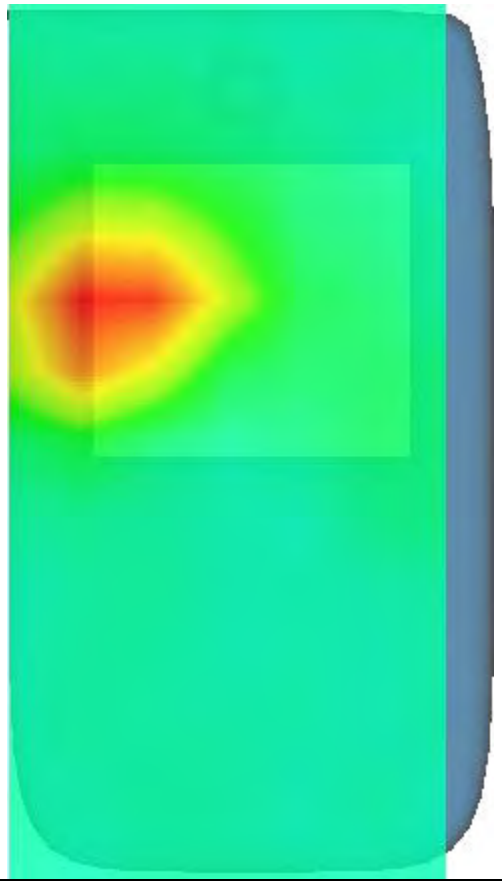
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=-24.00, Y=23.00
SAR Peak: 0.35 W/kg

SAR 10g (W/Kg)	0.106899
SAR 1g (W/Kg)	0.205668

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.3462	0.2180	0.1227	0.0763	0.0518	0.0354	0.0296



3D screen shot	Hot spot position
	

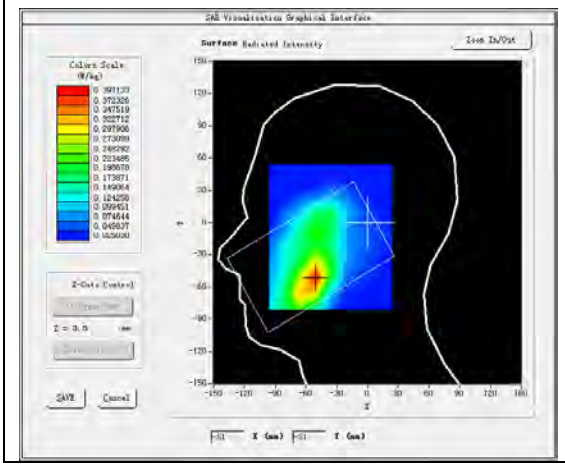
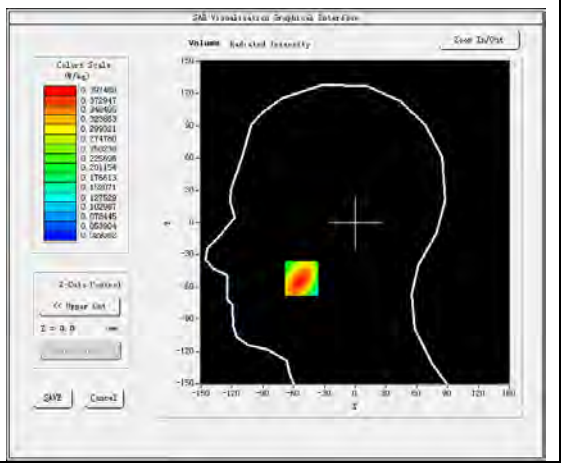
MEASUREMENT 15

A. Experimental conditions.

Area Scan	dx=15mm dy=15mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 4
Channels	Middle
Signal	LTE (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	1732.500000
Relative permittivity (real part)	53.629101
Relative permittivity (imaginary part)	15.112650
Conductivity (S/m)	1.454593
Variation (%)	-2.080000

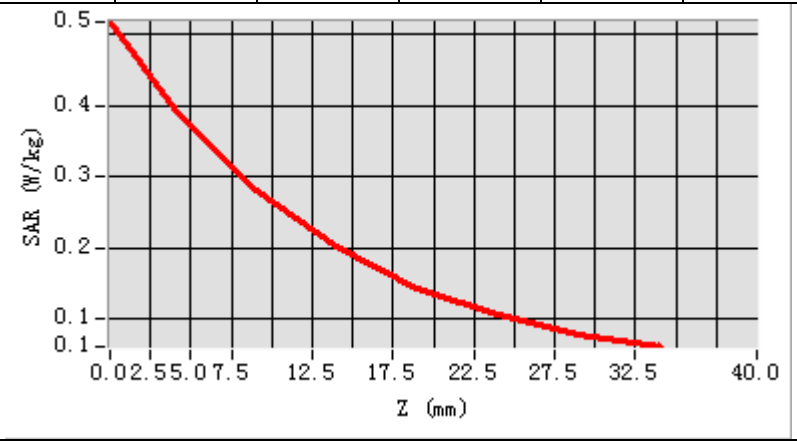
SURFACE SAR	VOLUME SAR
	

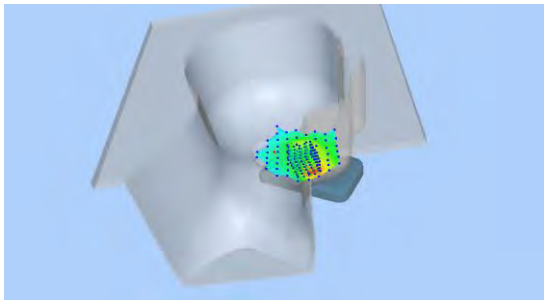
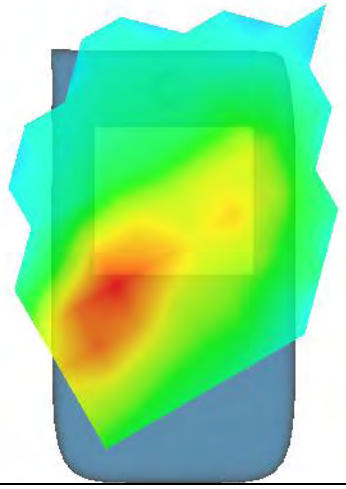
Maximum location: X=-52.00, Y=-52.00

SAR Peak: 0.55 W/kg

SAR 10g (W/Kg)	0.247272
SAR 1g (W/Kg)	0.385905

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.5174	0.3975	0.2815	0.2022	0.1416	0.1055	0.0795



3D screen shot	Hot spot position
	

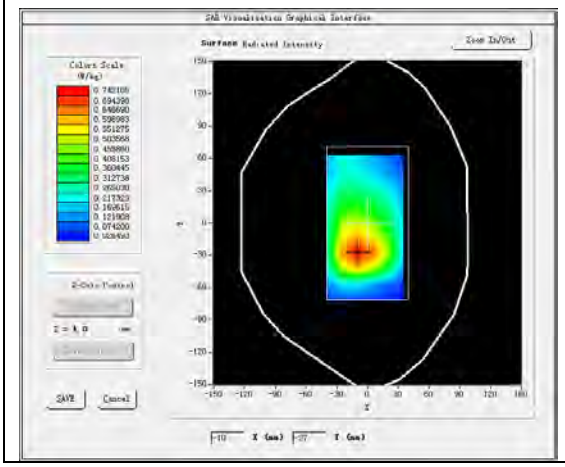
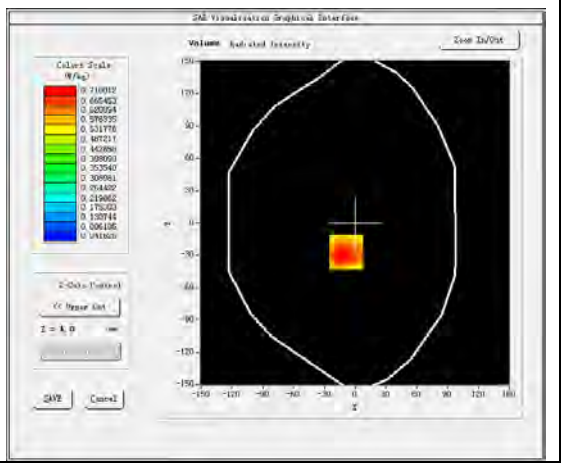
MEASUREMENT 16

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 4
Channels	Middle
Signal	LTE (Crest factor: 1.0)

B. SAR Measurement Results

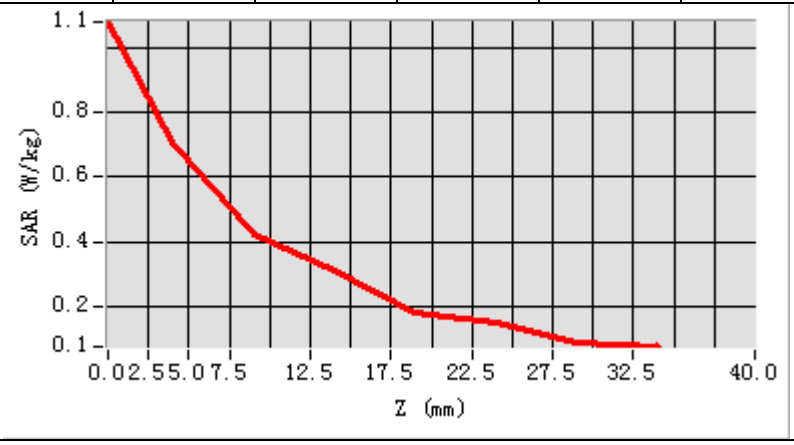
Frequency (MHz)	1732.500000
Relative permittivity (real part)	53.629101
Relative permittivity (imaginary part)	15.112650
Conductivity (S/m)	1.454593
Variation (%)	-1.030000

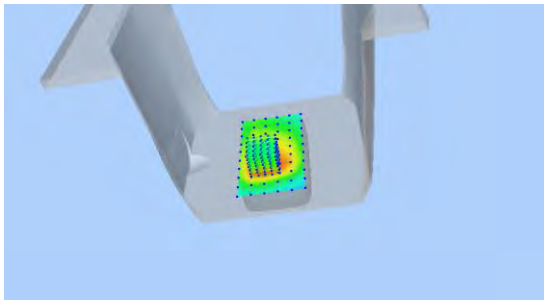
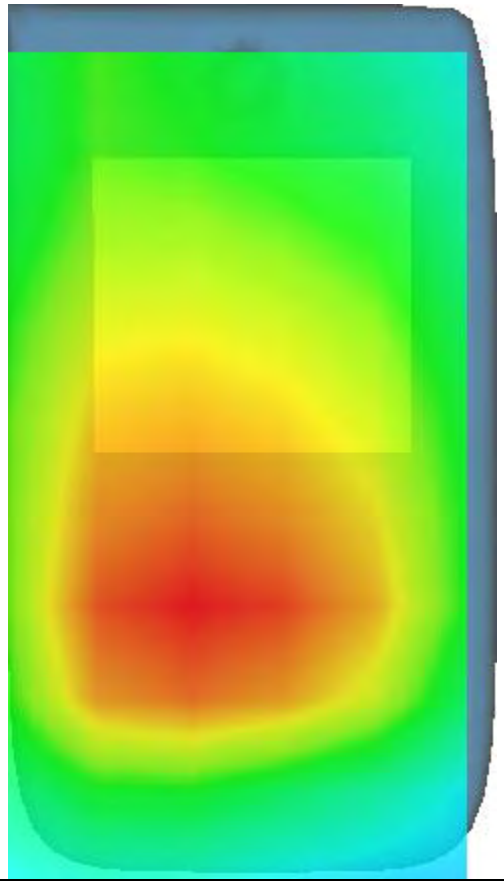
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=-9.00, Y=-27.00
SAR Peak: 1.07 W/kg

SAR 10g (W/Kg)	0.421424
SAR 1g (W/Kg)	0.673702

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.0804	0.7100	0.4223	0.3134	0.1821	0.1491	0.0903



3D screen shot	Hot spot position
	

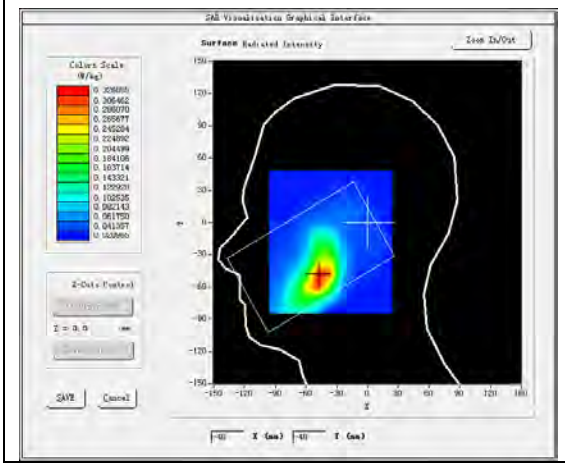
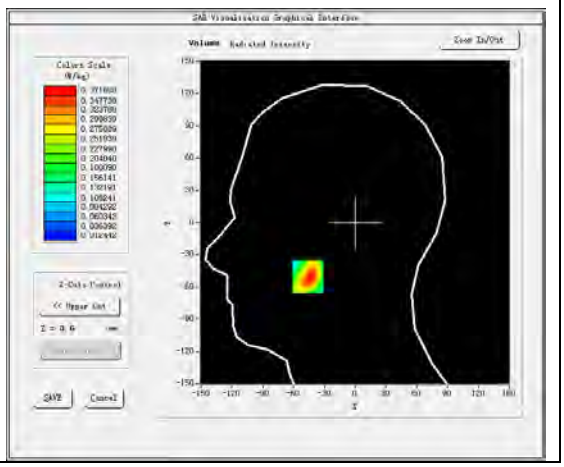
MEASUREMENT 17

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 7
Channels	Middle
Signal	LTE (Crest factor: 1.0)

B. SAR Measurement Results

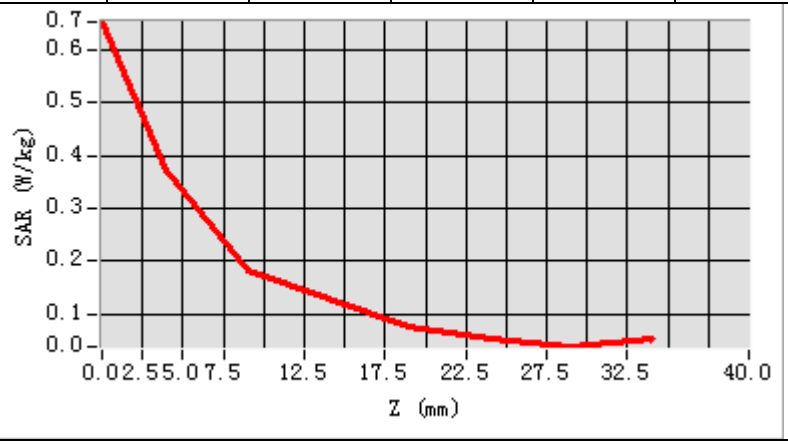
Frequency (MHz)	2535.000000
Relative permittivity (real part)	38.725487
Relative permittivity (imaginary part)	13.931160
Conductivity (S/m)	1.961972
Variation (%)	1.170000

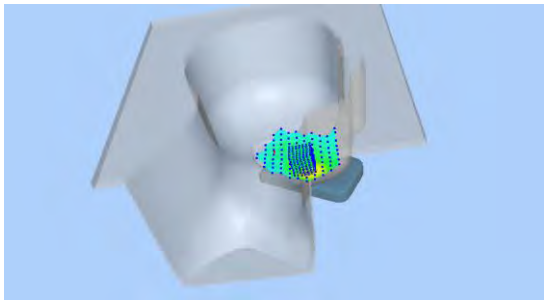
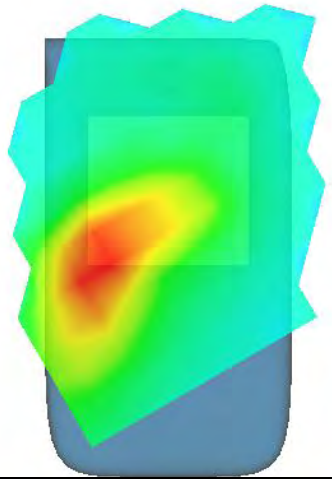
SURFACE SAR	**VOLUME SAR**
	

Maximum location: X=-46.00, Y=-50.00
SAR Peak: 0.58 W/kg

SAR 10g (W/Kg)	0.187843
SAR 1g (W/Kg)	0.354131

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.6518	0.3717	0.1833	0.1304	0.0745	0.0553	0.0384



3D screen shot	Hot spot position
	

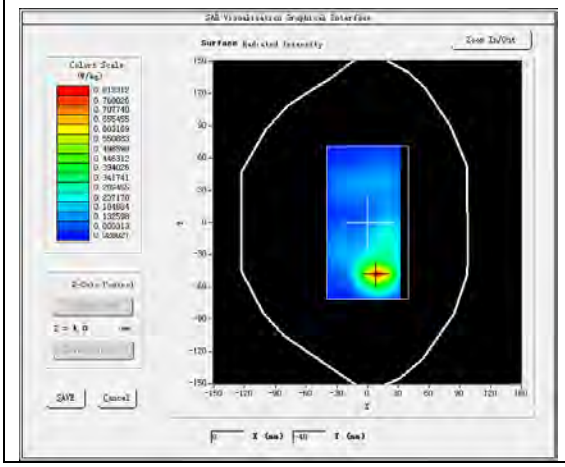
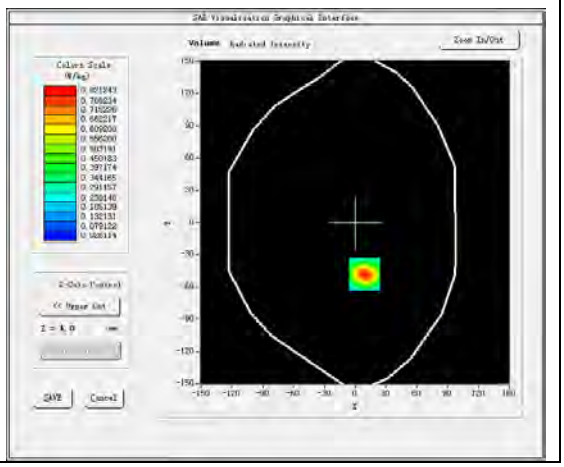
MEASUREMENT 18

A. Experimental conditions.

Area Scan	dx=12mm dy=12mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Body
Band	LTE band 7
Channels	Middle
Signal	LTE (Crest factor: 1.0)

B. SAR Measurement Results

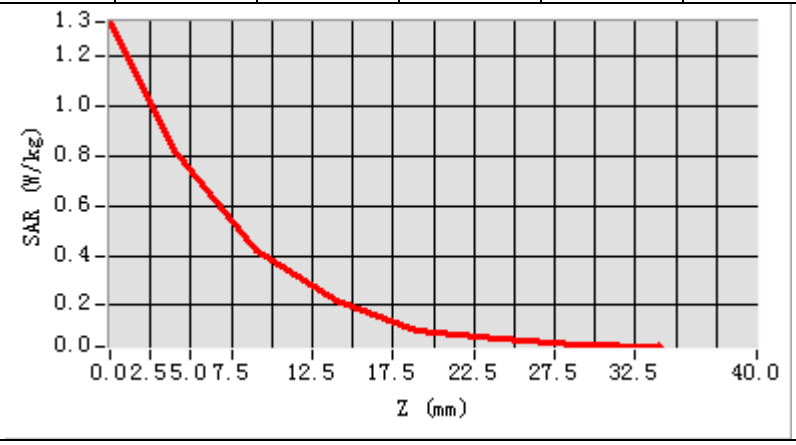
Frequency (MHz)	2535.000000
Relative permittivity (real part)	53.016945
Relative permittivity (imaginary part)	15.217840
Conductivity (S/m)	2.143179
Variation (%)	-4.200000

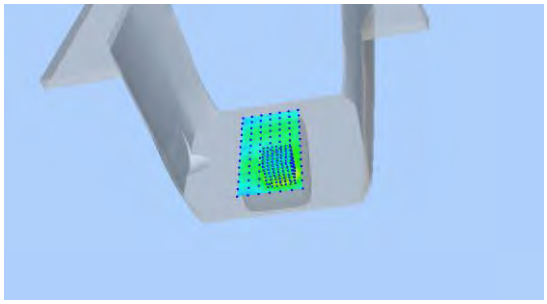
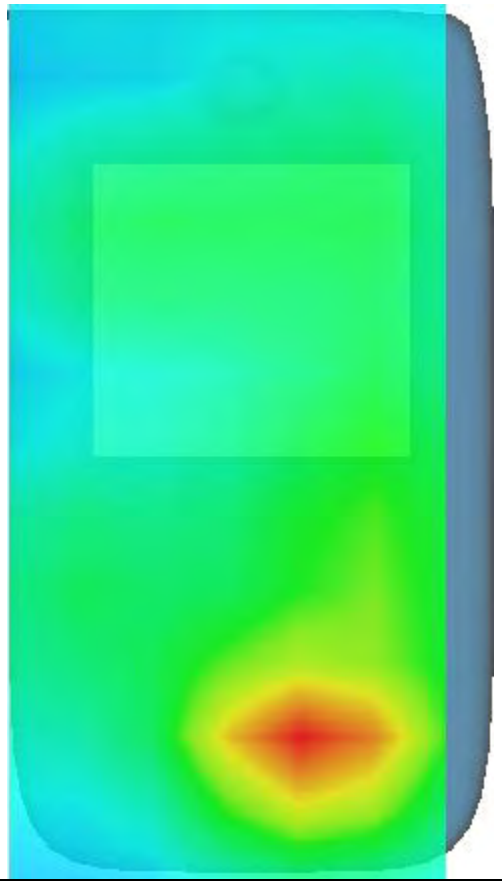
SURFACE SAR	VOLUME SAR
	

Maximum location: X=9.00, Y=-48.00
SAR Peak: 1.33 W/kg

SAR 10g (W/Kg)	0.359546
SAR 1g (W/Kg)	0.752775

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.3389	0.8212	0.4177	0.2194	0.1031	0.0702	0.0452



3D screen shot	Hot spot position
	

14. Appendix D. Calibration Certificate

Table of contents
E Field Probe - SN 08/16 EPGO287
835 MHz Dipole - SN 03/15 DIP 0G835-347
1800 MHz Dipole - SN 03/15 DIP 1G800-349
1900 MHz Dipole - SN 03/15 DIP 1G900-350
2450 MHz Dipole - SN 03/15 DIP 2G450-352
2600 MHz Dipole - SN 03/15 DIP 2G600-356
5000-6000 MHz Dipole - SN 13/14 WGA 33

COMOSAR E-Field Probe Calibration Report

Ref : ACR.260.1.18.SATU.A

SHENZHEN NTEK TESTING TECHNOLOGY CO., LTD.

BUILDING E, FENDA SCIENCE PARK, SANWEI COMMUNITY, XIXIANG STREET,

BAO'AN DISTRICT, SHENZHEN GUANGDONG, CHINA

MVG COMOSAR DOSIMETRIC E-FIELD PROBE

SERIAL NO.: SN 08/16 EPGO287

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144

Calibration Date: 09/17/2018

Summary:

This document presents the method and results from an accredited COMOSAR Dosimetric E-Field Probe calibration performed in MVG USA using the CALISAR / CALIBAIR test bench, for use with a COMOSAR system only. All calibration results are traceable to national metrology institutions.

COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.260.1.18.SATU.A

	Name	*Function*	*Date*	*Signature*
Prepared by :	Jérôme LUC	Product Manager	9/17/2018	
Checked by :	Jérôme LUC	Product Manager	9/17/2018	
Approved by :	Kim RUTKOWSKI	Quality Manager	9/17/2018	

	Customer Name
Distribution :	SHENZHEN NTEK TESTING TECHNOLOGY CO., LTD.

Issue	*Date*	*Modifications*
A	9/17/2018	Initial release

TABLE OF CONTENTS

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	SN 08/16 EPGO287
Product Condition (new / used)	Used
Frequency Range of Probe	0.15 GHz-6GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.209 MΩ Dipole 2: R2=0.196 MΩ Dipole 3: R3=0.197 MΩ

A yearly calibration interval is recommended.

2 PRODUCT DESCRIPTION

2.1 GENERAL INFORMATION

MVG's COMOSAR E field Probes are built in accordance to the IEEE 1528, OET 65 Bulletin C and CEI/IEC 62209 standards.

Figure 1 – *MVG COMOSAR Dosimetric E field Dipole*

Probe Length	330 mm
Length of Individual Dipoles	2 mm
Maximum external diameter	8 mm
Probe Tip External Diameter	2.5 mm
Distance between dipoles / probe extremity	1 mm

3 MEASUREMENT METHOD

The IEEE 1528, OET 65 Bulletin C, CENELEC EN50361 and CEI/IEC 62209 standards provide recommended practices for the probe calibrations, including the performance characteristics of interest and methods by which to assess their affect. All calibrations / measurements performed meet the fore mentioned standards.

3.1 LINEARITY

The evaluation of the linearity was done in free space using the waveguide, performing a power sweep to cover the SAR range 0.01W/kg to 100W/kg.

3.2 SENSITIVITY

The sensitivity factors of the three dipoles were determined using a two step calibration method (air and tissue simulating liquid) using waveguides as outlined in the standards.

3.3 LOWER DETECTION LIMIT

The lower detection limit was assessed using the same measurement set up as used for the linearity measurement. The required lower detection limit is 10 mW/kg.

3.4 ISOTROPY

The axial isotropy was evaluated by exposing the probe to a reference wave from a standard dipole with the dipole mounted under the flat phantom in the test configuration suggested for system validations and checks. The probe was rotated along its main axis from 0 - 360 degrees in 15 degree steps. The hemispherical isotropy is determined by inserting the probe in a thin plastic box filled with tissue-equivalent liquid, with the plastic box illuminated with the fields from a half wave dipole. The dipole is rotated about its axis (0°–180°) in 15° increments. At each step the probe is rotated about its axis (0°–360°).

3.5 BOUNDARY EFFECT

The boundary effect is defined as the deviation between the SAR measured data and the expected exponential decay in the liquid when the probe is oriented normal to the interface. To evaluate this effect, the liquid filled flat phantom is exposed to fields from either a reference dipole or waveguide. With the probe normal to the phantom surface, the peak spatial average SAR is measured and compared to the analytical value at the surface.

4 MEASUREMENT UNCERTAINTY

The guidelines outlined in the IEEE 1528, OET 65 Bulletin C, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty associated with an E-field probe calibration using the waveguide technique. All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

Uncertainty analysis of the probe calibration in waveguide					
ERROR SOURCES	Uncertainty value (%)	Probability Distribution	Divisor	ci	Standard Uncertainty (%)
Incident or forward power	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Reflected power	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Liquid conductivity	5.00%	Rectangular	$\sqrt{3}$	1	2.887%
Liquid permittivity	4.00%	Rectangular	$\sqrt{3}$	1	2.309%
Field homogeneity	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Field probe positioning	5.00%	Rectangular	$\sqrt{3}$	1	2.887%
Field probe linearity	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Combined standard uncertainty					5.831%
Expanded uncertainty 95 % confidence level k = 2					12.0%

5 CALIBRATION MEASUREMENT RESULTS

Calibration Parameters	
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

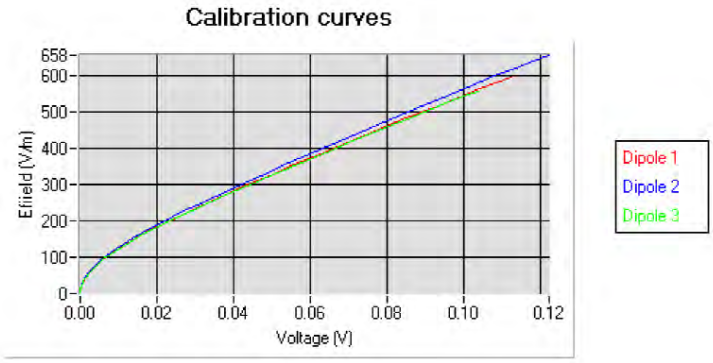
5.1 SENSITIVITY IN AIR

Normx dipole 1 (μV/(V/m)²)	Normy dipole 2 (μV/(V/m)²)	Normz dipole 3 (μV/(V/m)²)
0.66	0.75	0.58

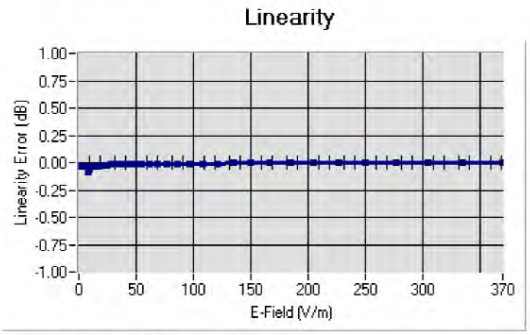
DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
93	93	98

Calibration curves ei=f(V) (i=1,2,3) allow to obtain H-field value using the formula:

$$E = \sqrt{E_1^{\,2} + E_2^{\,2} + E_3^{\,2}}$$



5.2 LINEARITY



Linearity:±1.89% (+/-0.08dB)

5.3 SENSITIVITY IN LIQUID

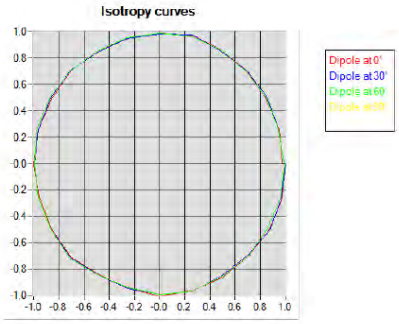
Liquid	Frequency (MHz +/- 100MHz)	Permittivity	Epsilon (S/m)	ConvF
HL750	750	40.03	0.93	1.45
BL750	750	56.83	1.00	1.49
HL850	835	42.19	0.90	1.50
BL850	835	54.67	1.01	1.56
HL900	900	42.08	1.01	1.51
HL1800	1800	41.68	1.46	1.71
BL1800	1800	53.86	1.46	1.77
HL1900	1900	38.45	1.45	2.03
BL1900	1900	53.32	1.56	2.07
HL2000	2000	38.26	1.38	1.76
HL2450	2450	37.50	1.80	2.00
BL2450	2450	53.22	1.89	2.08
HL2600	2600	39.80	1.99	2.12
BL2600	2600	52.52	2.23	2.19
HL5200	5200	35.64	4.67	2.55
BL5200	5200	48.64	5.51	2.62
HL5400	5400	36.44	4.87	2.53
BL5400	5400	46.52	5.77	2.59
HL5600	5600	36.66	5.17	2.64
BL5600	5600	46.79	5.77	2.73
HL5800	5800	35.31	5.31	2.72
BL5800	5800	47.04	6.10	2.81

LOWER DETECTION LIMIT: 7mW/kg

5.4 ISOTROPY

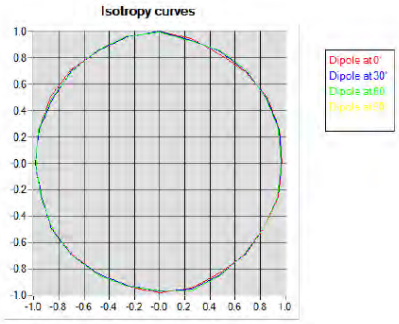
HL900 MHz

- Axial isotropy: 0.04 dB
- Hemispherical isotropy: 0.07 dB



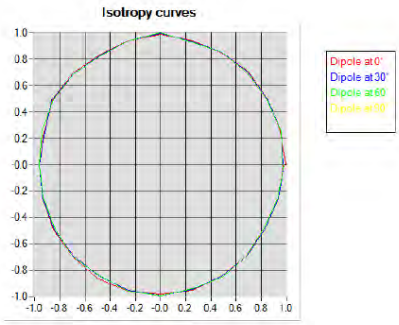
HL1800 MHz

- Axial isotropy: 0.06 dB
- Hemispherical isotropy: 0.08 dB



HL5600 MHz

- Axial isotropy: 0.06 dB
- Hemispherical isotropy: 0.08 dB



6 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
Flat Phantom	MVG	SN-20/09-SAM71	Validated. No cal required.	Validated. No cal required.
COMOSAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rhode & Schwarz ZVA	SN100132	02/2016	02/2019
Reference Probe	MVG	EP 94 SN 37/08	10/2017	10/2018
Multimeter	Keithley 2000	1188656	01/2017	01/2020
Signal Generator	Agilent E4438C	MY49070581	01/2017	01/2020
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	01/2017	01/2020
Power Sensor	HP ECP-E26A	US37181460	01/2017	01/2020
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Waveguide	Mega Industries	069Y7-158-13-712	Validated. No cal required.	Validated. No cal required.
Waveguide Transition	Mega Industries	069Y7-158-13-701	Validated. No cal required.	Validated. No cal required.
Waveguide Termination	Mega Industries	069Y7-158-13-701	Validated. No cal required.	Validated. No cal required.
Temperature / Humidity Sensor	Control Company	150798832	11/2017	11/2020