FCC SAR TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

Mobile Phone

ISSUED TO
GUANGDONG OPPO MOBILE TELECOMMUNICATIONS CORP., LTD.

NO.18 HAIBIN ROAD, USHA, CHANG'AN, DONGGUAN, GUANGDONG, CHINA

Report No.:	BL-SZ1570289-701
EUT Type:	Mobile Phone
Model Name:	OPPO R7sf
Brand Name:	OPPO
FCC ID:	R9C-R7SF
Test Standard:	FCC 47 CFR Part 2.1093
	ANSI C95.1: 1992
	IEEE 1528: 2013
Maximum SAR:	Head (1 g): 0.799 W/kg
	Body (1 g): 1.066 W/kg
Test Conclusion:	Pass
Test Date:	Aug. 17, 2015 ~ Sep. 28, 2015
Date of Issue:	Sep. 28, 2015

Tested by: Tu Lang
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(Engineer)
Date Sep. 28, 2015

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Revision History

Version	Issue Date	Revisions
Rev. 01	Sep. 15, 2015	Initial Issue
Rev. 02	Sep. 23, 2015	Second Issue
Rev. 03	Sep. 25, 2015	Third Issue
Rev. 04	Sep. 28, 2015	Fourth Issue

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1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625. The laboratory has met the requirements of the IAS Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ISO/IEC Standard 17025:2005. The accreditation certificate number is TL-588. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Test Environment Condition

Ambient Temperature	20 to 23 ℃
Ambient Relative Humidity	35 to 50 %
Ambient Pressure	100 to 102 kPa

1.4 Announce

(1) The test report reference to the report template version v1.1.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

(5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.

(6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant

Applicant	GUANGDONG OPPO MOBILE TELECOMMUNICATIONS CORP., LTD.
Address	NO.18 HAIBIN ROAD, WUSHA, CHANG'AN, DONGGUAN, CHINA.

2.2 Manufacturer

Manufacturer	GUANGDONG OPPO MOBILE TELECOMMUNICATIONS CORP., LTD.
Address	NO.18 HAIBIN ROAD, WUSHA, CHANG'AN, DONGGUAN, CHINA.

2.3 General Description for Equipment under Test (EUT)

EUT Type	Mobile phone
Model Name	OPPO R7sf
Hardware Version	11
Software Version	ColorOS V2.1.0i
Dimensions	151.85 X 75.45 X 6.85 mm
Weight	152 g (with battery)
Network and Wireless connectivity	2G Network GSM 850 / 900 / 1800 / 1900, GPRS Class 12, EGPRS Class 12; 3G Network WCDMA Band 1 /2 / 5 / 8 , HSDPA, HSUPA; 4G Network FDD Band 1 / 2 / 4 / 7 / 17; WLAN; Bluetooth;GPS; GLONASS

2.4 Technical Information

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	GSM, WCDMA, FDD-LTE, 2.4G WLAN, 5G WLAN,Bluetooth		
Frequency Range	GSM 850	TX: 824 MHz ~ 849 MHz	RX: 869 MHz ~ 894 MHz
	GSM 1900	TX: 1850 MHz ~ 1910 MHz	RX: 1930 MHz ~ 1990 MHz
	WCDMA Band 2	TX: 1850 MHz ~ 1910 MHz	RX: 1930 MHz ~ 1990 MHz
	WCDMA Band 4	TX: 1710 MHz ~ 1755 MHz	RX: 2110 MHz ~ 2155 MHz
	WCDMA Band 5	TX: 824 MHz ~ 849 MHz	RX: 869 MHz ~ 894 MHz
	LTE Band 2	TX: 1850 MHz ~ 1910 MHz	RX: 1930 MHz ~ 1990 MHz
	LTE Band 4	TX: 1710 MHz ~ 1755 MHz	RX: 2110 MHz ~ 2155 MHz
	LTE Band 7	TX: 2500 MHz ~ 2570 MHz	RX: 2620 MHz ~ 2690 MHz
	LTE Band 17	TX: 704 MHz ~ 716 MHz	RX: 734 MHz ~ 746 MHz
	802.11b/g /n(HT20/HT40)	2400~2483.5 MHz	
	802.11a/ /n(HT20/HT40) /ac(HT20/HT40 /HT80)	5150 MHz~ 5250 MHz	
		5250 MHz~ 5350 MHz	
		5470 MHz~ 5725 MHz	
		5725 MHz~ 5850 MHz	
	Bluetooth	2400~2483.5 MHz	
Antenna Type	WWAN: PIFA Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna		
DTM	Not Support		
Hotspot Function	Support (only 2.4G Band wifi support hotspot mode.)		
Power Reduction	Support (When device operating under hotspot mode, that the WCDMA B2/B4, LTE B2/B4/B7 power reduction will applied for SAR compliance. The reduction power details please refer section 8.)		
Exposure Category	General Population/Uncontrolled exposure		
EUT Stage	Portable Device		
Product	Type		
	☒ Production unit	☐ Identical prototype	

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	OPPO
	Model No.	BLP603
	Serial No.	N/A
	Capacitance	2980 mAh
	Rated Voltage	3.8 V
	Extreme Voltage	Low: 3.6 V / High: 4.35 V
Ancillary Equipment 2	Charger	
	Brand Name	OPPO
	Model No.	AK775
	Rated Input	100-240 V~, 0.6 A, 50/60 Hz
	Rated Output	5 V ⎓ 2 A or 5 V ⎓ 4 A for VOOC Flash Charger
Ancillary Equipment 3	Earphone	
	Length	1.1 m
Ancillary Equipment 4	USB Data Cable	
	Length	1.0 m

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	ANSI/IEEE Std. C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
3	IEEE Std. 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
4	FCC KDB 447498 D01 v05r02	Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
5	FCC KDB 941225 D01 v03	3G SAR MEAUREMENT PROCEDURES
6	FCC KDB 941225 D05 v02r03	SAR Evaluation Considerations for LTE Devices
7	FCC KDB 941225 D06 v01r01	SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities
8	FCC KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
9	FCC KDB 865664 D02 v01r01	RF Exposure Reporting
10	FCC KDB 648474 D04 v01r02	SAR Evaluation Considerations for Wireless Handsets

3.2 Device Category and SAR Limit

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

Table of Exposure Limits:

Body Position	SAR Value (W/Kg)	
	General Population/ Uncontrolled Exposure	Occupational/ Controlled Exposure
Whole-Body SAR (averaged over the entire body)	0.08	0.4
Partial-Body SAR (averaged over any 1 gram of tissue)	1.60	8.0
SAR for hands, wrists, feet and ankles (averaged over any 10 grams of tissue)	4.0	20.0

NOTE:

General Population/Uncontrolled: Locations where there is the exposure of individuals who have no knowledge or control of their exposure. General population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Occupational/Controlled: Locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

3.3 Test Result Summary

3.3.1 Highest SAR (1 g Value)

Position	Band	Maximum Scaled SAR (W/kg)	Maximum Report SAR (W/kg)	Limit (W/kg)	Verdict
Head	GSM 850	0.133	0.799	1.6	Pass
	GSM 1900	0.057			Pass
	WCDMA Band 2	0.078			Pass
	WCDMA Band 4	0.116			Pass
	WCDMA Band 5	0.155			Pass
	LTE Band 2	0.097			Pass
	LTE Band 4	0.127			Pass
	LTE Band 7	0.134			Pass
	LTE Band 17	0.017			Pass
	2.4G WLAN 802.11b	0.799			Pass
	5G WLAN 802.11a	0.775			Pass
	5G WLAN 802.11ac(HT-80)	0.462			Pass
	5G WLAN 802.11n(HT-20)	0.754			Pass
	5G WLAN 802.11n(HT-40)	0.585			Pass
	Bluetooth 8-DPSK	0.438			Pass
Body-Worn	GSM 850	0.271	0.524	1.6	Pass
	GSM 1900	0.250			Pass
	WCDMA Band 2	0.410			Pass
	WCDMA Band 4	0.514			Pass
	WCDMA Band 5	0.253			Pass
	LTE Band 2	0.467			Pass
	LTE Band 4	0.524			Pass
	LTE Band 7	0.308			Pass
	LTE Band 17	0.036			Pass
	2.4G WLAN 802.11b	0.073			Pass
	5G WLAN 802.11a	0.046			Pass
	5G WLAN 802.11ac(HT-80)	0.024			Pass
	5G WLAN 802.11n(HT-20)	0.033			Pass
	5G WLAN 802.11n(HT-40)	0.226			Pass
Hotspot Mode	GSM 850	0.395	1.066	1.6	Pass
	GSM 1900	1.066			Pass
	WCDMA Band 2	0.775			Pass
	WCDMA Band 4	0.893			Pass
	WCDMA Band 5	0.401			Pass
	LTE Band 2	0.933			Pass
	LTE Band 4	0.744			Pass
	LTE Band 7	0.652			Pass
	LTE Band 17	0.053			Pass
	2.4G WLAN 802.11b	0.158			Pass
	Bluetooth 8-DPSK	0.083			Pass

3.3.2 Highest Simultaneous SAR

Position	Simultaneous Configuration	Simultaneous SAR (W/kg)	Limit (W/kg)	Verdict
Head	WCDMA RMC + WLAN	0.954	1.6	Pass
Body-worn	LTE QPSK + WLAN	0.750	1.6	Pass
Hotspot Mode	GSM DATA + Bluetooth	1.149	1.6	Pass

3.4 Test Uncertainty

3.4.1 Measurement uncertainly evaluation for SAR test

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in IEEE 1528 This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Uncertainty Component	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System								
Probe calibration	5.8	N	1	1	1	5.80	5.80	∞
Axial Isotropy	3.5	R	$\sqrt{3}$	0.7	0.7	1.41	1.41	∞
Hemispherical Isotropy	5.9	R	$\sqrt{3}$	0.7	0.7	2.38	2.38	∞
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	4.7	R	$\sqrt{3}$	1	1	2.71	2.71	∞
System detection limits	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	0.5	N	1	1	1	0.50	0.50	∞
Reponse Time	0.0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Integration Time	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF ambient Conditions - Noise	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to Phantom Shell	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
Test sample Related								
Test sample positioning	2.6	N	1	1	1	2.60	2.60	N−1
Device Holder Uncertainty	1.0	N	1	1	1	1.00	1.00	N−1
Output power Variation - SAR drift measurement	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
SAR scaling	2.00	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Phantom and Tissue Parameters								
Phantom Uncertainty (Shape and thickness tolerances)	4.0	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Liquid conductivity (deviation from target values)	2.5	N	$\sqrt{3}$	0.64	0.43	0.92	0.62	∞
Liquid conductivity - measurement uncertainty	5.0	N	1	0.64	0.43	3.20	2.15	M
Liquid permittivity (deviation from target values)	2.5	N	$\sqrt{3}$	0.60	0.49	0.87	0.71	∞
Liquid permittivity - measurement uncertainty	5.0	N	1	0.60	0.49	3.00	2.45	M
Combined Standard Uncertainty		RSS				10.14	9.67	
Expanded Uncertainty (95% Confidence interval)		k				20.29	19.35	

3.4.2 Measurement uncertainly evaluation for system check

This measurement uncertainty budget is suggested by IEEE 1528. The break down of the individual uncertainties is as follows:

Uncertainty Component	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System								
Probe calibration	5.8	N	1	1	1	5.80	5.80	∞
Axial Isotropy	3.5	R	$\sqrt{3}$	0.7	0.7	1.41	1.41	∞
Hemispherical Isotropy	5.9	R	$\sqrt{3}$	0.7	0.7	2.38	2.38	∞
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Probe Linearity	4.7	R	$\sqrt{3}$	1	1	2.71	2.71	∞
System detection limits	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	0.5	N	1	1	1	0.50	0.50	∞
Reponse Time	0.0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Integration Time	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF ambient Conditions - Noise	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to Phantom Shell	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
Dipole								
Deviation of experimental dipole	5.5	R	$\sqrt{3}$	1	1	3.20	3.20	∞
Dipole axis to liquid distance	2.0	R	1	1	1	1.20	1.20	∞
Power drift	4.7	R	$\sqrt{3}$	1	1	2.70	2.70	∞
Phantom and Tissue Parameters								
Phantom Uncertainty (Shape and thickness tolerances)	4.0	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Liquid conductivity (deviation from target values)	2.5	N	$\sqrt{3}$	0.64	0.43	0.92	0.62	∞
Liquid conductivity - measurement uncertainty	5.0	N	1	0.64	0.43	3.20	2.15	M
Liquid permittivity (deviation from target values)	2.5	N	$\sqrt{3}$	0.60	0.49	0.87	0.71	∞
Liquid permittivity - measurement uncertainty	5.0	N	1	0.60	0.49	3.00	2.45	M
Combined Standard Uncertainty		RSS				10.22	9.75	
Expanded Uncertainty (95% Confidence interval)		k				20.44	19.50	

4 SAR MEASUREMENT SYSTEM

4.1 Definition of Specific Absorption Rate (SAR)

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

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

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

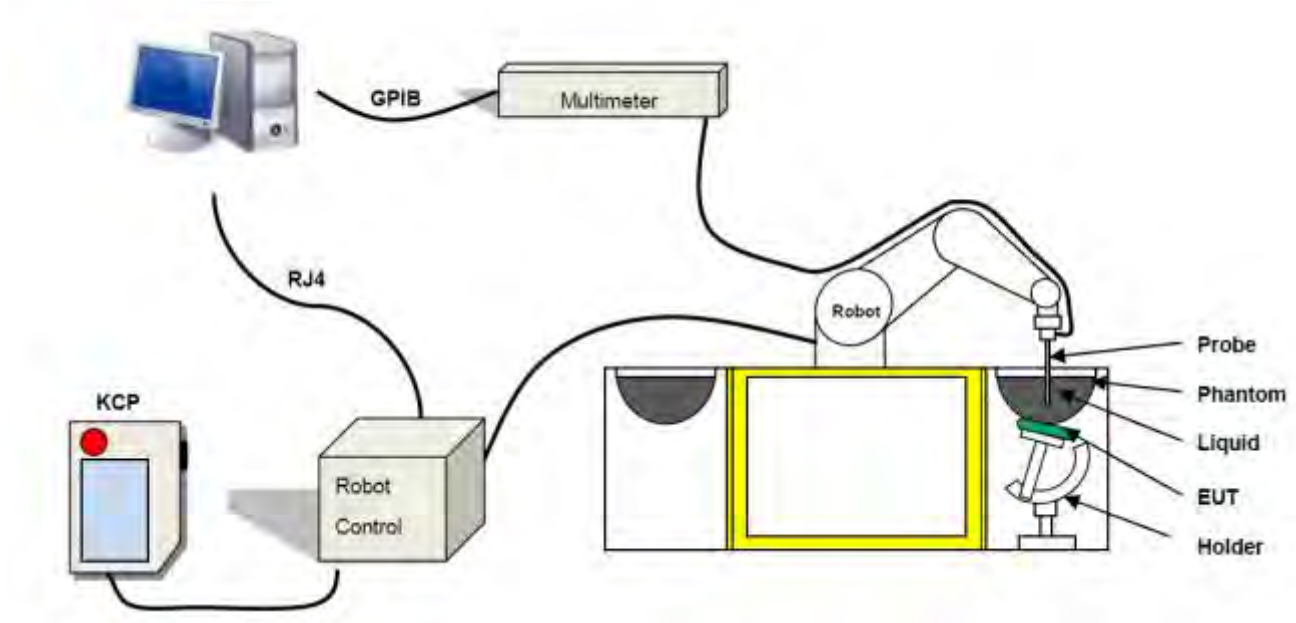
SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

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

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

4.2 SATIMO SAR System

4.2.1 SATIMO SAR System 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: 850 mm), which positions the probes with a positional repeatability of better than ± 0.02 mm. Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines to the data acquisition unit.

The SAR measurements were conducted with dosimetric probe (manufactured by SATIMO), designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe has been calibrated according to the procedure described in SAR standard with accuracy of better than ±10%. The spherical isotropy was evaluated with the procedure described in SAR standard and found to be better than ±0.25 dB. The phantom used was the SAM Phantom as described in FCC supplement C, IEEE P1528.

4.2.2 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 ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

4.2.3 E-Field Probe

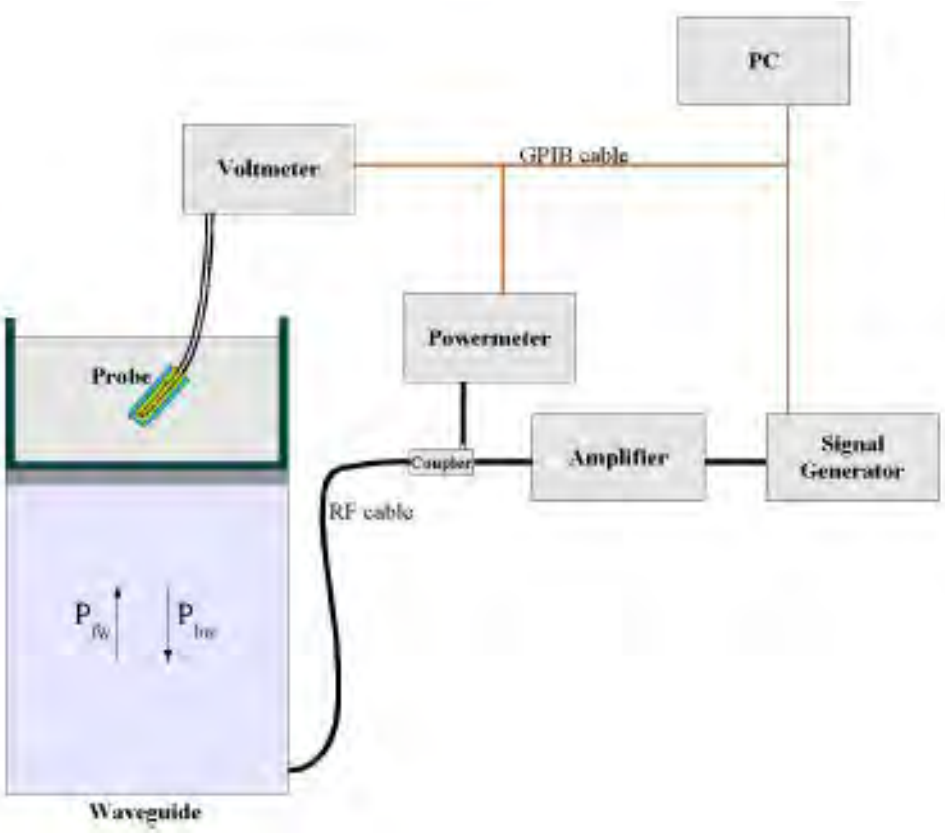
For the measurements the Specific Dosimetric E-Field Probe SN 27/14 SSE2 EPG 210 with following specifications is used
- Dynamic range: 0.01-100 W/kg
- Tip Diameter : 2.5 mm
- Distance between probe tip and sensor center: 1.0mm
- Distance between sensor center and the inner phantom surface: 4 mm
(repeatability better than +/- 1mm)
- Probe linearity: +/- 0.06 dB

- Axial Isotropy: ＜0.15 dB
- Spherical Isotropy: ＜0.15 dB
- Calibration range: 450MHz to 5800MHz for head & body simulating liquid.

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

E-Field Probe Calibration Process

Probe calibration is realized, in compliance with CENELEC EN 62209-1/-2 and IEEE 1528 std, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the IEC62209-1/2 annexe technique using reference guide at the five frequencies.



$$SAR = \frac{4(P_{fw} - P_{bw})}{ab\sigma} \cos^2\left(\pi \frac{y}{a}\right) c^{(2\pi/\sigma)}$$

Where :

Pfw = Forward Power

Pbw = Backward Power

a and b = Waveguide dimensions

ı = Skin depth

Keithley configuration:

Rate = Medium; Filter =ON; RDGS=10; FILTER TYPE =MOVING AVERAGE; RANGE AUTO After each calibration, a SAR measurement is performed on a validation dipole and compared with a NPL calibrated probe, to verify it.

The calibration factors, CF(N), for the 3 sensors corresponding to dipole 1, dipole 2 and dipole 3 are:

$$CF(N)=SAR(N)/Vlin(N) \qquad (N=1,2,3)$$

The linearised output voltage Vlin(N) is obtained from the displayed output voltage V(N) using

$$Vlin(N)=V(N)*(1+V(N)/DCP(N)) \qquad (N=1,2,3)$$

Where the DCP is the diode compression point in mV.

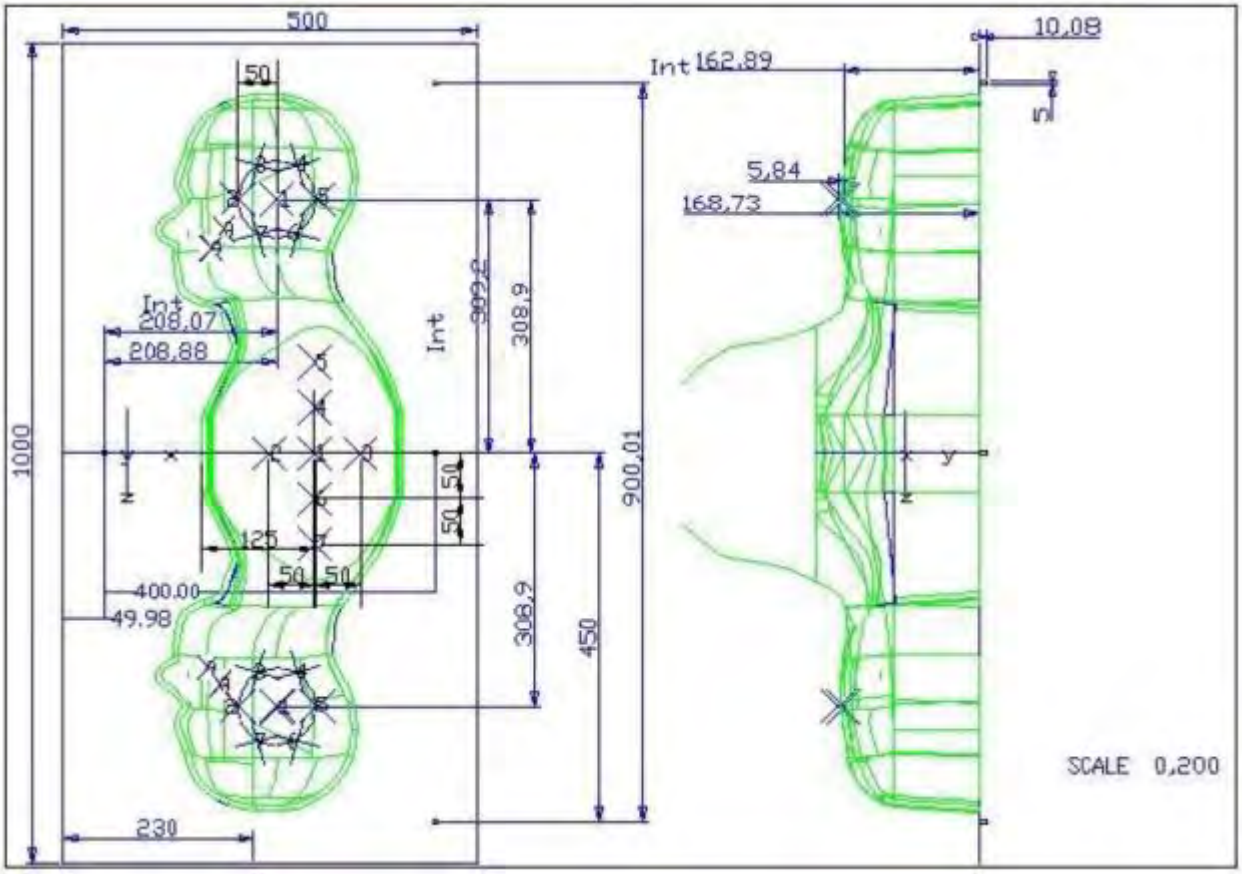
4.2.4 Phantoms

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2mm +/- 0.2mm. It enables the dosimetric evaluation of left and right phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.

Photo of Phantom SN 30/13 SAM103

Photo of Phantom SN 30/13 SAM104

Serial Number	Positionner Material	Permittivity	Loss Tangent
SN 30/13 SAM103	Gelcoat with fiberglass	3.4	0.02
SN 30/13 SAM104	Gelcoat with fiberglass	3.4	0.02



Serial Number	Left Head		Right Head		Flat Part	
SN 30/13 SAM103	2	2.00	2	2.03	1	2.09
	3	2.02	3	2.05	2	2.10
	4	2.04	4	2.04	3	2.09
	5	2.04	5	2.07	4	2.11
	6	2.02	6	2.07	5	2.11
	7	2.01	7	2.09	6	2.09
	8	2.04	8	2.10	7	2.11
	9	2.02	9	2.09	-	-
SN 30/13 SAM104	2	2.05	2	2.06	1	2.03
	3	2.08	3	2.03	2	2.03
	4	2.05	4	2.03	3	2.01
	5	2.06	5	2.02	4	2.03
	6	2.08	6	2.02	5	2.03
	7	2.06	7	2.04	6	2.00
	8	2.07	8	2.04	7	1.98
	9	2.07	9	2.05	-	-

4.2.5 Device Holder

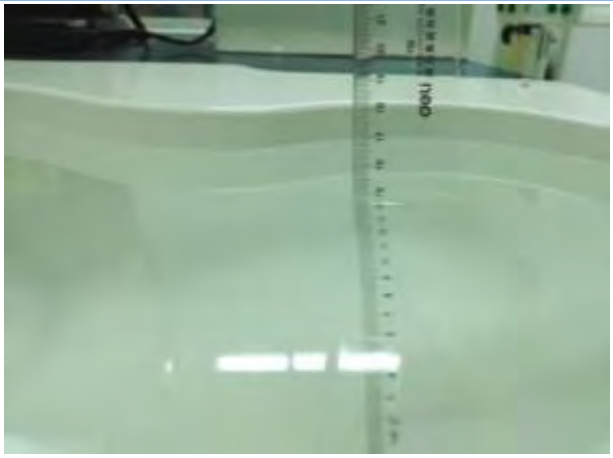
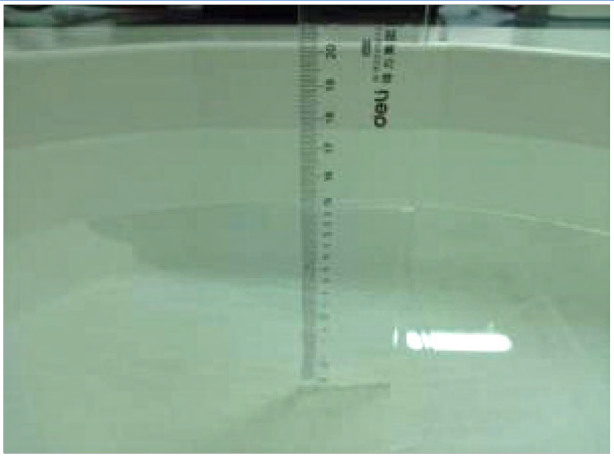
The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

Serial Number	Holder Material	Permittivity	Loss Tangent
SN 25/13 MSH87	Deirin	3.7	0.005
SN 25/13 MSH88	Deirin	3.7	0.005

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°.

4.2.6 Simulating Liquid

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 height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5%.

Head Liquid Depth	Body Liquid Depth
	

The following table gives the recipes for tissue simulating liquid.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity σ	Permittivity ε
Head (Reference IEEE1528)								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.4	40.0
2450	55.0	0	0	0.1	0	44.9	1.80	39.2
2600	54.9	0	0	0.1	0	45.0	1.96	39.0
Frequency(MHz)	Water (%)	Hexyl Carbitol (%)			Triton X-100 (%)		Conductivity σ	Permittivity ε
5200	62.52	17.24			17.24		4.66	36.0
5800	62.52	17.24			17.24		5.29	35.2
Body (From instrument manufacturer: SATIMO)								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0.1	0	31.3	1.95	52.7
2600	68.2	0	0	0.1	0	31.7	2.16	52.5
Frequency(MHz)	Water (%)	DGBE (%)			Salt (%)		Conductivity σ	Permittivity ε
5200	78.60	22.40			/		5.54	47.86
5800	78.50	22.40			0.1		6.00	48.20

5 SYSTEM VERIFICATION

5.1 Antenna Port Test Requirement

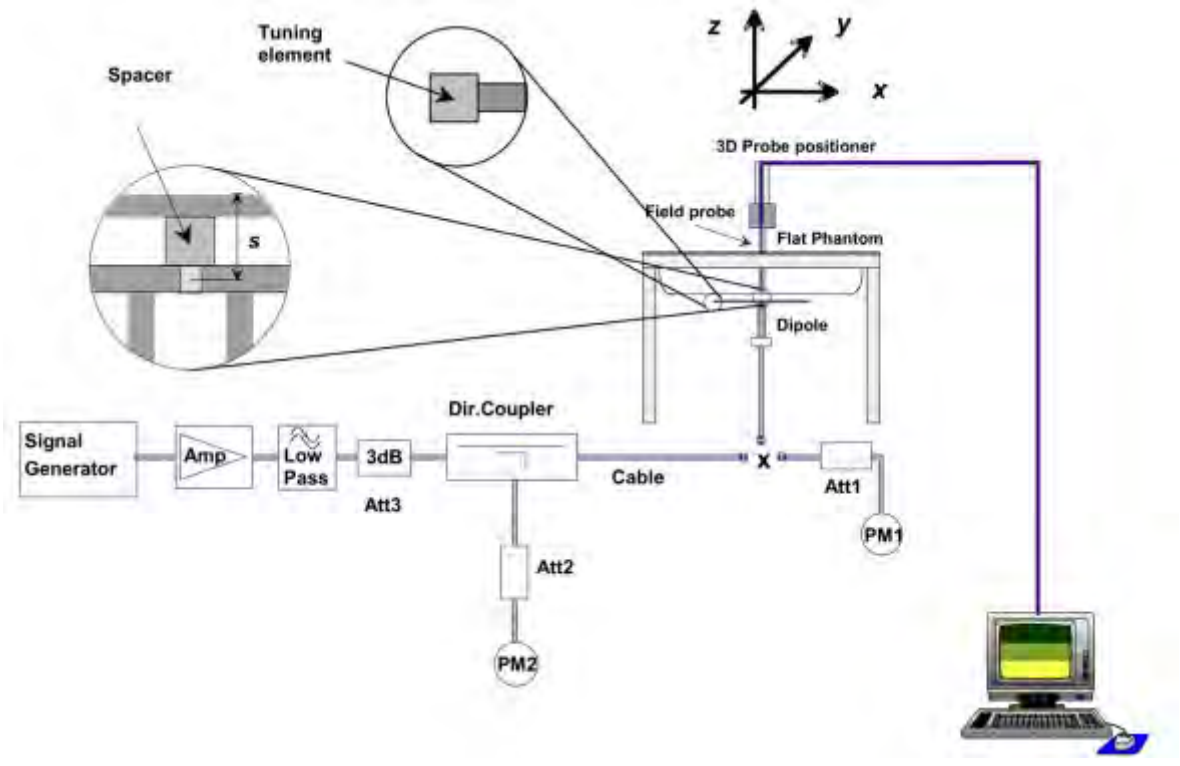
The SATIMO SAR system is equipped with one or more system validation kits. These units together with the predefined measurement procedures within the SATIMO software enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

5.2 Purpose of System Check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

5.3 System Check Setup

In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



6 EUT TEST POSITION CONFIGURATUONS

According to KDB 648474 D04 Handset v01r02, handsets are tested for SAR compliance in head, body-worn accessory and other use configurations described in the following subsections.

6.1 Head Exposure Conditions

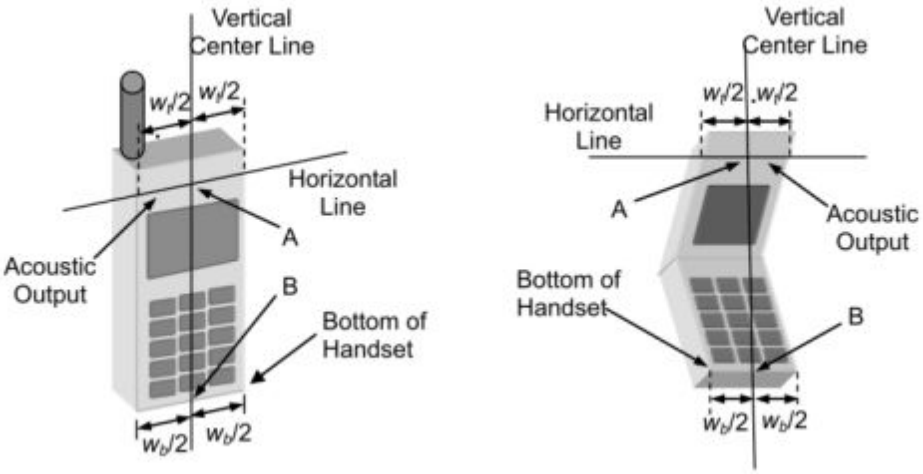
Head exposure is limited to next to the ear voice mode operations. Head SAR compliance is tested according to the test positions defined in IEEE Std 1528-2013 using the SAM phantom illustrated as below.

6.1.1 Define two imaginary lines on the handset

(a) 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, and the midpoint of the width w b of the bottom of the handset.

(b) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.

(c) 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, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.



6.1.2 Cheek Position

(a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

(b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.

6.1.3 Tilted Position

(a) To position the device in the “cheek” position described above.
(b) While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost.

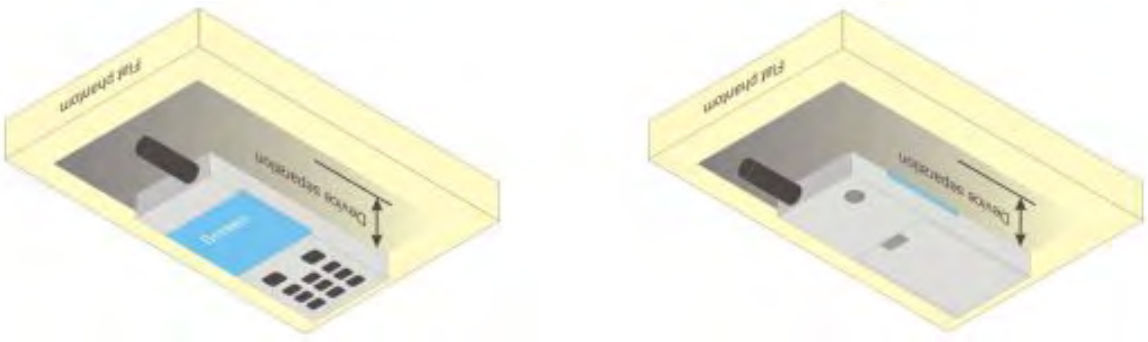
6.2 Body-worn Position Conditions

Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in KDB 447498 are 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 the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Body-worn accessories that do not contain metallic or conductive components may be tested according to worst-case exposure configurations, typically according to the smallest test separation distance required for the group of body-worn accessories with similar operating and exposure characteristics. All body-worn accessories containing metallic components are tested in conjunction with the host device.

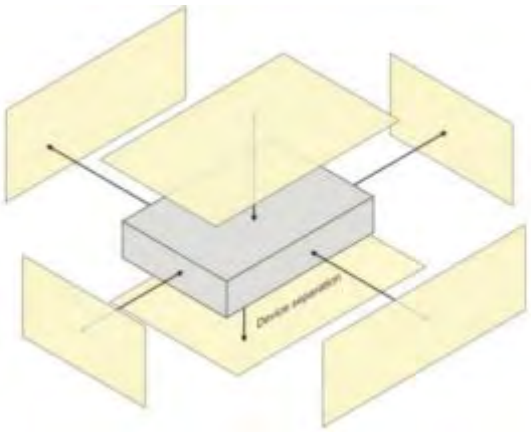
Body-worn accessory SAR compliance is based on a single minimum test separation distance for all wireless and operating modes applicable to each body-worn accessory used by the host, and according to the relevant voice and/or data mode transmissions and operations. If a body-worn accessory supports voice only operations in its normal and expected use conditions, testing of data mode for body-worn compliance is not required. A

conservative minimum test separation distance for supporting off-the-shelf body-worn accessories that may be acquired by users of consumer handsets is used to test for body-worn accessory SAR compliance. This distance is determined by the handset manufacturer, according to the requirements of Supplement C 01-01. Devices that are designed to operate on the body of users using lanyards and straps, or without requiring additional body-worn accessories, will be tested using a conservative minimum test separation distance <= 5 mm to support compliance.



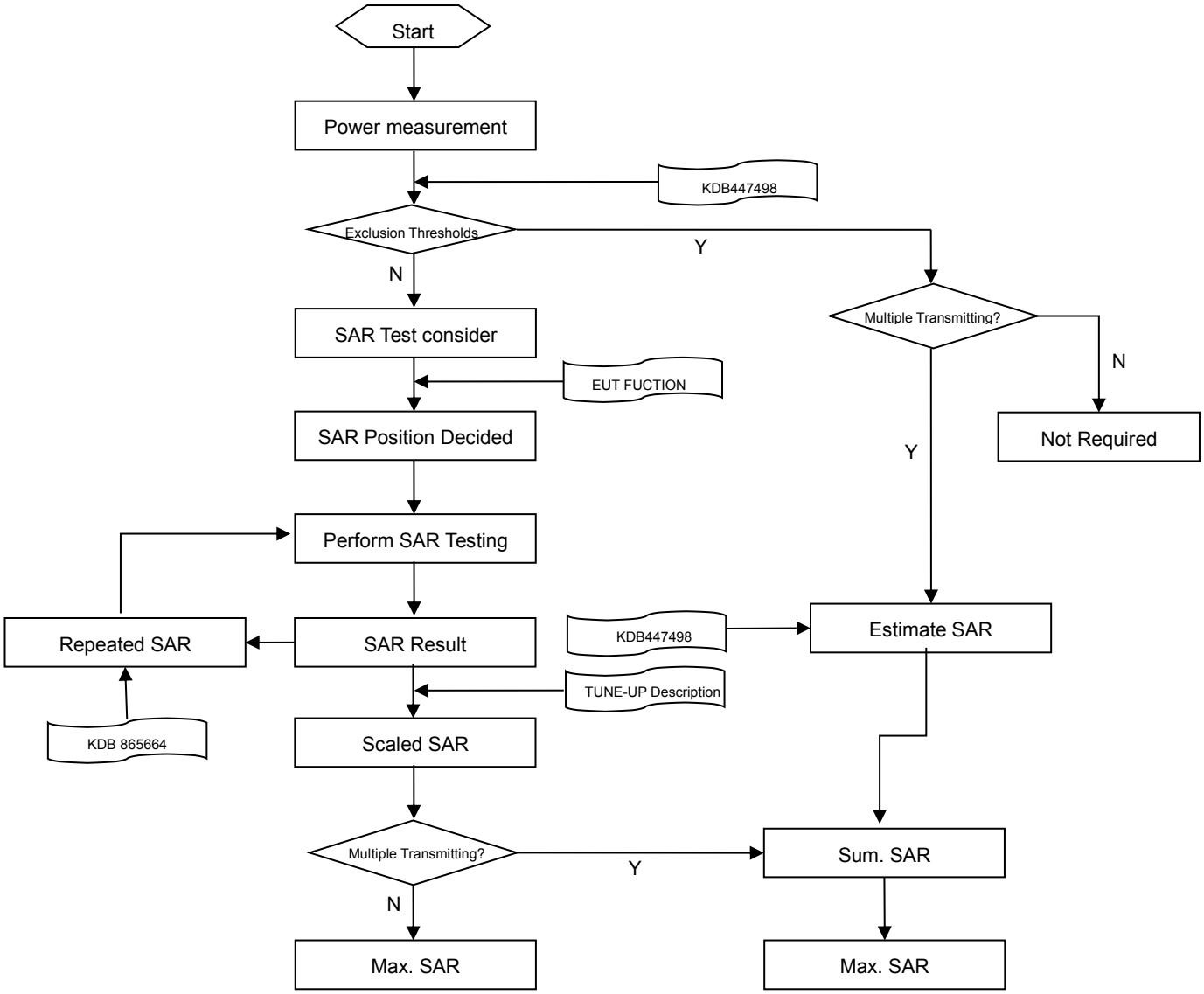
6.3 Hotspot Mode Exposure Position Conditions

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing functions, the relevant hand and body exposure conditions are tested according to the hotspot SAR procedures in KDB 941225. A test separation distance of 10 mm is required between the phantom and all surfaces and edges with a transmitting antenna located within 25 mm from that surface or edge. When the form factor of a handset is smaller than 9 cm x 5 cm, a test separation distance of 5 mm (instead of 10 mm) is required for testing hotspot mode. When the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface).



7 SAR MEASUREMENT PROCEDURES

7.1 SAR Measurement Process Diagram



7.2 SAR Scan General Requirements

Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2013.

<table>
<tr><th colspan="3"></th><th>≤3GHz</th><th>>3GHz</th></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="5">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2" rowspan="3">uniform grid: Δz Zoom (n)</td><td rowspan="3">≤ 5 mm</td><td>3–4 GHz: ≤ 4 mm</td></tr>
<tr><td>4–5 GHz: ≤ 3 mm</td></tr>
<tr><td>5–6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>Δ z Zoom (1): between 1st two points closest to phantom surface</td><td rowspan="2">≤ 4 mm</td><td>3–4 GHz: ≤ 3 mm
4–5 GHz: ≤ 2.5 mm
5–6 GHz: ≤ 2 mm</td></tr>
<tr><td>Δ z Zoom (n>1): between subsequent points</td><td colspan="2">≤ 1.5·Δz 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:
1. δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
2. * 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 3GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

7.3 SAR Measurement Procedure

The following steps are used for each test position

- Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface
- Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
- Measurement of the SAR distribution with a grid of 8 to 16mm * 8 to16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
- Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.
-

7.4 Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r03 quoted below.

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

8 CONDUCTED RF OUPUT POWER

GSM						
GSM 850 Band	Burst Average Power(dBm)			Frame-averaged power(dBm)		
Channel	128	190	251	128	190	251
Frequency (MHz)	824.2	836.6	848.8	824.2	836.6	848.8
GSM (GMSK, 1-Slot)	33.00	33.02	33.07	24.00	24.02	**24.07**
GPRS (GMSK, 1-Slot)	32.99	32.98	33.02	23.99	23.98	24.02
GPRS (GMSK, 2-Slots)	30.99	30.93	30.68	24.99	24.93	24.68
GPRS (GMSK, 3-Slots)	29.26	29.20	28.93	**25.00**	24.94	24.67
GPRS (GMSK, 4-Slots)	27.65	27.52	27.57	24.65	24.52	24.57
EGPRS (8PSK, 1-Slot)	29.71	29.50	29.54	20.71	20.50	20.54
EGPRS (8PSK, 2-Slots)	27.61	27.42	27.46	21.61	21.42	21.46
EGPRS (8PSK, 3-Slots)	26.58	26.28	26.28	22.32	22.02	22.02
EGPRS (8PSK, 4-Slots)	26.45	26.32	26.32	**23.45**	23.32	23.32
GSM 1900 Band	Burst Average Power(dBm)			Frame-averaged power(dBm)		
Channel	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8	1850.2	1880.0	1909.8
GSM (GMSK, 1-Slot)	30.44	30.52	30.56	21.44	21.52	**21.56**
GPRS (GMSK, 1-Slot)	30.41	30.49	30.51	21.41	21.49	21.51
GPRS (GMSK, 2-Slots)	27.56	27.64	27.75	21.56	21.64	21.75
GPRS (GMSK, 3-Slots)	26.57	26.62	26.69	22.31	22.36	**22.43**
GPRS (GMSK, 4-Slots)	25.05	25.09	25.08	22.05	22.09	22.08
EGPRS (8PSK, 1-Slot)	28.95	28.89	28.80	19.95	19.89	19.80
EGPRS (8PSK, 2-Slots)	27.78	27.76	27.65	21.78	21.76	21.65
EGPRS (8PSK, 3-Slots)	26.68	26.60	26.63	22.42	22.34	22.37
EGPRS (8PSK, 4-Slots)	25.64	25.61	25.53	**22.64**	22.61	22.53

Note:

1. SAR testing was performed on the maximum frame-Peaked power mode.
2. The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:

   Frame-averaged power = Burst averaged power (1 Tx Slot) - 9 dB

   Frame-averaged power = Burst averaged power (2 Tx Slots) - 6 dB

   Frame-averaged power = Burst averaged power (3 Tx Slots) - 4.26 dB

   Frame-averaged power = Burst averaged power (4 Tx Slots) - 3 dB

WCDMA						
Band	Band 2			Band 4		
Channel	9263	9400	9537	1662	1413	1513
Frequency (MHz)	1852.6	1880.0	1907.4	1712.5	1732.6	1752.6
RMC 12.2Kbps	**23.72**	23.70	23.85	23.23	**23.28**	23.24
HSDPA Subtest-1	22.75	22.62	22.81	22.33	22.26	22.25
HSDPA Subtest-2	22.78	22.61	22.80	22.14	22.34	22.33
HSDPA Subtest-3	22.10	21.99	22.32	21.90	21.82	21.83
HSDPA Subtest-4	22.29	21.94	22.23	21.91	21.85	21.66
HSUPA Subtest-1	22.43	22.69	22.92	22.06	22.19	22.25
HSUPA Subtest-2	21.19	21.42	21.69	20.92	20.71	20.94
HSUPA Subtest-3	21.66	21.72	21.23	21.02	21.17	21.12
HSUPA Subtest-4	21.48	21.69	21.90	21.24	21.09	21.22
HSUPA Subtest-5	22.51	22.40	22.59	22.41	22.30	22.42
Band	Band 5			N/A		
Channel	4133	4175	4232	N/A	N/A	N/A
Frequency (MHz)	826.6	835	846.4	N/A	N/A	N/A
RMC 12.2Kbps	22.80	22.95	**23.01**	-	-	-
HSDPA Subtest-1	22.08	21.92	21.99	-	-	-
HSDPA Subtest-2	22.00	21.96	21.96	-	-	-
HSDPA Subtest-3	21.61	21.47	21.53	-	-	-
HSDPA Subtest-4	21.60	21.47	21.53	-	-	-
HSUPA Subtest-1	21.38	21.26	21.47	-	-	-
HSUPA Subtest-2	20.58	20.66	20.44	-	-	-
HSUPA Subtest-3	20.79	20.84	20.61	-	-	-
HSUPA Subtest-4	21.00	20.88	21.23	-	-	-
HSUPA Subtest-5	21.89	21.76	21.99	-	-	-

FDD LTE Band 2							
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18607	18900	19193	18607	18900	19193
1.4MHz	1 (RB_Pos:0)	23.25	23.11	23.23	23.05	22.68	22.56
	1 (RB_Pos:3)	23.55	23.27	23.77	23.07	22.46	22.42
	1 (RB_Pos:5)	23.42	23.02	23.47	23.04	22.36	22.53
	3 (RB_Pos:0)	23.31	23.16	23.40	22.57	22.10	22.72
	3 (RB_Pos:1)	23.44	23.10	23.45	22.61	22.24	22.82
	3 (RB_Pos:3)	23.29	23.15	23.54	22.12	22.09	22.20
	6 (RB_Pos:0)	22.29	22.21	22.44	21.00	20.75	21.41
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
		18615	18900	19185	18615	18900	19185
3.0MHz	1 (RB_Pos:0)	23.53	23.27	23.55	22.96	22.52	22.58
	1 (RB_Pos:13)	23.48	23.10	23.25	22.60	22.17	22.30
	1 (RB_Pos:24)	23.51	23.27	23.45	23.32	22.41	22.58
	8 (RB_Pos:0)	22.38	22.21	22.43	21.69	21.17	21.16
	8 (RB_Pos:6)	22.49	22.24	22.38	21.70	21.34	21.20
	8 (RB_Pos:13)	22.40	22.18	22.39	21.07	21.13	21.62
	15 (RB_Pos:0)	22.49	22.24	22.38	21.33	21.04	21.29
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18625	18900	19175	18625	18900	19175
5MHz	1 (RB_Pos:0)	23.33	23.37	23.35	22.30	22.76	22.38
	1 (RB_Pos:13)	23.53	23.01	23.07	21.80	22.24	22.59
	1 (RB_Pos:24)	23.49	23.21	23.29	22.32	22.73	22.90
	12 (RB_Pos:0)	22.49	22.18	22.33	21.31	21.07	21.16
	12 (RB_Pos:6)	22.51	22.17	22.51	21.40	21.39	21.42
	12 (RB_Pos:13)	22.50	22.16	22.41	21.49	21.08	21.28
	25 (RB_Pos:0)	22.47	22.21	22.34	21.31	21.13	21.41
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18650	18900	19150	18650	18900	19150
10MHz	1 (RB_Pos:0)	23.73	23.52	23.64	23.17	22.70	22.75
	1 (RB_Pos:25)	23.49	23.27	23.50	23.33	22.60	22.48
	1 (RB_Pos:49)	23.58	23.43	23.55	23.29	22.83	22.69
	25 (RB_Pos:0)	22.64	22.30	22.52	21.43	21.15	21.50
	25 (RB_Pos:12)	22.60	22.33	22.37	21.51	21.33	21.57
	25 (RB_Pos:25)	22.55	22.32	22.39	21.60	21.10	21.59
	50 (RB_Pos:0)	22.59	22.21	22.35	21.47	21.21	21.49

Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18675	18900	19125	18675	18900	19125
15MHz	1 (RB_Pos:0)	23.60	23.82	23.89	23.26	22.88	23.57
	1 (RB_Pos:38)	23.28	23.20	23.49	23.01	22.39	23.33
	1 (RB_Pos:74)	23.73	23.36	23.58	23.06	23.18	23.24
	36 (RB_Pos:0)	22.67	22.36	22.57	21.57	21.30	21.35
	36 (RB_Pos:20)	22.66	22.30	22.51	21.43	21.35	21.32
	36 (RB_Pos:39)	22.57	22.25	22.44	21.45	21.30	21.41
	75 (RB_Pos:0)	22.59	22.28	22.50	21.59	21.35	21.42
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18700	18900	19100	18700	18900	19100
20MHz	1 (RB_Pos:0)	**23.76**	23.20	23.51	23.23	22.06	22.85
	1 (RB_Pos:50)	23.42	23.01	23.41	22.35	22.06	22.46
	1 (RB_Pos:99)	23.45	22.81	23.31	23.03	22.20	22.32
	50 (RB_Pos:0)	**22.51**	22.27	22.44	21.41	21.27	21.30
	50 (RB_Pos:25)	22.46	22.22	22.32	21.42	21.12	21.27
	50 (RB_Pos:50)	22.40	22.11	22.32	21.40	21.11	21.26
	100 (RB_Pos:0)	22.49	22.19	22.39	21.39	21.10	21.24

FDD LTE Band 4							
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	19957	20175	20393	19957	20175	20393
1.4MHz	1 (RB_Pos:0)	23.00	23.16	23.15	22.69	22.81	22.29
	1 (RB_Pos:3)	23.24	23.41	23.41	22.70	22.88	22.50
	1 (RB_Pos:5)	23.10	23.17	23.40	22.76	22.83	22.41
	3 (RB_Pos:0)	22.94	23.19	23.27	21.87	22.14	22.59
	3 (RB_Pos:1)	22.97	23.13	23.22	21.80	22.31	22.82
	3 (RB_Pos:3)	22.92	23.30	23.10	21.96	22.10	22.66
	6 (RB_Pos:0)	21.92	22.28	22.21	20.86	20.85	21.40
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
		19965	20175	20385	19965	20175	20385
3.0MHz	1 (RB_Pos:0)	21.89	23.25	23.31	22.46	22.37	22.23
	1 (RB_Pos:13)	22.06	23.37	23.22	22.70	22.29	21.91
	1 (RB_Pos:24)	22.00	23.13	23.44	22.86	22.73	22.32
	8 (RB_Pos:0)	21.94	22.32	22.19	20.74	21.37	21.04
	8 (RB_Pos:6)	21.89	22.22	22.24	20.78	21.53	21.08
	8 (RB_Pos:13)	22.07	22.28	22.21	20.94	21.33	21.04
	15 (RB_Pos:0)	22.00	22.24	22.26	21.00	21.15	21.10

\Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	19975	20175	20375	19975	20175	20375
5MHz	1 (RB_Pos:0)	23.06	23.44	23.17	22.17	23.02	22.32
	1 (RB_Pos:13)	23.07	23.14	22.99	22.16	22.94	21.78
	1 (RB_Pos:24)	23.14	23.09	23.24	22.20	22.88	22.31
	12 (RB_Pos:0)	21.88	22.33	22.03	21.06	21.24	21.04
	12 (RB_Pos:6)	22.09	22.26	22.08	21.17	21.46	21.09
	12 (RB_Pos:13)	22.02	22.21	22.08	21.28	21.34	21.09
	25 (RB_Pos:0)	21.96	22.26	22.21	20.92	21.07	21.19
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20000	20175	20350	20000	20175	20650
10MHz	1 (RB_Pos:0)	22.00	23.48	23.37	22.39	22.66	22.66
	1 (RB_Pos:25)	22.00	23.50	23.43	22.92	22.23	22.20
	1 (RB_Pos:49)	22.07	23.48	23.37	22.80	22.87	22.50
	25 (RB_Pos:0)	22.04	22.26	22.27	21.04	21.20	21.35
	25 (RB_Pos:12)	22.14	22.25	22.15	21.28	21.20	21.14
	25 (RB_Pos:25)	22.07	22.30	22.21	21.00	21.30	21.40
	50 (RB_Pos:0)	22.04	22.31	22.19	21.00	21.32	21.21
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20025	20175	20325	20025	20175	20325
15MHz	1 (RB_Pos:0)	23.27	23.85	23.61	22.69	22.78	23.36
	1 (RB_Pos:38)	23.07	23.17	22.93	21.94	22.56	22.96
	1 (RB_Pos:74)	23.08	23.72	23.25	22.63	23.00	23.30
	36 (RB_Pos:0)	22.41	22.34	22.18	21.18	21.27	21.01
	36 (RB_Pos:20)	22.17	22.26	22.14	21.05	21.36	20.99
	36 (RB_Pos:39)	22.25	22.32	22.16	21.22	21.41	20.93
	75 (RB_Pos:0)	22.21	22.32	22.16	21.19	21.32	21.17
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20050	20175	20300	20050	20175	20300
20MHz	1 (RB_Pos:0)	23.44	23.41	23.10	22.26	22.25	22.36
	1 (RB_Pos:50)	23.24	23.12	23.17	22.10	21.96	22.56
	1 (RB_Pos:99)	**23.50**	23.26	23.04	22.13	22.30	22.41
	50 (RB_Pos:0)	22.30	**22.45**	22.24	21.43	21.31	21.10
	50 (RB_Pos:25)	22.25	22.32	22.10	21.37	21.40	21.18
	50 (RB_Pos:50)	22.20	22.34	22.09	21.30	21.44	20.79
	100 (RB_Pos:0)	22.25	22.33	22.14	21.32	21.33	21.13

FDD LTE Band 7							
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20775	21100	21425	20775	21100	21425
5MHz	1 (RB_Pos:0)	22.38	22.38	22.02	21.62	21.35	20.96
	1 (RB_Pos:13)	22.26	21.99	21.82	21.38	20.68	20.45
	1 (RB_Pos:24)	22.25	22.04	22.03	21.46	21.30	20.79
	12 (RB_Pos:0)	21.31	21.16	21.02	20.37	20.04	19.93
	12 (RB_Pos:6)	21.29	21.14	21.02	20.19	20.10	19.76
	12 (RB_Pos:13)	21.42	21.08	20.96	20.31	20.09	19.70
	25 (RB_Pos:0)	21.27	21.20	21.01	20.31	20.38	20.09
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20800	21100	21400	20800	21100	21400
10MHz	1 (RB_Pos:0)	22.47	22.33	22.03	21.97	21.76	21.25
	1 (RB_Pos:25)	22.40	22.18	22.17	21.98	21.34	21.26
	1 (RB_Pos:49)	22.47	22.06	21.95	22.01	21.86	21.00
	25 (RB_Pos:0)	21.44	21.24	21.08	20.40	20.30	20.12
	25 (RB_Pos:12)	21.48	21.16	21.02	20.36	20.02	19.91
	25 (RB_Pos:25)	21.31	21.07	20.98	20.38	20.03	19.96
	50 (RB_Pos:0)	21.39	21.26	21.05	20.34	20.28	20.05
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20825	21100	21375	20825	21100	21375
15MHz	1 (RB_Pos:0)	22.43	22.40	22.37	21.86	21.68	22.17
	1 (RB_Pos:38)	22.08	22.15	22.12	21.20	21.31	21.85
	1 (RB_Pos:74)	22.48	22.17	21.99	21.81	21.54	21.84
	36 (RB_Pos:0)	21.50	21.39	21.25	20.47	20.39	20.24
	36 (RB_Pos:20)	21.33	21.18	21.19	20.18	19.97	20.00
	36 (RB_Pos:39)	21.32	21.10	21.02	20.29	20.18	19.80
	75 (RB_Pos:0)	21.34	21.23	21.05	20.33	20.24	20.02
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20850	21100	21350	20850	21100	21350
20MHz	1 (RB_Pos:0)	22.42	22.20	22.05	21.26	21.44	21.55
	1 (RB_Pos:50)	22.15	22.12	22.08	21.26	20.98	21.34
	1 (RB_Pos:99)	**22.62**	21.75	21.75	21.34	20.76	21.24
	50 (RB_Pos:0)	**21.35**	21.18	21.20	20.27	20.22	20.07
	50 (RB_Pos:25)	21.26	21.07	21.02	20.25	19.98	20.05
	50 (RB_Pos:50)	21.25	20.95	20.94	20.28	20.08	19.87
	100 (RB_Pos:0)	21.28	21.13	20.98	20.29	20.21	19.89

FDD LTE Band 17							
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	23755	23790	23825	23755	23790	23825
5MHz	1 (RB_Pos:0)	23.67	23.41	23.37	22.44	22.99	22.61
	1 (RB_Pos:13)	23.36	23.50	23.68	22.41	22.59	22.48
	1 (RB_Pos:24)	23.58	23.30	23.43	22.30	22.87	22.71
	12 (RB_Pos:0)	22.53	22.57	22.53	21.27	21.48	21.45
	12 (RB_Pos:6)	22.58	22.69	22.72	21.55	21.43	21.53
	12 (RB_Pos:13)	22.56	22.58	22.70	21.40	21.47	21.62
	25 (RB_Pos:0)	22.66	23.41	23.37	22.44	22.99	22.61
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	23780	23790	23800	23780	23790	23800
10MHz	1 (RB_Pos:0)	**23.82**	23.67	23.72	22.80	22.85	22.83
	1 (RB_Pos:25)	23.47	23.47	23.57	23.14	22.93	22.46
	1 (RB_Pos:49)	23.59	23.67	23.58	23.16	23.00	22.68
	25 (RB_Pos:0)	22.54	22.58	22.52	21.53	21.46	21.56
	25 (RB_Pos:12)	**22.59**	22.43	22.51	21.30	21.60	21.58
	25 (RB_Pos:25)	22.49	22.51	22.61	21.40	21.35	21.73
	50 (RB_Pos:0)	23.82	23.67	23.72	22.80	22.85	22.83

WLAN 2.4G						
Mode	802.11b			802.11g		
Channel	1	6	11	1	6	11
Frequency (MHz)	2412	2437	2462	2412	2437	2462
Peak Power (dBm))	**15.54**	15.52	15.37	13.12	13.19	12.78
Mode	802.11n(HT-20)			802.11n(HT-40)		
Channel	1	6	11	3	6	9
Frequency (MHz)	2412	2437	2462	2422	2437	2452
Peak Power (dBm)	13.06	12.91	12.62	10.42	10.41	10.48

WLAN 5G												
Mode	802.11a											
Band(MHz)	5150-5250			5250-5350			5470-5725			5725-5875		
Channel	36	40	48	52	56	64	100	116	140	149	157	165
Frequency (MHz)	5180	5200	5240	5230	5280	5320	5500	5580	5700	5745	5785	5825
Peak Power(dBm)	10.22	9.44	9.22	9.07	9.08	9.32	10.22	10.16	9.90	10.08	10.52	**10.61**
Mode	802.11n(HT-20)											
Band(MHz)	5150-5250			5250-5350			5470-5725			5725-5875		
Channel	36	40	48	52	56	64	100	116	140	149	157	165
Frequency (MHz)	5180	5200	5240	5230	5280	5320	5500	5580	5700	5745	5785	5825
Peak Power(dBm)	10.36	9.45	9.13	8.91	9.22	9.39	10.33	10.30	10.08	10.12	10.45	**10.55**
Mode	802.11n(HT-40)											
Band(MHz)	5150-5250		5250-5350		5470-5725		5725-5875					
Channel	38	46	54	62	102	134	151			159		
Frequency (MHz)	5290	5230	5270	5310	5510	5670	5755			5795		
Peak Power(dBm)	8.10	7.16	7.01	7.25	8.29	7.80	8.35			**8.52**		
Mode	802.11ac(HT-20)											
Band(MHz)	5150-5250			5250-5350			5470-5725			5725-5875		
Channel	36	40	48	52	56	64	100	116	140	149	157	165
Frequency (MHz)	5510	5670	5755	5795	5180	5200	5500	5580	5700	5745	5785	5825
Peak Power(dBm)	10.09	9.24	8.90	8.80	9.07	9.27	10.14	10.18	9.89	9.98	10.22	**10.42**
Mode	802.11ac(HT-40)											
Band(MHz)	5150-5250			5250-5350			5470-5725			5725-5875		
Channel	38		46	52		56	102		134	151		159
Frequency (MHz)	8.10		7.16	5795		5180	5510		5670	5755		5795
Peak Power(dBm)	7.70		6.85	6.63		6.96	7.93		7.40	8.10		**8.24**
Mode	802.11ac(HT-80)											
Band(MHz)	5150-5250			5250-5350			5470-5725			5725-5875		
Channel	42			58			106			155		
Frequency (MHz)	5210			5290			5530			5775		
Peak Power(dBm)	6.60			6.13			7.24			**7.51**		

BLUETOOTH						
Mode	GFSK			π/4-DQPSK		
Channel	0	39	78	0	39	78
Frequency (MHz)	2402	2441	2480	2402	2441	2480
Peak Power (dBm)	12.01	11.74	11.94	12.08	11.81	11.99
Mode	8-DPSK			BLE		
Channel	0	39	78	0	19	39
Frequency (MHz)	2402	2441	2480	2402	2440	2480
Peak Power (dBm)	**12.41**	12.09	12.31	1.78	1.75	1.92

Power Reduction List (When device operating under hotspot mode, that the WCDMA B2/B4, LTE B2/B4/B7power reduction will applied for SAR compliance)

WCDMA						
Band	Band 2			Band 4		
Channel	9263	9400	9537	1662	1413	1513
Frequency (MHz)	1852.6	1880.0	1907.4	1712.5	1732.6	1752.6
RMC 12.2Kbps	**20.24**	20.24	20.30	20.38	20.34	**20.40**
HSDPA Subtest-1	19.75	20.10	19.86	20.42	20.42	20.40
HSDPA Subtest-2	19.78	20.13	19.94	20.44	20.19	20.28
HSDPA Subtest-3	19.65	19.95	19.99	20.48	20.44	20.17
HSDPA Subtest-4	19.65	20.14	19.98	20.46	20.43	20.40
HSUPA Subtest-1	19.05	19.86	19.96	19.11	19.88	19.28
HSUPA Subtest-2	19.50	20.12	19.37	20.39	20.00	19.55
HSUPA Subtest-3	19.04	19.86	19.02	20..05	19.78	20.09
HSUPA Subtest-4	19.09	19.73	18.96	19.99	19.63	19.90
HSUPA Subtest-5	19.97	20.27	20.09	20.40	20.30	20.49

FDD LTE Band 2							
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18607	18900	19193	18607	18900	19193
1.4MHz	1 (RB_Pos:0)	20.95	20.97	21.13	21.58	21.45	21.27
	1 (RB_Pos:3)	21.29	20.75	21.40	21.81	21.52	21.34
	1 (RB_Pos:5)	21.03	20.84	21.19	21.87	21.44	21.18
	3 (RB_Pos:0)	21.07	20.94	21.09	21.09	20.8	21.39
	3 (RB_Pos:1)	21.08	20.91	21.13	20.98	20.83	21.55
	3 (RB_Pos:3)	21.04	20.88	21.10	20.95	20.7	21.16
	6 (RB_Pos:0)	21.05	20.86	21.09	20.97	20.63	21.12
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
		18615	18900	19185	18615	18900	19185
3.0MHz	1 (RB_Pos:0)	21.20	20.88	21.19	21.66	21.21	21.12
	1 (RB_Pos:13)	21.10	20.79	21.10	21.70	21.03	21.22
	1 (RB_Pos:24)	21.13	20.79	21.23	21.97	20.92	21.20
	8 (RB_Pos:0)	21.11	20.88	21.06	21.19	20.95	20.80
	8 (RB_Pos:6)	21.08	20.93	21.10	20.94	21.27	21.20
	8 (RB_Pos:13)	21.09	20.91	21.01	20.93	21.07	20.99
	15 (RB_Pos:0)	21.09	20.93	21.09	21.22	20.86	20.95
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18625	18900	19175	18625	18900	19175
5MHz	1 (RB_Pos:0)	21.21	20.78	20.99	20.99	21.29	21.29
	1 (RB_Pos:13)	21.06	20.74	20.92	20.66	20.53	21.22
	1 (RB_Pos:24)	21.17	20.83	20.95	21.02	21.36	21.72
	12 (RB_Pos:0)	21.10	20.92	21.01	20.93	20.86	20.91

	12 (RB_Pos:6)	21.09	20.92	21.04	21.12	20.86	20.91
	12 (RB_Pos:13)	21.09	20.94	21.08	21.25	20.75	20.96
	25 (RB_Pos:0)	21.11	20.98	21.08	21.36	20.96	21.04
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18650	18900	19150	18650	18900	19150
10MHz	1 (RB_Pos:0)	21.59	20.99	21.43	21.5	21.23	21.43
	1 (RB_Pos:25)	21.08	20.92	21.24	21.96	21.27	21.14
	1 (RB_Pos:49)	21.46	21.05	21.18	22.00	22.02	21.28
	25 (RB_Pos:0)	21.32	20.99	21.12	21.33	20.9	21.07
	25 (RB_Pos:12)	21.18	21.03	20.97	21.08	21.05	21.05
	25 (RB_Pos:25)	21.26	20.97	21.03	21.19	20.88	20.98
	50 (RB_Pos:0)	21.29	20.97	21.04	21.21	21.14	21.12
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18675	18900	19125	18675	18900	19125
15MHz	1 (RB_Pos:0)	21.43	21.27	21.2	21.45	21.38	22.15
	1 (RB_Pos:38)	20.93	21.01	20.99	21.04	21.56	22.06
	1 (RB_Pos:74)	21.35	21.11	21.16	21.74	21.13	22.39
	36 (RB_Pos:0)	21.27	21.04	21.23	21.37	21.13	21.06
	36 (RB_Pos:20)	21.23	21.01	21.16	21.19	21.12	21.11
	36 (RB_Pos:39)	21.34	20.89	21.03	21.42	21.02	21.09
	75 (RB_Pos:0)	21.35	20.93	21.07	21.24	20.83	21.03
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	18700	18900	19100	18700	18900	19100
20MHz	1 (RB_Pos:0)	**21.64**	21.15	21.52	21.92	21.52	21.73
	1 (RB_Pos:50)	21.24	21.21	21.29	21.19	21.09	21.62
	1 (RB_Pos:99)	21.41	21.05	21.13	21.05	20.88	21.37
	50 (RB_Pos:0)	**21.35**	21.02	21.24	21.41	21.02	21.08
	50 (RB_Pos:25)	21.21	21.06	21.05	21.23	21.16	20.99
	50 (RB_Pos:50)	21.20	20.94	21.12	21.33	20.88	21.00
	100 (RB_Pos:0)	21.32	20.92	21.13	21.25	20.95	21.12

FDD LTE Band 4							
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	19957	20175	20393	19957	20175	20393
1.4MHz	1 (RB_Pos:0)	22.97	21.29	21.47	21.56	21.93	21.58
	1 (RB_Pos:3)	21.11	21.58	21.82	21.88	21.99	21.68
	1 (RB_Pos:5)	21.04	21.40	21.59	21.86	21.92	21.59
	3 (RB_Pos:0)	21.00	21.50	21.38	21.35	21.29	21.77
	3 (RB_Pos:1)	21.05	21.53	21.57	21.37	21.42	21.71
	3 (RB_Pos:3)	21.02	21.35	21.32	20.74	21.27	21.86
	6 (RB_Pos:0)	21.01	21.35	21.54	21.05	21.10	21.55

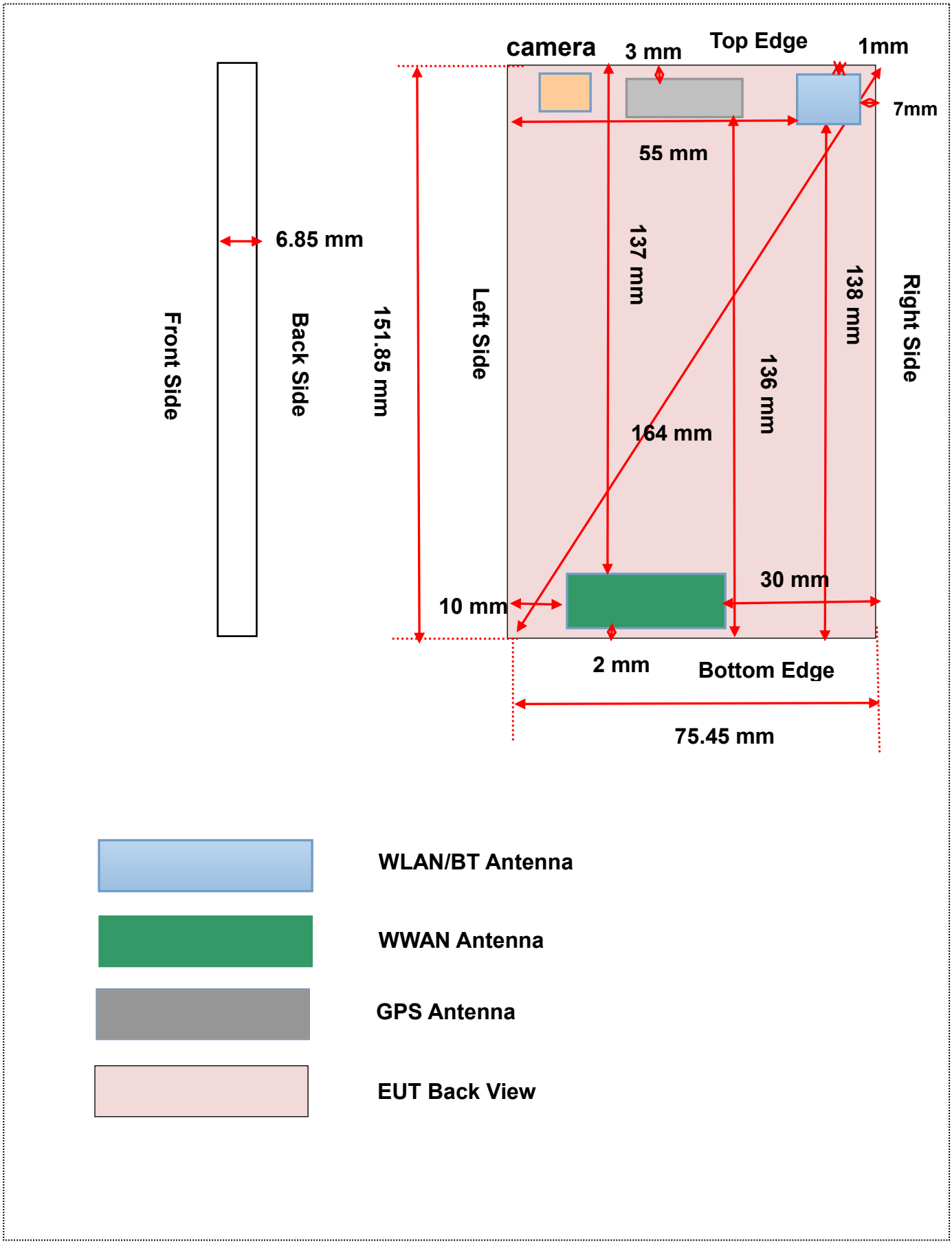
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
		19965	20175	20385	19965	20175	20385
3.0MHz	1 (RB_Pos:0)	21.36	21.41	21.50	21.97	22.00	21.61
	1 (RB_Pos:13)	21.15	21.15	21.33	21.79	21.96	21.39
	1 (RB_Pos:24)	21.36	21.33	21.26	21.84	21.97	21.63
	8 (RB_Pos:0)	20.96	21.38	21.45	21.15	21.63	21.29
	8 (RB_Pos:6)	21.14	21.51	21.44	21.19	21.60	21.48
	8 (RB_Pos:13)	21.07	21.40	21.44	21.19	21.55	21.38
	15 (RB_Pos:0)	21.09	21.39	21.37	21.25	21.59	21.30
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	19975	20175	20375	19975	20175	20375
5MHz	1 (RB_Pos:0)	20.95	21.42	21.28	20.99	21.36	21.60
	1 (RB_Pos:13)	21.09	21.22	21.09	20.70	21.07	21.66
	1 (RB_Pos:24)	21.41	21.29	21.41	21.17	21.31	21.66
	12 (RB_Pos:0)	21.09	21.38	21.42	21.03	21.29	21.38
	12 (RB_Pos:6)	21.12	21.39	21.37	21.11	21.38	21.38
	12 (RB_Pos:13)	21.06	21.41	21.38	21.23	21.53	21.45
	25 (RB_Pos:0)	21.09	21.40	21.32	21.18	21.43	21.45
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20000	20175	20350	20000	20175	20650
10MHz	1 (RB_Pos:0)	21.51	21.61	21.57	21.39	22.19	21.75
	1 (RB_Pos:25)	21.50	21.48	21.55	22.04	21.38	21.13
	1 (RB_Pos:49)	21.41	21.40	21.54	21.93	21.97	21.41
	25 (RB_Pos:0)	21.21	21.46	21.44	21.20	21.37	21.46
	25 (RB_Pos:12)	21.24	21.46	21.45	21.06	21.37	21.50
	25 (RB_Pos:25)	21.24	21.40	21.35	21.18	21.30	21.57
	50 (RB_Pos:0)	21.18	21.49	21.36	21.25	21.50	21.42
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20025	20175	20325	20025	20175	20325
15MHz	1 (RB_Pos:0)	21.40	21.27	21.95	21.65	22.46	21.60
	1 (RB_Pos:38)	21.21	21.32	21.49	21.27	21.80	21.63
	1 (RB_Pos:74)	21.43	21.50	21.44	21.97	22.68	21.80
	36 (RB_Pos:0)	21.31	21.51	21.38	21.34	21.46	21.29
	36 (RB_Pos:20)	21.36	21.40	21.35	21.21	21.30	21.36
	36 (RB_Pos:39)	21.28	21.44	21.28	21.50	21.37	21.30
	75 (RB_Pos:0)	21.33	21.36	21.35	21.33	21.47	21.26
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20050	20175	20300	20050	20175	20300
20MHz	1 (RB_Pos:0)	21.50	21.55	21.55	21.38	21.29	21.82

	1 (RB_Pos:50)	21.35	21.29	21.38	21.29	21.50	21.43
	1 (RB_Pos:99)	**21.60**	21.59	20.92	21.28	21.18	21.56
	50 (RB_Pos:0)	21.40	**21.49**	21.34	21.34	21.55	21.23
	50 (RB_Pos:25)	21.33	21.45	21.28	21.45	21.46	21.30
	50 (RB_Pos:50)	21.32	21.41	21.20	21.29	21.42	21.17
	100 (RB_Pos:0)	21.42	21.42	21.28	21.39	21.43	21.29

FDD LTE Band 7							
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20775	21100	21425	20775	21100	21425
5MHz	1 (RB_Pos:0)	20.25	20.09	20.17	20.72	20.49	19.94
	1 (RB_Pos:13)	19.78	19.99	19.93	20.18	19.62	19.56
	1 (RB_Pos:24)	20.05	19.89	20.06	20.19	20.33	19.91
	12 (RB_Pos:0)	20.24	20.17	20.01	20.26	20.15	19.81
	12 (RB_Pos:6)	20.18	20.30	20.11	20.05	20.02	19.94
	12 (RB_Pos:13)	20.18	20.18	19.98	20.25	20.22	19.89
	25 (RB_Pos:0)	20.15	20.25	20.00	20.47	20.29	19.91
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20800	21100	21400	20800	21100	21400
10MHz	1 (RB_Pos:0)	20.53	20.28	20.12	20.46	20.85	20.36
	1 (RB_Pos:25)	20.16	20.25	20.01	20.92	20.23	20.18
	1 (RB_Pos:49)	20.46	20.09	20.18	20.97	20.63	20.22
	25 (RB_Pos:0)	20.26	20.15	20.17	20.38	20.32	20.28
	25 (RB_Pos:12)	20.18	20.26	20.04	20.18	20.19	20.08
	25 (RB_Pos:25)	20.28	20.18	20.00	20.27	20.29	19.93
	50 (RB_Pos:0)	20.37	20.22	20.05	20.33	20.30	20.02
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20825	21100	21375	20825	21100	21375
15MHz	1 (RB_Pos:0)	20.50	20.40	20.13	20.43	20.98	21.16
	1 (RB_Pos:38)	20.26	20.33	20.17	20.09	20.80	21.23
	1 (RB_Pos:74)	20.57	20.24	20.06	20.87	20.68	20.90
	36 (RB_Pos:0)	20.39	20.31	20.15	20.40	20.13	20.26
	36 (RB_Pos:20)	20.35	20.27	20.09	20.41	20.11	20.10
	36 (RB_Pos:39)	20.33	20.20	20.12	20.32	20.11	20.11
	75 (RB_Pos:0)	20.44	20.32	20.10	20.33	20.30	20.01
Bandwidth (MHz)	RB Set	Power (dBm)					
		QPSK			16QAM		
	Channel	20850	21100	21350	20850	21100	21350
20MHz	1 (RB_Pos:0)	**20.70**	20.32	20.20	20.48	21.02	20.88
	1 (RB_Pos:50)	20.28	20.20	20.19	20.39	20.37	20.60
	1 (RB_Pos:99)	20.58	19.98	20.12	20.30	19.75	20.03
	50 (RB_Pos:0)	**20.47**	20.36	20.38	20.57	20.35	20.32

	50 (RB_Pos:25)	20.41	20.35	20.17	20.36	20.30	20.13
	50 (RB_Pos:50)	20.44	20.22	20.16	20.56	20.12	19.97
	100 (RB_Pos:0)	20.41	20.33	20.17	20.43	20.23	20.07

9 EUT ANTENNA LOCATION SKETCH



9.1 SAR Test Exclusion Consider Table

According with FCC KDB 447498 D01v05r02, Appendix A, <SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm> Table, this Device SAR test configurations consider as following :

Band	Mode	Max. Tune-up Power		Test Position Configurations					
		dBm	mW	Head	Front/ Back	Left Edge	Right Edge	Top Edge	Bottom Edge
GSM 850	Distance to User			<5mm	<5 mm	10 mm	30 mm	164 mm	<5mm
	Voice	33.20	2089.30	Yes	Yes	Yes	Yes	No	Yes
	Data	33.20	2089.30	No	Yes	Yes	Yes	No	Yes
GSM 1900	Distance to User			<5mm	<5 mm	10 mm	30 mm	164 mm	<5mm
	Voice	30.70	1174.90	Yes	Yes	Yes	Yes	No	Yes
	Data	30.60	1148.15	No	Yes	Yes	Yes	No	Yes
WCDMA Band 2	Distance to User			<5mm	<5 mm	10 mm	30 mm	164 mm	<5mm
	RMC	23.90	245.47	Yes	Yes	Yes	Yes	No	Yes
WCDMA Band 4	Distance to User			<5mm	<5 mm	10 mm	30 mm	164 mm	<5mm
	RMC	23.40	218.78	Yes	Yes	Yes	Yes	No	Yes
WCDMA Band 5	Distance to User			<5mm	<5 mm	10 mm	30 mm	164 mm	<5mm
	RMC	23.30	213.80	Yes	Yes	Yes	Yes	No	Yes
LTE Band 2	Distance to User			<5mm	<5 mm	10 mm	30 mm	164 mm	<5mm
	QPSK	23.90	245.47	Yes	Yes	Yes	Yes	No	Yes
LTE Band 4	Distance to User			<5mm	<5 mm	10 mm	30 mm	164 mm	<5mm
	QPSK	23.60	229.09	Yes	Yes	Yes	Yes	No	Yes
LTE Band 7	Distance to User			<5mm	<5 mm	10 mm	30 mm	164 mm	<5mm
	QPSK	22.70	186.21	Yes	Yes	Yes	Yes	No	Yes
LTE Band 17	Distance to User			<5mm	<5 mm	10 mm	30 mm	164 mm	<5mm
	QPSK	23.90	245.47	Yes	Yes	Yes	Yes	No	Yes
WLAN 2.4 G	Distance to User			<5mm	<5mm	55mm	7mm	<5mm	138 mm
	802.11b	15.60	36.31	Yes	Yes	No	Yes	Yes	No
	802.11g	13.30	21.38	No	No	No	No	No	No
	802.11n(HT20)	13.10	20.42	No	No	No	No	No	No
	802.11n(HT40)	10.60	11.48	No	No	No	No	No	No
WLAN 5 G	Distance to User			<5mm	<5mm	55mm	7mm	<5mm	138 mm
	802.11a	10.70	11.75	Yes	Yes	No	Yes	Yes	No
	802.11n(HT-20)	10.60	11.48	Yes	Yes	No	Yes	Yes	No
	802.11n(HT-40)	8.60	7.24	Yes	Yes	No	Yes	Yes	No
	802.11ac(HT-20)	10.50	11.22	Yes	Yes	No	Yes	Yes	No
	802.11ac(HT-40)	8.30	6.76	No	No	No	No	No	No
	802.11ac(HT-80)	7.60	5.75	No	No	No	No	No	No
Bluetooth	Distance to User			<5mm	<5mm	55mm	7mm	<5mm	138 mm
	Bluetooth BR/EDR	12.50	17.78	Yes	Yes	No	Yes	Yes	No
	Bluetooth BLE	2.05	1.60	No	No	No	No	No	No

Note:

1. Maximum power is the source-based time-average power and represents the maximum RF output power among production units
2. Per KDB 447498 D01v05r02, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
3. Per KDB 447498 D01v05r02, standalone SAR test exclusion threshold is applied; If the distance of the antenna to the user is < 5mm, 5mm is used to determine SAR exclusion threshold
4. Per KDB 447498 D01v05r02, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
   [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   a. f(GHz) is the RF channel transmit frequency in GHz
   b. Power and distance are rounded to the nearest mW and mm before calculation
   c. The result is rounded to one decimal place for comparison
   d. For < 50 mm distance, we just calculate mW of the exclusion threshold value (3.0) to do compare.
   This formula is [3.0] / [√f(GHz)] ·[(min. test separation distance, mm)] = exclusion threshold of mW.
5. Per KDB 447498 D01v05r02, at 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following
   a. [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
   b. [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz
6. Per KDB 941225 D01v03, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA /HSUPA /DC-HSDPA output power is < 0.25dB higher than RMC12.2Kbps, or reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/HSUPA/DC-HSDPA SAR evaluation can be excluded.
7. Per KDB 248227 D01 v02, choose the highest output power channel to test SAR and determine further SAR exclusion.8. For each frequency band, testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than 1/4dB higher than those measured at the lowest data rate
8. Apply the test exclusion rule in KDB 248227 D01 v02ro1 11g, 11n-HT20 and HT40 output power is less than 1/4dB higher than 11b mode, thus the SAR can be excluded.
9. Per KDB 447498 D01v05r02, Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
   a. ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz.
   b. ≤0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200MHz
   c. ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz.

9.2 10g Extremity Exposure Consider

According with FCC KDB 648474 D04 v01r02, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, unless it is confirmed otherwise through KDB inquiries, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless modes and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance;

The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.

Conclusion:
The EUT hotspot mode 1-g reported SAR is 1.066 W/Kg, which is less than 1.2W/Kg, 10-g extremity SAR is not required.

10 TEST RESULTS

10.1 Head SAR (1 g Value)

Band	Mode	Position	Ch.	Freq. (MHz)	Power Drift (%)	Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	Scaled SAR(W/Kg)	Meas. No.
GSM 850	Voice	Left Cheek	251	848.8	-1.5	**0.129**	33.07	33.20	1.030	**0.133**	1#
		Left Tilt	251	848.8	1.23	0.061	33.07	33.20	1.030	0.063	/
		Right Cheek	251	848.8	-1.13	0.078	33.07	33.20	1.030	0.080	/
		Right Tilt	251	848.8	-1.44	0.057	33.07	33.20	1.030	0.059	/
GSM 1900	Voice	Left Cheek	810	1909.8	-0.49	**0.055**	30.56	30.70	1.033	**0.057**	2#
		Left Tilt	810	1909.8	3.08	0.019	30.56	30.70	1.033	0.020	/
		Right Cheek	810	1909.8	1.13	0.041	30.56	30.70	1.033	0.042	/
		Right Tilt	810	1909.8	0.07	0.014	30.56	30.70	1.033	0.014	/
WCDMA Band 2	RMC	Left Cheek	9538	1907.6	3.06	**0.075**	23.72	23.90	1.042	**0.078**	3#
		Left Tilt	9538	1907.6	-2.61	0.028	23.72	23.90	1.042	0.029	/
		Right Cheek	9538	1907.6	-0.88	0.074	23.72	23.90	1.042	0.077	/
		Right Tilt	9538	1907.6	3.56	0.022	23.72	23.90	1.042	0.023	/
WCDMA Band 4	RMC	Left Cheek	1413	1732.6	-1.29	**0.113**	23.28	23.40	1.028	**0.116**	4#
		Left Tilt	1413	1732.6	1.11	0.048	23.28	23.40	1.028	0.049	/
		Right Cheek	1413	1732.6	-1.2	0.110	23.28	23.40	1.028	0.113	/
		Right Tilt	1413	1732.6	-0.76	0.048	23.28	23.40	1.028	0.049	/
WCDMA Band 5	RMC	Left Cheek	4233	846.6	-1.17	**0.145**	23.01	23.30	1.069	**0.155**	5#
		Left Tilt	4233	846.6	3.93	0.065	23.01	23.30	1.069	0.069	/
		Right Cheek	4233	846.6	-0.77	0.096	23.01	23.30	1.069	0.103	/
		Right Tilt	4233	846.6	0.23	0.069	23.01	23.30	1.069	0.074	/
LTE Band 2 20MHz 1 RB Pos: 0	QPSK	Left Cheek	18600	1850.0	1.7	**0.094**	23.76	23.90	1.033	**0.097**	6#
		Left Tilt	18600	1850.0	-0.48	0.043	23.76	23.90	1.033	0.044	/
		Right Cheek	18600	1850.0	-0.12	0.088	23.76	23.90	1.033	0.091	/
		Right Tilt	18600	1850.0	-2.85	0.040	23.76	23.90	1.033	0.041	/
LTE Band 2 20MHz 50%RB Pos: 0	QPSK	Left Cheek	18600	1850.0	-2.41	**0.070**	22.51	22.60	1.021	**0.071**	7#
		Left Tilt	18600	1850.0	0.87	0.031	22.51	22.60	1.021	0.032	/
		Right Cheek	18600	1850.0	-1.6	0.062	22.51	22.60	1.021	0.063	/
		Right Tilt	18600	1850.0	-0.3	0.026	22.51	22.60	1.021	0.027	/
LTE Band 4 20MHz 1 RB Pos: 99	QPSK	Left Cheek	19950	1710.0	-0.14	**0.124**	23.50	23.60	1.023	**0.127**	8#
		Left Tilt	19950	1710.0	1.03	0.049	23.50	23.60	1.023	0.050	/
		Right Cheek	19950	1710.0	-2.54	0.107	23.50	23.60	1.023	0.109	/
		Right Tilt	19950	1710.0	1.7	0.049	23.50	23.60	1.023	0.050	/
LTE Band 4 20MHz 50% RB Pos: 0	QPSK	Left Cheek	19950	1710.0	-0.14	**0.085**	22.45	22.50	1.012	**0.086**	9#
		Left Tilt	19950	1710.0	-0.41	0.038	22.45	22.50	1.012	0.038	/
		Right Cheek	19950	1710.0	0.16	0.066	22.45	22.50	1.012	0.067	/
		Right Tilt	19950	1710.0	0.23	0.042	22.45	22.50	1.012	0.042	/
LTE Band 7	QPSK	Left Cheek	20750	2500.0	-1.53	**0.132**	22.62	22.70	1.019	**0.134**	10#
		Left Tilt	20750	2500.0	-0.82	0.066	22.62	22.70	1.019	0.067	/

20MHz 1 RB Pos: 99		Right Cheek	20750	2500.0	-1.70	0.049	22.62	22.70	1.019	0.050	/
		Right Tilt	20750	2500.0	1.12	0.032	22.62	22.70	1.019	0.033	/
LTE Band 7 10MHz 50%RB Pos: 0	QPSK	Left Cheek	20750	2500.0	0.29	**0.087**	21.35	21.40	1.012	**0.088**	11#
		Left Tilt	20750	2500.0	1.25	0.030	21.35	21.40	1.012	0.030	/
		Right Cheek	20750	2500.0	-2.96	0.030	21.35	21.40	1.012	0.030	/
		Right Tilt	20750	2500.0	0.16	0.019	21.35	21.40	1.012	0.019	/
LTE Band 17 10MHz 1 RB Pos: 99	QPSK	Left Cheek	23730	704.0	-1.09	**0.017**	23.82	23.90	1.019	**0.017**	12#
		Left Tilt	23730	704.0	1.68	0.010	23.82	23.90	1.019	0.010	/
		Right Cheek	23730	704.0	3.97	0.014	23.82	23.90	1.019	0.014	/
		Right Tilt	23730	704.0	-0.79	0.012	23.82	23.90	1.019	0.012	/
LTE Band 17 20MHz 50%RB Pos: 12	QPSK	Left Cheek	23730	704.0	1.24	**0.013**	22.59	22.70	1.026	**0.013**	13#
		Left Tilt	23730	704.0	-2.31	0.007	22.59	22.70	1.026	0.007	/
		Right Cheek	23730	704.0	1.71	0.010	22.59	22.70	1.026	0.010	/
		Right Tilt	23730	704.0	-1.28	0.006	22.59	22.70	1.026	0.006	/
WLAN 802.11 b	DATA	Left Cheek	1	2412.0	-0.33	0.307	15.54	15.60	1.014	0.311	/
		Left Tilt	1	2412.0	0.10	0.349	15.54	15.60	1.014	0.354	/
		Right Cheek	1	2412.0	0.18	**0.788**	15.54	15.60	1.014	**0.799**	14#
		Right Tilt	1	2412.0	-0.89	0.658	15.54	15.60	1.014	0.667	/
WLAN 802.11 a	DATA	Left Cheek	165	5825.0	-2.73	0.621	10.61	10.70	1.021	0.634	/
		Left Tilt	165	5825.0	-1.10	0.633	10.61	10.70	1.021	0.646	/
		Right Cheek	165	5825.0	-1.19	**0.759**	10.61	10.70	1.021	**0.775**	15#
		Right Tilt	165	5825.0	-1.55	0.602	10.61	10.70	1.021	0.615	/
WLAN 802.11 ac(HT-20)	DATA	Left Cheek	165	5825.0	3.93	0.167	7.51	7.60	1.021	0.170	/
		Left Tilt	165	5825.0	1.14	0.165	7.51	7.60	1.021	0.168	/
		Right Cheek	165	5825.0	0.51	0.374	7.51	7.60	1.021	0.382	/
		Right Tilt	165	5825.0	-0.87	**0.453**	7.51	7.60	1.021	**0.462**	16#
WLAN 802.11 n(HT-20)	DATA	Left Cheek	159	5795.0	1.16	0.218	10.55	10.60	1.012	0.221	/
		Left Tilt	159	5795.0	0.54	0.266	10.55	10.60	1.012	0.269	/
		Right Cheek	159	5795.0	0.34	**0.745**	10.55	10.60	1.012	**0.754**	17#
		Right Tilt	159	5795.0	1.93	0.704	10.55	10.60	1.012	0.712	/
WLAN 802.11 n(HT-40)	DATA	Left Cheek	165	5825.0	-0.82	0.418	8.52	8.60	1.007	0.421	/
		Left Tilt	165	5825.0	-1.12	0.454	8.52	8.60	1.007	0.457	/
		Right Cheek	165	5825.0	-1.21	**0.581**	8.52	8.60	1.007	**0.585**	18#
		Right Tilt	165	5825.0	-1.78	0.308	8.52	8.60	1.007	0.310	/
Bluetooth	8-DPSK	Left Cheek	0	2402.0	-0.21	0.307	12.41	12.50	1.007	0.309	/
		Left Tilt	0	2402.0	-1.20	0.401	12.41	12.50	1.007	0.404	/
		Right Cheek	0	2402.0	-0.34	**0.438**	12.41	12.50	1.007	**0.438**	63#
		Right Tilt	0	2402.0	0.55	0.302	12.41	12.50	1.007	0.304	/

10.2 Body-worn Mode SAR (15 mm Separation)

Band	Mode	Position	Ch.	Freq. (MHz)	Power Drift	Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	Scaled SAR(W/Kg)	Meas. No.
GSM 850	Voice (Body-worn)	Front Side	251	848.8	-4.33	0.173	33.07	33.20	1.030	0.178	/
		Back Side	251	848.8	-3.31	**0.195**	33.07	33.20	1.030	**0.201**	19#
	GPRS Data (Body-worn) 4 slots	Front Side	128	824.2	3.83	**0.268**	27.65	27.70	1.012	**0.271**	20#
		Back Side	128	824.2	-2.26	0.258	27.65	27.70	1.012	0.261	/
	GPRS Data (Body-worn) 3 slots	Front Side	128	824.2	1.56	0.265	29.26	29.30	1.010	**0.267**	65#
		Back Side	128	824.2	0.36	0.253	29.26	29.30	1.010	0.255	/
	EDGE Data (Body-worn)	Front Side	128	824.2	-2.25	0.097	26.45	26.50	1.012	0.098	/
		Back Side	128	824.2	-0.39	**0.103**	26.45	26.50	1.012	**0.104**	21#
GSM 1900	Voice (Body-worn)	Front Side	810	1909.8	2.74	0.232	30.56	30.70	1.033	0.240	/
		Back Side	810	1909.8	0.29	**0.242**	30.56	30.70	1.033	**0.250**	22#
	GPRS Data (Body-worn) 4 slots	Front Side	661	1880.0	2.26	0.219	25.09	25.30	1.038	0.227	/
		Back Side	661	1880.0	-2.75	**0.220**	25.09	25.30	1.038	**0.228**	23#
	GPRS Data (Body-worn) 3 slots	Front Side	810	1909.8	1.23	0.216	26.69	26.80	1.030	0.222	/
		Back Side	810	1909.8	-2.03	**0.221**	26.69	26.80	1.030	**0.227**	66#
	EDGE Data (Body-worn)	Front Side	512	1850.2	0.81	**0.117**	25.64	25.70	1.014	**0.119**	24#
		Back Side	512	1850.2	-0.98	0.111	25.64	25.70	1.014	0.113	/
WCDMA Band 2	RMC (Body-Worn)	Front Side	9538	1907.6	2.8	**0.393**	23.72	23.90	1.042	**0.410**	25#
		Back Side	9538	1907.6	-0.36	0.379	23.72	23.90	1.042	0.395	/
WCDMA Band 4	RMC (Body-Worn)	Front Side	1413	1732.6	-1.56	0.426	23.28	23.40	1.028	0.438	/
		Back Side	1413	1732.6	-0.69	**0.500**	23.28	23.40	1.028	**0.514**	26#
WCDMA Band 5	RMC (Body-Worn)	Front Side	4233	846.6	-1.06	0.229	23.01	23.30	1.069	0.245	/
		Back Side	4233	846.6	1.43	**0.237**	23.01	23.30	1.069	**0.253**	27#
LTE Band 2 20MHz 1 RB Pos: 0	QPSK (Body-Worn)	Front Side	18600	1850.0	-1.02	0.408	23.76	23.90	1.033	0.421	/
		Back Side	18600	1850.0	0.46	**0.452**	23.76	23.90	1.033	**0.467**	28#
LTE Band2 20MHz 50% RB Pos: 0	QPSK (Body-Worn)	Front Side	18600	1850.0	1.84	0.329	22.51	22.60	1.021	0.336	/
		Back Side	18600	1850.0	-0.77	**0.344**	22.51	22.60	1.021	**0.351**	29#
LTE Band 4 20MHz 1 RB Pos: 99	QPSK (Body-Worn)	Front Side	19950	1710.0	3.04	0.474	23.50	23.90	1.096	0.520	/
		Back Side	19950	1710.0	-2.7	**0.478**	23.50	23.90	1.096	**0.524**	30#
LTE Band 4 20MHz 50% RB Pos: 0	QPSK (Body-Worn)	Front Side	19950	1710.0	1.35	**0.423**	22.45	22.50	1.012	**0.428**	31#
		Back Side	19950	1710.0	1.07	0.388	22.45	22.50	1.012	0.392	/
LTE Band 7 20MHz 1 RB Pos: 99	QPSK (Body-Worn)	Front Side	20750	2500	-1.12	**0.302**	22.62	22.70	1.019	**0.308**	32#
		Back Side	20750	2500	-1.3	0.266	22.62	22.70	1.019	0.271	/
LTE Band 7 20MHz 50% RB Pos:0	QPSK (Body-Worn)	Front Side	20750	2500	0.22	0.191	21.35	21.40	1.012	0.193	/
		Back Side	20750	2500	-0.15	**0.214**	21.35	21.40	1.012	**0.216**	33#
LTE Band 17 10MHz 1 RB Pos: 0	QPSK (Body-Worn)	Front Side	23730	704	0.00	0.029	23.82	23.90	1.019	0.030	/
		Back Side	23730	704	-0.65	**0.035**	23.82	23.90	1.019	**0.036**	34#

Band	Mode	Position	Ch.	Freq. (MHz)	Power Drift	Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	Scaled SAR(W/Kg)	Meas. No.
LTE Band 17 10MHz 50% RB Pos:12	QPSK (Body-Worn)	Front Side	23730	704	0.18	0.025	22.59	22.70	1.026	0.026	/
		Back Side	23730	704	0.21	**0.030**	22.59	22.70	1.026	**0.031**	35#
WLAN 802.11 b	DATA (Body-Worn)	Front Side	1	2412.0	-0.59	0.066	15.54	15.60	1.014	0.067	/
		Back Side	1	2412.0	-0.59	**0.072**	15.54	15.60	1.014	**0.073**	36#
WLAN 802.11 a	DATA (Body-Worn)	Front Side	36	5180	-1.9	0.044	10.61	10.70	1.021	0.045	/
		Back Side	36	5180	1.32	**0.045**	10.61	10.70	1.021	**0.046**	37#
WLAN 802.11 ac(HT-20)	DATA (Body-Worn)	Front Side	165	5825.0	2.2	**0.024**	7.51	7.60	1.019	**0.024**	38#
		Back Side	165	5825.0	0.94	0.020	7.51	7.60	1.019	0.020	/
WLAN 802.11 n(HT-20)	DATA (Body-Worn)	Front Side	159	5795.0	-0.08	**0.033**	10.55	10.60	1.012	**0.033**	39#
		Back Side	159	5795.0	2.66	0.032	10.55	10.60	1.012	0.032	/
WLAN 802.11 n(HT-40)	DATA (Body-Worn)	Front Side	165	5825.0	-0.73	**0.222**	8.52	8.60	1.019	**0.226**	40#
		Back Side	165	5825.0	-0.76	0.184	8.52	8.60	1.019	0.187	/

10.3 Hotspot Mode SAR (10 mm Separation)

Band	Mode	Position	Ch.	Freq. (MHz)	Power Drift (%)	Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	Scaled SAR(W/Kg)	Meas. No.
GSM 850	GPRS Data (Hotspot) 4 slots	Front Side	128	824.2	-0.94	**0.383**	33.07	33.20	1.030	**0.395**	41#
		Back Side	128	824.2	4.21	0.366	33.07	33.20	1.030	0.377	/
		Left Edge	128	824.2	1.71	0.182	33.07	33.20	1.030	0.188	/
		Right Edge	128	824.2	2.06	0.047	33.07	33.20	1.030	0.048	/
		Bottom Edge	128	824.2	4.24	0.283	33.07	33.20	1.030	0.292	/
	GPRS Data (Hotspot) 3slots	Front Side	128	824.2	2.32	0.386	29.26	29.30	1.010	0.390	67#
		Back Side	128	824.2	-1.25	0.369	29.26	29.30	1.010	0.372	/
		Left Edge	128	824.2	0.96	0.187	29.26	29.30	1.010	0.189	/
		Right Edge	128	824.2	1.12	0.043	29.26	29.30	1.010	0.043	/
		Bottom Edge	128	824.2	-0.86	0.287	29.26	29.30	1.010	0.290	/
	EDGE Data (Hotspot)	Front Side	128	824.2	-0.39	**0.162**	26.45	26.50	1.012	**0.164**	42#
		Back Side	128	824.2	2.11	0.161	26.45	26.50	1.012	0.163	/
		Left Edge	128	824.2	-3.74	0.076	26.45	26.50	1.012	0.077	/
		Right Edge	128	824.2	2.42	0.021	26.45	26.50	1.012	0.021	/
		Bottom Edge	128	824.2	-1.20	0.112	26.45	26.50	1.012	0.113	/
GSM 1900	GPRS Data (Hotspot) 4 slots	Front Side	661	1880.0	4.56	0.477	25.09	25.25	1.038	0.495	/
		Back Side	661	1880.0	2.49	0.473	25.09	25.25	1.038	0.491	/
		Left Edge	661	1880.0	4.36	0.073	25.09	25.25	1.038	0.076	/
		Right Edge	661	1880.0	-2.61	0.069	25.09	25.25	1.038	0.072	/
		Bottom Edge	661	1880.0	-3.45	**1.004**	25.09	25.25	1.038	**1.042**	43#
	GPRS Data (Hotspot) 3 slots	Front Side	810	1909.8	-2.63	0.482	26.69	26.80	1.030	0.494	/
		Back Side	810	1909.8	1.03	0.474	26.69	26.80	1.030	0.486	/
		Left Edge	810	1909.8	0.76	0.068	26.69	26.80	1.030	0.070	/
		Right Edge	810	1909.8	-3.05	0.065	26.69	26.80	1.030	0.067	/
		Bottom Edge	810	1909.8	2.31	**1.012**	26.69	26.80	1.030	**1.038**	68#
	EDGE Data (Hotspot)	Front Side	512	1850.2	0.46	0.234	25.64	25.70	1.014	0.237	/
		Back Side	512	1850.2	2.01	0.234	25.64	25.70	1.014	0.237	/
		Left Edge	512	1850.2	-2.8	0.050	25.64	25.70	1.014	0.051	/
		Right Edge	512	1850.2	2.59	0.046	25.64	25.70	1.014	0.047	/
		Bottom Edge	512	1850.2	-0.48	**0.495**	25.64	25.70	1.014	**0.502**	44#
WCDMA Band 2	RMC (Hotspot)	Front Side	9538	1904.6	4.61	0.344	20.24	20.40	1.038	0.357	/
		Back Side	9538	1904.6	-1.09	0.356	20.24	20.40	1.038	0.369	/
		Left Edge	9538	1904.6	-0.25	0.056	20.24	20.40	1.038	0.058	/
		Right Edge	9538	1904.6	0.45	0.055	20.24	20.40	1.038	0.057	/
		Bottom Edge	9538	1904.6	-0.44	**0.747**	20.24	20.40	1.038	**0.775**	45#
WCDMA Band 4	RMC (Hotspot)	Front Side	1513	1752.6	0.2	0.475	20.40	20.50	1.023	0.486	/
		Back Side	1513	1752.6	0.04	0.445	20.40	20.50	1.023	0.455	/
		Left Edge	1513	1752.6	-0.73	0.089	20.40	20.50	1.023	0.091	/
		Right Edge	1513	1752.6	-0.79	0.102	20.40	20.50	1.023	0.104	/
		Bottom Edge	1513	1752.6	-1.27	**0.869**	20.40	20.50	1.023	**0.889**	46#

Band	Mode	Position	Ch.	Freq. (MHz)	Power Drift (%)	Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	Scaled SAR(W/Kg)	Meas. No.
WCDMA Band 5	RMC (Hotspot)	Front Side	782	826.5	0.57	**0.375**	23.01	23.30	1.069	**0.401**	47#
		Back Side	782	826.5	-0.13	0.367	23.01	23.30	1.069	0.392	/
		Left Edge	782	826.5	0.9	0.179	23.01	23.30	1.069	0.191	/
		Right Edge	782	826.5	-0.55	0.049	23.01	23.30	1.069	0.052	/
		Bottom Edge	782	826.5	1.3	0.302	23.01	23.30	1.069	0.323	/
LTE Band 2 20MHz 1 RB Pos:0	QPSK (Hotspot)	Front Side	18000	1920.0	-2.79	0.510	21.64	21.95	1.074	0.548	/
		Back Side	18000	1920.0	1.25	0.552	21.64	21.95	1.074	0.593	/
		Left Edge	18000	1920.0	0.44	0.089	21.64	21.95	1.074	0.096	/
		Right Edge	18000	1920.0	-0.49	0.080	21.64	21.95	1.074	0.086	/
		Bottom Edge	18000	1920.0	-2.98	**0.809**	21.64	21.95	1.074	**0.869**	48#
LTE Band 2 20MHz 50% RB Pos: 0	QPSK (Hotspot)	Front Side	18000	1920.0	1.7	0.492	21.35	21.45	1.023	0.503	/
		Back Side	18000	1920.0	0.46	0.497	21.35	21.45	1.023	0.509	/
		Left Edge	18000	1920.0	-1.47	0.075	21.35	21.45	1.023	0.077	/
		Right Edge	18000	1920.0	0.19	0.066	21.35	21.45	1.023	0.068	/
		Bottom Edge	18000	1920.0	-0.79	**0.727**	21.35	21.45	1.023	**0.744**	49#
LTE Band 4 20MHz 1 RB Pos: 99	QPSK (Hotspot)	Front Side	19950	1710.0	-0.59	0.541	21.60	21.85	1.059	0.573	/
		Back Side	19950	1710.0	-0.57	0.458	21.60	21.85	1.059	0.485	/
		Left Edge	19950	1710.0	1.57	0.112	21.60	21.85	1.059	0.119	/
		Right Edge	19950	1710.0	-1.27	0.114	21.60	21.85	1.059	0.121	/
		Bottom Edge	19950	1710.0	-4.53	**0.702**	21.60	21.85	1.059	**0.744**	50#
LTE Band 4 20MHz 50% RB Pos: 0	QPSK (Hotspot)	Front Side	19950	1710.0	-0.15	0.529	21.49	21.60	1.026	0.543	/
		Back Side	19950	1710.0	-0.88	0.414	21.49	21.60	1.026	0.425	/
		Left Edge	19950	1710.0	-1.05	0.103	21.49	21.60	1.026	0.106	/
		Right Edge	19950	1710.0	-4.6	0.103	21.49	21.60	1.026	0.106	/
		Bottom Edge	19950	1710.0	3.13	**0.699**	21.49	21.60	1.026	**0.717**	51#
LTE Band 7 20MHz 1 RB Pos: 0	QPSK (Hotspot)	Front Side	20750	2500.0	-2.72	0.285	20.70	21.10	1.096	0.312	/
		Back Side	20750	2500.0	-0.62	0.304	20.70	21.10	1.096	0.333	/
		Left Edge	20750	2500.0	1.36	0.096	20.70	21.10	1.096	0.105	/
		Right Edge	20750	2500.0	-1.33	0.093	20.70	21.10	1.096	0.102	/
		Bottom Edge	20750	2500.0	1.8	**0.595**	20.70	21.10	1.096	**0.652**	52#
LTE Band 7 20MHz 50% RB Pos: 0	QPSK (Hotspot)	Front Side	20750	2500.0	-3.85	0.263	20.47	20.60	1.030	0.271	/
		Back Side	20750	2500.0	0.02	0.319	20.47	20.60	1.030	0.329	/
		Left Edge	20750	2500.0	2.4	0.088	20.47	20.60	1.030	0.091	/
		Right Edge	20750	2500.0	-0.77	0.095	20.47	20.60	1.030	0.098	/
		Bottom Edge	20750	2500.0	0.57	**0.616**	20.47	20.60	1.030	**0.635**	53#
LTE Band 17 20MHz 1 RB Pos: 0	QPSK (Hotspot)	Front Side	23730	704.0	-0.38	0.049	23.82	23.90	1.019	0.050	/
		Back Side	23730	704.0	0.86	**0.052**	23.82	23.90	1.019	**0.053**	54#
		Left Edge	23730	704.0	-0.36	0.032	23.82	23.90	1.019	0.033	/
		Right Edge	23730	704.0	-0.81	0.012	23.82	23.90	1.019	0.012	/
		Bottom Edge	23730	704.0	0.28	0.031	23.82	23.90	1.019	0.032	/
LTE Band 17 20MHz 50% RB Pos: 0	QPSK (Hotspot)	Front Side	23730	704.0	0.00	0.039	22.59	22.70	1.026	0.040	/
		Back Side	23730	704.0	-0.39	**0.042**	22.59	22.70	1.026	**0.043**	55#

Band	Mode	Position	Ch.	Freq. (MHz)	Power Drift (%)	Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	Scaled SAR(W/Kg)	Meas. No.
		Left Edge	23730	704.0	0.25	0.026	22.59	22.70	1.026	0.027	/
		Right Edge	23730	704.0	0.65	0.009	22.59	22.70	1.026	0.009	/
		Bottom Edge	23730	704.0	-0.22	0.025	22.59	22.70	1.026	0.026	/
WLAN 802.11 b	DATA (Body-Worn)	Front Side	1	2412	-0.68	0.141	15.54	15.60	1.014	0.143	/
		Back Side	1	2412	-0.4	**0.156**	15.54	15.60	1.014	**0.158**	56#
		Left Edge	1	2412	-0.46	0.092	15.54	15.60	1.014	0.093	/
		Right Edge	1	2412	-0.56	0.025	15.54	15.60	1.014	0.025	/
		Top Edge	1	2412	-0.5	0.075	15.54	15.60	1.014	0.076	/
Bluetooth 8-DPSK	DATA (Body-Worn)	Front Side	0	2402	-0.24	0.073	12.41	12.50	1.007	0.074	/
		Back Side	0	2402	0.24	**0.082**	12.41	12.50	1.007	**0.083**	64#
Bluetooth 8-DPSK	DATA (Body-Worn)	Left Edge	0	2402	-0.51	0.064	12.41	12.50	1.007	0.064	/
		Right Edge	0	2402	0.26	0.076	12.41	12.50	1.007	0.077	/
		Top Edge	0	2402	0.31	0.071	12.41	12.50	1.007	0.071	/

Band	Mode	Position	Ch.	Freq. (MHz)	Power Drift (%)	Meas. SAR (W/Kg)	Meas. Power (dBm)	Max. tune-up Power(dBm)	Scaling Factor	Scaled SAR(W/Kg)	Meas. No.
Additional Channels											
GSM 1900	GPRS Data (Hotspot) 4 slots	Bottom Edge	512	1850.2	-1.80	**1.018**	25.05	25.25	1.047	**1.066**	57#
		Bottom Edge	810	1909.8	-2.55	**1.025**	25.08	25.25	1.040	**1.066**	58#
	GPRS Data (Hotspot) 3 slots	Bottom Edge	512	1850.2	1.26	**1.009**	**26.57**	**26.80**	**1.054**	**1.064**	69#
		Bottom Edge	661	1880.0	1.38	1.019	26.62	26.80	1.042	1.062	70#
WCDMA Band 4	RMC (hotspot)	Bottom Edge	1662	1712.5	-0.46	0.837	20.38	20.50	1.028	0.860	59#
		Bottom Edge	1413	1732.6	-0.55	0.861	20.34	20.50	1.038	**0.893**	60#
LTE Band 2 20MHz 1 RB Pos: 0	QPSK (hotspot)	Bottom Edge	18900	1880.0	-0.73	0.776	21.15	21.95	1.202	0.933	61#
		Bottom Edge	19199	1909.9	-1.03	0.735	21.52	21.95	1.104	0.811	62#

Note:

1. When device operating under hotspot mode, that the WCDMA B2/B4, LTE B2/B4/B7 power reduction.
2. Because the WLAN and BT can not transmit together, we tested Bluetooth in 10mm separation and listed under this section.

10.4 SAR Measurement Variability

According to KDB 865664 D01 v01r03, SAR measurement variability was assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are ≤ 1.45 W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is ≤ 1.10, the highest SAR configuration for either head or body tissue-equivalent medium may be used to perform the repeated measurement. These 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.

SAR repeated measurement procedure:

1. When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
2. When the highest measured SAR is >= 0.80 W/kg, repeat that measurement once.
3. 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, perform a second repeated measurement.
4. If the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20, and the original, first or second repeated measurement is >= 1.5 W/kg, perform a third repeated measurement.

SAR Repeated Measurement

Band	Mode	Position	Ch.	Freq.	Original	first repeated	ratio	second repeated
GSM 1900	GPRS Data (Hotspot) 4 slots	Bottom Edge	661	1880.0	1.004	1.003	1.001	-
		Bottom Edge	512	1850.2	1.018	1.033	1.015	-
		Bottom Edge	810	1909.8	1.025	1.018	1.007	-
	GPRS Data (Hotspot) 3 slots	Bottom Edge	661	1880.0	1.019	1.023	1.004	
		Bottom Edge	512	1850.2	1.009	1.006	1.003	
		Bottom Edge	810	1909.8	1.012	1.015	1.003	
WCDMA Band 4	RMC (hotspot)	Bottom Edge	1513	1752.6	0.869	0.873	1.005	-
		Bottom Edge	1662	1712.5	0.837	0.835	1.002	-
		Bottom Edge	1413	1732.6	0.861	0.843	1.021	-
LTE Band 2 20MHz 1 RB Pos: 0	QPSK (hotspot)	Bottom Edge	18000	1920.0	0.809	0.811	1.002	-

Note:the ratio of largest to smallest SAR for the original and first repeated measurements is < 1.20,the second repeated measurement. is not required.

11 SIMULTANEOUS TRANSMISSION

11.1 Simultaneous Transmission Mode Consider

Simultaneous Transmitting （Yes/NO）	BT	2.4G WLAN	5G WLAN	LTE QPSK	WCDMA RMC	GSM Data	GSM Voice
GSM Voice	Yes	Yes	Yes	No	No	No	-
GSM Data	Yes	Yes	Yes	No	No	-	-
WCDMA RMC	Yes	Yes	Yes	No	-		-
LTE QPSK	Yes	Yes	Yes	No			
WLAN	NO				-	-	-
BT	-				-	-	-

Note:
1.The Bluetooth and WLAN share the same antenna, cannot transmitting together.
2.Both the 2.4G WLAN and 5G WLAN can transmit simultaneously with each WWAN.

11.2 Sum SAR of Simultaneous Transmission

11.2.1 Sum Head SAR of Simultaneous Transmission

Simultaneous Mode	Position	Mode	Max. 1g SAR (W/kg)	1g Sum SAR (W/kg)
GSM Voice +Bluetooth	Head	GSM Voice	0.133	0.868
		Bluetooth	0.438	
GSM Voice + 2.4G WLAN	Head	GSM Voice	0.133	0.932
		2.4G WLAN	0.799	
GSM Voice + 5G WLAN	Head	GSM Voice	0.133	0.908
		5G WLAN	0.775	
WCDMA RMC +Bluetooth	Head	WCDMA RMC	0.155	0.593
		Bluetooth	0.438	
WCDMA RMC +2.4G WLAN	Head	WCDMA RMC	0.155	**0.954**
		2.4G WLAN	0.799	
WCDMA RMC +5G WLAN	Head	WCDMA RMC	0.155	0.930
		5G WLAN	0.775	
LTE QPSK + Bluetooth	Head	LTE QPSK	0.134	0.572
		Bluetooth	0.438	
LTE QPSK + 2.4G WLAN	Head	LTE QPSK	0.134	0.933
		2.4G WLAN	0.799	
LTE QPSK + 5G WLAN	Head	LTE QPSK	0.134	0.909
		2.4G WLAN	0.775	

11.2.2 Sum Body-worn SAR of Simultaneous Transmission

Simultaneous Mode	Position	Mode	Max. 1g SAR (W/kg)	1g Sum SAR (W/kg)
GSM Voice +Bluetooth	Body-worn	GSM Voice	0.250	0.617
		Bluetooth	0.083	
GSM Voice + 2.4G WLAN	Body-worn	GSM Voice	0.250	0.323
		2.4G WLAN	0.073	
GSM Voice + 5G WLAN	Body-worn	GSM Voice	0.250	0.576
		5G WLAN	0.226	
GSM DATA +Bluetooth	Body-worn	GSM DATA	0.271	0.354
		Bluetooth	0.083	
GSM DATA + 2.4G WLAN	Body-worn	GSM DATA	0.271	0.344
		2.4G WLAN	0.073	
GSM DATA + 5G WLAN	Body-worn	GSM DATA	0.271	0.497
		5G WLAN	0.226	
WCDMA RMC +Bluetooth	Body-worn	WCDMA RMC	0.514	0.597
		Bluetooth	0.083	
WCDMA RMC +2.4G WLAN	Body-worn	WCDMA RMC	0.514	0.587
		2.4G WLAN	0.073	
WCDMA RMC + 5G WLAN	Body-worn	WCDMA RMC	0.514	0.740
		5G WLAN	0.226	
LTE QPSK + Bluetooth	Body-worn	LTE QPSK	0.524	0.607
		Bluetooth	0.083	
LTE QPSK + 2.4G WLAN	Body-worn	LTE QPSK	0.524	0.597
		2.4G WLAN	0.073	
LTE QPSK + 5G WLAN	Body-worn	LTE QPSK	0.524	**0.750**
		5G WLAN	0.226	

11.2.3 Sum Hotspot mode SAR of Simultaneous Transmission

Simultaneous Mode	Position	Mode	Max. 1g SAR (W/kg)	1g Sum SAR (W/kg)
GSM DATA +Bluetooth	Hotspot mode	GSM DATA	1.066	**1.149**
		Bluetooth	0.083	
GSM DATA + 2.4G WLAN	Hotspot mode	GSM DATA	1.066	1.224
		2.4G WLAN	0.158	
WCDMA RMC +Bluetooth	Hotspot mode	WCDMA RMC	0.893	0.976
		Bluetooth	0.083	
WCDMA RMC +2.4G WLAN	Hotspot mode	WCDMA RMC	0.893	1.051
		2.4G WLAN	0.158	
LTE QPSK + Bluetooth	Hotspot mode	LTE QPSK	0.933	1.016
		Bluetooth	0.083	
LTE QPSK + 2.4G WLAN	Hotspot mode	LTE QPSK	0.933	1.091
		2.4G WLAN	0.158	
Note: Only 2.4G WLAN support hotspot mode.				

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna. When the sum of SAR 1g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR 1g 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR 1g is greater than the SAR limit (SAR 1g 1.6 W/kg), SAR test exclusion is determined by the SPLSR.

12 TEST EQUIPMENTS LIST

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
PC	Dell	N/A	N/A	N/A	N/A
750MHz Dipole	SATIMO	SID 750	S/N 25/13 DIP 0G750-253	2015/03/16	2016/03/15
835MHz Dipole	SATIMO	SID 835	S/N 25/13 DIP 0G835-246	2015/03/16	2016/03/15
1800MHz Dipole	SATIMO	SID 1900	S/N 25/13 DIP 1G800-248	2015/03/16	2016/03/15
1900MHz Dipole	SATIMO	SID 1900	S/N 25/13 DIP 1G900-249	2015/03/16	2016/03/15
2450MHz Dipole	SATIMO	SID 2450	S/N 25/13 DIP 2G450-251	2015/03/16	2016/03/15
2600MHz Dipole	SATIMO	SID 2600	SN 25/13 DIP 2G600-254	2015/03/16	2016/03/15
Waveguide	SATIMO	SWG5500	S/N 30/13 DIP WGA24	2015/03/16	2016/03/15
E-Field Probe	SATIMO	SSE2	SN 27/14 EPG 210	2015/07/16	2016/07/15
Antenna	SATIMO	ANTA3	SN 17/13 ZNTA45	N/A	N/A
Phantom1	SATIMO	SAM	SN 30/13 SAM013	N/A	N/A
Phantom2	SATIMO	SAM	SN 30/13 SAM014	N/A	N/A
Dielectric Probe Kit	SATIMO	SCLMP	SN 25/13 OCPG56	2015/08/17	2016/08/16
MultiMeter	Keithley	MultiMeter 2000	4024022	2015/07/16	2016/07/15
Signal Generator	R&S	SMF100A	1167.0000k02/104260	2015/07/16	2016/07/15
Power Meter	Agilent	5738A	11290	2015/07/16	2016/07/15
Power Sensor	R&S	NRP-Z21	103971	2015/07/16	2016/07/15
Power Amplifier	SATIMO	6552B	22374	N/A	N/A
Wireless Communication Test Set	R&S	CMW 500	138884	2015/07/16	2016/07/15
Network Analyzer	R&S	ZVL-6	EMY46103472	2015/07/16	2016/07/15
Attenuator	COM-MW	ZA-S1-31	1305003187	N/A	N/A
Directional coupler	AA-MCS	AAMCS-UDC	000272	N/A	N/A

ANNEX A SIMULATING LIQUID VERIFICATION RESULT

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an SATIMO SCLMP Dielectric Probe Kit.

Date	Liquid Type	Freq. (MHz)	Temp. (℃)	Meas. Conductivity (σ)	Meas. Permittivity (ε)	Target conductivity (σ)	Target Permittivity (ε)	Conductivity tolerance (%)	Permittivity tolerance (%)
2015.08.17	Head	750	22.0	0.85	41.92	0.89	41.90	-4.49	0.05
2015.08.18	Body	750	22.0	0.93	55.71	0.96	55.73	-3.12	-0.04
2015.08.19	Head	835	22.1	0.89	41.50	0.90	41.50	-1.11	0.00
2015.08.20	Body	835	22.1	0.96	55.87	0.97	55.20	-1.03	1.21
2015.08.22	Head	1900	22.2	1.45	39.75	1.40	40.00	3.57	-0.63
2015.08.23	Body	1900	22.2	1.49	54.26	1.52	53.30	-1.97	1.80
2015.08.25	Head	2450	22.4	1.88	37.97	1.80	39.20	4.44	-3.14
2015.08.27	Body	2450	22.4	2.01	53.56	1.95	52.70	3.08	1.63
2015.08.27	Head	1800	22.4	1.38	39.80	1.40	40.00	-1.43	-0.50
2015.08.27	Body	1800	22.4	1.49	53.20	1.52	53.30	-1.97	-0.19
2015.08.28	Head	2600	22.6	1.96	39.01	1.96	39.00	0.00	0.03
2015.08.29	Body	2600	22.6	2.23	50.48	2.16	52.50	3.24	-3.85
2015.08.30	Head	5200	22.1	4.46	35.60	4.66	36.00	-4.29	-1.11
2015.08.31	Body	5200	22.1	5.27	48.82	5.30	49.01	-0.57	-0.43
2015.09.02	Head	5800	22.5	5.19	35.21	5.29	35.20	-1.52	-0.28
2015.09.06	Body	5800	22.5	5.95	47.93	6.00	48.20	-0.83	-0.62
2015.09.25	Head	2450	22.2	1.84	38.77	1.80	39.20	2.22	-1.11
2015.09.25	Body	2450	22.4	2.04	51.25	1.95	52.70	4.62	-2.75
2015.09.28	Body	835	22.2	1.06	55.29	0.97	55.20	4.12	0.16
2015.09.28	Body	1900	22.2	1.48	53.26	1.52	53.30	-2.63	-0.08
Note: The tolerance limit of Conductivity and Permittivity is± 5%.									

ANNEX B SYSTEM CHECK RESULT

Comparing to the original SAR value provided by SATIMO, the validation data should be within its specification of 10%(for 1 g).

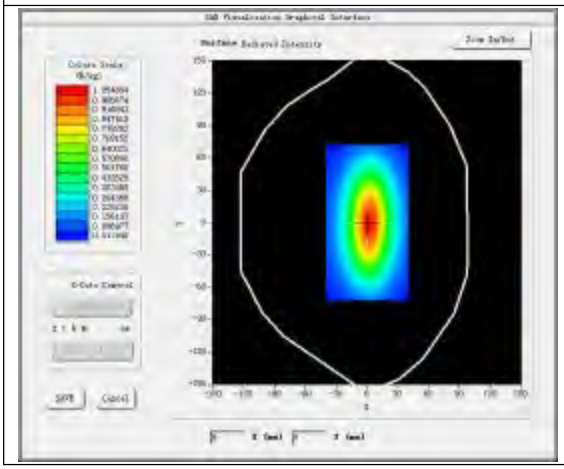
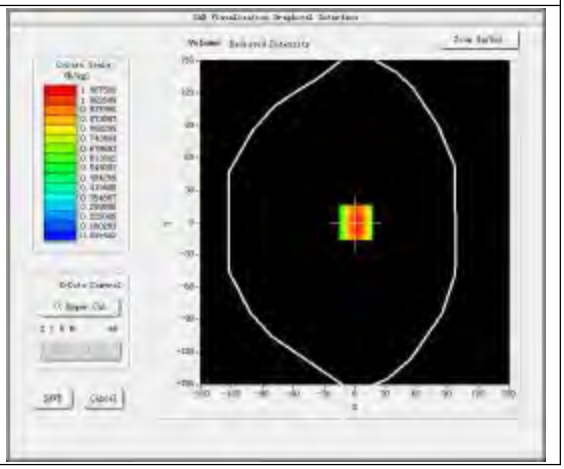
Date	Liquid Type	Freq. (MHz)	Power (mW)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Dipole SAR (W/kg)	Tolerance (%)	Targeted SAR(W/kg)	Tolerance (%)
2015.08.17	Head	750	100	0.850	8.50	8.60	-1.16	8.49	0.12
2015.08.18	Body	750	100	0.856	8.56	8.91	-3.93	8.49	0.82
2015.08.19	Head	835	100	0.992	9.92	9.81	1.12	9.56	3.77
2015.08.20	Body	835	100	1.005	10.05	10.53	-4.56	9.56	5.13
2015.08.22	Head	1900	100	3.852	38.52	40.75	-5.74	39.70	-2.97
2015.08.23	Body	1900	100	4.116	41.16	42.06	-2.14	39.70	3.68
2015.08.25	Head	2450	100	5.356	53.56	54.29	-1.34	52.40	2.21
2015.08.27	Body	2450	100	5.463	54.63	54.70	-0.13	52.40	4.26
2015.08.27	Head	1800	100	3.85	38.50	38.70	-0.52	38.40	0.26
2015.08.27	Body	1800	100	4.12	41.20	40.40	1.98	38.40	7.29
2015.08.29	Head	2600	100	5.36	53.60	57.4	-6.62	55.30	-3.07
2015.08.30	Body	2600	100	5.79	57.90	57.4	0.87	55.30	4.70
2015.08.31	Head	5200	100	16.45	164.50	157.80	4.25	165	-0.30
2015.09.02	Body	5200	100	16.39	163.90	157.80	3.87	165	-0.67
2015.09.06	Head	5800	100	16.98	169.80	179.53	-5.42	165	2.91
2015.09.07	Body	5800	100	17.08	170.80	179.53	-4.86	165	3.52
2015.09.25	Head	2450	100	5.151	51.51	54.29	-5.12	52.40	-1.70
2015.09.25	Body	2450	100	5.444	54.44	54.70	-0.48	52.40	3.89
2015.09.28	Body	835	100	0.998	9.98	10.53	-5.22	9.56	4.39
2015.09.28	Body	1900	100	4.135	41.35	42.06	-1.69	39.70	4.16
Note: The tolerance limit of System validation ±10%.									

System Performance Check Data(750 MHz Head)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.08.17
Measurement duration: 13 minutes 27 seconds

Experimental conditions.

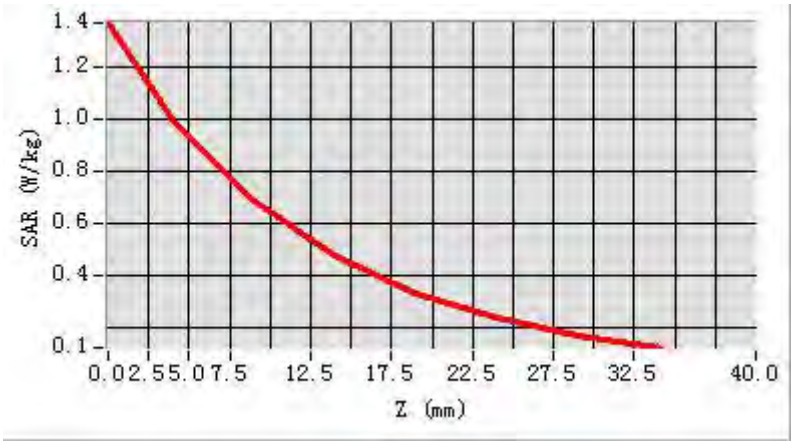
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	750MHz
Channels	-
Signal	CW
Frequency (MHz)	750MHz
Relative permittivity (real part)	41.923526
Relative permittivity	19.236865
Conductivity (S/m)	0.853686
Power drift (%)	-3.100000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.0°C
ConvF:	22.51
Crest factor:	1:1

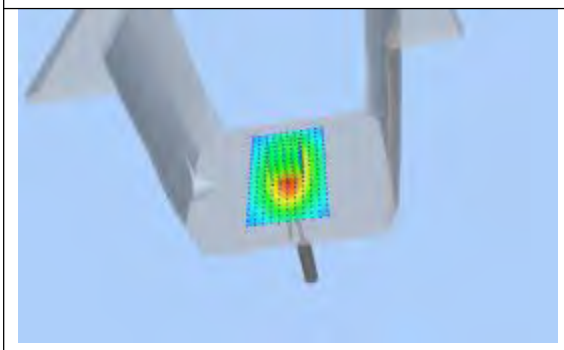
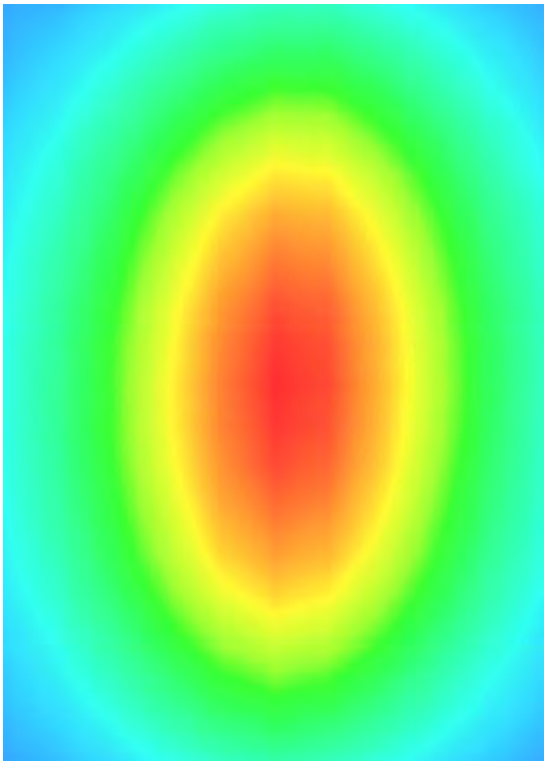
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=0.00
SAR Peak: 1.25 W/kg

SAR 10g (W/Kg)	0.5985863
SAR 1g (W/Kg)	0.850356

Z Axis Scan



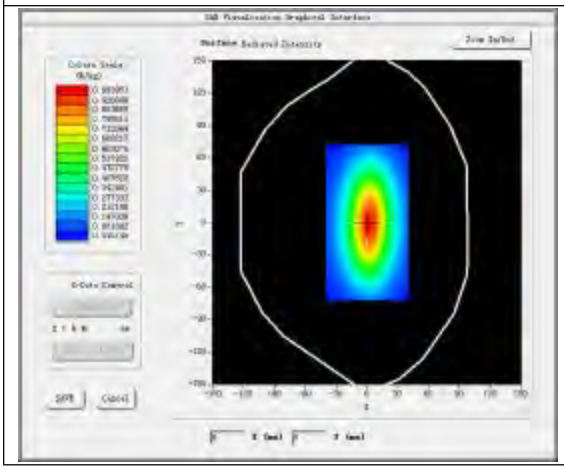
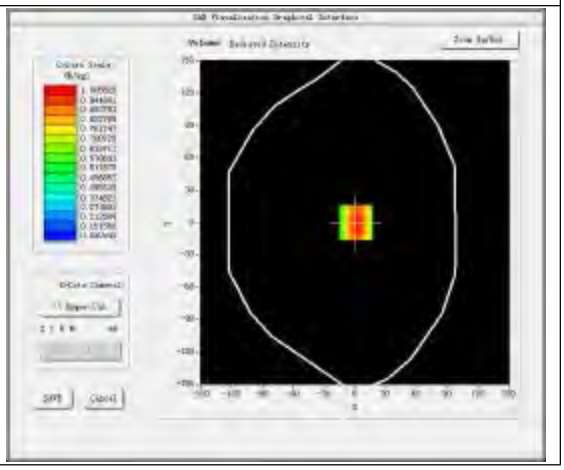
3D screen shot	Hot spot position
	

System Performance Check Data(750 MHz Body)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.08.18
Measurement duration: 13 minutes 13 seconds

Experimental conditions.

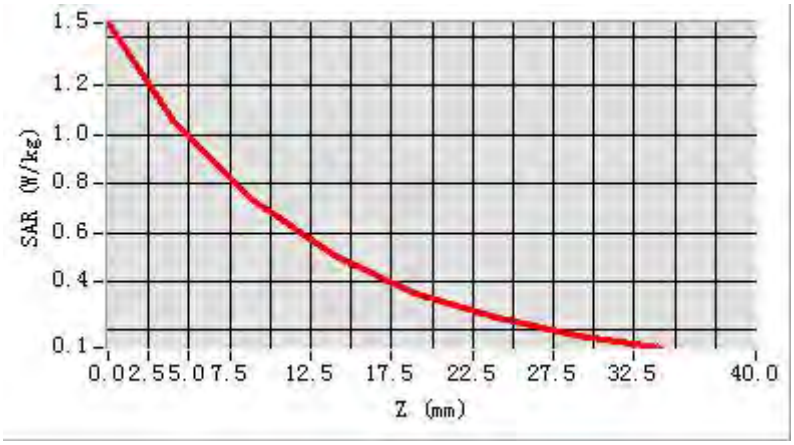
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	750MHz
Channels	-
Signal	CW
Frequency (MHz)	750MHz
Relative permittivity (real part)	55.712359
Relative permittivity	21.253685
Conductivity (S/m)	0.934365
Power drift (%)	0.090000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.0°C
ConvF:	23.36
Crest factor:	1:1

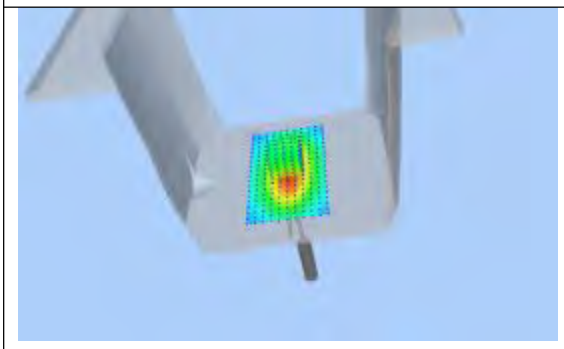
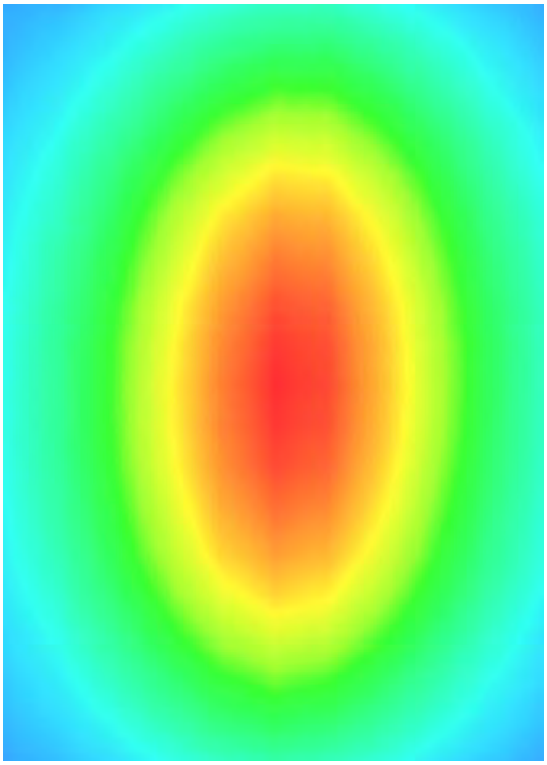
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=0.00
SAR Peak: 1.39 W/kg

SAR 10g (W/Kg)	0.5831523
SAR 1g (W/Kg)	0.8564952

Z Axis Scan



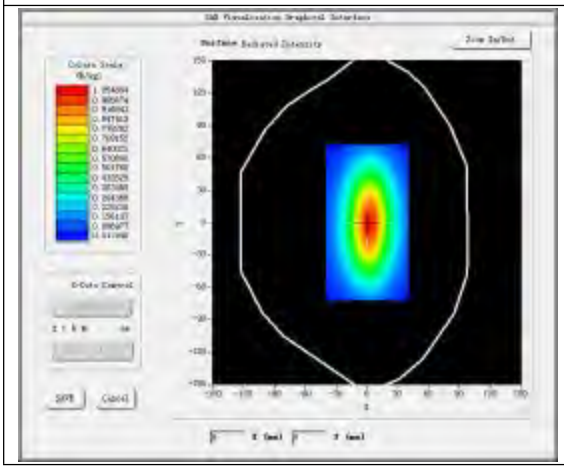
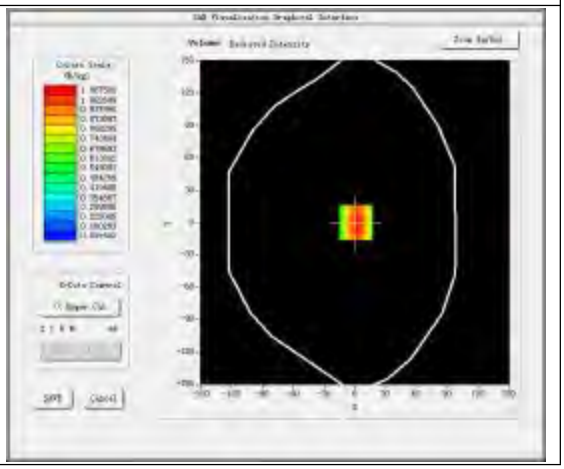
3D screen shot	Hot spot position
	

System Performance Check Data(835MHz Head)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.08.19
Measurement duration: 13 minutes 27 seconds

Experimental conditions.

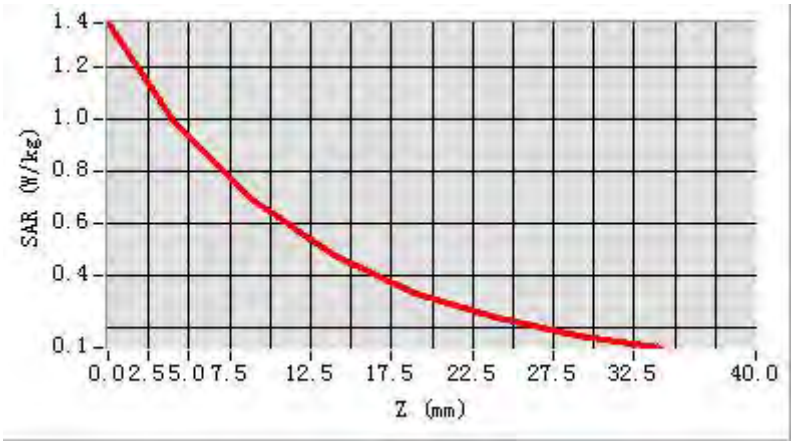
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	835MHz
Channels	-
Signal	CW
Frequency (MHz)	835 MHz
Relative permittivity (real part)	41.503526
Relative permittivity	19.236865
Conductivity (S/m)	0.885683
Power drift (%)	-3.100000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.1°C
ConvF:	23.67
Crest factor:	1:1

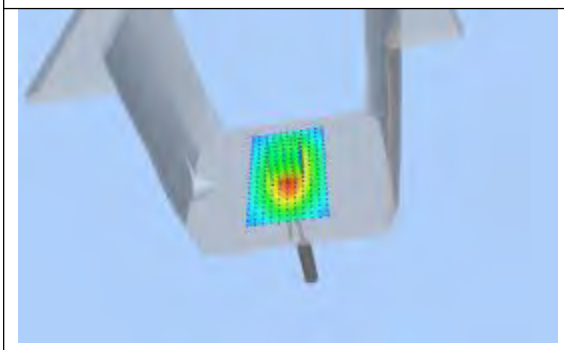
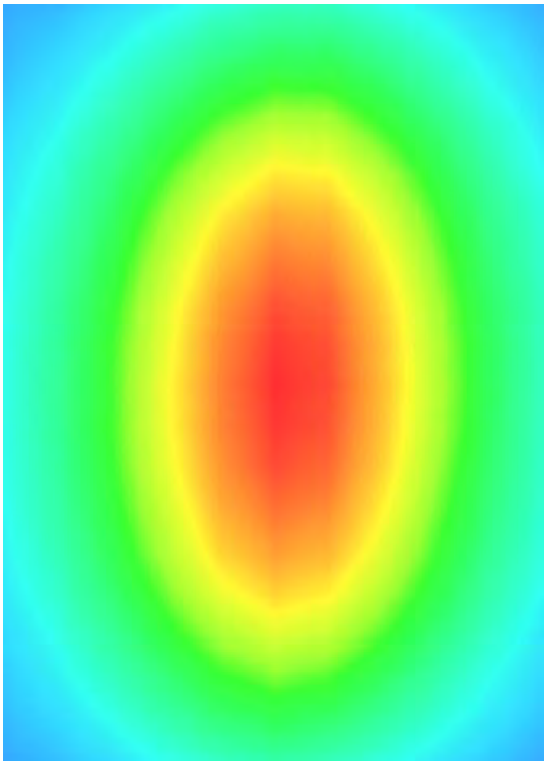
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=0.00
SAR Peak: 1.42W/kg

SAR 10g (W/Kg)	0.6158432
SAR 1g (W/Kg)	0.992356

Z Axis Scan



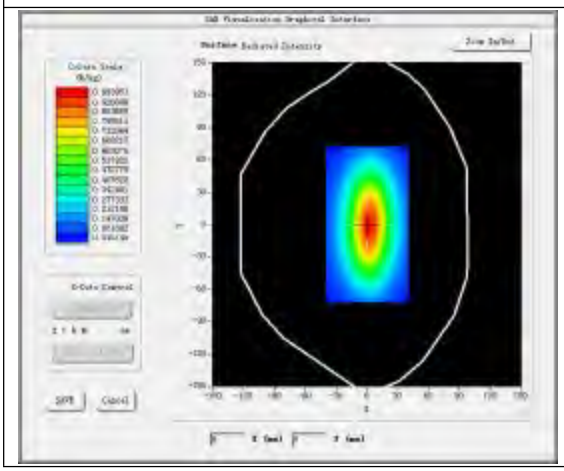
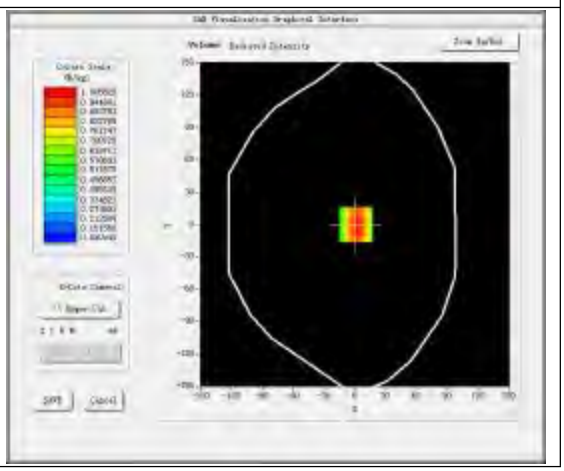
3D screen shot	Hot spot position
	

System Performance Check Data(835MHz Body)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.08.20
Measurement duration: 14 minutes 13 seconds

Experimental conditions.

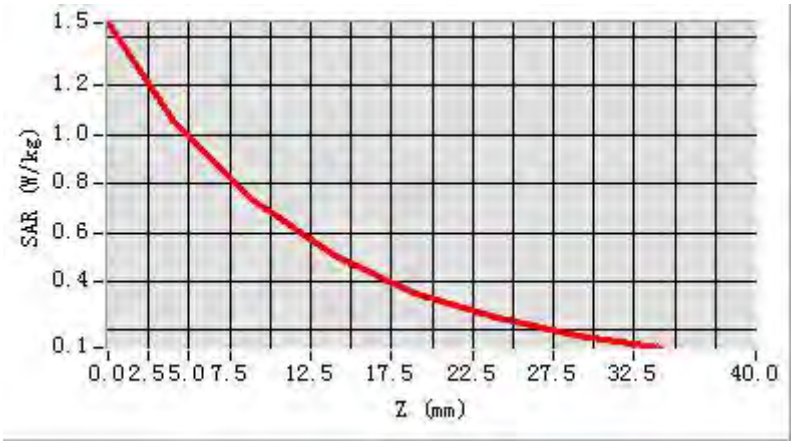
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	835MHz
Channels	-
Signal	CW
Frequency (MHz)	835MHz
Relative permittivity (real part)	55.872359
Relative permittivity	21.253685
Conductivity (S/m)	0.964365
Power drift (%)	0.090000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.1°C
ConvF:	24.58
Crest factor:	1:1

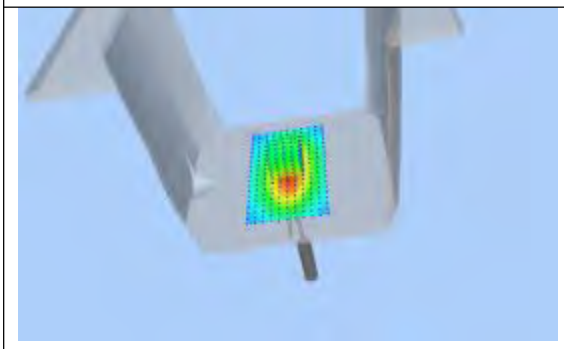
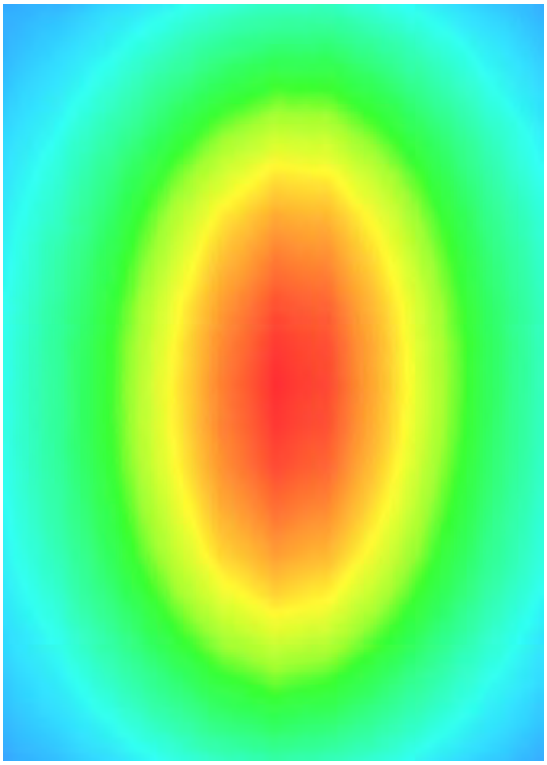
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=0.00
SAR Peak: 1.47 W/kg

SAR 10g (W/Kg)	0.686523
SAR 1g (W/Kg)	1.004952

Z Axis Scan



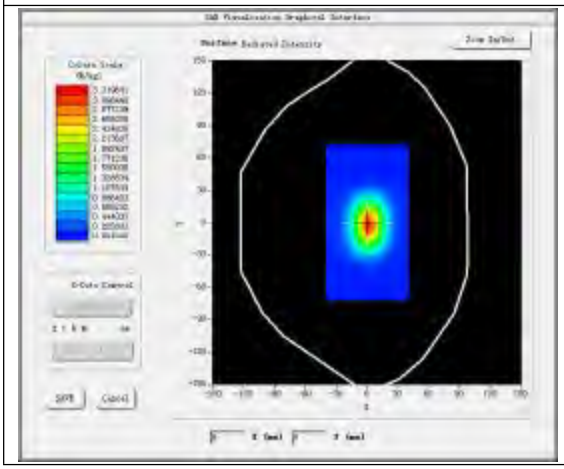
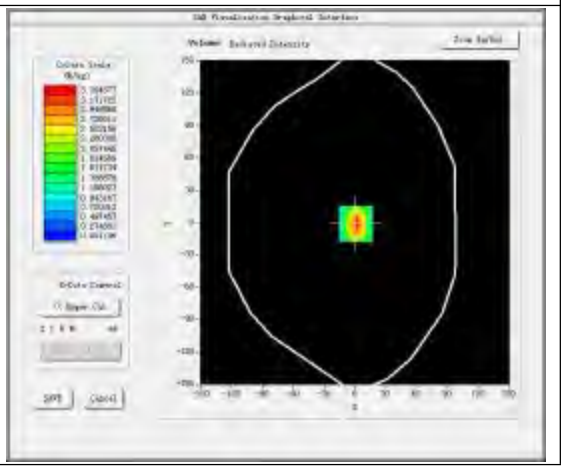
3D screen shot	Hot spot position
	

System Performance Check Data(1900MHz Head)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.08.22
Measurement duration: 14 minutes 12 seconds

Experimental conditions.

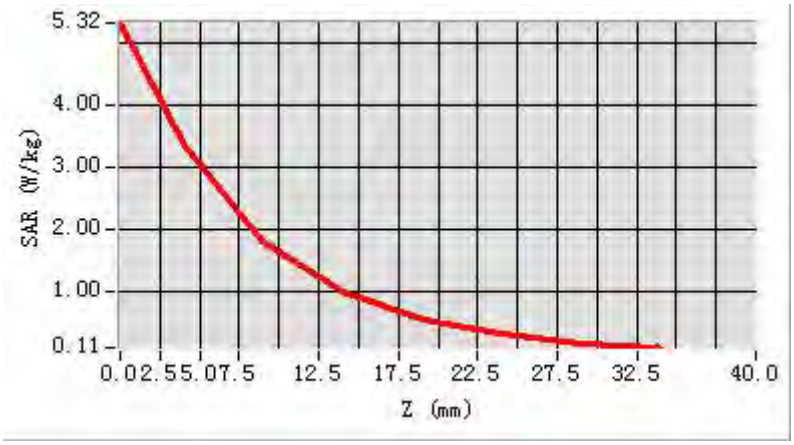
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	1900MHz
Channels	-
Signal	CW
Frequency (MHz)	1900MHz
Relative permittivity (real part)	39.752536
Relative permittivity	13.198636
Conductivity (S/m)	1.450025
Power drift (%)	0.020000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.2°C
ConvF:	26.70
Crest factor:	1:1

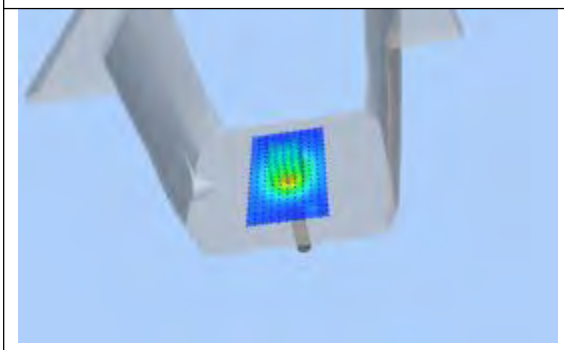
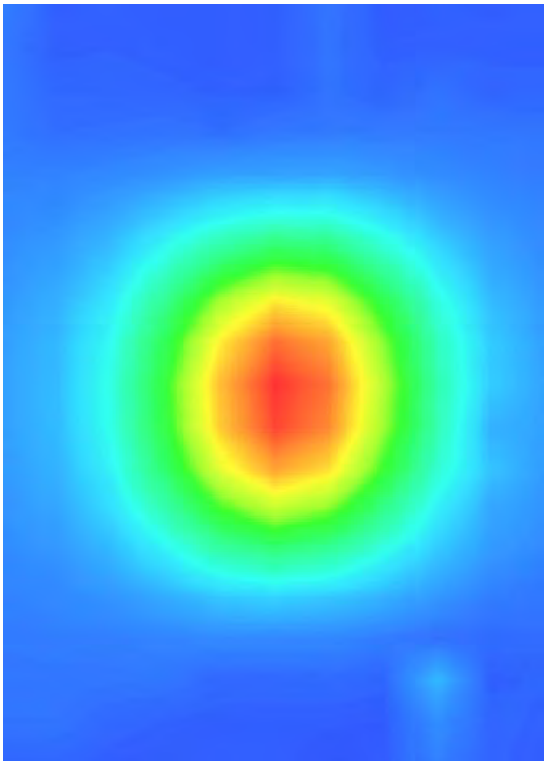
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=-1.00
SAR Peak: 5.28 W/kg

SAR 10g (W/Kg)	1.602536
SAR 1g (W/Kg)	3.852368

Z Axis Scan



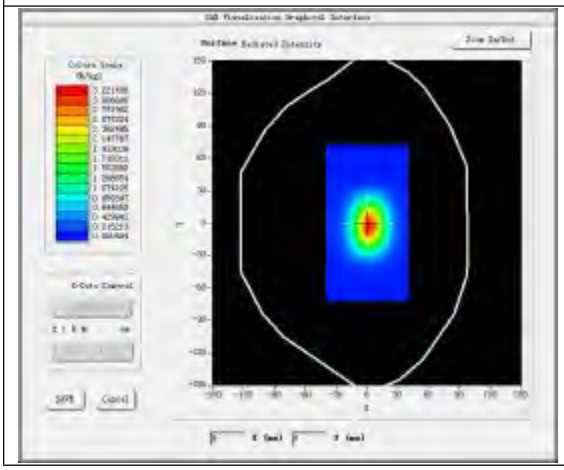
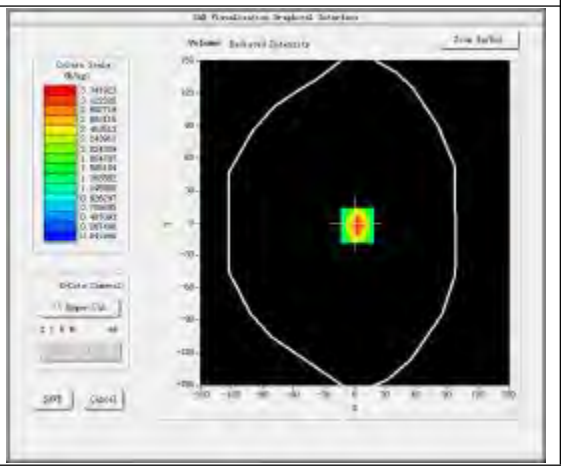
3D screen shot	Hot spot position
	

System Performance Check Data(1900MHz Body)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.08.23
Measurement duration: 14 minutes 46 seconds

Experimental conditions.

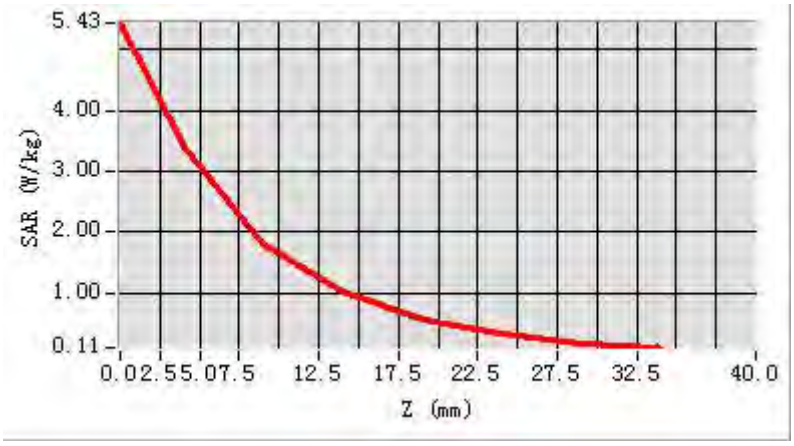
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	1900MHz
Channels	-
Signal	CW
Frequency (MHz)	1900.000000
Relative permittivity (real part)	54.260000
Relative permittivity	12.905356
Conductivity (S/m)	1.490023
Power drift (%)	0.370000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.2°C
ConvF:	27.47
Crest factor:	1:1

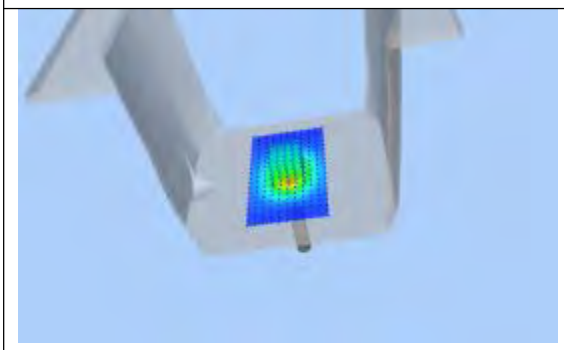
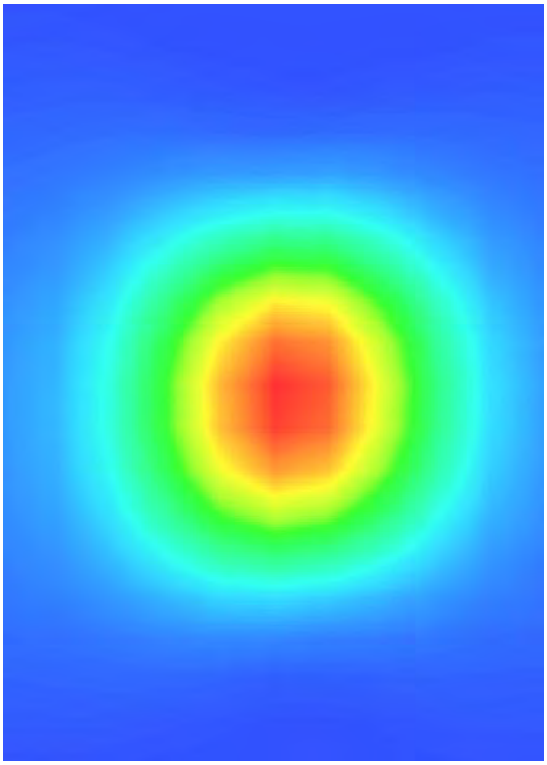
SURFACE SAR	VOLUME SAR
	

Maximum location: X=2.00, Y=-2.00
SAR Peak: 5.38 W/kg

SAR 10g (W/Kg)	1.985632
SAR 1g (W/Kg)	4.115863

Z Axis Scan



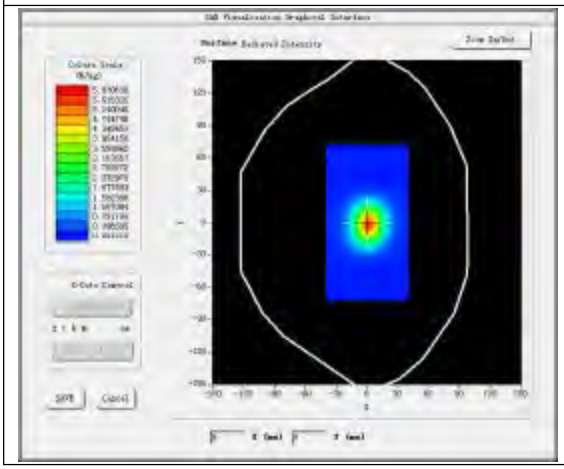
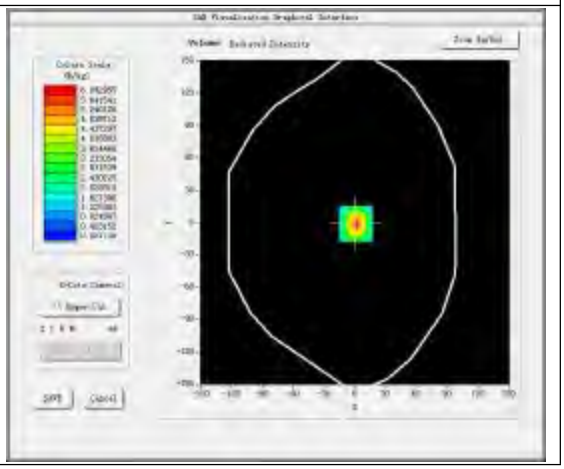
3D screen shot	Hot spot position
	

System Performance Check Data(2450MHz Head)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm
Date of measurement: 2015.08.25
Measurement duration: 12 minutes 38 seconds

Experimental conditions.

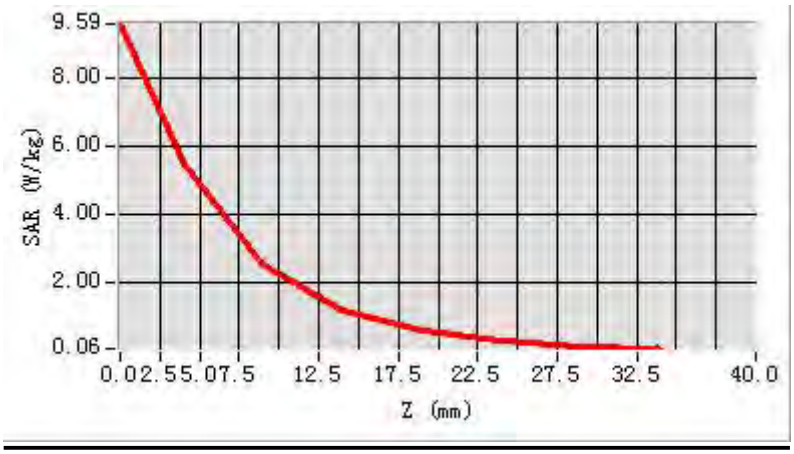
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	24500MHz
Channels	-
Signal	CW
Frequency (MHz)	2450.000000
Relative permittivity (real part)	37.970052
Relative permittivity	13.215236
Conductivity (S/m)	1.883262
Power drift (%)	-1.200000
Ambient Temperature:	22.6°C
Liquid Temperature:	22.1°C
ConvF:	25.25
Crest factor:	1:1

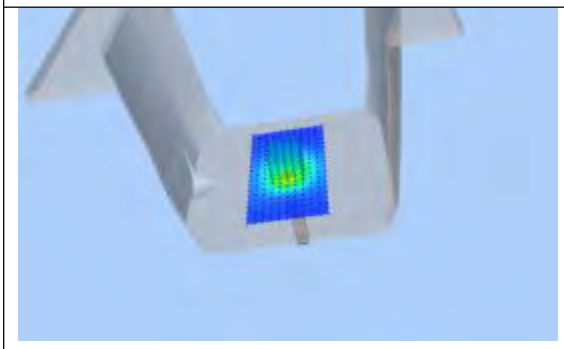
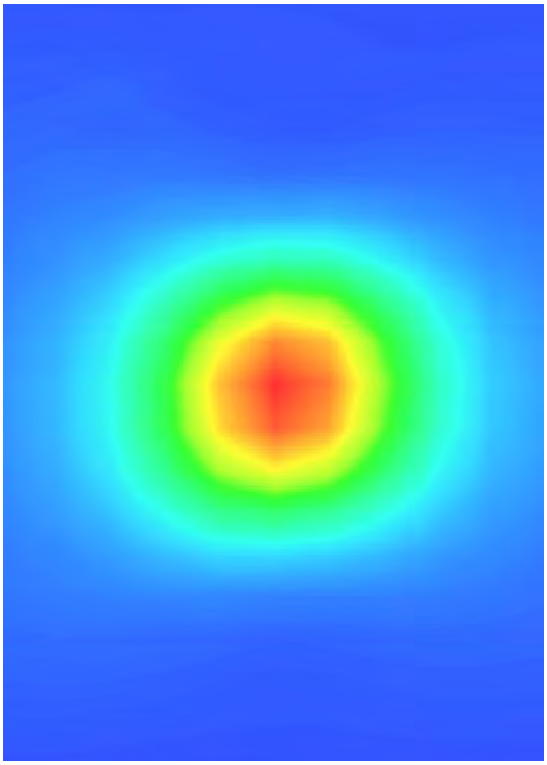
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=-1.00
SAR Peak: 9.56 W/kg

SAR 10g (W/Kg)	2.297836
SAR 1g (W/Kg)	5.356203

Z Axis Scan



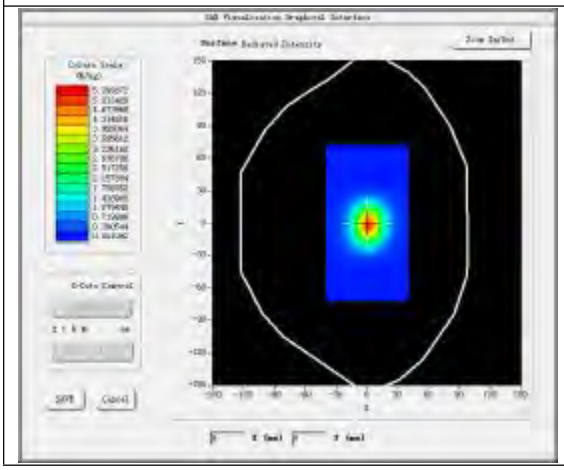
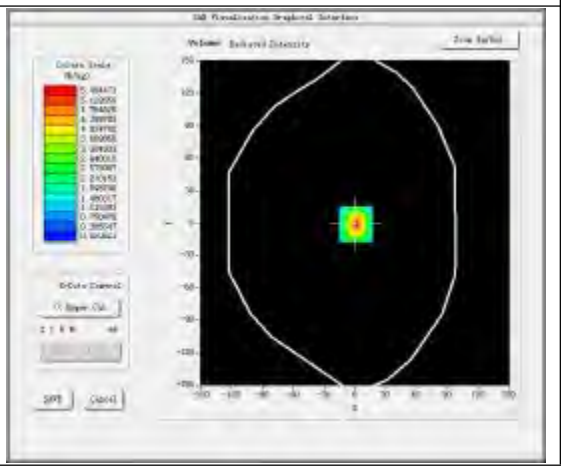
3D screen shot	Hot spot position
	

System Performance Check Data(2450MHz Body)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm
Date of measurement: 2015.08.27
Measurement duration: 14 minutes 46 seconds

Experimental conditions.

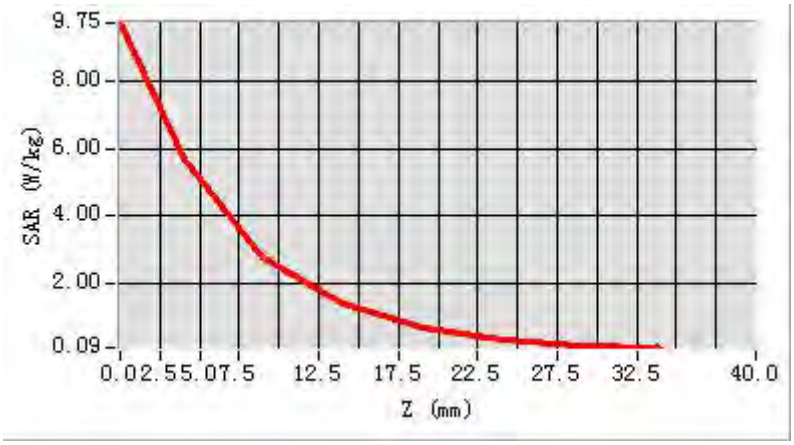
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	2450MHz
Channels	-
Signal	CW
Frequency (MHz)	2450.000000
Relative permittivity (real part)	50.7098457
Relative permittivity	11.982563
Conductivity (S/m)	2.0245987
Power drift (%)	0.250000
Ambient Temperature:	22.6°C
Liquid Temperature:	22.1°C
ConvF:	26.09
Crest factor:	1:1

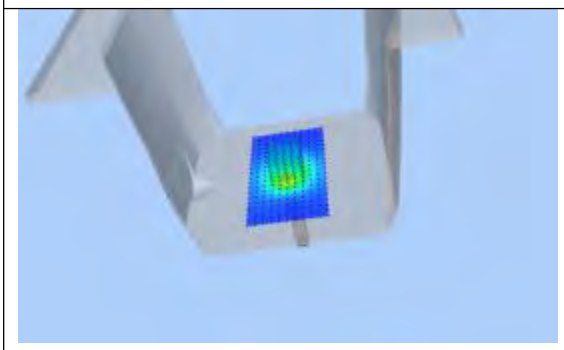
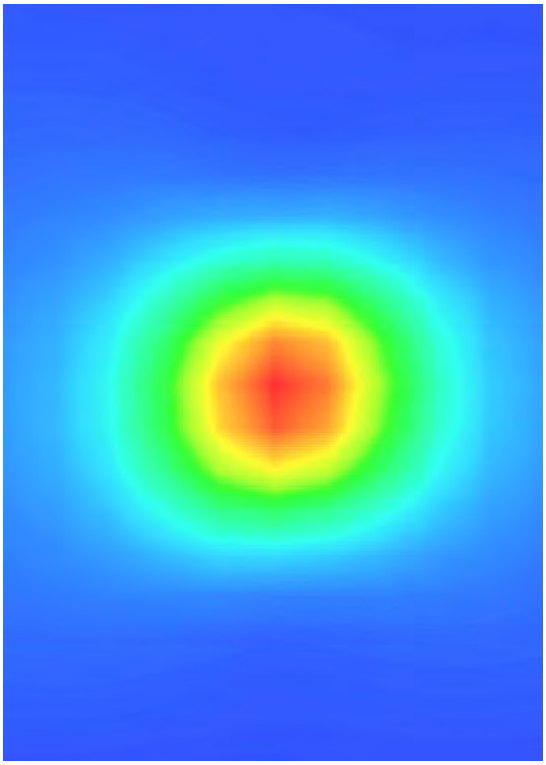
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=-1.00
SAR Peak: 9.68 W/kg

SAR 10g (W/Kg)	2.302133
SAR 1g (W/Kg)	5.462953

Z Axis Scan



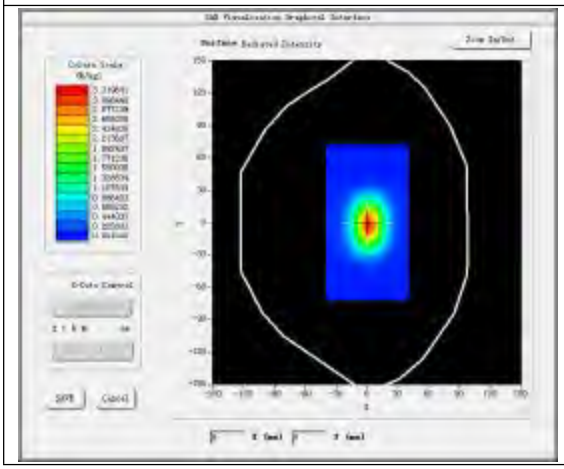
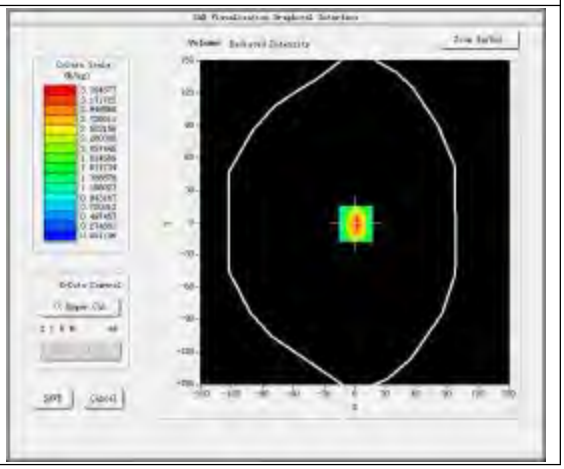
3D screen shot	Hot spot position
	

System Performance Check Data(1800MHz Head)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.08.27
Measurement duration: 14 minutes 12 seconds

Experimental conditions.

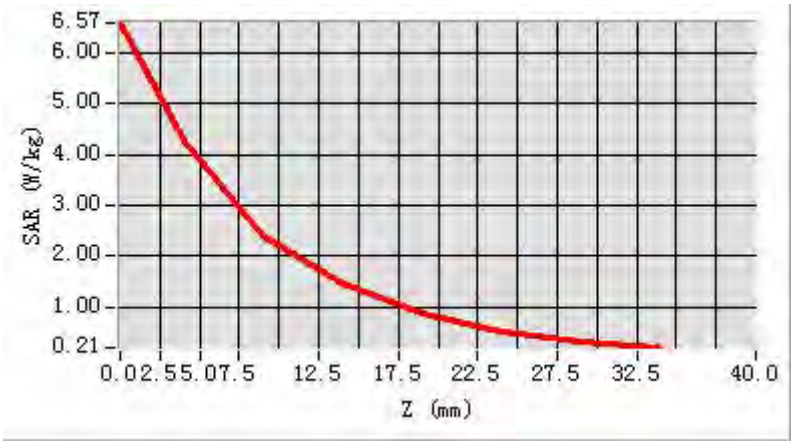
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	1800MHz
Channels	-
Signal	CW
Frequency (MHz)	1800MHz
Relative permittivity (real part)	39.80136
Relative permittivity	13.198636
Conductivity (S/m)	1.380025
Power drift (%)	0.020000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.4°C
ConvF:	23.21
Crest factor:	1:1

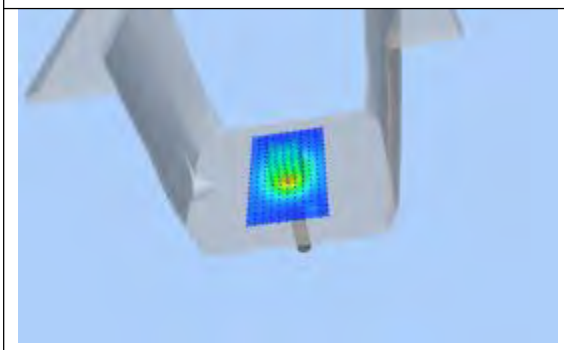
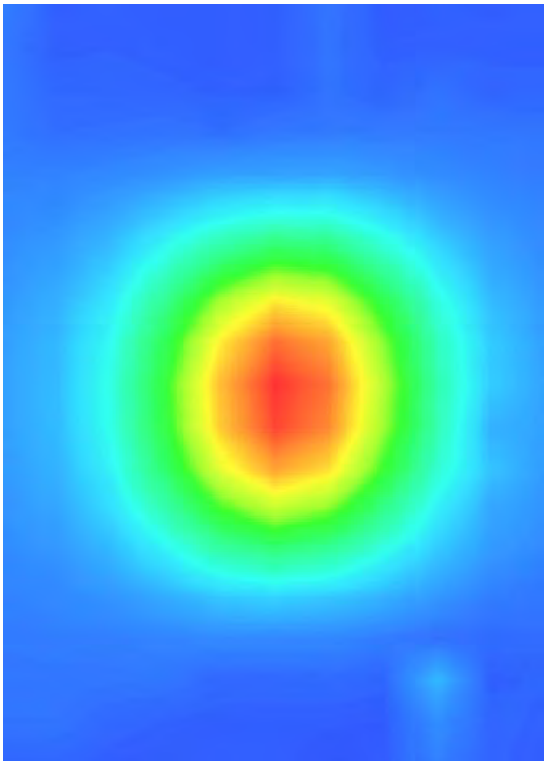
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=-1.00
SAR Peak: 5.18 W/kg

SAR 10g (W/Kg)	1.602536
SAR 1g (W/Kg)	3.852368

Z Axis Scan



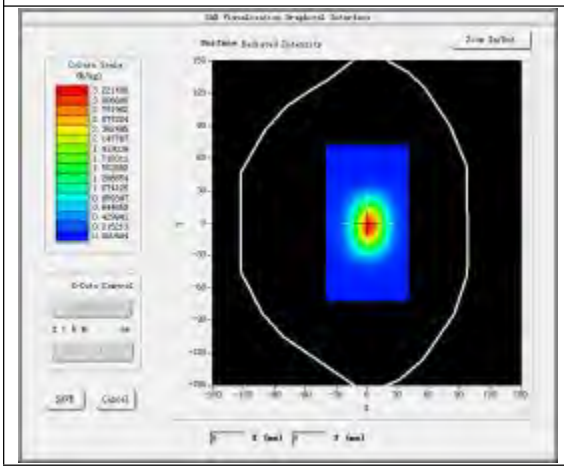
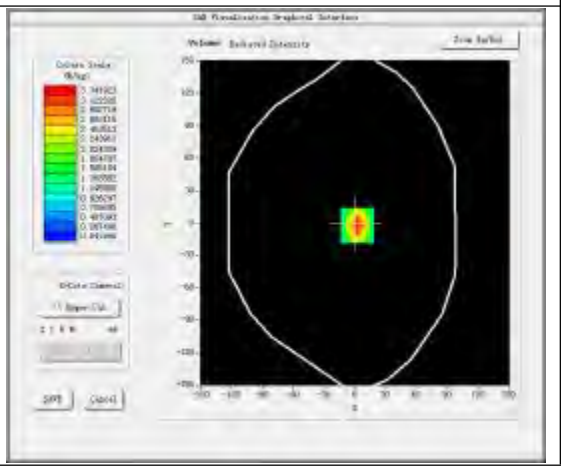
3D screen shot	Hot spot position
	

System Performance Check Data(1800MHz Body)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.08.27
Measurement duration: 14 minutes 46 seconds

Experimental conditions.

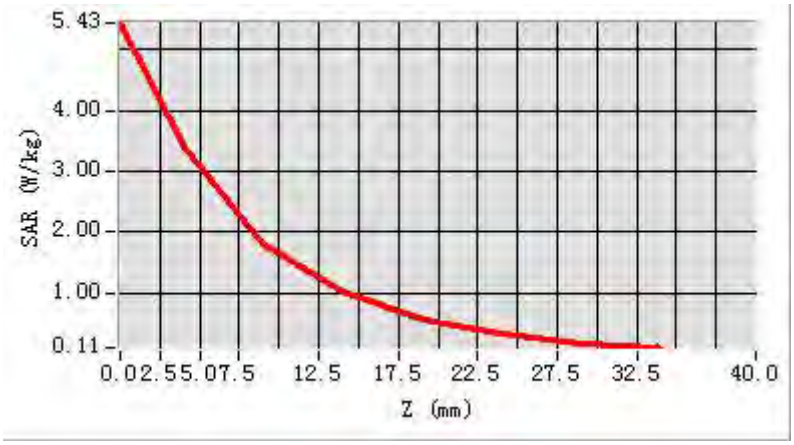
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	1800 MHz
Channels	-
Signal	CW
Frequency (MHz)	1800.000000
Relative permittivity (real part)	53.560000
Relative permittivity	11.982563
Conductivity (S/m)	2.013568
Power drift (%)	0.370000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.2°C
ConvF:	23.69
Crest factor:	1:1

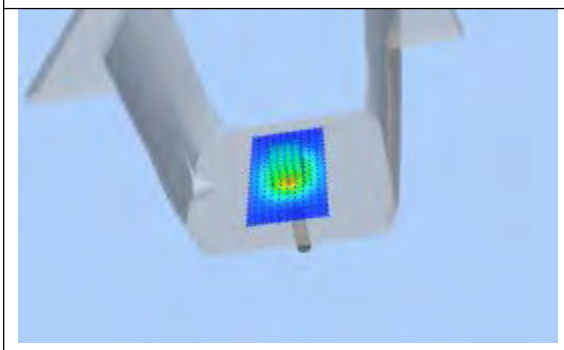
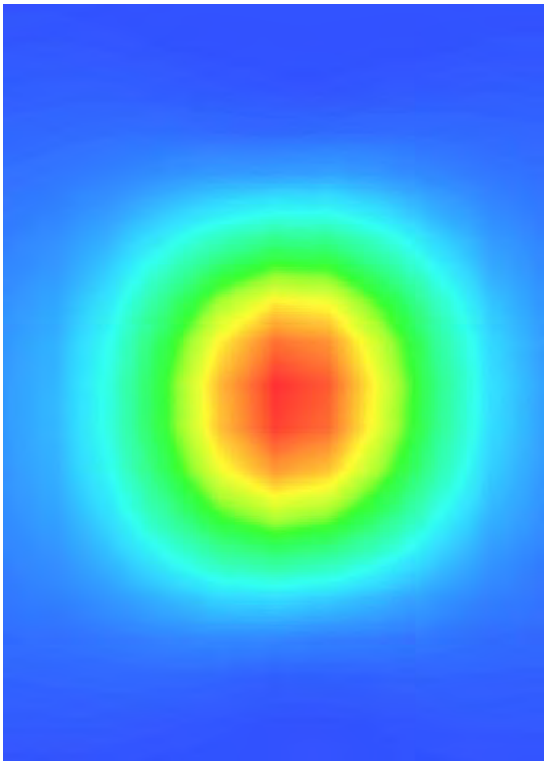
SURFACE SAR	VOLUME SAR
	

Maximum location: X=2.00, Y=-2.00
SAR Peak: 5.43 W/kg

SAR 10g (W/Kg)	1.985632
SAR 1g (W/Kg)	4.120863

Z Axis Scan



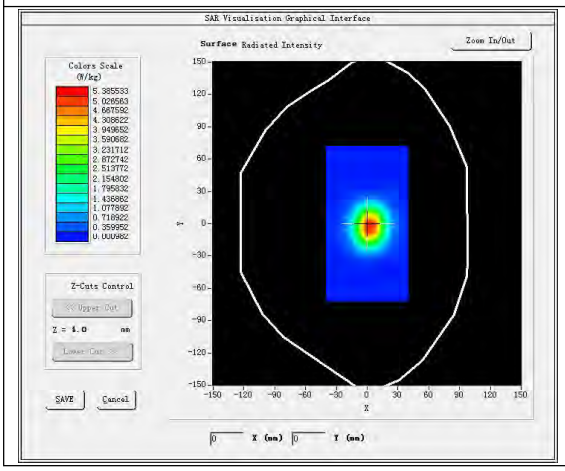
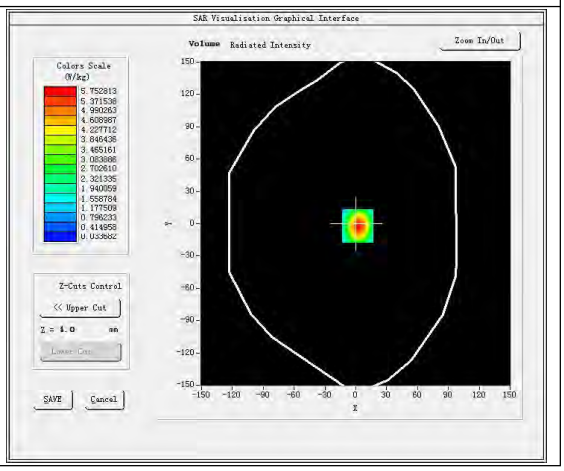
3D screen shot	Hot spot position
	

System Performance Check Data(2600MHz Head)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm
Date of measurement: 2015.08.28
Measurement duration: 13 minutes 20 seconds

Experimental conditions.

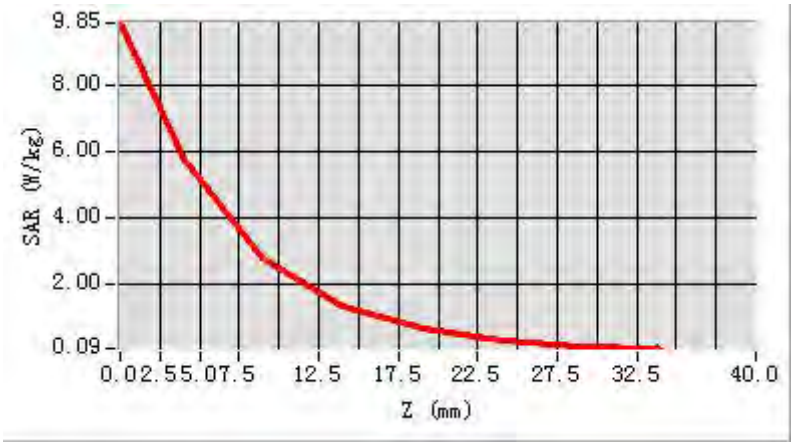
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	2600MHz
Signal	CW
Frequency (MHz)	2600.000000
Relative permittivity (real part)	39.076950
Relative permittivity	13.269150
Conductivity (S/m)	1.960079
Power drift (%)	2.570000
Ambient Temperature:	22.5°C
Liquid Temperature:	22.6°C
ConvF:	25.94
Crest factor:	1:1

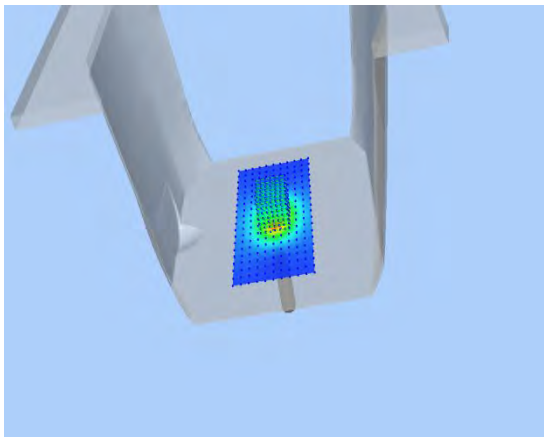
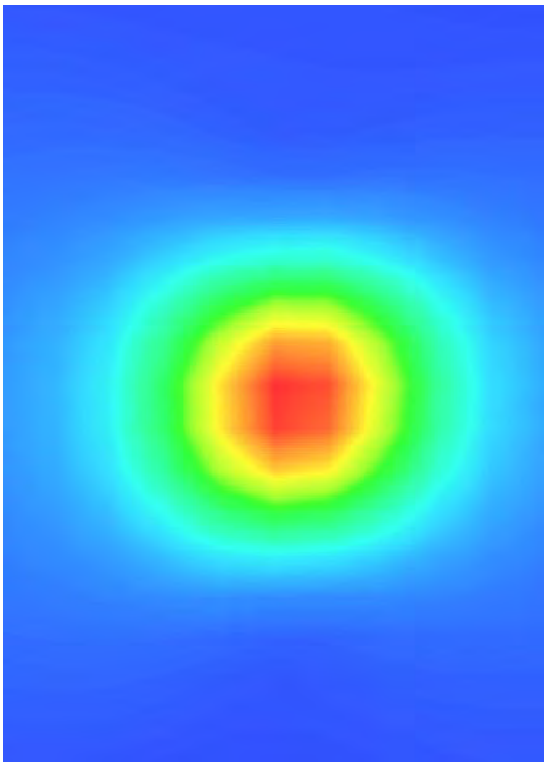
SURFACE SAR	VOLUME SAR
	

Maximum location: X=3.00, Y=1.00
SAR Peak: 9.48 W/kg

SAR 10g (W/Kg)	2.483244
SAR 1g (W/Kg)	5.358480

Z Axis Scan



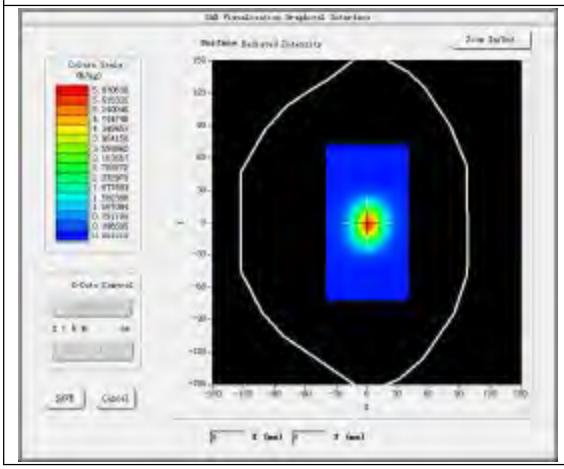
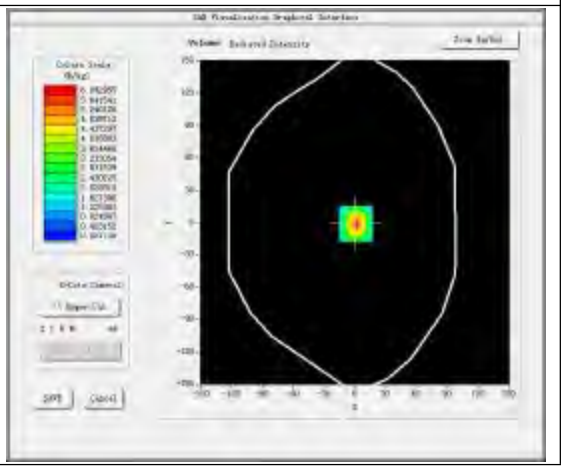
3D screen shot	Hot spot position
	

System Performance Check Data(2600MHz Body)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm
Date of measurement: 2015.08.29
Measurement duration: 12 minutes 38 seconds

Experimental conditions.

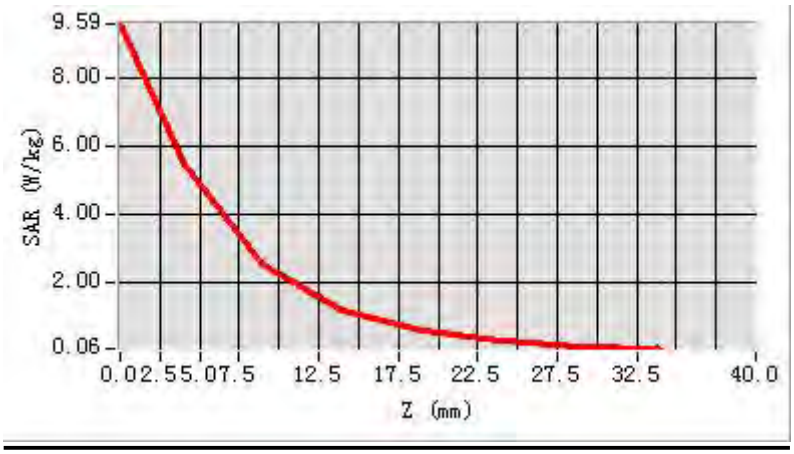
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	2600MHz
Channels	-
Signal	CW
Frequency (MHz)	2600.000000
Relative permittivity (real part)	50.480052
Relative permittivity	13.215236
Conductivity (S/m)	2.163262
Power drift (%)	-1.200000
Ambient Temperature:	22.6°C
Liquid Temperature:	22.1°C
ConvF:	26.66
Crest factor:	1:1

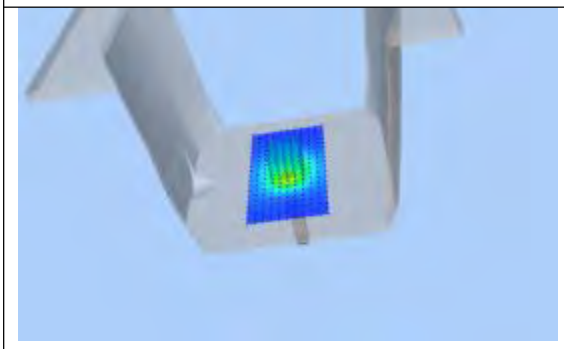
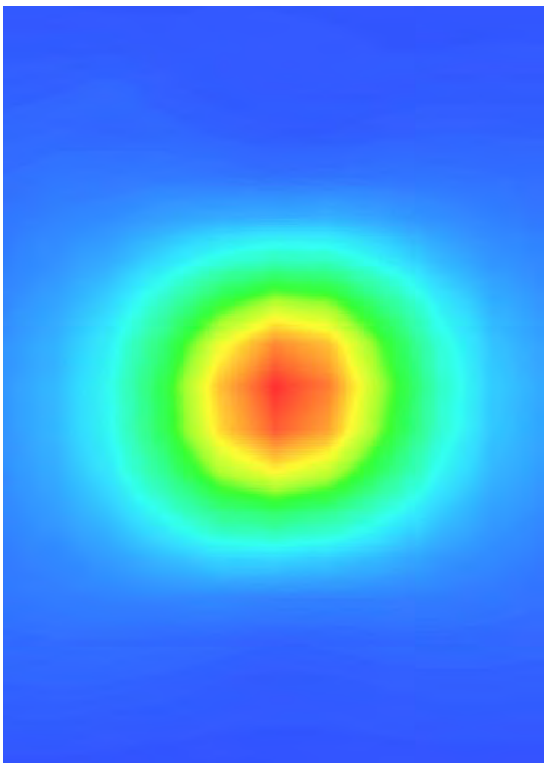
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=-1.00
SAR Peak: 9.52 W/kg

SAR 10g (W/Kg)	2.287846
SAR 1g (W/Kg)	5.786582

Z Axis Scan



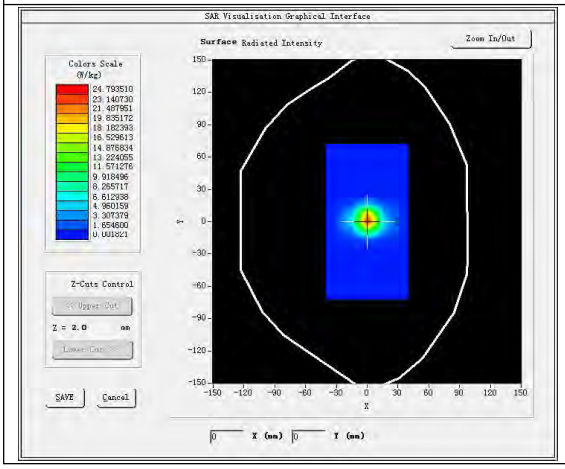
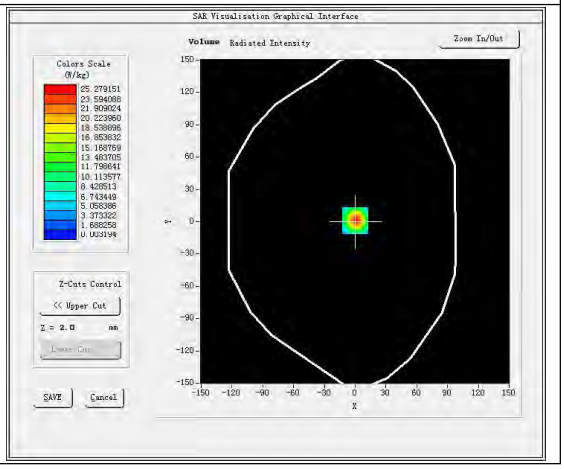
3D screen shot	Hot spot position
	

System Performance Check Data(5200MHz Head)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm
Date of measurement: 2015.08.31
Measurement duration: 13 minutes 20 seconds

Experimental conditions.

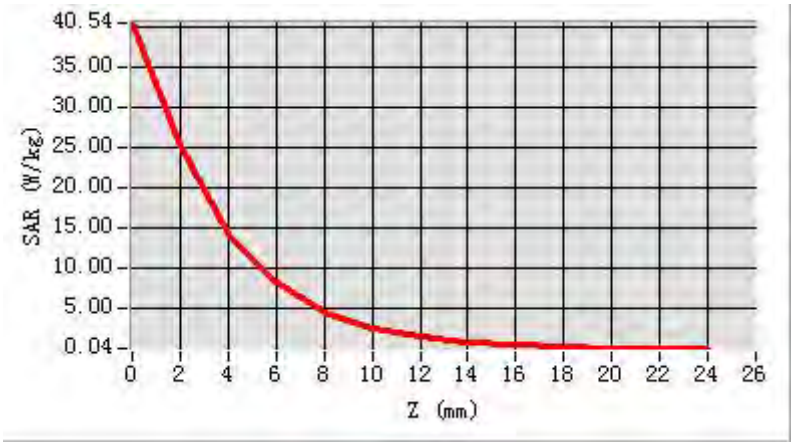
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	5200 MHz
Signal	CW
Frequency (MHz)	5200.000000
Relative permittivity (real part)	35.5786950
Relative permittivity	13.269150
Conductivity (S/m)	4.460256
Power drift (%)	1.570000
Ambient Temperature:	22.5°C
Liquid Temperature:	22.1°C
ConvF:	22.36
Crest factor:	1:1

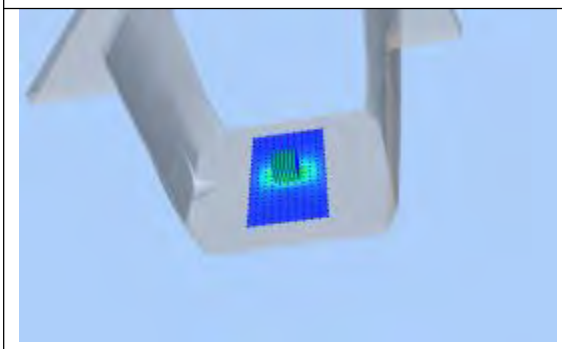
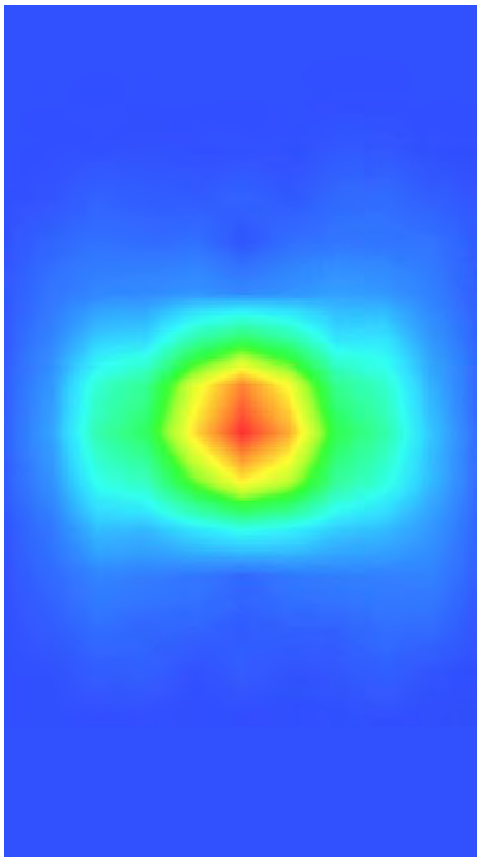
SURFACE SAR	VOLUME SAR
	

Maximum location: X=3.00, Y=1.00
SAR Peak: 40.54 W/kg

SAR 10g (W/Kg)	5.4933244
SAR 1g (W/Kg)	16.4545880

Z Axis Scan



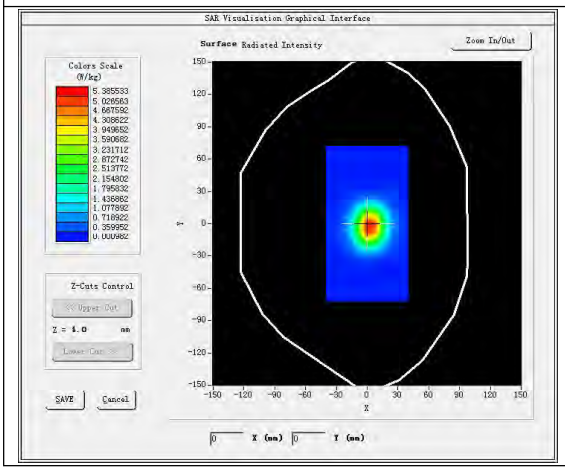
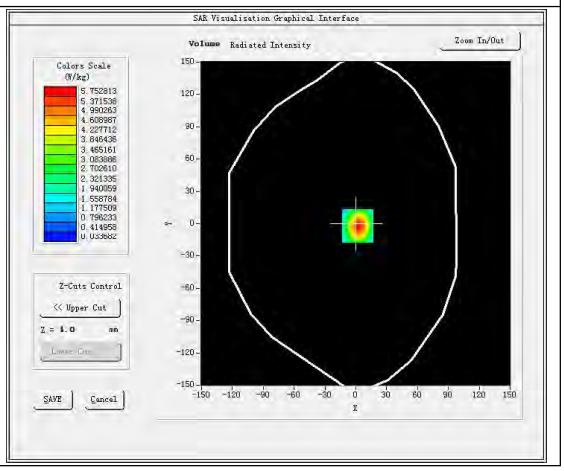
3D screen shot	Hot spot position
	

System Performance Check Data(5200MHz Body)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm
Date of measurement: 2015.08.31
Measurement duration: 13 minutes 20 seconds

Experimental conditions.

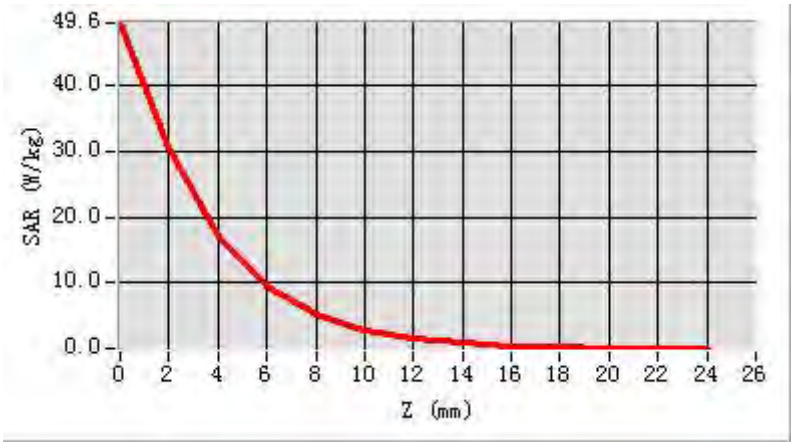
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	5200 MHz
Signal	CW
Frequency (MHz)	5200.000000
Relative permittivity (real part)	48.8001350
Relative permittivity	13.269150
Conductivity (S/m)	5.266079
Power drift (%)	2.130000
Ambient Temperature:	22.5°C
Liquid Temperature:	22.1°C
ConvF:	22.36
Crest factor:	1:1

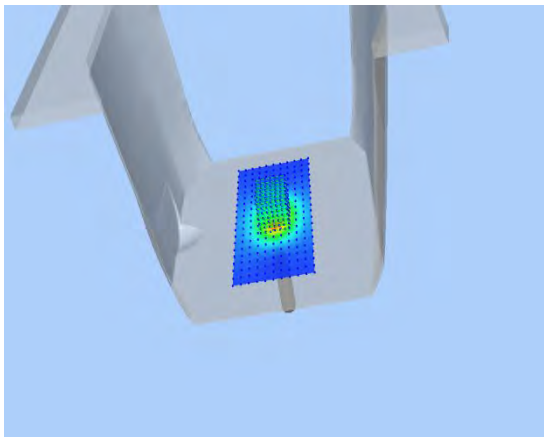
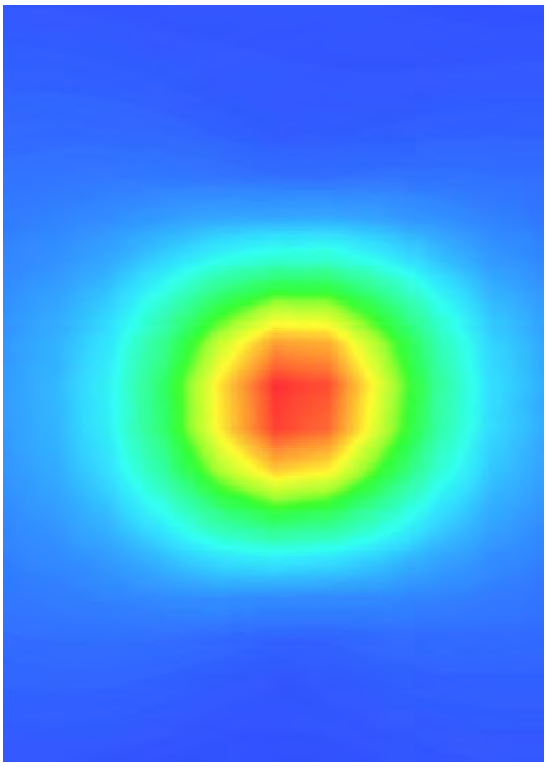
SURFACE SAR	VOLUME SAR
	

Maximum location: X=3.00, Y=1.00
SAR Peak: 49.60 W/kg

SAR 10g (W/Kg)	5.581754
SAR 1g (W/Kg)	16.392480

Z Axis Scan



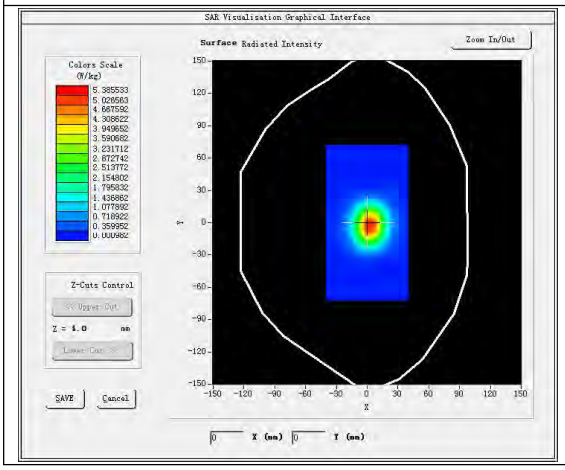
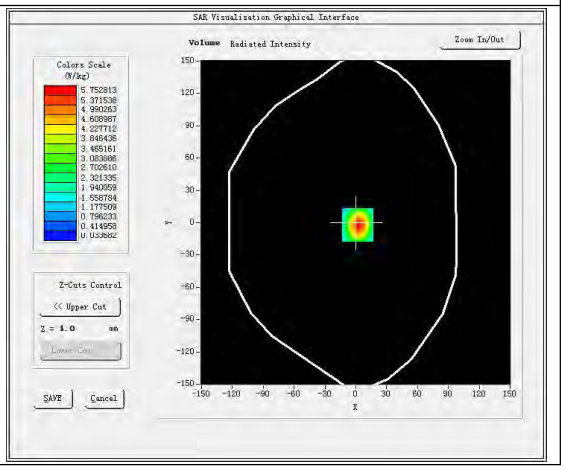
3D screen shot	Hot spot position
	

System Performance Check Data(5800MHz Head)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm
Date of measurement: 2015.09.02
Measurement duration: 29 minutes 32 seconds

Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	5800 MHz
Signal	CW
Frequency (MHz)	5800.000000
Relative permittivity (real part)	35.201623
Relative permittivity	11.066563
Conductivity (S/m)	5.192363
Power drift (%)	2.130000
Ambient Temperature:	22.5°C
Liquid Temperature:	22.1°C
E-Field	SN 27/14 SSE2 EPG 210
ConvF:	22.60
Crest factor:	1:1

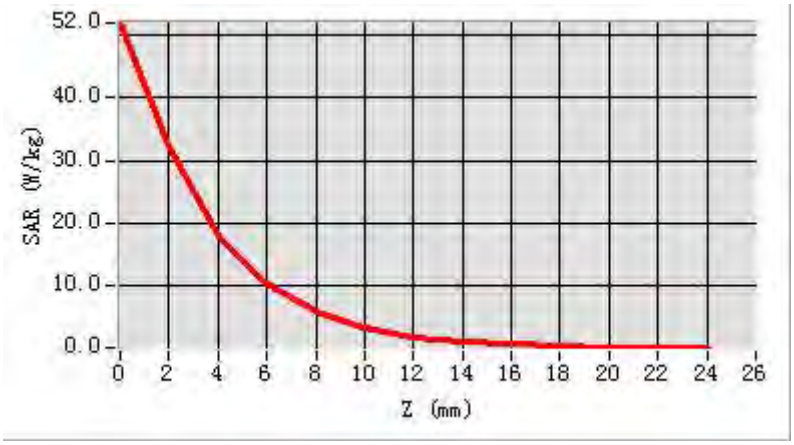
SURFACE SAR	VOLUME SAR
	

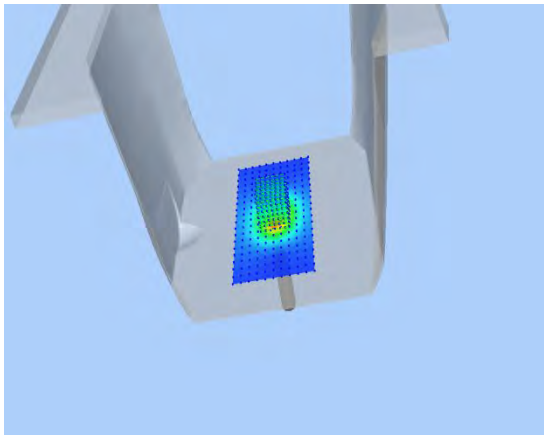
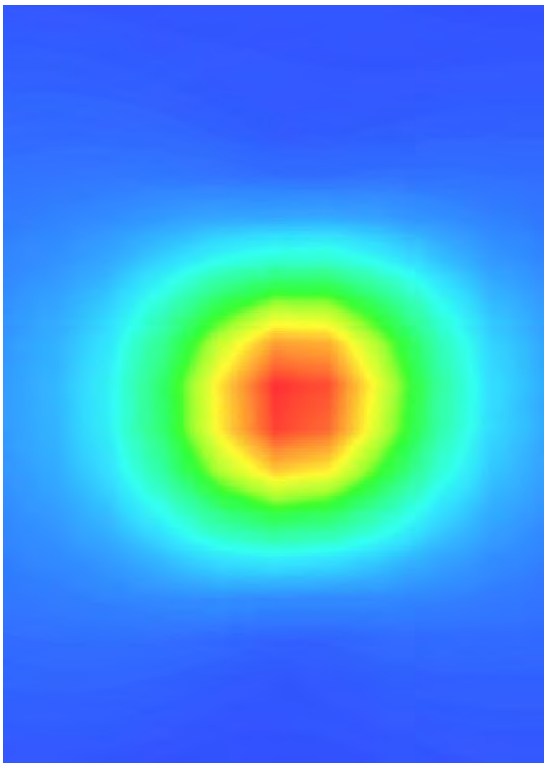
Maximum location: X=3.00, Y=1.00

SAR Peak: 52.0 W/kg

SAR 10g (W/Kg)	6.065365
SAR 1g (W/Kg)	16.978480

Z Axis Scan



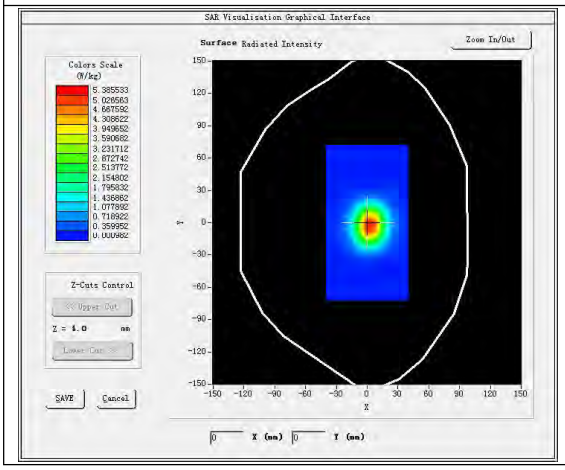
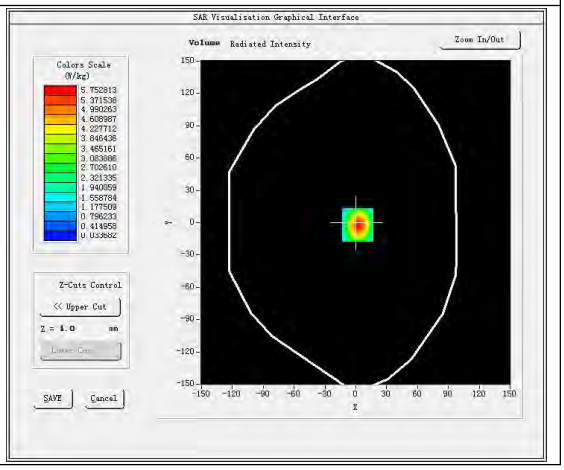
3D screen shot	Hot spot position
	

System Performance Check Data(5800MHz Body)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm
Date of measurement: 2015.09.06
Measurement duration: 29 minutes 32 seconds

Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	5800 MHz
Signal	CW
Frequency (MHz)	5800.000000
Relative permittivity (real part)	47.86950
Relative permittivity	13.269150
Conductivity (S/m)	5.95369
Power drift (%)	2.130000
Ambient Temperature:	22.5°C
Liquid Temperature:	22.1°C
E-Field	SN 27/14 SSE2 EPG 210
ConvF:	23.20
Crest factor:	1:1

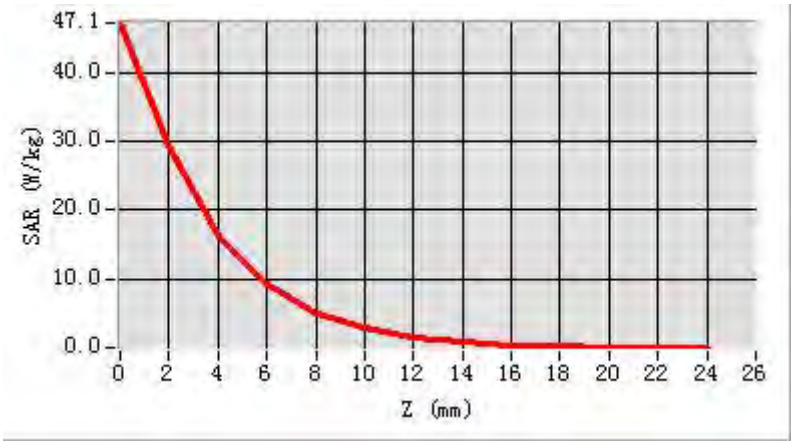
SURFACE SAR	VOLUME SAR
	

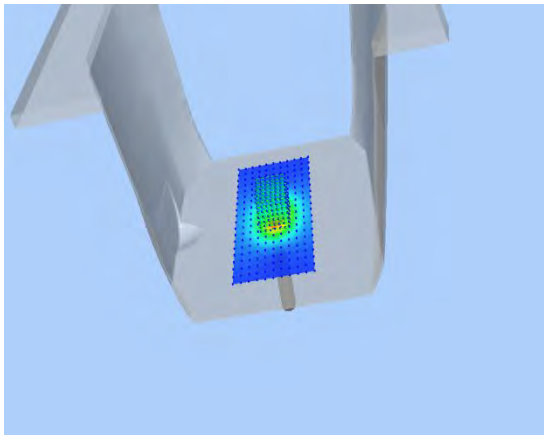
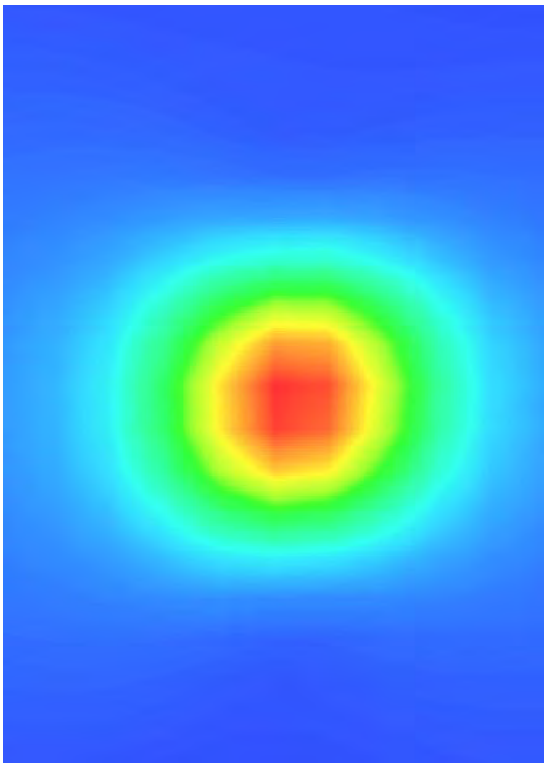
Maximum location: X=3.00, Y=1.00

SAR Peak: 47.10W/kg

SAR 10g (W/Kg)	6.356952
SAR 1g (W/Kg)	17.084802

Z Axis Scan



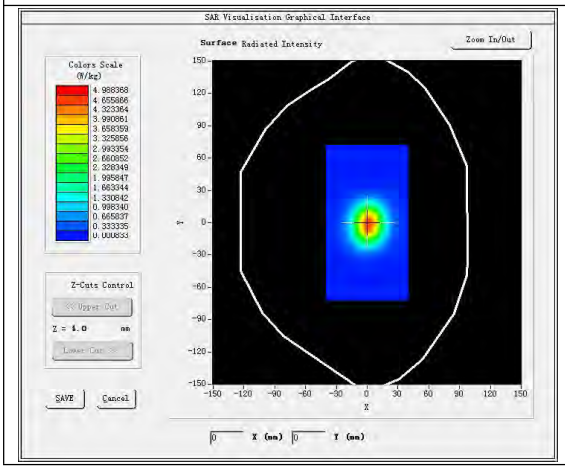
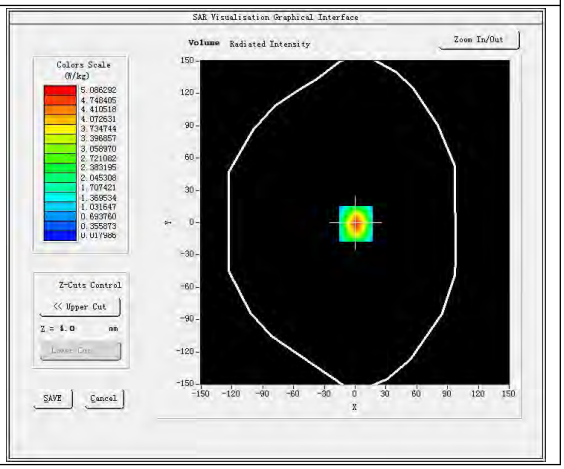
3D screen shot	Hot spot position
	

System Performance Check Data (2450MHz Head)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm
Date of measurement: 2015.09.25
Measurement duration: 12 minutes 43 seconds

Experimental conditions.

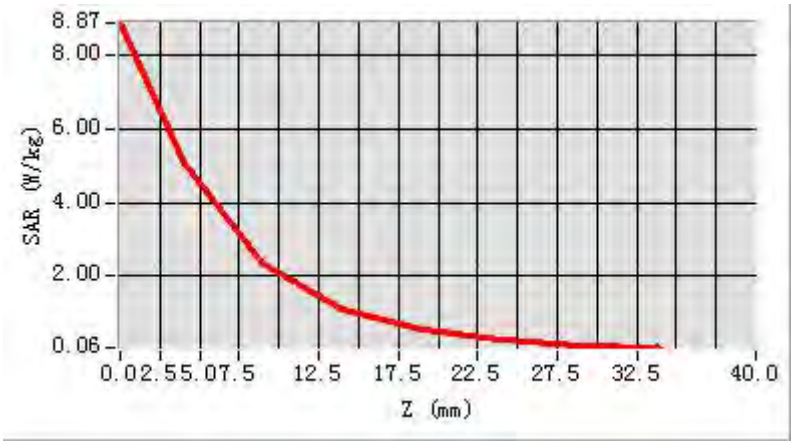
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	24500MHz
Channels	-
Signal	CW
Frequency (MHz)	2450.000000
Relative permittivity (real part)	38.770152
Relative permittivity	13.221264
Conductivity (S/m)	1.842623
Power drift (%)	-2.500000
Ambient Temperature:	22.6°C
Liquid Temperature:	22.2°C
ConvF:	25.25
Crest factor:	1:1

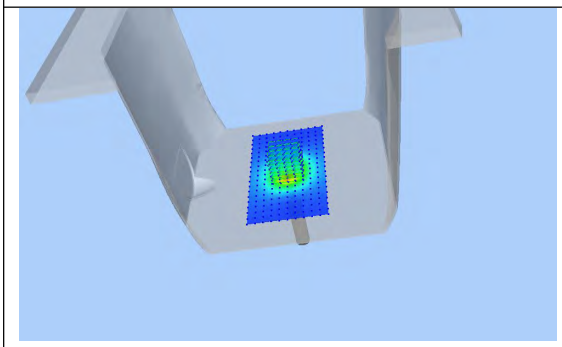
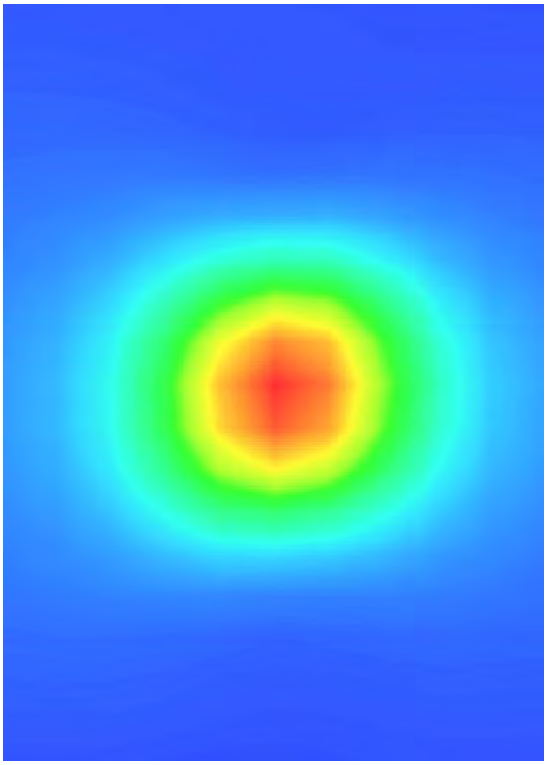
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=-1.00
SAR Peak: 8.75 W/kg

SAR 10g (W/Kg)	2.824122
SAR 1g (W/Kg)	5.141824

Z Axis Scan



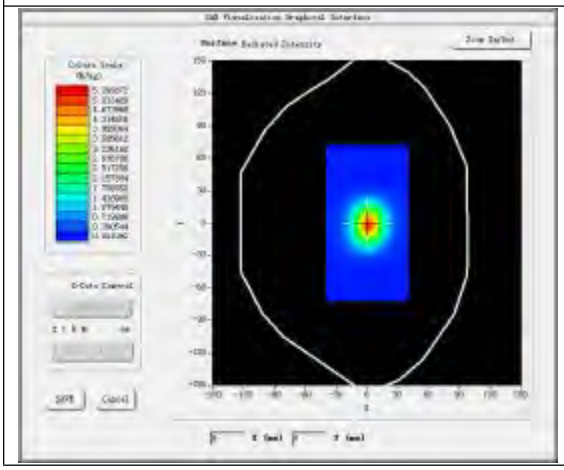
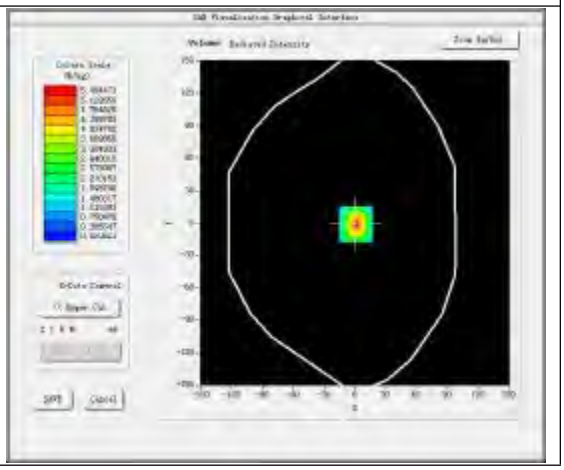
3D screen shot	Hot spot position
	

System Performance Check Data (2450MHz Body)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm
Date of measurement: 2015.09.25
Measurement duration: 13 minutes 26 seconds

Experimental conditions.

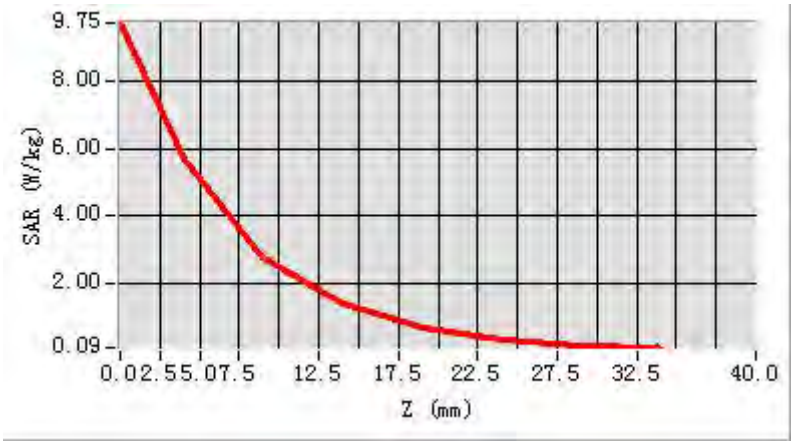
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	2450MHz
Channels	-
Signal	CW
Frequency (MHz)	2450.000000
Relative permittivity (real part)	51.246394
Relative permittivity	12.062555
Conductivity (S/m)	2.038644
Power drift (%)	0.150000
Ambient Temperature:	22.6°C
Liquid Temperature:	22.4°C
ConvF:	26.09
Crest factor:	1:1

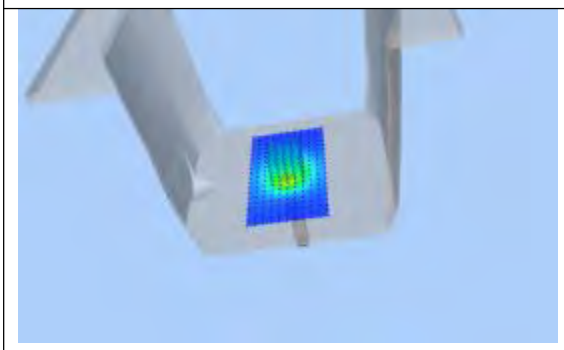
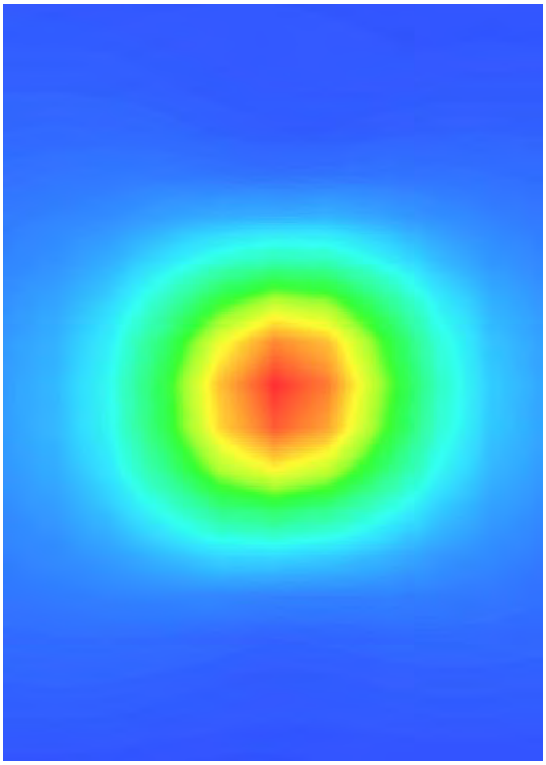
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=-1.00
SAR Peak: 8.69 W/kg

SAR 10g (W/Kg)	2.333312
SAR 1g (W/Kg)	5.443592

Z Axis Scan



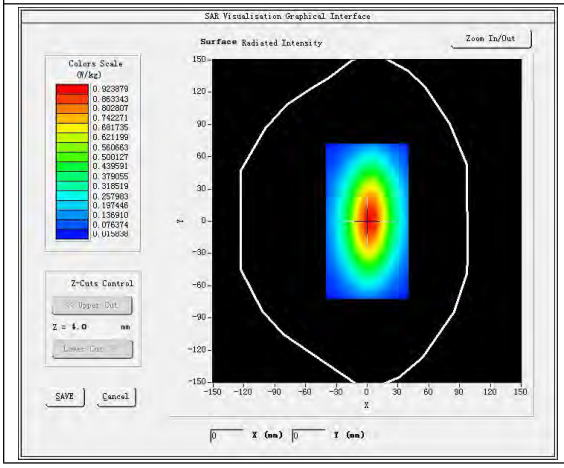
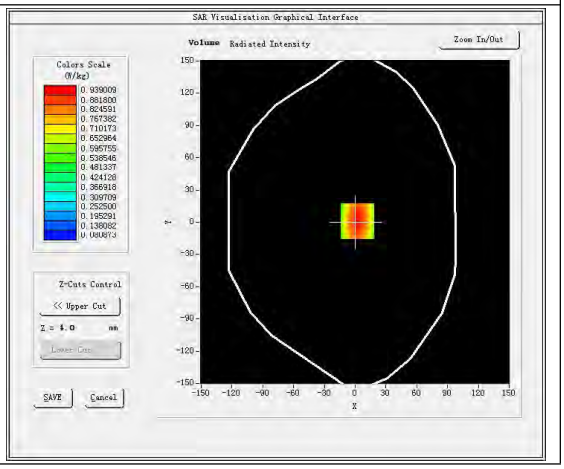
3D screen shot	Hot spot position
	

System Performance Check Data(835MHz Body)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.09.28
Measurement duration: 14 minutes 18 seconds

Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	835MHz
Channels	-
Signal	CW
Frequency (MHz)	835MHz
Relative permittivity (real part)	55.293562
Relative permittivity	21.132563
Conductivity (S/m)	1.0632525
Power drift (%)	0.120000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.2°C
ConvF:	24.58
Crest factor:	1:1

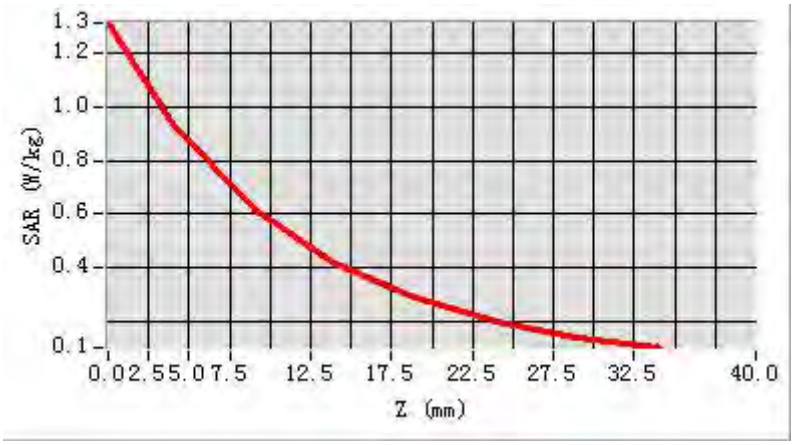
SURFACE SAR	VOLUME SAR
	

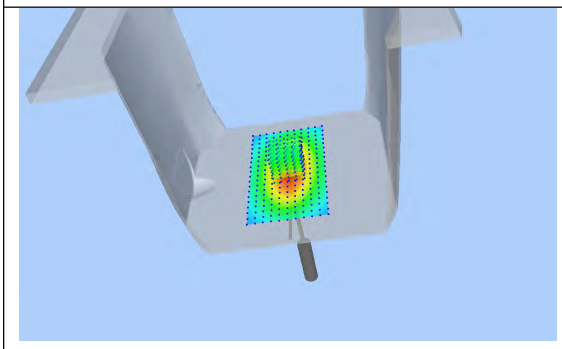
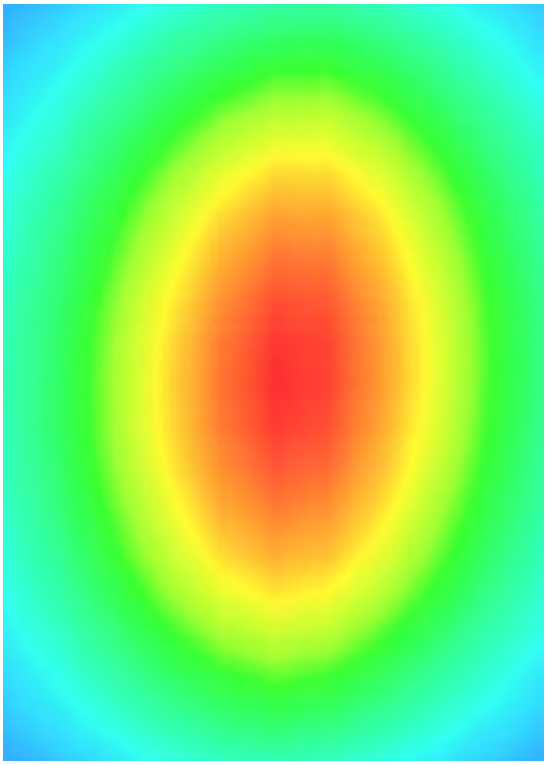
Maximum location: X=1.00, Y=0.00

SAR Peak: 1.31 W/kg

SAR 10g (W/Kg)	0.623563
SAR 1g (W/Kg)	0.998023

Z Axis Scan



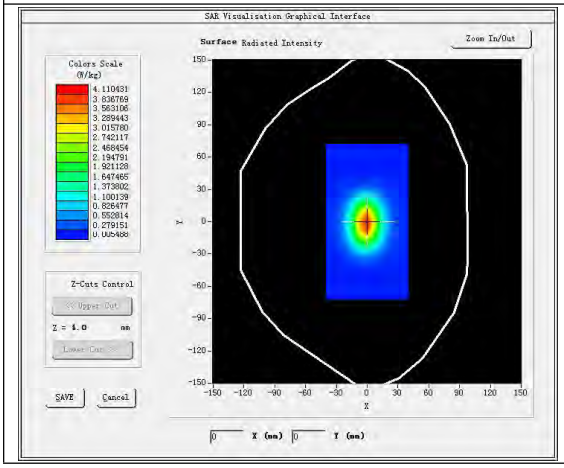
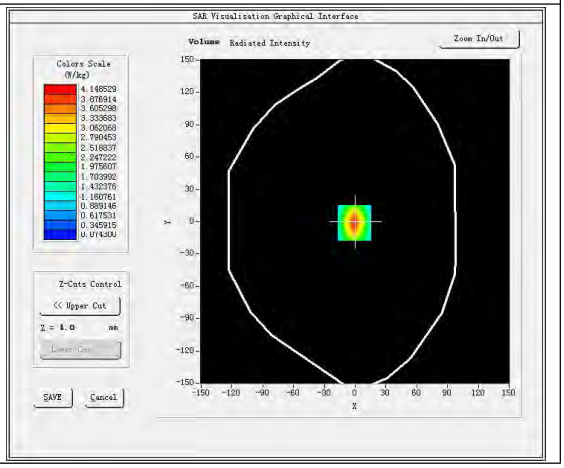
3D screen shot	Hot spot position
	

System Performance Check Data(1900MHz Body)

Type: Phone measurement (Complete)
E-Field Probe: SN 27/14 SSE2 EPG 210
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.09.28
Measurement duration: 14 minutes 53 seconds

Experimental conditions.

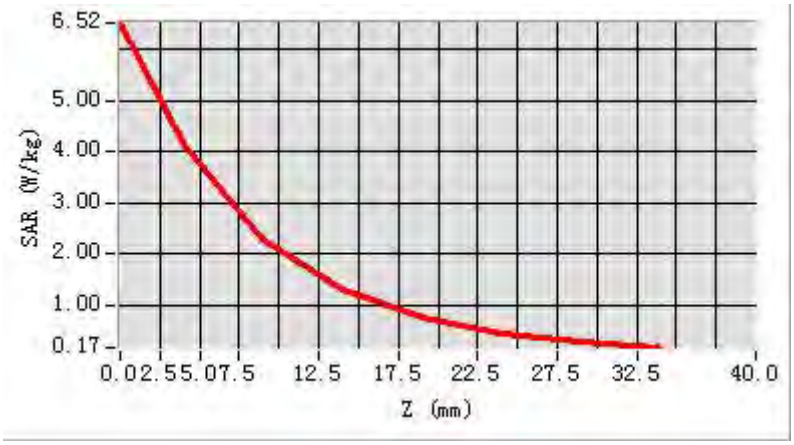
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	-
Band	1900MHz
Channels	-
Signal	CW
Frequency (MHz)	1900.000000
Relative permittivity (real part)	53.260000
Relative permittivity	12.682003
Conductivity (S/m)	1.482365
Power drift (%)	0.260000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.2°C
ConvF:	27.47
Crest factor:	1:1

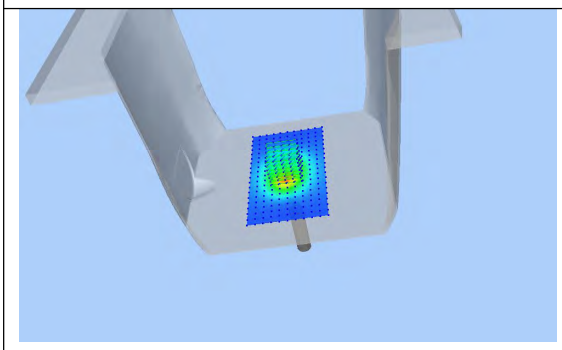
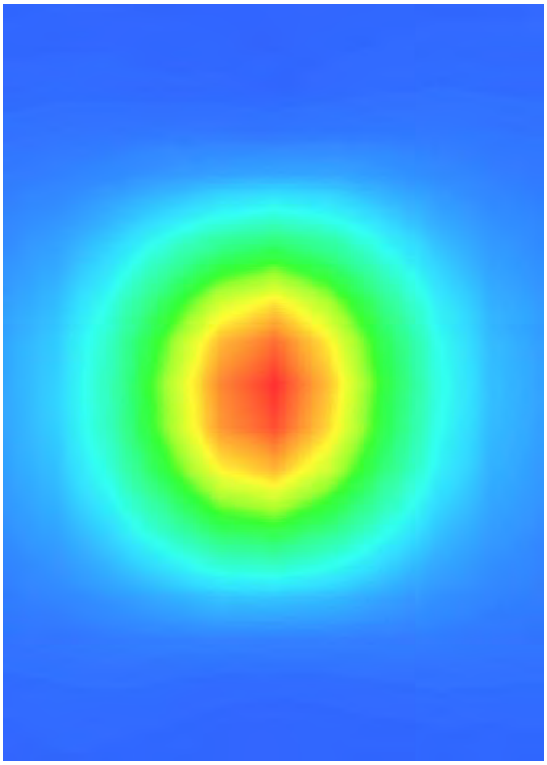
SURFACE SAR	VOLUME SAR
	

Maximum location: X=2.00, Y=-2.00
SAR Peak: 6.46 W/kg

SAR 10g (W/Kg)	1.963256
SAR 1g (W/Kg)	4.135136

Z Axis Scan



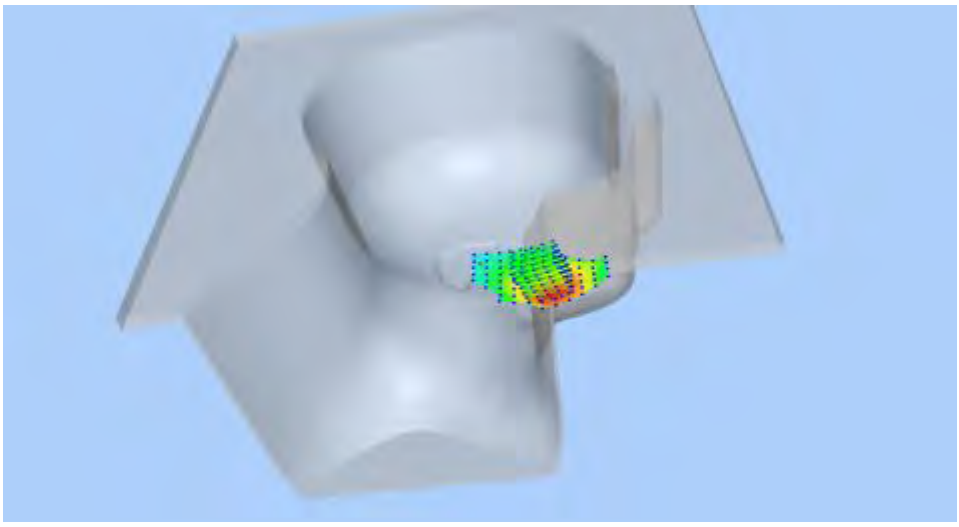
3D screen shot	Hot spot position
	

ANNEX C TEST DATA

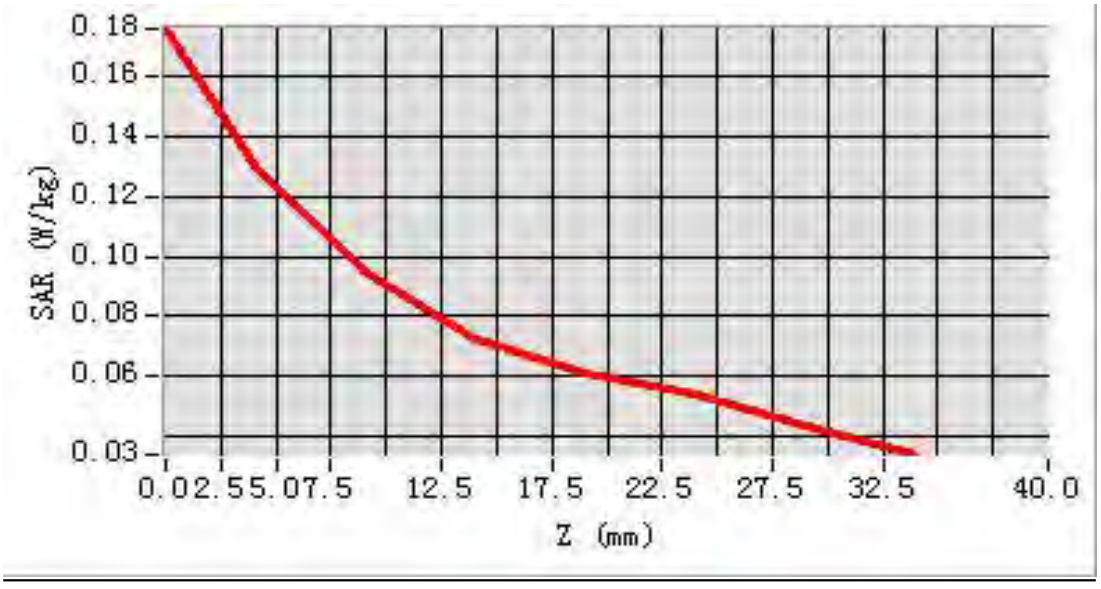
MEAS. 1 Left Head with Cheek on High Channel in GSM 850 mode

Test Date:	17/8/2015
Signal:	GSM, f=848.8 MHz, Duty Cycle: 1:8.3
Liquid Parameters:	Permittivity: 39.61; Conductivity: 0.98 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.67
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-56.000000, Y=-42.000000
SAR 10g (W/Kg):	0.090909
SAR 1g (W/Kg):	0.129334
Power drift (%):	-1.50

3D screen shot



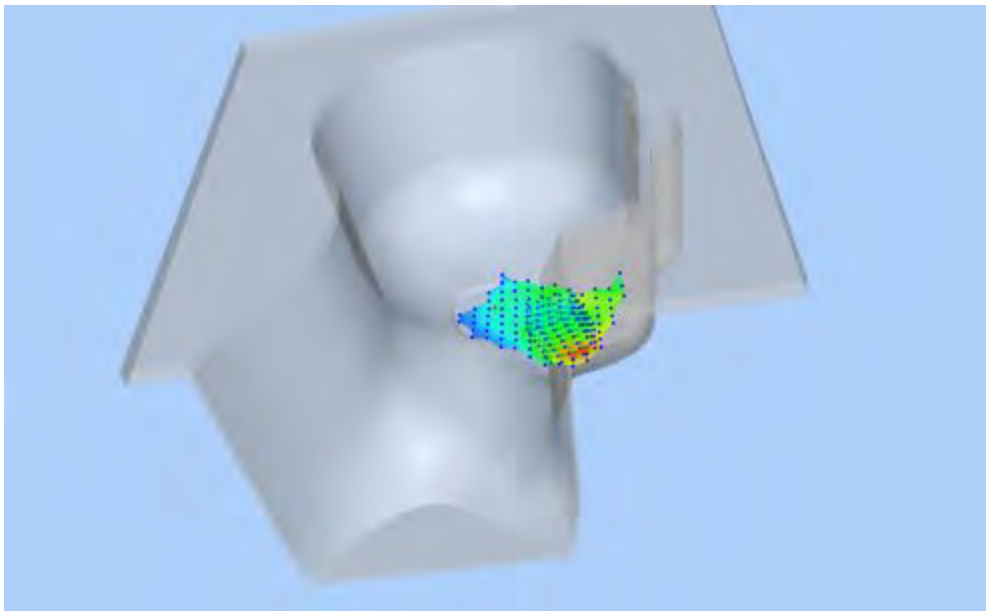
Z Axis Scan



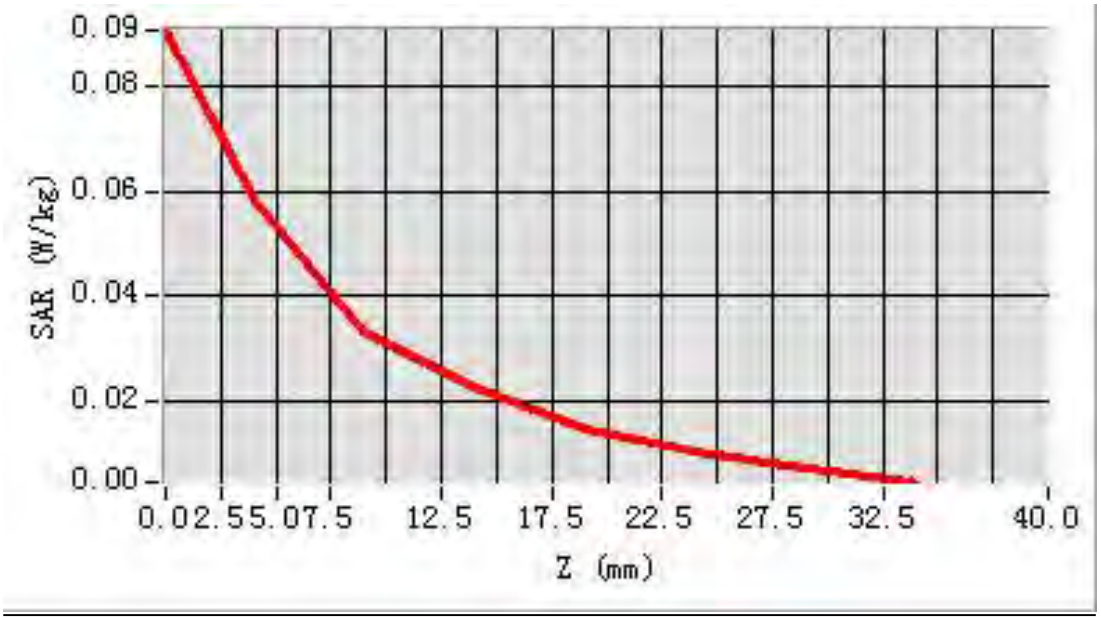
MEAS. 2 Left Head with Cheek on High Channel in GSM 1900 mode

Test Date:	22/8/2015
Signal:	GSM, f=1909.8 MHz, Duty Cycle: 1:8.3
Liquid Parameters:	Permittivity: 40.00; Conductivity: 1.40 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 26.70
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-56.000000, Y=-56.000000
SAR 10g (W/Kg):	0.031091
SAR 1g (W/Kg):	0.054844
Power drift (%):	-0.49

3D screen shot



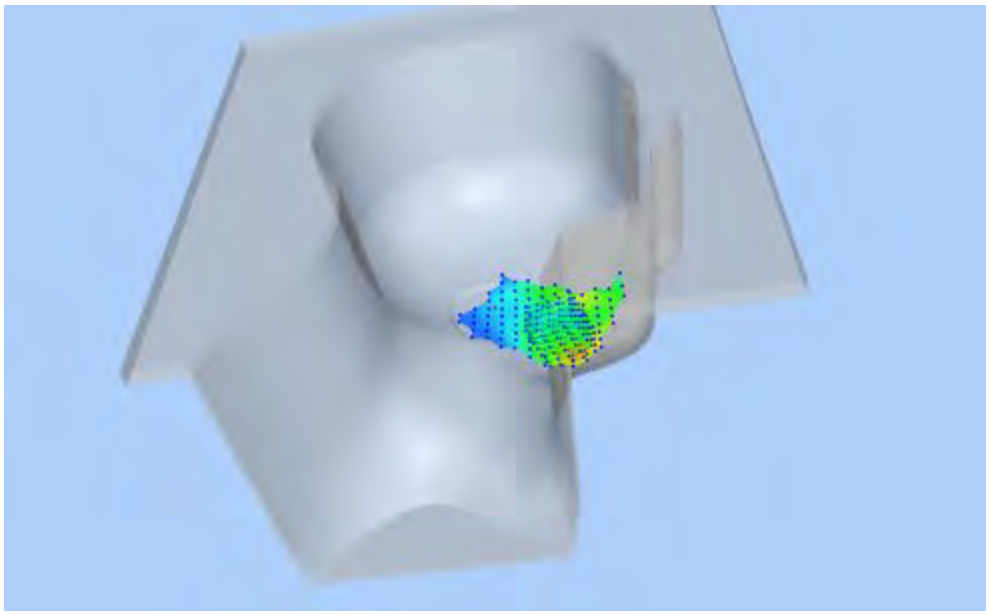
Z Axis Scan



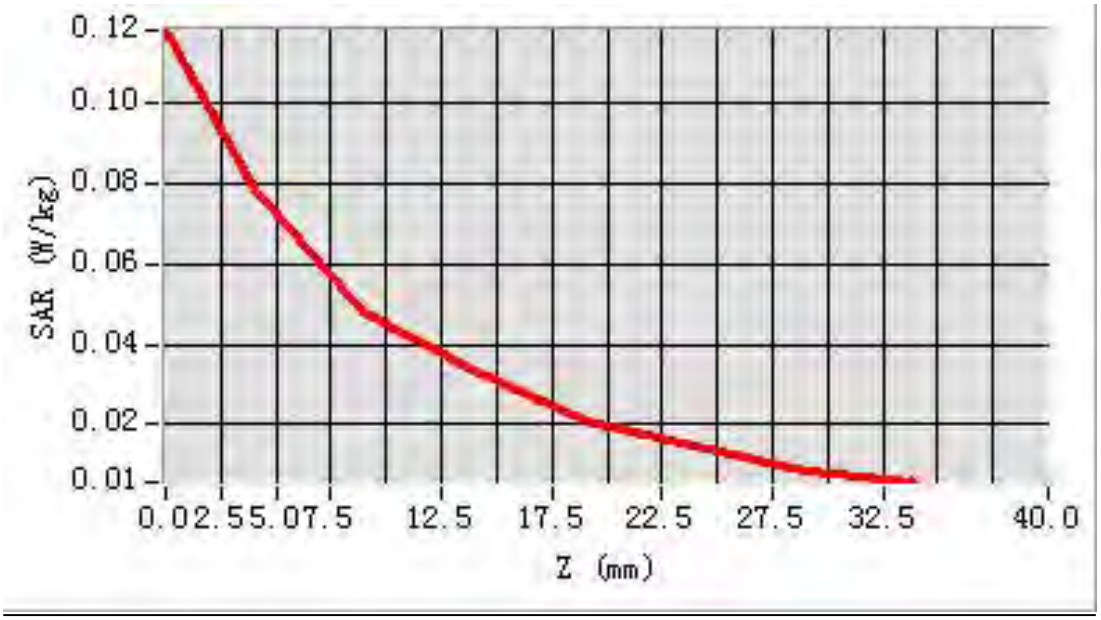
MEAS. 3 Left Head with Cheek on High Channel in WCDMA Band 2 mode

Test Date:	22/8/2015
Signal:	WCDMA, f=1907.6 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 40.00; Conductivity: 1.40 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 26.70
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-56.000000, Y=-66.000000
SAR 10g (W/Kg):	0.044022
SAR 1g (W/Kg):	0.075431
Power drift (%):	3.06

3D screen shot



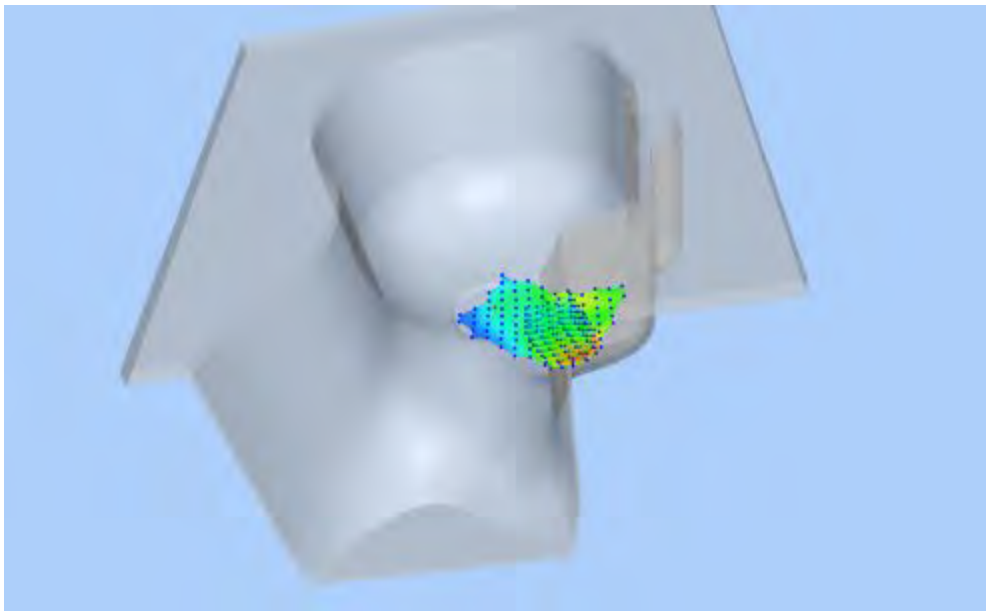
Z Axis Scan



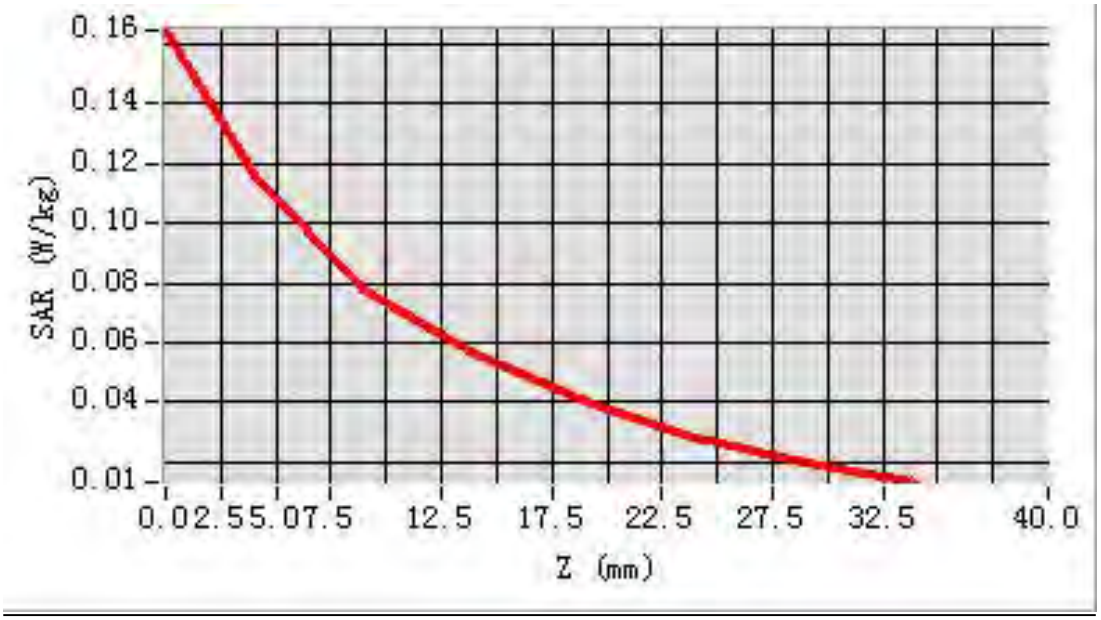
MEAS. 4 Left Head with Cheek on Middle Channel in WCDMA Band 4 mode

Test Date:	27/8/2015
Signal:	WCDMA, f=1732.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 40.12; Conductivity: 1.36 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.21
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-56.000000, Y=-66.000000
SAR 10g (W/Kg):	0.070613
SAR 1g (W/Kg):	0.112881
Power drift (%):	-1.29

3D screen shot



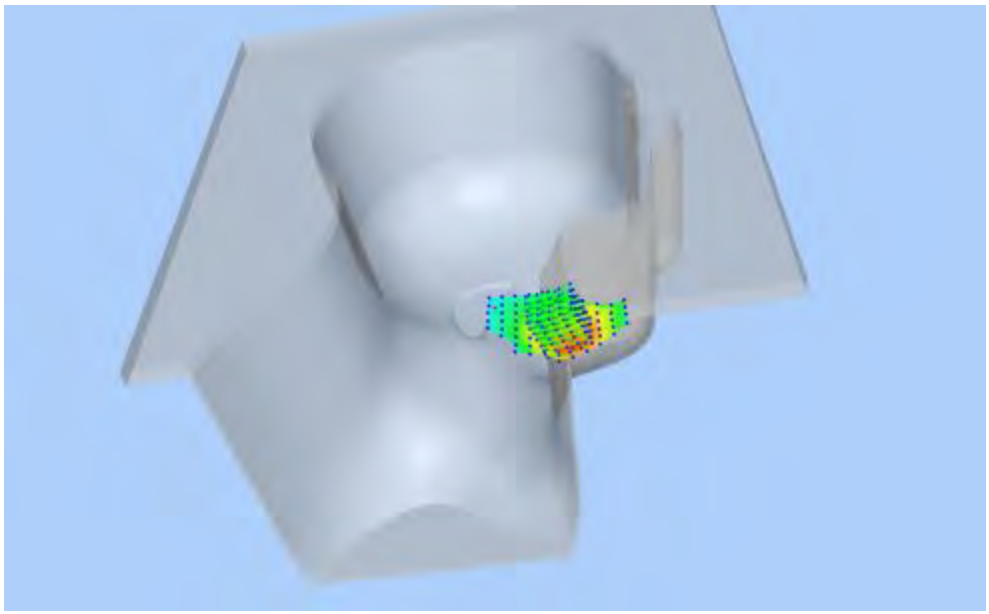
Z Axis Scan



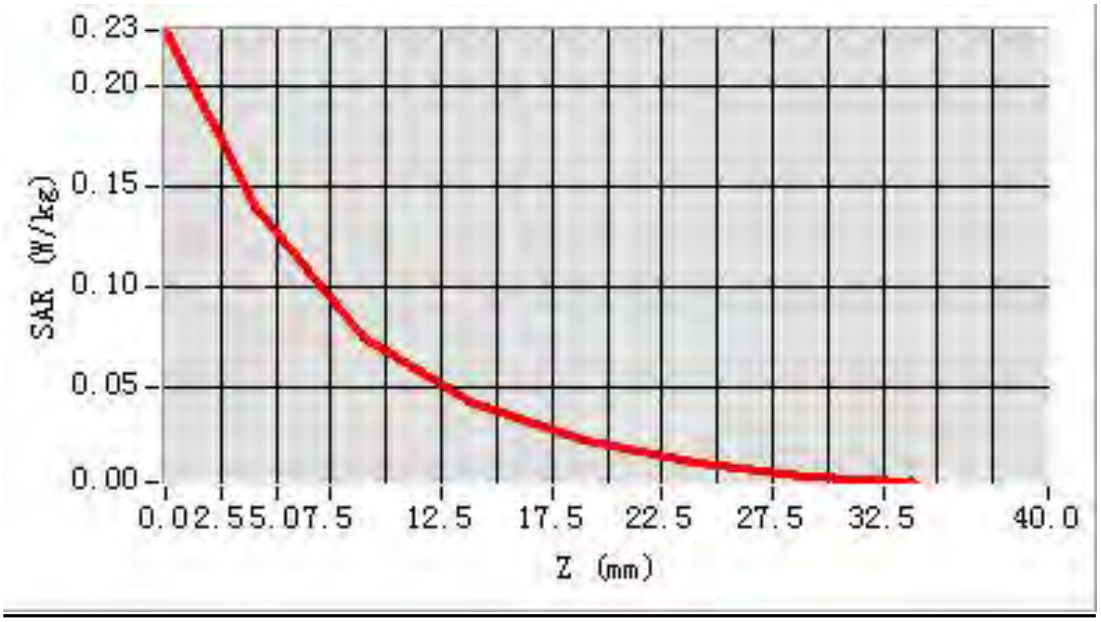
MEAS. 5 Left Head with Cheek on High Channel in WCDMA Band 5 mode

Test Date:	19/8/2015
Signal:	WCDMA, f=846.6 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 41.05; Conductivity: 0.91 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.67
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-56.000000, Y=-52.000000
SAR 10g (W/Kg):	0.102136
SAR 1g (W/Kg):	0.145026
Power drift (%):	-1.17

3D screen shot



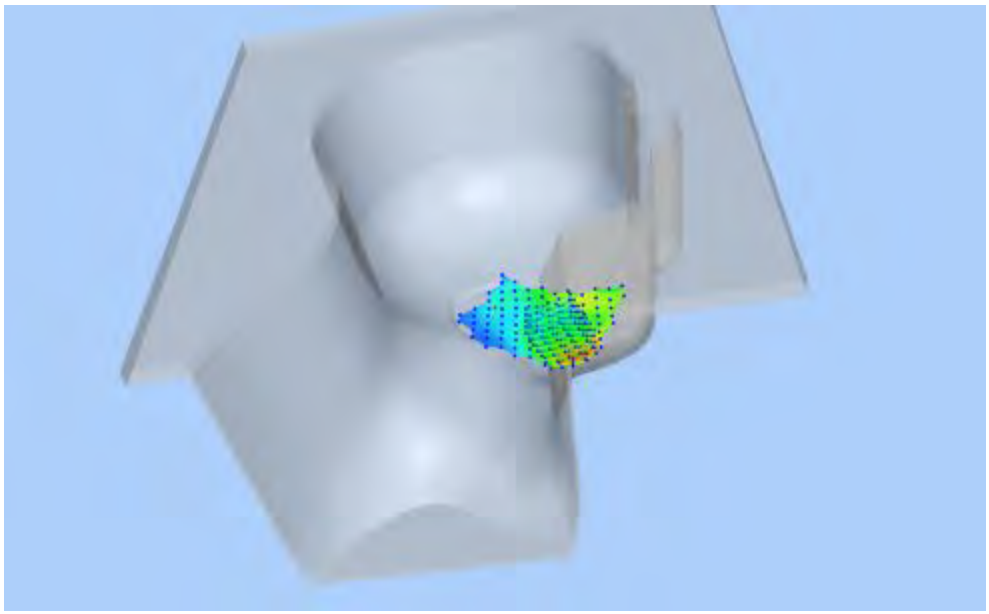
Z Axis Scan



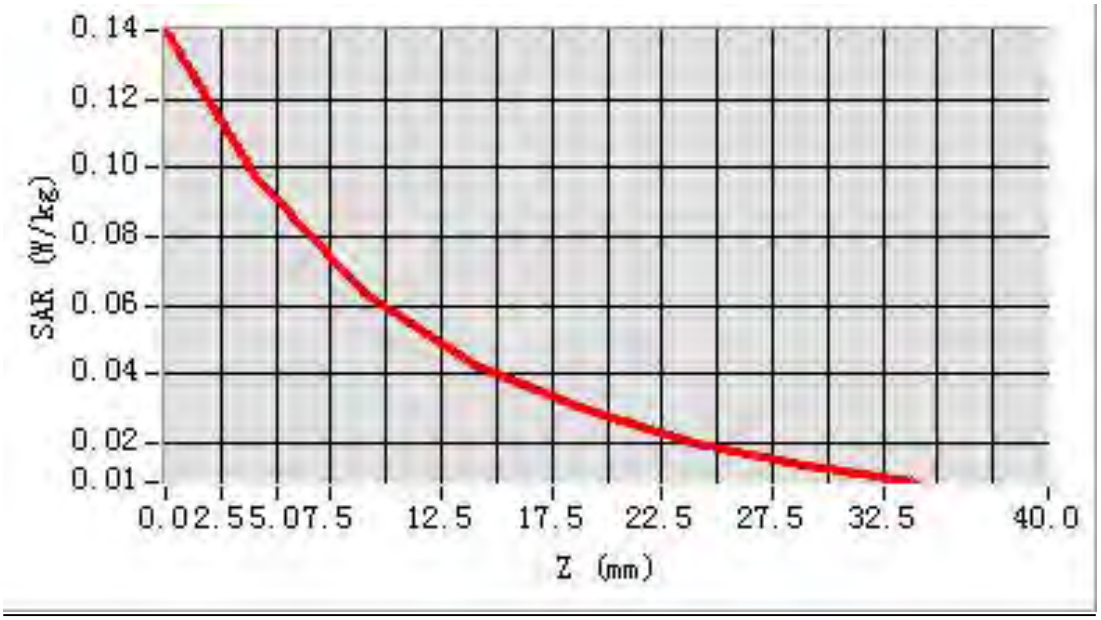
MEAS. 6 Left Head with Cheek on Low Channel in LTE Band 2 1RB mode

Test Date:	22/8/2015
Signal:	LTE, f=1850.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 40.00; Conductivity: 1.40 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 26.70
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-56.000000, Y=-66.000000
SAR 10g (W/Kg):	0.056588
SAR 1g (W/Kg):	0.093772
Power drift (%):	1.70

3D screen shot



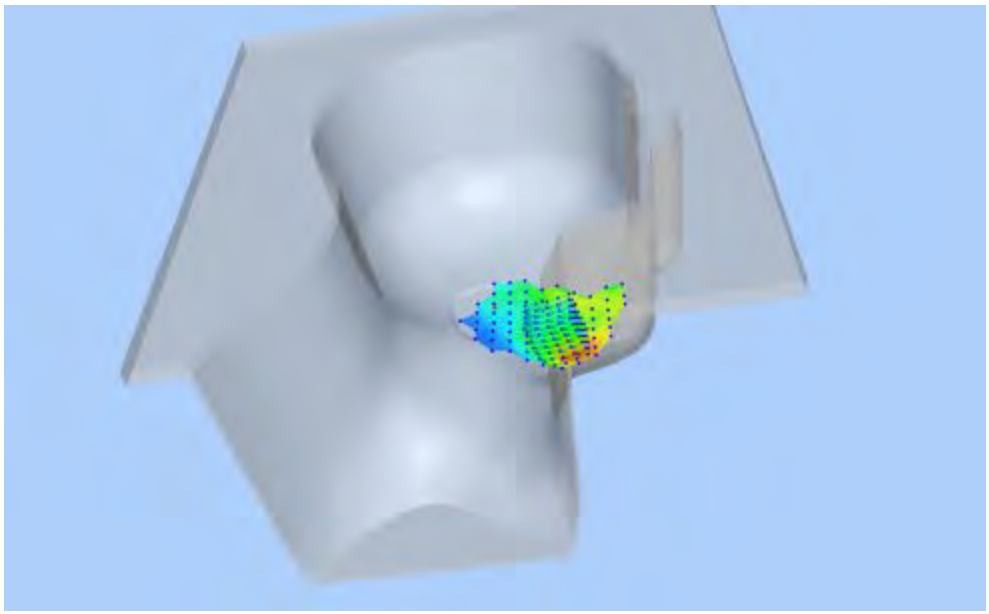
Z Axis Scan



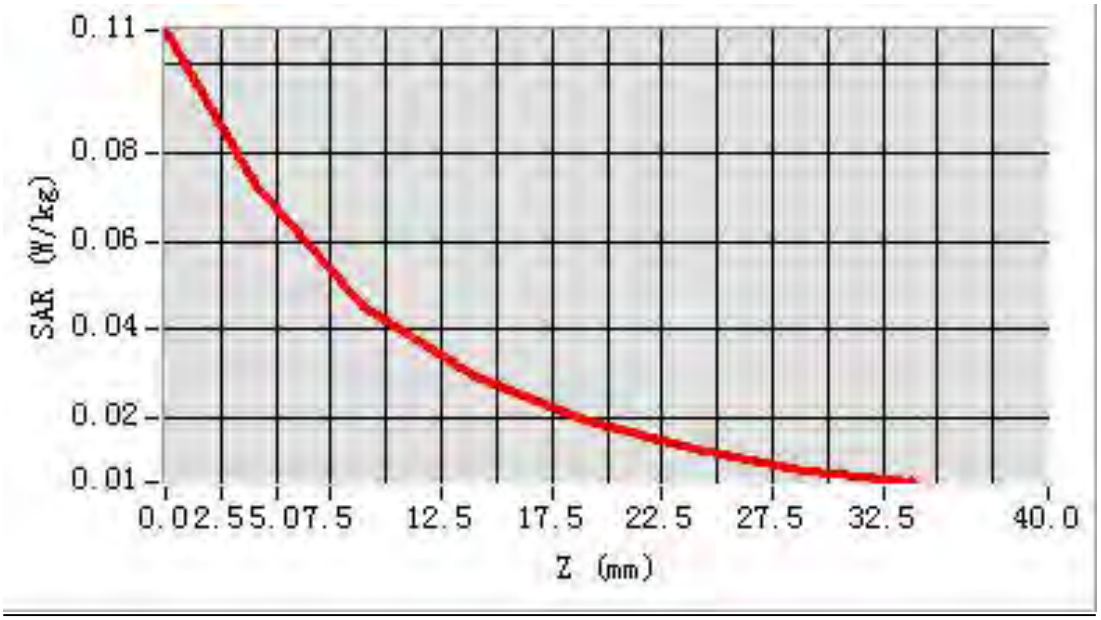
MEAS. 7 Left Head with Cheek on Low Channel in LTE Band 2 50RB mode

Test Date:	22/8/2015
Signal:	LTE, f=1850.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 40.00; Conductivity: 1.40 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 26.70
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-48.000000, Y=-60.000000
SAR 10g (W/Kg):	0.040879
SAR 1g (W/Kg):	0.069854
Power drift (%):	-2.41

3D screen shot



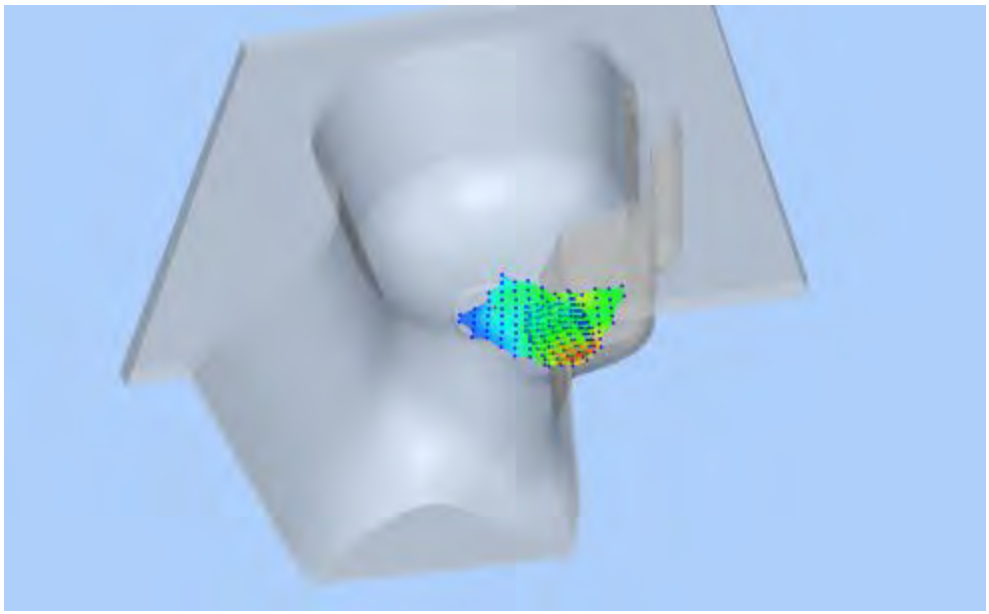
Z Axis Scan



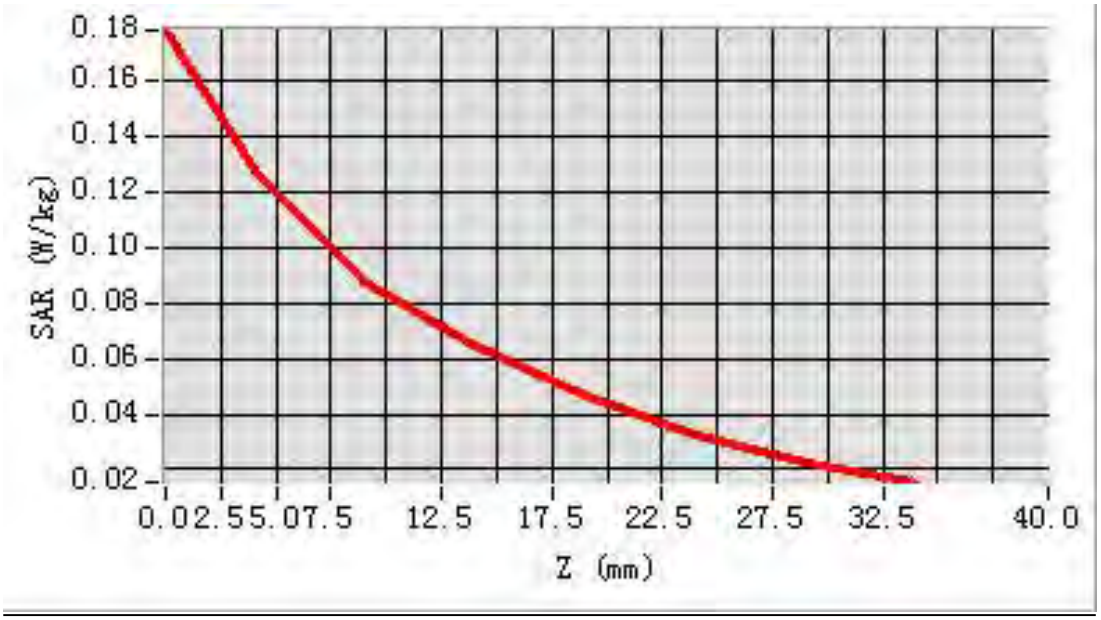
MEAS. 8 Left Head with Cheek on Low Channel in LTE Band 4 1RB mode

Test Date:	27/8/2015
Signal:	LTE, f=1710.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 40.14; Conductivity: 1.35 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.21
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-56.000000, Y=-66.000000
SAR 10g (W/Kg):	0.078565
SAR 1g (W/Kg):	0.123901
Power drift (%):	-0.14

3D screen shot



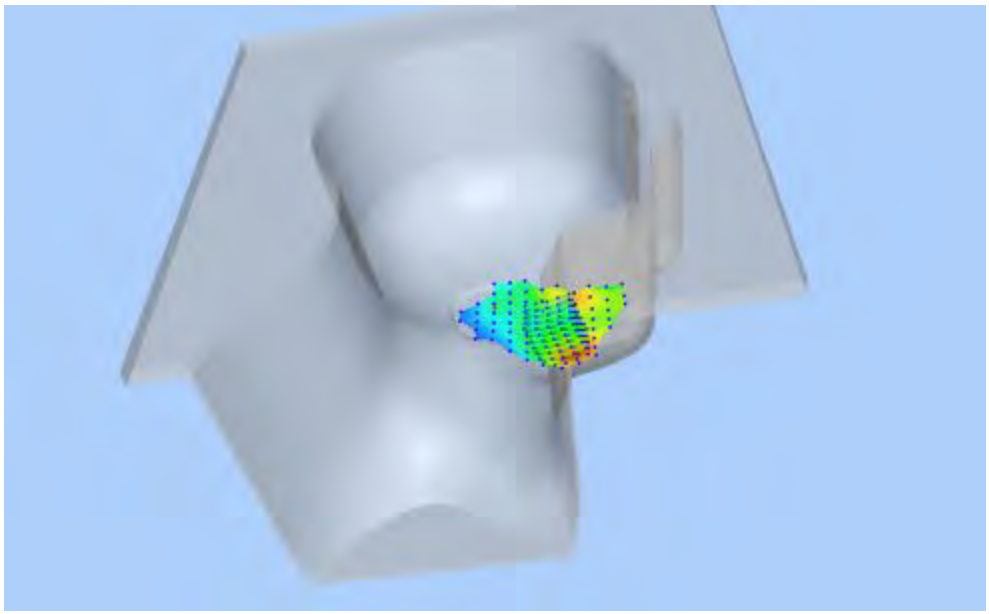
Z Axis Scan



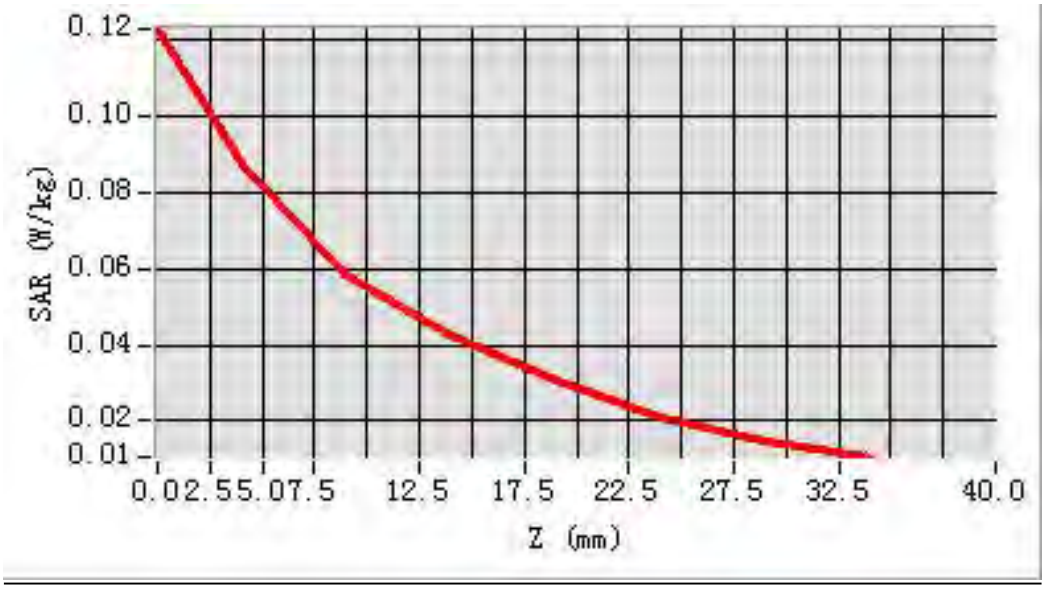
MEAS. 9 Left Head with Cheek on Low Channel in LTE Band 4 50RB mode

Test Date:	27/8/2015
Signal:	LTE, f=1710.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 40.14; Conductivity: 1.35 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.21
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-48.000000, Y=-60.000000
SAR 10g (W/Kg):	0.053159
SAR 1g (W/Kg):	0.084539
Power drift (%):	-0.14

3D screen shot



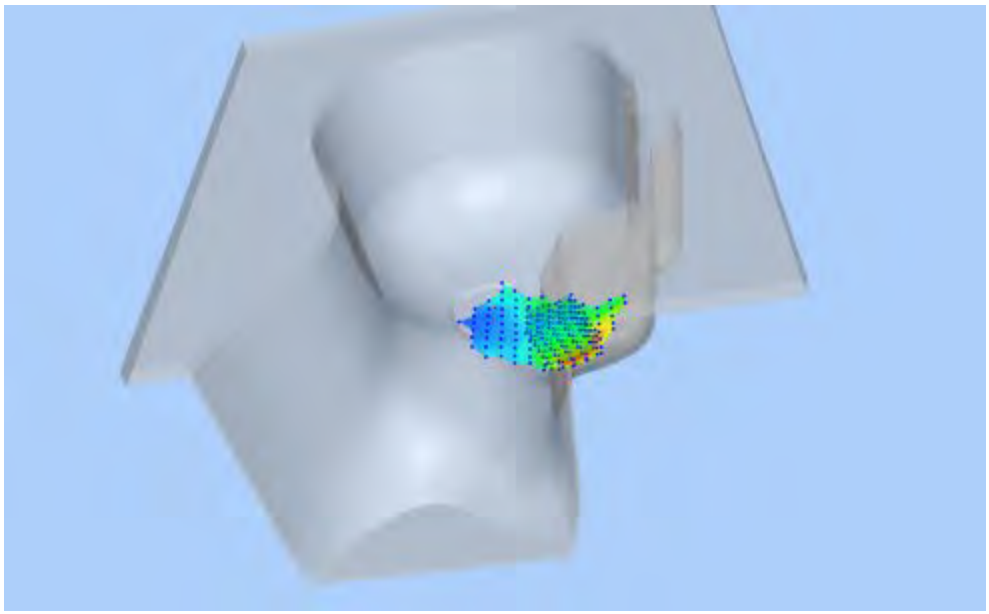
Z Axis Scan



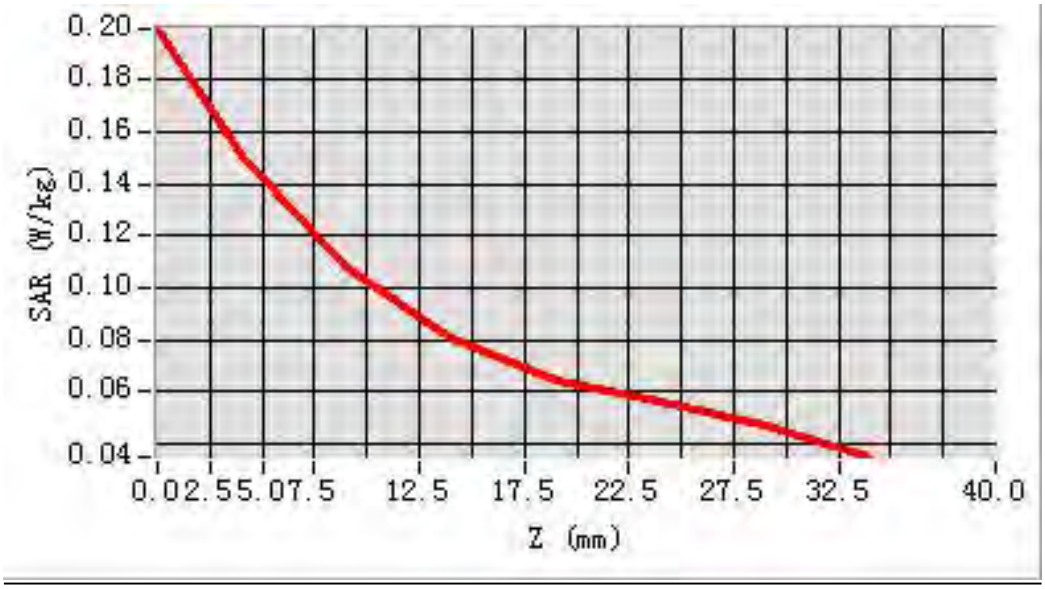
MEAS. 10 Left Head with Cheek on Low Channel in LTE Band 7 1RB mode

Test Date:	28/8/2015
Signal:	LTE, f=2500.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 39.13; Conductivity: 1.85 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 25.25
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-56.000000, Y=-66.000000
SAR 10g (W/Kg):	0.070184
SAR 1g (W/Kg):	0.132076
Power drift (%):	-1.53

3D screen shot



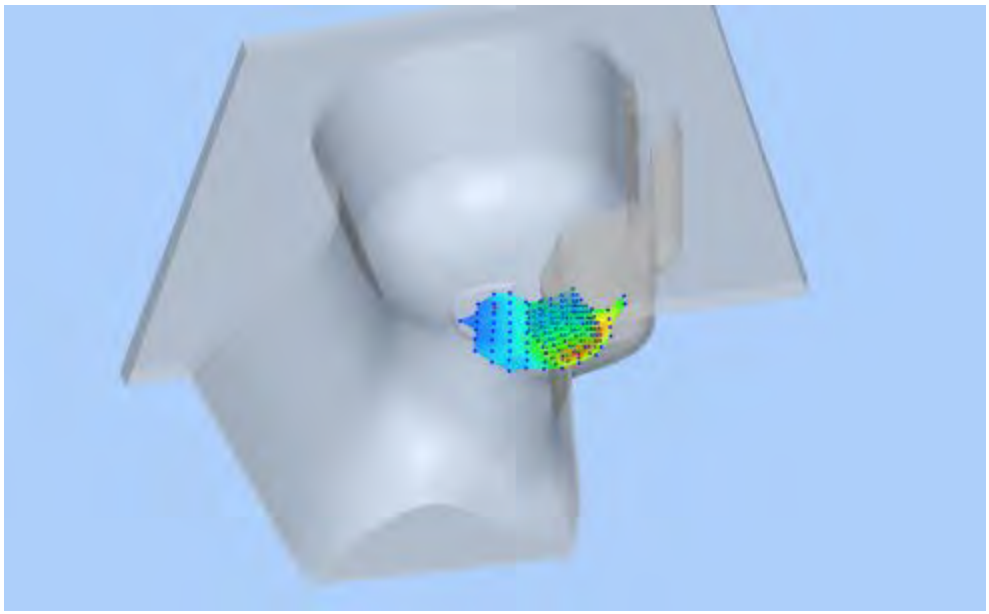
Z Axis Scan



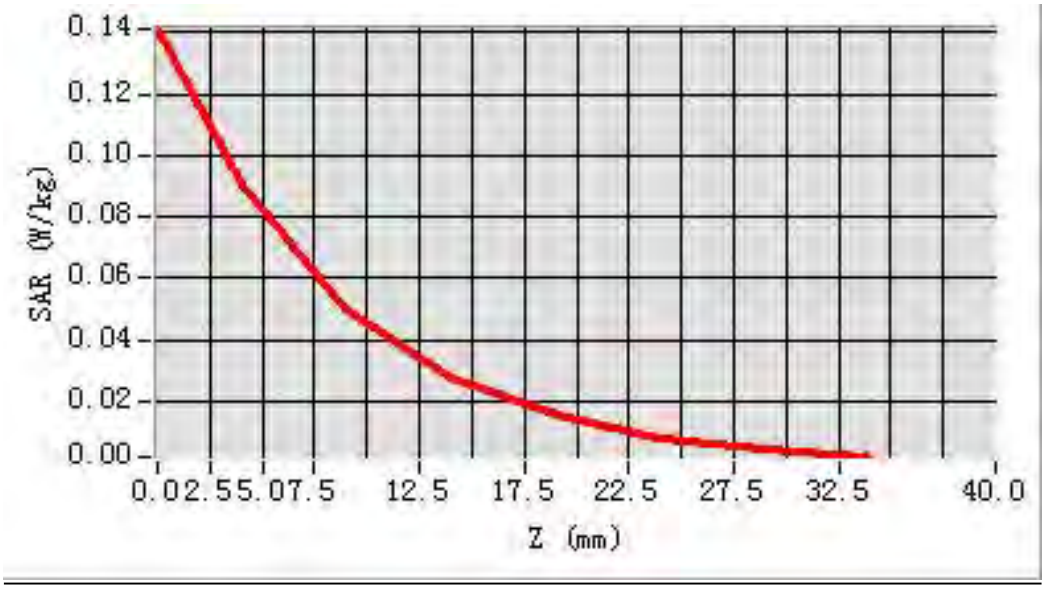
MEAS. 11 Left Head with Cheek on Low Channel in LTE Band 7 50RB mode

Test Date:	28/8/2015
Signal:	LTE, f=2500.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 39.13; Conductivity: 1.85 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 25.25
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-60.000000, Y=-60.000000
SAR 10g (W/Kg):	0.047503
SAR 1g (W/Kg):	0.087047
Power drift (%):	0.29

3D screen shot



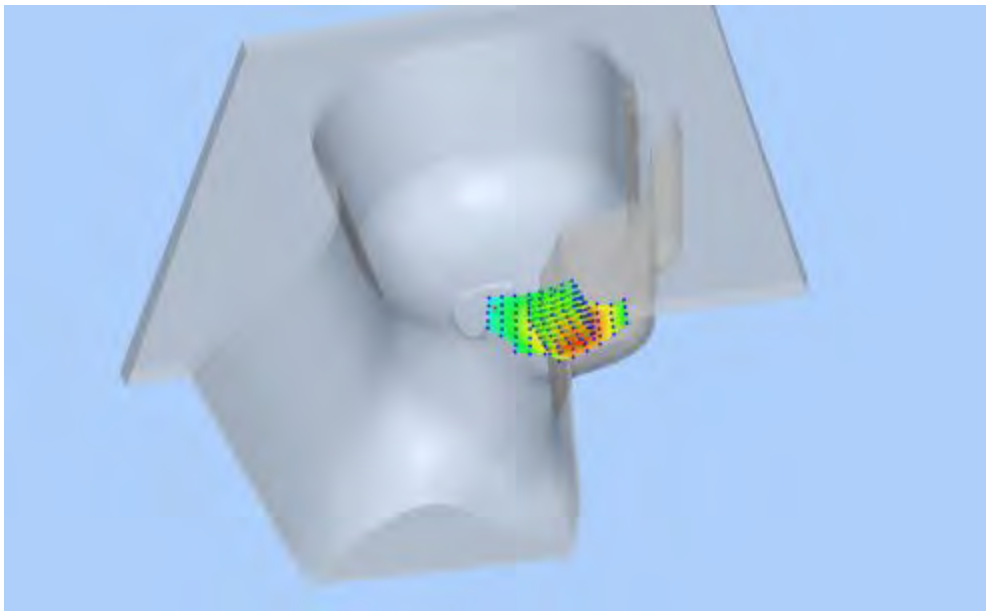
Z Axis Scan



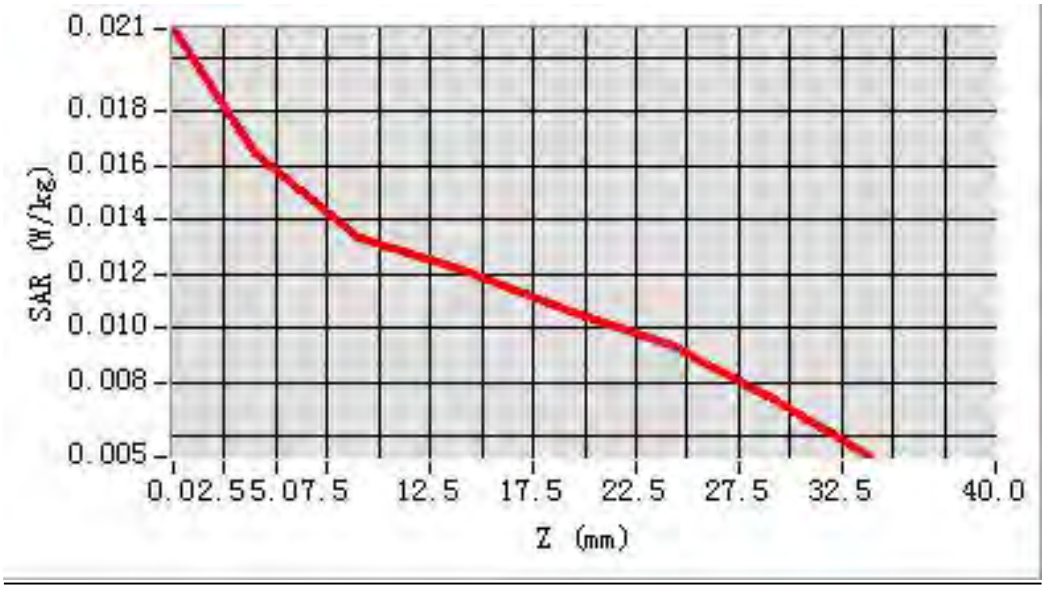
MEAS. 12 Left Head with Cheek on Low Channel in LTE Band 17 1RB mode

Test Date:	17/8/2015
Signal:	LTE, f=704.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 42.15; Conductivity: 0.92 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 22.51
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-56.000000, Y=-42.000000
SAR 10g (W/Kg):	0.013436
SAR 1g (W/Kg):	0.017057
Power drift (%):	-1.09

3D screen shot



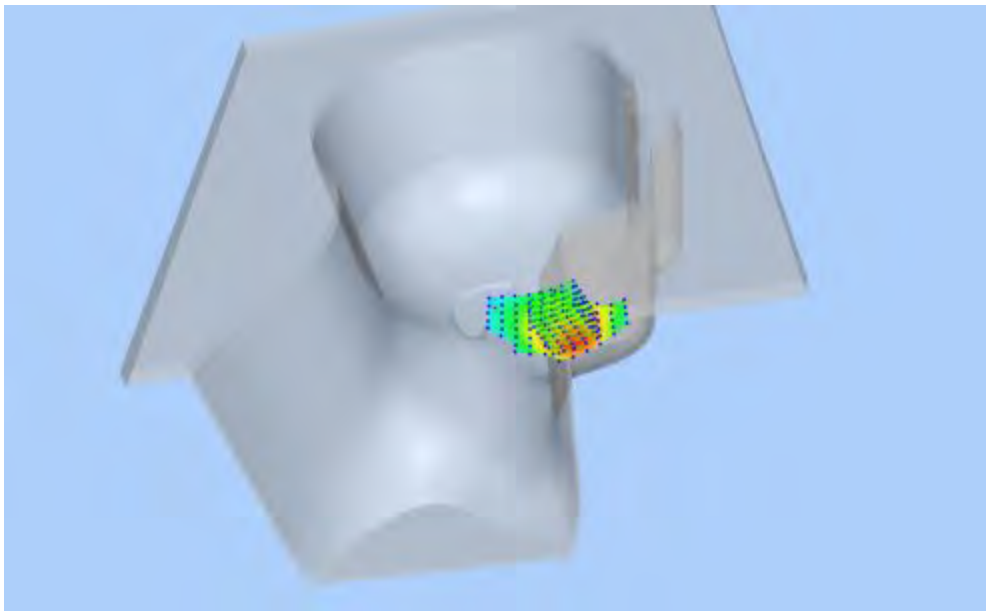
Z Axis Scan



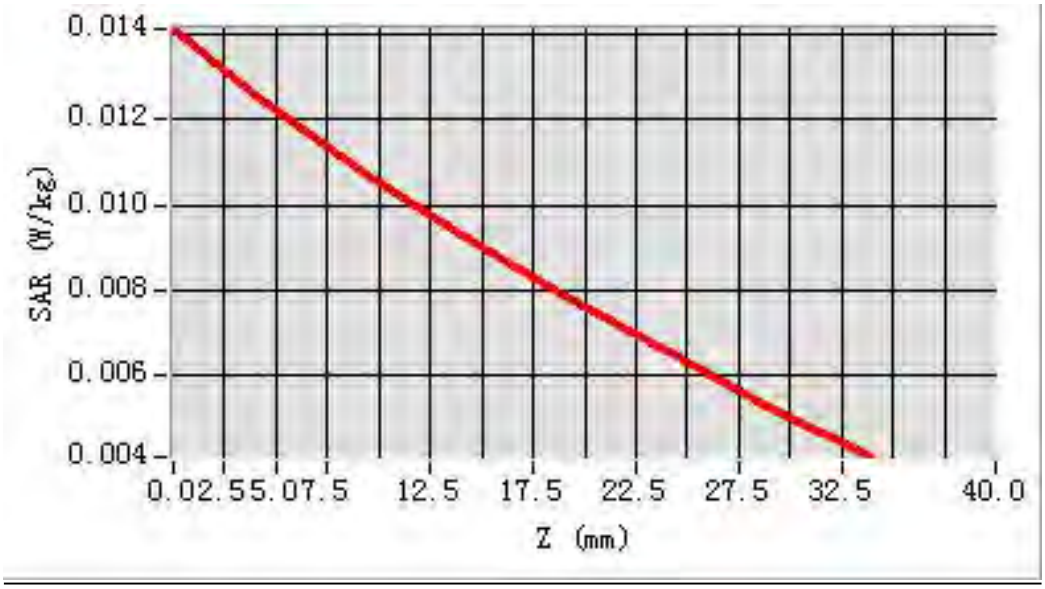
MEAS. 13 Left Head with Cheek on Low Channel in LTE Band 17 25 RB mode

Test Date:	17/8/2015
Signal:	LTE, f=704.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 42.15; Conductivity: 0.92 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 22.51
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-56.000000, Y=-42.000000
SAR 10g (W/Kg):	0.009932
SAR 1g (W/Kg):	0.012572
Power drift (%):	1.24

3D screen shot



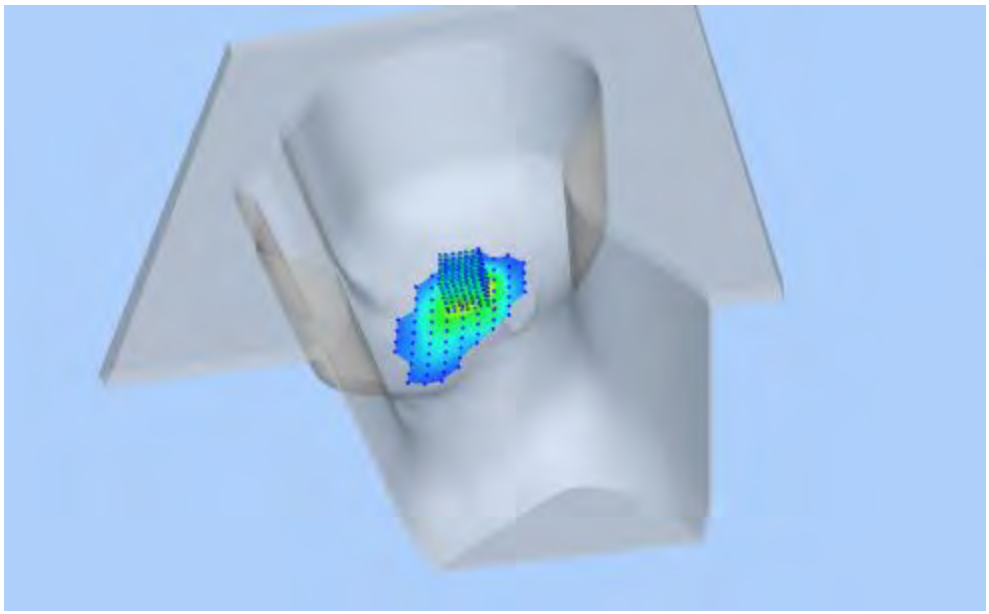
Z Axis Scan



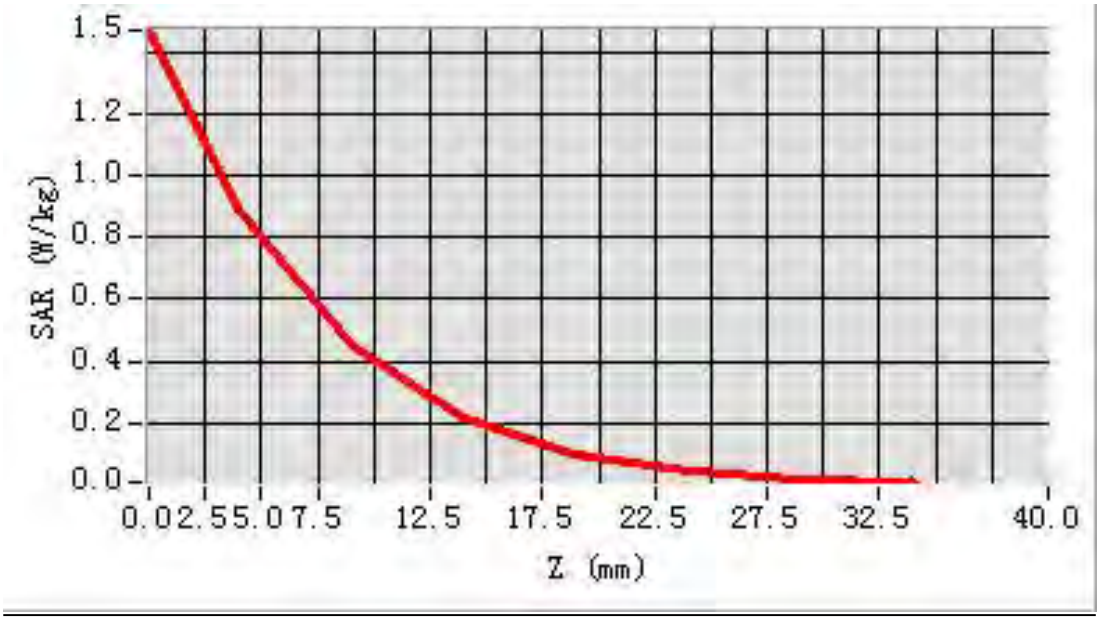
MEAS. 14 Right Head with Cheek on Low Channel in IEEE 802.b mode

Test Date:	25/8/2015
Signal:	WLAN, f=2412.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 38.16; Conductivity: 1.74 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 25.25
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location:	X=-24.000000, Y=16.000000
SAR 10g (W/Kg):	0.343776
SAR 1g (W/Kg):	0.787845
Power drift (%):	0.18

3D screen shot



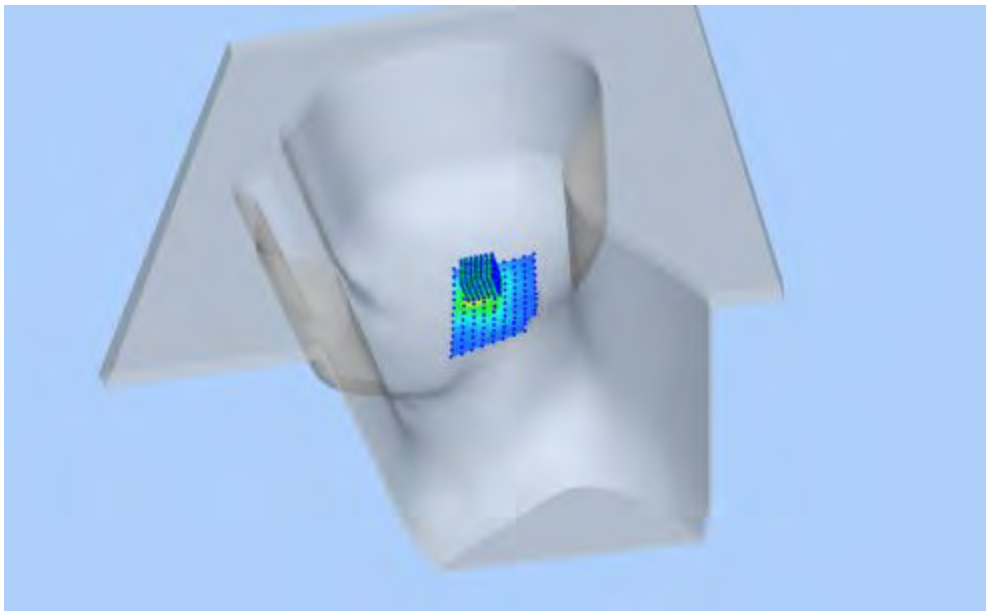
Z Axis Scan



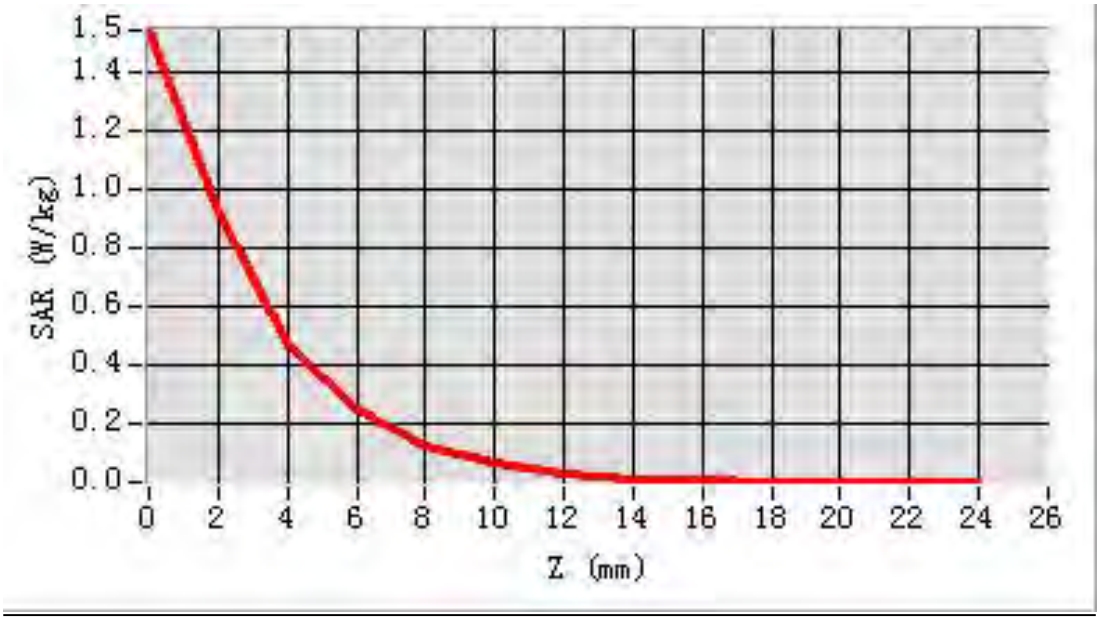
MEAS. 15 Right Head with Cheek on Channel 165 in IEEE 802.a mode

Test Date:	30/8/2015
Signal:	WLAN, f=5825.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 36.03; Conductivity: 4.63 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 22.36
Area Scan:	sam_direct_droit2_surf8mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=4mm, dy=4mm, dz=2mm,Complete
Maximum location:	X=-8.000000, Y=24.000000
SAR 10g (W/Kg):	0.251230
SAR 1g (W/Kg):	0.758737
Power drift (%):	-1.19

3D screen shot



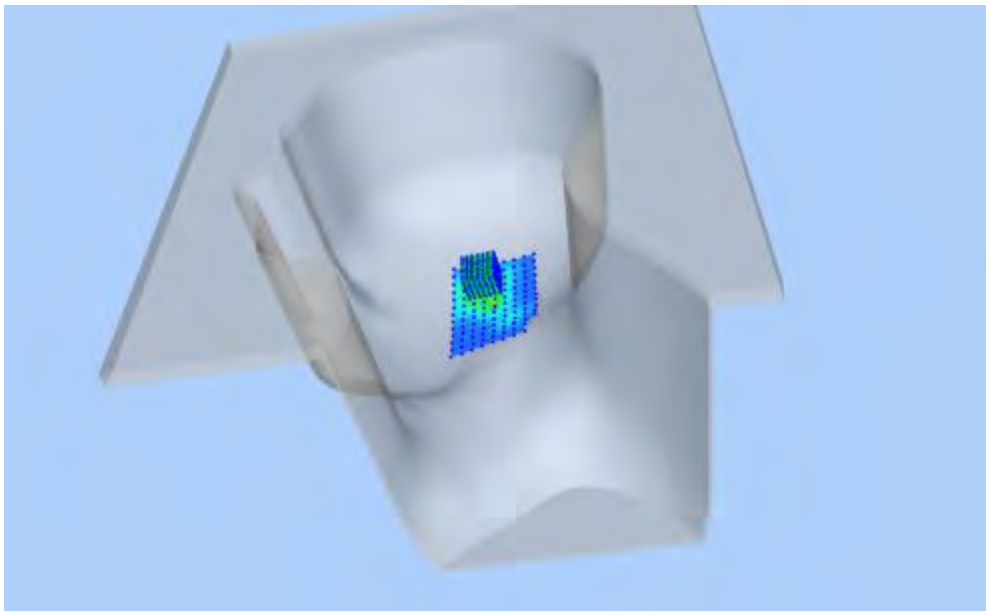
Z Axis Scan



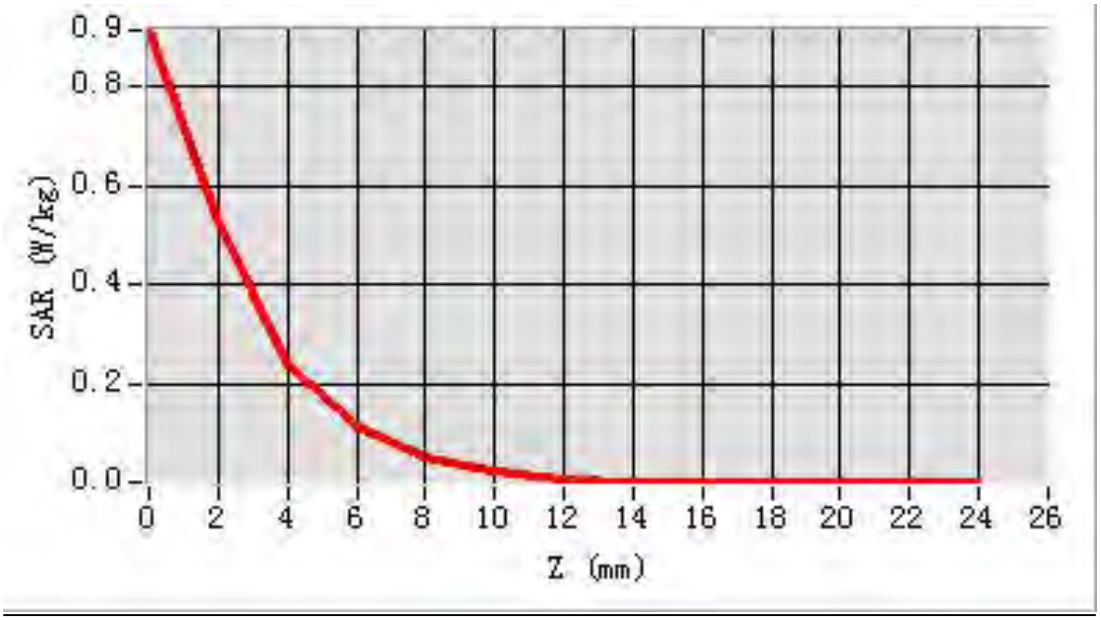
MEAS. 16 Right Head with Tilt on Channel 165 in IEEE 802.ac(HT-20) mode

Test Date:	02/9/2015
Signal:	WLAN, f=5825.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 35.65; Conductivity: 4.97 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 22.60
Area Scan:	sam_direct_droit2_surf8mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=4mm, dy=4mm, dz=2mm,Complete
Maximum location:	X=-8.000000, Y=24.000000
SAR 10g (W/Kg):	0.133450
SAR 1g (W/Kg):	0.453387
Power drift (%):	-0.87

3D screen shot



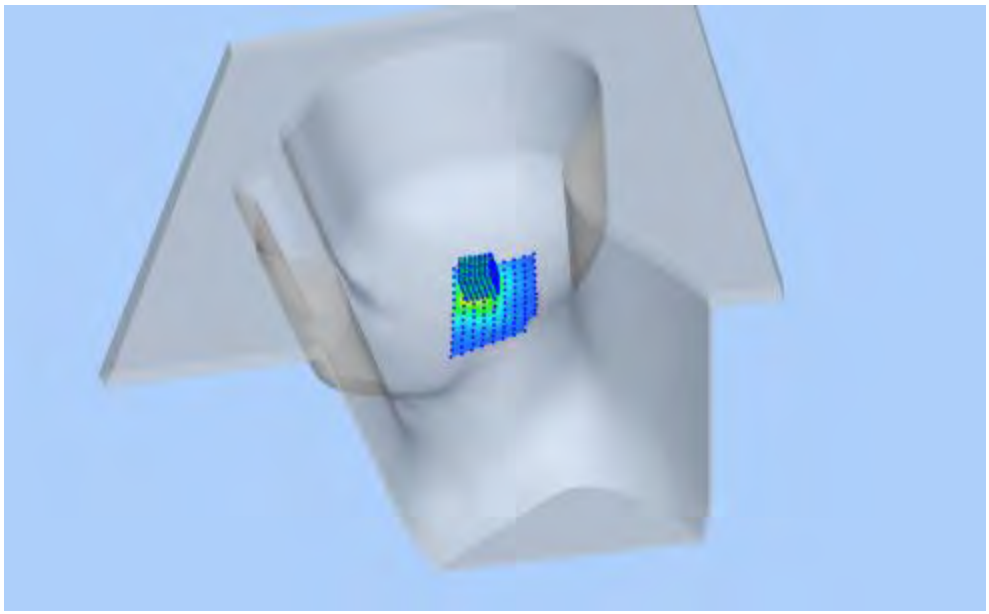
Z Axis Scan



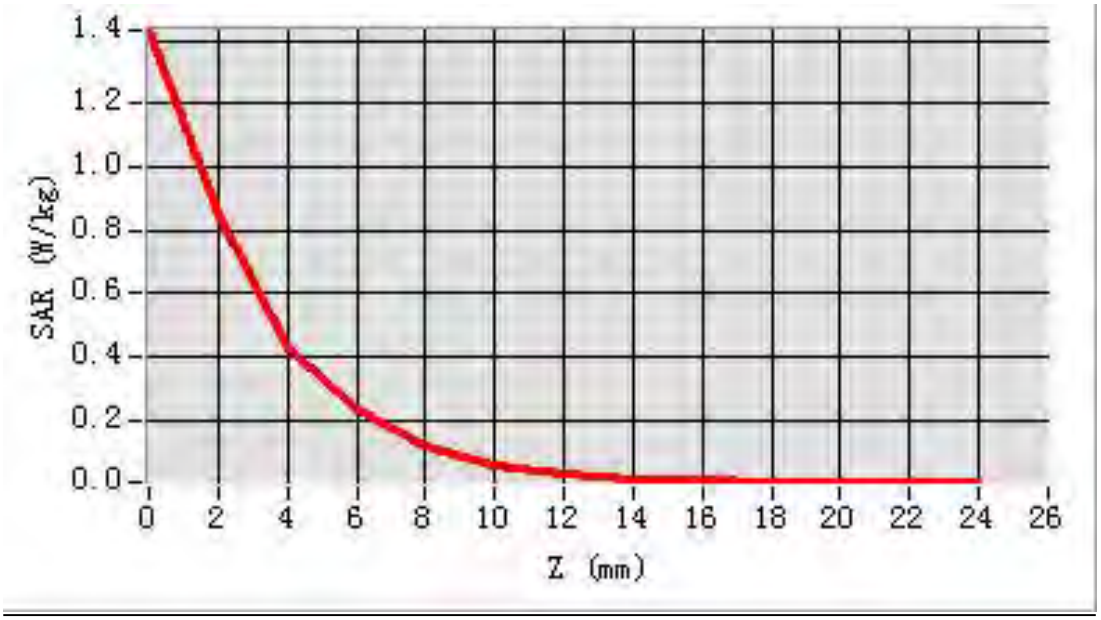
MEAS. 17 Right Head with Cheek on Channel 159 in IEEE 802.n(HT-20) mode

Test Date:	30/8/2015
Signal:	WLAN, f=5795.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 36.03; Conductivity: 4.63 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 22.36
Area Scan:	sam_direct_droit2_surf8mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=4mm, dy=4mm, dz=2mm,Complete
Maximum location:	X=-8.000000, Y=24.000000
SAR 10g (W/Kg):	0.249247
SAR 1g (W/Kg):	0.744536
Power drift (%):	0.34

3D screen shot



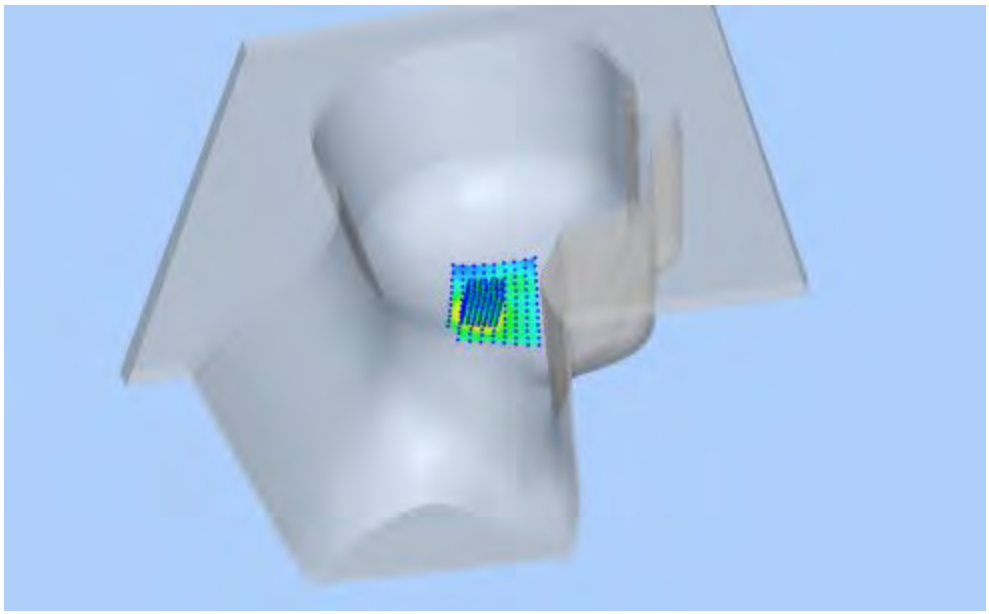
Z Axis Scan



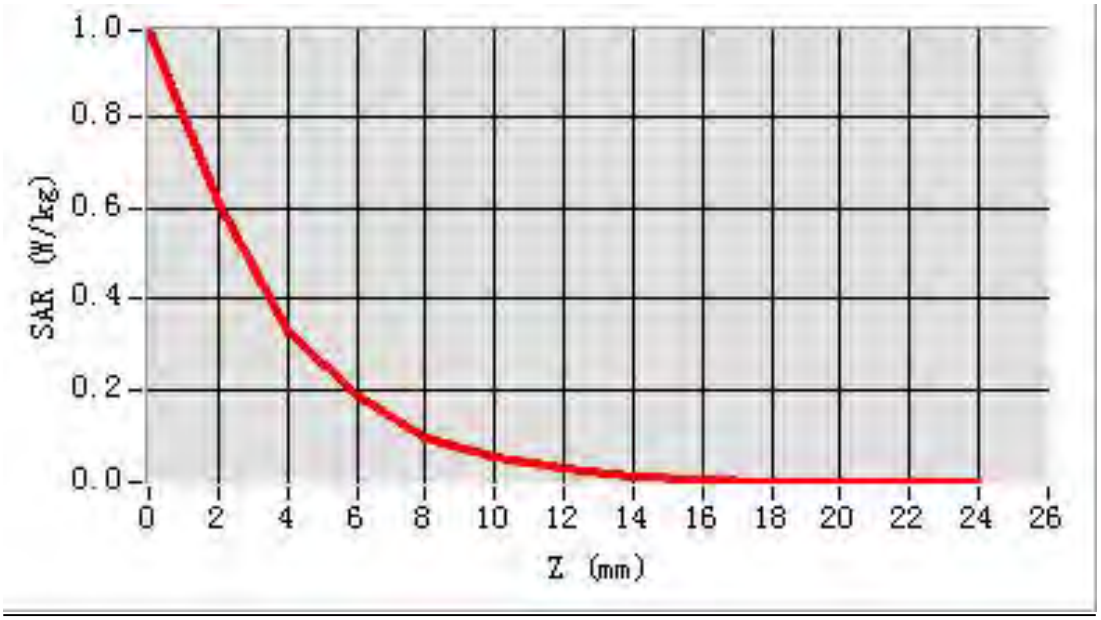
MEAS. 18 Right Head with Cheek on Channel 165 in IEEE 802.n HT-40 mode

Test Date:	30/8/2015
Signal:	WLAN, f=5825.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 36.03; Conductivity: 4.63 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 22.36
Area Scan:	sam_direct_droit2_surf8mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=4mm, dy=4mm, dz=2mm,Complete
Maximum location:	X=8.000000, Y=-16.000000
SAR 10g (W/Kg):	0.238903
SAR 1g (W/Kg):	0.581471
Power drift (%):	-1.21

3D screen shot



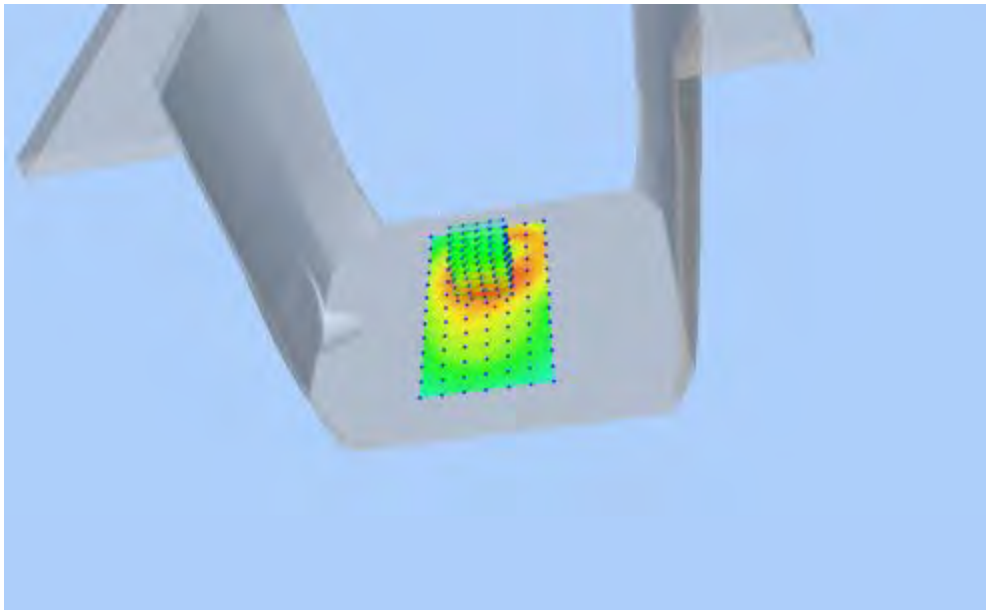
Z Axis Scan



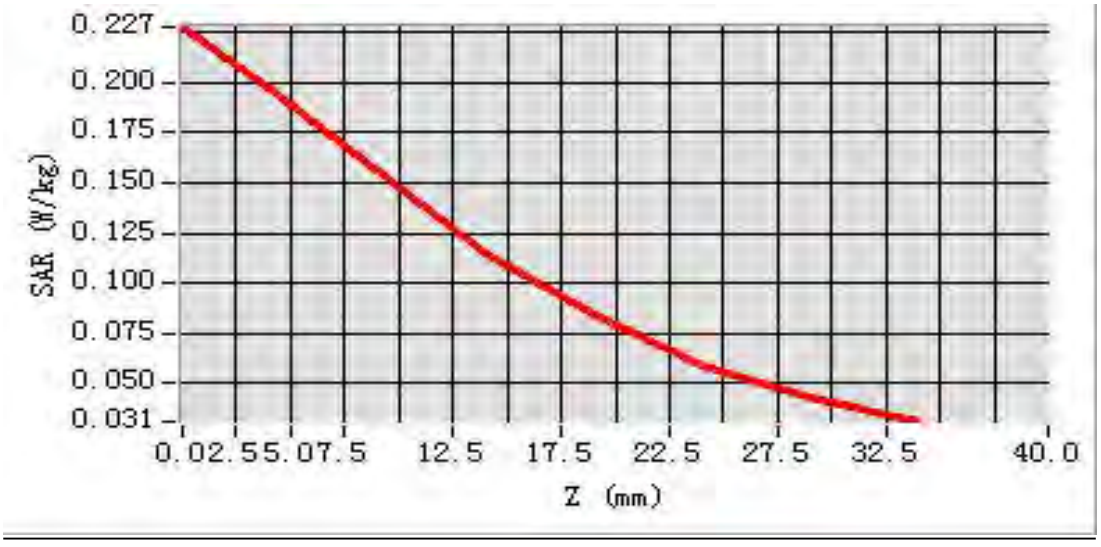
MEAS. 19 Body Plane with Body-worn in Back side on High Channel in GSM 850 mode

Test Date:	20/8/2015
Signal:	GSM, f=848.6 MHz, Duty Cycle: 1:8.3
Liquid Parameters:	Permittivity: 55.16; Conductivity: 0.99 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 24.58
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=24.000000
SAR 10g (W/Kg):	0.137050
SAR 1g (W/Kg):	0.194707
Power drift (%):	-3.31

3D screen shot



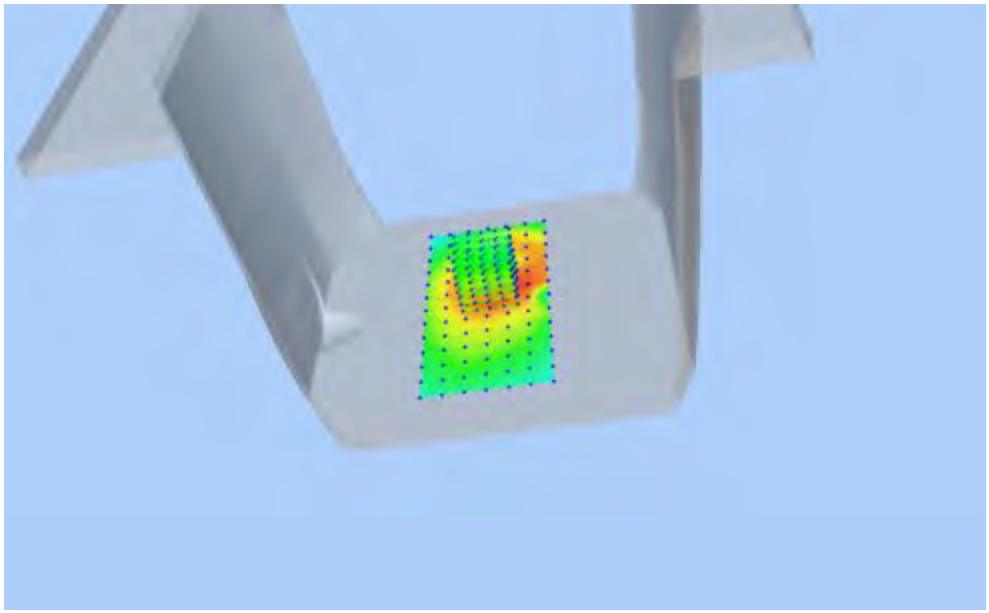
Z Axis Scan



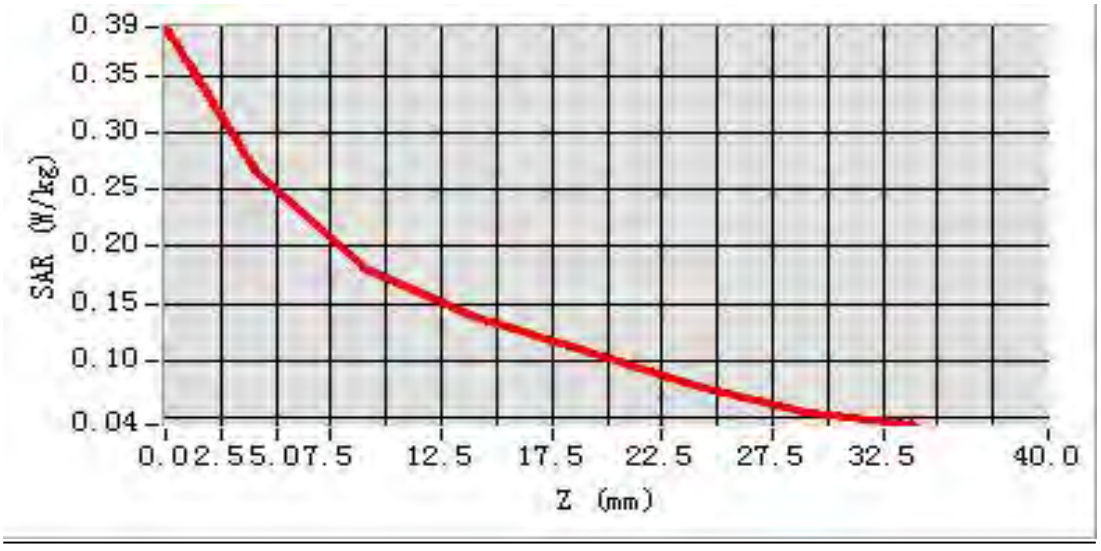
MEAS. 20 Body Plane with Body-worn in Front side on Low Channel in GPRS850-12 mode

Test Date:	20/8/2015
Signal:	GSM, f=824.2 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 55.24; Conductivity: 0.98 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 24.58
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=12.000000
SAR 10g (W/Kg):	0.173560
SAR 1g (W/Kg):	0.268151
Power drift (%):	3.83

3D screen shot



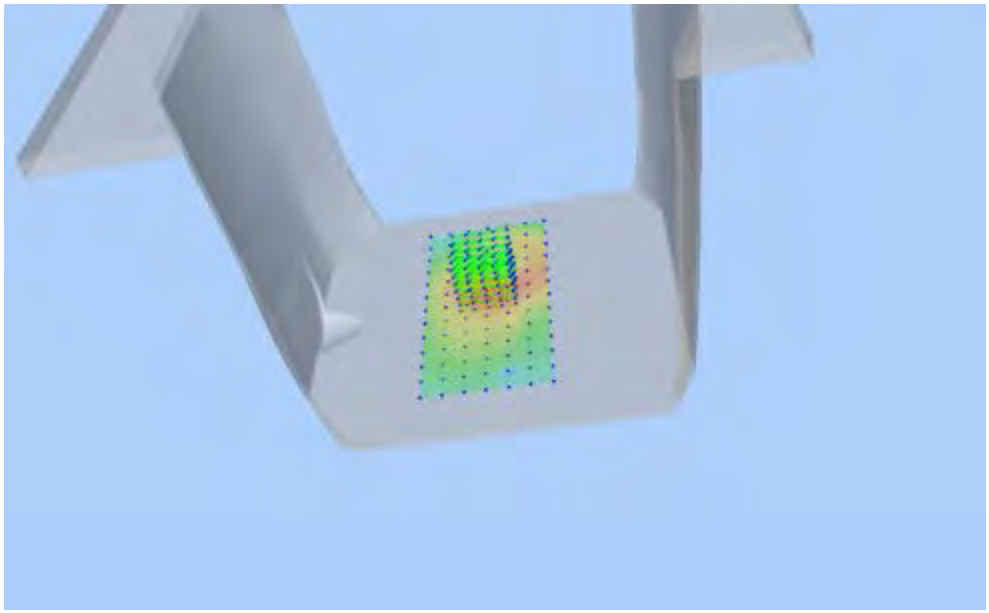
Z Axis Scan



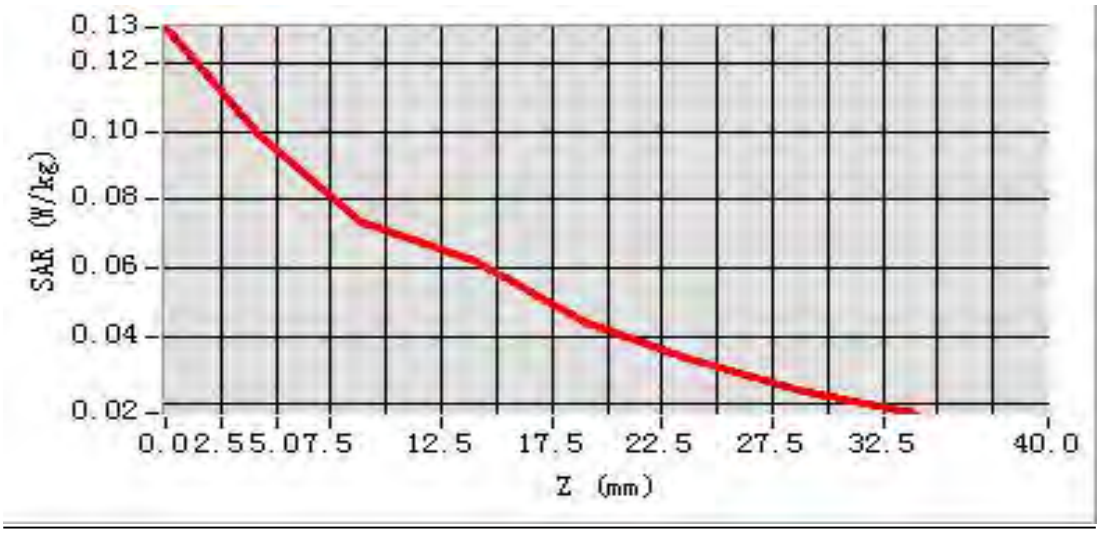
MEAS. 21 Body Plane with Body-worn in Back side on Low Channel in EGPRS850-12 mode

Test Date:	20/8/2015
Signal:	GSM, f=824.2 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 55.24; Conductivity: 0.98 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 24.58
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=12.000000
SAR 10g (W/Kg):	0.070404
SAR 1g (W/Kg):	0.103322
Power drift (%):	-0.34

3D screen shot



Z Axis Scan

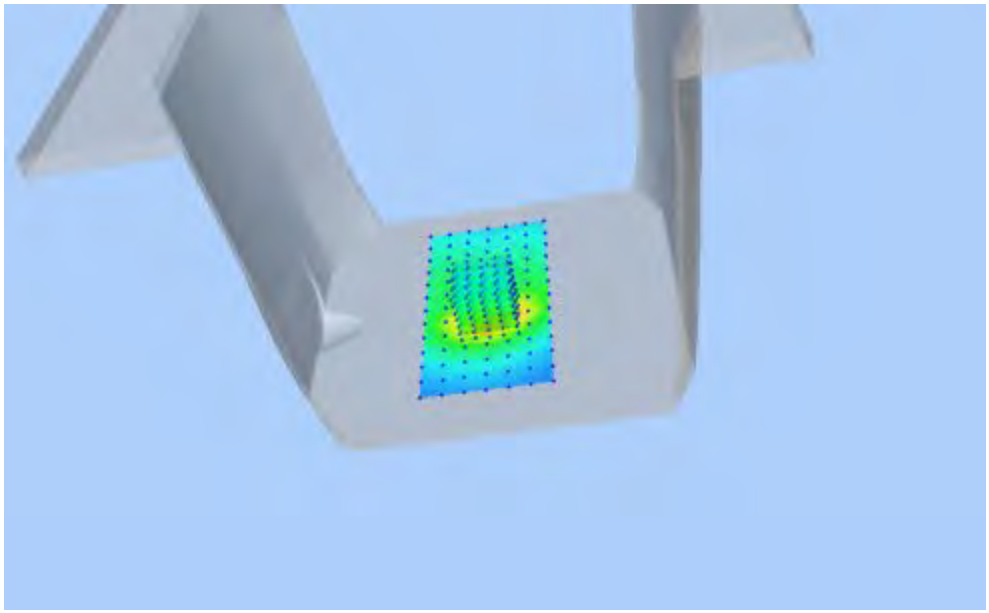


MEAS. 22 Body Plane with Body-worn in Back side on High Channel in GSM

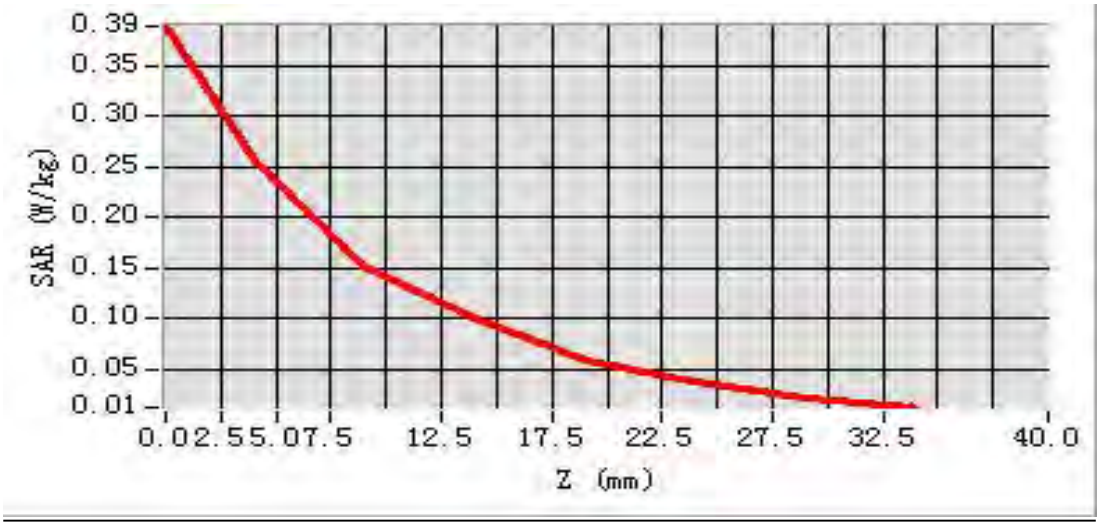
1900 mode

Test Date:	23/8/2015
Signal:	GSM, f=1909.8 MHz, Duty Cycle: 1:8.3
Liquid Parameters:	Permittivity: 53.30; Conductivity: 1.52 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=-12.000000
SAR 10g (W/Kg):	0.129375
SAR 1g (W/Kg):	0.242376
Power drift (%):	0.29

3D screen shot



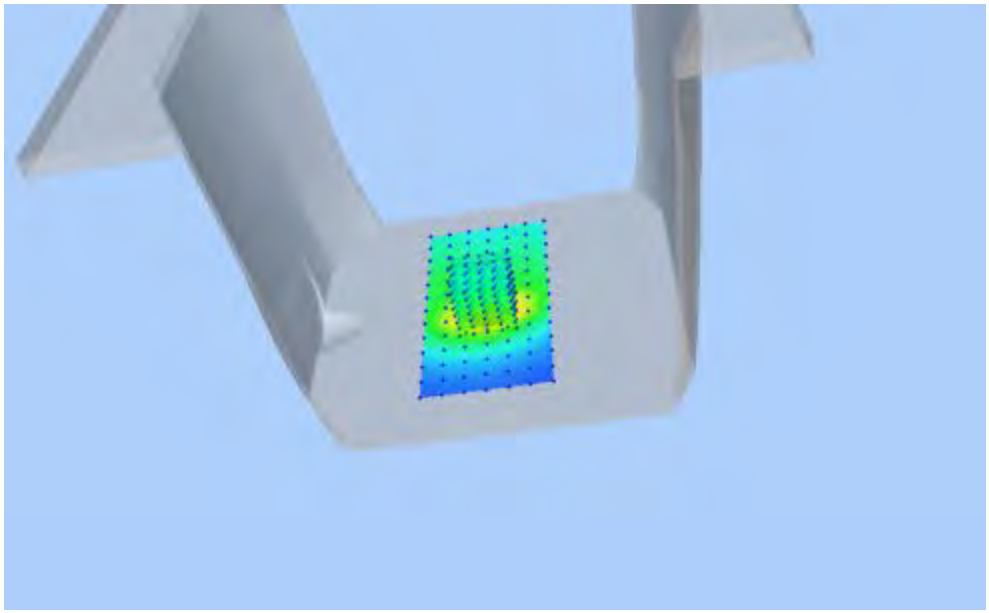
Z Axis Scan



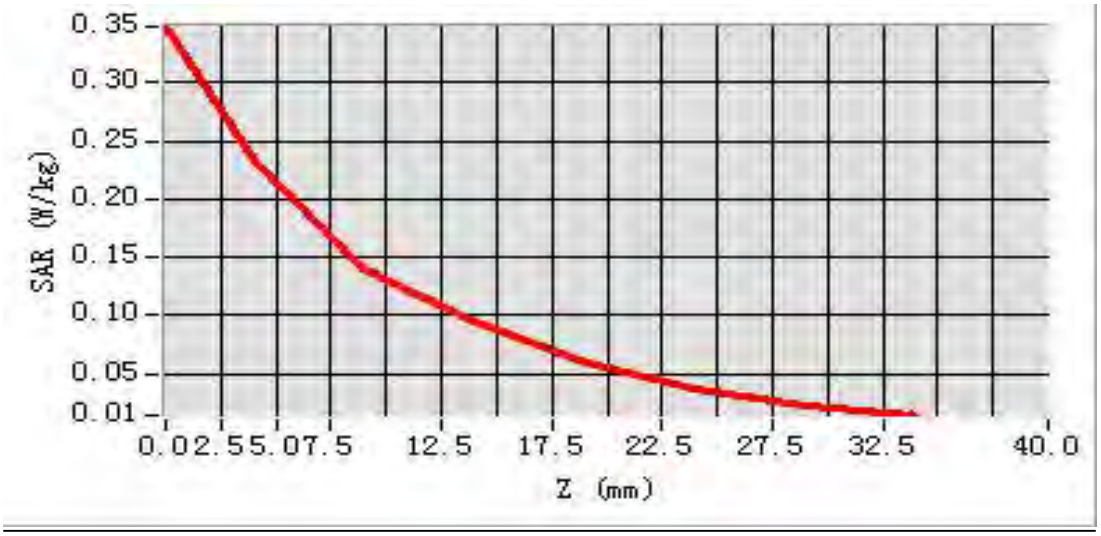
MEAS. 23 Body Plane with Body-worn in Back side on Middle Channel in GPRS1900-12 mode

Test Date:	23/8/2015
Signal:	GSM, f=1880.0 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 40.00; Conductivity: 1.40 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=-12.000000
SAR 10g (W/Kg):	0.120881
SAR 1g (W/Kg):	0.219861
Power drift (%):	-2.75

3D screen shot



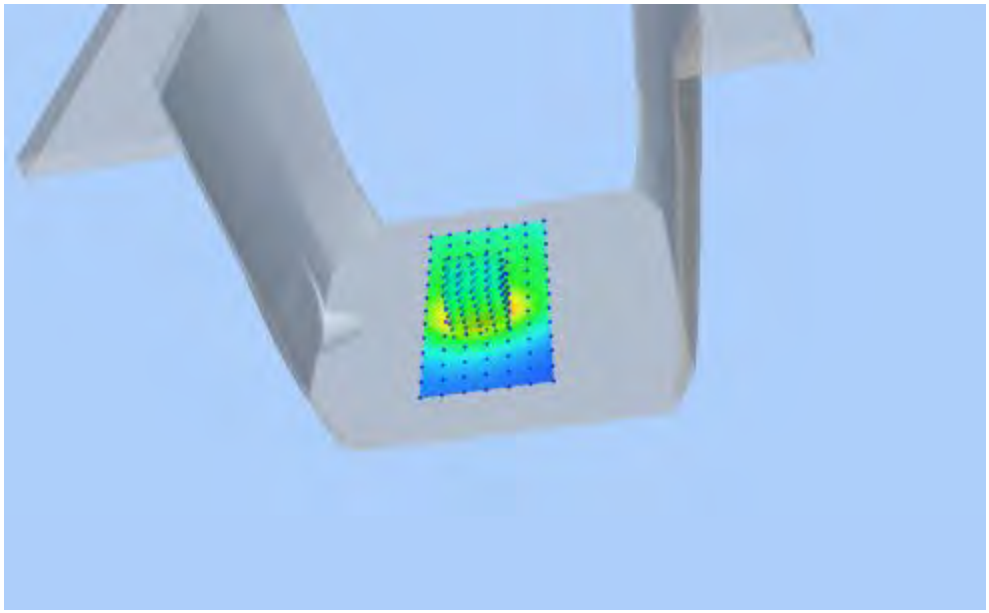
Z Axis Scan



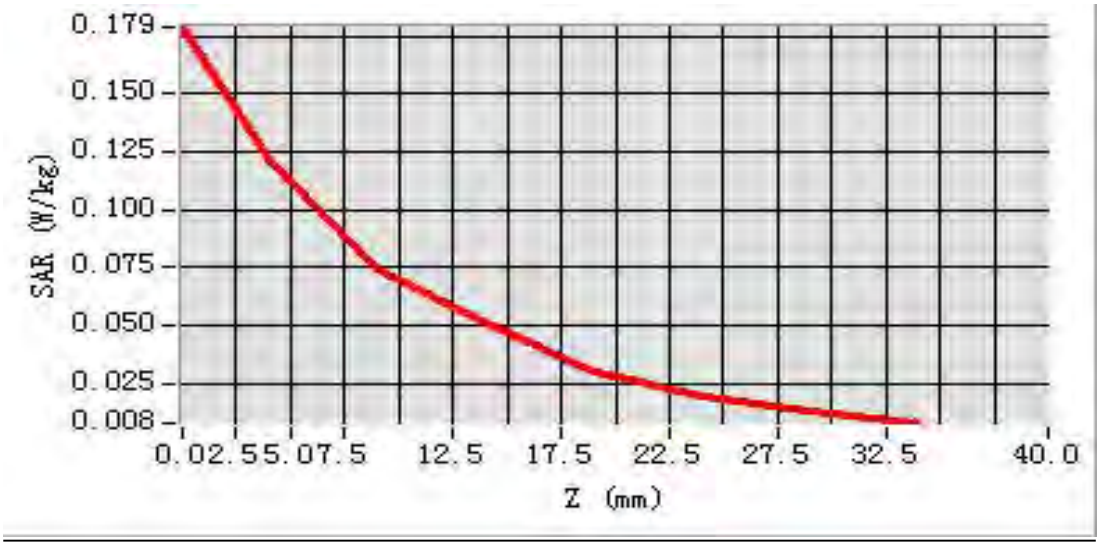
MEAS. 24 Body Plane with Body-worn in Front side on Low Channel in EGPRS1900-12 mode

Test Date:	23/8/2015
Signal:	GSM, f=1850.2 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 40.00; Conductivity: 1.40 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=-12.000000
SAR 10g (W/Kg):	0.064967
SAR 1g (W/Kg):	0.116789
Power drift (%):	0.81

3D screen shot



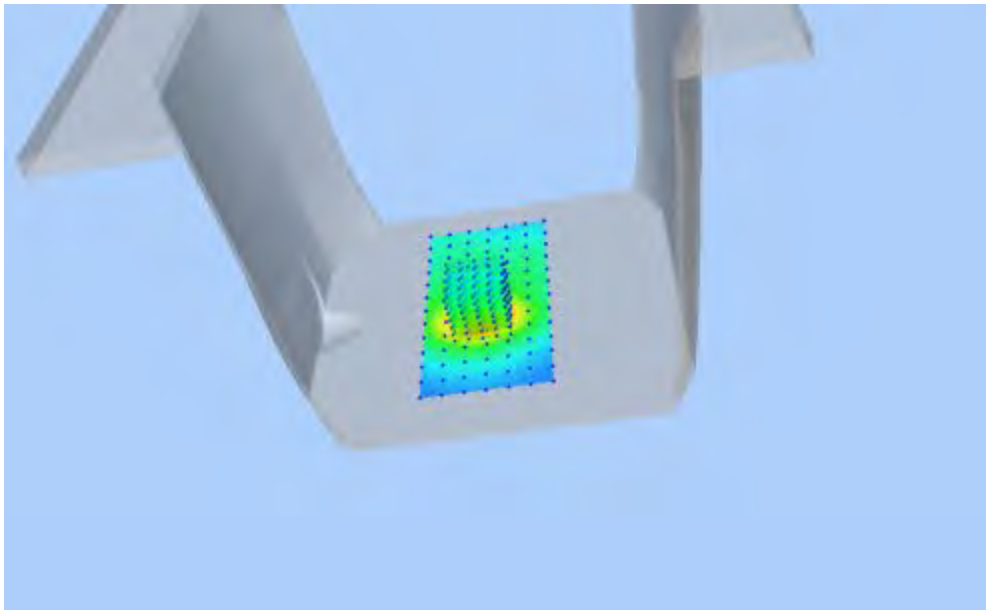
Z Axis Scan



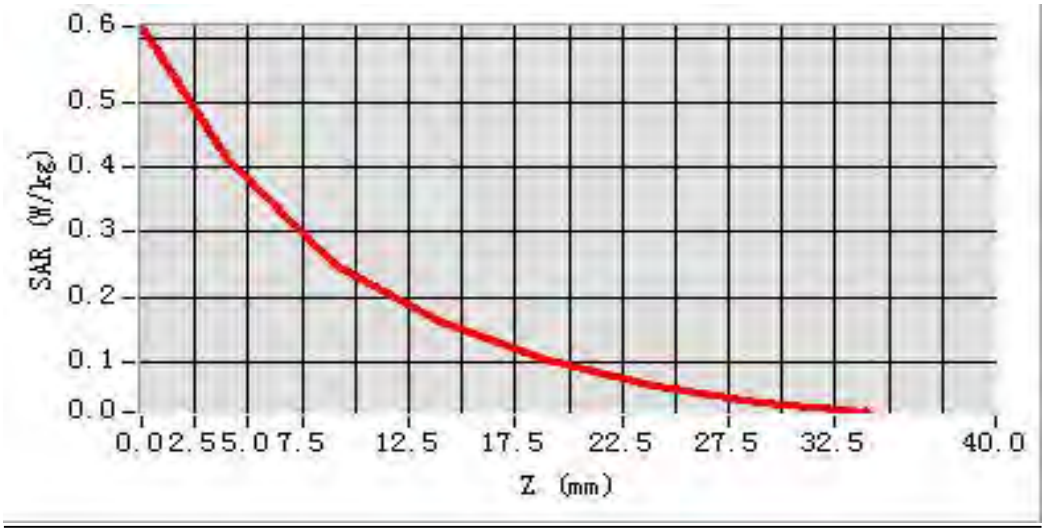
MEAS. 25 Body Plane with Body-worn in Front side on High Channel in WCDMA Band 2 mode

Test Date:	23/8/2015
Signal:	WCDMA, f=1907.6 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.30; Conductivity: 1.52 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=-12.000000
SAR 10g (W/Kg):	0.219574
SAR 1g (W/Kg):	0.393241
Power drift (%):	2.80

3D screen shot



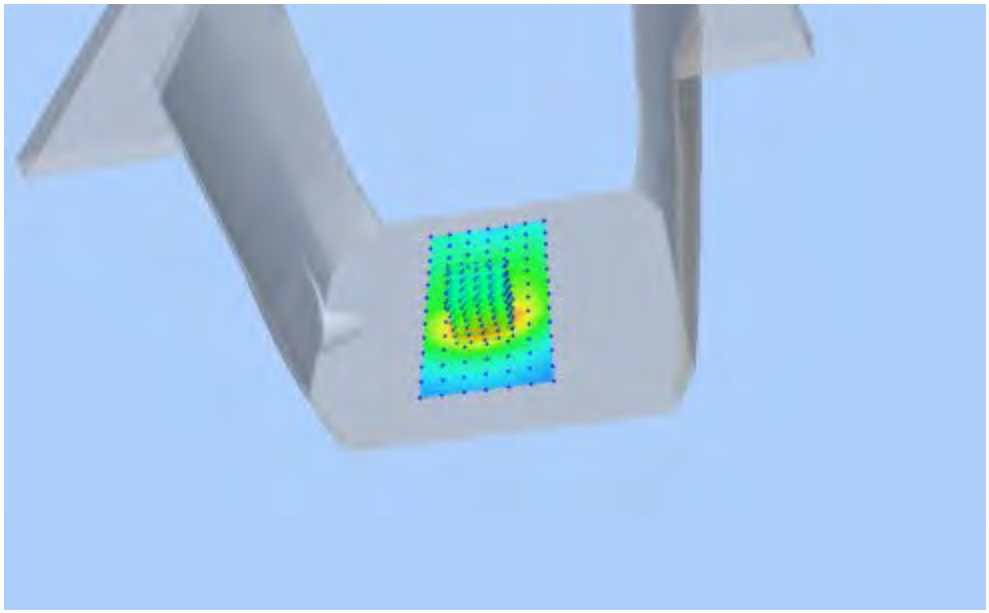
Z Axis Scan



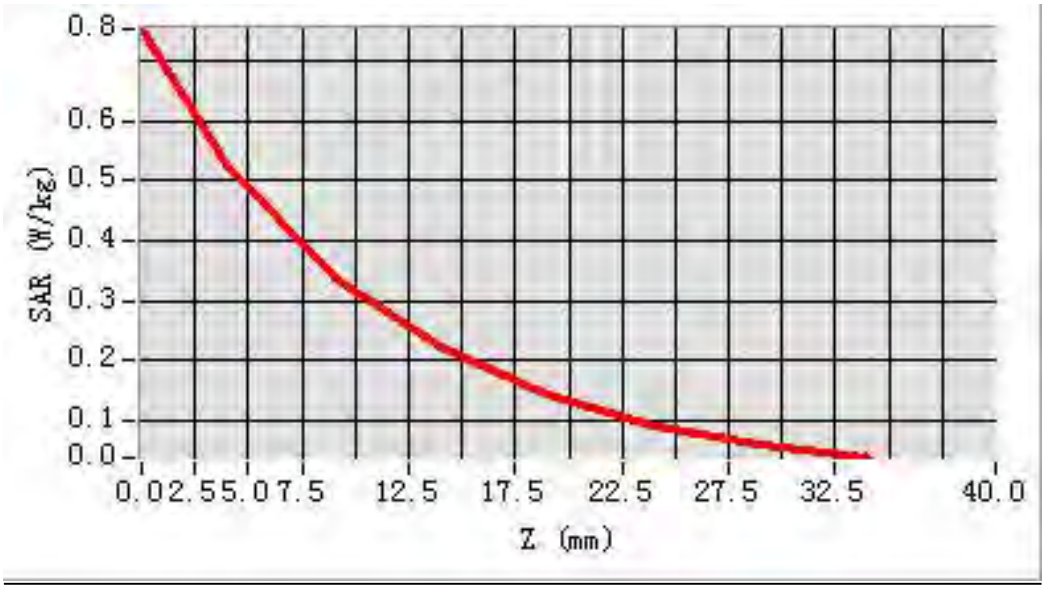
MEAS. 26 Body Plane withBody-worn in Back side on Middle Channel in WCDMA Band 4 mode

Test Date:	27/8/2015
Signal:	WCDMA, f=1732.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.48; Conductivity: 1.48 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.69
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=-12.000000
SAR 10g (W/Kg):	0.291054
SAR 1g (W/Kg):	0.500242
Power drift (%):	-0.69

3D screen shot



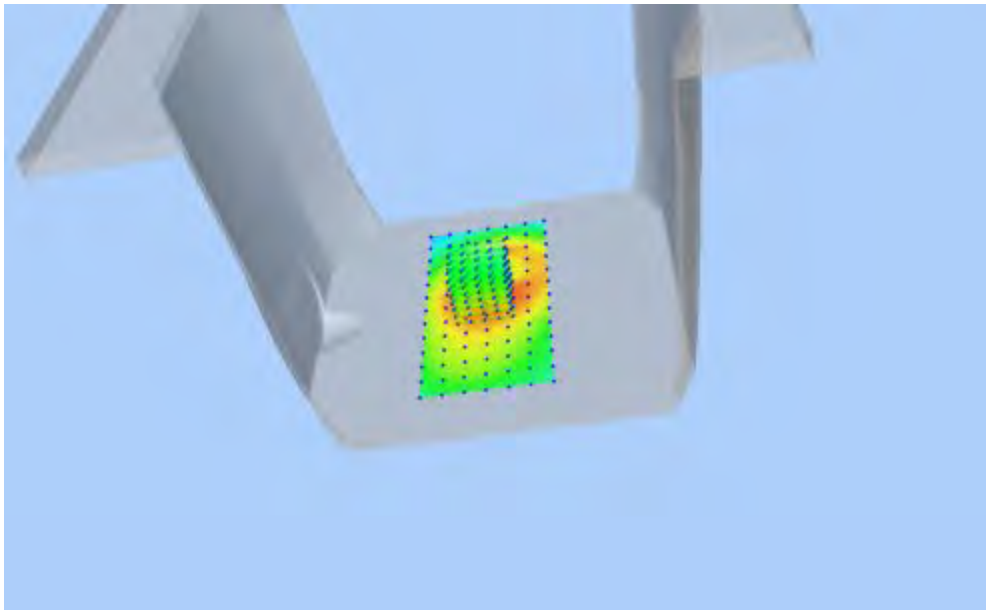
Z Axis Scan



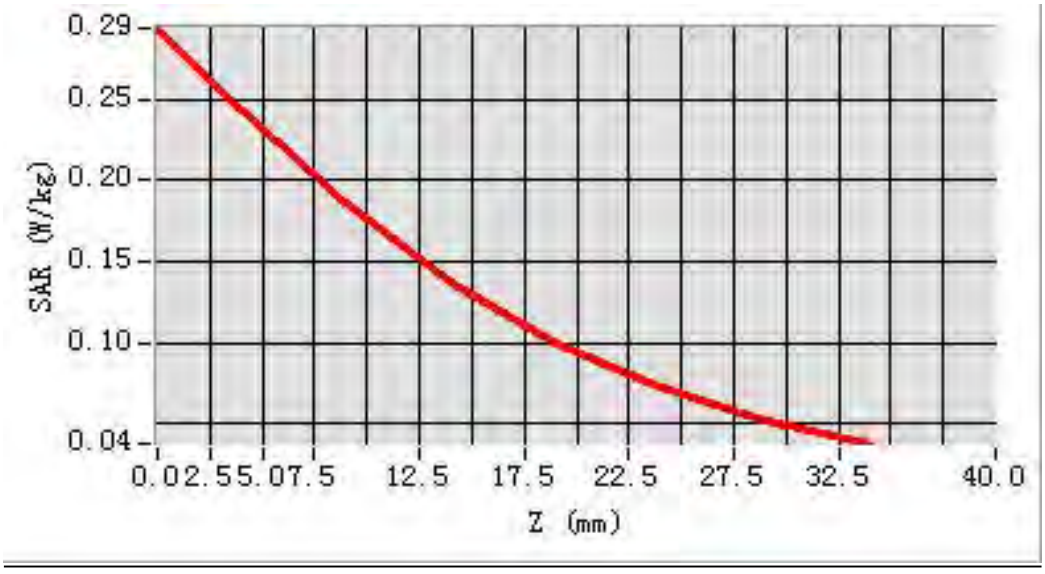
MEAS. 27 Body Plane with Body-worn in Back side on High Channel in WCDMA Band 5 mode

Test Date:	20/8/2015
Signal:	WCDMA, f=846.6 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 55.16; Conductivity: 0.98 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 24.58
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=0.000000
SAR 10g (W/Kg):	0.165393
SAR 1g (W/Kg):	0.237472
Power drift (%):	1.43

3D screen shot



Z Axis Scan

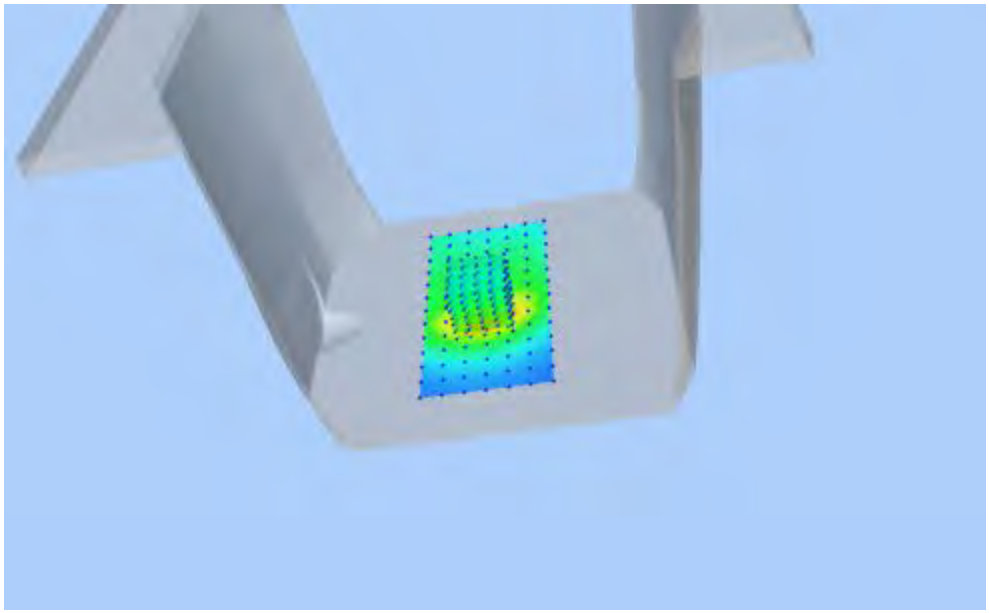


MEAS. 28 Body Plane with Body-worn in Back side on Low Channel in LTE

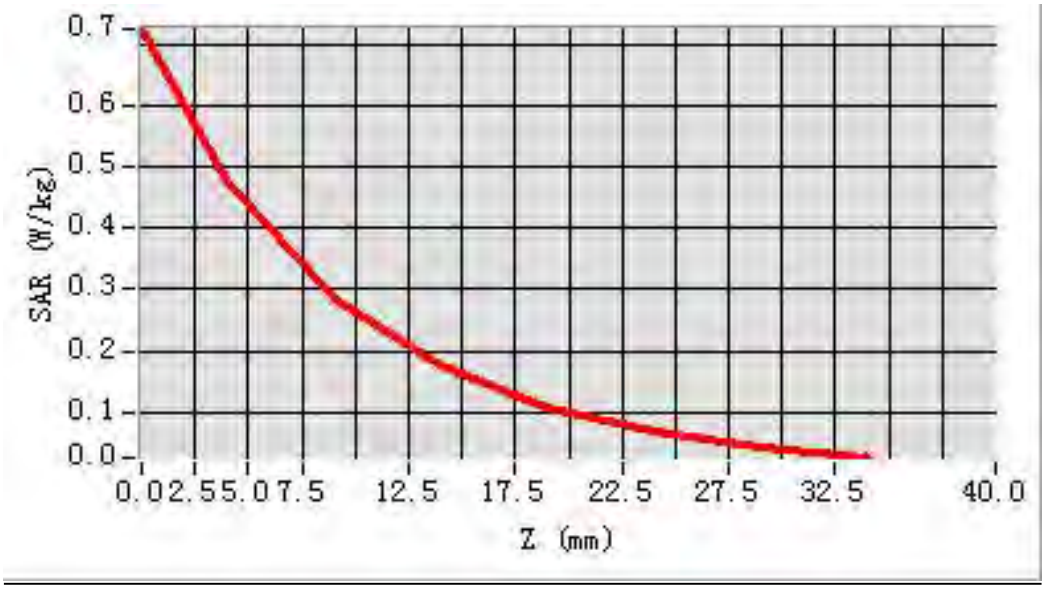
Band 2 1RB mode

Test Date:	27/8/2015
Signal:	LTE, f=1850.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.30; Conductivity: 1.52 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=-12.000000
SAR 10g (W/Kg):	0.249316
SAR 1g (W/Kg):	0.451521
Power drift (%):	0.46

3D screen shot



Z Axis Scan

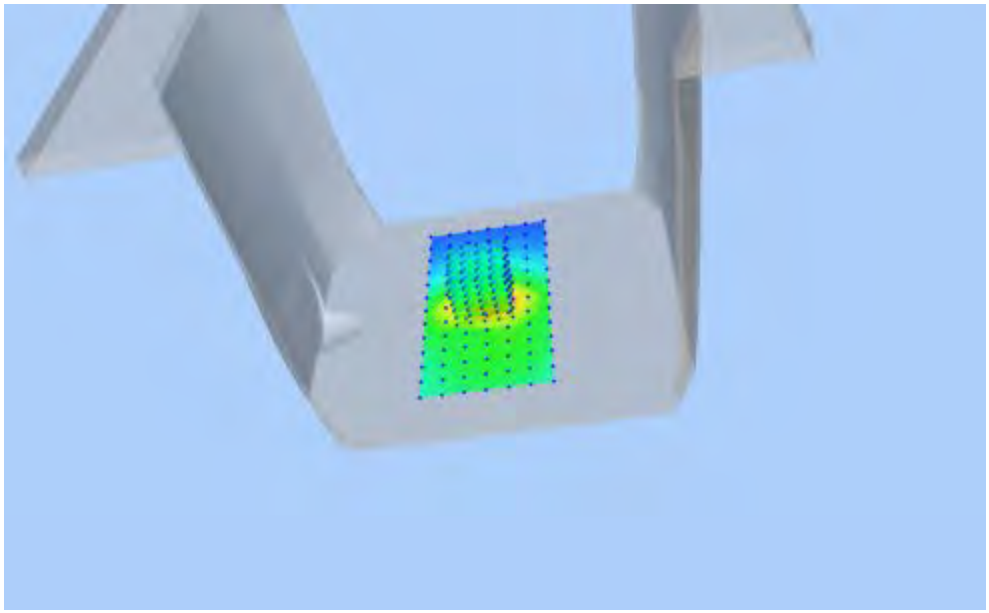


MEAS. 29 Body Plane with Body-worn in Back side on Low Channel in LTE

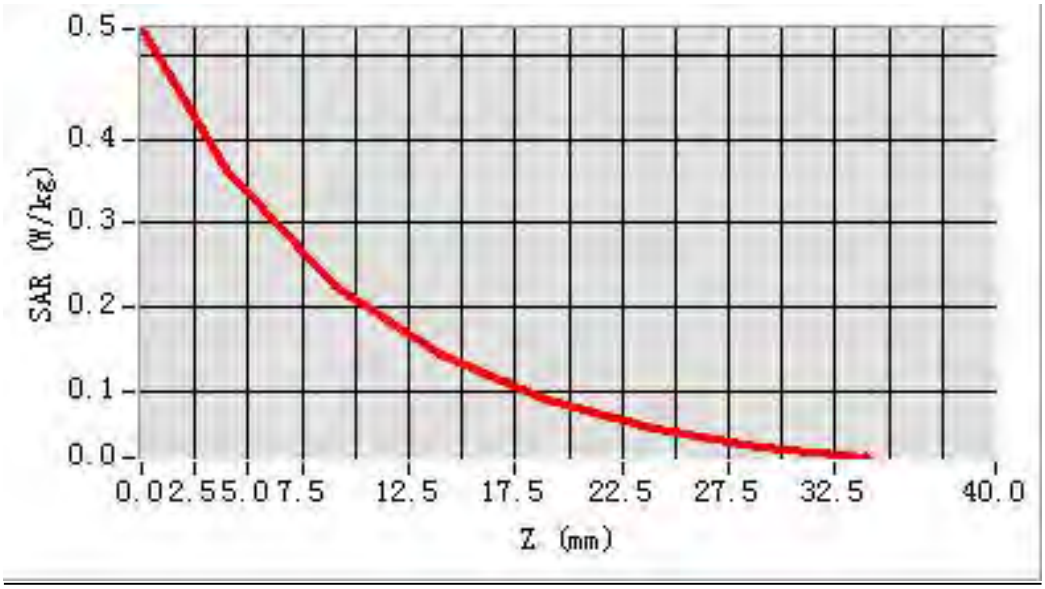
Band 2 50RB mode

Test Date:	23/8/2015
Signal:	LTE, f=1850.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.30; Conductivity: 1.52 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=0.000000
SAR 10g (W/Kg):	0.194133
SAR 1g (W/Kg):	0.344134
Power drift (%):	-0.77

3D screen shot



Z Axis Scan

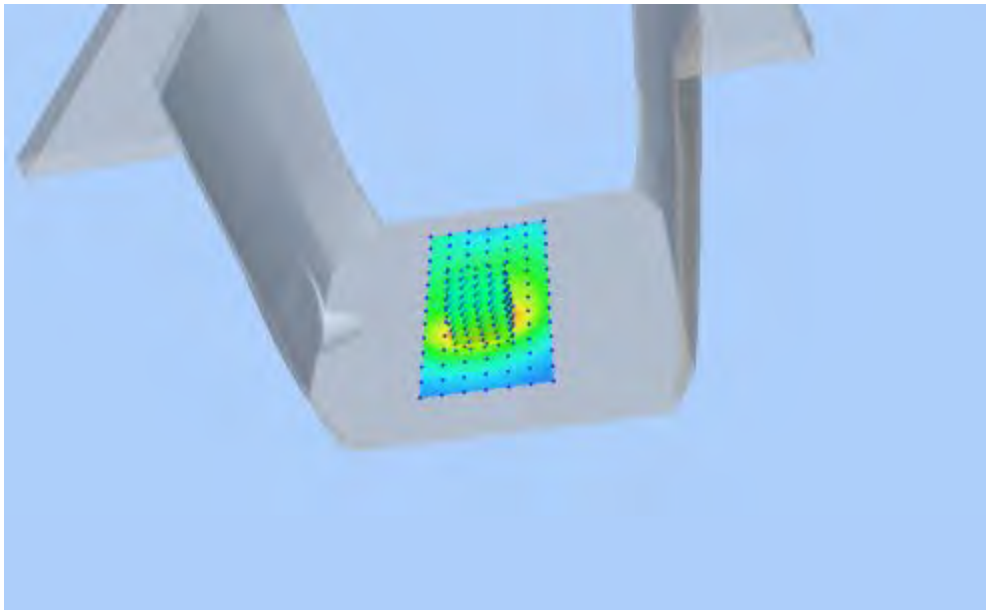


MEAS. 30 Body Plane with Body-worn in Back side on Low Channel in LTE

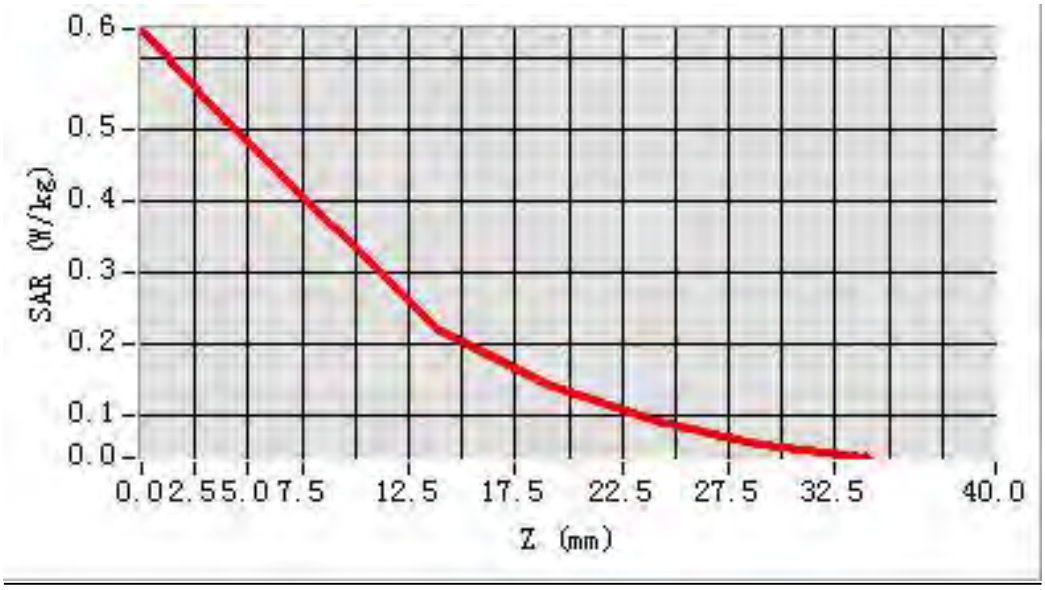
Band 4 1RB mode

Test Date:	27/8/2015
Signal:	LTE, f=1710.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.54; Conductivity: 1.46 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.69
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=-24.000000
SAR 10g (W/Kg):	0.286322
SAR 1g (W/Kg):	0.478067
Power drift (%):	-2.70

3D screen shot



Z Axis Scan

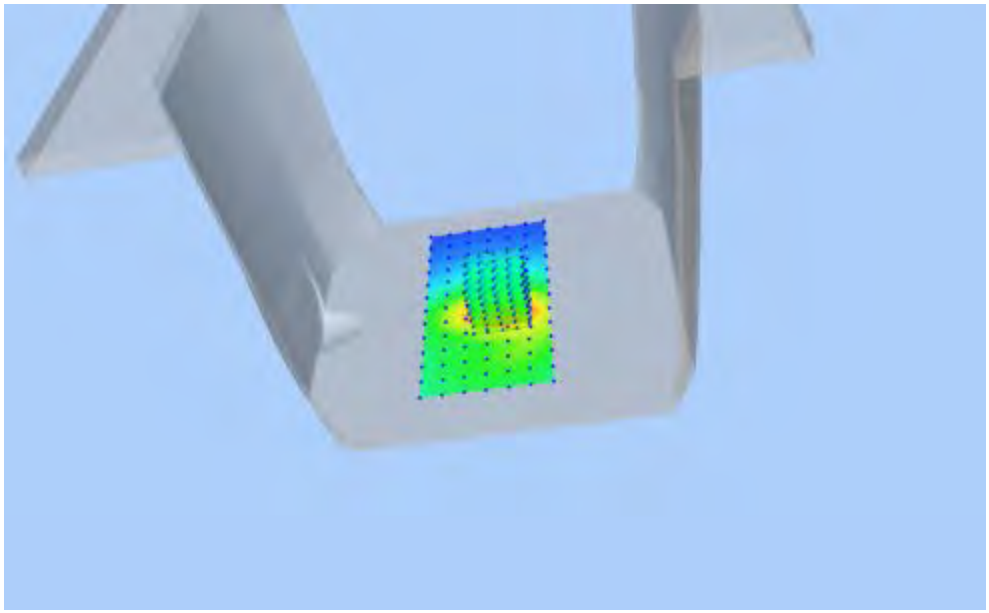


MEAS. 31 Body Plane with Body-worn in Front side on Low Channel in LTE

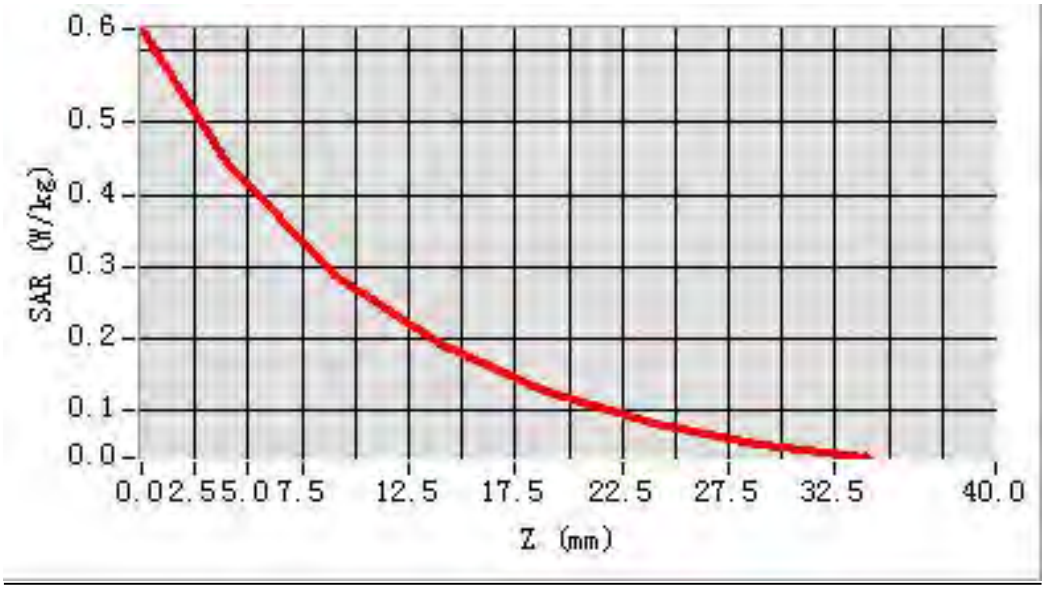
Band 4 50RB mode

Test Date:	27/8/2015
Signal:	LTE, f=1710.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.54; Conductivity: 1.46 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.69
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=8.000000, Y=-12.000000
SAR 10g (W/Kg):	0.249650
SAR 1g (W/Kg):	0.423060
Power drift (%):	1.35

3D screen shot



Z Axis Scan

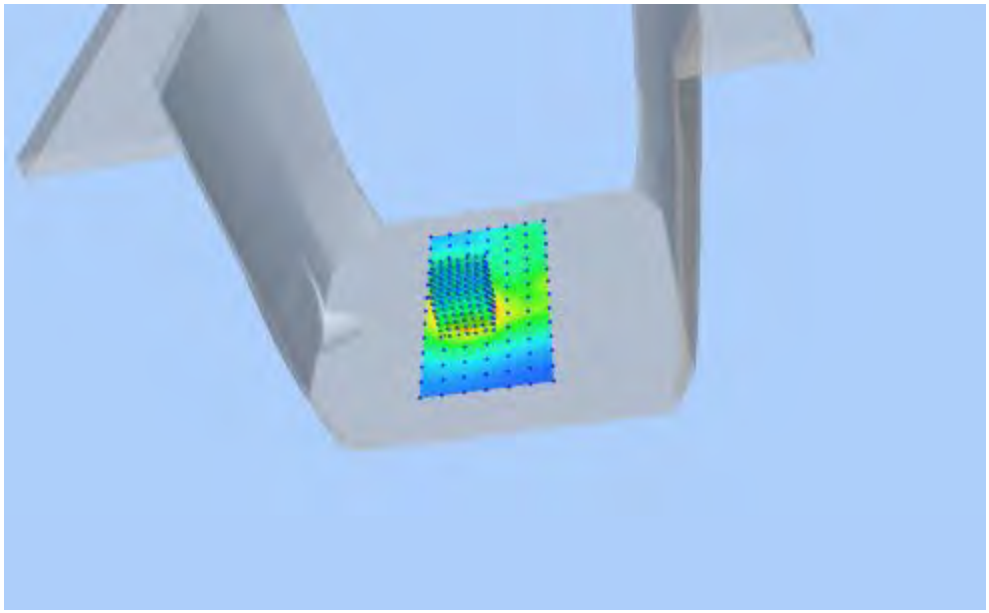


MEAS. 32 Body Plane with Body-worn in Front side on Low Channel in LTE

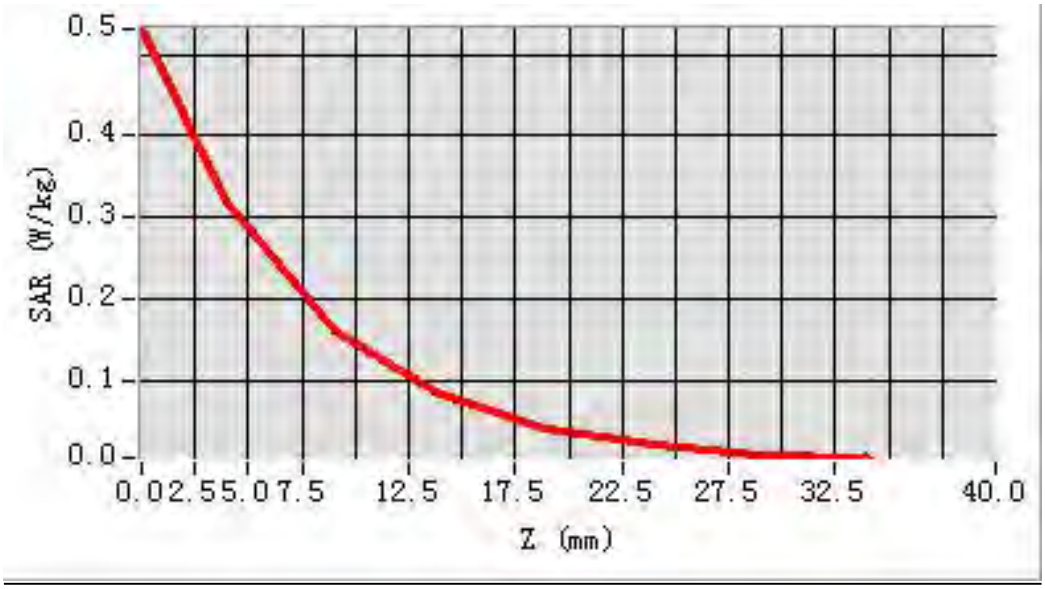
Band 7 1RB mode

Test Date:	29/8/2015
Signal:	LTE, f=2500.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 51.19; Conductivity: 2.06 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 26.09
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location:	X=-16.000000, Y=-12.000000
SAR 10g (W/Kg):	0.154870
SAR 1g (W/Kg):	0.302207
Power drift (%):	-1.12

3D screen shot



Z Axis Scan

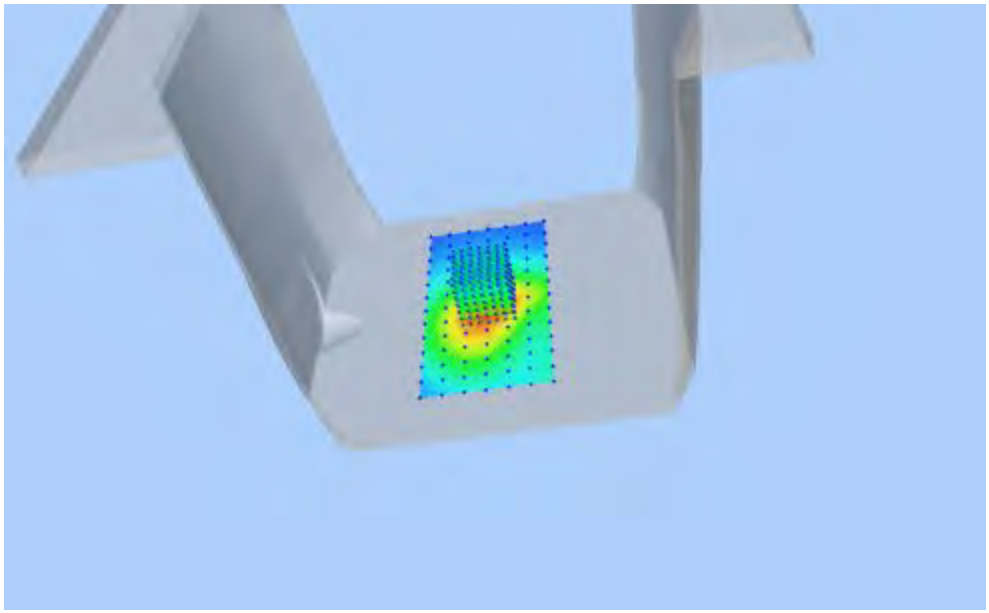


MEAS. 33 Body Plane with Body-worn in Back side on Low Channel in LTE

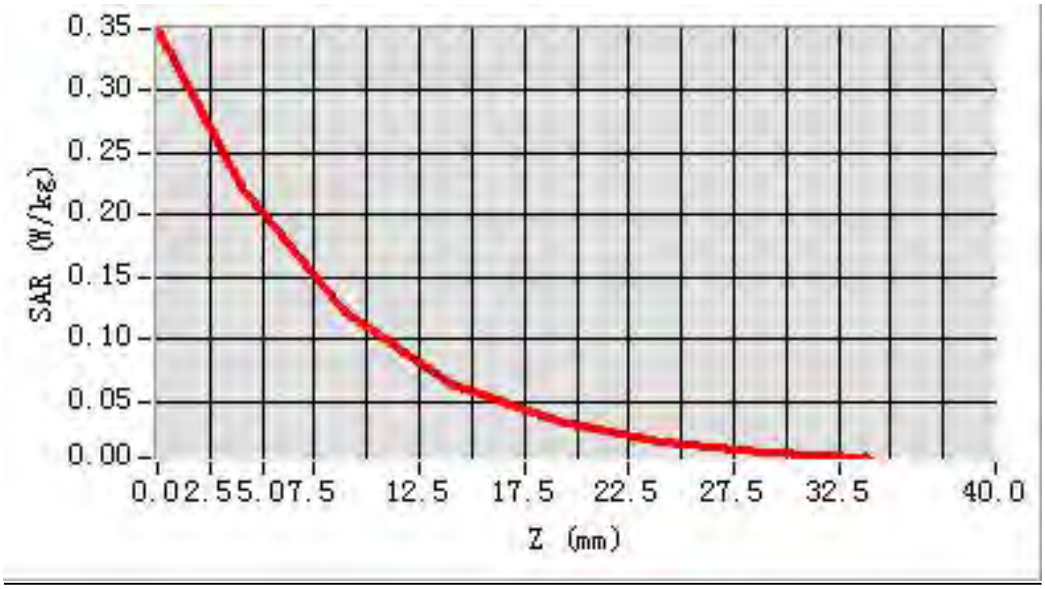
Band 7 50RB mode

Test Date:	29/8/2015
Signal:	LTE, f=2500.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 51.19; Conductivity: 2.06 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 26.09
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=0.000000
SAR 10g (W/Kg):	0.114486
SAR 1g (W/Kg):	0.213675
Power drift (%):	-0.15

3D screen shot



Z Axis Scan

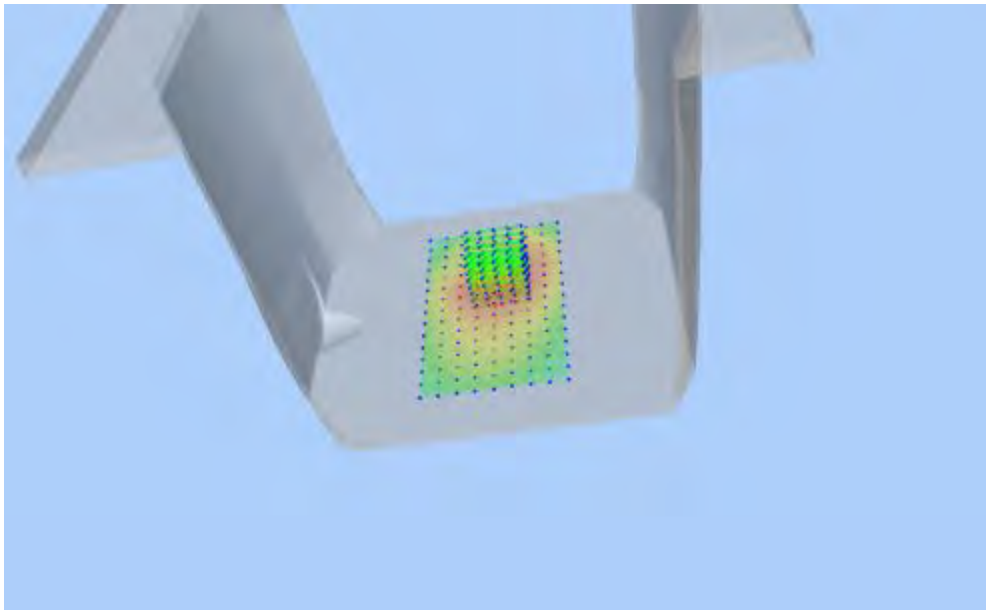


MEAS. 34 Body Plane with Body-worn in Back side on Low Channel in LTE

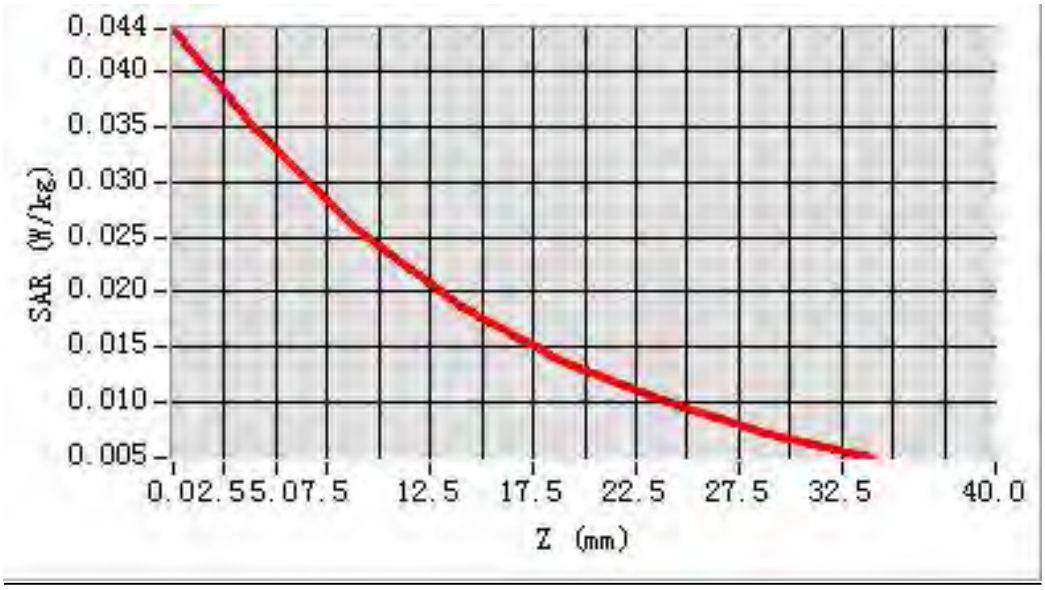
Band 17 1RB mode

Test Date:	18/8/2015
Signal:	LTE, f=704.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 55.71; Conductivity: 1.04 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.36
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=10.000000, Y=18.000000
SAR 10g (W/Kg):	0.025118
SAR 1g (W/Kg):	0.035368
Power drift (%):	-0.65

3D screen shot



Z Axis Scan

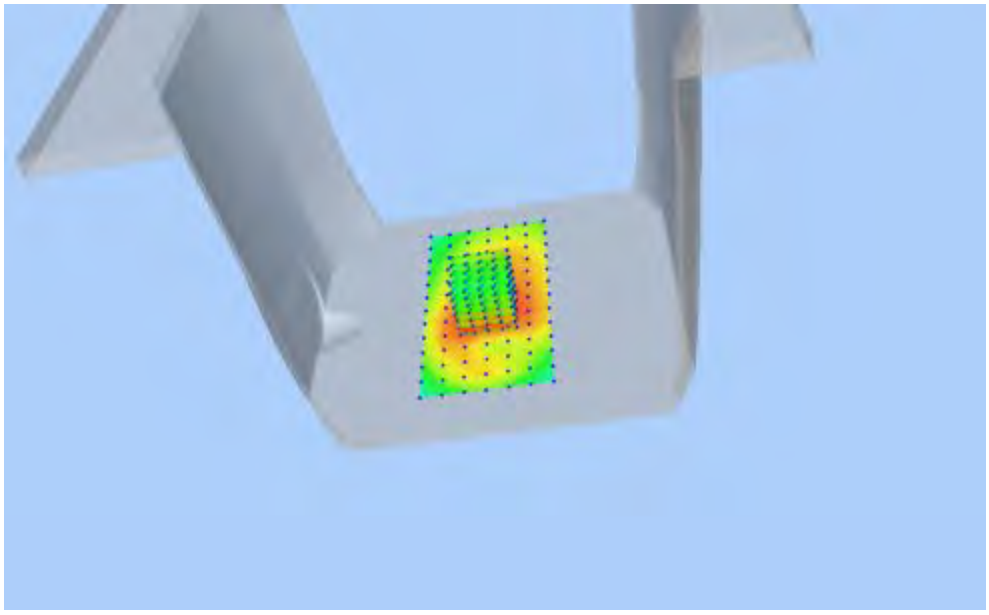


MEAS. 35 Body Plane with Body-worn in Back side on Low Channel in LTE

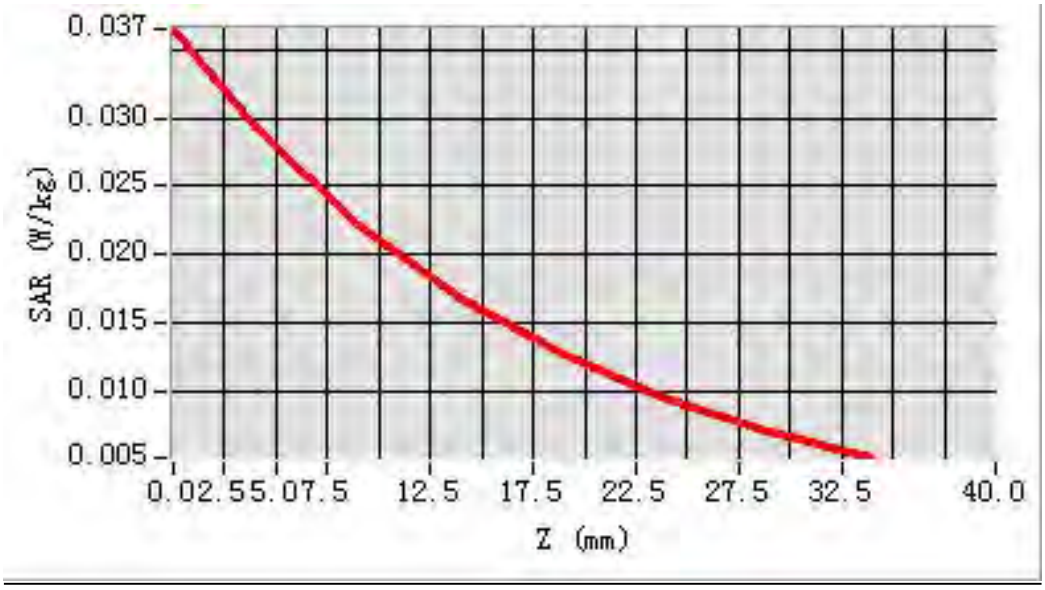
Band 17 25RB mode

Test Date:	18/8/2015
Signal:	LTE, f=704.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 55.71; Conductivity: 1.04 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.36
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=-12.000000
SAR 10g (W/Kg):	0.022123
SAR 1g (W/Kg):	0.030241
Power drift (%):	0.21

3D screen shot



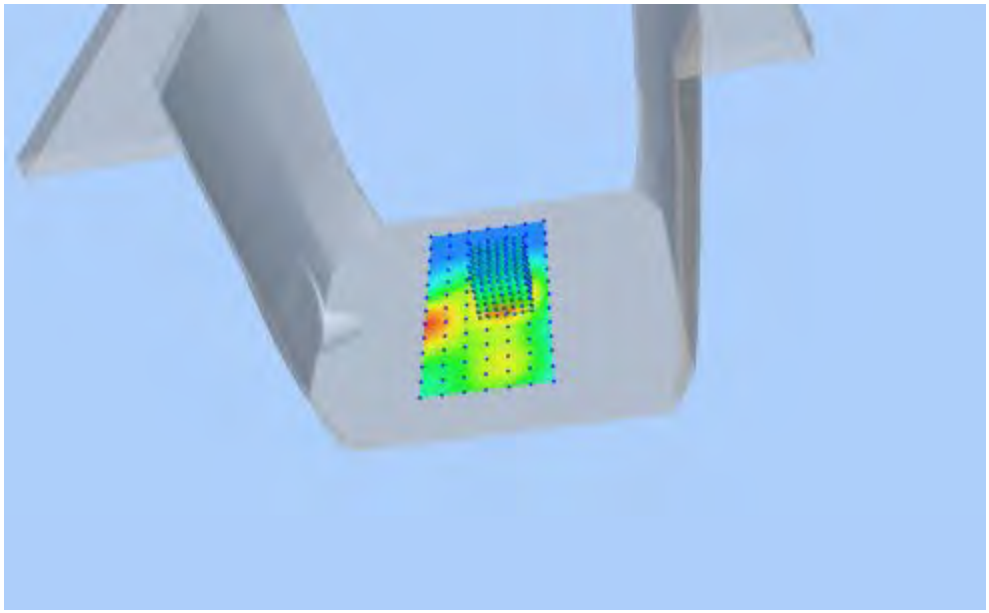
Z Axis Scan



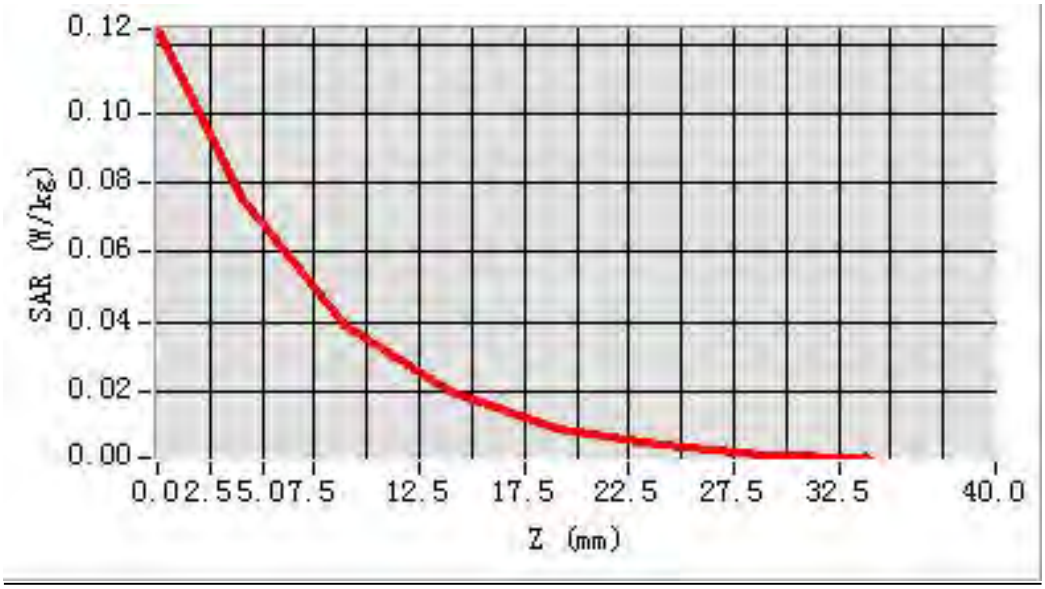
MEAS. 36 Body Plane with Body-worn in Back Side on Low Channel in IEEE 802.b mode

Test Date:	27/8/2015
Signal:	WLAN, f=2412.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 52.75; Conductivity: 1.91 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 26.09
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location:	X=8.000000, Y=0.000000
SAR 10g (W/Kg):	0.037605
SAR 1g (W/Kg):	0.072412
Power drift (%):	-0.59

3D screen shot



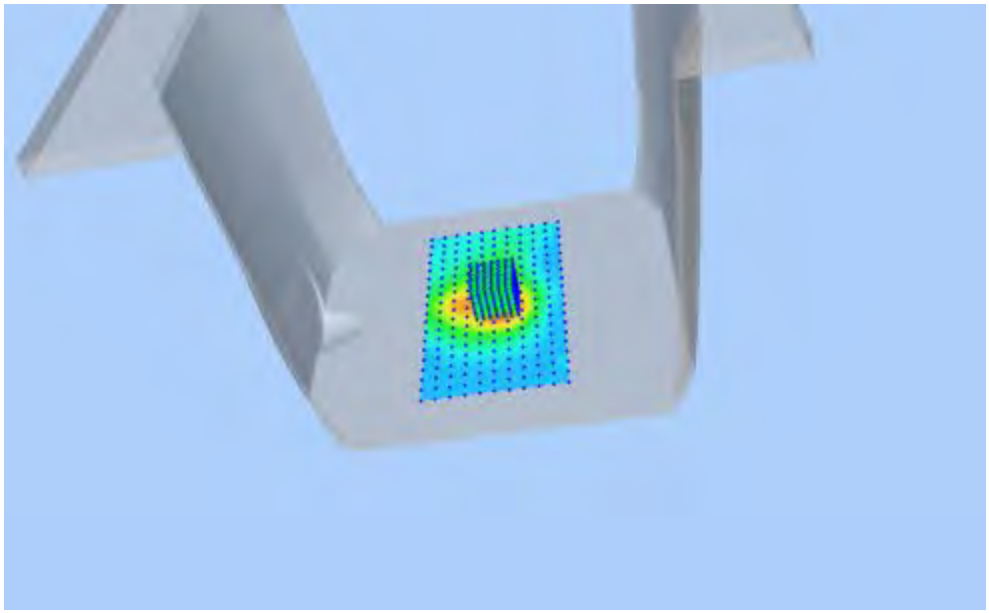
Z Axis Scan



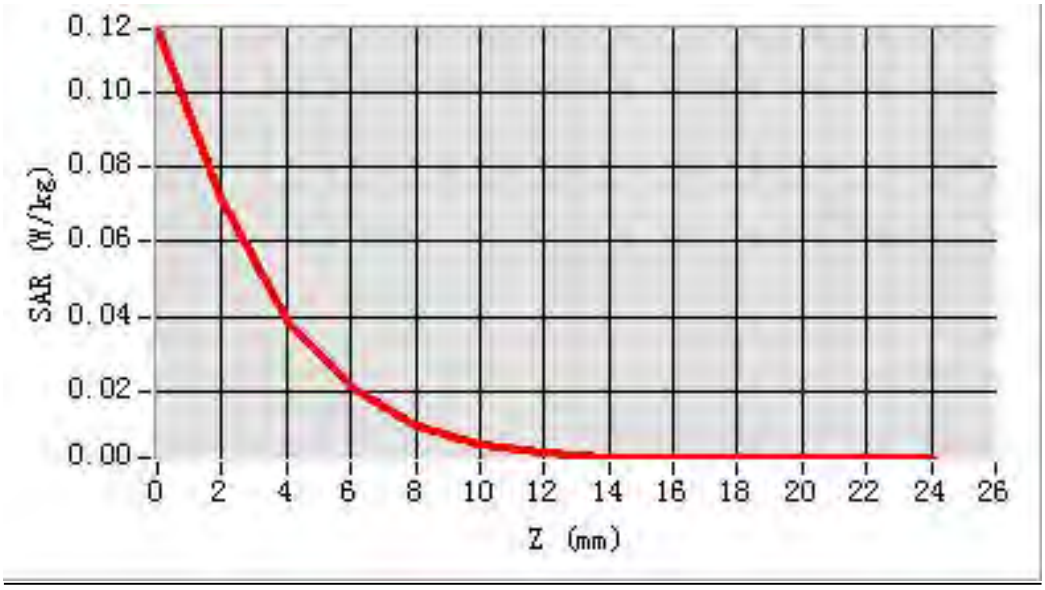
MEAS. 37 Body Plane with Body-worn in Back Side on Channel 36 in IEEE 802.a mode

Test Date:	6/9/2015
Signal:	WLAN, f=5180.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 35.65; Conductivity: 4.97 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 22.88
Area Scan:	sam_direct_droit2_surf8mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=4mm, dy=4mm, dz=2mm,Complete
Maximum location:	X=0.000000, Y=0.000000
SAR 10g (W/Kg):	0.020564
SAR 1g (W/Kg):	0.045036
Power drift (%):	1.32

3D screen shot



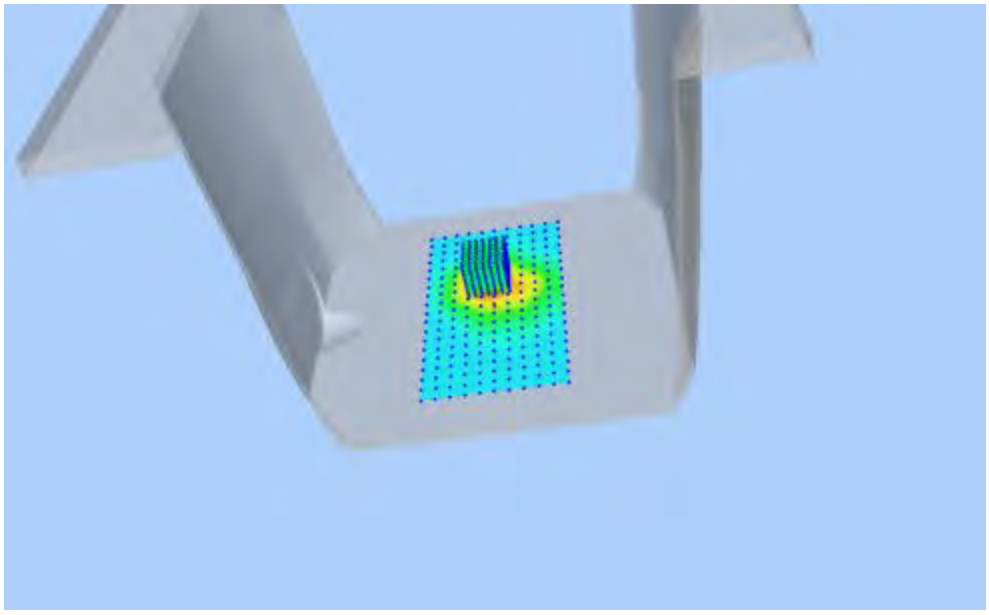
Z Axis Scan



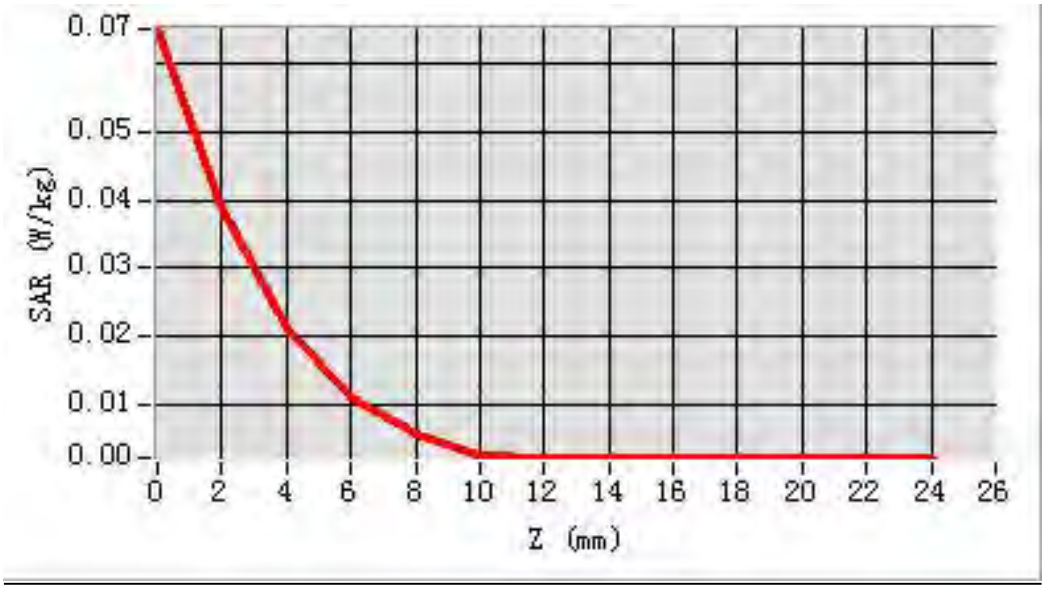
MEAS. 38 Body Plane with Body-worn in Front Side on Channel 165 in IEEE 802.ac(HT-20) mode

Test Date:	31/8/2015
Signal:	WLAN, f=5825.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 36.03; Conductivity: 4.63 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 22.88
Area Scan:	sam_direct_droit2_surf8mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=4mm, dy=4mm, dz=2mm,Complete
Maximum location:	X=0.000000, Y=24.000000
SAR 10g (W/Kg):	0.011061
SAR 1g (W/Kg):	0.024385
Power drift (%):	2.20

3D screen shot



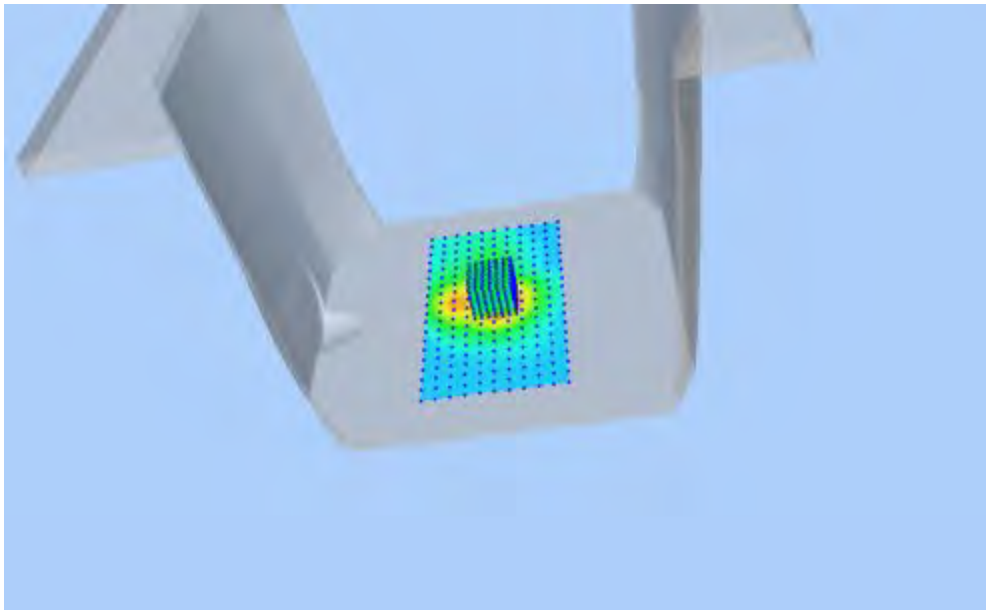
Z Axis Scan



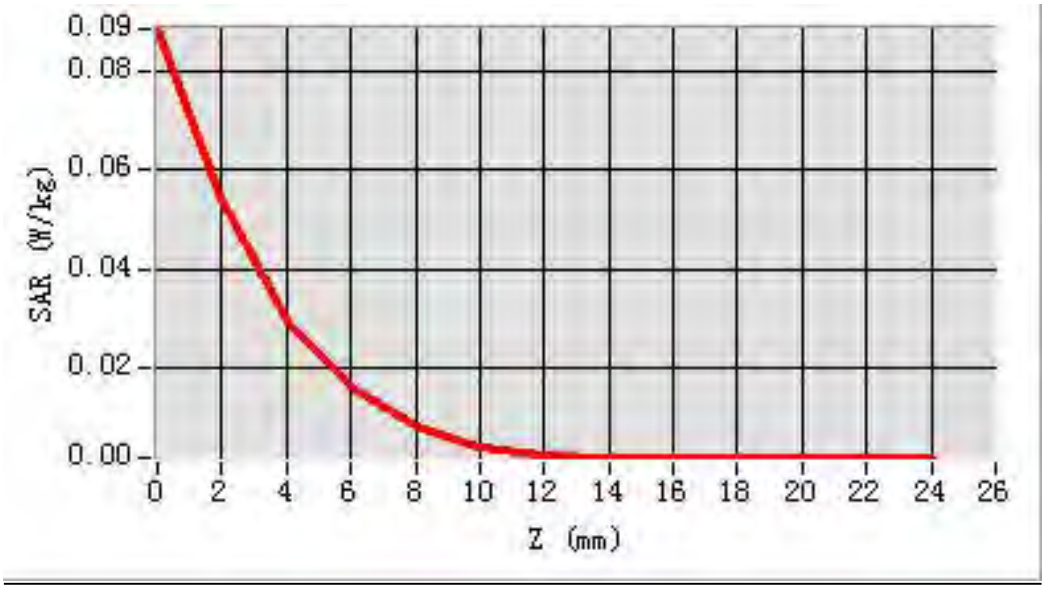
MEAS. 39 Body Plane with Body-worn in Front Side on Channel 159 in IEEE 802.n(HT-20) mode

Test Date:	31/8/2015
Signal:	WLAN, f=5795.0 MHz, f=5500.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 35.65; Conductivity: 4.97 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 22.88
Area Scan:	sam_direct_droit2_surf8mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=4mm, dy=4mm, dz=2mm,Complete
Maximum location:	X=0.000000, Y=0.000000
SAR 10g (W/Kg):	0.014054
SAR 1g (W/Kg):	0.033119
Power drift (%):	-0.08

3D screen shot



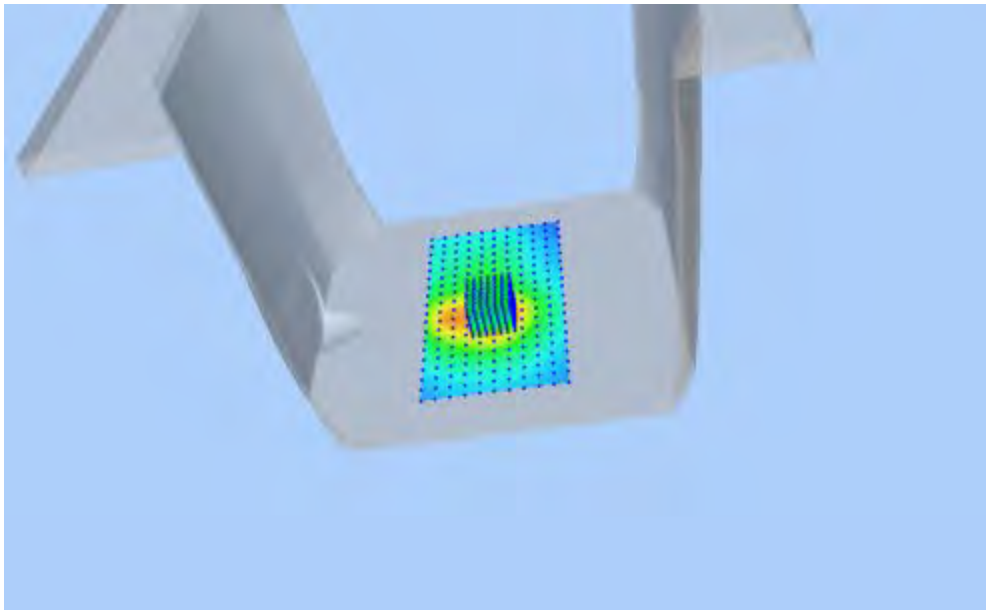
Z Axis Scan



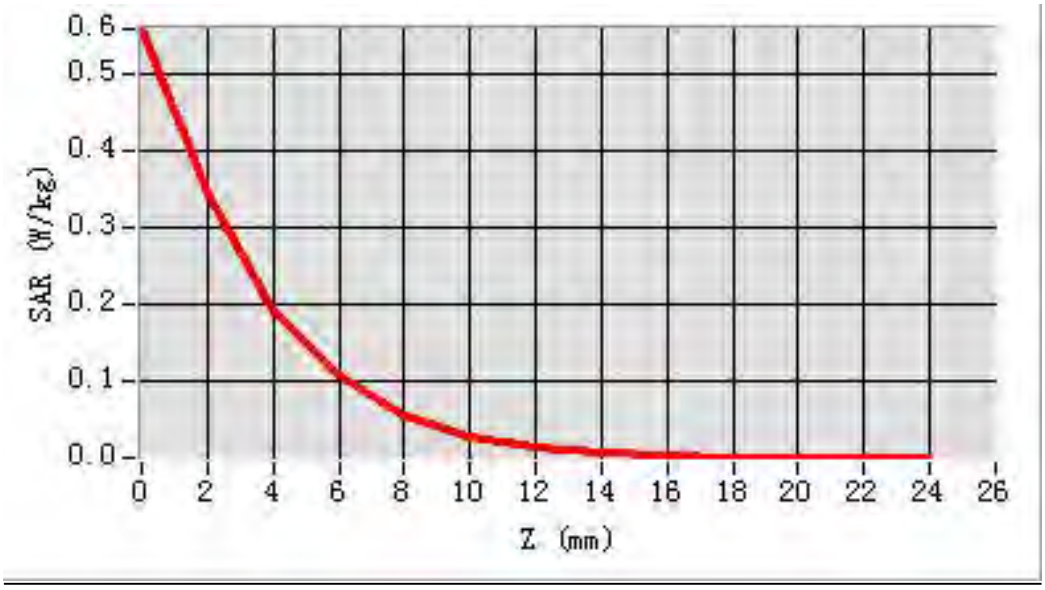
MEAS. 40 Body Plane with Body-worn in Front Side on Channel 165 in IEEE 802.n(HT-40) mode

Test Date:	31/8/2015
Signal:	WLAN, f=5825.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 36.03; Conductivity: 4.63 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 22.88
Area Scan:	sam_direct_droit2_surf8mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=4mm, dy=4mm, dz=2mm,Complete
Maximum location:	X=0.000000, Y=-16.000000
SAR 10g (W/Kg):	0.096207
SAR 1g (W/Kg):	0.222324
Power drift (%):	-0.73

3D screen shot



Z Axis Scan

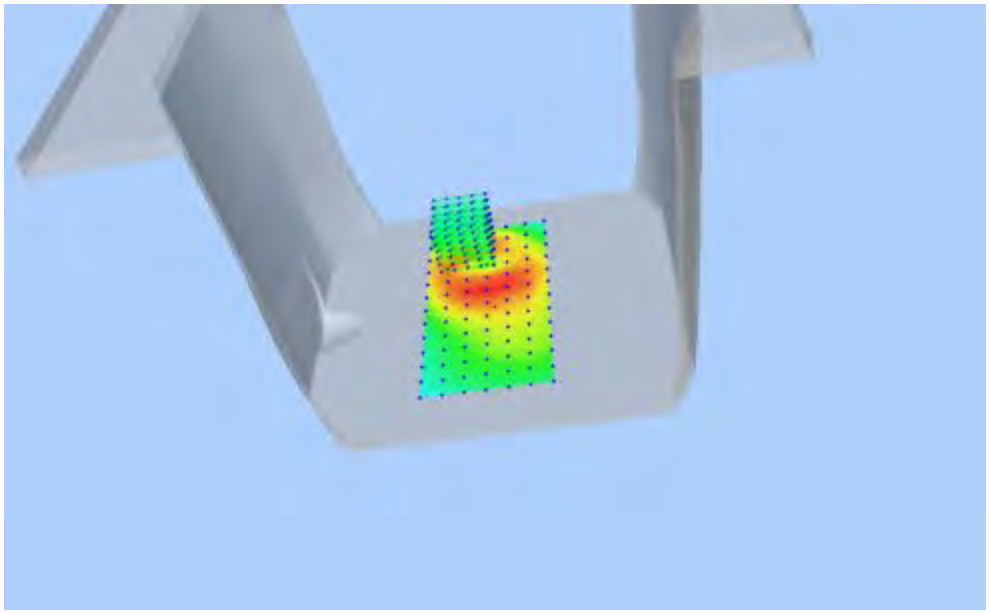


MEAS. 41 Body Plane with Front Side on Low Channel in GPRS850-12

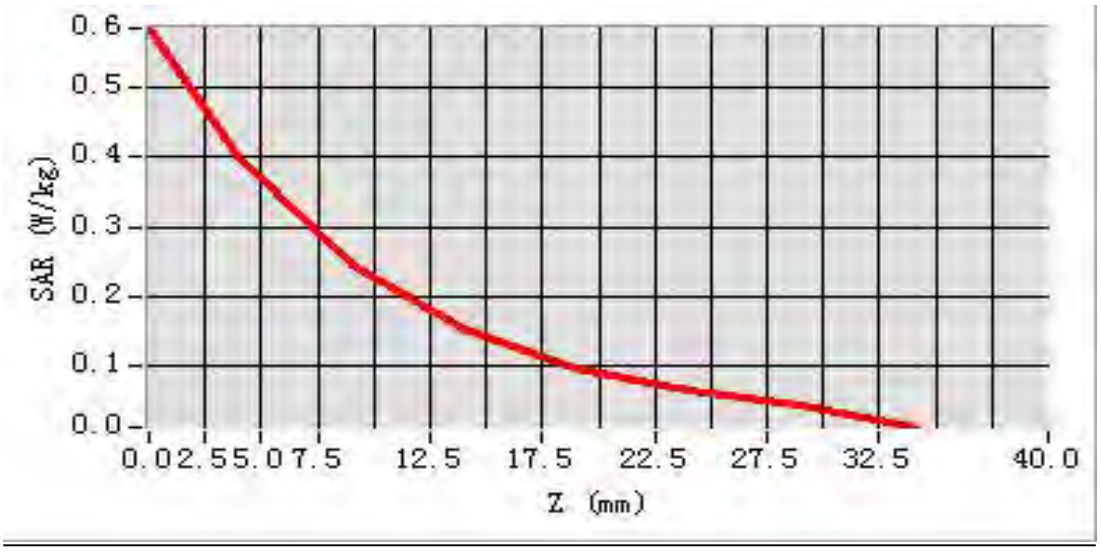
Hotspot mode

Test Date:	20/8/2015
Signal:	GSM, f=824.2 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 55.24; Conductivity: 0.98 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 24.58
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-16.000000, Y=48.000000
SAR 10g (W/Kg):	0.207682
SAR 1g (W/Kg):	0.382983
Power drift (%):	-0.94

3D screen shot



Z Axis Scan

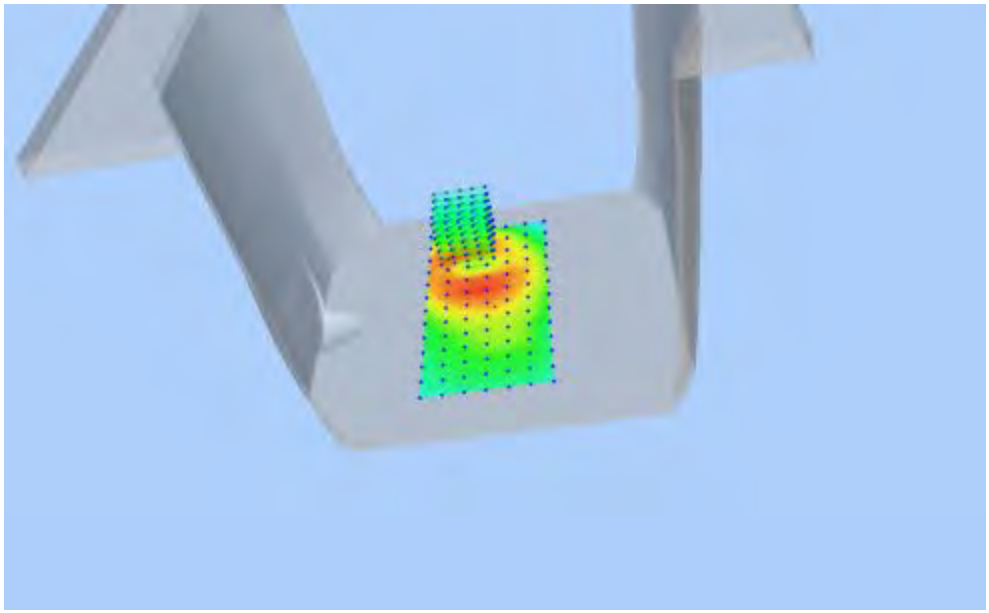


MEAS. 42 Body Plane with Front Side on Low Channel in EGPRS850-12

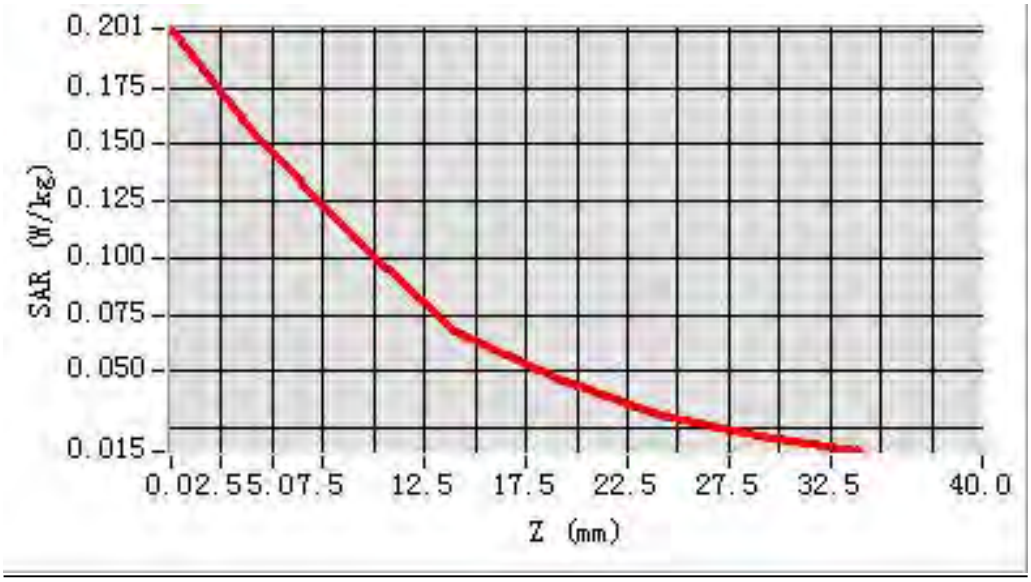
Hotspot mode

Test Date:	20/8/2015
Signal:	GSM, f=824.2 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 55.24; Conductivity: 0.98 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 24.58
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-16.000000, Y=60.000000
SAR 10g (W/Kg):	0.091895
SAR 1g (W/Kg):	0.161710
Power drift (%):	-0.39

3D screen shot



Z Axis Scan

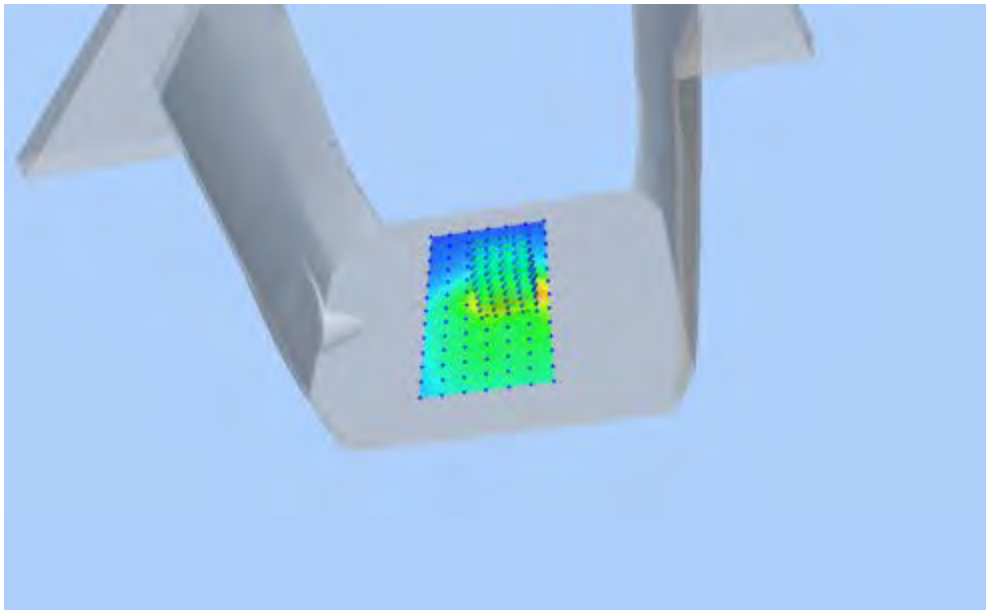


MEAS. 43 Body Plane with Front side on Middle Channel in GPRS1900-12

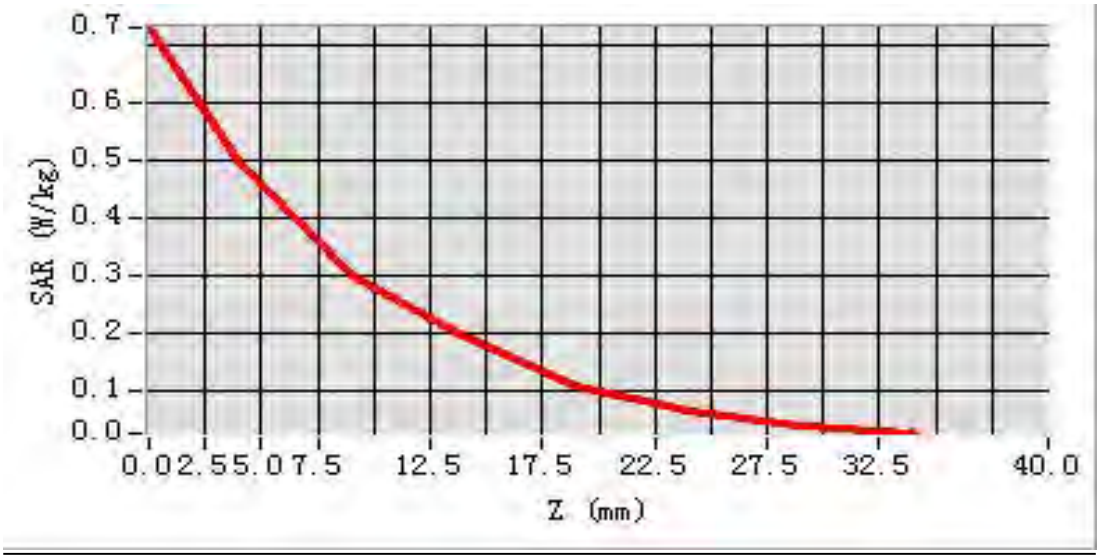
Hotspot mode

Test Date:	23/8/2015
Signal:	GSM, f=1880.0 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 53.30; Conductivity: 1.52 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=8.000000, Y=0.000000
SAR 10g (W/Kg):	0.250121
SAR 1g (W/Kg):	0.476962
Power drift (%):	4.56

3D screen shot



Z Axis Scan

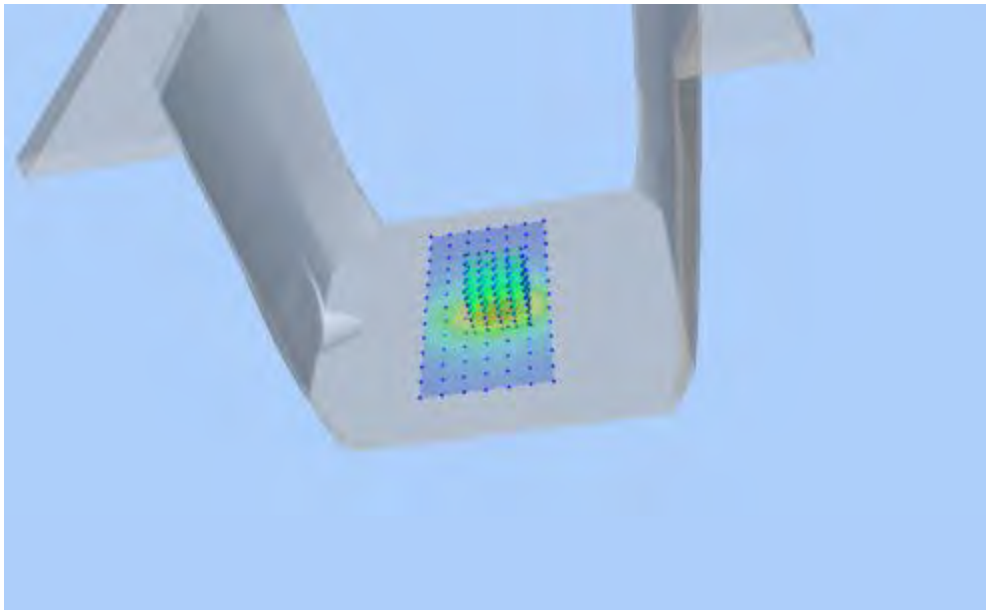


MEAS. 44 Body Plane with Bottom side on Low Channel in EGPRS1900-12

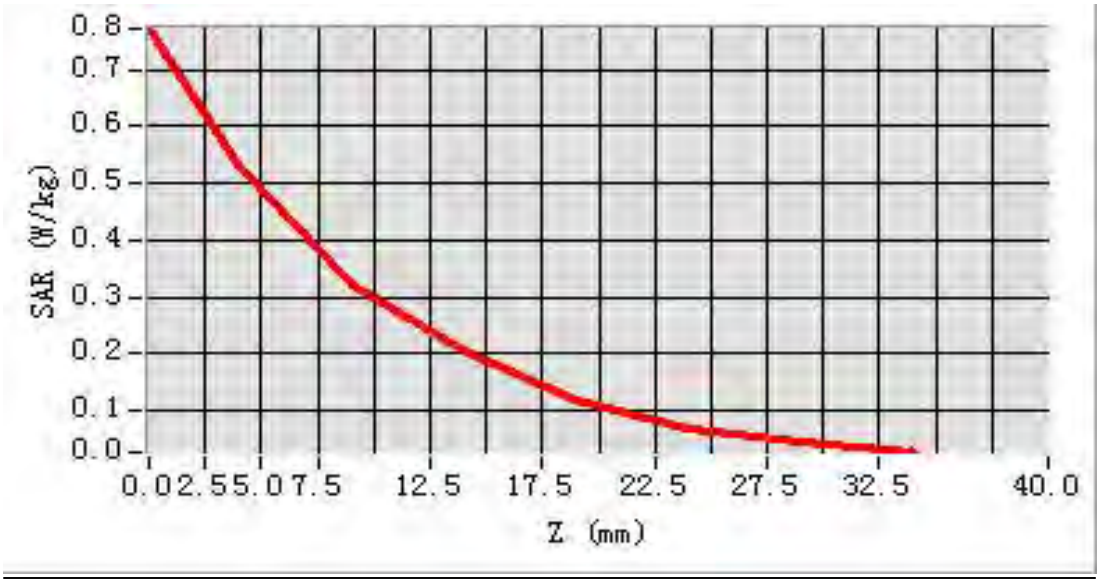
Hotspot mode

Test Date:	23/8/2015
Signal:	GSM, f=1850.2 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 53.30; Conductivity: 1.52 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=8.000000, Y=-12.000000
SAR 10g (W/Kg):	0.263535
SAR 1g (W/Kg):	0.495358
Power drift (%):	-0.48

3D screen shot



Z Axis Scan

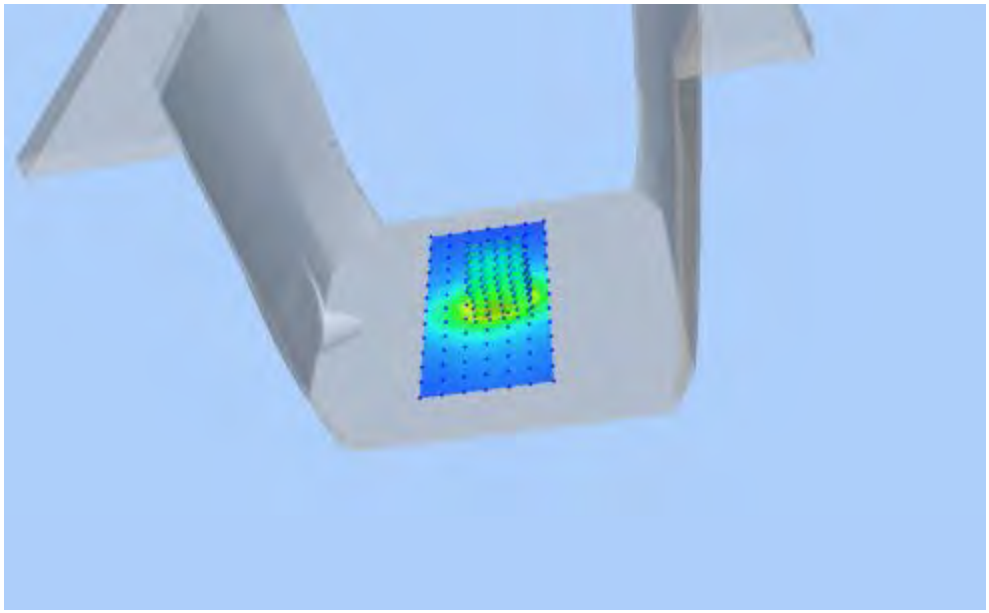


MEAS. 45 Body Plane with Bottom Side on High Channel in WCDMA Band 2

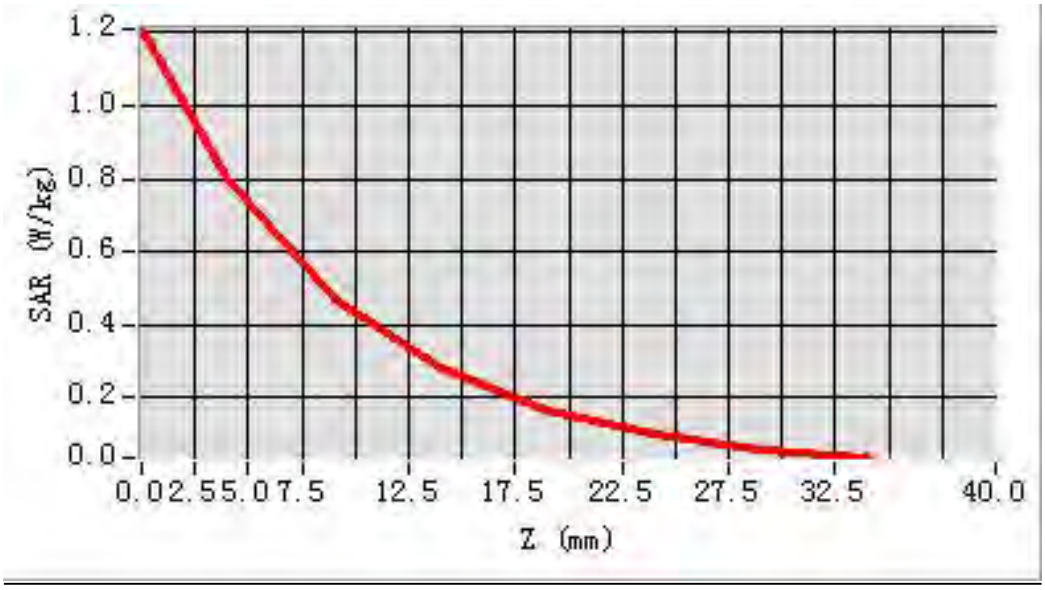
Hotspot mode

Test Date:	23/8/2015
Signal:	WCDMA, f=1907.6 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.30; Conductivity: 1.52 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=8.000000, Y=0.000000
SAR 10g (W/Kg):	0.387241
SAR 1g (W/Kg):	0.747145
Power drift (%):	-0.44

3D screen shot



Z Axis Scan

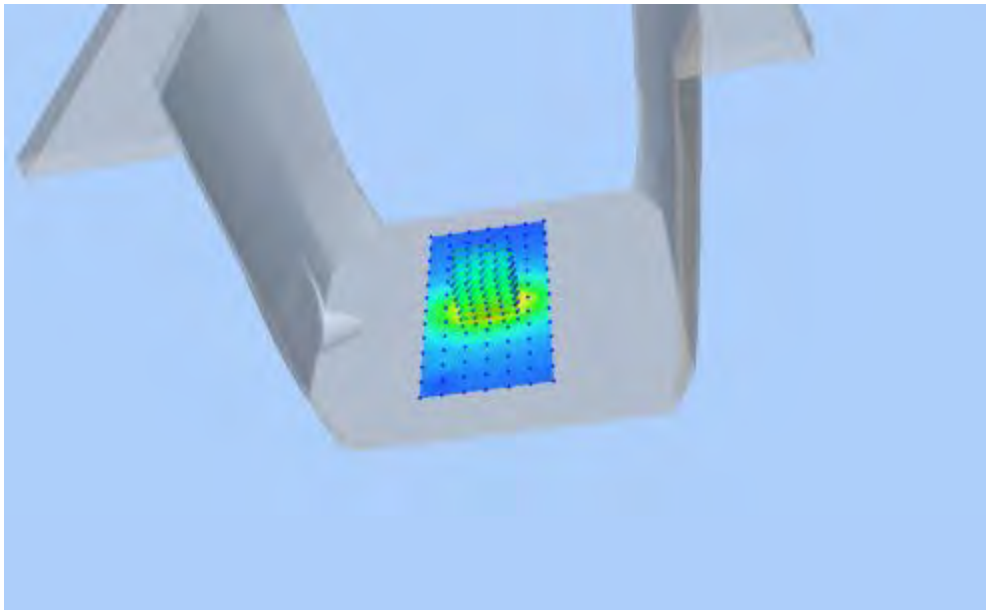


MEAS. 46 Body Plane with Bottom Side on High Channel in WCDMA Band 4

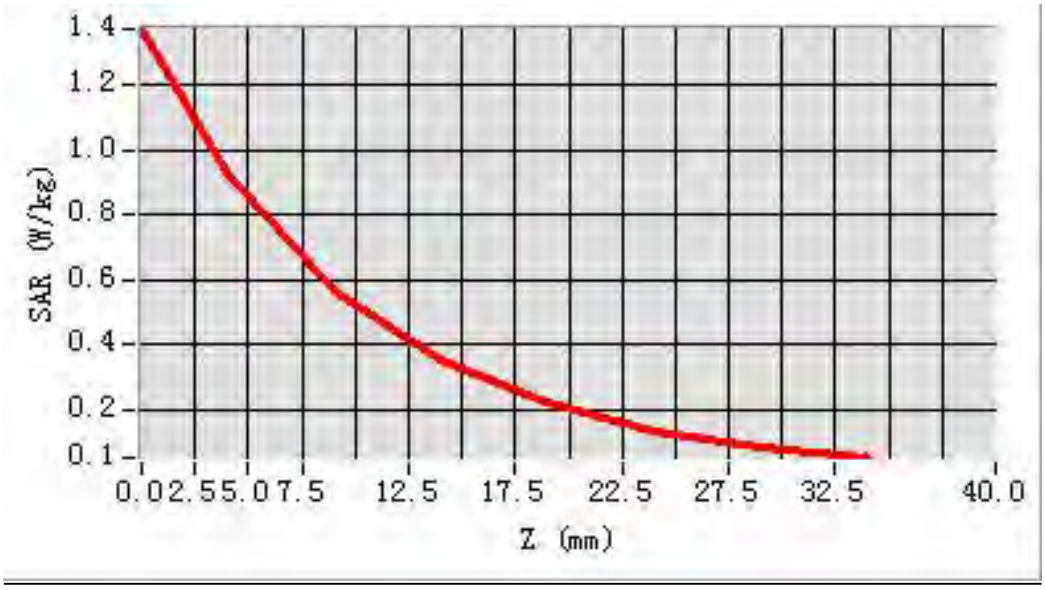
Hotspot mode

Test Date:	26/8/2015
Signal:	WCDMA, f=1752.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.43; Conductivity: 1.49 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.69
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=0.000000
SAR 10g (W/Kg):	0.468633
SAR 1g (W/Kg):	0.869388
Power drift (%):	-1.27

3D screen shot



Z Axis Scan

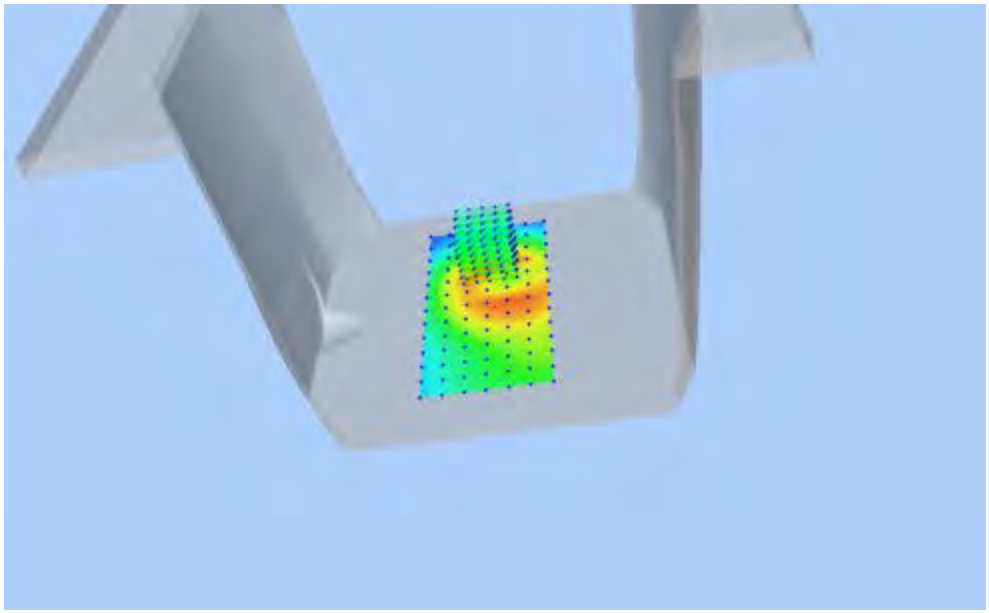


MEAS. 47 Body Plane with Front sideon High Channel in WCDMA Band 5

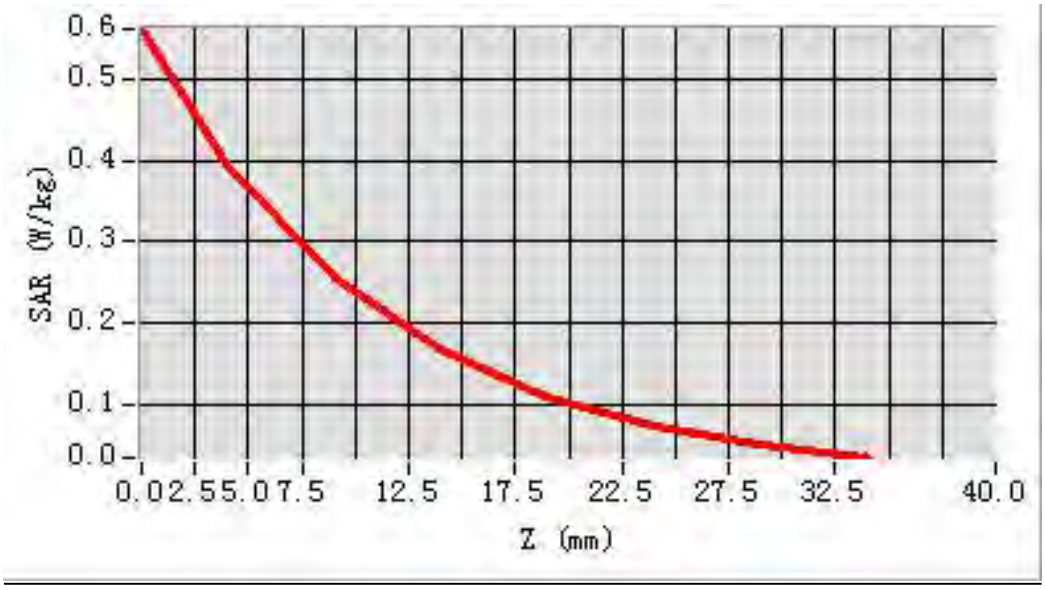
Hotspot mode

Test Date:	20/8/2015
Signal:	WCDMA, f=846.6 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 55.16; Conductivity: 0.98 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 24.58
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=36.000000
SAR 10g (W/Kg):	0.217978
SAR 1g (W/Kg):	0.375284
Power drift (%):	0.57

3D screen shot



Z Axis Scan

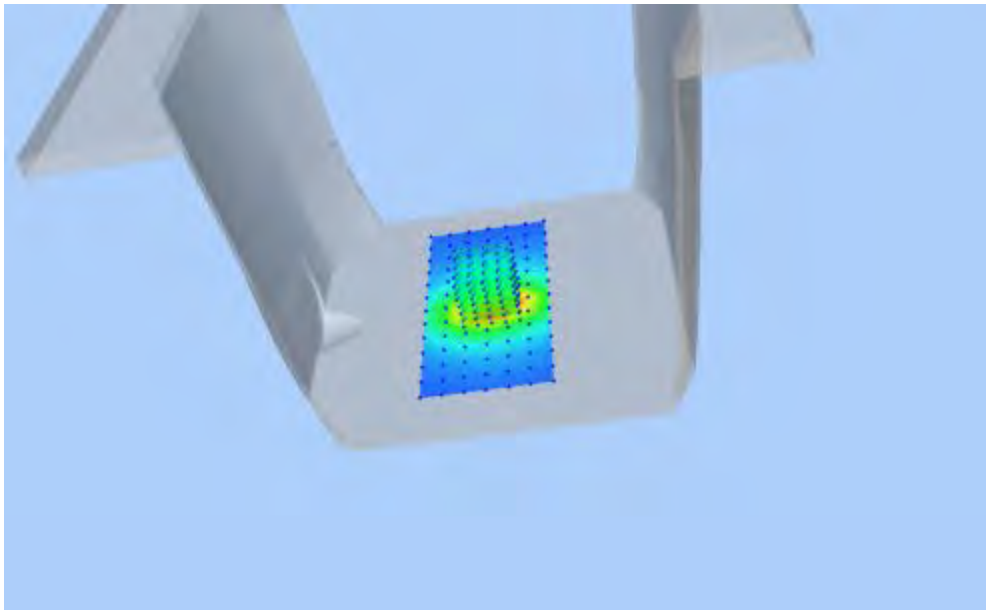


MEAS. 48 Body Plane with Bottom Side on Low Channel in LTE Band 2

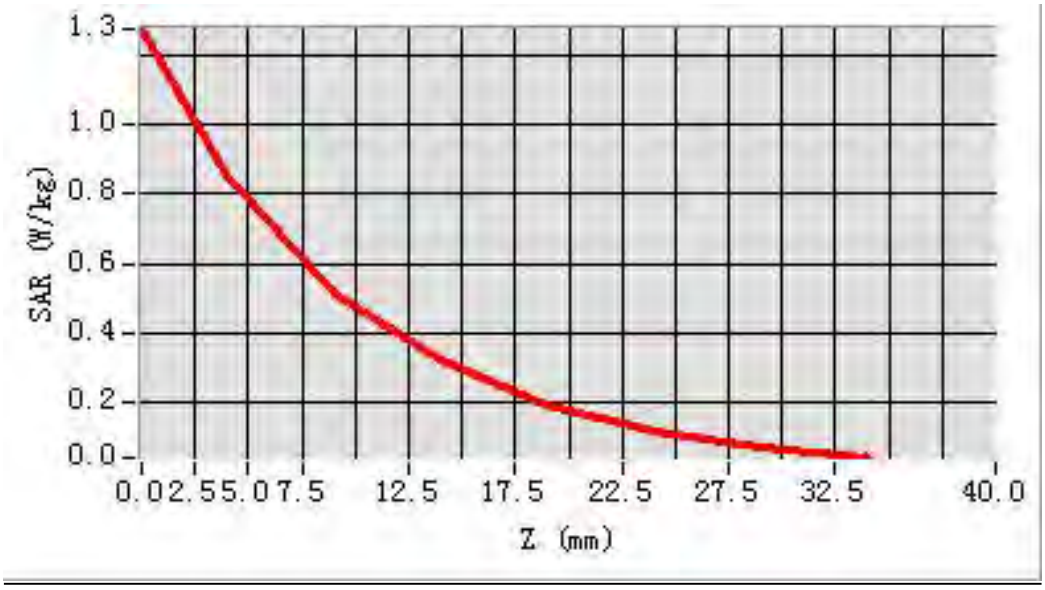
Hotspot 1RB mode

Test Date:	23/8/2015
Signal:	LTE, f=1850.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.30; Conductivity: 1.52 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=0.000000
SAR 10g (W/Kg):	0.439376
SAR 1g (W/Kg):	0.809257
Power drift (%):	-2.98

3D screen shot



Z Axis Scan

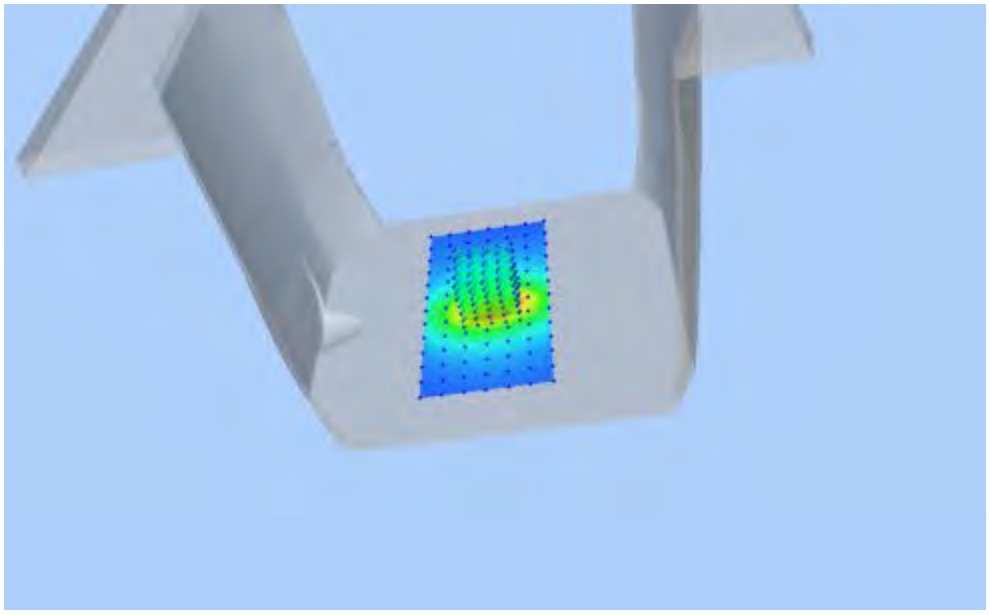


MEAS. 49 Body Plane with Bottom Side on Low Channel in LTE Band 2

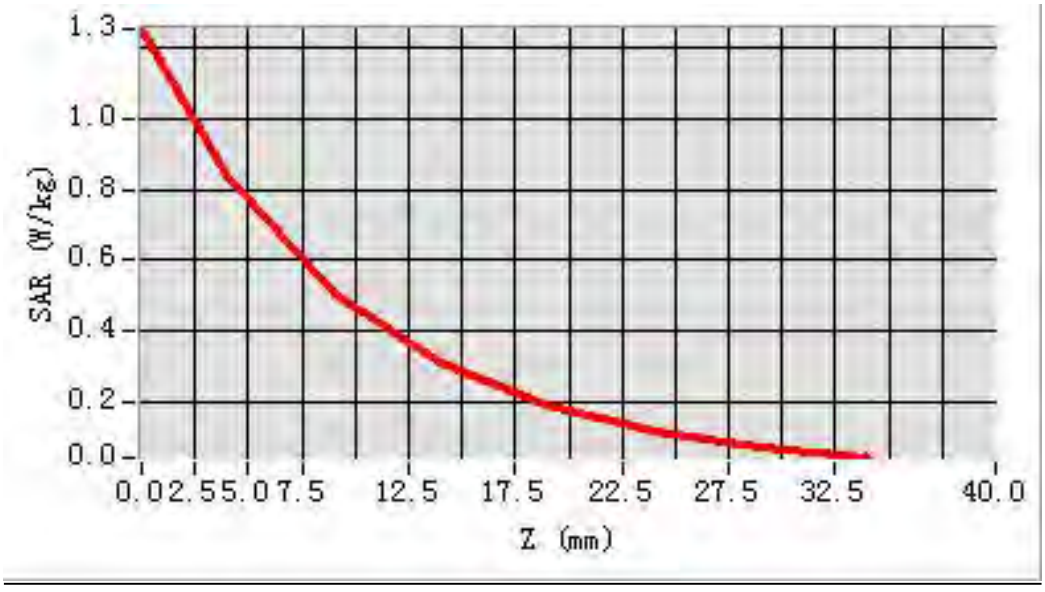
Hotspot 50RB mode

Test Date:	27/8/2015
Signal:	LTE, f=1850.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.30; Conductivity: 1.52 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=0.000000
SAR 10g (W/Kg):	0.411906
SAR 1g (W/Kg):	0.727045
Power drift (%):	-0.79

3D screen shot



Z Axis Scan

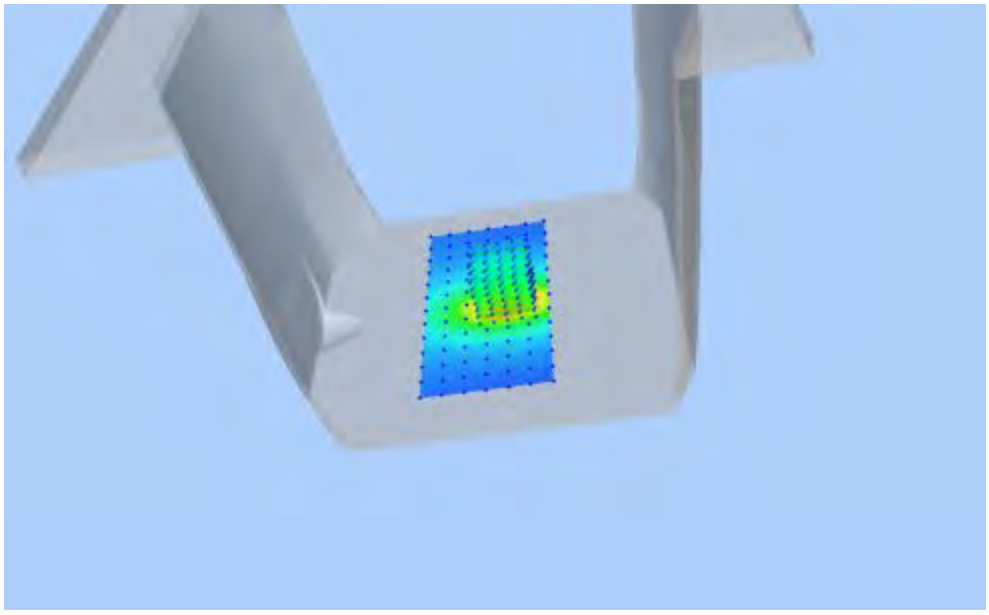


MEAS. 50 Body Plane with Bottom Side on Low Channel in LTE Band 4

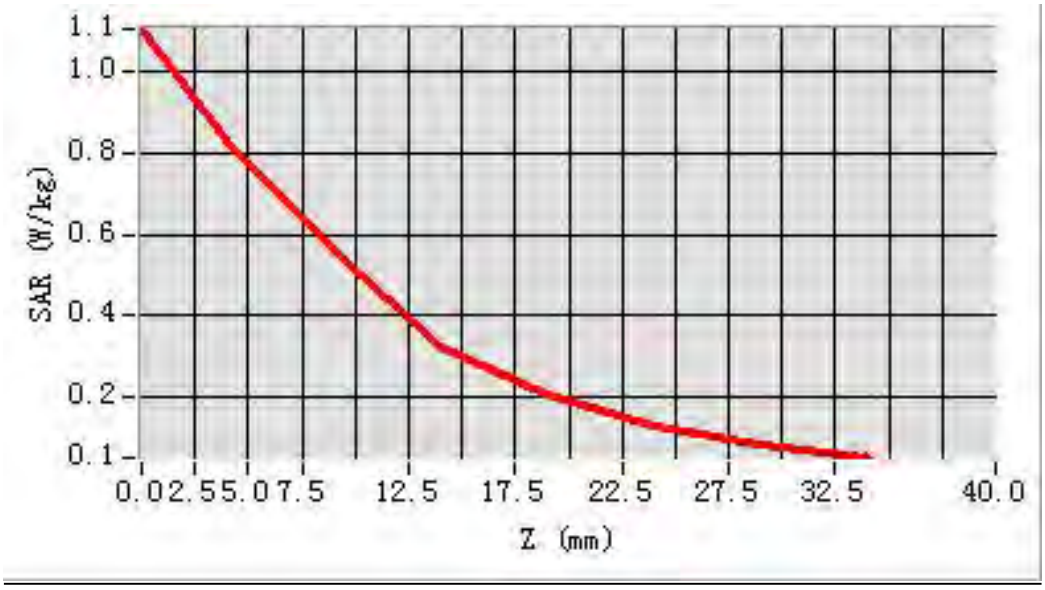
Hotspot 1RB mode

Test Date:	27/8/2015
Signal:	LTE, f=1710.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.54; Conductivity: 1.46 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.69
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=8.000000, Y=0.000000
SAR 10g (W/Kg):	0.411189
SAR 1g (W/Kg):	0.702319
Power drift (%):	-4.53

3D screen shot



Z Axis Scan

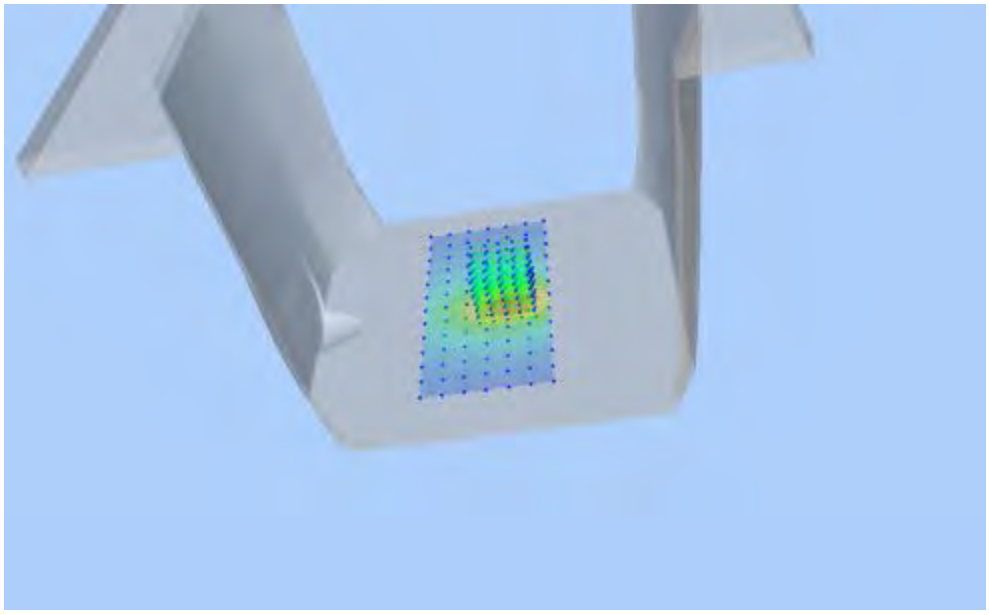


MEAS. 51 Body Plane with Bottom Side on Low Channel in LTE Band 4

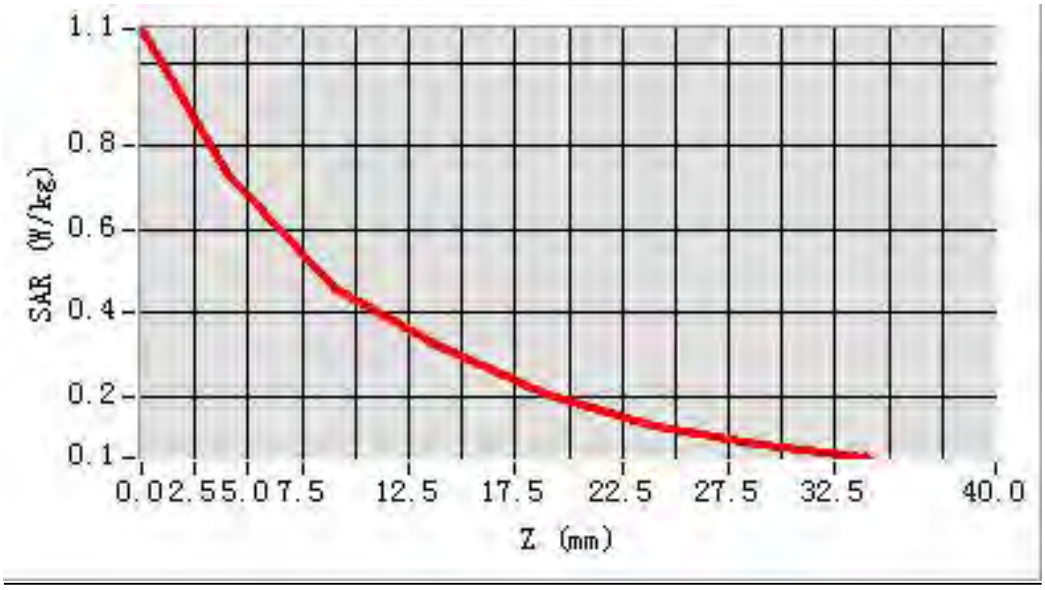
Hotspot 50RB mode

Test Date:	27/8/2015
Signal:	LTE, f=1710.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.54; Conductivity: 1.46 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.69
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=8.000000, Y=0.000000
SAR 10g (W/Kg):	0.395087
SAR 1g (W/Kg):	0.6990489
Power drift (%):	3.13

3D screen shot



Z Axis Scan

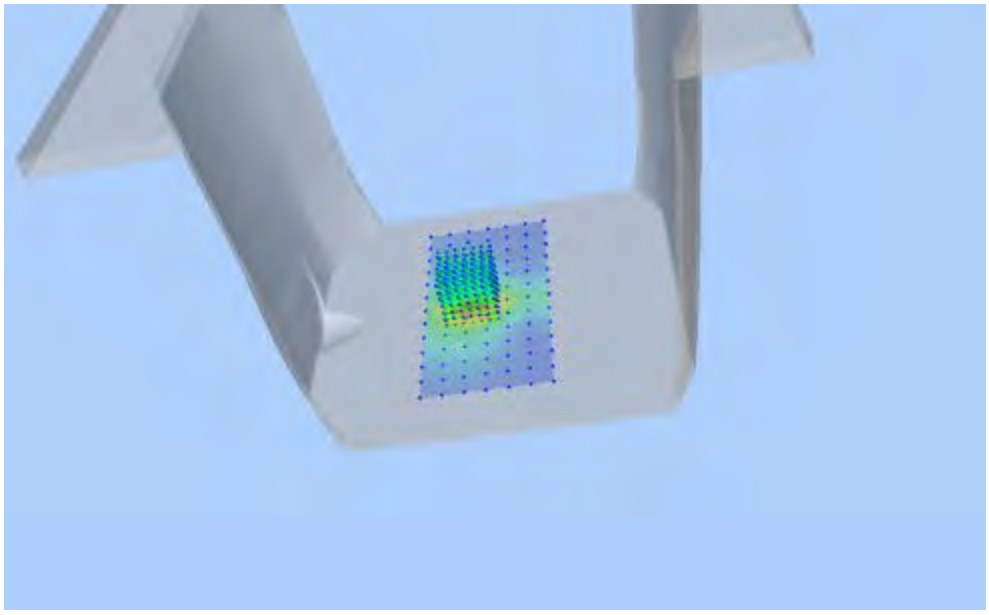


MEAS. 52 Body Plane with Bottom Side on Low Channel in LTE Band 7

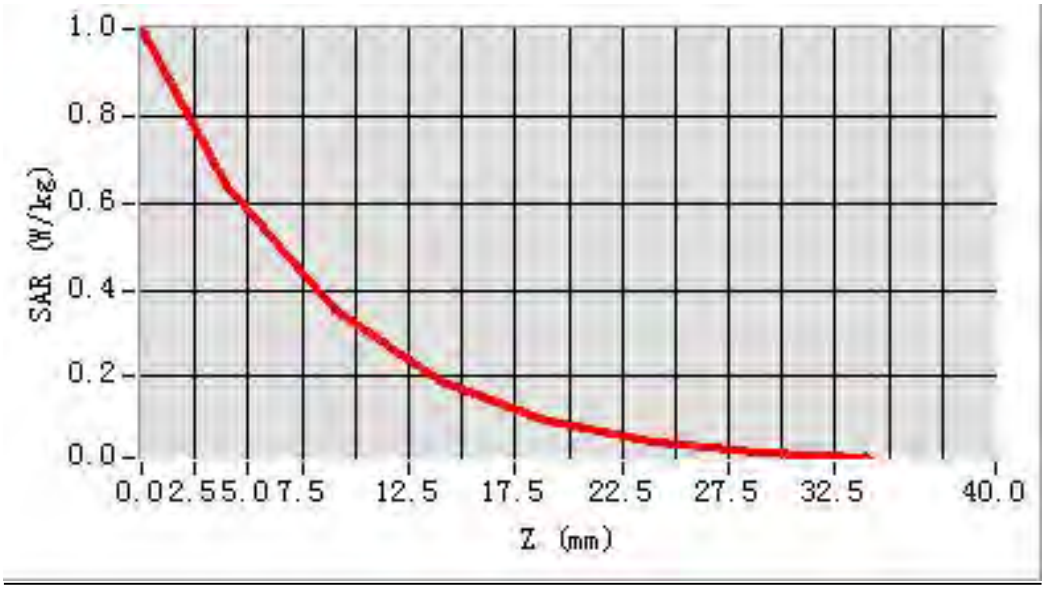
Hotspot 1RB mode

Test Date:	29/8/2015
Signal:	LTE, f=2500.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 51.19; Conductivity: 2.06 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 26.09
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location:	X=-16.000000, Y=0.000000
SAR 10g (W/Kg):	0.295056
SAR 1g (W/Kg):	0.594932
Power drift (%):	1.80

3D screen shot



Z Axis Scan

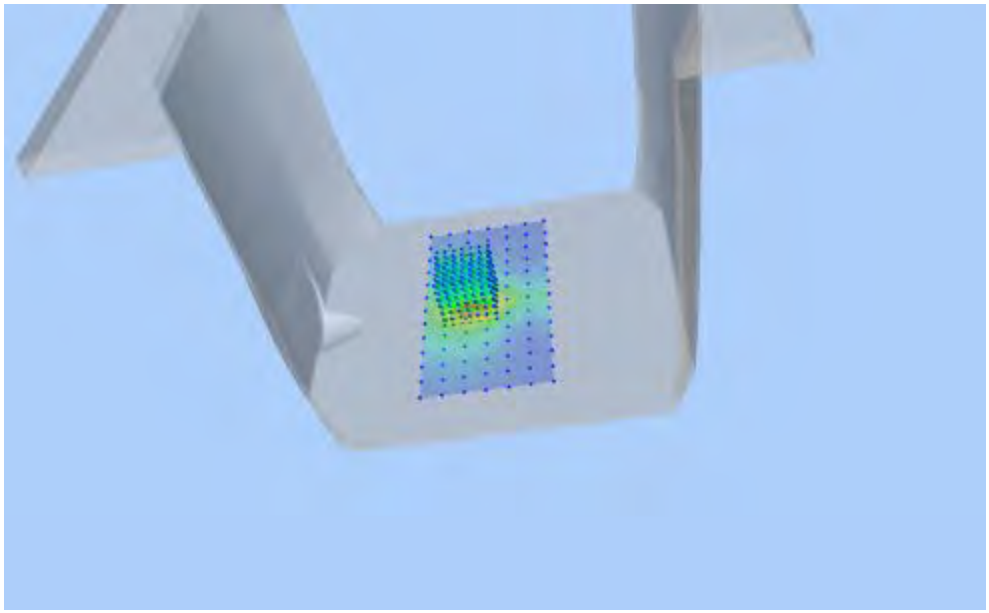


MEAS. 53 Body Plane with Bottom Side on Low Channel in LTE Band 7

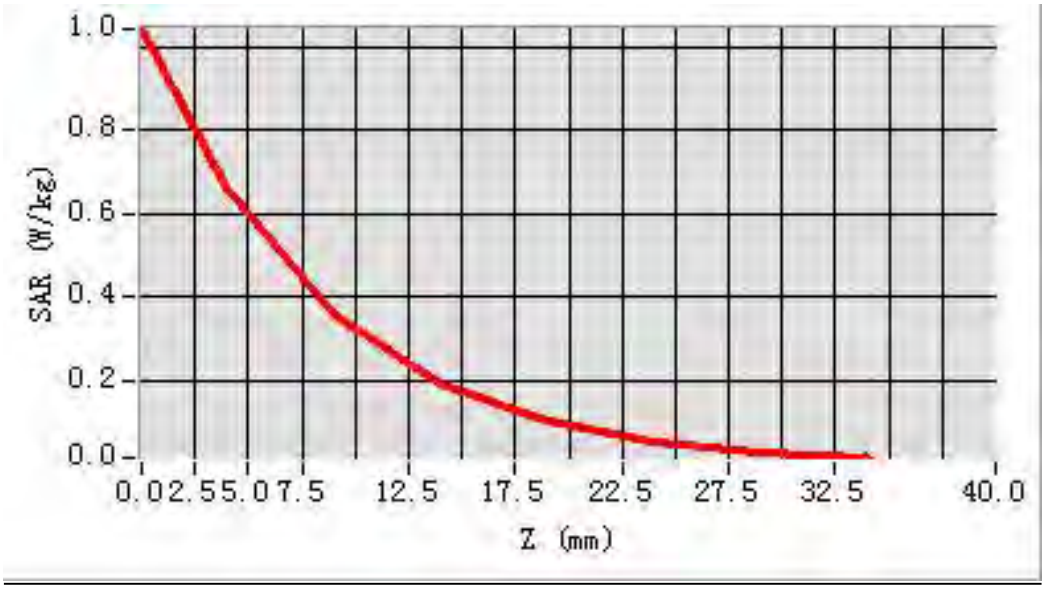
Hotspot 50RB mode

Test Date:	29/8/2015
Signal:	LTE, f=2500.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 51.19; Conductivity: 2.06 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 26.09
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location:	X=-16.000000, Y=0.000000
SAR 10g (W/Kg):	0.303311
SAR 1g (W/Kg):	0.616397
Power drift (%):	0.57

3D screen shot



Z Axis Scan

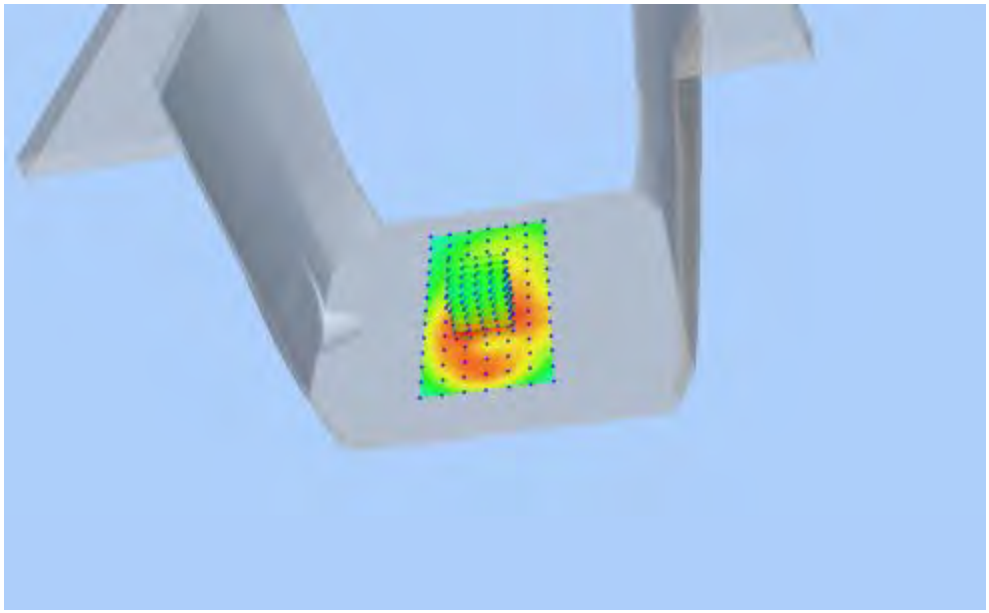


MEAS. 54 Body Plane with Back side on Low Channel in LTE Band 17 Hotspot

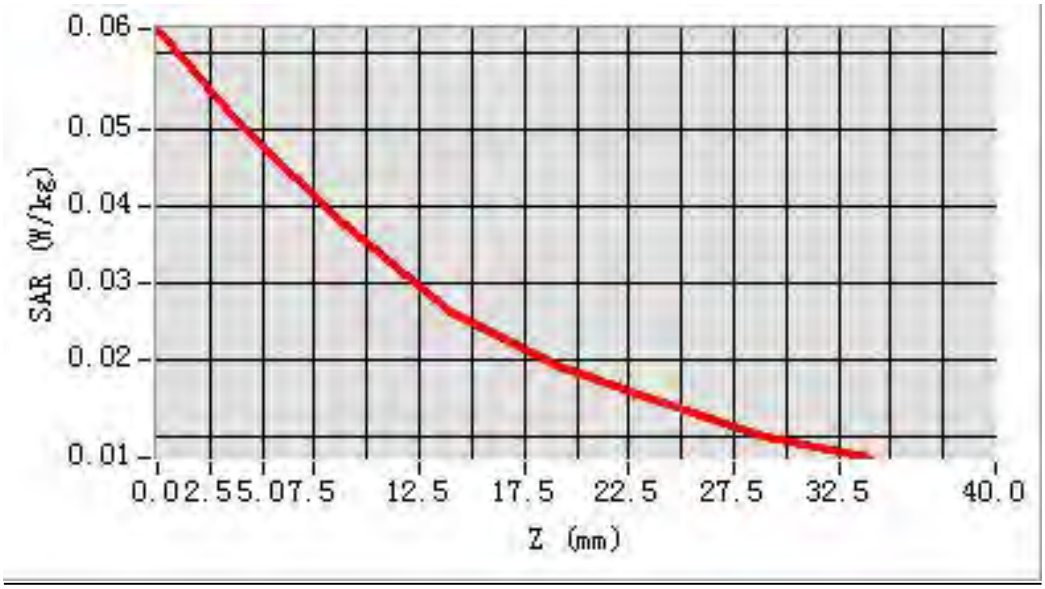
1RB mode

Test Date:	18/8/2015
Signal:	LTE, f=704.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 55.71; Conductivity: 1.04 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.36
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=-12.000000
SAR 10g (W/Kg):	0.036730
SAR 1g (W/Kg):	0.052424
Power drift (%):	0.86

3D screen shot



Z Axis Scan

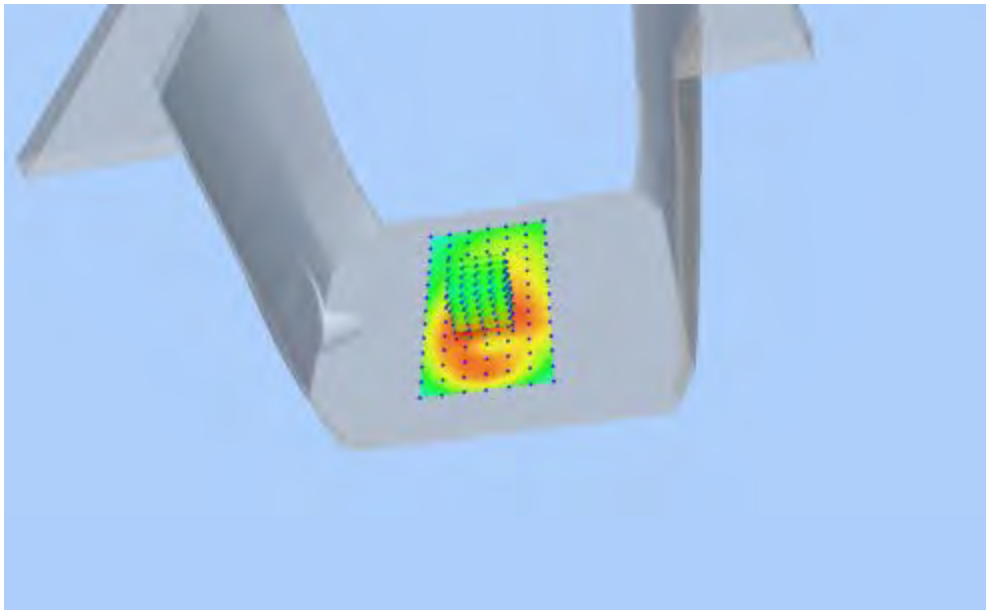


MEAS. 55 Body Plane with Back side on Low Channel in LTE Band 17 Hotspot

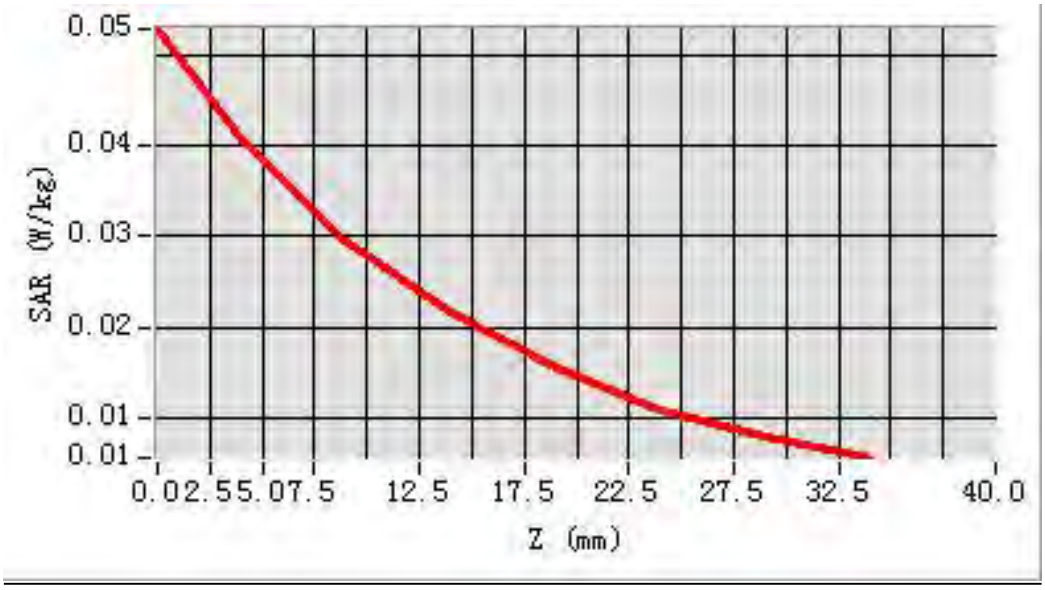
25RB mode

Test Date:	18/8/2015
Signal:	LTE, f=704.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 55.71; Conductivity: 1.04 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.36
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=-12.000000
SAR 10g (W/Kg):	0.029683
SAR 1g (W/Kg):	0.042364
Power drift (%):	-0.39

3D screen shot



Z Axis Scan

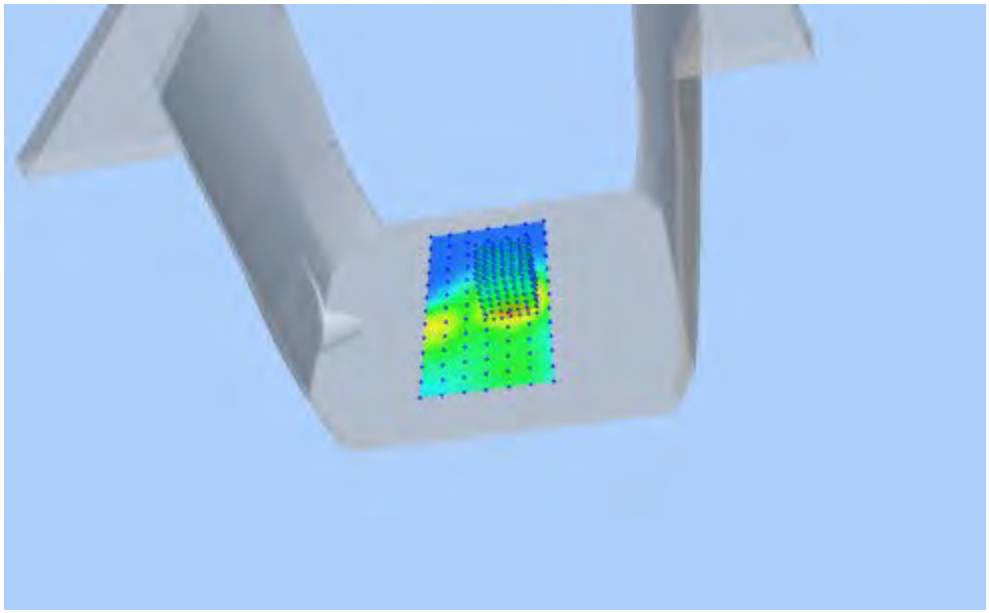


MEAS. 56 Body Plane with Back Side on Middle Channel in IEEE 802.b

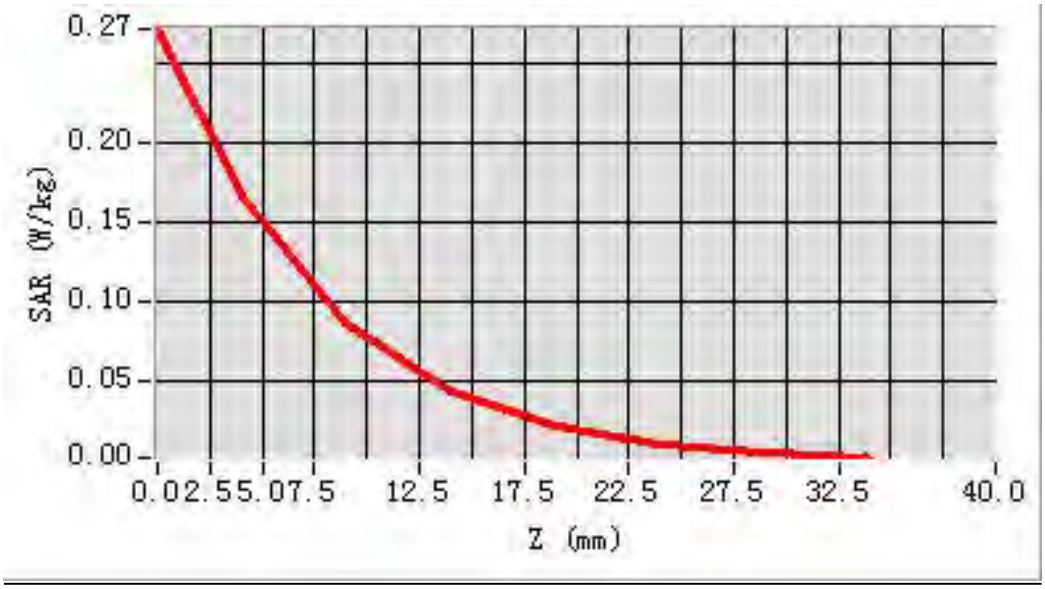
Hotspot mode

Test Date:	27/8/2015
Signal:	WLAN, f=2442.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 52.71; Conductivity: 1.94 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 26.09
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location:	X=8.000000, Y=0.000000
SAR 10g (W/Kg):	0.078732
SAR 1g (W/Kg):	0.156260
Power drift (%):	-0.40

3D screen shot



Z Axis Scan

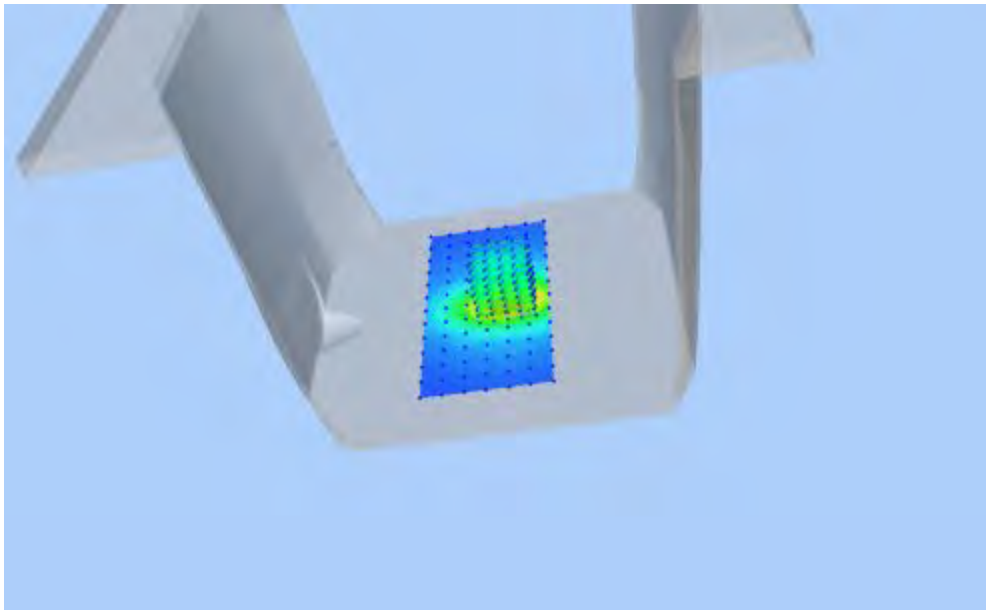


MEAS. 57 Body Plane with Bottom side on Low Channel in GPRS1900-12

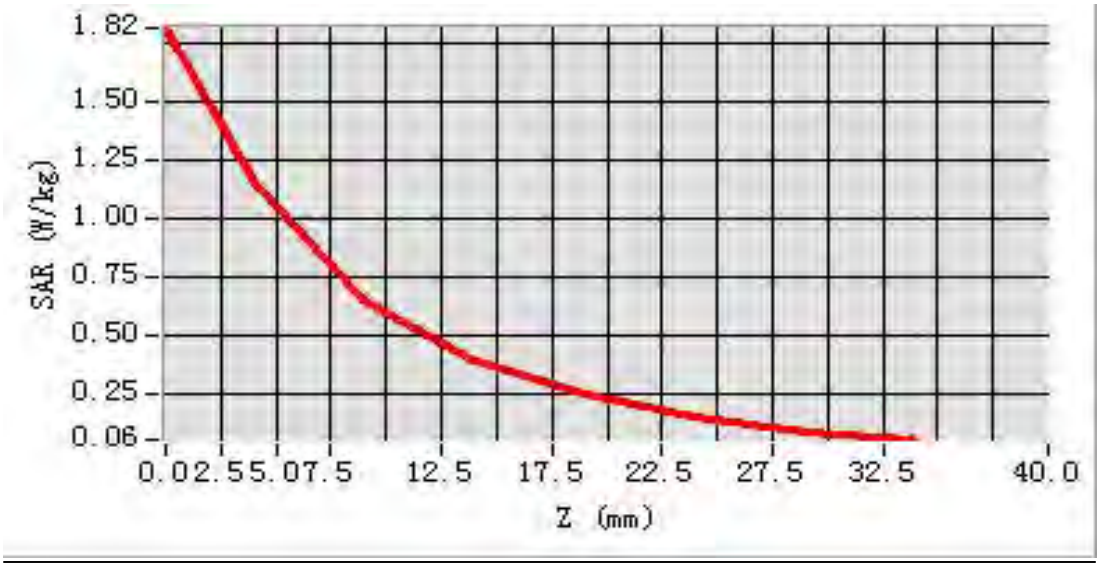
Hotspot mode

Test Date:	23/8/2015
Signal:	GSM, f=1850.2 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 53.30; Conductivity: 1.52 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=8.000000, Y=0.000000
SAR 10g (W/Kg):	0.541658
SAR 1g (W/Kg):	1.017714
Power drift (%):	-1.80

3D screen shot



Z Axis Scan

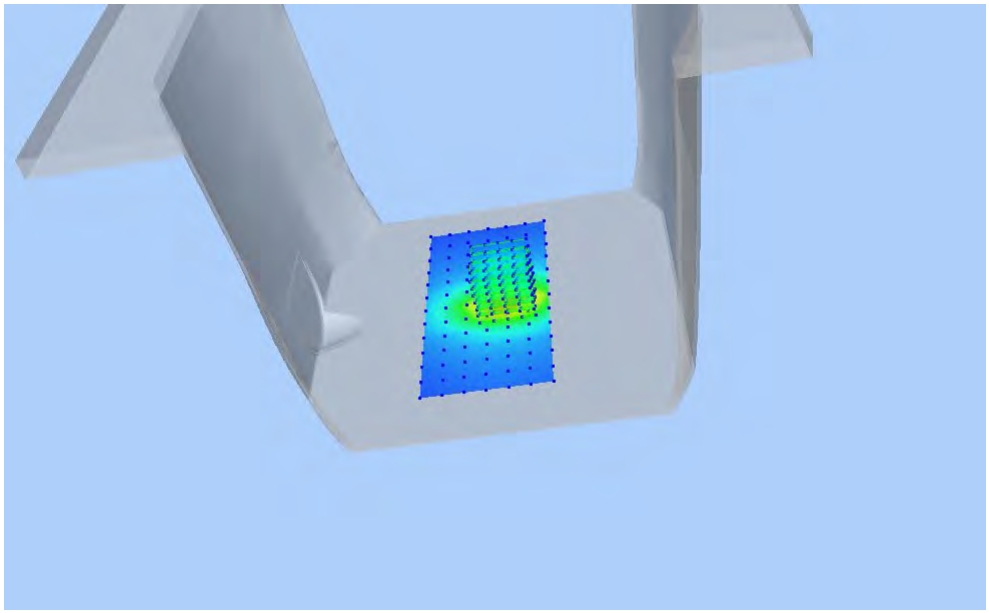


MEAS. 58 Body Plane with Bottom side on High Channel in GPRS1900-12

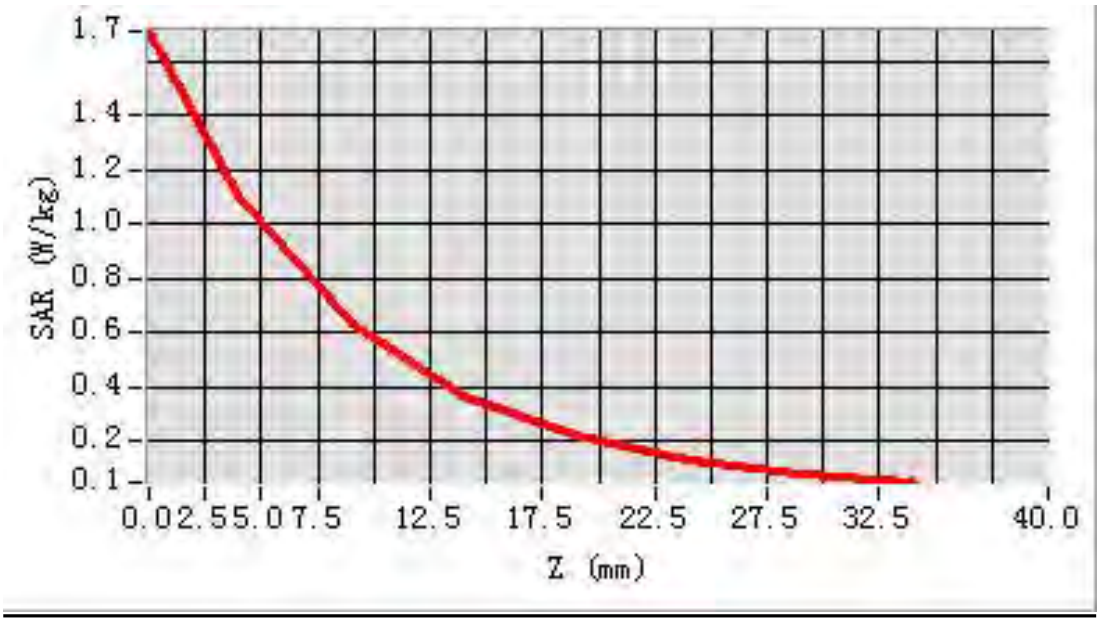
Hotspot mode

Test Date:	23/8/2015
Signal:	GSM, f=1909.8 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 53.30; Conductivity: 1.52 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=8.000000, Y=0.000000
SAR 10g (W/Kg):	0.517790
SAR 1g (W/Kg):	1.025030
Power drift (%):	-0.38

3D screen shot



Z Axis Scan

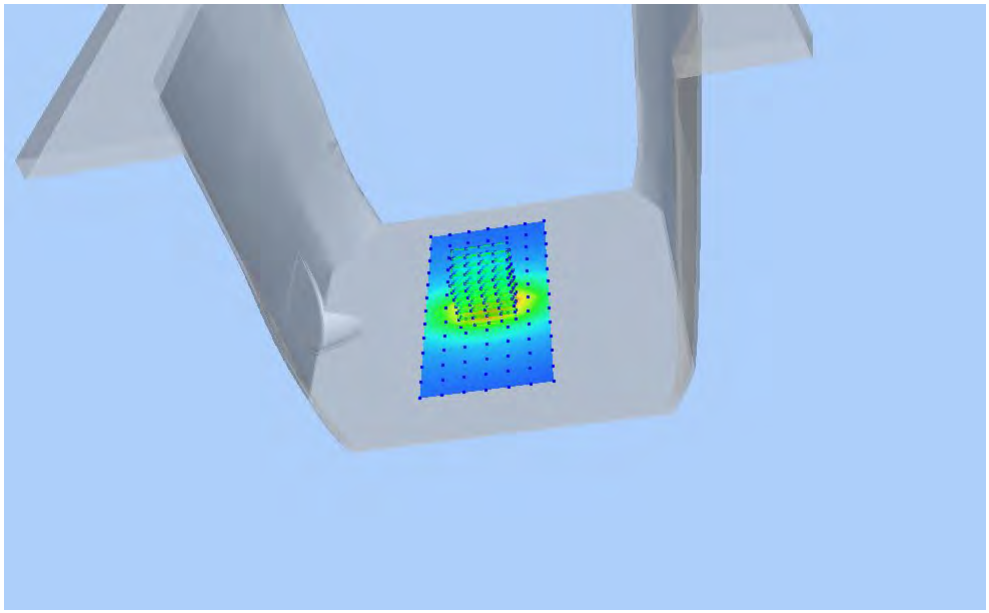

1.7
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.1
SAR (W/kg)
0.0
2.5
5.0
7.5
12.5
17.5
22.5
27.5
32.5
40.0
Z (mm)

MEAS. 59 Body Plane with Body Bottom Side on Low Channel in WCDMA

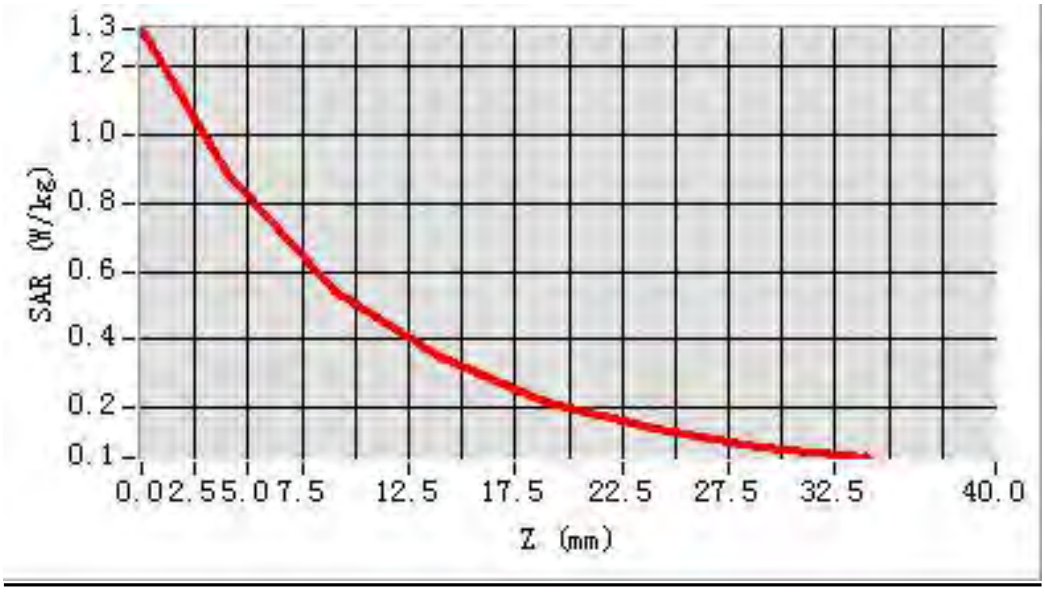
Band 4 Hotspot mode

Test Date:	23/8/2015
Signal:	WCDMA, f=1712.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.53; Conductivity: 1.47 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.69
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=0.000000
SAR 10g (W/Kg):	0.453470
SAR 1g (W/Kg):	0.836795
Power drift (%):	0.46

3D screen shot



Z Axis Scan

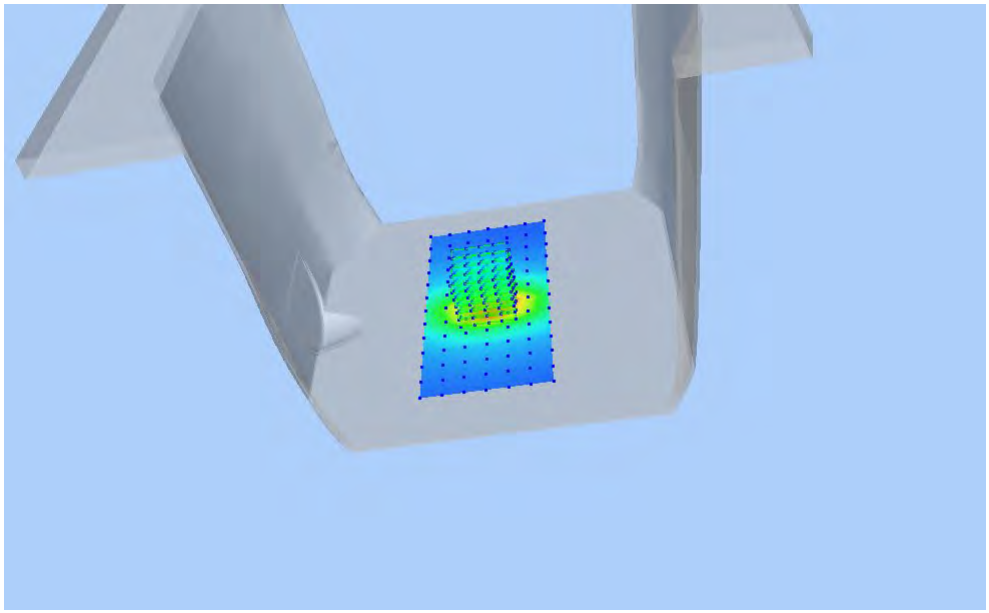


MEAS. 60 Body Plane with Body Bottom Side on Middle Channel in WCDMA

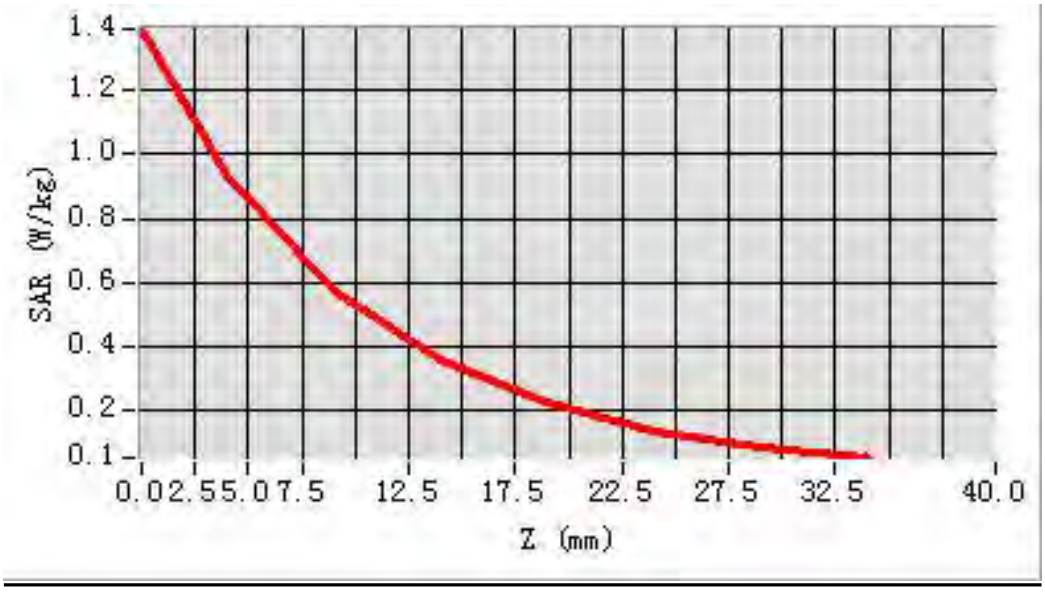
Band 4 Hotspot mode

Test Date:	23/8/2015
Signal:	WCDMA, f=1732.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.48; Conductivity: 1.48 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.69
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=0.000000
SAR 10g (W/Kg):	0.475936
SAR 1g (W/Kg):	0.860663
Power drift (%):	-0.55

3D screen shot



Z Axis Scan

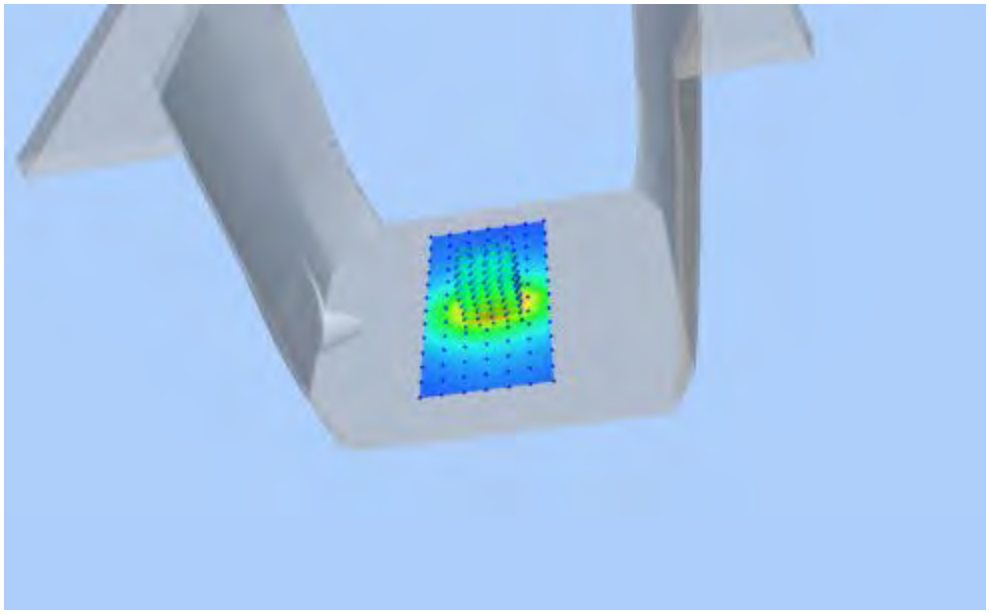


MEAS. 61 Body Plane with Bottom Side on Middle Channel in LTE Band 2

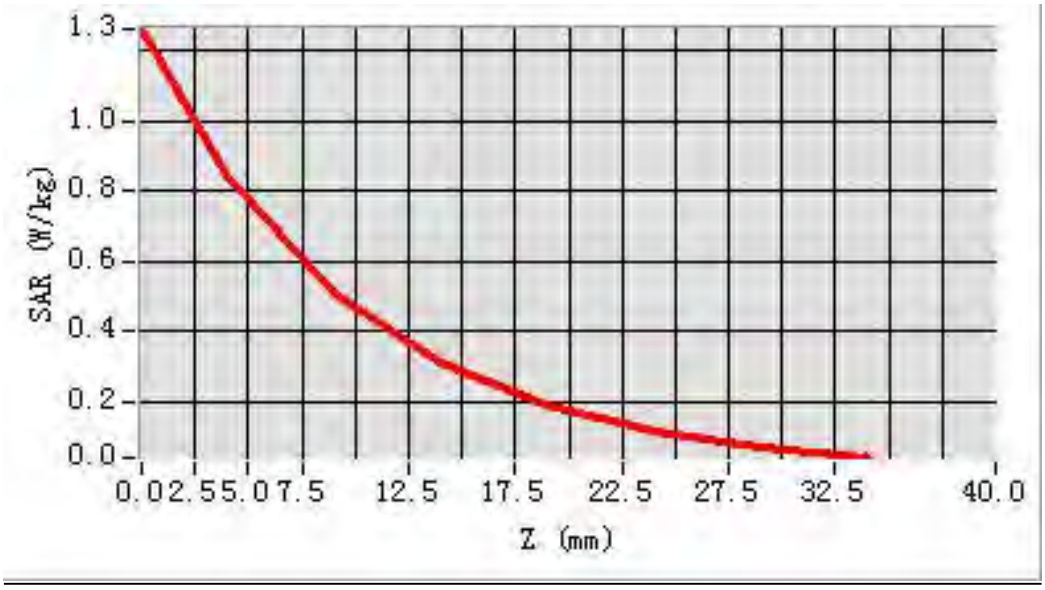
Hotspot 1RB mode

Test Date:	23/8/2015
Signal:	LTE, f=1879.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.30; Conductivity: 1.52 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.69
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=0.000000
SAR 10g (W/Kg):	0.430057
SAR 1g (W/Kg):	0.776133
Power drift (%):	-0.73

3D screen shot



Z Axis Scan

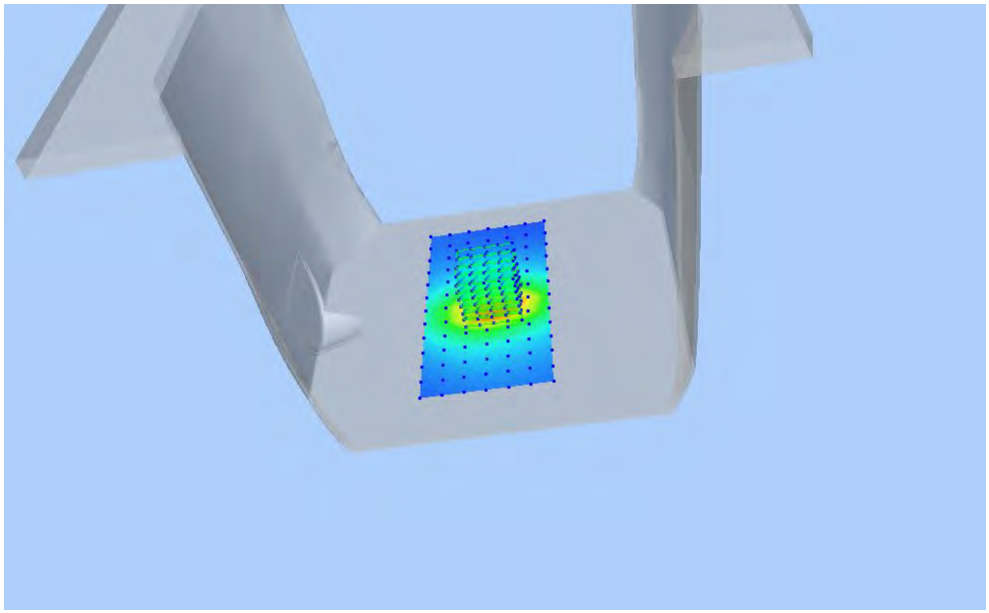


MEAS. 62 Body Plane with Bottom Side on High Channel in LTE Band 2

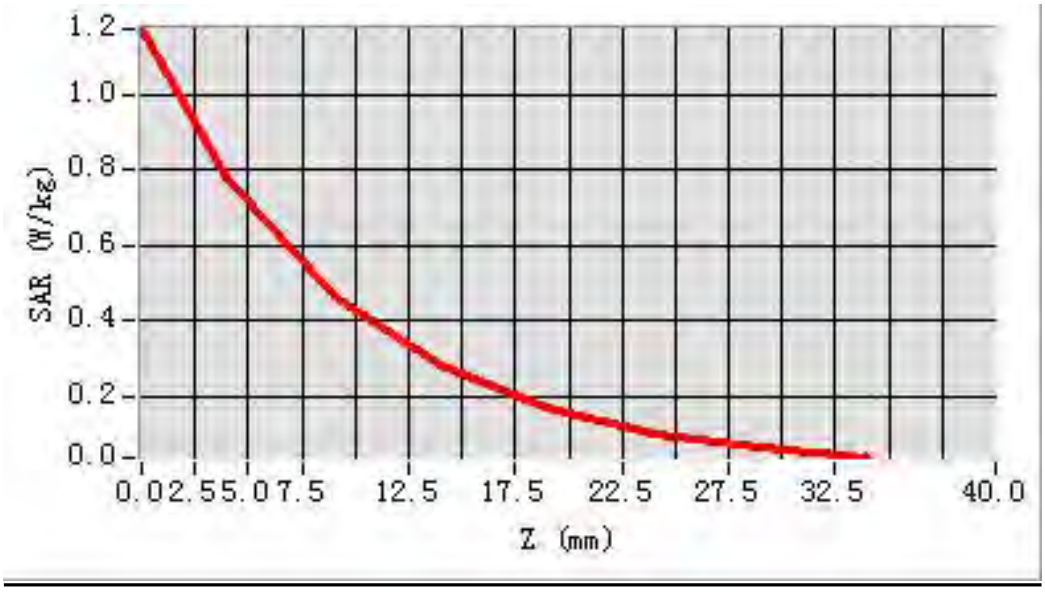
Hotspot 1RB mode

Test Date:	26/8/2015
Signal:	LTE, f=1909.5 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 53.30; Conductivity: 1.52 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 23.69
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=0.000000
SAR 10g (W/Kg):	0.393297
SAR 1g (W/Kg):	0.734843
Power drift (%):	-1.03

3D screen shot



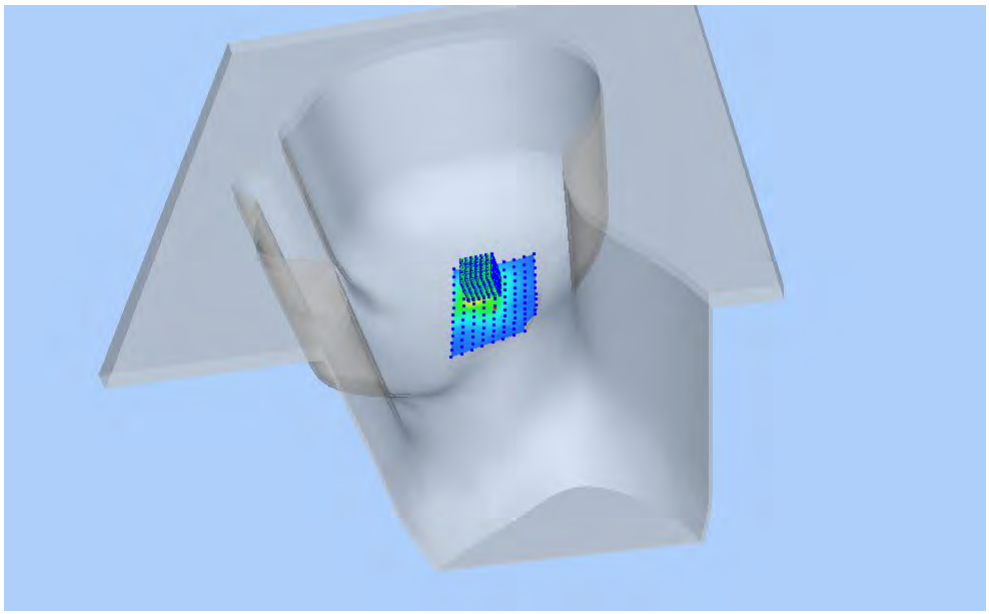
Z Axis Scan



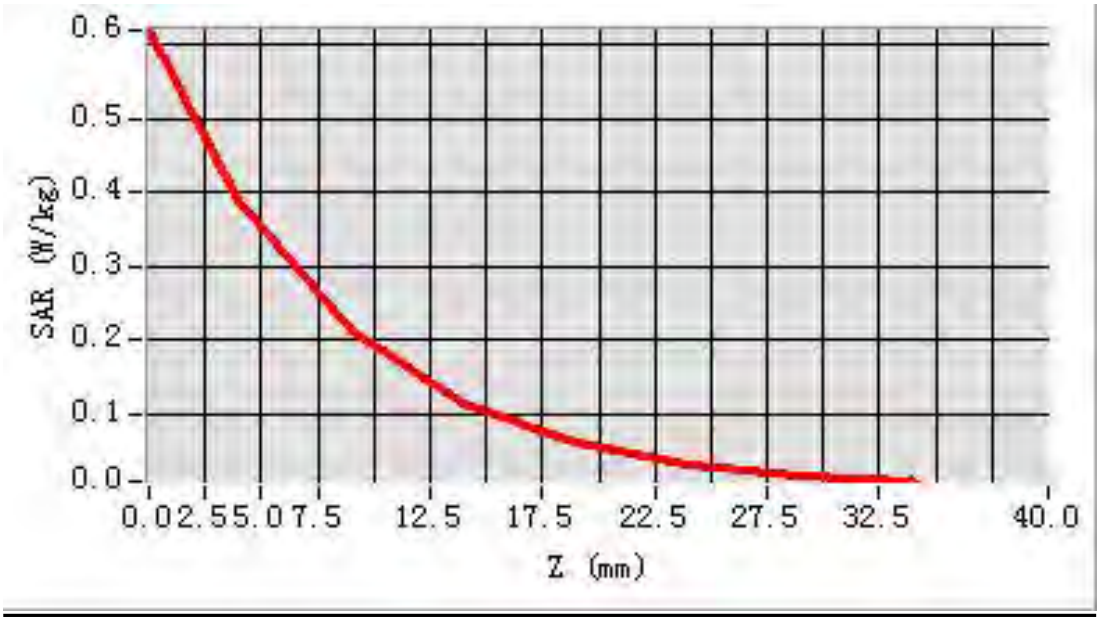
MEAS. 63 Right Head with Cheek on Low Channel in Bluetooth 8-DPSK mode

Test Date:	25/9/2015
Signal:	Bluetooth, f=2402.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 38.19; Conductivity: 1.73 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 25.25
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location:	X=-12.000000, Y=12.000000
SAR 10g (W/Kg):	0.188537
SAR 1g (W/Kg):	0.437632
Power drift (%):	0.24

3D screen shot



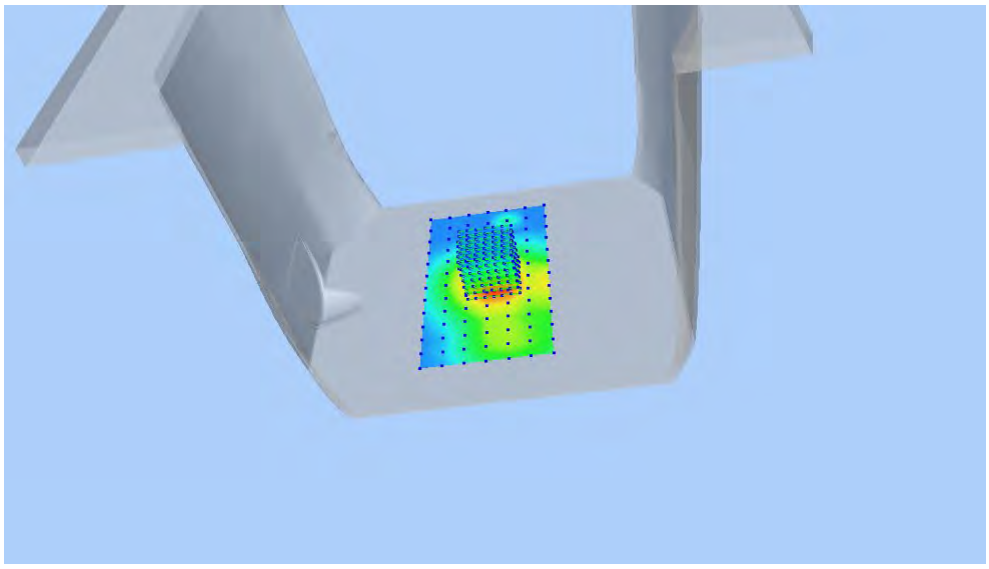
Z Axis Scan



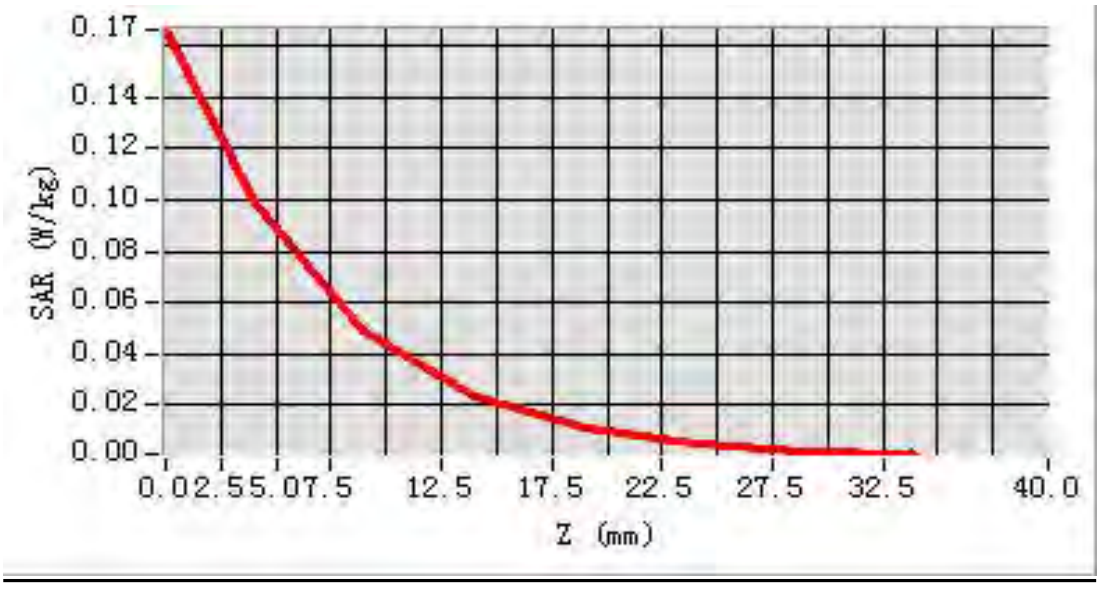
MEAS. 64 Body Plane with Back Side on Low Channel in Bluetooth 8-DPSK mode

Test Date:	25/9/2015
Signal:	Bluetooth, f=2402.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters:	Permittivity: 52.75; Conductivity: 1.90 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.1°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 26.09
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=0.000000
SAR 10g (W/Kg):	0.038907
SAR 1g (W/Kg):	0.082125
Power drift (%):	-0.34

3D screen shot



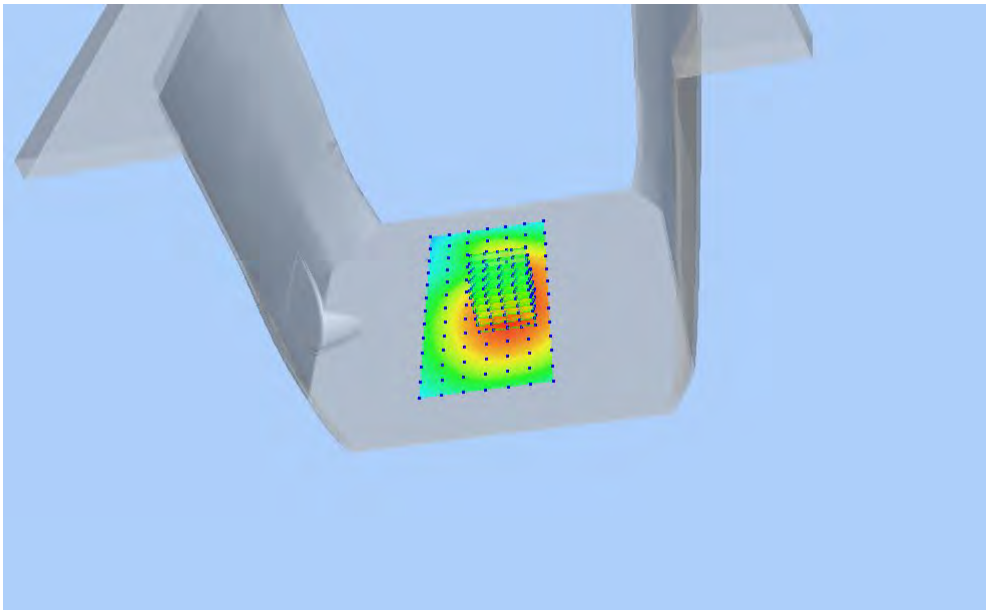
Z Axis Scan



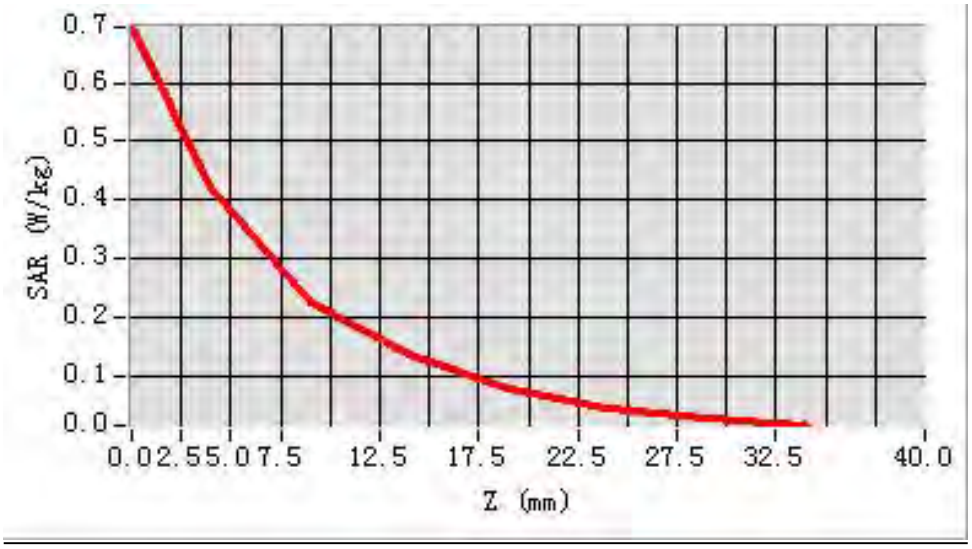
MEAS. 65 Body Plane with Body-worn in Front side on Low Channel in GPRS850-12 3 slots mode

Test Date:	28/9/2015
Signal:	GSM, f=824.2 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 55.16; Conductivity: 0.96 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.0°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 24.58
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-4.000000, Y=-8.000000
SAR 10g (W/Kg):	0.180236
SAR 1g (W/Kg):	0.265320
Power drift (%):	1.56

3D screen shot



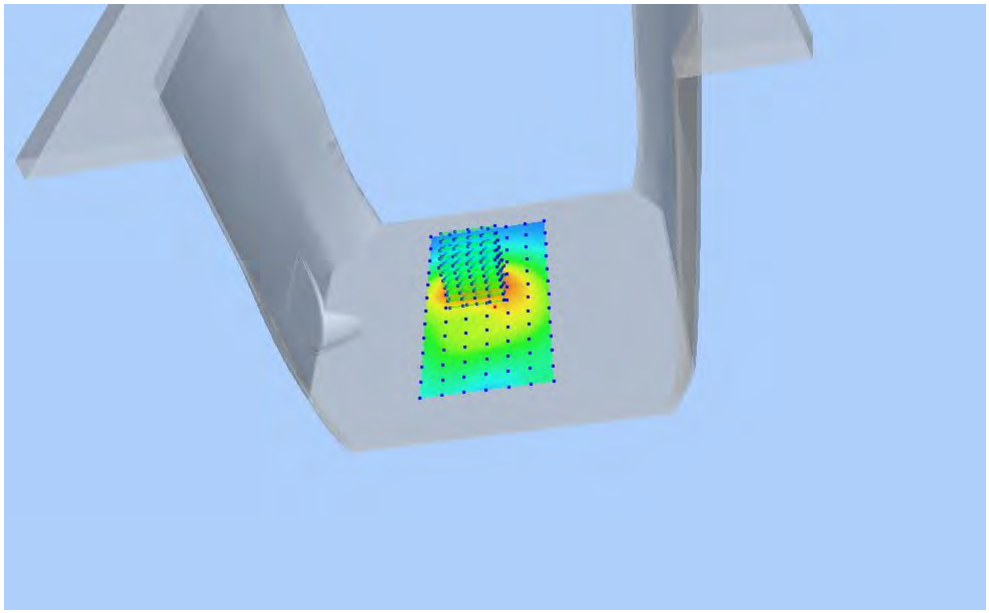
Z Axis Scan



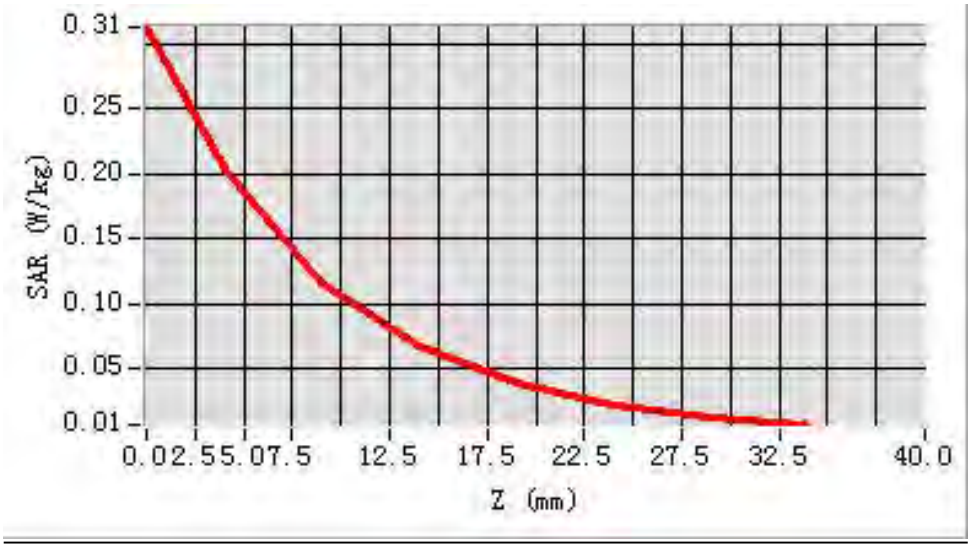
MEAS. 66 Body Plane with Body-worn in Back side on High Channel in GPRS1900-12 3 slots mode

Test Date:	28/9/2015
Signal:	GSM, f=1909.8 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 40.56; Conductivity: 1.38 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.0°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-8.000000, Y=-10.000000
SAR 10g (W/Kg):	0.118636
SAR 1g (W/Kg):	0.221056
Power drift (%):	-2.03

3D screen shot



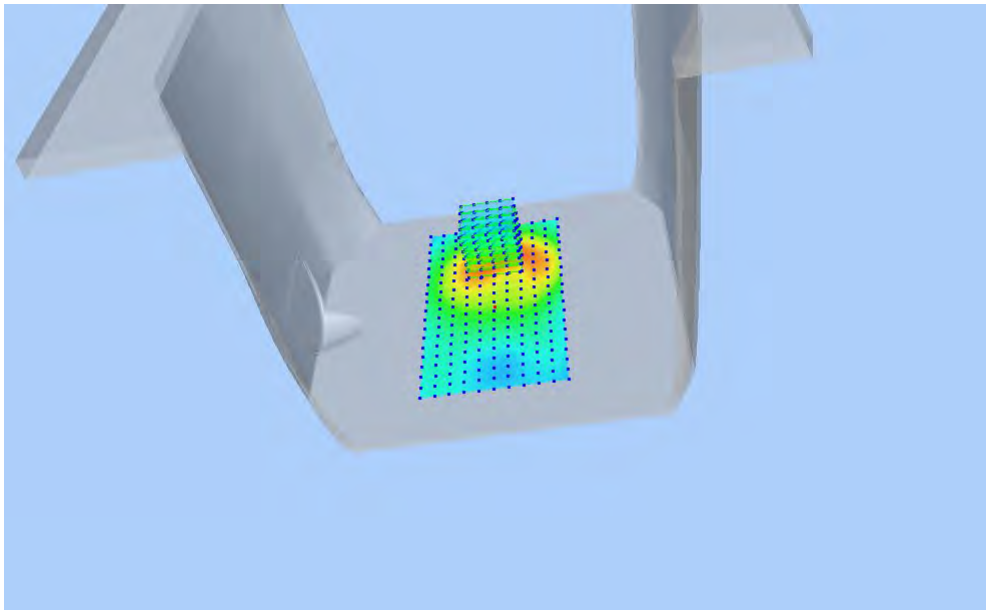
Z Axis Scan



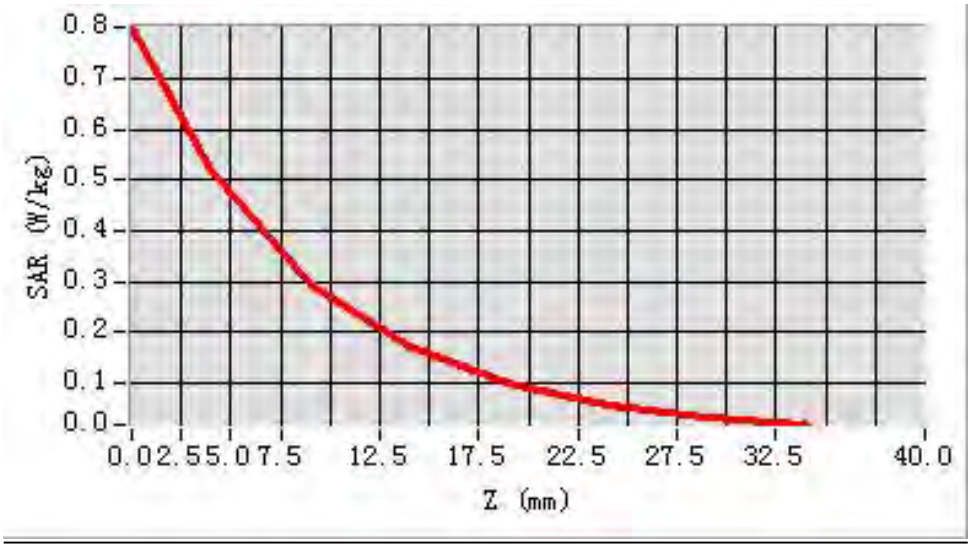
MEAS. 67 Body Plane with Hotspot in Front side on Low Channel in GPRS850-12 3 slots mode

Test Date:	28/9/2015
Signal:	GSM, f=824.2 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 55.16; Conductivity: 0.96 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.0°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 24.58
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-12.000000, Y=-20.000000
SAR 10g (W/Kg):	0.190236
SAR 1g (W/Kg):	0.386023
Power drift (%):	2.32

3D screen shot



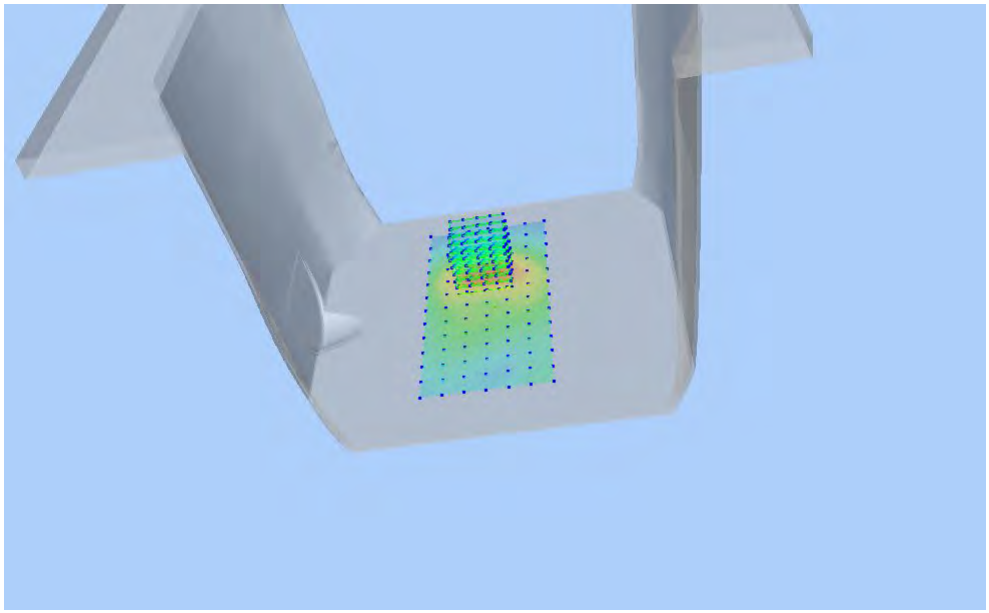
Z Axis Scan



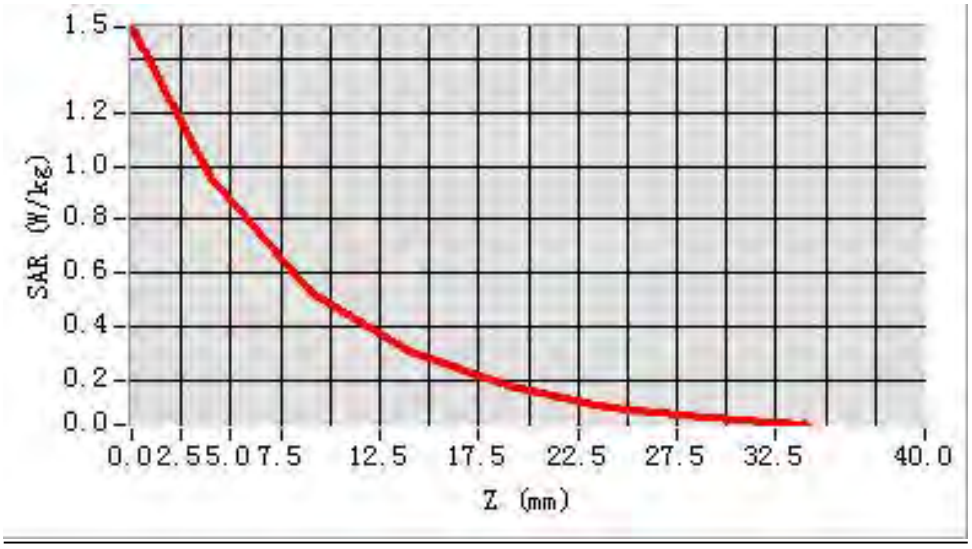
MEAS. 68 Body Plane with Hotspot in Bottom Edge on High Channel in GPRS1900-12 3 slots mode

Test Date:	28/9/2015
Signal:	GSM, f=1909.8 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 40.56; Conductivity: 1.38 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.0°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-24.000000, Y=-12.000000
SAR 10g (W/Kg):	0.523635
SAR 1g (W/Kg):	1.019235
Power drift (%):	2.31

3D screen shot



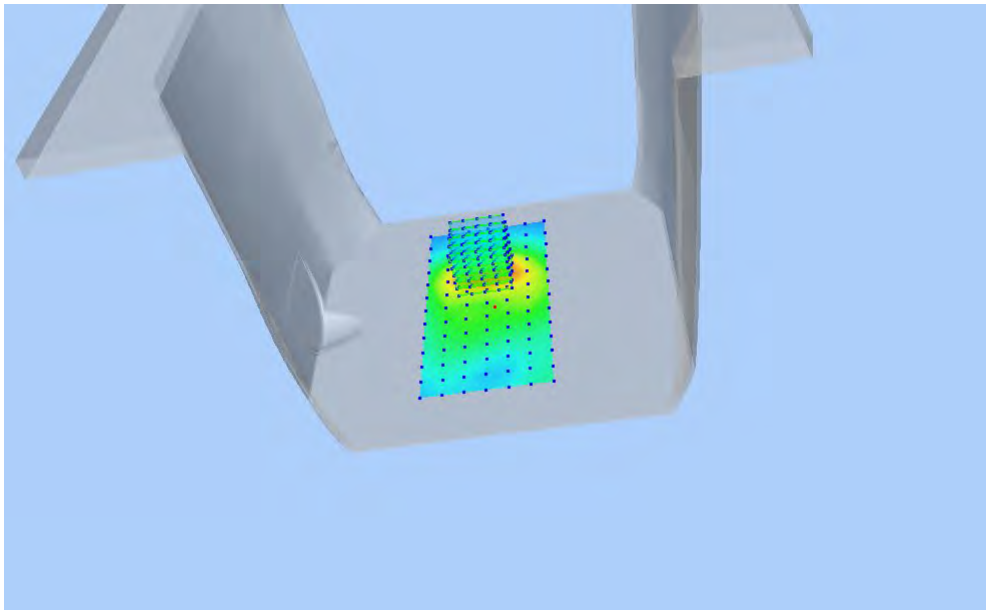
Z Axis Scan



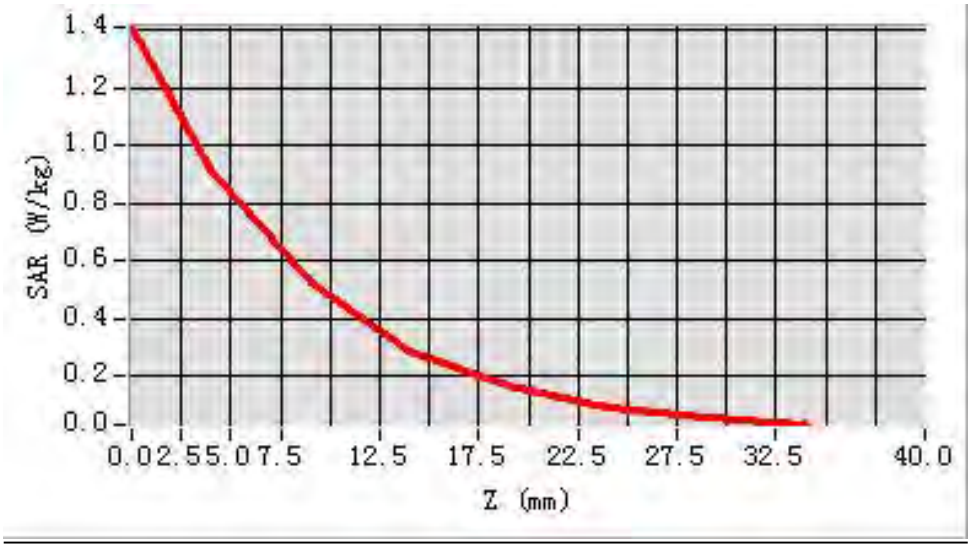
MEAS. 69 Body Plane with Hotspot in Bottom Edge on Low Channel in GPRS1900-12 3 slots mode

Test Date:	28/9/2015
Signal:	GSM, f=1850.2 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 40.63; Conductivity: 1.35 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.0°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-10.000000, Y=-16.000000
SAR 10g (W/Kg):	0.489205
SAR 1g (W/Kg):	1.009125
Power drift (%):	1.26

3D screen shot



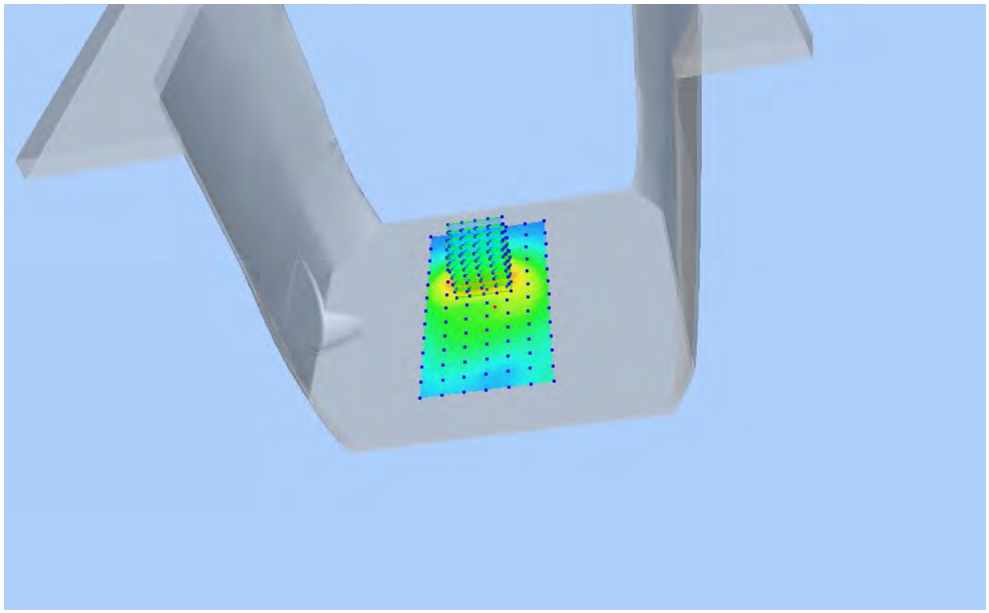
Z Axis Scan



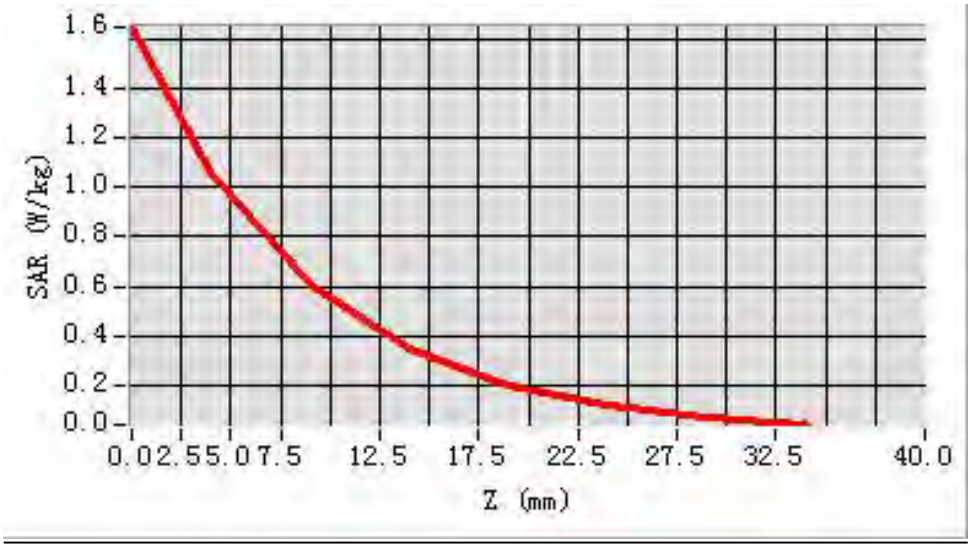
MEAS. 70 Body Plane with Hotspot in Bottom Edge on Middle Channel in GPRS1900-12 3 slots mode

Test Date:	28/9/2015
Signal:	GSM, f=1880.0 MHz, Duty Cycle: 1:2.0
Liquid Parameters:	Permittivity: 40.68; Conductivity: 1.36 S/m
Test condition:	Ambient Temperature: 22.5°C, Liquid Temperature: 22.0°C
Probe:	SN 27/14 SSE2 EPG 210, ConvF: 27.47
Area Scan:	sam_direct_droit2_surf12mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=10.000000, Y=-8.000000
SAR 10g (W/Kg):	0.512632
SAR 1g (W/Kg):	1.018602
Power drift (%):	1.38

3D screen shot



Z Axis Scan



ANNEX D EUT EXTERNAL PHOTOS

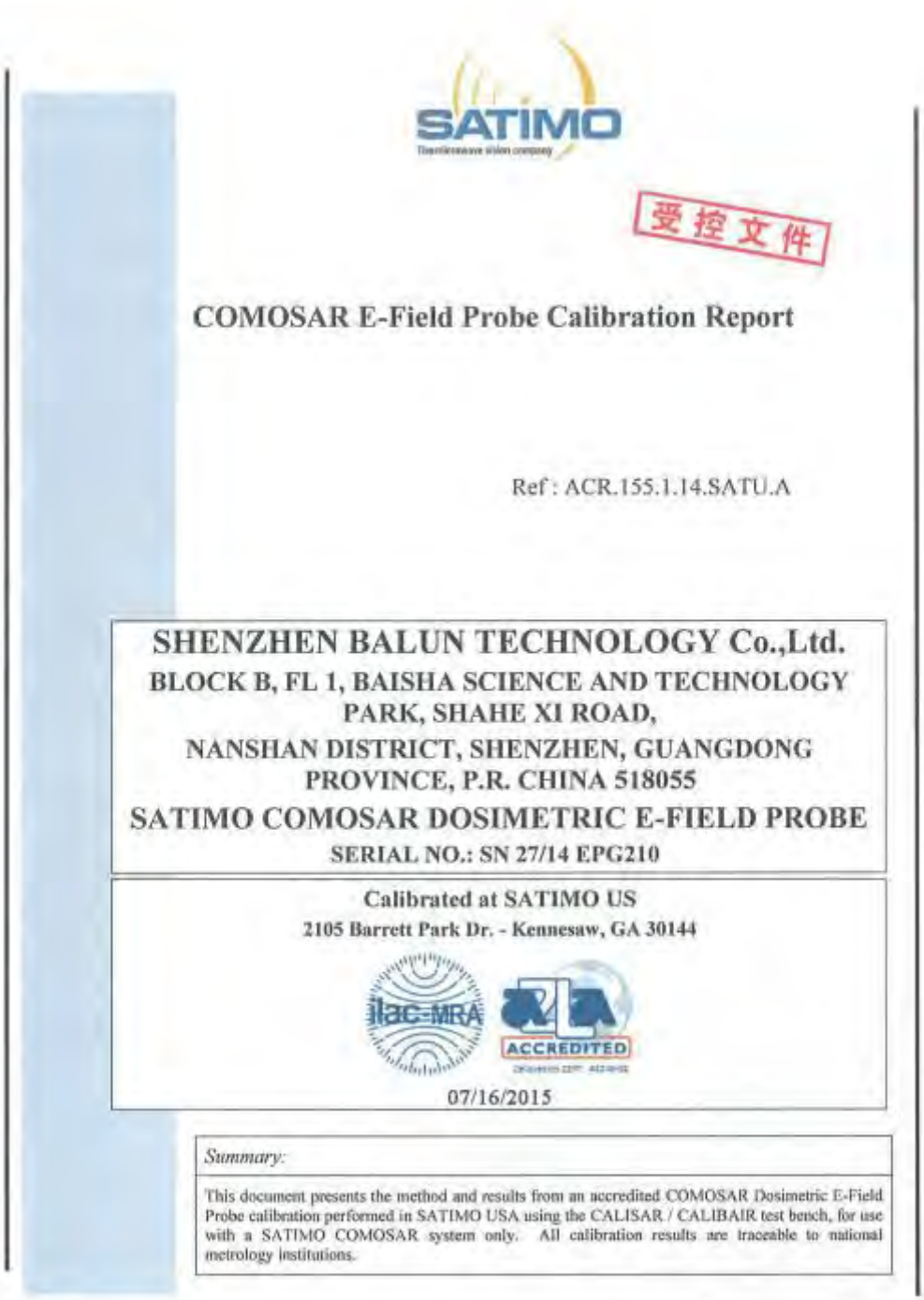
Please refer the document " EUT EXTERNAL PHOTOS. PDF".

ANNEX E SAR TEST SETUP PHOTOS

Please refer the document "SAR TEST SETUP PHOTOS. PDF".

ANNEX E CALIBRATION REPORT

F.1 E-Field Probe



SATIMO

受控文件

COMOSAR E-Field Probe Calibration Report

Ref : ACR.155.1.14.SATU.A

SHENZHEN BALUN TECHNOLOGY Co.,Ltd.
BLOCK B, FL 1, BAISHA SCIENCE AND TECHNOLOGY PARK, SHAHE XI ROAD,
NANSHAN DISTRICT, SHENZHEN, GUANGDONG PROVINCE, P.R. CHINA 518055

SATIMO COMOSAR DOSIMETRIC E-FIELD PROBE
SERIAL NO.: SN 27/14 EPG210

Calibrated at SATIMO US
2105 Barrett Park Dr. - Kennesaw, GA 30144

ilac-MRA A2LA ACCREDITED

07/16/2015

Summary:

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

SATIMO COMOSAR E-FIELD PROBE CALIBRATION REPORT Ref: ACR.155.14.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	07/16/2015	
Checked by :	Jérôme LUC	Product Manager	07/16/2015	
Approved by :	Kim RUTKOWSKI	Quality Manager	07/16/2015	

	Customer Name
Distribution :	ChangNing (Shenzhen) Electronics Co., Ltd.

Issue	Date	Modifications
A	07/16/2015	Initial release

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1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	Satimo
Model	SSE2
Serial Number	SN 27/14 EPG210
Product Condition (new / used)	New
Frequency Range of Probe	0.3 GHz-6GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.197 MΩ Dipole 2: R2=0.220 MΩ Dipole 3: R3=0.241 MΩ

A yearly calibration interval is recommended.

2 PRODUCT DESCRIPTION

2.1 GENERAL INFORMATION

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

Figure 1 – *Satimo 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 %

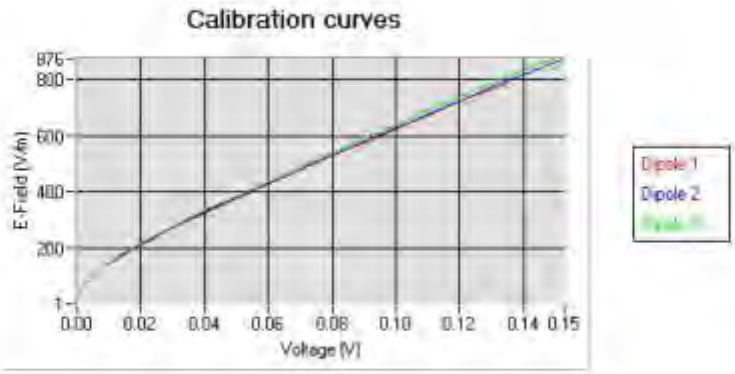
5.1 SENSITIVITY IN AIR

Normx dipole 1 (μV/(V/m)²)	Normy dipole 2 (μV/(V/m)²)	Normz dipole 3 (μV/(V/m)²)
0.44	0.54	0.52

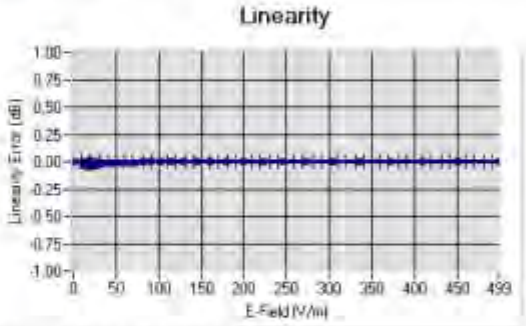
DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
90	90	90

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: +/-1.25% (+/-0.05dB)

5.3 SENSITIVITY IN LIQUID

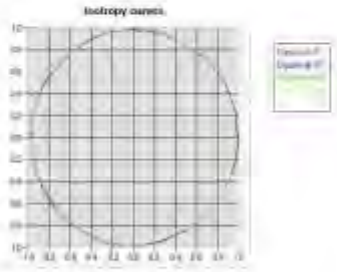
Liquid	Frequency (MHz +/- 100MHz)	Permittivity	Epsilon (S/m)	ConvF
HL450	450	43.02	0.85	30.15
BL450	450	57.52	0.96	31.02
HL750	750	42.30	0.88	22.51
BL750	750	54.79	0.96	23.36
HL850	835	43.03	0.87	23.67
BL850	835	53.35	0.96	24.58
HL900	900	42.29	0.96	23.35
BL900	900	56.82	1.06	24.10
HL1800	1800	40.93	1.36	23.21
BL1800	1800	52.57	1.47	23.69
HL1900	1900	40.92	1.45	26.70
BL1900	1900	53.60	1.52	27.47
HL2000	2000	39.36	1.44	25.28
BL2000	2000	52.17	1.53	26.28
HL2450	2450	39.12	1.78	25.25
BL2450	2450	52.17	1.90	26.09
HL2600	2600	38.46	1.92	25.94
BL2600	2600	51.76	2.19	26.66
HL5200	5200	36.47	4.91	22.36
BL5200	5200	51.18	4.84	22.88
HL5400	5400	36.83	5.02	25.63
BL5400	5400	48.35	5.81	26.47
HL5600	5600	35.30	5.49	24.82
BL5600	5600	49.03	6.17	25.66
HL5800	5800	34.91	5.76	22.60
BL5800	5800	47.18	6.32	23.20

LOWER DETECTION LIMIT: 7mW/kg

5.4 ISOTROPY

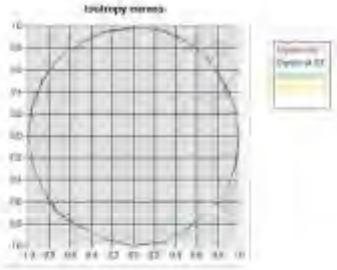
HL900 MHz

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



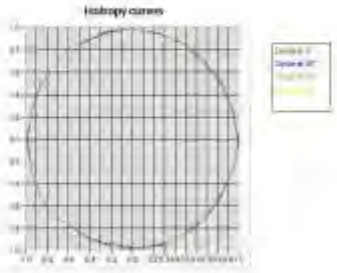
HL1800 MHz

- Axial isotropy: 0.04 dB
- Hemispherical isotropy: 0.08 dB



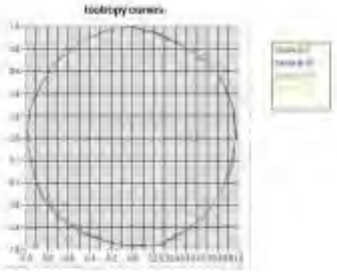
HL2450 MHz

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



HL5800 MHz

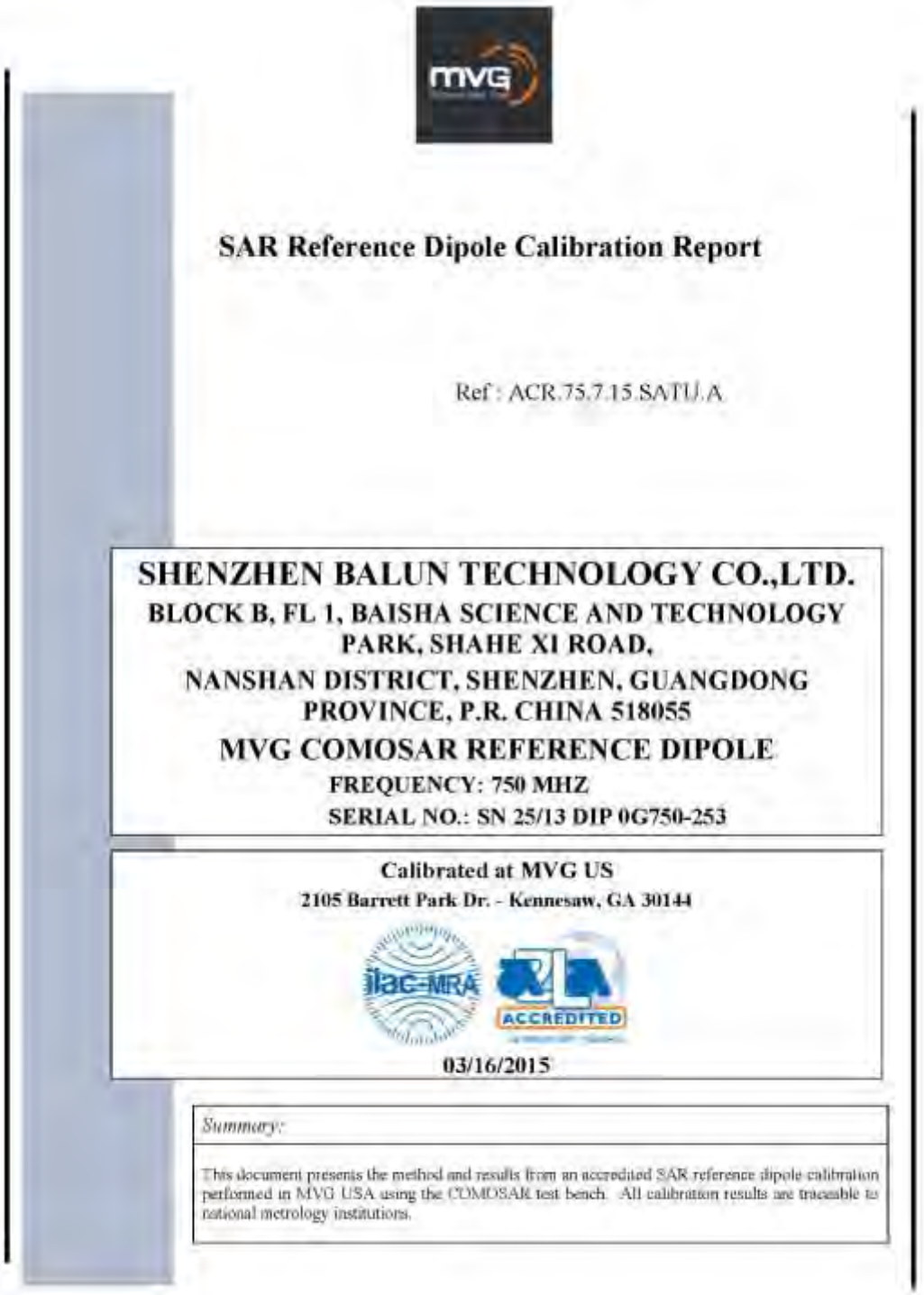
- Axial isotropy: 0.09 dB
- Hemispherical isotropy: 0.11 dB



6 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
Flat Phantom	Satimo	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	02/2013	02/2016
Reference Probe	Satimo	EP 94 SN 37/08	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Multimeter	Keithley 2000	1188656	12/2013	12/2016
Signal Generator	Agilent E4438C	MY49070581	12/2013	12/2016
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	12/2013	12/2016
Power Sensor	HP ECP-E26A	US37181460	12/2013	12/2016
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	11-661-9	8/2013	8/2016

F.2 750 MHz Dipole



SAR Reference Dipole Calibration Report

Ref : ACR.75.7.15.SATU.A

SHENZHEN BALUN TECHNOLOGY CO.,LTD.
BLOCK B, FL 1, BAISHA SCIENCE AND TECHNOLOGY PARK, SHAHE XI ROAD,
NANSHAN DISTRICT, SHENZHEN, GUANGDONG PROVINCE, P.R. CHINA 518055

MVG COMOSAR REFERENCE DIPOLE
FREQUENCY: 750 MHZ
SERIAL NO.: SN 25/13 DIP 0G750-253

Calibrated at MVG US
2105 Barrett Park Dr. - Kennesaw, GA 30144

03/16/2015

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.75.1.15.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	3/16/2015	
Checked by :	Jérôme LUC	Product Manager	3/16/2015	
Approved by :	Kim RUTKOWSKI	Quality Manager	3/16/2015	

	Customer Name
Distribution :	SHENZHEN BALUN TECHNOLOGY Co.,Ltd.

Issue	Date	Modifications
A	3/16/2015	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 750 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID750
Serial Number	SN 25/13 DIP 0G750-253
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards. The product is designed for use with the COMOSAR test bench only.

Figure 1 - *MVG COMOSAR Validation Dipole*

4 MEASUREMENT METHOD

The IEEE 1528, FCC KDBs and CEI/IEC 62209 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom with the phantom constucted as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE Std. 1528 and CEI/IEC 62209 standards specify the mechanical components and dimensions of the validation dipoles, with the dimensions frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness.

5 MEASUREMENT UNCERTAINTY

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.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

5.3 VALIDATION MEASUREMENT

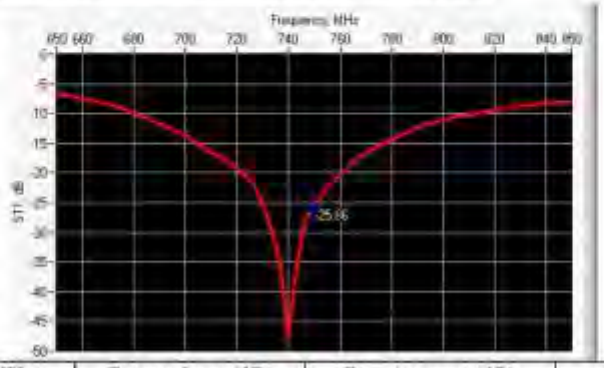
The guidelines outlined in the IEEE 1528, FCC KDBs, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Scan Volume	Expanded Uncertainty
1 g	20.3 %

10 g	20.1 %

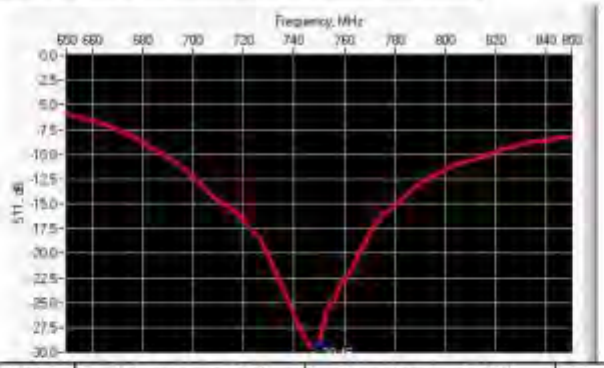
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
750	-25.86	-20	54.5 Ω - 2.7 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
750	-29.45	-20	52.6 Ω + 2.3 jΩ

6.3 MECHANICAL DIMENSIONS

Frequency MHz	l mm		h mm		d mm	
	required	measured	required	measured	required	measured
300	420.0 ±1 %		250.0 ±1 %		6.35 ±1 %	

450	290.0 ±1 %		166.7 ±1 %		6.35 ±1 %	
750	176.0 ±1 %	PASS	100.0 ±1 %	PASS	6.35 ±1 %	PASS
835	161.0 ±1 %		89.8 ±1 %		3.6 ±1 %	
900	149.0 ±1 %		83.3 ±1 %		3.6 ±1 %	
1450	89.1 ±1 %		51.7 ±1 %		3.6 ±1 %	
1500	80.5 ±1 %		50.0 ±1 %		3.6 ±1 %	
1640	79.0 ±1 %		45.7 ±1 %		3.6 ±1 %	
1750	75.2 ±1 %		42.8 ±1 %		3.6 ±1 %	
1800	72.0 ±1 %		41.7 ±1 %		3.6 ±1 %	
1900	68.0 ±1 %		39.5 ±1 %		3.6 ±1 %	
1950	66.3 ±1 %		38.5 ±1 %		3.6 ±1 %	
2000	64.5 ±1 %		37.5 ±1 %		3.6 ±1 %	
2100	61.0 ±1 %		35.7 ±1 %		3.6 ±1 %	
2300	55.5 ±1 %		32.6 ±1 %		3.6 ±1 %	
2450	51.5 ±1 %		30.4 ±1 %		3.6 ±1 %	
2600	48.5 ±1 %		28.8 ±1 %		3.6 ±1 %	
3000	41.5 ±1 %		25.0 ±1 %		3.6 ±1 %	
3500	37.0±1 %		26.4 ±1 %		3.6 ±1 %	
3700	34.7±1 %		26.4 ±1 %		3.6 ±1 %	

7 VALIDATION MEASUREMENT

The IEEE Std. 1528, FCC KDBs and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

7.1 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
300	45.3 ±5 %		0.87 ±5 %	
450	43.5 ±5 %		0.87 ±5 %	
750	41.9 ±5 %	PASS	0.89 ±5 %	PASS
835	41.5 ±5 %		0.90 ±5 %	
900	41.5 ±5 %		0.97 ±5 %	
1450	40.5 ±5 %		1.20 ±5 %	
1500	40.4 ±5 %		1.23 ±5 %	
1640	40.2 ±5 %		1.31 ±5 %	
1750	40.1 ±5 %		1.37 ±5 %	

1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

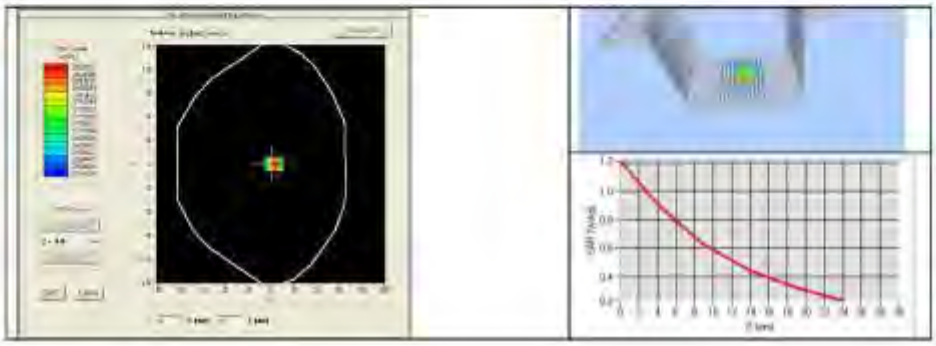
7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 41.8 sigma : 0.90
Distance between dipole center and liquid	15.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8m/dz=5mm
Frequency	750 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49	8.60 (0.86)	5.55	5.65 (0.56)
835	9.56		6.22	
900	10.9		6.99	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	

1900	39.7		20.5	
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4		24	
2600	55.3		24.6	
3000	63.8		25.7	
3500	67.1		25	



7.3 BODY LIQUID MEASUREMENT

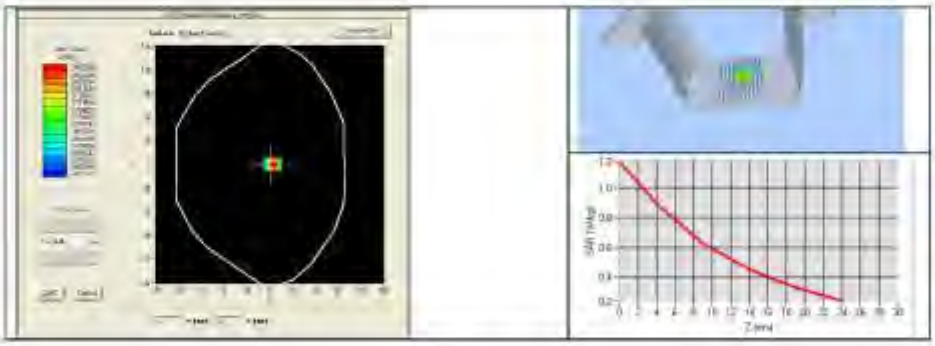
Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
150	61.9 ±5 %		0.80 ±5 %	
300	58.2 ±5 %		0.92 ±5 %	
450	56.7 ±5 %		0.94 ±5 %	
750	55.5 ±5 %	PASS	0.96 ±5 %	PASS
835	55.2 ±5 %		0.97 ±5 %	
900	55.0 ±5 %		1.05 ±5 %	
915	55.0 ±5 %		1.06 ±5 %	
1450	54.0 ±5 %		1.30 ±5 %	
1610	53.8 ±5 %		1.40 ±5 %	
1800	53.3 ±5 %		1.52 ±5 %	
1900	53.3 ±5 %		1.52 ±5 %	
2000	53.3 ±5 %		1.52 ±5 %	
2100	53.2 ±5 %		1.62 ±5 %	
2450	52.7 ±5 %		1.95 ±5 %	

2600	52.5 ±5 %		2.16 ±5 %	
3000	52.0 ±5 %		2.73 ±5 %	
3500	51.3 ±5 %		3.31 ±5 %	
5200	49.0 ±10 %		5.30 ±10 %	
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %		5.53 ±10 %	
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %		5.77 ±10 %	
5800	48.2 ±10 %		6.00 ±10 %	

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values: eps' 56.3 sigma 0.98
Distance between dipole center and liquid	15.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8m/dz=5mm
Frequency	750 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)	10 g SAR (W/kg/W)
	measured	measured
750	8.91 (0.89)	5.91 (0.59)



8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
SAM 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	02/2013	02/2016
Calipers	Carrera	CALIPER-01	12/2013	12/2016
Reference Probe	MVG	EPG122 SN 18/11	10/2014	10/2015
Multimeter	Keithley 2000	1188656	12/2013	12/2016
Signal Generator	Agilent E4438C	MY49070581	12/2013	12/2016
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	12/2013	12/2016
Power Sensor	HP ECP-E26A	US37181460	12/2013	12/2016
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	8/2012	8/2015

F.3 835MHz Dipole

SAR Reference Dipole Calibration Report

Ref : ACR.75.8.15.SATU.A

SHENZHEN BALUN TECHNOLOGY CO.,LTD.
BLOCK B, FL 1, BAISHA SCIENCE AND TECHNOLOGY PARK, SHAHE XI ROAD,
NANSHAN DISTRICT, SHENZHEN, GUANGDONG PROVINCE, P.R. CHINA 518055

MVG COMOSAR REFERENCE DIPOLE
FREQUENCY: 835 MHZ
SERIAL NO.: SN 25/13 DIP 0G835-246

Calibrated at MVG US
2105 Barrett Park Dr. - Kennesaw, GA 30144

03/16/2015

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.75.8.15.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	3/16/2015	
Checked by :	Jérôme LUC	Product Manager	3/16/2015	
Approved by :	Kim RUTKOWSKI	Quality Manager	3/16/2015	

	Customer Name
Distribution :	SHENZHEN BALUN TECHNOLOGY Co.,Ltd.

Issue	Date	Modifications
A	3/16/2015	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 835 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID835
Serial Number	SN 25/13 DIP 0G835-246
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards. The product is designed for use with the COMOSAR test bench only.

Figure 1 - *MVG COMOSAR Validation Dipole*

4 MEASUREMENT METHOD

The IEEE 1528, FCC KDBs and CEI/IEC 62209 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom with the phantom constucted as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE Std. 1528 and CEI/IEC 62209 standards specify the mechanical components and dimensions of the validation dipoles, with the dimensions frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness.

5 MEASUREMENT UNCERTAINTY

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.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

5.3 VALIDATION MEASUREMENT

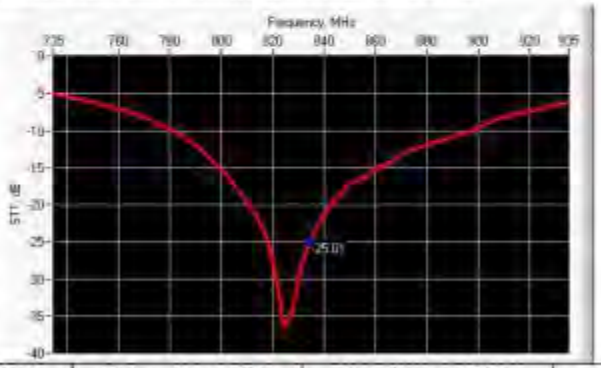
The guidelines outlined in the IEEE 1528, FCC KDBs, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Sean Volume	Expanded Uncertainty
1 g	20.3 %

10 g	20.1 %

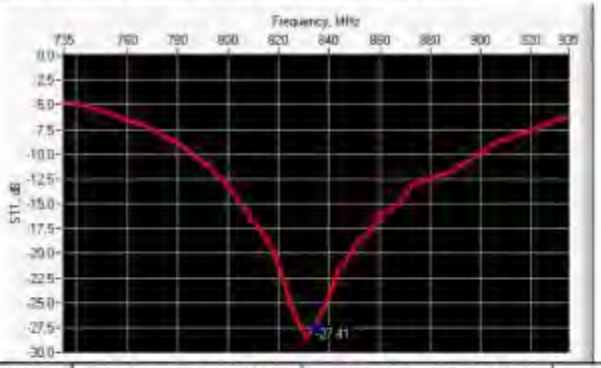
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
835	-25.01	-20	55.9 Ω + 0.9 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
835	-27.41	-20	52.1 Ω + 3.8 jΩ

6.3 MECHANICAL DIMENSIONS

Frequency MHz	L mm		h mm		d mm	
	required	measured	required	measured	required	measured
300	420.0 ±1 %		250.0 ±1 %		6.35 ±1 %	

450	290.0 ±1 %		166.7 ±1 %		6.35 ±1 %	
750	176.0 ±1 %		100.0 ±1 %		6.35 ±1 %	
835	161.0 ±1 %	PASS	89.8 ±1 %	PASS	3.6 ±1 %	PASS
900	149.0 ±1 %		83.3 ±1 %		3.6 ±1 %	
1450	89.1 ±1 %		51.7 ±1 %		3.6 ±1 %	
1500	80.5 ±1 %		50.0 ±1 %		3.6 ±1 %	
1640	79.0 ±1 %		45.7 ±1 %		3.6 ±1 %	
1750	75.2 ±1 %		42.8 ±1 %		3.6 ±1 %	
1800	72.0 ±1 %		41.7 ±1 %		3.6 ±1 %	
1900	68.0 ±1 %		39.5 ±1 %		3.6 ±1 %	
1950	66.3 ±1 %		38.5 ±1 %		3.6 ±1 %	
2000	64.5 ±1 %		37.5 ±1 %		3.6 ±1 %	
2100	61.0 ±1 %		35.7 ±1 %		3.6 ±1 %	
2300	55.5 ±1 %		32.6 ±1 %		3.6 ±1 %	
2450	51.5 ±1 %		30.4 ±1 %		3.6 ±1 %	
2600	48.5 ±1 %		28.8 ±1 %		3.6 ±1 %	
3000	41.5 ±1 %		25.0 ±1 %		3.6 ±1 %	
3500	37.0±1 %		26.4 ±1 %		3.6 ±1 %	
3700	34.7±1 %		26.4 ±1 %		3.6 ±1 %	

7 VALIDATION MEASUREMENT

The IEEE Std. 1528, FCC KDBs and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

7 1 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
300	45.3 ±5 %		0.87 ±5 %	
450	43.5 ±5 %		0.87 ±5 %	
750	41.9 ±5 %		0.89 ±5 %	
835	41.5 ±5 %	PASS	0.90 ±5 %	PASS
900	41.5 ±5 %		0.97 ±5 %	
1450	40.5 ±5 %		1.20 ±5 %	
1500	40.4 ±5 %		1.23 ±5 %	
1640	40.2 ±5 %		1.31 ±5 %	
1750	40.1 ±5 %		1.37 ±5 %	

1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

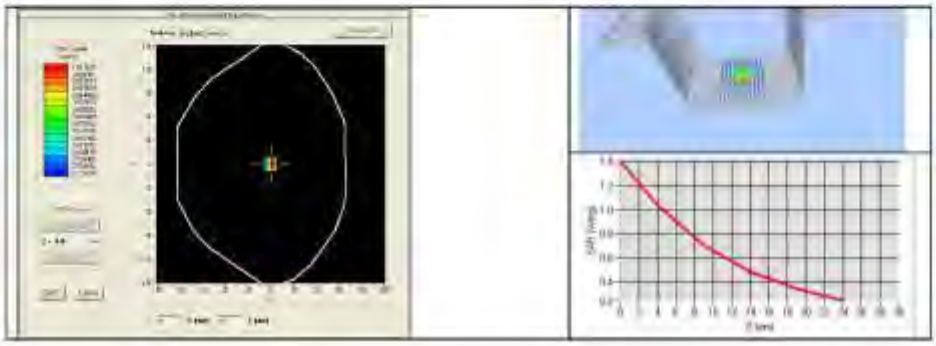
7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 42.1 sigma : 0.92
Distance between dipole center and liquid	15.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoom Scan Resolution	dx=8mm/dy=8m/dz=5mm
Frequency	835 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56	9.61 (0.98)	6.22	6.33 (0.63)
900	10.9		6.95	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	

1900	39.7		20.5	
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4		24	
2600	55.3		24.6	
3000	63.8		25.7	
3500	67.1		25	



7.3 BODY LIQUID MEASUREMENT

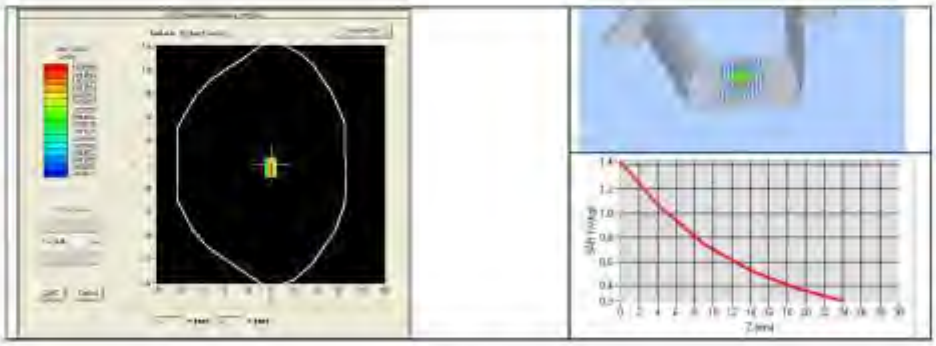
Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
150	61.9 ±5 %		0.80 ±5 %	
300	58.2 ±5 %		0.92 ±5 %	
450	56.7 ±5 %		0.94 ±5 %	
750	55.5 ±5 %		0.96 ±5 %	
835	55.2 ±5 %	PASS	0.97 ±5 %	PASS
900	55.0 ±5 %		1.05 ±5 %	
915	55.0 ±5 %		1.06 ±5 %	
1450	54.0 ±5 %		1.30 ±5 %	
1610	53.8 ±5 %		1.40 ±5 %	
1800	53.3 ±5 %		1.52 ±5 %	
1900	53.3 ±5 %		1.52 ±5 %	
2000	53.3 ±5 %		1.52 ±5 %	
2100	53.2 ±5 %		1.62 ±5 %	
2450	52.7 ±5 %		1.95 ±5 %	

2600	52.5 ±5 %		2.16 ±5 %	
3000	52.0 ±5 %		2.73 ±5 %	
3500	51.3 ±5 %		3.31 ±5 %	
5200	49.0 ±10 %		5.30 ±10 %	
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %		5.53 ±10 %	
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %		5.77 ±10 %	
5800	48.2 ±10 %		6.00 ±10 %	

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values: eps' 53.8 sigma 0.98
Distance between dipole center and liquid	15.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8m/dz=5mm
Frequency	835 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	43 %

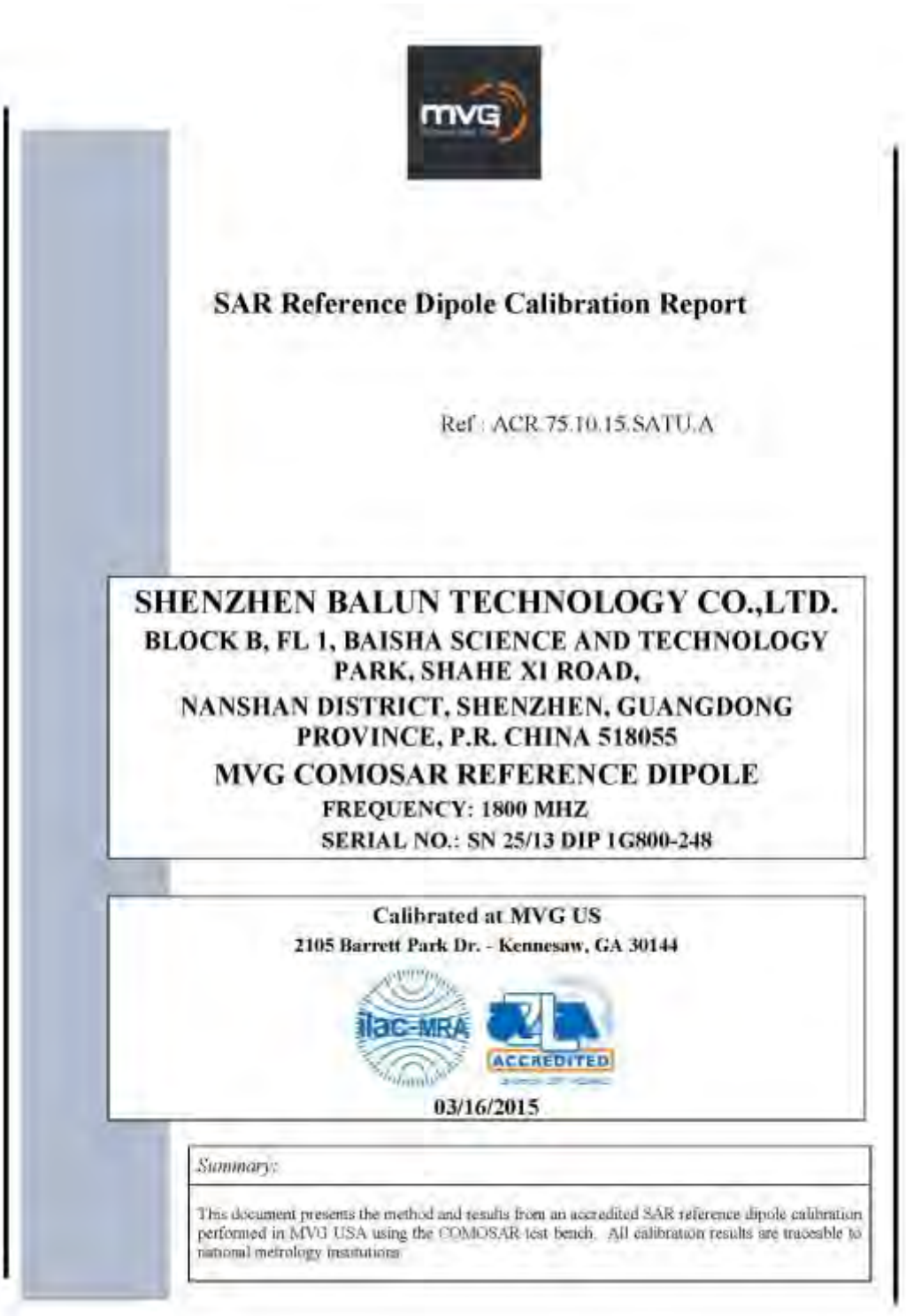
Frequency MHz	1 g SAR (W/kg/W)	10 g SAR (W/kg/W)
	measured	measured
835	10.53 (1.05)	6.89 (0.69)



8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
SAM 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	02/2013	02/2016
Calipers	Carrera	CALIPER-01	12/2013	12/2016
Reference Probe	MVG	EPG122 SN 18/11	10/2014	10/2015
Multimeter	Keithley 2000	1188656	12/2013	12/2016
Signal Generator	Agilent E4438C	MY49070581	12/2013	12/2016
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	12/2013	12/2016
Power Sensor	HP ECP-E26A	US37181460	12/2013	12/2016
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	8/2012	8/2015

F.4 1800MHz Dipole



SAR Reference Dipole Calibration Report

Ref : ACR.75.10.15.SATU.A

SHENZHEN BALUN TECHNOLOGY CO.,LTD.
BLOCK B, FL 1, BAISHA SCIENCE AND TECHNOLOGY PARK, SHAHE XI ROAD,
NANSHAN DISTRICT, SHENZHEN, GUANGDONG PROVINCE, P.R. CHINA 518055
MVG COMOSAR REFERENCE DIPOLE
FREQUENCY: 1800 MHZ
SERIAL NO.: SN 25/13 DIP 1G800-248

Calibrated at MVG US
2105 Barrett Park Dr. - Kennesaw, GA 30144

03/16/2015

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.75.10.15.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	3/16/2015	
Checked by :	Jérôme LUC	Product Manager	3/16/2015	
Approved by :	Kim RUTKOWSKI	Quality Manager	3/16/2015	

	Customer Name
Distribution :	SHENZHEN BALUN TECHNOLOGY Co.,Ltd.

Issue	Date	Modifications
A	3/16/2015	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 1800 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID1800
Serial Number	SN 25/13 DIP 1G800-248
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards. The product is designed for use with the COMOSAR test bench only.

Figure 1 – *MVG COMOSAR Validation Dipole*

4 MEASUREMENT METHOD

The IEEE 1528, FCC KDBs and CEI/IEC 62209 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom with the phantom constucted as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE Std. 1528 and CEI/IEC 62209 standards specify the mechanical components and dimensions of the validation dipoles, with the dimensions frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness.

5 MEASUREMENT UNCERTAINTY

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.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

5.3 VALIDATION MEASUREMENT

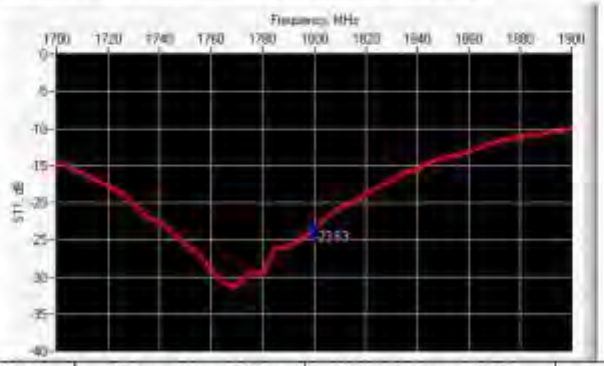
The guidelines outlined in the IEEE 1528, FCC KDBs, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Sean Volume	Expanded Uncertainty
1 g	20.3 %

10 g	20.1 %

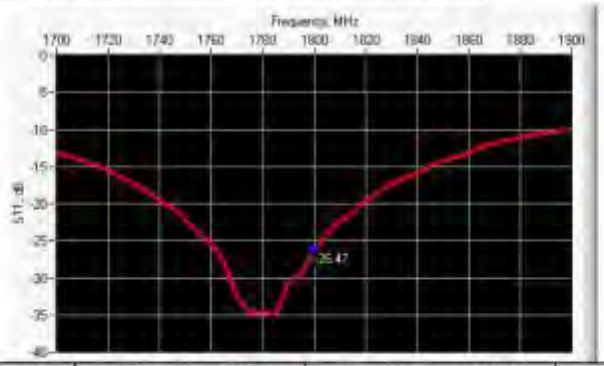
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
1800	-23.63	-20	45.1 Ω + 4.0 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
1800	-26.47	-20	45.5 Ω - 0.3 jΩ

6.3 MECHANICAL DIMENSIONS

Frequency MHz	l mm		h mm		d mm	
	required	measured	required	measured	required	measured
300	420.0 ±1 %		250.0 ±1 %		6.35 ±1 %	

450	290.0 ±1 %		166.7 ±1 %		6.35 ±1 %	
750	176.0 ±1 %		100.0 ±1 %		6.35 ±1 %	
835	161.0 ±1 %		89.8 ±1 %		3.6 ±1 %	
900	149.0 ±1 %		83.3 ±1 %		3.6 ±1 %	
1450	89.1 ±1 %		51.7 ±1 %		3.6 ±1 %	
1500	80.5 ±1 %		50.0 ±1 %		3.6 ±1 %	
1640	79.0 ±1 %		45.7 ±1 %		3.6 ±1 %	
1750	75.2 ±1 %		42.8 ±1 %		3.6 ±1 %	
1800	72.0 ±1 %	PASS	41.7 ±1 %	PASS	3.6 ±1 %	PASS
1900	68.0 ±1 %		39.5 ±1 %		3.6 ±1 %	
1950	66.3 ±1 %		38.5 ±1 %		3.6 ±1 %	
2000	64.5 ±1 %		37.5 ±1 %		3.6 ±1 %	
2100	61.0 ±1 %		35.7 ±1 %		3.6 ±1 %	
2300	55.5 ±1 %		32.6 ±1 %		3.6 ±1 %	
2450	51.5 ±1 %		30.4 ±1 %		3.6 ±1 %	
2600	48.5 ±1 %		28.8 ±1 %		3.6 ±1 %	
3000	41.5 ±1 %		25.0 ±1 %		3.6 ±1 %	
3500	37.0±1 %		26.4 ±1 %		3.6 ±1 %	
3700	34.7±1 %		26.4 ±1 %		3.6 ±1 %	

7 VALIDATION MEASUREMENT

The IEEE Std. 1528, FCC KDBs and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

7.1 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
300	45.3 ±5 %		0.87 ±5 %	
450	43.5 ±5 %		0.87 ±5 %	
750	41.9 ±5 %		0.89 ±5 %	
835	41.5 ±5 %		0.90 ±5 %	
900	41.5 ±5 %		0.97 ±5 %	
1450	40.5 ±5 %		1.20 ±5 %	
1500	40.4 ±5 %		1.23 ±5 %	
1640	40.2 ±5 %		1.31 ±5 %	
1750	40.1 ±5 %		1.37 ±5 %	

1800	40.0 ±5 %	PASS	1.40 ±5 %	PASS
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

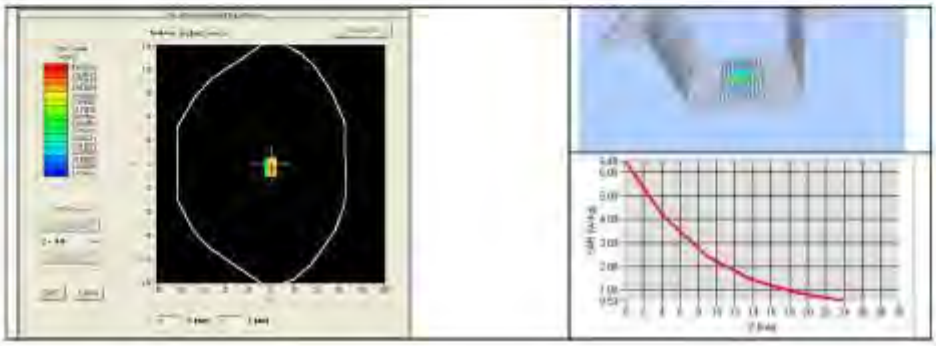
7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

Software	OPENSAR V4
Phantom	SN 2009 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 41.1 sigma : 1.39
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm dy=8mm
Zoom Scan Resolution	dx=8mm dy=8m dz=5mm
Frequency	1800 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9		6.95	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4	38.72 (3.87)	20.1	20.37 (2.04)

1900	39.7		20.5	
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4		24	
2600	55.3		24.6	
3000	63.8		25.7	
3500	67.1		25	



7.3 BODY LIQUID MEASUREMENT

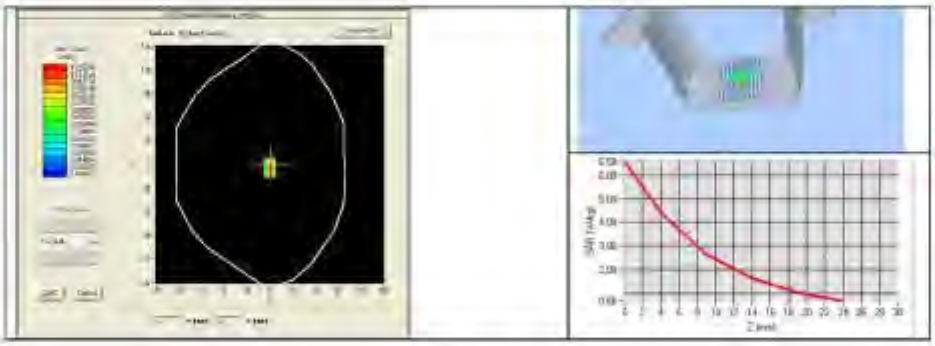
Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
150	61.9 ±5 %		0.80 ±5 %	
300	58.2 ±5 %		0.92 ±5 %	
450	56.7 ±5 %		0.94 ±5 %	
750	55.5 ±5 %		0.96 ±5 %	
835	55.2 ±5 %		0.97 ±5 %	
900	55.0 ±5 %		1.05 ±5 %	
915	55.0 ±5 %		1.06 ±5 %	
1450	54.0 ±5 %		1.30 ±5 %	
1610	53.8 ±5 %		1.40 ±5 %	
1800	53.3 ±5 %	PASS	1.52 ±5 %	PASS
1900	53.3 ±5 %		1.52 ±5 %	
2000	53.3 ±5 %		1.52 ±5 %	
2100	53.2 ±5 %		1.62 ±5 %	
2450	52.7 ±5 %		1.95 ±5 %	

2600	52.5 ±5 %		2.16 ±5 %	
3000	52.0 ±5 %		2.73 ±5 %	
3500	51.3 ±5 %		3.31 ±5 %	
5200	49.0 ±10 %		5.30 ±10 %	
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %		5.53 ±10 %	
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %		5.77 ±10 %	
5800	48.2 ±10 %		6.00 ±10 %	

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values: eps' 53.0 sigma : 1.52
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8m/dz=5mm
Frequency	1800 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)	10 g SAR (W/kg/W)
	measured	measured
1800	10.42 (4.04)	21.53 (2.15)



8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
SAM 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	02/2013	02/2016
Calipers	Carrera	CALIPER-01	12/2013	12/2016
Reference Probe	MVG	EPG122 SN 18/11	10/2014	10/2015
Multimeter	Keithley 2000	1188656	12/2013	12/2016
Signal Generator	Agilent E4438C	MY49070581	12/2013	12/2016
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	12/2013	12/2016
Power Sensor	HP ECP-E26A	US37181460	12/2013	12/2016
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	8/2012	8/2015

F.5 1900MHz Dipole

SAR Reference Dipole Calibration Report

Ref : ACR.75.11.15.SATU.A

SHENZHEN BALUN TECHNOLOGY CO.,LTD.
BLOCK B, FL 1, BAISHA SCIENCE AND TECHNOLOGY PARK, SHAHE XI ROAD,
NANSHAN DISTRICT, SHENZHEN, GUANGDONG PROVINCE, P.R. CHINA 518055

MVG COMOSAR REFERENCE DIPOLE

FREQUENCY: 1900 MHZ
SERIAL NO.: SN 25/13 DIP 1G900-249

Calibrated at MVG US
2105 Barrett Park Dr. - Kennesaw, GA 30144

03/16/2015

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.75.11.15.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	3/16/2015	
Checked by :	Jérôme LUC	Product Manager	3/16/2015	
Approved by :	Kim RUTKOWSKI	Quality Manager	3/16/2015	

	Customer Name
Distribution :	SHENZHEN BALUN TECHNOLOGY Co.,Ltd.

Issue	Date	Modifications
A	3/16/2015	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 1900 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID1900
Serial Number	SN 25/13 DIP 1G900-249
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards. The product is designed for use with the COMOSAR test bench only.

Figure 1 – *MVG COMOSAR Validation Dipole*

4 MEASUREMENT METHOD

The IEEE 1528, FCC KDBs and CEI/IEC 62209 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom with the phantom constucted as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE Std. 1528 and CEI/IEC 62209 standards specify the mechanical components and dimensions of the validation dipoles, with the dimensions frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness.

5 MEASUREMENT UNCERTAINTY

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.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

5.3 VALIDATION MEASUREMENT

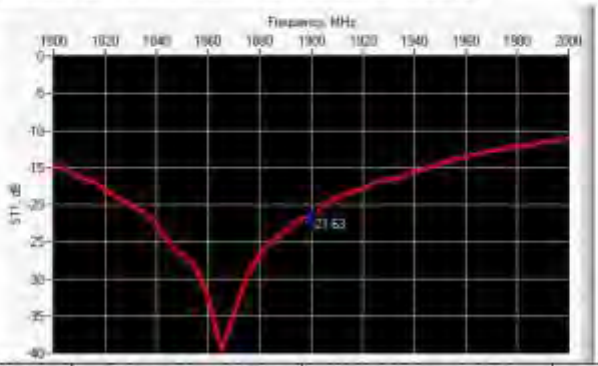
The guidelines outlined in the IEEE 1528, FCC KDBs, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Sean Volume	Expanded Uncertainty
1 g	20.3 %

10 g	20.1 %

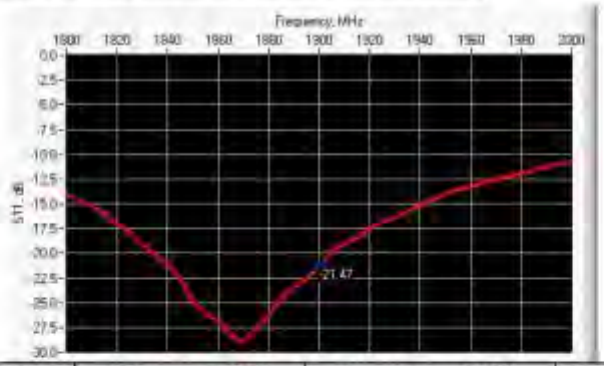
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
1900	-21.63	-20	53.9 Ω + 7.7 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
1900	-21.47	-20	48.9 Ω + 8.4 jΩ

6.3 MECHANICAL DIMENSIONS

Frequency MHz	l mm		h mm		d mm	
	required	measured	required	measured	required	measured
300	420.0 ±1 %		250.0 ±1 %		6.35 ±1 %	

450	240.0 ±1 %		166.7 ±1 %		6.35 ±1 %	
750	176.0 ±1 %		100.0 ±1 %		6.35 ±1 %	
835	161.0 ±1 %		89.8 ±1 %		3.6 ±1 %	
900	149.0 ±1 %		83.3 ±1 %		3.6 ±1 %	
1450	89.1 ±1 %		51.7 ±1 %		3.6 ±1 %	
1500	80.5 ±1 %		50.0 ±1 %		3.6 ±1 %	
1640	79.0 ±1 %		45.7 ±1 %		3.6 ±1 %	
1750	75.2 ±1 %		42.8 ±1 %		3.6 ±1 %	
1800	72.0 ±1 %		41.7 ±1 %		3.6 ±1 %	
1900	68.0 ±1 %	PASS	39.5 ±1 %	PASS	3.6 ±1 %	PASS
1950	66.3 ±1 %		38.5 ±1 %		3.6 ±1 %	
2000	64.5 ±1 %		37.5 ±1 %		3.6 ±1 %	
2100	61.0 ±1 %		35.7 ±1 %		3.6 ±1 %	
2300	55.5 ±1 %		32.6 ±1 %		3.6 ±1 %	
2450	51.5 ±1 %		30.4 ±1 %		3.6 ±1 %	
2600	48.5 ±1 %		28.8 ±1 %		3.6 ±1 %	
3000	41.5 ±1 %		25.0 ±1 %		3.6 ±1 %	
3500	37.0±1 %		26.4 ±1 %		3.6 ±1 %	
3700	34.7±1 %		26.4 ±1 %		3.6 ±1 %	

7 VALIDATION MEASUREMENT

The IEEE Std. 1528, FCC KDBs and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

7 1 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
300	45.3 ±5 %		0.87 ±5 %	
450	43.5 ±5 %		0.87 ±5 %	
750	41.9 ±5 %		0.89 ±5 %	
835	41.5 ±5 %		0.90 ±5 %	
900	41.5 ±5 %		0.97 ±5 %	
1450	40.5 ±5 %		1.20 ±5 %	
1500	40.4 ±5 %		1.23 ±5 %	
1640	40.2 ±5 %		1.31 ±5 %	
1750	40.1 ±5 %		1.37 ±5 %	

1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %	PASS	1.40 ±5 %	PASS
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

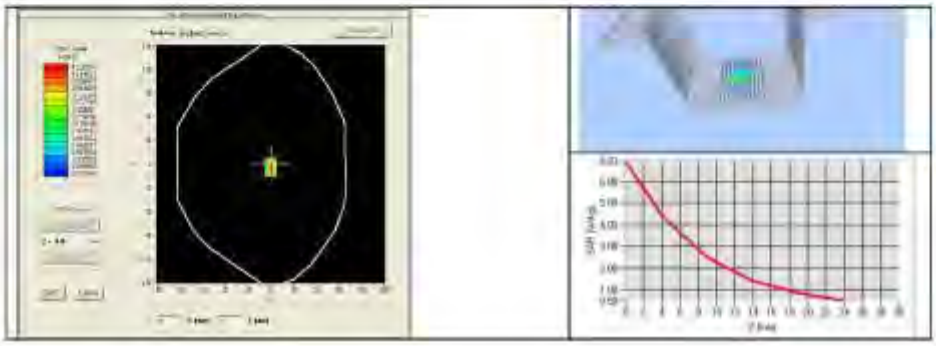
7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' : 40.9 sigma : 1.43
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoom Scan Resolution	dx=8mm/dy=8m/dz=5mm
Frequency	1900 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9		6.99	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	

1900	39.7	40.75 (4.08)	20.5	20.82 (2.08)
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4		24	
2600	55.3		24.6	
3000	63.8		25.7	
3500	67.1		25	



7.3 BODY LIQUID MEASUREMENT

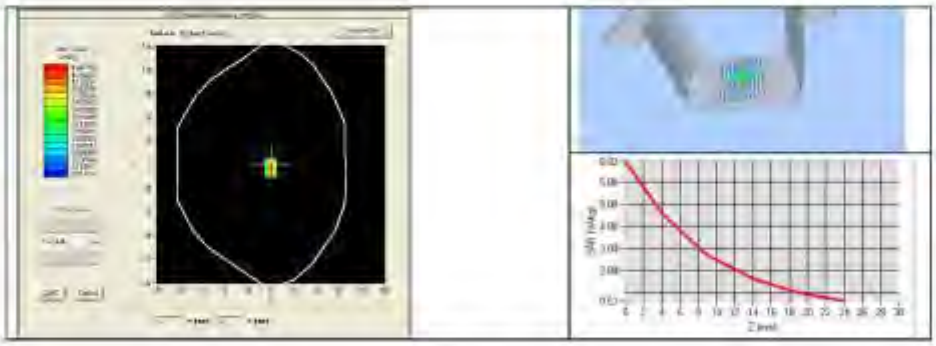
Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
150	61.9 ±5 %		0.80 ±5 %	
300	58.2 ±5 %		0.92 ±5 %	
450	56.7 ±5 %		0.94 ±5 %	
750	55.5 ±5 %		0.96 ±5 %	
835	55.2 ±5 %		0.97 ±5 %	
900	55.0 ±5 %		1.05 ±5 %	
915	55.0 ±5 %		1.06 ±5 %	
1450	54.0 ±5 %		1.30 ±5 %	
1610	53.8 ±5 %		1.40 ±5 %	
1800	53.3 ±5 %		1.52 ±5 %	
1900	53.3 ±5 %	PASS	1.52 ±5 %	PASS
2000	53.3 ±5 %		1.52 ±5 %	
2100	53.2 ±5 %		1.62 ±5 %	
2450	52.7 ±5 %		1.95 ±5 %	

2600	52.5 ±5 %		2.16 ±5 %	
3000	52.0 ±5 %		2.73 ±5 %	
3500	51.3 ±5 %		3.31 ±5 %	
5200	49.0 ±10 %		5.30 ±10 %	
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %		5.53 ±10 %	
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %		5.77 ±10 %	
5800	48.2 ±10 %		6.00 ±10 %	

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values: eps' 53.9 sigma : 1.55
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=8mm/dy=8m/dz=5mm
Frequency	1900 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

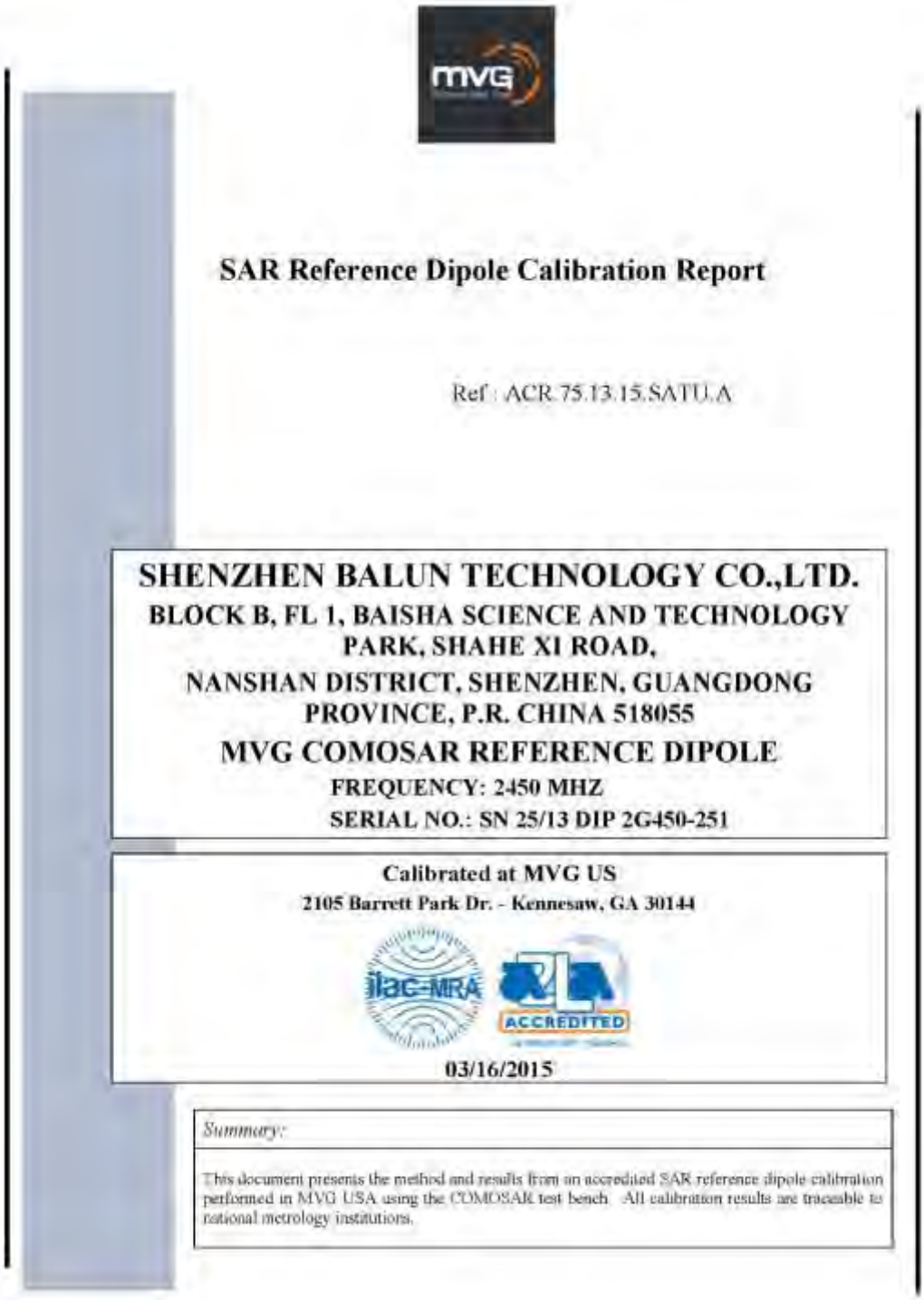
Frequency MHz	1 g SAR (W/kg/W)	10 g SAR (W/kg/W)
	measured	measured
1900	42.06 (4.21)	21.87 (2.19)



8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
SAM 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	02/2013	02/2016
Calipers	Carrera	CALIPER-01	12/2013	12/2016
Reference Probe	MVG	EPG122 SN 18/11	10/2014	10/2015
Multimeter	Keithley 2000	1188656	12/2013	12/2016
Signal Generator	Agilent E4438C	MY49070581	12/2013	12/2016
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	12/2013	12/2016
Power Sensor	HP ECP-E26A	US37181460	12/2013	12/2016
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	8/2012	8/2015

F.6 2450MHz Dipole



SAR Reference Dipole Calibration Report

Ref : ACR.75.13.15.SATU.A

SHENZHEN BALUN TECHNOLOGY CO.,LTD.
BLOCK B, FL 1, BAISHA SCIENCE AND TECHNOLOGY PARK, SHAHE XI ROAD,
NANSHAN DISTRICT, SHENZHEN, GUANGDONG PROVINCE, P.R. CHINA 518055
MVG COMOSAR REFERENCE DIPOLE
FREQUENCY: 2450 MHZ
SERIAL NO.: SN 25/13 DIP 2G450-251

Calibrated at MVG US
2105 Barrett Park Dr. - Kennesaw, GA 30144

03/16/2015

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.75.13.15.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	3/16/2015	
Checked by :	Jérôme LUC	Product Manager	3/16/2015	
Approved by :	Kim RUTKOWSKI	Quality Manager	3/16/2015	

	Customer Name
Distribution :	SHENZHEN BALUN TECHNOLOGY Co.,Ltd.

Issue	Date	Modifications
A	3/16/2015	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 2450 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID2450
Serial Number	SN 25/13 DIP 2G450-251
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards. The product is designed for use with the COMOSAR test bench only.

Figure 1 – *MVG COMOSAR Validation Dipole*

4 MEASUREMENT METHOD

The IEEE 1528, FCC KDBs and CEI/IEC 62209 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom with the phantom constucted as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE Std. 1528 and CEI/IEC 62209 standards specify the mechanical components and dimensions of the validation dipoles, with the dimensions frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness.

5 MEASUREMENT UNCERTAINTY

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.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement.

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

5.3 VALIDATION MEASUREMENT

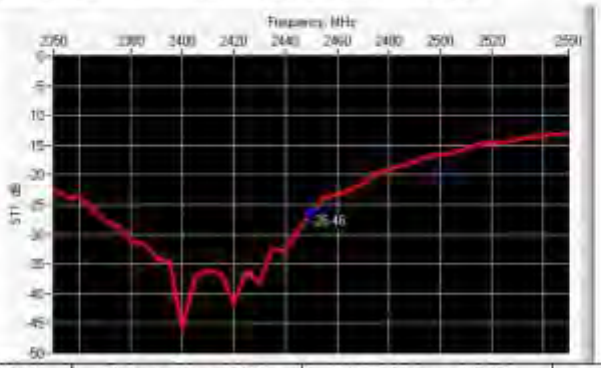
The guidelines outlined in the IEEE 1528, FCC KDBs, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Scan Volume	Expanded Uncertainty
1 g	20.3 %

10 g	20.1 %

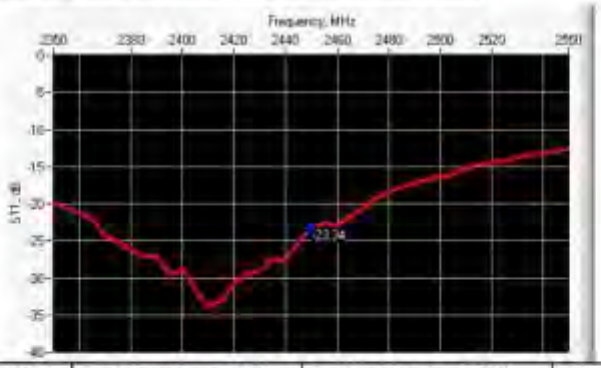
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
2450	-26.46	-20	49.3 Ω - 4.7 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
2450	-23.34	-20	53.4 Ω - 6.2 jΩ

6.3 MECHANICAL DIMENSIONS

Frequency MHz	l mm		h mm		d mm	
	required	measured	required	measured	required	measured
300	420.0 ±1 %		250.0 ±1 %		6.35 ±1 %	

450	290.0 ±1 %		166.7 ±1 %		6.35 ±1 %	
750	176.0 ±1 %		100.0 ±1 %		6.35 ±1 %	
835	161.0 ±1 %		89.8 ±1 %		3.6 ±1 %	
900	149.0 ±1 %		83.3 ±1 %		3.6 ±1 %	
1450	89.1 ±1 %		51.7 ±1 %		3.6 ±1 %	
1500	80.5 ±1 %		50.0 ±1 %		3.6 ±1 %	
1640	79.0 ±1 %		45.7 ±1 %		3.6 ±1 %	
1750	75.2 ±1 %		42.8 ±1 %		3.6 ±1 %	
1800	72.0 ±1 %		41.7 ±1 %		3.6 ±1 %	
1900	68.0 ±1 %		39.5 ±1 %		3.6 ±1 %	
1950	66.3 ±1 %		38.5 ±1 %		3.6 ±1 %	
2000	64.5 ±1 %		37.5 ±1 %		3.6 ±1 %	
2100	61.0 ±1 %		35.7 ±1 %		3.6 ±1 %	
2300	55.5 ±1 %		32.6 ±1 %		3.6 ±1 %	
2450	51.5 ±1 %	PASS	30.4 ±1 %	PASS	3.6 ±1 %	PASS
2600	48.5 ±1 %		28.8 ±1 %		3.6 ±1 %	
3000	41.5 ±1 %		25.0 ±1 %		3.6 ±1 %	
3500	37.0 ±1 %		26.4 ±1 %		3.6 ±1 %	
3700	34.7 ±1 %		26.4 ±1 %		3.6 ±1 %	

7 VALIDATION MEASUREMENT

The IEEE Std. 1528, FCC KDBs and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

7.1 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
300	45.3 ±5 %		0.87 ±5 %	
450	43.5 ±5 %		0.87 ±5 %	
750	41.9 ±5 %		0.89 ±5 %	
835	41.5 ±5 %		0.90 ±5 %	
900	41.5 ±5 %		0.97 ±5 %	
1450	40.5 ±5 %		1.20 ±5 %	
1500	40.4 ±5 %		1.23 ±5 %	
1640	40.2 ±5 %		1.31 ±5 %	
1750	40.1 ±5 %		1.37 ±5 %	

1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %	PASS	1.80 ±5 %	PASS
2600	39.0 ±5 %		1.96 ±5 %	
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

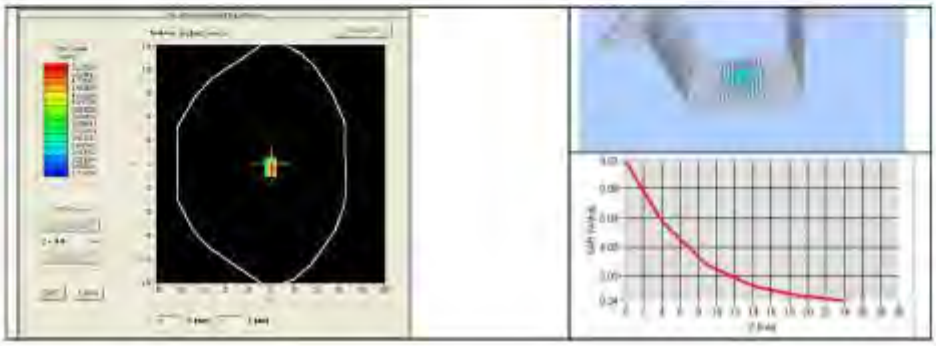
7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps= 38.9 sigma= 1.79
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoom Scan Resolution	dx=5mm/dy=5m/dz=5mm
Frequency	2450 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9		6.99	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	

1900	39.7		20.5	
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4	54.29 (5.43)	24	24.20 (2.42)
2600	55.3		24.6	
3000	63.8		25.7	
3500	67.1		25	



7.3 BODY LIQUID MEASUREMENT

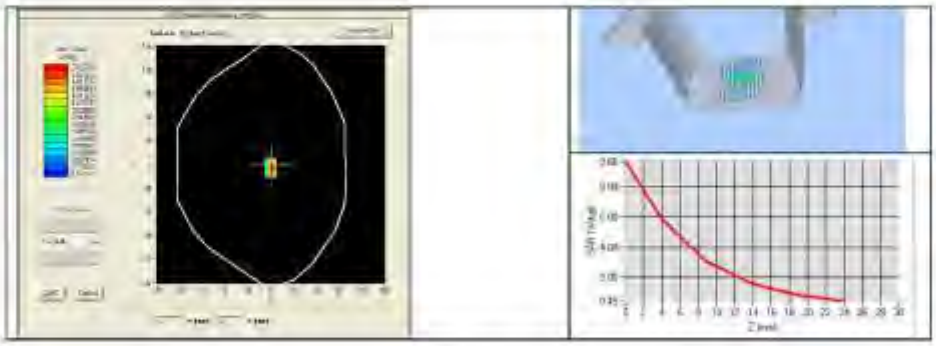
Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
150	61.9 ±5 %		0.80 ±5 %	
300	58.2 ±5 %		0.92 ±5 %	
450	56.7 ±5 %		0.94 ±5 %	
750	55.5 ±5 %		0.96 ±5 %	
835	55.2 ±5 %		0.97 ±5 %	
900	55.0 ±5 %		1.05 ±5 %	
915	55.0 ±5 %		1.06 ±5 %	
1450	54.0 ±5 %		1.30 ±5 %	
1610	53.8 ±5 %		1.40 ±5 %	
1800	53.3 ±5 %		1.52 ±5 %	
1900	53.3 ±5 %		1.52 ±5 %	
2000	53.3 ±5 %		1.52 ±5 %	
2100	53.2 ±5 %		1.62 ±5 %	
2450	52.7 ±5 %	PASS	1.95 ±5 %	PASS

2600	52.5 ±5 %		2.16 ±5 %	
3000	52.0 ±5 %		2.73 ±5 %	
3500	51.3 ±5 %		3.31 ±5 %	
5200	49.0 ±10 %		5.30 ±10 %	
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %		5.53 ±10 %	
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %		5.77 ±10 %	
5800	48.2 ±10 %		6.00 ±10 %	

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values: eps' 52.7 sigma : 1.94
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5m/dz=5mm
Frequency	2450 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	43 %

Frequency MHz	1 g SAR (W/kg/W)	10 g SAR (W/kg/W)
	measured	measured
2450	54.70 (5.47)	24.86 (2.48)



8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
SAM 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	02/2013	02/2016
Calipers	Carrera	CALIPER-01	12/2013	12/2016
Reference Probe	MVG	EPG122 SN 18/11	10/2014	10/2015
Multimeter	Keithley 2000	1188656	12/2013	12/2016
Signal Generator	Agilent E4438C	MY49070581	12/2013	12/2016
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	12/2013	12/2016
Power Sensor	HP ECP-E26A	US37181460	12/2013	12/2016
Directional Coupler	Narda 4216-20	01396	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	8/2012	8/2015

F.7 2600 MHz Dipole

SAR Reference Dipole Calibration Report

Ref : ACR.75.14.15.SATU.A

SHENZHEN BALUN TECHNOLOGY CO.,LTD.
BLOCK B, FL 1, BAISHA SCIENCE AND TECHNOLOGY PARK, SHAHE XI ROAD,
NANSHAN DISTRICT, SHENZHEN, GUANGDONG PROVINCE, P.R. CHINA 518055

MVG COMOSAR REFERENCE DIPOLE
FREQUENCY: 2600 MHZ
SERIAL NO.: SN 25/13 DIP 2G600-254

Calibrated at MVG US
2105 Barrett Park Dr. - Kennesaw, GA 30144

03/16/2015

Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

SAR REFERENCE DIPOLE CALIBRATION REPORT Ref: ACR.73.14.15.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	3/16/2015	
Checked by :	Jérôme LUC	Product Manager	3/16/2015	
Approved by :	Kim RUTKOWSKI	Quality Manager	3/16/2015	

	Customer Name
Distribution :	SHENZHEN BALUN TECHNOLOGY Co.,Ltd.

Issue	*Date*	*Modifications*
A	3/16/2015	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 2600 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID2600
Serial Number	SN 25/13 DIP 2G600-254
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEEE 1528, FCC KDBs and CEI/IEC 62209 standards. The product is designed for use with the COMOSAR test bench only.

Figure 1 – *MVG COMOSAR Validation Dipole*

4 MEASUREMENT METHOD

The IEEE 1528, FCC KDBs and CEI/IEC 62209 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom with the phantom constucted as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE Std. 1528 and CEI/IEC 62209 standards specify the mechanical components and dimensions of the validation dipoles, with the dimensions frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness.

5 MEASUREMENT UNCERTAINTY

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.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

5.3 VALIDATION MEASUREMENT

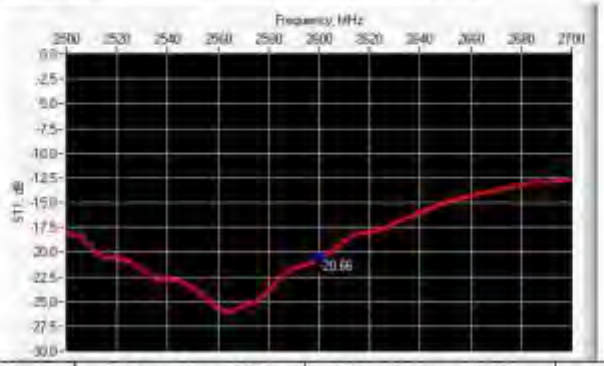
The guidelines outlined in the IEEE 1528, FCC KDBs, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Scan Volume	Expanded Uncertainty
1 g	20.3 %

10 g	20.1 %

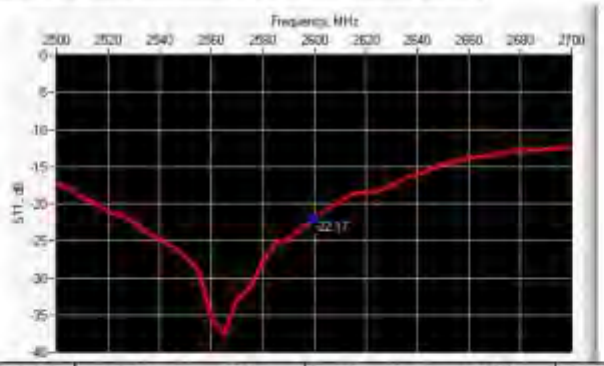
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
2600	-20.66	-20	51.0 Ω + 9.4 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
2600	-22.17	-20	47.9 Ω + 7.5 jΩ

6.3 MECHANICAL DIMENSIONS

Frequency MHz	l mm		h mm		d mm	
	required	measured	required	measured	required	measured
300	420.0 ±1 %		250.0 ±1 %		6.35 ±1 %	

450	290.0 ±1 %		166.7 ±1 %		6.35 ±1 %	
750	176.0 ±1 %		100.0 ±1 %		6.35 ±1 %	
835	161.0 ±1 %		89.8 ±1 %		3.6 ±1 %	
900	149.0 ±1 %		83.3 ±1 %		3.6 ±1 %	
1450	89.1 ±1 %		51.7 ±1 %		3.6 ±1 %	
1500	80.5 ±1 %		50.0 ±1 %		3.6 ±1 %	
1640	79.0 ±1 %		45.7 ±1 %		3.6 ±1 %	
1750	75.2 ±1 %		42.8 ±1 %		3.6 ±1 %	
1800	72.0 ±1 %		41.7 ±1 %		3.6 ±1 %	
1900	68.0 ±1 %		39.5 ±1 %		3.6 ±1 %	
1950	66.3 ±1 %		38.5 ±1 %		3.6 ±1 %	
2000	64.5 ±1 %		37.5 ±1 %		3.6 ±1 %	
2100	61.0 ±1 %		35.7 ±1 %		3.6 ±1 %	
2300	55.5 ±1 %		32.6 ±1 %		3.6 ±1 %	
2450	51.5 ±1 %		30.4 ±1 %		3.6 ±1 %	
2600	48.5 ±1 %	PASS	28.8 ±1 %	PASS	3.6 ±1 %	PASS
3000	41.5 ±1 %		25.0 ±1 %		3.6 ±1 %	
3500	37.0 ±1 %		26.4 ±1 %		3.6 ±1 %	
3700	34.7 ±1 %		26.4 ±1 %		3.6 ±1 %	

7 VALIDATION MEASUREMENT

The IEEE Std. 1528, FCC KDBs and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

7.1 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
300	45.3 ±5 %		0.87 ±5 %	
450	43.5 ±5 %		0.87 ±5 %	
750	41.9 ±5 %		0.89 ±5 %	
835	41.5 ±5 %		0.90 ±5 %	
900	41.5 ±5 %		0.97 ±5 %	
1450	40.5 ±5 %		1.20 ±5 %	
1500	40.4 ±5 %		1.23 ±5 %	
1640	40.2 ±5 %		1.31 ±5 %	
1750	40.1 ±5 %		1.37 ±5 %	

1800	40.0 ±5 %		1.40 ±5 %	
1900	40.0 ±5 %		1.40 ±5 %	
1950	40.0 ±5 %		1.40 ±5 %	
2000	40.0 ±5 %		1.40 ±5 %	
2100	39.8 ±5 %		1.49 ±5 %	
2300	39.5 ±5 %		1.67 ±5 %	
2450	39.2 ±5 %		1.80 ±5 %	
2600	39.0 ±5 %	PASS	1.96 ±5 %	PASS
3000	38.5 ±5 %		2.40 ±5 %	
3500	37.9 ±5 %		2.91 ±5 %	

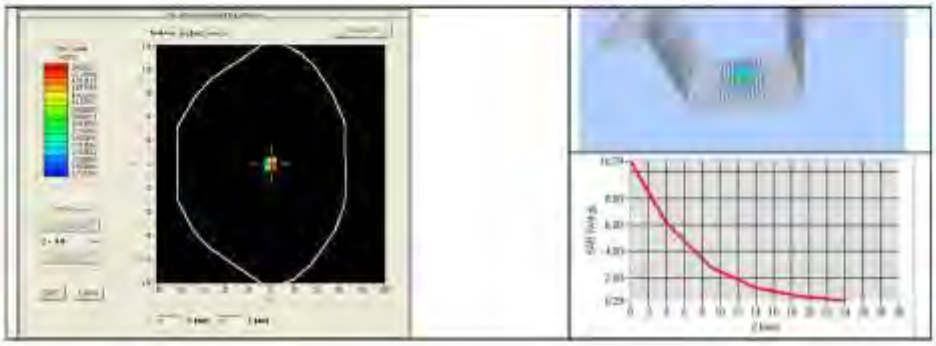
7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

Software	OPENSAR V4
Phantom	SN 2009 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values: eps' 38.2 sigma 1.93
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoom Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	2600 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency MHz	1 g SAR (W/kg/W)		10 g SAR (W/kg/W)	
	required	measured	required	measured
300	2.85		1.94	
450	4.58		3.06	
750	8.49		5.55	
835	9.56		6.22	
900	10.9		6.95	
1450	29		16	
1500	30.5		16.8	
1640	34.2		18.4	
1750	36.4		19.3	
1800	38.4		20.1	

1900	39.7		20.5	
1950	40.5		20.9	
2000	41.1		21.1	
2100	43.6		21.9	
2300	48.7		23.3	
2450	52.4		24	
2600	55.3	57.37 (5.74)	24.6	24.68 (2.47)
3000	63.8		25.7	
3500	67.1		25	



7.3 BODY LIQUID MEASUREMENT

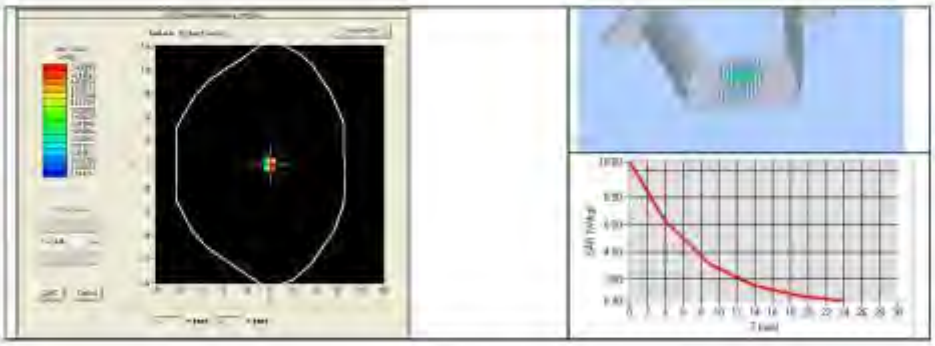
Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
150	61.9 ±5 %		0.80 ±5 %	
300	58.2 ±5 %		0.92 ±5 %	
450	56.7 ±5 %		0.94 ±5 %	
750	55.5 ±5 %		0.96 ±5 %	
835	55.2 ±5 %		0.97 ±5 %	
900	55.0 ±5 %		1.05 ±5 %	
915	55.0 ±5 %		1.06 ±5 %	
1450	54.0 ±5 %		1.30 ±5 %	
1610	53.8 ±5 %		1.40 ±5 %	
1800	53.3 ±5 %		1.52 ±5 %	
1900	53.3 ±5 %		1.52 ±5 %	
2000	53.3 ±5 %		1.52 ±5 %	
2100	53.2 ±5 %		1.62 ±5 %	
2450	52.7 ±5 %		1.95 ±5 %	

2600	52.5 ±5 %	PASS	2.16 ±5 %	PASS
3000	52.0 ±5 %		2.73 ±5 %	
3500	51.3 ±5 %		3.31 ±5 %	
5200	49.0 ±10 %		5.30 ±10 %	
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %		5.53 ±10 %	
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %		5.77 ±10 %	
5800	48.2 ±10 %		6.00 ±10 %	

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values: eps = 51.6 sigma = 2.21
Distance between dipole center and liquid	10.0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=5mm/dy=5mm/dz=5mm
Frequency	2600 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

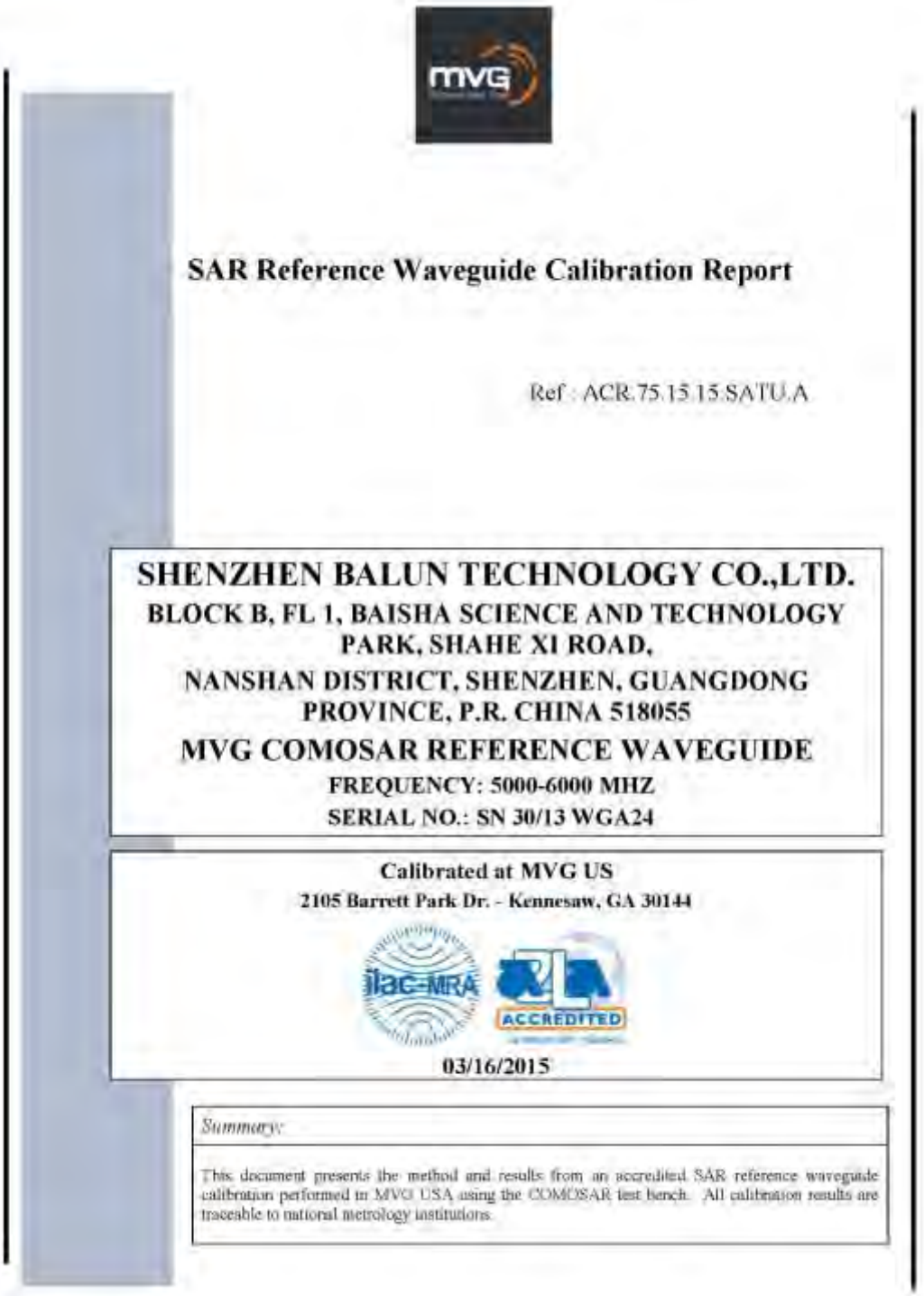
Frequency MHz	1 g SAR (W/kg/W)	10 g SAR (W/kg/W)
	measured	measured
2600	57.62 (5.76)	25.39 (2.54)



8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
SAM 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	02/2013	02/2016
Calipers	Carrera	CALIPER-01	12/2013	12/2016
Reference Probe	MVG	EPG122 SN 18/11	10/2014	10/2015
Multimeter	Keithley 2000	1188656	12/2013	12/2016
Signal Generator	Agilent E4438C	MY49070581	12/2013	12/2016
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	12/2013	12/2016
Power Sensor	HP ECP-E26A	US37181460	12/2013	12/2016
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	8/2012	8/2015

F.8 Waveguide



SAR Reference Waveguide Calibration Report

Ref : ACR.75.15.15.SATU.A

SHENZHEN BALUN TECHNOLOGY CO.,LTD.
BLOCK B, FL 1, BAISHA SCIENCE AND TECHNOLOGY PARK, SHAHE XI ROAD,
NANSHAN DISTRICT, SHENZHEN, GUANGDONG PROVINCE, P.R. CHINA 518055

MVG COMOSAR REFERENCE WAVEGUIDE
FREQUENCY: 5000-6000 MHZ
SERIAL NO.: SN 30/13 WGA24

Calibrated at MVG US
2105 Barrett Park Dr. - Kennesaw, GA 30144

03/16/2015

Summary:

This document presents the method and results from an accredited SAR reference waveguide calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

SAR REFERENCE WAVEGUIDE CALIBRATION REPORT Ref: ACR.75.15.14.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	3/16/2015	
Checked by :	Jérôme LUC	Product Manager	3/16/2015	
Approved by :	Kim RUTKOWSKI	Quality Manager	3/16/2015	

	Customer Name
Distribution :	SHENZHEN BALUN TECHNOLOGY Co.,Ltd.

Issue	Date	Modifications
A	3/16/2015	Initial release

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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEEE 1528 and CEI/IEC 62209 standards for reference waveguides used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 5000-6000 MHz REFERENCE WAVEGUIDE
Manufacturer	MVG
Model	SWG5500
Serial Number	SN 30/13 WGA24
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Waveguides are built in accordance to the IEEE 1528 and CEI/IEC 62209 standards.

4 MEASUREMENT METHOD

The IEEE 1528 and CEI/IEC 62209 standards provide requirements for reference waveguides used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 RETURN LOSS REQUIREMENTS

The waveguide used for SAR system validation measurements and checks must have a return loss of -8 dB or better. The return loss measurement shall be performed with matching layer placed in the open end of the waveguide, with the waveguide and matching layer in direct contact with the phantom shell as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE 1528 and CEI/IEC 62209 standards specify the mechanical dimensions of the validation waveguide, the specified dimensions are as shown in Section 6.2. Figure 1 shows how the dimensions relate to the physical construction of the waveguide.

5 MEASUREMENT UNCERTAINTY

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.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

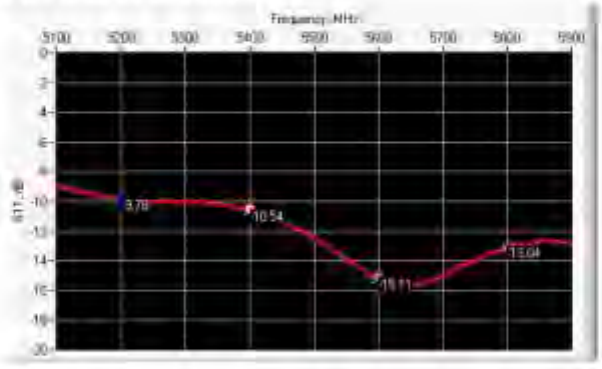
5.3 VALIDATION MEASUREMENT

The guidelines outlined in the IEEE 1528 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Scan Volume	Expanded Uncertainty
1 g	20.3 %
10 g	20.1 %

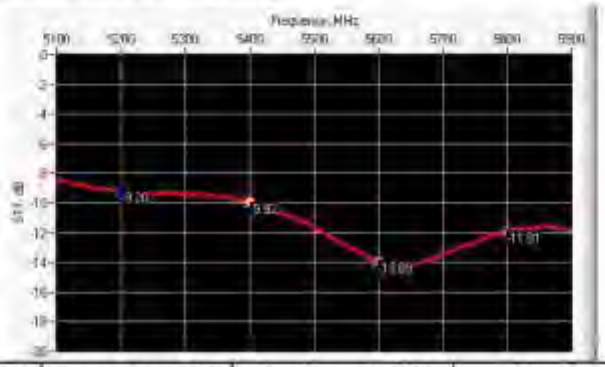
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
5200	-9.78	-8	26.6 Ω + 9.1 jΩ
5400	-10.54	-8	89.7 Ω + 12.3 jΩ
5600	-15.11	-8	38.1 Ω - 9.8 jΩ
5800	-13.04	-8	54.0 Ω + 23.4 jΩ

6.2 RETURN LOSS IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
5200	-9.20	-8	25.7 Ω + 10.6 jΩ
5400	-9.92	-8	95.8 Ω + 8.8 jΩ
5600	-13.89	-8	35.3 Ω - 9.2 jΩ
5800	-11.91	-8	56.0 Ω + 27.2 jΩ

6.3 MECHANICAL DIMENSIONS

Frequency (MHz)	L (mm)		W (mm)		L_2 (mm)		W_2 (mm)		T (mm)	
	Require d	Measure d	Require d	Measure d	Require d	Measure d	Require d	Measure d	Require d	Measure d
5200	40.30 ± 0.13	PASS	20.19 ± 0.13	PASS	81.03 ± 0.13	PASS	61.98 ± 0.13	PASS	5.3*	PASS
5800	40.39 ± 0.13	PASS	20.19 ± 0.13	PASS	81.03 ± 0.13	PASS	61.98 ± 0.13	PASS	4.3*	PASS

* The tolerance for the matching layer is included in the return loss measurement.

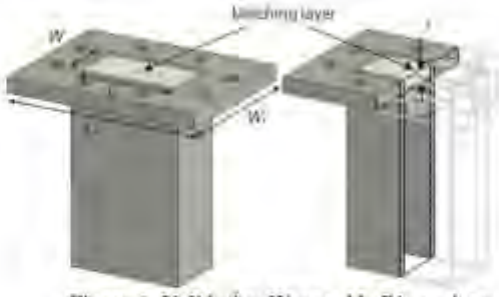


Figure 1: Validation Waveguide Dimensions

7 VALIDATION MEASUREMENT

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference waveguide meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed with the matching layer placed in the open end of the waveguide, with the waveguide and matching layer in direct contact with the phantom shell.

7.1 HEAD LIQUID MEASUREMENT

Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
5000	36.2 ±10 %		4.45 ±10 %	
5100	36.1 ±10 %		4.56 ±10 %	
5200	36.0 ±10 %	PASS	4.66 ±10 %	PASS
5300	35.9 ±10 %		4.76 ±10 %	
5400	35.8 ±10 %	PASS	4.86 ±10 %	PASS
5500	35.6 ±10 %		4.97 ±10 %	
5600	35.5 ±10 %	PASS	5.07 ±10 %	PASS
5700	35.4 ±10 %		5.17 ±10 %	
5800	35.3 ±10 %	PASS	5.27 ±10 %	PASS
5900	35.2 ±10 %		5.38 ±10 %	
6000	35.1 ±10 %		5.48 ±10 %	

7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

At those frequencies, the target SAR value can not be generic. Hereunder is the target SAR value defined by MVG, within the uncertainty for the system validation. All SAR values are normalized to 1 W net power. In bracket, the measured SAR is given with the used input power.

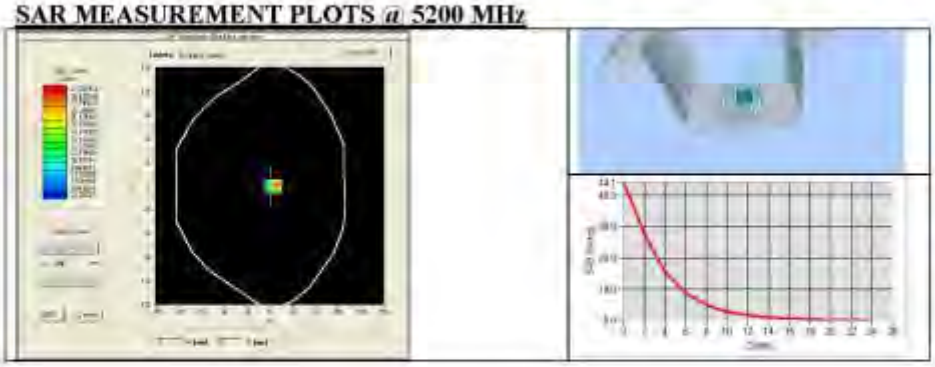
SAR REFERENCE WAVEGUIDE CALIBRATION REPORT

Ref: ACR.75.15.14.SATU.A

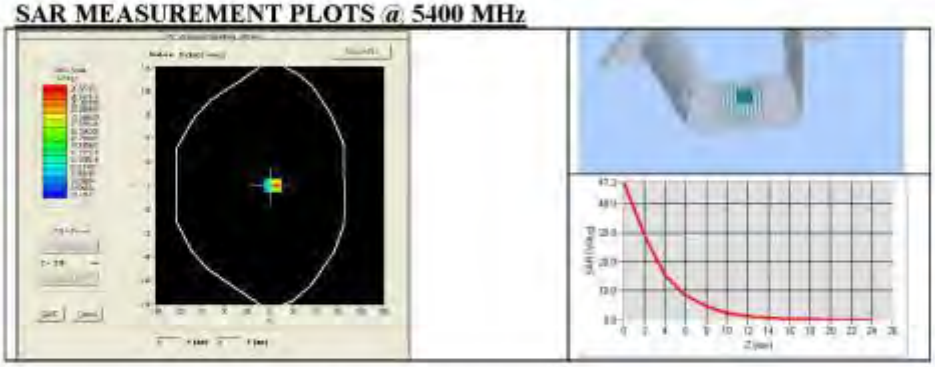
Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Head Liquid Values 5200 MHz: eps' :36.44 sigma :4.79 Head Liquid Values 5400 MHz: eps' :35.99 sigma :4.91 Head Liquid Values 5600 MHz: eps' :35.22 sigma :5.18 Head Liquid Values 5800 MHz: eps' :34.95 sigma :5.42
Distance between dipole waveguide and liquid	0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=4mm/dy=4m/dz=2mm
Frequency	5200 MHz 5400 MHz 5600 MHz 5800 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency (MHz)	1 g SAR (W/kg)		10 g SAR (W/kg)	
	required	measured	required	measured
5200	159.00	157.80 (15.78)	56.90	55.01 (5.50)
5400	166.40	162.69 (16.27)	58.43	56.17 (5.62)
5600	173.80	171.22 (17.12)	59.97	58.57 (5.86)
5800	181.20	179.53 (17.95)	61.50	60.55 (6.05)

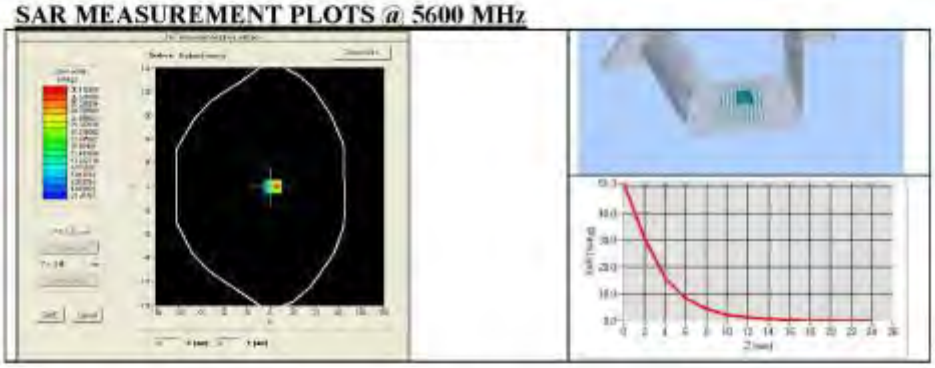
SAR MEASUREMENT PLOTS @ 5200 MHz



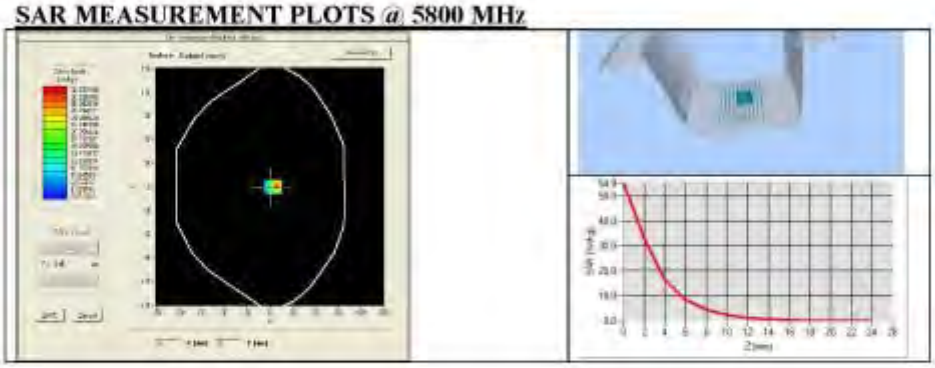
SAR MEASUREMENT PLOTS @ 5400 MHz



SAR MEASUREMENT PLOTS @ 5600 MHz



SAR MEASUREMENT PLOTS @ 5800 MHz



7.3 BODY LIQUID MEASUREMENT

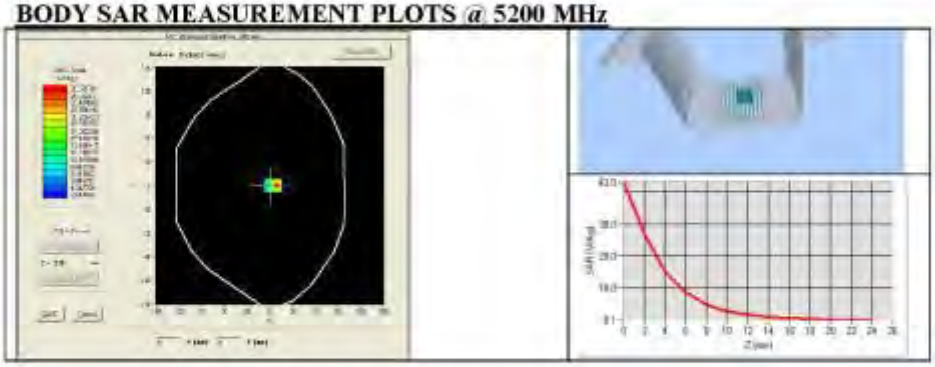
Frequency MHz	Relative permittivity (ε')		Conductivity (σ) S/m	
	required	measured	required	measured
5200	49.0 ±10 %	PASS	5.30 ±10 %	PASS
5300	48.9 ±10 %		5.42 ±10 %	
5400	48.7 ±10 %	PASS	5.53 ±10 %	PASS
5500	48.6 ±10 %		5.65 ±10 %	
5600	48.5 ±10 %	PASS	5.77 ±10 %	PASS
5800	48.2 ±10 %	PASS	6.00 ±10 %	PASS

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

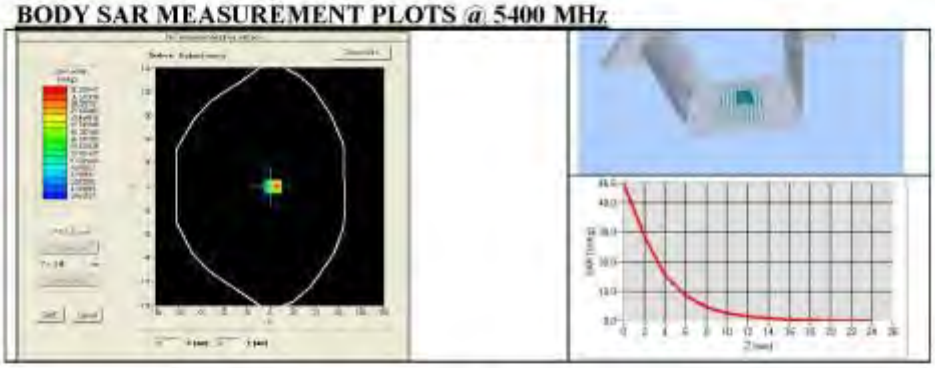
Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values 5200 MHz: eps: 50.70 sigma : 5.11 Body Liquid Values 5400 MHz: eps: 50.01 sigma : 5.64 Body Liquid Values 5600 MHz: eps: 49.34 sigma : 5.85 Body Liquid Values 5800 MHz: eps: 48.54 sigma : 6.22
Distance between dipole waveguide and liquid	0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=4mm/dy=4m/dz=2mm
Frequency	5200 MHz 5400 MHz 5600 MHz 5800 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency (MHz)	1 g SAR (W/kg)	10 g SAR (W/kg)
	measured	measured
5200	155.12 (15.51)	54.66 (5.47)
5400	162.06 (16.21)	56.46 (5.65)
5600	167.13 (16.71)	57.78 (5.78)
5800	173.19 (17.32)	59.30 (5.93)

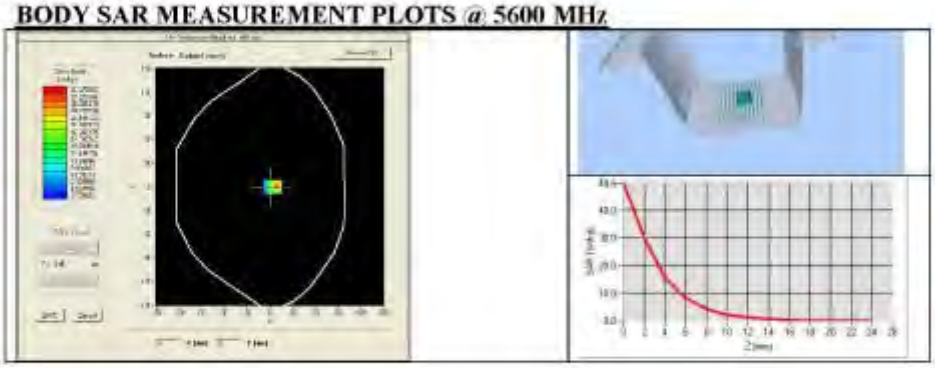
BODY SAR MEASUREMENT PLOTS @ 5200 MHz



BODY SAR MEASUREMENT PLOTS @ 5400 MHz



BODY SAR MEASUREMENT PLOTS @ 5600 MHz



8 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	02/2013	02/2016
Calipers	Carrera	CALIPER-01	12/2013	12/2016
Reference Probe	MVG	EPG122 SN 18/11	10/2014	10/2015
Multimeter	Keithley 2000	1188656	12/2013	12/2016
Signal Generator	Agilent E4438C	MY49070581	12/2013	12/2016
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	12/2013	12/2016
Power Sensor	HP ECP-E26A	US37181460	12/2013	12/2016
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	8/2012	8/2015

8 LIST OF EQUIPMENT

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--END OF REPORT--