

# FCC SAR

## Measurement and Test Report

For

**Hyundai Corporation**

25, Yulgok-ro 2-Gil, Jongno-gu, Seoul, South Korea

**FCC ID: RQQHLT-FSL500A**

<b>Test Standards:</b>	FCC Part 2.1093 ANSI / IEEE C95.1 :2005 ANSI / IEEE C95.3 :2002 <u>IEEE 1528 :2013</u>
<b>Product Description:</b>	<u>4G Smart Phone</u>
<b>Tested Model:</b>	<u>L500</u>
<b>Report No.:</b>	<u>STR16108014H</u>
<b>Tested Date:</b>	<u>2016-10-17 to 2016-10-21</u>
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## 1. General Information

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: Hyundai Corporation  
Address of applicant: 25, Yulgok-ro 2-Gil, Jongno-gu, Seoul, South Korea

Manufacturer: Shenzhen Fortuneship Technology Co., Ltd.  
Address of manufacturer: Room 701-716, 7th Floor, Kanghesheng Building, No.1  
ChuangSheng Road, Nanshan District, Shenzhen,  
Guangdong, P. R. China

General Description of EUT:	
Product Name:	4G Smart Phone
Brand Name:	/
Model No.:	L500
Adding Model(s):	/
Hardware Version:	WW816 V0.6
Software Version:	Android 6.0
Rated Voltage:	DC 3.7V
Battery Capacity:	2200mAh
Device Category:	Portable Device
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

<b>Technical Characteristics of EUT:</b>	
<b>2G</b>	
Support Networks:	GSM, GPRS, EDGE
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS/EDGE 850: 869~894MHz GSM/GPRS/EDGE 1900: 1930~1990MHz
Max RF Output Power:	GSM850: 32.24dBm, GSM1900: 29.63dBm EDGE850: 26.33dBm, EDGE1900: 25.60dBm
Type of Modulation:	GMSK, 8PSK
Type of Antenna:	Integral Antenna
Antenna Gain:	GSM850: -2.0dBi; GSM1900: -1.6dBi
GPRS/EDGE Class:	Class 12
<b>3G</b>	
Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band 2, WCDMA Band 5
Uplink Frequency:	WCDMA Band 2: 1850~1910MHz WCDMA Band 5: 824~849MHz
Downlink Frequency:	WCDMA Band 2: 1930~1990MHz WCDMA Band 5: 869~894MHz
Max RF Output Power:	WCDMA Band 2: 22.58dBm, WCDMA Band 5: 22.52dBm,
Type of Modulation:	BPSK
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band 2: -1.6dBi, WCDMA Band 5: -2.0dBi,
<b>4G</b>	
Support Networks:	FDD-LTE
Support Band:	FDD-LTE Band 2, 4,7,17
Uplink Frequency:	FDD-LTE Band 2: Tx: 1850-1910MHz, FDD-LTE Band 4: Tx: 1710-1755MHz, FDD-LTE Band 7: Tx: 2500-2570MHz FDD-LTE Band 17: Tx: 704-716MHz
Downlink Frequency:	FDD-LTE Band 2: Rx: 1930-1990MHz, FDD-LTE Band 4: Rx: 2110-2155MHz, FDD-LTE Band 7: Rx: 2620-2690MHz, FDD-LTE Band 17: Tx: 734-746MHz
Max RF Output Power:	FDD-LTE Band 2: 23.52dBm, FDD-LTE Band 4: 24.88dBm, FDD-LTE Band 7: 24.75dBm, FDD-LTE Band 17: 24.90dBm
Type of Modulation:	QPSK, 16QAM

Antenna Type:	Integral Antenna
Antenna Gain:	FDD-LTE Band 2: -1.6dBi, FDD-LTE Band 4: -1.5dBi, FDD-LTE Band 7: -1.0dBi, FDD-LTE Band 17: -2.0dBi,
<b>WIFI</b>	
Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)
RF Output Power:	13.20dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	11/7
Channel Separation:	5MHz
Antenna Type:	Integral Antenna
Antenna Gain:	-1.0dBi
<b>Bluetooth</b>	
Bluetooth Version:	V4.0
Frequency Range:	2402-2480MHz
RF Output Power:	0.048dBm (Conducted)
Data Rate:	1Mbps, 2Mbps, 3Mbps
Modulation:	GFSK, Pi/4 QDPSK, 8DPSK
Quantity of Channels:	79/40
Channel Separation:	1MHz/2MHz
Antenna Type:	Integral Antenna
Antenna Gain:	-1.0dBi

## 1.2 Test Standards

The following report is prepared on behalf of the Hyundai Corporation in accordance with FCC 47 CFR Part 2.1093, ANSI/IEEE C95.1-2005, ANSI / IEEE C95.3 :2002, IEEE 1528-2013, KDB 447498 D01 v06, KDB 648474 D04 v01r03, KDB 248227 D01 v02r02, KDB 941225 D01 v03r01, KDB 941225 D05 v02r05 ,KDB 941225 D06 v02r01, and KDB 865664 D01 v01r04 and KDB 865664 D02 v01r02.

The objective is to determine compliance with FCC Part 2.1093 of the Federal Communication Commissions rules.

*Maintenance of compliance* is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

## 1.3 Test Methodology

All measurements contained in this report were conducted with KDB 865664 D01 v01r04 and KDB 865664 D02 v01r02. The public notice KDB 447498 D01 v06 for Mobile and Portable Devices RF Exposure Procedure also.

## 1.4 Test Facility

- **FCC – Registration No.: 934118**

Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

- **Industry Canada (IC) Registration No.: 11464A**

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

- **CNAS Registration No.: L4062**

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101)

## 2. Summary of Test Results

The maximum results of Specific Absorption Rate (SAR) have found during testing are as follows:

Frequency Band	Head SAR	Body-worn (10mm Gap)	Hotspot (10mm Gap)	SAR <sub>1g</sub> Limit (W/kg)
	Maximum SAR <sub>1g</sub> (W/kg)	Maximum SAR <sub>1g</sub> (W/kg)	Maximum SAR <sub>1g</sub> (W/kg)	
GSM	0.308	0.726	1.356	1.6
WCDMA	0.566	0.772	0.880	1.6
FDD-LTE	<b>0.605</b>	<b>1.381</b>	<b>1.381</b>	1.6
WLAN 2.4G	0.453	0.093	0.093	1.6
Simultaneous Transmission	1.057	1.446	<b>1.446</b>	1.6

**Remark:**

*The highest reported SAR values for head, body-worn accessory, wireless router(hotspot), and simultaneous transmission conditions are **0.605W/kg, 1.381W/kg, 1.381W/kg, and 1.446W/kg** respectively.*

The device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR Part 2.1093 and ANSI/IEEE C95.1-2005, and had been tested in accordance with the measurement methods and procedure specified in IEEE 1528-2013 and KDB 865664 D01 v01r04 and KDB 865664 D02 v01r02

### 3. Specific Absorption Rate (SAR)

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#### 3.1 Introduction

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.

#### 3.2 SAR Definition

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 ( $\rho$ ). The equation description is as below:

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

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be either related to the temperature elevation in tissue by

$$\text{SAR} = C \left( \frac{\delta T}{\delta t} \right)$$

Where: C is the specific heat capacity,  $\delta T$  is the temperature rise and  $\delta t$  is the exposure duration, or related to the electrical field in the tissue by

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

Where:  $\sigma$  is the conductivity of the tissue,  $\rho$  is the mass density of the tissue and E is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.



## 4. SAR Measurement System

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### 4.1 The Measurement System

Comosar is a system that is able to determine the SAR distribution inside a phantom of human being according to different standards. The Comosar system consists of the following items:

- Main computer to control all the system
- 6 axis robot
- Data acquisition system
- Miniature E-field probe
- Phone holder
- Head simulating tissue

The following figure shows the system.



The EUT under test operating at the maximum power level is placed in the phone holder, under the phantom, which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The OpenSAR software computes the results to give a SAR value in a 1g or 10g mass.

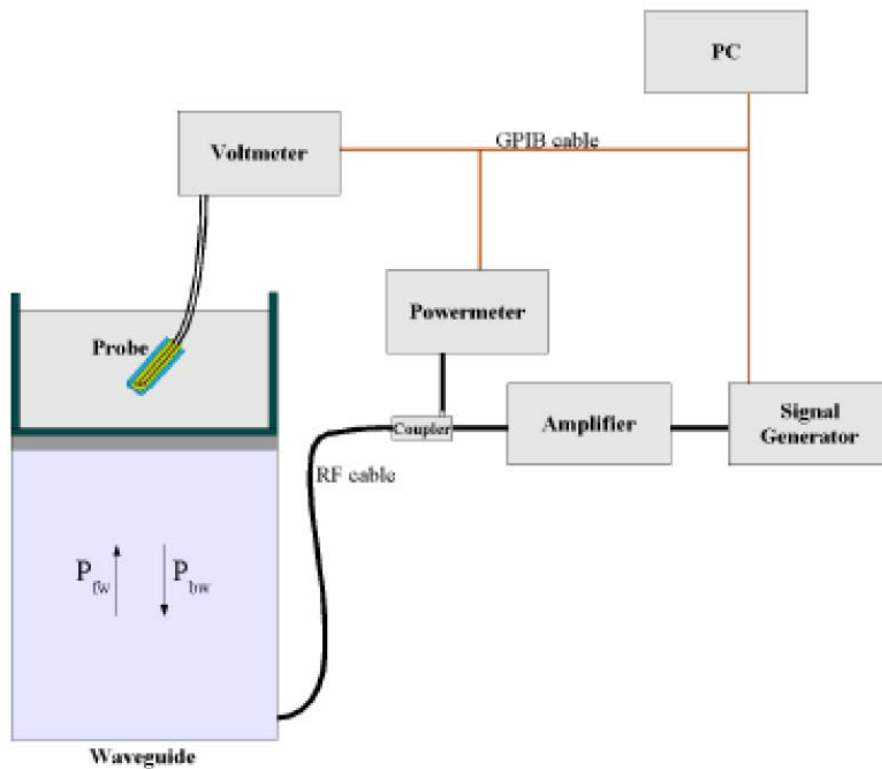
### 4.2 Probe

For the measurements the Specific Dosimetric E-Field Probe SSE5 SN 09/13 EP168 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Probe Length: 330 mm
- Length of Individual Dipoles: 4.5 mm
- Maximum external diameter: 8 mm
- Probe Tip External Diameter : 5 mm
- Distance between dipoles / probe extremity: 2.7mm

- Probe linearity: <0.25 dB
  - Axial Isotropy: <0.25 dB
  - Spherical Isotropy: <0.50 dB
  - Calibration range: 700 to 3000MHz for head & body simulating liquid.
- Angle between probe axis (evaluation axis) and surface normal line: less than 30°

Probe calibration is realized, in compliance with EN 62209-1 and IEEE 1528 STD, with CALISAR, Antenna proprietary calibration system. The calibration is performed with the EN 62209-1 annexe technique using reference guide at the five frequencies.



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

Where :

$P_{fw}$  = Forward Power

$P_{bw}$  = Backward Power

a and b = Waveguide dimensions

$\delta$  = 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:

$$CF(N)=SAR(N)/V_{lin}(N) \quad (N=1,2,3)$$

The linearised output voltage  $V_{lin}(N)$  is obtained from the displayed output voltage  $V(N)$  using

$$V_{lin}(N)=V(N)*(1+V(N)/DCP(N)) \quad (N=1,2,3)$$

where DCP is the diode compression point in mV.

### 4.3 Probe Calibration Process

#### Dosimetric Assessment Procedure

Each E-Probe/Probe Amplifier combination has unique calibration parameters. SATIMO Probe calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm<sup>2</sup>) using an with CALISAR, Antenna proprietary calibration system.

#### Free Space Assessment Procedure

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1mW/cm<sup>2</sup>.

#### Temperature Assessment Procedure

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated head tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

Where:

$$SAR = C \frac{\Delta T}{\Delta t}$$

$\Delta t$  = exposure time (30 seconds),

$C$  = heat capacity of tissue (brain or muscle),

$\Delta T$  = temperature increase due to RF exposure.

SAR is proportional to  $\Delta T / \Delta t$ , the initial rate of tissue heating, before thermal diffusion takes place. The electric field in the simulated tissue can be used to estimate SAR by equating the thermally derived SAR to that with the E- field component.

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

Where:

$\sigma$  = simulated tissue conductivity,

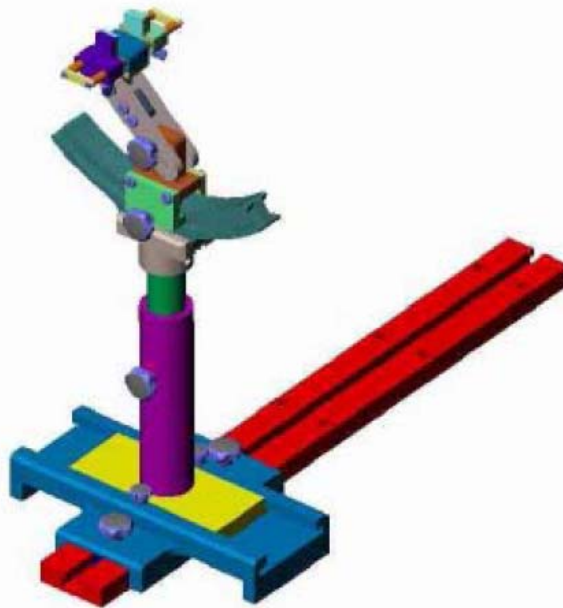
$\rho$  = Tissue density (1.25 g/cm<sup>3</sup> for brain tissue)

#### 4.4 Phantom

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

#### 4.5 Device Holder

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



System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005

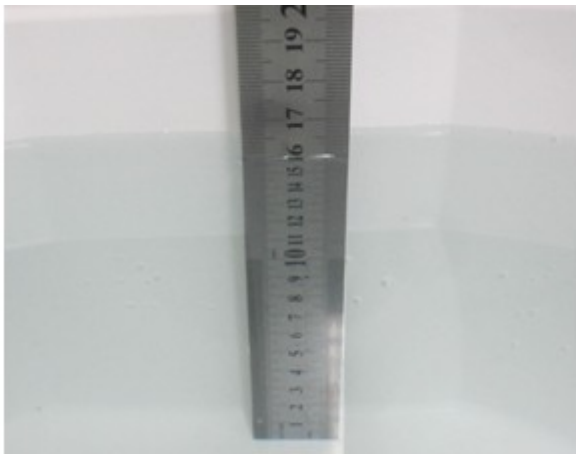
#### 4.6 Test Equipment List

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
E-Field Probe	SATIMO	SSE5	SN 09/13 EP168	2016-06-01	2017-05-31
750MHz Dipole	SATIMO	SID750	SN 47/12 DIP 0G750-203	2016-03-20	2017-03-19
835MHz Dipole	SATIMO	SID835	SN 47/12 DIP 0G835-204	2016-03-20	2017-03-19
1800MHz Dipole	SATIMO	SID1800	SN 47/12 DIP 1G800-206	2016-03-20	2017-03-19
1900MHz Dipole	SATIMO	SID1900	SN 47/12 DIP 1G900-207	2016-03-20	2017-03-19
2450MHz Dipole	SATIMO	SID2450	SN 13/15 DIP 2G450-364	2016-03-20	2017-03-19
Dielectric Probe Kit	SATIMO	SCLMP	SN 47/12 OCPG49	2016-03-20	2017-03-19
SAM Phantom	SATIMO	SAM	SN/ 47/12 SAM95	N/A	N/A
MULTIMETER	KEITHLEY	Keithley 2000	4006367	2016-06-04	2017-06-03
Signal Generator	Rohde & Schwarz	SMR20	100047	2016-06-04	2017-06-03
Universal Tester	Rohde & Schwarz	CMU200	112012	2016-06-04	2017-06-03
Network Analyzer	HP	8753C	2901A00831	2016-06-04	2017-06-03
Directional Couplers	Agilent	778D	20160	2016-06-04	2017-06-03

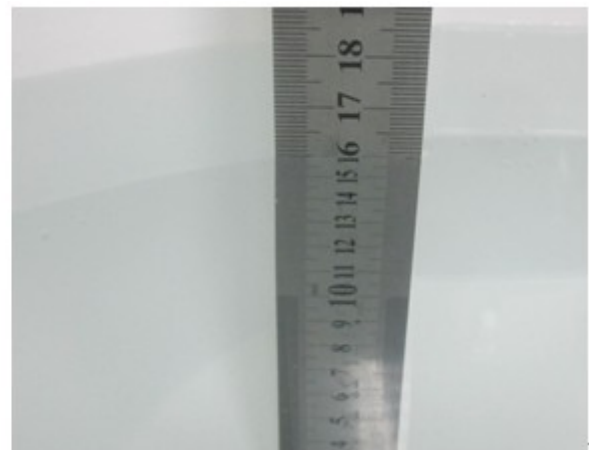
## 5. Tissue Simulating Liquids

### 5.1 Composition of Tissue Simulating Liquid

For the measurement of the field distribution inside the SAM phantom with SMTIMO, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. 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. Please see the following photos for the liquid height.



**Liquid Height for Head SAR**



**Liquid Height for Body SAR**

#### The Composition of Tissue Simulating Liquid

Frequency (MHz)	Water (%)	Salt (%)	Triton (%)	HEC (%)	Preventol (%)	DGBE (%)
<b>Head</b>						
750	34.29	1.05	0.00	0.00	64.66	0.00
835	35.34	0.98	0.00	0.00	63.68	0.00
1800	55.19	0.66	30.35	0.00	0.00	13.80
1900	55.26	0.52	30.40	0.00	0.00	13.82
2450	55.44	0.32	30.50	0.00	0.00	13.74
<b>Body</b>						
750	51.75	1.17	0.00	0.00	47.08	0.00
835	52.87	1.07	0.00	0.00	46.10	0.00
1800	70.81	0.52	20.01	0.00	0.00	8.65
1900	69.99	0.41	20.66	0.00	0.00	8.93
2450	55.44	0.32	30.50	0.00	0.00	13.74

## 5.2 Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

Target Frequency (MHz)	Head		Body	
	Conductivity ( $\sigma$ )	Permittivity ( $\epsilon_r$ )	Conductivity ( $\sigma$ )	Permittivity ( $\epsilon_r$ )
150	0.76	52.3	0.80	61.9
300	0.87	45.3	0.92	58.2
450	0.87	43.5	0.94	56.7
<b>750</b>	<b>0.89</b>	<b>41.9</b>	<b>0.96</b>	<b>55.5</b>
<b>835</b>	<b>0.90</b>	<b>41.5</b>	<b>0.97</b>	<b>55.2</b>
900	0.97	41.5	1.05	55.0
915	0.98	41.5	1.06	55.0
1450	1.20	40.5	1.30	54.0
1610	1.29	40.3	1.40	53.8
<b>1800-2000</b>	<b>1.40</b>	<b>40.0</b>	<b>1.52</b>	<b>53.3</b>
<b>2450</b>	<b>1.80</b>	<b>39.2</b>	<b>1.95</b>	<b>52.7</b>
3000	2.40	38.5	2.73	52.0
5800	5.27	35.3	6.00	48.2

### 5.3 Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using COMOSAR Dielectric Probe Kit and an Agilent Network Analyzer.

#### Calibration Result for Dielectric Parameters of Tissue Simulating Liquid

Head Tissue Simulating Liquid									
Freq. MHz.	Temp. (°C)	Conductivity			Permittivity			Limit (%)	Date
		Reading ( $\sigma$ )	Target ( $\sigma$ )	Delta (%)	Reading ( $\epsilon_r$ )	Target ( $\epsilon_r$ )	Delta (%)		
750	21.2	0.86	0.89	-3.37	41.32	41.90	-1.38	$\pm 5$	2016-10-17
835	21.2	0.87	0.90	-3.33	41.11	41.50	-0.94	$\pm 5$	2016-10-17
1800	21.3	1.37	1.40	-2.14	39.02	40.0	-2.45	$\pm 5$	2016-10-17
1900	21.3	1.38	1.40	-1.43	38.56	40.00	-3.60	$\pm 5$	2016-10-17
2450	21.3	1.74	1.80	-3.33	38.15	39.20	-2.68	$\pm 5$	2016-10-17

Body Tissue Simulating Liquid									
Freq. MHz.	Temp. (°C)	Conductivity			Permittivity			Limit (%)	Date
		Reading ( $\sigma$ )	Target ( $\sigma$ )	Delta (%)	Reading ( $\epsilon_r$ )	Target ( $\epsilon_r$ )	Delta (%)		
750	21.2	0.93	0.96	-3.12	54.96	55.50	-0.97	$\pm 5$	2016-10-17
835	21.2	0.95	0.97	-2.06	54.85	55.20	-0.63	$\pm 5$	2016-10-17
1800	21.3	1.46	1.52	-3.95	51.22	53.30	-3.90	$\pm 5$	2016-10-17
1900	21.3	1.50	1.52	-1.32	52.42	53.30	-1.65	$\pm 5$	2016-10-17
2450	21.3	1.91	1.95	-2.05	52.01	52.70	-1.31	$\pm 5$	2016-10-17



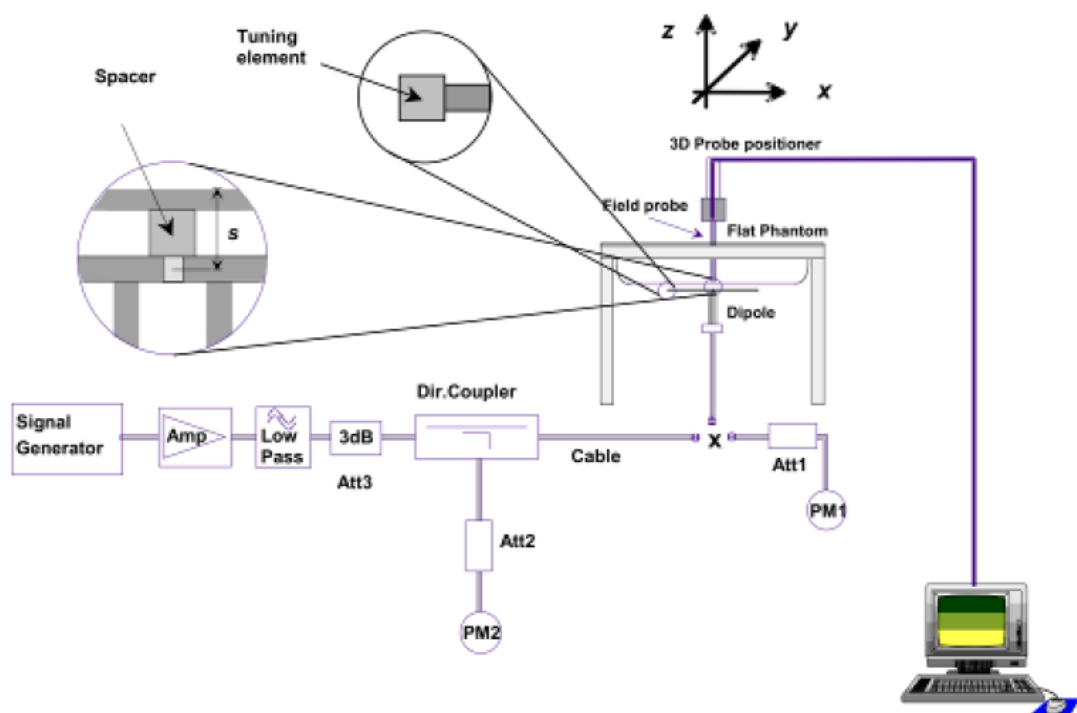
## 6. SAR Measurement Evaluation

### 6.1 Purpose of System Performance 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.

### 6.2 System 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 which comes from a signal generator at frequency 835 MHz and 1900 MHz. 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.



System Verification Setup Block Diagram



**Setup Photo of Dipole Antenna**

The output power on dipole port must be calibrated to 24 dBm(250 mW) before dipole is connected.

### 6.3 Validation Results

Comparing to the original SAR value provided by SATIMO, the validation data should be within its specification of 10 %. Table 6.1 shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion.

Frequency	Targeted SAR <sub>1g</sub>	Measured SAR <sub>1g</sub>	Normalized SAR <sub>1g</sub>	Tolerance
MHz	(W/kg)	(W/kg)	(W/kg)	(%)
Head				
750	8.40	2.16	8.64	2.86
835	9.67	2.41	9.64	-0.31
1800	38.51	9.61	38.44	-0.18
1900	39.58	9.91	39.64	0.15
2450	53.69	13.45	53.8	0.20
Body				
750	8.40	2.12	8.48	0.95
835	9.38	2.35	9.4	0.21
1800	38.31	9.58	38.32	0.03
1900	39.10	9.78	39.12	0.05
2450	50.41	12.59	50.36	-0.10

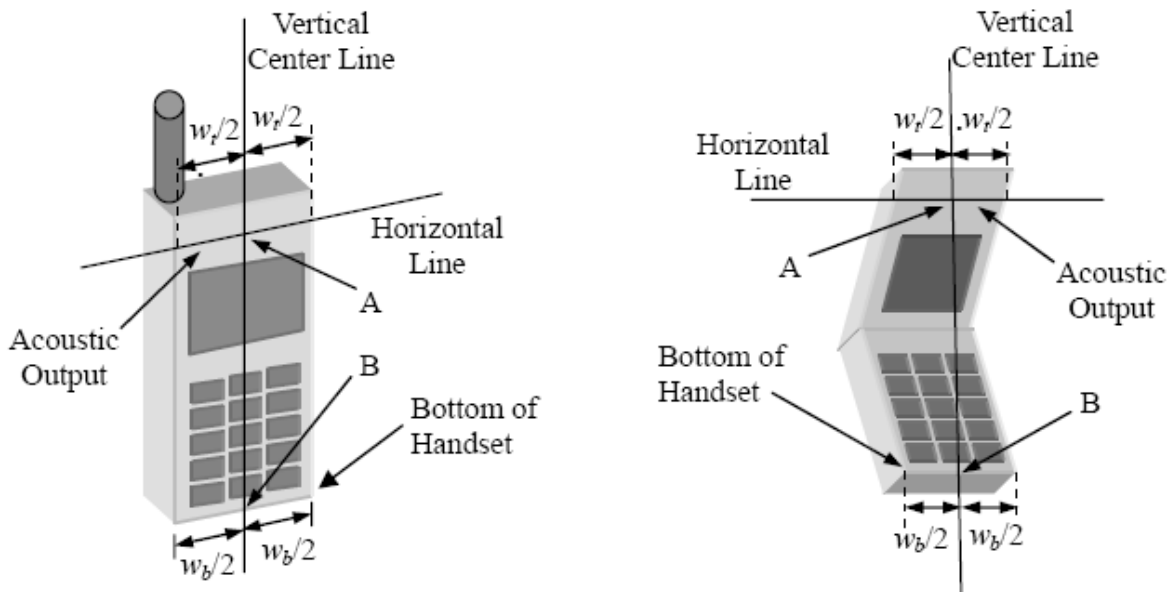
Targeted and Measurement SAR

***Please refer to Annex A for the plots of system performance check.***

## 7. EUT Testing Position

### 7.1 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.



**Illustration for Handset Vertical and Horizontal Reference Lines**

## 7.2 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 (see Fig. 7.2).

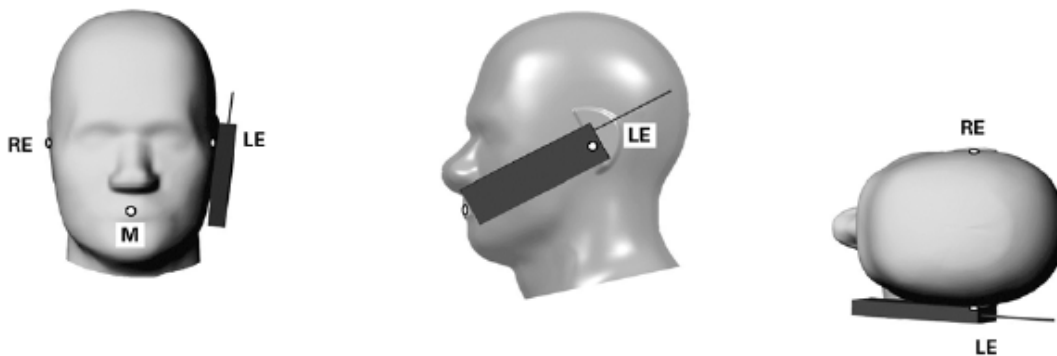


Illustration for Cheek Position

## 7.3 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 (see Fig. 7.3).

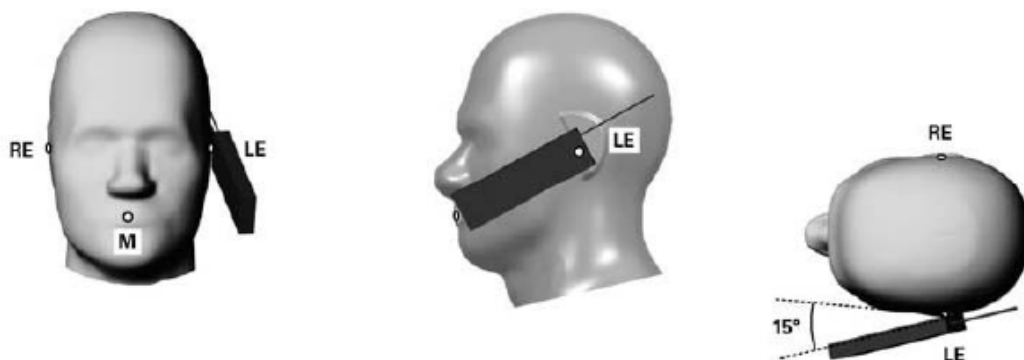


Illustration for Tilted Position

## 7.4 Body Worn Position

- To position the device parallel to the phantom surface with either keypad up or down.
- To adjust the device parallel to the flat phantom.
- To adjust the distance between the device surface and the flat phantom to 10mm.

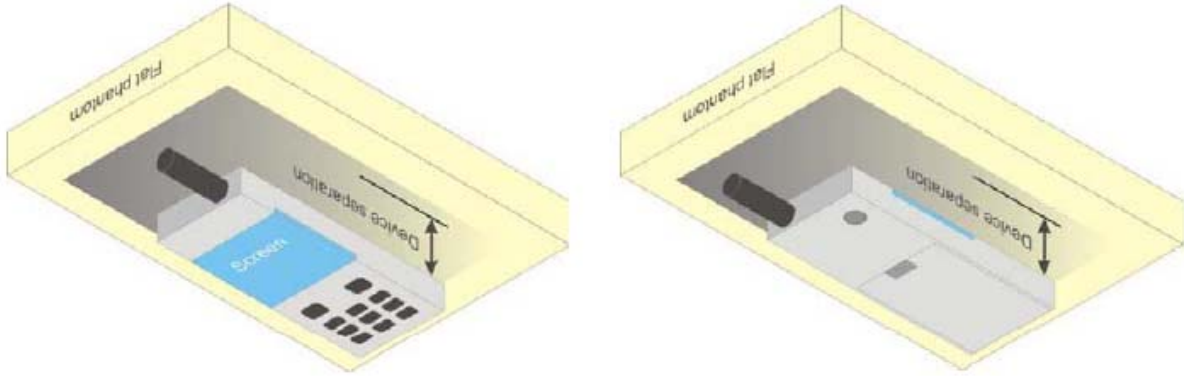
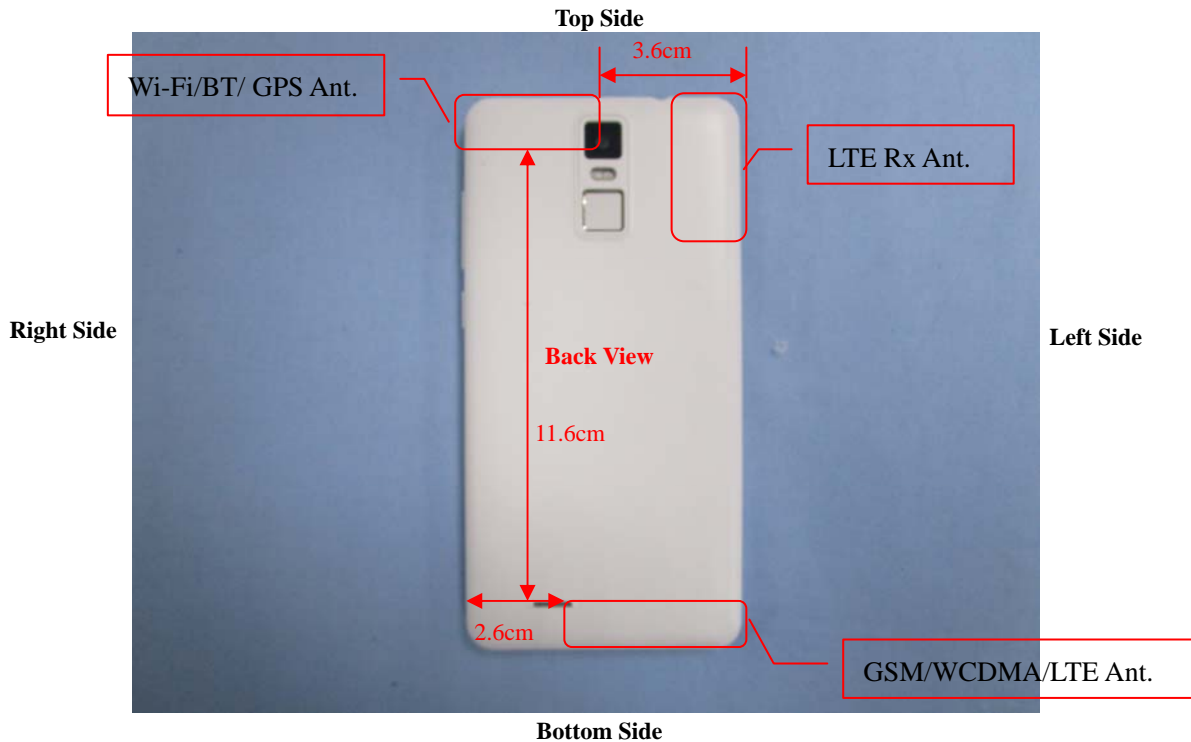


Illustration for Body Worn Position

## 7.5 EUT Antenna Position



Block Diagram for EUT Antenna Position

## 7.6 EUT Testing Position

Head/Body-worn/Hotspot mode SAR assessments are required for this device. This EUT was tested in different positions for different SAR test modes, more information as below:

Head SAR tests				
Antennas	Right Cheek	Left Cheek	Right Tilted	Left Tilted
WWAN	Yes	Yes	Yes	Yes
WLAN	Yes	Yes	Yes	Yes

Hotspot SAR tests, Test distance: 10mm						
Antennas	Front	Back	Right Side	Left Side	Top Side	Bottom Side
WWAN	Yes	Yes	No	Yes	No	Yes
WLAN	Yes	Yes	Yes	No	Yes	No

Body-worn SAR tests		
Antennas	Front	Back
WWAN	Yes	Yes
WLAN	Yes	Yes

**Remark:**

1. Referring to KDB 941225 D06, when the overall device length and width are  $\geq 9\text{cm} \times 5\text{cm}$ , the test separation distances is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.

*Please refer to Annex D for the EUT test setup photos.*

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## 8. SAR Measurement Procedures

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### 8.1 Measurement Procedures

The measurement procedures are as follows:

- (a) Use base station simulator (if applicable) or engineering software to transmit RF power continuously (continuous Tx) in the highest power channel.
- (b) Keep EUT to radiate maximum output power or 100% factor (if applicable)
- (c) Measure output power through RF cable and power meter.
- (d) Place the EUT in the positions as Annex E demonstrates.
- (e) Set scan area, grid size and other setting on the SATIMO software.
- (f) Measure SAR results for the highest power channel on each testing position.
- (g) Find out the largest SAR result on these testing positions of each band
- (h) Measure SAR results for other channels in worst SAR testing position if the SAR of highest power channel is larger than 0.8 W/kg

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

- (a) Power reference measurement
- (b) Area scan
- (c) Zoom scan
- (d) Power drift measurement

### 8.2 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The SATIMO software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine. The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g

### 8.3 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 measures 5x5x7 points with step size 8, 8 and 5 mm for 300 MHz to 3 GHz, and 8x8x8 points with step size 4, 4 and 2.5 mm for 3 GHz to 6 GHz. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.

### 8.4 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing (step-size is 4, 4 and 2.5 mm). When all volume scan were completed, the software can combine and subsequently superpose these measurement data to calculating the multiband SAR.

### 8.5 SAR Averaged Methods

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1mm step.

The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10g and 1 g requires a very fine resolution in the three dimensional scanned data array.

### 8.6 Power Drift Monitoring

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



## 9. SAR Test Result

### 9.1 Conducted RF Output Power

GSM - Burst Average Power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
GSM	32.18	32.19	32.18	29.54	29.13	28.55
GPRS (1 slot)	32.21	32.24	32.21	29.63	29.21	28.6
GPRS (2 slots)	31.51	31.57	31.55	28.86	28.56	28.07
GPRS (3 slots)	30.05	30.08	30.03	27.22	27.13	26.86
GPRS (4 slots)	28.34	28.38	28.31	26.56	26.54	26.29
EDGE (1 slot)	26.33	26.1	25.73	25.08	25.48	25.6
EDGE (2 slots)	25.34	25.07	24.71	24.04	24.37	24.6
EDGE (3 slots)	23.26	22.95	22.55	22.14	22.5	22.74
EDGE (4 slots)	22.01	21.71	21.31	20.94	21.24	21.5

GSM - Source-Based Time-Average Power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
GSM	23.18	23.19	23.18	20.54	20.13	19.55
GPRS (1 slot)	23.21	23.24	23.21	20.63	20.21	19.60
GPRS (2 slots)	25.51	25.57	25.55	22.86	22.56	22.07
GPRS (3 slots)	25.80	25.83	25.78	22.97	22.88	22.61
GPRS (4 slots)	25.34	25.38	25.31	23.56	23.54	23.29
EDGE (1 slot)	17.33	17.10	16.73	16.08	16.48	16.60
EDGE (2 slots)	19.34	19.07	18.71	18.04	18.37	18.60
EDGE (3 slots)	19.01	18.70	18.30	17.89	18.25	18.49
EDGE (4 slots)	19.01	18.71	18.31	17.94	18.24	18.50

Note: The source-based time-averaged power is linearly scaled the maximum burst averaged power based on time slots. The calculated method are shown as below:

Source based time-average power = Burst averaged power - Duty cycle factor in dB

Duty cycle factor = 9 dB for 1 Tx slot, 6 dB for 2 Tx slots, 4.25 dB for 3 Tx slots, 3 dB for 4 Tx slots

#### Remark:

1. For Head SAR testing, GSM should be evaluated, therefore the EUT was set in GSM for GSM850 and GSM1900 due to its highest source-based time-average power.
2. For Body SAR testing, GPRS should be evaluated, therefore the EUT was set in GPRS (3TX slots) for GSM850 and GPRS (4TX slots) for GSM1900 due to its highest source-based time-average power.
3. Per KDB 447498 D01 v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
4. The DUT do not support DTM function.

WCDMA - Average Power (dBm)						
Band	WCDMA Band II			WCDMA Band V		
Channel	9262	9400	9538	4132	4182	4233
Frequency (MHz)	1852.4	1880.0	1907.6	826.4	836.6	846.6
RMC 12.2k	22.47	22.58	22.44	22.52	22.31	22.49
HSDPA Subtest-1	21.72	21.32	21.85	21.99	21.46	21.22
HSDPA Subtest-2	21.67	21.36	21.83	21.87	21.42	21.26
HSDPA Subtest-3	21.52	21.39	21.73	21.77	21.44	21.22
HSDPA Subtest-4	21.55	21.25	21.66	21.76	21.38	21.16
HSUPA Subtest-1	21.97	21.69	21.57	21.34	21.94	21.89
HSUPA Subtest-2	21.89	21.61	21.56	21.18	21.84	21.86
HSUPA Subtest-3	21.83	21.65	21.45	21.29	21.77	21.74
HSUPA Subtest-4	21.89	21.51	21.39	21.19	21.74	21.73
HSUPA Subtest-5	21.72	21.45	21.37	21.04	21.69	21.61

**Remark:**

1. For Head SAR, per KDB 941225 D01 v03, RMC 12.2kbps setting is used to evaluate SAR. If AMR 12.2kbps power is < 1/4 dB higher than RMC, SAR tests with AMR 12.2kbps can be excluded.
2. For Body SAR, per KDB 941225 D01 v03, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA subset-1 output power is < 1/4 dB higher than RMC, and SAR with RMC 12.2kbps setting is  $\leq 1.2\text{W/kg}$ , HSDPA SAR evaluation can be excluded

**FDD-LTE Band 2:**

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	23.18	
		1	3	23.23	
		1	5	23.12	
		3	0	23.20	
		3	2	23.18	
		3	3	23.19	
		6	0	22.23	
	MCH	1	0	21.71	
		1	3	21.73	
		1	5	21.63	
		3	0	21.69	
		3	2	21.60	
		3	3	21.60	
		6	0	20.71	
	HCH	1	0	21.56	
		1	3	21.64	
		1	5	21.58	
		3	0	21.53	
		3	2	21.56	
		3	3	21.59	
		6	0	20.64	
16QAM	LCH	1	0	22.39	
		1	3	22.51	
		1	5	22.37	
		3	0	22.34	
		3	2	22.28	
		3	3	22.31	
		6	0	21.21	
	MCH	1	0	21.03	
		1	3	21.10	
		1	5	20.96	
		3	0	20.64	
		3	2	20.61	
		3	3	20.61	
		6	0	21.78	
HCH	1	0	20.78		
	1	3	20.96		

		1	5	20.81	
		3	0	20.69	
		3	2	20.67	
		3	3	20.70	
		6	0	21.60	

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	23.22	
		1	7	23.24	
		1	14	23.09	
		8	0	22.24	
		8	4	22.20	
		8	7	22.18	
		15	0	22.21	
	MCH	1	0	21.71	
		1	7	21.75	
		1	14	21.57	
		8	0	20.73	
		8	4	20.70	
		8	7	20.70	
		15	0	20.69	
	HCH	1	0	21.56	
		1	7	21.68	
		1	14	21.61	
		8	0	20.59	
		8	4	20.60	
		8	7	20.63	
		15	0	20.56	
16QAM	LCH	1	0	22.51	
		1	7	22.53	
		1	14	22.36	
		8	0	21.28	
		8	4	21.27	
		8	7	21.24	
		15	0	21.18	
	MCH	1	0	20.94	
		1	7	21.02	
		1	14	20.84	
		8	0	21.76	
		8	4	21.75	
		8	7	21.72	

	HCH	15	0	21.64	
		1	0	20.92	
		1	7	21.03	
		1	14	20.99	
		8	0	21.57	
		8	4	21.58	
		8	7	21.61	
		15	0	21.54	

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	23.32	
		1	12	23.28	
		1	24	23.08	
		12	0	22.30	
		12	6	22.24	
		12	13	22.14	
		25	0	22.17	
	MCH	1	0	21.87	
		1	12	21.82	
		1	24	21.69	
		12	0	20.82	
		12	6	20.75	
		12	13	20.71	
		25	0	20.71	
	HCH	1	0	21.57	
		1	12	21.70	
		1	24	21.70	
		12	0	20.59	
		12	6	20.61	
		12	13	20.63	
		25	0	20.57	
16QAM	LCH	1	0	22.71	
		1	12	22.70	
		1	24	22.49	
		12	0	21.42	
		12	6	21.37	
		12	13	21.29	
		25	0	21.21	
	MCH	1	0	21.22	
		1	12	21.18	
		1	24	21.04	

		12	0	21.92	
		12	6	21.86	
		12	13	21.82	
		25	0	21.72	
	HCH	1	0	20.71	
		1	12	20.77	
		1	24	20.75	
		12	0	21.60	
		12	6	21.62	
		12	13	21.64	
		25	0	21.57	

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	23.31	
		1	24	23.03	
		1	49	22.82	
		25	0	22.21	
		25	12	22.01	
		25	25	21.92	
		50	0	22.03	
	MCH	1	0	21.96	
		1	24	21.78	
		1	49	21.61	
		25	0	20.82	
		25	12	20.74	
		25	25	20.65	
		50	0	20.74	
	HCH	1	0	21.58	
		1	24	21.59	
		1	49	21.69	
		25	0	20.55	
		25	12	20.57	
		25	25	20.60	
		50	0	20.56	
16QAM	LCH	1	0	22.64	
		1	24	22.35	
		1	49	22.16	
		25	0	21.21	
		25	12	21.04	
		25	25	20.91	
		50	0	21.03	

	MCH	1	0	21.26	
		1	24	21.03	
		1	49	20.90	
		25	0	21.79	
		25	12	21.70	
		25	25	21.64	
		50	0	21.71	
	HCH	1	0	21.03	
		1	24	21.00	
		1	49	21.11	
		25	0	21.54	
		25	12	21.57	
		25	25	21.60	
		50	0	21.59	

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	23.34	
		1	37	22.99	
		1	74	22.55	
		37	0	22.09	
		37	18	21.90	
		37	38	21.71	
		75	0	21.88	
	MCH	1	0	22.14	
		1	37	21.81	
		1	74	21.59	
		37	0	20.92	
		37	18	20.79	
		37	38	20.64	
		75	0	20.78	
	HCH	1	0	21.53	
		1	37	21.62	
		1	74	21.66	
		37	0	20.51	
		37	18	20.55	
		37	38	20.64	
		75	0	20.55	
16QAM	LCH	1	0	22.67	
		1	37	22.30	
		1	74	21.94	
		37	0	21.10	

		37	18	20.93	
		37	38	20.74	
		75	0	20.90	
	MCH	1	0	21.43	
		1	37	21.07	
		1	74	20.89	
		37	0	21.92	
		37	18	21.77	
		37	38	21.62	
		75	0	21.77	
	HCH	1	0	20.91	
		1	37	20.96	
		1	74	21.00	
		37	0	21.58	
37		18	21.58		
37		38	21.68		
75		0	21.59		

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	23.41	
		1	49	22.86	
		1	99	22.46	
		50	0	22.04	
		50	25	21.73	
		50	50	21.56	
		100	0	20.49	
	MCH	1	0	23.36	
		1	49	21.91	
		1	99	21.71	
		50	0	20.98	
		50	25	20.70	
		50	50	20.58	
		100	0	20.73	
	HCH	1	0	23.52	
		1	49	21.47	
		1	99	21.67	
		50	0	22.42	
		50	25	20.44	
		50	50	20.51	
		100	0	21.79	
16QAM	LCH	1	0	22.64	



		1	49	22.08		
		1	99	21.69		
		50	0	21.05		
		50	25	20.73		
		50	50	20.56		
		100	0	20.78		
	MCH	1	0	21.57		
		1	49	21.03		
		1	99	20.89		
		50	0	21.94		
		50	25	21.67		
		50	50	21.54		
	HCH	100	0	21.62		
		1	0	20.90		
		1	49	20.89		
		1	99	21.04		
		50	0	21.46		
		50	25	21.48		
		50	50	21.54		
			100	0	21.49	

**FDD-LTE Band 4:**

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	Verdict
		Size	Offset		
QPSK	LCH	1	0	24.75	
		1	3	24.80	
		1	5	24.72	
		3	0	24.77	
		3	2	24.75	
		3	3	24.77	
		6	0	23.77	
	MCH	1	0	23.47	
		1	3	23.49	
		1	5	23.38	
		3	0	23.51	
		3	2	23.41	
		3	3	23.41	
		6	0	22.40	
	HCH	1	0	22.41	
		1	3	22.45	

		1	5	22.35	
		3	0	22.43	
		3	2	22.39	
		3	3	22.37	
		6	0	21.38	
16QAM	LCH	1	0	23.98	
		1	3	24.07	
		1	5	23.95	
		3	0	23.92	
		3	2	23.86	
		3	3	23.88	
		6	0	22.75	
	MCH	1	0	22.89	
		1	3	22.94	
		1	5	22.81	
		3	0	22.52	
		3	2	22.48	
		3	3	22.49	
		6	0	21.39	
	HCH	1	0	21.76	
		1	3	21.84	
		1	5	21.71	
		3	0	21.50	
		3	2	21.47	
		3	3	21.49	
		6	0	20.53	

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	24.76	
		1	7	24.79	
		1	14	24.60	
		8	0	23.79	
		8	4	23.73	
		8	7	23.70	
		15	0	23.75	
	MCH	1	0	23.47	
		1	7	23.52	
		1	14	23.33	
		8	0	22.49	
		8	4	22.42	
		8	7	22.44	

	HCH	15	0	22.45	
		1	0	22.50	
		1	7	22.53	
		1	14	22.29	
		8	0	21.47	
		8	4	21.41	
		8	7	21.36	
		15	0	21.44	
16QAM	LCH	1	0	24.04	
		1	7	24.06	
		1	14	23.90	
		8	0	22.85	
		8	4	22.82	
		8	7	22.77	
		15	0	22.73	
	MCH	1	0	22.79	
		1	7	22.86	
		1	14	22.65	
		8	0	21.56	
		8	4	21.53	
		8	7	21.52	
		15	0	21.45	
	HCH	1	0	21.96	
		1	7	21.96	
		1	14	21.73	
		8	0	20.52	
		8	4	20.41	
		8	7	20.38	
		15	0	20.45	

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	24.87	
		1	12	24.83	
		1	24	24.62	
		12	0	23.81	
		12	6	23.75	
		12	13	23.66	
		25	0	23.67	
	MCH	1	0	23.65	
		1	12	23.59	
		1	24	23.40	

		12	0	22.60			
		12	6	22.50			
		12	13	22.46			
		25	0	22.48			
	HCH	1	0	22.71			
		1	12	22.62			
		1	24	22.38			
		12	0	21.71			
		12	6	21.62			
		12	13	21.51			
		25	0	21.56			
		16QAM	LCH	1	0	24.25	
				1	12	24.22	
1	24			24.02			
12	0			22.96			
12	6			22.89			
12	13			22.82			
25	0			22.73			
MCH	1		0	23.09			
	1		12	23.02			
	1		24	22.82			
	12		0	21.78			
	12		6	21.71			
	12		13	21.64			
	25	0	21.54				
HCH	1	0	21.90				
	1	12	21.80				
	1	24	21.54				
	12	0	20.76				
	12	6	20.66				
	12	13	20.55				
	25	0	20.61				

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	24.87	
		1	24	24.59	
		1	49	24.37	
		25	0	23.68	
		25	12	23.57	
		25	25	23.45	
		50	0	23.62	

	MCH	1	0	23.78	
		1	24	23.53	
		1	49	23.30	
		25	0	22.65	
		25	12	22.52	
		25	25	22.38	
		50	0	22.49	
	HCH	1	0	22.94	
		1	24	22.72	
		1	49	22.38	
		25	0	21.83	
		25	12	21.73	
		25	25	21.56	
		50	0	21.72	
16QAM	LCH	1	0	24.16	
		1	24	23.91	
		1	49	23.71	
		25	0	22.70	
		25	12	22.62	
		25	25	22.50	
		50	0	22.64	
	MCH	1	0	23.12	
		1	24	22.85	
		1	49	22.62	
		25	0	21.69	
		25	12	21.56	
		25	25	21.40	
		50	0	21.52	
	HCH	1	0	22.40	
		1	24	22.19	
		1	49	21.86	
		25	0	20.89	
		25	12	20.77	
		25	25	20.61	
		50	0	20.79	

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	24.86	
		1	37	24.53	
		1	74	24.07	
		37	0	23.66	

		37	18	23.46		
		37	38	23.26		
		75	0	23.47		
	MCH	1	0	23.95		
		1	37	23.61		
		1	74	23.26		
		37	0	22.73		
		37	18	22.50		
		37	38	22.37		
		75	0	22.48		
		HCH	1	0	23.15	
			1	37	22.88	
	1		74	22.41		
	37		0	22.05		
	37		18	21.89		
	37		38	21.67		
	75		0	21.86		
16QAM	LCH	1	0	24.17		
		1	37	23.85		
		1	74	23.41		
		37	0	22.65		
		37	18	22.47		
		37	38	22.29		
		75	0	22.51		
	MCH	1	0	23.28		
		1	37	22.94		
		1	74	22.58		
		37	0	21.74		
		37	18	21.54		
		37	38	21.37		
		75	0	21.50		
	HCH	1	0	22.53		
		1	37	22.28		
		1	74	21.80		
		37	0	21.06		
		37	18	20.90		
		37	38	20.74		
		75	0	20.86		

Channel Bandwidth: 20 MHz				
Modulation	Channel	RB Configuration		Average Power [dBm]
		Size	Offset	
QPSK	LCH	1	0	24.88

		1	49	24.41		
		1	99	23.92		
		50	0	23.62		
		50	25	23.32		
		50	50	23.09		
		100	0	23.37		
	MCH	1	0	24.24		
		1	49	23.65		
		1	99	23.37		
		50	0	22.84		
		50	25	22.55		
		50	50	22.36		
	HCH	100	0	22.54		
		1	0	23.44		
		1	49	23.02		
		1	99	22.56		
		50	0	22.19		
		50	25	21.98		
	16QAM	LCH	50	50	21.79	
			100	0	21.99	
			1	0	24.18	
1			49	23.64		
1			99	23.15		
50			0	22.64		
MCH		50	25	22.35		
		50	50	22.10		
		100	0	22.41		
		1	0	23.50		
		1	49	22.86		
		1	99	22.56		
HCH		50	0	21.86		
		50	25	21.53		
		50	50	21.34		
		100	0	21.53		
		1	0	22.82		
		1	49	22.40		
			1	99	21.99	
			50	0	21.24	
			50	25	21.03	
	50		50	20.86		
	100		0	21.01		

**FDD-LTE Band 7:**

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	24.34	
		1	12	24.23	
		1	24	24.03	
		12	0	23.28	
		12	6	23.13	
		12	13	23.10	
		25	0	23.14	
	MCH	1	0	23.02	
		1	12	23.06	
		1	24	22.97	
		12	0	22.02	
		12	6	22.01	
		12	13	21.99	
		25	0	21.95	
	HCH	1	0	23.06	
		1	12	23.25	
		1	24	23.41	
		12	0	24.07	
		12	6	24.16	
		12	13	24.27	
		25	0	24.13	
16QAM	LCH	1	0	23.36	
		1	12	23.27	
		1	24	23.02	
		12	0	22.30	
		12	6	22.23	
		12	13	22.14	
		25	0	22.23	
	MCH	1	0	22.35	
		1	12	22.39	
		1	24	22.29	
		12	0	21.15	
		12	6	21.13	
		12	13	21.11	
		25	0	20.96	
HCH	1	0	24.00		
	1	12	24.22		



		1	24	24.29	
		12	0	23.03	
		12	6	23.14	
		12	13	23.23	
		25	0	23.11	

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	24.40	
		1	24	23.99	
		1	49	23.65	
		25	0	23.15	
		25	12	22.91	
		25	25	22.75	
		50	0	22.93	
	MCH	1	0	22.99	
		1	24	22.93	
		1	49	22.87	
		25	0	21.95	
		25	12	21.90	
		25	25	21.86	
		50	0	21.90	
	HCH	1	0	24.47	
		1	24	24.08	
		1	49	23.36	
		25	0	23.77	
		25	12	23.98	
		25	25	24.15	
		50	0	23.93	
16QAM	LCH	1	0	23.63	
		1	24	23.16	
		1	49	22.83	
		25	0	22.12	
		25	12	21.90	
		25	25	21.73	
		50	0	21.91	
	MCH	1	0	22.26	
		1	24	22.18	
		1	49	22.14	
		25	0	20.93	
		25	12	20.89	
		25	25	20.85	

	HCH	50	0	20.89	
		1	0	23.85	
		1	24	24.30	
		1	49	24.40	
		25	0	22.73	
		25	12	22.95	
		25	25	23.13	
		50	0	22.95	

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	24.45	
		1	37	23.81	
		1	74	23.44	
		37	0	23.14	
		37	18	22.87	
		37	38	22.63	
		75	0	22.89	
	MCH	1	0	23.10	
		1	37	22.97	
		1	74	22.89	
		37	0	22.03	
		37	18	22.00	
		37	38	21.94	
		75	0	21.98	
	HCH	1	0	23.91	
		1	37	24.09	
		1	74	23.41	
		37	0	23.38	
		37	18	23.78	
		37	38	24.21	
		75	0	23.82	
16QAM	LCH	1	0	23.66	
		1	37	23.00	
		1	74	22.65	
		37	0	22.08	
		37	18	21.81	
		37	38	21.56	
		75	0	21.85	
	MCH	1	0	22.34	
		1	37	22.24	
		1	74	22.11	

		37	0	20.99	
		37	18	20.93	
		37	38	20.89	
		75	0	20.94	
	HCH	1	0	23.18	
		1	37	24.12	
		1	74	24.58	
		37	0	22.38	
		37	18	22.76	
		37	38	23.15	
		75	0	22.78	

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	24.58	
		1	49	23.76	
		1	99	23.44	
		50	0	22.98	
		50	25	22.59	
		50	50	22.42	
		100	0	22.69	
	MCH	1	0	24.28	
		1	49	23.07	
		1	99	23.09	
		50	0	22.06	
		50	25	21.93	
		50	50	21.89	
		100	0	21.96	
	HCH	1	0	24.75	
		1	49	24.50	
		1	99	23.53	
		50	0	22.93	
		50	25	23.48	
		50	50	23.98	
		100	0	23.51	
16QAM	LCH	1	0	23.73	
		1	49	22.83	
		1	99	22.59	
		50	0	21.92	
		50	25	21.57	
		50	50	21.37	
		100	0	21.66	

	MCH	1	0	22.46	
		1	49	22.19	
		1	99	22.27	
		50	0	21.01	
		50	25	20.90	
		50	50	20.85	
		100	0	20.93	
	HCH	1	0	22.84	
		1	49	23.79	
		1	99	23.55	
		50	0	21.94	
		50	25	22.48	
		50	50	22.97	
		100	0	22.47	

**FDD-LTE Band 17:**

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	24.67	
		1	12	23.71	
		1	24	23.05	
		12	0	22.63	
		12	6	22.45	
		12	13	22.96	
		25	0	22.72	
	MCH	1	0	24.53	
		1	12	23.76	
		1	24	23.23	
		12	0	23.91	
		12	6	24.61	
		12	13	23.13	
		25	0	24.59	
	HCH	1	0	23.38	
		1	12	24.89	
		1	24	24.23	
		12	0	23.10	
		12	6	24.08	
		12	13	23.24	
		25	0	24.19	
16QAM	LCH	1	0	23.93	
		1	12	23.01	
		1	24	24.49	

		12	0	21.83	
		12	6	21.67	
		12	13	22.21	
		25	0	21.81	
	MCH	1	0	23.77	
		1	12	24.88	
		1	24	23.46	
		12	0	22.98	
		12	6	23.69	
		12	13	24.30	
		25	0	23.67	
	HCH	1	0	23.59	
		1	12	24.15	
		1	24	23.56	
		12	0	24.24	
		12	6	23.24	
		12	13	22.30	
25		0	23.37		

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	
		Size	Offset		
QPSK	LCH	1	0	24.03	
		1	24	24.90	
		1	49	23.06	
		25	0	22.88	
		25	12	23.94	
		25	25	24.81	
		50	0	23.98	
	MCH	1	0	23.64	
		1	24	23.73	
		1	49	24.16	
		25	0	23.32	
		25	12	24.49	
		25	25	24.59	
		50	0	24.06	
	HCH	1	0	23.76	
		1	24	23.35	
		1	49	23.99	
		25	0	23.95	
		25	12	24.77	
		25	25	24.16	
		50	0	24.12	

16QAM	LCH	1	0	23.41	
		1	24	24.21	
		1	49	24.49	
		25	0	21.96	
		25	12	23.01	
		25	25	23.93	
		50	0	23.05	
	MCH	1	0	23.05	
		1	24	23.03	
		1	49	23.61	
		25	0	22.38	
		25	12	23.57	
		25	25	23.75	
		50	0	23.13	
	HCH	1	0	23.29	
		1	24	22.80	
		1	49	23.54	
		25	0	23.03	
		25	12	23.87	
		25	25	23.34	
		50	0	23.22	

**Remark:**

- Per KDB941225 D05 v02r05, Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is  $\leq 0.8$  W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel.8 When the reported SAR of a required test channel is  $> 1.45$  W/kg, SAR is required for all three RB offset configurations for that required test channel.
- Per KDB941225 D05 v02r05, the procedures required for 1 RB allocation in section 4.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.
- Per KDB941225 D05 v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in sections 4.2.1 and 4.2.2 are  $\leq 0.8$  W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is  $> 1.45$  W/kg, the remaining required test channels must also be tested.
- Per KDB941225 D05 v02r05, For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 4.2.1, 5.2.2 and 4.2.3 to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is  $> \frac{1}{2}$  dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is  $> 1.45$  W/kg.

WLAN - Maximum Average Power				
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)
802.11b	1Mbps	CH 01	2412	13.2
		CH 06	2437	11.02
		CH 11	2462	12.59
802.11g	54Mbps	CH 01	2412	9.31
		CH 06	2437	8.46
		CH 11	2462	10.13
802.11n (20MHz)	MCS7	CH 01	2412	9.52
		CH 06	2437	8.65
		CH 11	2462	10.35
802.11n (40MHz)	MCS7	CH 03	2422	10.06
		CH 06	2437	8.25
		CH 09	2452	9.1

**Remark:**

1. Per KDB 248227 D01 v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion
2. Per KDB 248227 D01 v02r02, if 11g and 11n average output power is higher than 1/4 dB higher than 11b mode, SAR will be verified.
3. 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 1/4 dB higher than those measured at the lowest data rate. For 802.11n mode, SAR test according to the highest power channel with correspondence data rates.

Bluetooth - Maximum Average Power		
Test Mode	Data Rate	Average Power(dBm)
GFSK	1Mbps	0.048
Pi/4 QDPSK	2Mbps	-0.981
8DPSK	3Mbps	-0.979

Bluetooth - Maximum Average Power				
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)
BLE	1Mbps	CH 00	2402	-6.619
		CH 19	2440	-8.884
		CH 39	2480	-7.659

**Remark:**

Bluetooth maximum output power is 0.048dBm, and Maximum Tune-Up output power is 0.5dBm. Per KDB 447498 D01 V06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, 16 where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation<sup>17</sup>
- The result is rounded to one decimal place for comparison

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	Result	Limit
0.5	1.12	5	2.402	0.35	3

The exclusion thresholds is  $0.35 < 3$ , therefore, the RF exposure evaluation is not required.



## 9.2 Test Results for Standalone SAR Test

### Head SAR

GSM850 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
1.	GSM	Right Cheek	190	836.6	32.19	32.5	1.0740	0.2128	0.2285
2.	GSM	Right Tilted	190	836.6	32.19	32.5	1.0740	0.1039	0.1116
3.	GSM	Left Cheek	190	836.6	32.19	32.5	1.0740	0.2131	0.2289
4.	GSM	Left Tilted	190	836.6	32.19	32.5	1.0740	0.1202	0.1291

GSM1900 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	M Hz					
5.	GSM	Right Cheek	512	1850.2	29.54	30.0	1.1117	0.2687	0.2987
6.	GSM	Right Tilted	512	1850.2	29.54	30.0	1.1117	0.1134	0.1261
7.	GSM	Left Cheek	512	1850.2	29.54	30.0	1.1117	0.2427	0.2698
8.	GSM	Left Tilted	512	1850.2	29.54	30.0	1.1117	0.1075	0.1195

GPRS850 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
9.	GPRS_3TX	Right Cheek	190	836.6	30.08	30.5	1.1015	0.2786	0.3069
10.	GPRS_3TX	Right Tilted	190	836.6	30.08	30.5	1.1015	0.1378	0.1518
11.	GPRS_3TX	Left Cheek	190	836.6	30.08	30.5	1.1015	0.2797	0.3081
12.	GPRS_3TX	Left Tilted	190	836.6	30.08	30.5	1.1015	0.1624	0.1789

GPRS1900 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	M Hz					
13.	GPRS_4TX	Right Cheek	512	1850.2	26.56	27.0	1.1066	0.0913	0.1010
14.	GPRS_4TX	Right Tilted	512	1850.2	26.56	27.0	1.1066	0.0548	0.0606
15.	GPRS_4TX	Left Cheek	512	1850.2	26.56	27.0	1.1066	0.1229	0.1360
16.	GPRS_4TX	Left Tilted	512	1850.2	26.56	27.0	1.1066	0.0864	0.0956

WCDMA Band 2 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
17.	RMC	Right Cheek	9400	1880.0	22.58	23.0	1.1015	0.3399	0.3744
18.	RMC	Right Tilted	9400	1880.0	22.58	23.0	1.1015	0.1572	0.1732
19.	RMC	Left Cheek	9400	1880.0	22.58	23.0	1.1015	0.5142	0.5664
20.	RMC	Left Tilted	9400	1880.0	22.58	23.0	1.1015	0.2947	0.3246

WCDMA Band 5 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
21.	RMC	Right Cheek	4132	826.4	22.52	23.0	1.1169	0.2002	0.2236
22.	RMC	Right Tilted	4132	826.4	22.52	23.0	1.1169	0.1256	0.1403
23.	RMC	Left Cheek	4132	826.4	22.52	23.0	1.1169	0.1942	0.2169
24.	RMC	Left Tilted	4132	826.4	22.52	23.0	1.1169	0.1018	0.1137

LTE Band 2– Head SAR Test									
Plot No.	Mode	Test Position Head	Freque	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)	
	Modulation, Bandwidth, RB		ncy						MHz
25.	RMC QPSK 20MHz 1RB	Right Cheek	1900.0	23.52	24.0	1.1169	0.3070	0.3429	
26.	RMC QPSK 20MHz 1RB	Right Tilted	1900.0	23.52	24.0	1.1169	0.1425	0.1592	
27.	RMC QPSK 20MHz 1RB	Left Cheek	1900.0	23.52	24.0	1.1169	0.5414	0.6047	
28.	RMC QPSK 20MHz 1RB	Left Tilted	1900.0	23.52	24.0	1.1169	0.2937	0.3280	
29.	RMC QPSK 20MHz 50%RB	Right Cheek	1900.0	22.42	22.5	1.0186	0.1927	0.1963	
30.	RMC QPSK 20MHz 50%RB	Right Tilted	1900.0	22.42	22.5	1.0186	0.1056	0.1076	
31.	RMC QPSK 20MHz 50%RB	Left Cheek	1900.0	22.42	22.5	1.0186	0.3781	0.3851	
32.	RMC QPSK 20MHz 50%RB	Left Tilted	1900.0	22.42	22.5	1.0186	0.1872	0.1907	

LTE Band 4– Head SAR Test								
Plot No.	Mode	Test Position Head	Freque ncy	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
33.	RMC QPSK 20MHz 1RB	Right Cheek	1720.0	24.88	25.0	1.0280	0.3195	0.3285
34.	RMC QPSK 20MHz 1RB	Right Tilted	1720.0	24.88	25.0	1.0280	0.1373	0.1411
35.	RMC QPSK 20MHz 1RB	Left Cheek	1720.0	24.88	25.0	1.0280	0.2828	0.2907
36.	RMC QPSK 20MHz 1RB	Left Tilted	1720.0	24.88	25.0	1.0280	0.1029	0.1058
37.	RMC QPSK 20MHz 50%RB	Right Cheek	1720.0	23.62	24.0	1.0914	0.2038	0.2224
38.	RMC QPSK 20MHz 50%RB	Right Tilted	1720.0	23.62	24.0	1.0914	0.0979	0.1069
39.	RMC QPSK 20MHz 50%RB	Left Cheek	1720.0	23.62	24.0	1.0914	0.1988	0.2170
40.	RMC QPSK 20MHz 50%RB	Left Tilted	1720.0	23.62	24.0	1.0914	0.0836	0.0912

LTE Band 7– Head SAR Test								
Plot No.	Mode	Test Position Head	Freque ncy	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth		MHz					
41.	RMC QPSK 20MHz 1RB	Right Cheek	2560.0	24.75	25.0	1.0593	0.1202	0.1273
42.	RMC QPSK 20MHz 1RB	Right Tilted	2560.0	24.75	25.0	1.0593	0.0627	0.0664
43.	RMC QPSK 20MHz 1RB	Left Cheek	2560.0	24.75	25.0	1.0593	0.2281	0.2416
44.	RMC QPSK 20MHz 1RB	Left Tilted	2560.0	24.75	25.0	1.0593	0.1663	0.1762
45.	RMC QPSK 20MHz 50%RB	Right Cheek	2560.0	23.98	24.0	1.0046	0.0827	0.0831
46.	RMC QPSK 20MHz 50%RB	Right Tilted	2560.0	23.98	24.0	1.0046	0.0425	0.0427
47.	RMC QPSK 20MHz 50%RB	Left Cheek	2560.0	23.98	24.0	1.0046	0.1037	0.1042
48.	RMC QPSK 20MHz 50%RB	Left Tilted	2560.0	23.98	24.0	1.0046	0.0622	0.0625

LTE Band 17– Head SAR Test								
Plot No.	Mode	Test Position Head	Freque ncy	Output Power (dBm)	Rated Limit (dBm)	Scalin g Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth		MHz					
49.	RMC,QPSK 10MHz 1RB	Right Cheek	709.0	24.90	25.0	1.0233	0.2142	0.2192
50.	RMC,QPSK 10MHz 1RB	Right Tilted	709.0	24.90	25.0	1.0233	0.1154	0.1181
51.	RMC,QPSK 10MHz 1RB	Left Cheek	709.0	24.90	25.0	1.0233	0.2317	0.2371
52.	RMC,QPSK 10MHz 1RB	Left Tilted	709.0	24.90	25.0	1.0233	0.1273	0.1303
53.	RMC,QPSK 10MHz 50%RB	Right Cheek	709.0	24.81	25.0	1.0447	0.1536	0.1605
54.	RMC,QPSK 10MHz 50%RB	Right Tilted	709.0	24.81	25.0	1.0447	0.0827	0.0864
55.	RMC,QPSK 10MHz 50%RB	Left Cheek	709.0	24.81	25.0	1.0447	0.1932	0.2018
56.	RMC,QPSK 10MHz 50%RB	Left Tilted	709.0	24.81	25.0	1.0447	0.1083	0.1131

WLAN 2.4GHz – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
57.	802.11b	Right Cheek	01	2412	13.2	13.5	1.0715	0.1739	0.1863
58.	802.11b	Right Tilted	01	2412	13.2	13.5	1.0715	0.1087	0.1165
59.	802.11b	Left Cheek	01	2412	13.2	13.5	1.0715	0.4224	0.4526
60.	802.11b	Left Tilted	01	2412	13.2	13.5	1.0715	0.3488	0.3737

**Remark:** Per KDB 447498 D01 v06, if the highest output channel SAR for each exposure position  $\leq 0.8$  W/kg other channels SAR tests are not necessary.

**Body-worn SAR**

GSM850 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
61.	GSM	Back	190	836.6	32.19	32.5	1.0740	0.2611	0.2804
62.	GSM	Front	190	836.6	32.19	32.5	1.0740	0.2147	0.2306

GSM1900 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
63.	GSM	Back	512	1850.2	29.54	30.0	1.1117	0.6047	0.6723
64.	GSM	Front	512	1850.2	29.54	30.0	1.1117	0.6533	0.7263

WCDMA Band 2 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
75	RMC 12.2k	Back Side	9400	1880.0	22.58	23.0	1.1015	0.7009	0.7721
76	RMC 12.2k	Front Side	9400	1880.0	22.58	23.0	1.1015	0.6411	0.7062

WCDMA Band 5 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
79	RMC 12.2k	Back Side	4132	826.4	22.52	23.0	1.1169	0.2272	0.2538
80	RMC 12.2k	Front Side	4132	826.4	22.52	23.0	1.1169	0.2327	0.2599

LTE Band 2–Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Freque	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)	
	Modulation, Bandwidth, RB		ncy						MHz
83	RMC QPSK 20MHz 1RB	Back Side	1900.0	23.52	24.0	1.1169	0.5548	0.6196	
84	RMC QPSK 20MHz 1RB	Front Side	1900.0	23.52	24.0	1.1169	0.7982	0.8915	
89	RMC QPSK 20MHz 50%RB	Back Side	1900.0	22.42	22.5	1.0186	0.4673	0.4760	
90	RMC QPSK 20MHz 50%RB	Front Side	1900.0	22.42	22.5	1.0186	0.5927	0.6037	

LTE Band 4–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
94	RMC QPSK 20MHz 1RB	Back Side	1720.0	24.88	25.0	1.0280	0.7177	0.7378
95	RMC QPSK 20MHz 1RB	Front Side	1720.0	24.88	25.0	1.0280	0.4607	0.4736
98	RMC QPSK 20MHz 50%RB	Back Side	1720.0	23.62	24.0	1.0914	0.5362	0.5852
99	RMC QPSK 20MHz 50%RB	Front Side	1720.0	23.62	24.0	1.0914	0.3289	0.3590

LTE Band 7–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
102	RMC QPSK 20MHz 1RB	Back Side	2560.0	24.75	25.0	1.0593	1.0204	1.0809
103	RMC QPSK 20MHz 1RB	Back Side	2510.0	24.58	25.0	1.1015	1.0719	1.1807
104	RMC QPSK 20MHz 1RB	Back Side	2535.0	24.28	25.0	1.1803	1.1700	1.3810
105	RMC QPSK 20MHz 1RB	Front Side	2560.0	24.75	25.0	1.0593	0.1443	0.1529
108	RMC QPSK 20MHz 50%RB	Back Side	2560.0	23.98	24.0	1.0046	0.7627	0.7662
109	RMC QPSK 20MHz 50%RB	Front Side	2560.0	23.98	24.0	1.0046	0.2156	0.2166

LTE Band 17–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth		MHz					
113	RMC,QPSK 10MHz 1RB	Back Side	709.0	24.90	25.0	1.0233	0.4386	0.4488
114	RMC,QPSK 10MHz 1RB	Front Side	709.0	24.90	25.0	1.0233	0.2937	0.3005
117	RMC,QPSK 10MHz 50%RB	Back Side	709.0	24.81	25.0	1.0447	0.3022	0.3157
118	RMC,QPSK 10MHz 50%RB	Front Side	709.0	24.81	25.0	1.0447	0.1687	0.1762

WLAN 2.4GHz –Body SAR Test									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
121	802.11b	Back Side	01	2412	13.2	13.5	1.0715	0.0606	0.0649
122	802.11b	Front Side	01	2412	13.2	13.5	1.0715	0.0869	0.0931

**Remark:** Per KDB 447498 D01 v06, if the highest output channel SAR for each exposure position  $\leq 0.8$  W/kg other channels SAR tests are not necessary.

**Hotspot SAR**

GSM850 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
65.	GPRS_3TX	Back Side	190	836.6	30.08	30.5	1.1015	0.3555	0.3916
66.	GPRS_3TX	Front Side	190	836.6	30.08	30.5	1.1015	0.3327	0.3665
67.	GPRS_3TX	Bottom side	190	836.6	30.08	30.5	1.1015	0.1800	0.1983
68.	GPRS_3TX	Left side	190	836.6	30.08	30.5	1.1015	0.2272	0.2503

GSM1900 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
69.	GPRS_4TX	Back Side	512	1850.2	26.56	27.0	1.1066	0.7967	0.8816
70.	GPRS_4TX	Front Side	512	1850.2	26.56	27.0	1.1066	0.6730	0.7448
71.	GPRS_4TX	Bottom side	512	1850.2	26.56	27.0	1.1066	0.9823	1.0870
72.	GPRS_4TX	Bottom side	661	1880.0	26.54	27.0	1.1117	1.0077	1.1203
73.	GPRS_4TX	Bottom side	810	1909.8	26.29	27.0	1.1776	1.1517	1.3562
74.	GPRS_4TX	Left side	512	1850.2	26.56	27.0	1.1066	0.3976	0.4400

WCDMA Band 2 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
75.	RMC 12.2k	Back Side	9400	1880.0	22.58	23.0	1.1015	0.7009	0.7721
76.	RMC 12.2k	Front Side	9400	1880.0	22.58	23.0	1.1015	0.6411	0.7062
77.	RMC 12.2k	Bottom side	9400	1880.0	22.58	23.0	1.1015	0.7988	0.8799
78.	RMC 12.2k	Left side	9400	1880.0	22.58	23.0	1.1015	0.3358	0.3699

WCDMA Band 5 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
79.	RMC 12.2k	Back Side	4132	826.4	22.52	23.0	1.1169	0.2272	0.2538
80.	RMC 12.2k	Front Side	4132	826.4	22.52	23.0	1.1169	0.2327	0.2599
81.	RMC 12.2k	Bottom side	4132	826.4	22.52	23.0	1.1169	0.1062	0.1186
82.	RMC 12.2k	Left side	4132	826.4	22.52	23.0	1.1169	0.2151	0.2402

LTE Band 2–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
83.	RMC QPSK 20MHz 1RB	Back Side	1900.0	23.52	24.0	1.1169	0.5548	0.6196
84.	RMC QPSK 20MHz 1RB	Front Side	1900.0	23.52	24.0	1.1169	0.7982	0.8915
85.	RMC QPSK 20MHz 1RB	Bottom side	1900.0	23.52	24.0	1.1169	0.9419	1.0520
86.	RMC QPSK 20MHz 1RB	Bottom side	1860.0	23.41	24.0	1.1455	0.9185	1.0522
87.	RMC QPSK 20MHz 1RB	Bottom side	1880.0	23.36	24.0	1.1588	0.9675	1.1211
88.	RMC QPSK 20MHz 1RB	Left side	1900.0	23.52	24.0	1.1169	0.2147	0.2398
89.	RMC QPSK 20MHz 50%RB	Back Side	1900.0	22.42	22.5	1.0186	0.4673	0.4760
90.	RMC QPSK 20MHz 50%RB	Front Side	1900.0	22.42	22.5	1.0186	0.5927	0.6037
91.	RMC QPSK 20MHz 50%RB	Bottom side	1900.0	22.42	22.5	1.0186	0.7511	0.7651
92.	RMC QPSK 20MHz 50%RB	Left side	1900.0	22.42	22.5	1.0186	0.1982	0.2019
93.	RMC QPSK 20MHz 100%RB	Bottom side	1900.0	21.79	22.0	1.0495	0.6443	0.6762

LTE Band 4–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
94.	RMC QPSK 20MHz 1RB	Back Side	1720.0	24.88	25.0	1.0280	0.7177	0.7378
95.	RMC QPSK 20MHz 1RB	Front Side	1720.0	24.88	25.0	1.0280	0.4607	0.4736
96.	RMC QPSK 20MHz 1RB	Bottom side	1720.0	24.88	25.0	1.0280	0.5979	0.6147
97.	RMC QPSK 20MHz 1RB	Left side	1720.0	24.88	25.0	1.0280	0.3282	0.3374
98.	RMC QPSK 20MHz 50%RB	Back Side	1720.0	23.62	24.0	1.0914	0.5362	0.5852
99.	RMC QPSK 20MHz 50%RB	Front Side	1720.0	23.62	24.0	1.0914	0.3289	0.3590
100.	RMC QPSK 20MHz 50%RB	Bottom side	1720.0	23.62	24.0	1.0914	0.2154	0.2351
101.	RMC QPSK 20MHz 50%RB	Left side	1720.0	23.62	24.0	1.0914	0.1928	0.2104

LTE Band 7–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
102.	RMC QPSK 20MHz 1RB	Back Side	2560.0	24.75	25.0	1.0593	1.0204	1.0809
103.	RMC QPSK 20MHz 1RB	Back Side	2510.0	24.58	25.0	1.1015	1.0719	1.1807
104.	RMC QPSK 20MHz 1RB	Back Side	2535.0	24.28	25.0	1.1803	1.1700	1.3810
105.	RMC QPSK 20MHz 1RB	Front Side	2560.0	24.75	25.0	1.0593	0.1443	0.1529



106.	RMC QPSK 20MHz 1RB	Bottom side	2560.0	24.75	25.0	1.0593	0.5978	0.6332
107.	RMC QPSK 20MHz 1RB	Left side	2560.0	24.75	25.0	1.0593	0.3622	0.3837
108.	RMC QPSK 20MHz 50%RB	Back Side	2560.0	23.98	24.0	1.0046	0.7627	0.7662
109.	RMC QPSK 20MHz 50%RB	Front Side	2560.0	23.98	24.0	1.0046	0.2156	0.2166
110.	RMC QPSK 20MHz 50%RB	Bottom side	2560.0	23.98	24.0	1.0046	0.2738	0.2751
111.	RMC QPSK 20MHz 50%RB	Left side	2560.0	23.98	24.0	1.0046	0.1526	0.1533
112.	RMC QPSK 20MHz 100%RB	Back Side	2560.0	23.51	24.0	1.1194	0.7544	0.8445

LTE Band 17–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth		MHz					
113.	RMC,QPSK 10MHz 1RB	Back Side	709.0	24.90	25.0	1.0233	0.4386	0.4488
114.	RMC,QPSK 10MHz 1RB	Front Side	709.0	24.90	25.0	1.0233	0.2937	0.3005
115.	RMC,QPSK 10MHz 1RB	Bottom side	709.0	24.90	25.0	1.0233	0.0715	0.0732
116.	RMC,QPSK 10MHz 1RB	Left side	709.0	24.90	25.0	1.0233	0.0638	0.0653
117.	RMC,QPSK 10MHz 50%RB	Back Side	709.0	24.81	25.0	1.0447	0.3022	0.3157
118.	RMC,QPSK 10MHz 50%RB	Front Side	709.0	24.81	25.0	1.0447	0.1687	0.1762
119.	RMC,QPSK 10MHz 50%RB	Bottom side	709.0	24.81	25.0	1.0447	0.0272	0.0284
120.	RMC,QPSK 10MHz 50%RB	Left side	709.0	24.81	25.0	1.0447	0.0334	0.0349

WLAN 2.4GHz –Body SAR Test									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
121.	802.11b	Back Side	01	2412	13.2	13.5	1.0715	0.0606	0.0649
122.	802.11b	Front Side	01	2412	13.2	13.5	1.0715	0.0869	0.0931
123.	802.11b	Right side	01	2412	13.2	13.5	1.0715	0.0197	0.0211
124.	802.11b	Top Side	01	2412	13.2	13.5	1.0715	0.0271	0.0290

### 9.3 Simultaneous Multi-band Transmission SAR Analysis

#### List of Mode for Simultaneous Multi-band Transmission

No.	Configurations	Head SAR	Body-worn SAR	Hotspot SAR
1	GSM(Voice) + WLAN(Data)	Yes	Yes	-
2	GPRS/ EDGE(Data) + WLAN(Data)	-	-	Yes
3	WCDMA (Voice)+ WLAN(Data)	Yes	Yes	-
4	HSDPA(Data) + WLAN(Data)	-	-	Yes
5	HSUPA(Data) + WLAN(Data)	-	-	Yes
6	LTE(Data) + WLAN(Data)	-	-	Yes
7	GSM(Voice) + Bluetooth(Data)	Yes	Yes	-
8	GPRS/ EDGE(Data) + Bluetooth(Data)	-	-	Yes
9	WCDMA(Voice) + Bluetooth(Data)	Yes	Yes	-
10	HSDPA(Data)+ Bluetooth(Data)	-	-	Yes
11	HSUPA(Data) + Bluetooth(Data)	-	-	Yes
12	LTE(Data) + Bluetooth(Data)	-	-	Yes

#### Remark:

- GSM and WCDMA share the same antenna, and cannot transmit simultaneously.
- WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
- According to the KDB 447498 D01 v06, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:  
 $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})} / x]$  W/kg for test separation distances  $\leq 50$  mm;  
 where  $x = 7.5$  for 1-g SAR, and  $x = 18.75$  for 10-g SAR.

For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01 v06 as below:

#### Bluetooth:

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	X	SAR(1g) 5mm	SAR(1g) 10mm
0.5	1.12	5/10	2.402	7.5	0.0463	0.0231

- The maximum SAR summation is calculated based on the same configuration and test position.

**Head SAR**
**WWAN and WLAN**

Position	WWAN		WLAN	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Right Cheek	GSM850	0.2285	0.1863	0.4148
Right Tilted	GSM850	0.1116	0.1165	0.2281
Left Cheek	GSM850	0.2289	0.4526	0.6815
Left Tilted	GSM850	0.1291	0.3737	0.5028
Right Cheek	GSM1900	0.2987	0.1863	0.485
Right Tilted	GSM1900	0.1261	0.1165	0.2426
Left Cheek	GSM1900	0.2698	0.4526	0.7224
Left Tilted	GSM1900	0.1195	0.3737	0.4932
Right Cheek	GPRS850	0.3069	0.1863	0.4932
Right Tilted	GPRS850	0.1518	0.1165	0.2683
Left Cheek	GPRS850	0.3081	0.4526	0.7607
Left Tilted	GPRS850	0.1789	0.3737	0.5526
Right Cheek	GPRS1900	0.1010	0.1863	0.2873
Right Tilted	GPRS1900	0.0606	0.1165	0.1771
Left Cheek	GPRS1900	0.1360	0.4526	0.5886
Left Tilted	GPRS1900	0.0956	0.3737	0.4693
Right Cheek	WCDMA Band 2	0.3744	0.1863	0.5607
Right Tilted	WCDMA Band 2	0.1732	0.1165	0.2897
Left Cheek	WCDMA Band 2	0.5664	0.4526	1.019
Left Tilted	WCDMA Band 2	0.3246	0.3737	0.6983
Right Cheek	WCDMA Band 5	0.2236	0.1863	0.4099
Right Tilted	WCDMA Band 5	0.1403	0.1165	0.2568
Left Cheek	WCDMA Band 5	0.2169	0.4526	0.6695
Left Tilted	WCDMA Band 5	0.1137	0.3737	0.4874
Right Cheek	LTE Band 2	0.3429	0.1863	0.5292
Right Tilted	LTE Band 2	0.1592	0.1165	0.2757
Left Cheek	LTE Band 2	0.6047	0.4526	<b>1.0573</b>
Left Tilted	LTE Band 2	0.3280	0.3737	0.7017
Right Cheek	LTE Band 4	0.3285	0.1863	0.5148
Right Tilted	LTE Band 4	0.1411	0.1165	0.2576
Left Cheek	LTE Band 4	0.2907	0.4526	0.7433
Left Tilted	LTE Band 4	0.1058	0.3737	0.4795
Right Cheek	LTE Band 7	0.1273	0.1863	0.3136
Right Tilted	LTE Band 7	0.0664	0.1165	0.1829
Left Cheek	LTE Band 7	0.2416	0.4526	0.6942
Left Tilted	LTE Band 7	0.1762	0.3737	0.5499
Right Cheek	LTE Band 17	0.2192	0.1863	0.4055

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Right Tilted	LTE Band 17	0.1181	0.1165	0.2346
Left Cheek	LTE Band 17	0.2371	0.4526	0.6897
Left Tilted	LTE Band 17	0.1303	0.3737	0.504

**WWAN and Bluetooth**

Position	WWAN		Bluetooth	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Right Cheek	GSM850	0.2285	0.0463	0.2748
Right Tilted	GSM850	0.1116	0.0463	0.1579
Left Cheek	GSM850	0.2289	0.0463	0.2752
Left Tilted	GSM850	0.1291	0.0463	0.1754
Right Cheek	GSM1900	0.2987	0.0463	0.345
Right Tilted	GSM1900	0.1261	0.0463	0.1724
Left Cheek	GSM1900	0.2698	0.0463	0.3161
Left Tilted	GSM1900	0.1195	0.0463	0.1658
Right Cheek	GPRS850	0.3069	0.0463	0.3532
Right Tilted	GPRS850	0.1518	0.0463	0.1981
Left Cheek	GPRS850	0.3081	0.0463	0.3544
Left Tilted	GPRS850	0.1789	0.0463	0.2252
Right Cheek	GPRS1900	0.1010	0.0463	0.1473
Right Tilted	GPRS1900	0.0606	0.0463	0.1069
Left Cheek	GPRS1900	0.1360	0.0463	0.1823
Left Tilted	GPRS1900	0.0956	0.0463	0.1419
Right Cheek	WCDMA Band 2	0.3744	0.0463	0.4207
Right Tilted	WCDMA Band 2	0.1732	0.0463	0.2195
Left Cheek	WCDMA Band 2	0.5664	0.0463	0.6127
Left Tilted	WCDMA Band 2	0.3246	0.0463	0.3709
Right Cheek	WCDMA Band 5	0.2236	0.0463	0.2699
Right Tilted	WCDMA Band 5	0.1403	0.0463	0.1866
Left Cheek	WCDMA Band 5	0.2169	0.0463	0.2632
Left Tilted	WCDMA Band 5	0.1137	0.0463	0.16
Right Cheek	LTE Band 2	0.3429	0.0463	0.3892
Right Tilted	LTE Band 2	0.1592	0.0463	0.2055
Left Cheek	LTE Band 2	0.6047	0.0463	<b>0.651</b>
Left Tilted	LTE Band 2	0.3280	0.0463	0.3743
Right Cheek	LTE Band 4	0.3285	0.0463	0.3748
Right Tilted	LTE Band 4	0.1411	0.0463	0.1874
Left Cheek	LTE Band 4	0.2907	0.0463	0.337
Left Tilted	LTE Band 4	0.1058	0.0463	0.1521
Right Cheek	LTE Band 7	0.1273	0.0463	0.1736
Right Tilted	LTE Band 7	0.0664	0.0463	0.1127
Left Cheek	LTE Band 7	0.2416	0.0463	0.2879
Left Tilted	LTE Band 7	0.1762	0.0463	0.2225
Right Cheek	LTE Band 17	0.2192	0.0463	0.2655
Right Tilted	LTE Band 17	0.1181	0.0463	0.1644

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Left Cheek	LTE Band 17	0.2371	0.0463	0.2834
Left Tilted	LTE Band 17	0.1303	0.0463	0.1766

**Body-worn SAR**
**WWAN and WLAN**

Position	WWAN		WLAN	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.2804	0.0649	0.3453
Front	GSM850	0.2306	0.0931	0.3237
Back	GSM1900	0.6723	0.0649	0.7372
Front	GSM1900	0.7263	0.0931	0.8194
Back	WCDMA Band 2	0.7721	0.0649	0.837
Front	WCDMA Band 2	0.7062	0.0931	0.7993
Back	WCDMA Band 5	0.2538	0.0649	0.3187
Front	WCDMA Band 5	0.2599	0.0931	0.353
Back	LTE Band 2	0.6196	0.0649	0.6845
Front	LTE Band 2	0.8915	0.0931	0.9846
Back	LTE Band 4	0.7378	0.0649	0.8027
Front	LTE Band 4	0.4736	0.0931	0.5667
Back	LTE Band 7	1.3810	0.0649	<b>1.4459</b>
Front	LTE Band 7	0.1529	0.0931	0.246
Back	LTE Band 17	0.4488	0.0649	0.5137
Front	LTE Band 17	0.3005	0.0931	0.3936

**WWAN and Bluetooth**

Position	WWAN		Bluetooth	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.2804	0.0231	0.3035
Front	GSM850	0.2306	0.0231	0.2537
Back	GSM1900	0.6723	0.0231	0.6954
Front	GSM1900	0.7263	0.0231	0.7494
Back	WCDMA Band 2	0.7721	0.0231	0.7952
Front	WCDMA Band 2	0.7062	0.0231	0.7293
Back	WCDMA Band 5	0.2538	0.0231	0.2769
Front	WCDMA Band 5	0.2599	0.0231	0.283
Back	LTE Band 2	0.6196	0.0231	0.6427
Front	LTE Band 2	0.8915	0.0231	0.9146
Back	LTE Band 4	0.7378	0.0231	0.7609
Front	LTE Band 4	0.4736	0.0231	0.4967
Back	LTE Band 7	1.3810	0.0231	<b>1.4041</b>
Front	LTE Band 7	0.1529	0.0231	0.176
Back	LTE Band 17	0.4488	0.0231	0.4719
Front	LTE Band 17	0.3005	0.0231	0.3236



**Hotspot SAR**
**WWAN and WLAN**

Position	WWAN		WLAN	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.3916	0.0649	0.4565
Front	GSM850	0.3665	0.0931	0.4596
Top side	GSM850	--	0.0290	0.0290
Bottom side	GSM850	0.1983	--	0.1983
Right side	GSM850	--	0.0211	0.0211
Left side	GSM850	0.2503	--	0.2503
Back	GSM1900	0.8816	0.0649	0.9465
Front	GSM1900	0.7448	0.0931	0.8379
Top side	GSM1900	--	0.0290	0.0290
Bottom side	GSM1900	1.3562	--	1.3562
Right side	GSM1900	--	0.0211	0.0211
Left side	GSM1900	0.4400	--	0.4400
Back	WCDMA Band 2	0.7721	0.0649	0.837
Front	WCDMA Band 2	0.7062	0.0931	0.7993
Top side	WCDMA Band 2	--	0.0290	0.0290
Bottom side	WCDMA Band 2	0.8799	--	0.8799
Right side	WCDMA Band 2	--	0.0211	0.0211
Left side	WCDMA Band 2	0.3699	--	0.3699
Back	WCDMA Band 5	0.2538	0.0649	0.3187
Front	WCDMA Band 5	0.2599	0.0931	0.353
Top side	WCDMA Band 5	--	0.0290	0.0290
Bottom side	WCDMA Band 5	0.1186	--	0.1186
Right side	WCDMA Band 5	--	0.0211	0.0211
Left side	WCDMA Band 5	0.2402	--	0.2402
Back	LTE Band 2	0.6196	0.0649	0.6845
Front	LTE Band 2	0.8915	0.0931	0.9846
Top side	LTE Band 2	--	0.0290	0.0290
Bottom side	LTE Band 2	1.1211	--	1.1211
Right side	LTE Band 2	--	0.0211	0.0211
Left side	LTE Band 2	0.2398	--	0.2398
Back	LTE Band 4	0.7378	0.0649	0.8027
Front	LTE Band 4	0.4736	0.0931	0.5667
Top side	LTE Band 4	--	0.0290	0.0290
Bottom side	LTE Band 4	0.6147	--	0.6147
Right side	LTE Band 4	--	0.0211	0.0211
Left side	LTE Band 4	0.3374	--	0.3374
Back	LTE Band 7	1.3810	0.0649	<b>1.4459</b>

Front	LTE Band 7	0.1529	0.0931	0.246
Top side	LTE Band 7	--	0.0290	0.0290
Bottom side	LTE Band 7	0.6332	--	0.6332
Right side	LTE Band 7	--	0.0211	0.0211
Left side	LTE Band 7	0.3837	--	0.3837
Back	LTE Band 17	0.4488	0.0649	0.5137
Front	LTE Band 17	0.3005	0.0931	0.3936
Top side	LTE Band 17	--	0.0290	0.0290
Bottom side	LTE Band 17	0.0732	--	0.0732
Right side	LTE Band 17	--	0.0211	0.0211
Left side	LTE Band 17	0.0653	--	0.0653

**WWAN and Bluetooth**

Position	WWAN		Bluetooth	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.3916	0.0231	0.4147
Front	GSM850	0.3665	0.0231	0.3896
Top side	GSM850	--	0.0231	0.0231
Bottom side	GSM850	0.1983	--	0.1983
Right side	GSM850	--	0.0231	0.0231
Left side	GSM850	0.2503	--	0.2503
Back	GSM1900	0.8816	0.0231	0.9047
Front	GSM1900	0.7448	0.0231	0.7679
Top side	GSM1900	--	0.0231	0.0231
Bottom side	GSM1900	1.3562	--	1.3562
Right side	GSM1900	--	0.0231	0.0231
Left side	GSM1900	0.4400	--	0.4400
Back	WCDMA Band 2	0.7721	0.0231	0.7952
Front	WCDMA Band 2	0.7062	0.0231	0.7293
Top side	WCDMA Band 2	--	0.0231	0.0231
Bottom side	WCDMA Band 2	0.8799	--	0.8799
Right side	WCDMA Band 2	--	0.0231	0.0231
Left side	WCDMA Band 2	0.3699	--	0.3699
Back	WCDMA Band 5	0.2538	0.0231	0.2769
Front	WCDMA Band 5	0.2599	0.0231	0.283
Top side	WCDMA Band 5	--	0.0231	0.0231
Bottom side	WCDMA Band 5	0.1186	--	0.1186
Right side	WCDMA Band 5	--	0.0231	0.0231
Left side	WCDMA Band 5	0.2402	--	0.2402
Back	LTE Band 2	0.6196	0.0231	0.6427
Front	LTE Band 2	0.8915	0.0231	0.9146

Top side	LTE Band 2	--	0.0231	0.0231
Bottom side	LTE Band 2	1.1211	--	1.1211
Right side	LTE Band 2	--	0.0231	0.0231
Left side	LTE Band 2	0.2398	--	0.2398
Back	LTE Band 4	0.7378	0.0231	0.7609
Front	LTE Band 4	0.4736	0.0231	0.4967
Top side	LTE Band 4	--	0.0231	0.0231
Bottom side	LTE Band 4	0.6147	--	0.6147
Right side	LTE Band 4	--	0.0231	0.0231
Left side	LTE Band 4	0.3374	--	0.3374
Back	LTE Band 7	1.3810	0.0231	<b>1.4041</b>
Front	LTE Band 7	0.1529	0.0231	0.176
Top side	LTE Band 7	--	0.0231	0.0231
Bottom side	LTE Band 7	0.6332	--	0.6332
Right side	LTE Band 7	--	0.0231	0.0231
Left side	LTE Band 7	0.3837	--	0.3837
Back	LTE Band 17	0.4488	0.0231	0.4719
Front	LTE Band 17	0.3005	0.0231	0.3236
Top side	LTE Band 17	--	0.0231	0.0231
Bottom side	LTE Band 17	0.0732	--	0.0732
Right side	LTE Band 17	--	0.0231	0.0231
Left side	LTE Band 17	0.0653	--	0.0653

## 10. Measurement Uncertainty

### 10.1 Uncertainty for EUT SAR Test

a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+- %)	10g Ui (+- %)	Vi
<b>Measurement System</b>									
Probe calibration	E.2.1	7.0	N	1	1	1	7.00	7.00	$\infty$
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	$(1_{Cp})^{1/2}$	$(1_{Cp})^{1/2}$	1.02	1.02	$\infty$
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	$(Cp)^{1/2}$	$(Cp)^{1/2}$	1.63	1.63	$\infty$
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	$\infty$
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	$\infty$
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	$\infty$
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	$\infty$
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	$\infty$
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	$\infty$
RF ambient Conditions – Noise	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	$\infty$
RF ambient Conditions - Reflections	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	$\infty$
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	$\infty$
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	$\infty$
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	E.5	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	$\infty$
<b>Test Sample Related</b>									
Test sample positioning	E.4.2	0.03	N	1	1	1	0.03	0.03	N-1
Device Holder Uncertainty	E.4.1	5.00	N	1	1	1	5.00	5.00	
Output power Variation - SAR drift measurement	E.2.9	12.02	R	$\sqrt{3}$	1	1	6.94	6.94	$\infty$
SAR scaling	E6.5	0.0	R	$\sqrt{3}$	1	1	0.0	0.0	$\infty$
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	$\infty$
Uncertainty in SAR correction for deviations in permittivity and conductivity	E3.2	1.9	R	$\sqrt{3}$	1	0.84	1.10	0.90	$\infty$
Liquid conductivity - deviation	E.3.2	5.00	R	$\sqrt{3}$	0.64	0.43	1.85	1.24	$\infty$

from target value										
Liquid conductivity measurement uncertainty	E.3.3	5.00	N	1	0.64	0.43	3.20	2.15	$\infty$	
Liquid permittivity - deviation from target value	E.3.2	0.37	R	$\sqrt{3}$	0.6	0.49	0.13	0.10	$\infty$	
Liquid permittivity measurement uncertainty	E.3.3	10.00	N	1	0.6	0.49	6.00	4.90	$\infty$	
Combined Standard Uncertainty			RSS				12.98	12.53		
Expanded Uncertainty (95% Confidence interval)			K=2				25.32	24.43		

## 10.2 Uncertainty for System Performance Check

a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+- %)	10g Ui (+- %)	Vi
<b>Measurement System</b>									
Probe calibration	E.2.1	7.0	N	1	1	1	7.00	7.00	$\infty$
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	$(1_{Cp})^{1/2}$	$(1_{Cp})^{1/2}$	1.02	1.02	$\infty$
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	$(Cp)^{1/2}$	$(Cp)^{1/2}$	1.63	1.63	$\infty$
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	$\infty$
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	$\infty$
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	$\infty$
Modulation response	E.2.5	0	R	$\sqrt{3}$	0	0	0.0	0.0	$\infty$
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	$\infty$
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	$\infty$
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	$\infty$
RF ambient Conditions – Noise	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	$\infty$
RF ambient Conditions - Reflections	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	$\infty$
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	$\infty$
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	$\infty$
Extrapolation, interpolation and integration Algorithms for Max.	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	$\infty$

SAR Evaluation									
<b>Dipole</b>									
Dipole axis to liquid Distance	8,E.4.2	1.00	N	$\sqrt{3}$	1	1	0.58	0.58	N-1
Input power and SAR drift measurement	8,6.6.2	12.02	R	$\sqrt{3}$	1	1	6.94	6.94	$\infty$
Deviation of experimental dipole from numerical dipole	E.6.4	5.5	R	$\sqrt{3}$	1	1	3.20	3.20	$\infty$
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	$\infty$
Uncertainty in SAR correction for deviations in permittivity and conductivity	E3.2	2.0	R	$\sqrt{3}$	1	0.84	1.10	1.10	$\infty$
Liquid conductivity - deviation from target value	E.3.2	5.00	R	$\sqrt{3}$	0.64	0.43	1.85	1.24	
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	1	0.64	0.43	3.20	2.15	
Liquid permittivity - deviation from target value	E.3.2	0.37	R	$\sqrt{3}$	0.6	0.49	0.13	0.10	
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N	1	0.6	0.49	6.00	4.90	M
Combined Standard Uncertainty			RSS				12.00	11.50	
Expanded Uncertainty (95% Confidence interval)			K=2				23.39	22.43	

## Annex A. Plots of System Performance Check

# MEASUREMENT 1

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 10/17/2016

Measurement duration: 7 minutes 21 seconds

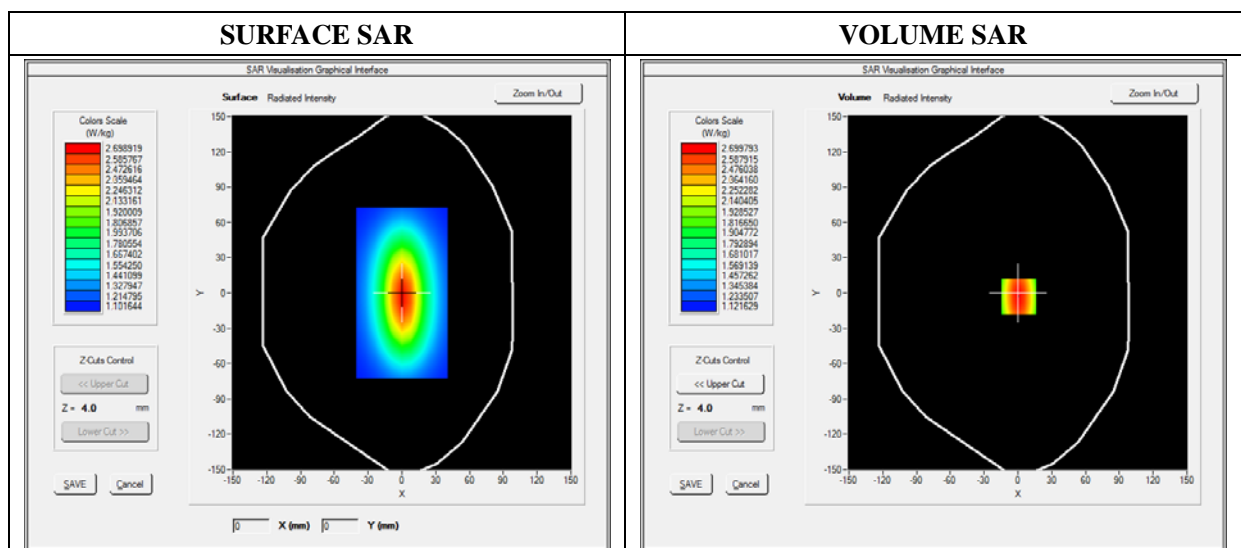
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.99; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW750
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	750.000000
<b>Relative Permittivity (real part)</b>	41.320574
<b>Conductivity (S/m)</b>	0.862373
<b>Power Variation (%)</b>	0.038363
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

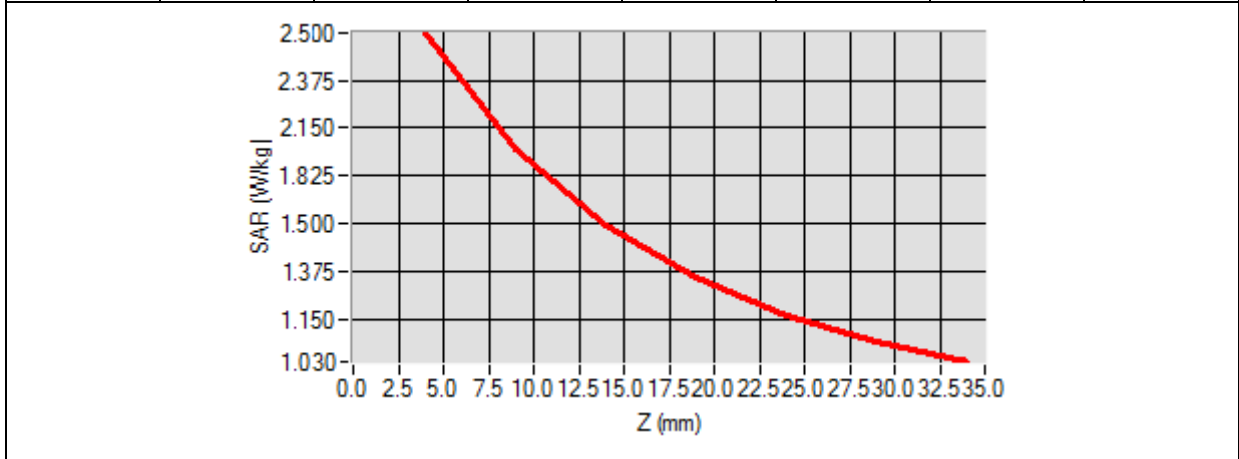


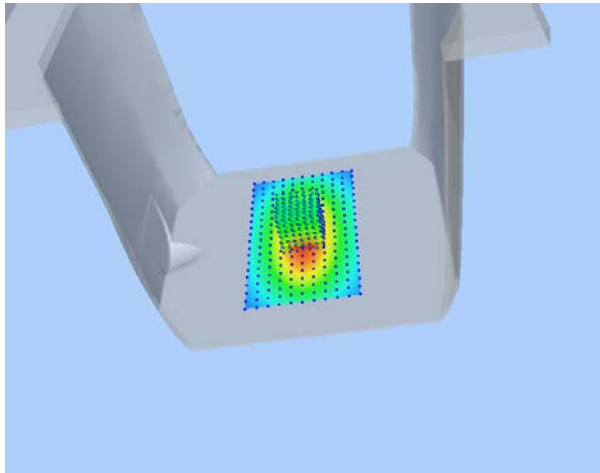
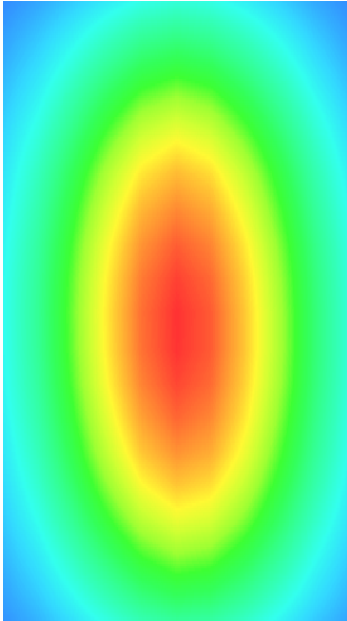
Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	1.042744
SAR 1g (W/Kg)	2.164534

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	2.3634	1.8023	1.4523	1.2514	1.1005	1.0245



3D screen shot	Hot spot position
	



# MEASUREMENT 2

**For Head Liquid**

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 10/17/2016

Measurement duration: 7 minutes 21 seconds

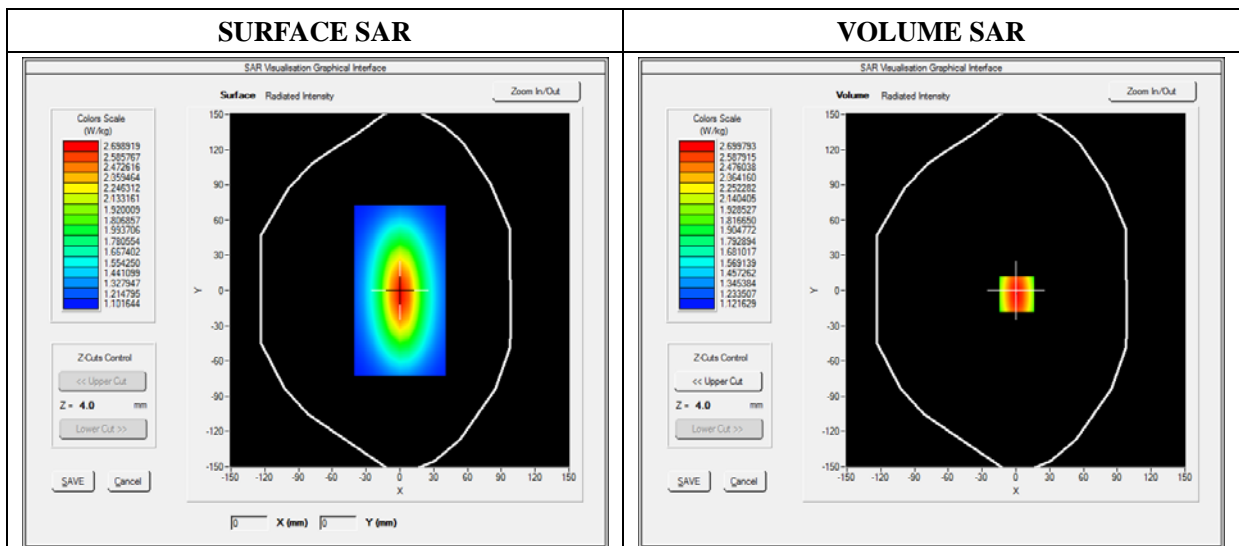
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2016

**A. Experimental conditions**

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW835
<b>Signal</b>	Duty Cycle 1:1

**B. SAR Measurement Results**

<b>Frequency (MHz)</b>	835.000000
<b>Relative Permittivity (real part)</b>	41.110245
<b>Conductivity (S/m)</b>	0.871245
<b>Power Variation (%)</b>	0.038437
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

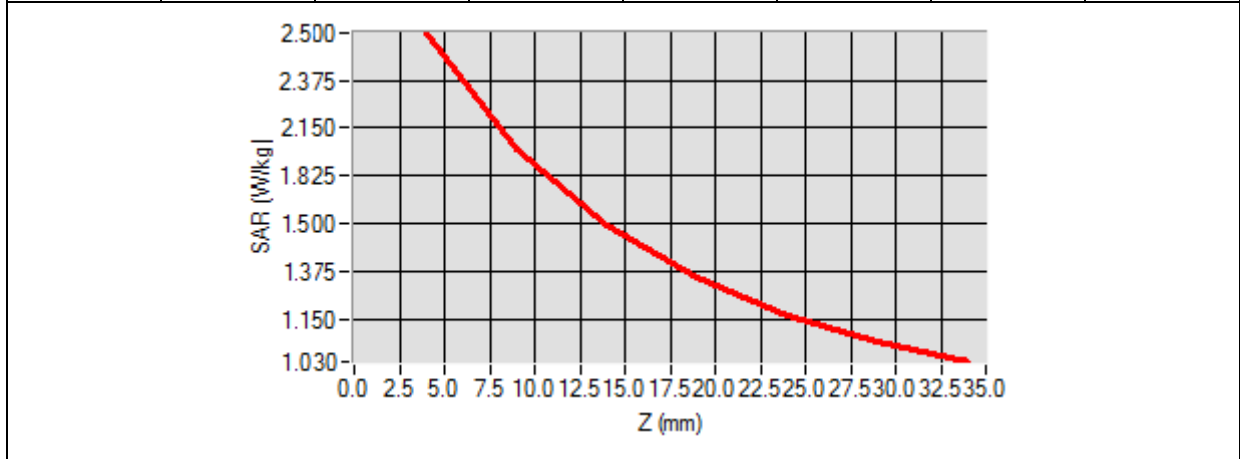


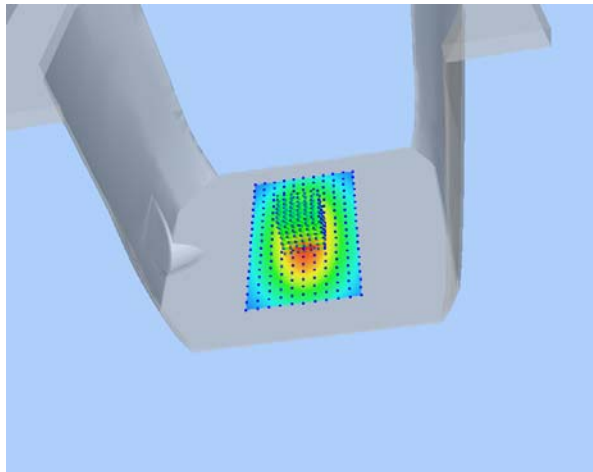
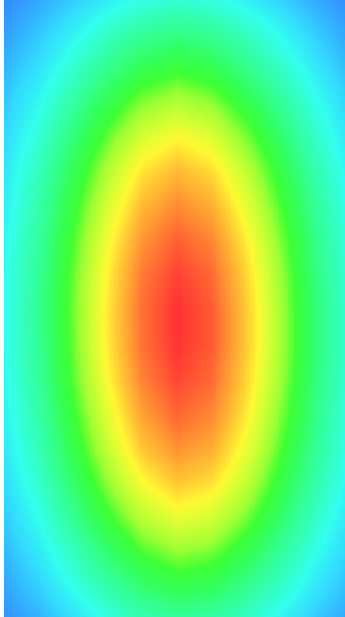
Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	1.129489
SAR 1g (W/Kg)	2.411253

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	2.4900	1.8942	1.4811	1.3541	1.1123	1.0539



3D screen shot	Hot spot position
	

## MEASUREMENT 3

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 21 seconds

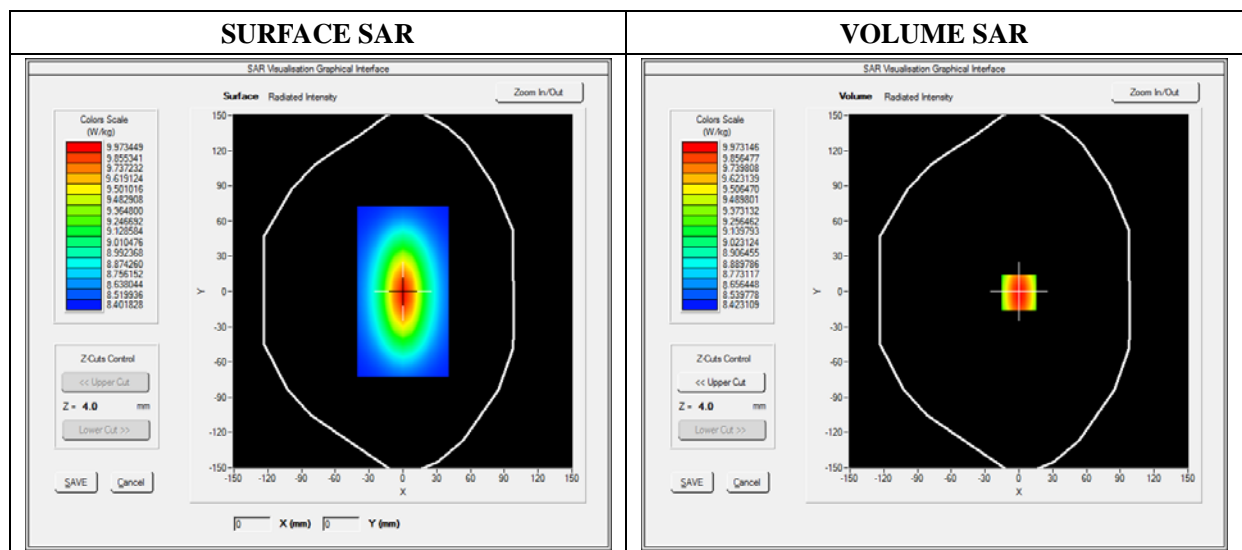
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW1800
<b>Signal</b>	CW (Crest factor: 1.0)

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	1800.000000
<b>Relative Permittivity (real part)</b>	39.024890
<b>Conductivity (S/m)</b>	1.371250
<b>Power Variation (%)</b>	1.401232
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

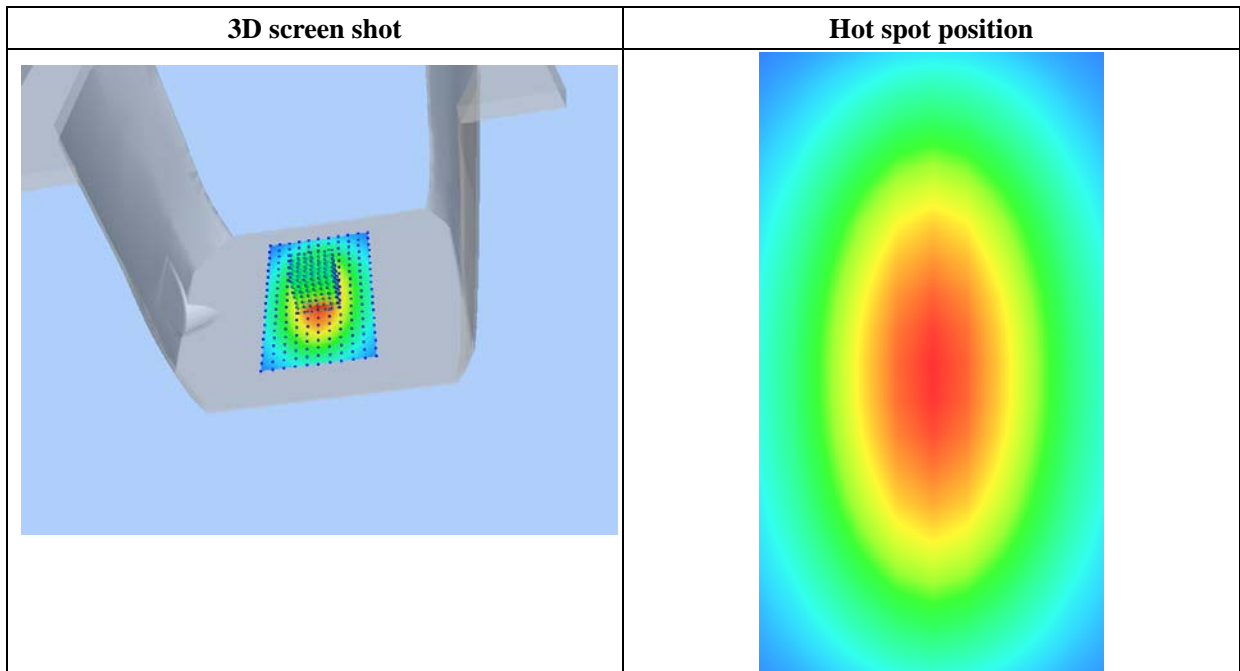
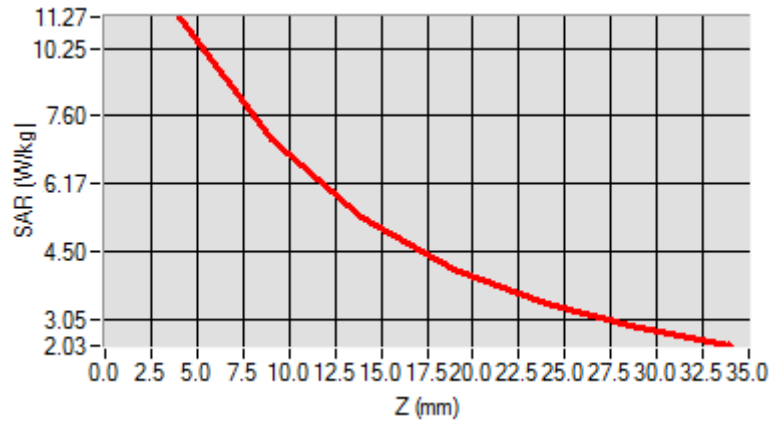


Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	5.171252
SAR 1g (W/Kg)	9.611250

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	10.3455	7.1125	5.1026	3.425	3.0242	2.1125



# MEASUREMENT 4

**For Head Liquid**

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 21 seconds

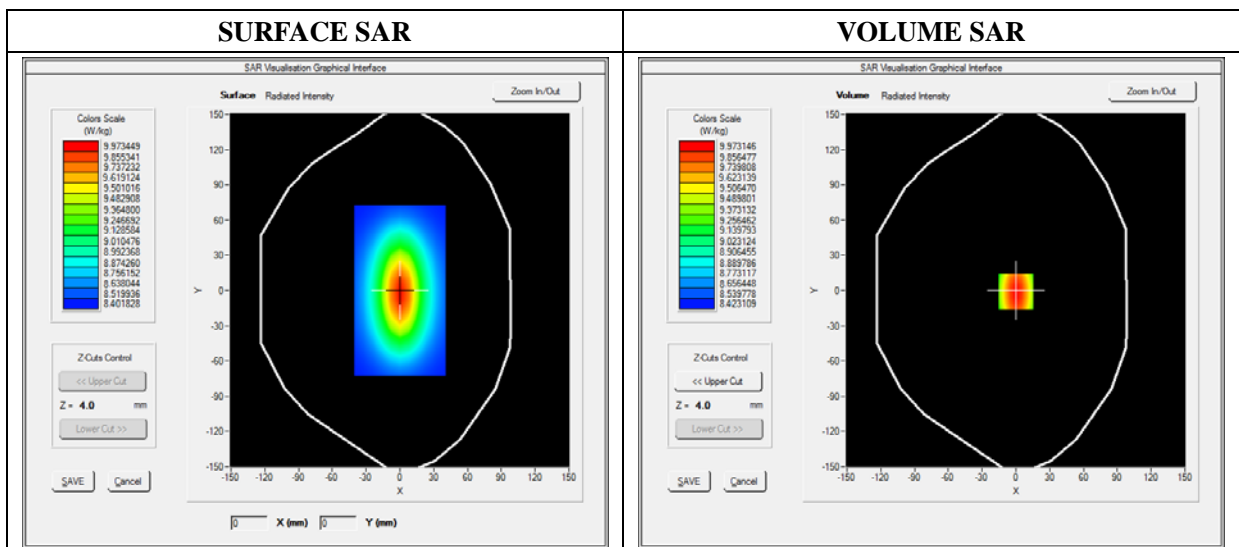
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2016

**A. Experimental conditions**

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW1900
<b>Signal</b>	Duty Cycle 1:1

**B. SAR Measurement Results**

<b>Frequency (MHz)</b>	1900.000000
<b>Relative Permittivity (real part)</b>	38.560124
<b>Conductivity (S/m)</b>	1.380369
<b>Power Variation (%)</b>	1.022540
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

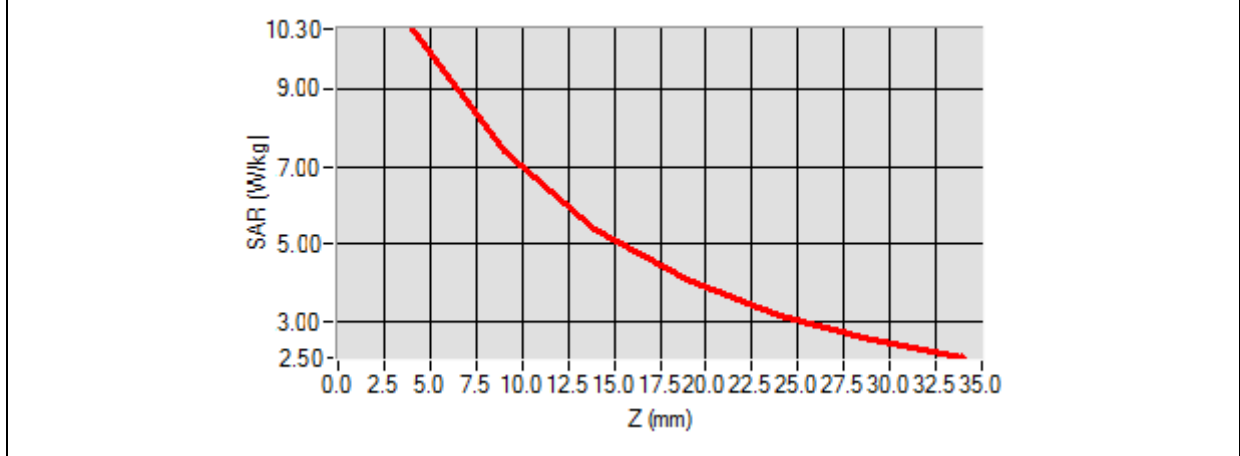


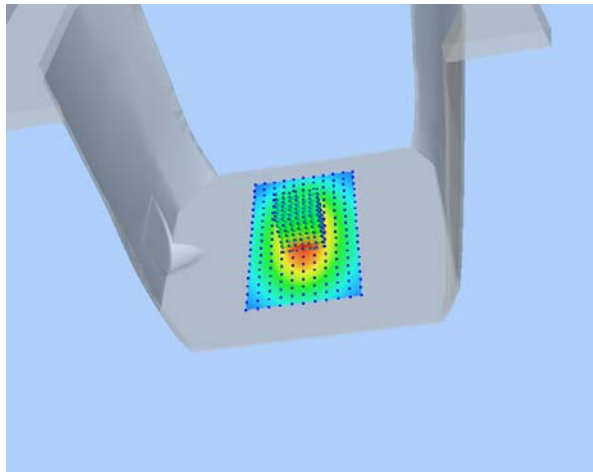
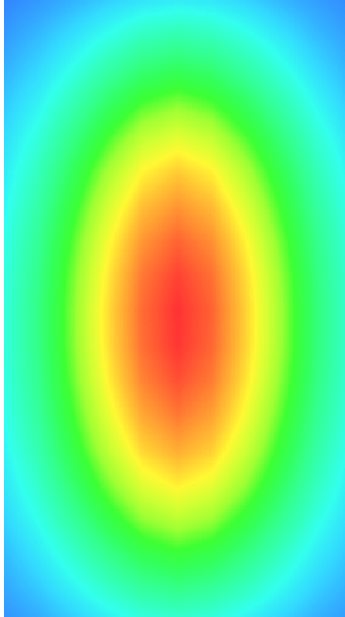
Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	7.174526
SAR 1g (W/Kg)	9.913214

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	10.2354	6.8400	5.0121	4.1189	3.0522	2.8424



3D screen shot	Hot spot position
	

# MEASUREMENT 5

**For Head Liquid**

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 21 seconds

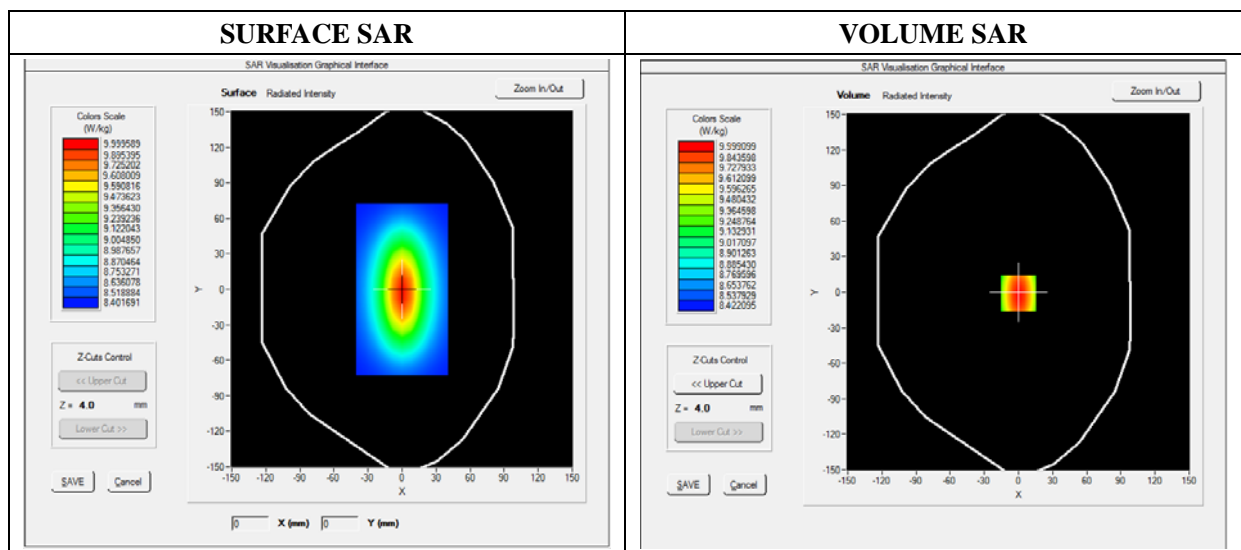
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.64; Calibrated: 06/01/2016

**A. Experimental conditions**

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW2450
<b>Signal</b>	Duty Cycle 1:1

**B. SAR Measurement Results**

<b>Frequency (MHz)</b>	2450.000000
<b>Relative Permittivity (real part)</b>	38.153660
<b>Conductivity (S/m)</b>	1.740236
<b>Power Variation (%)</b>	1.141452
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

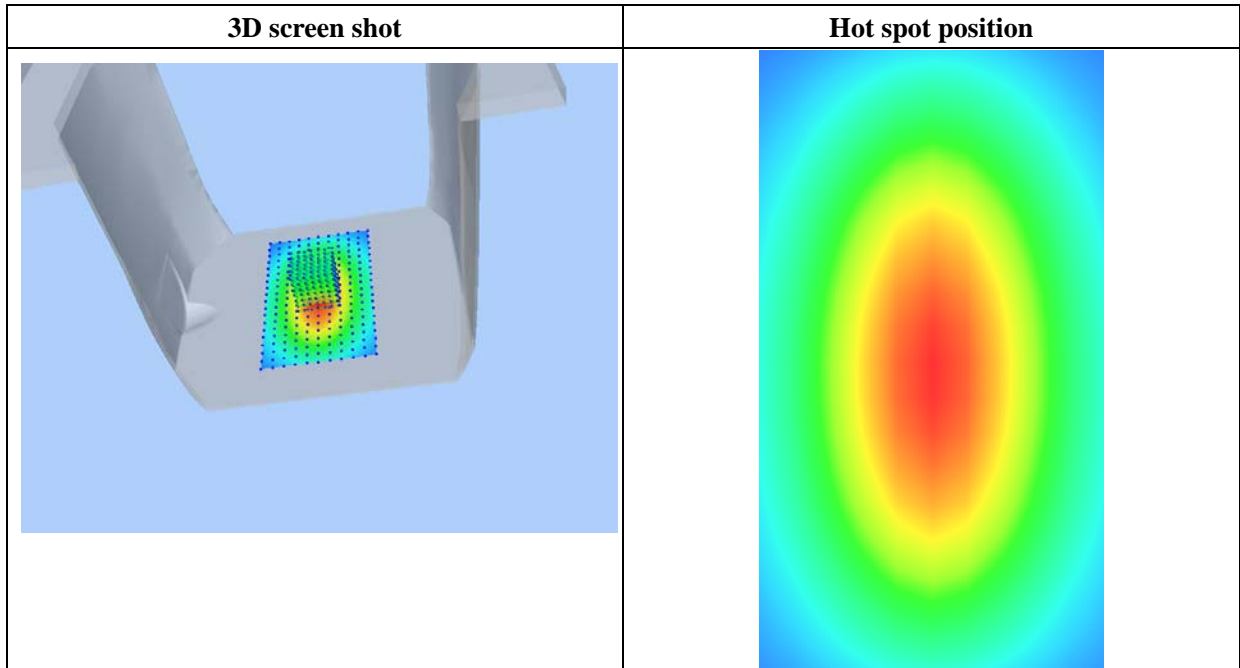
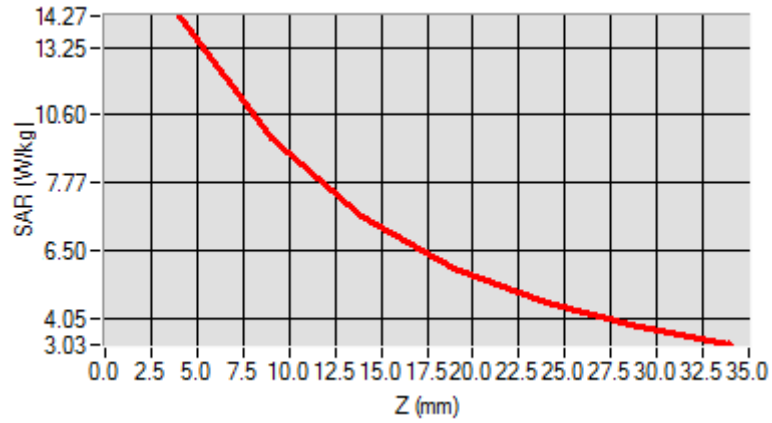


Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	8.020427
SAR 1g (W/Kg)	13.452457

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	14.1034	12.0012	10.2624	7.4715	5.9022	4.5114





# MEASUREMENT 6

**For Body Liquid**

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 21 seconds

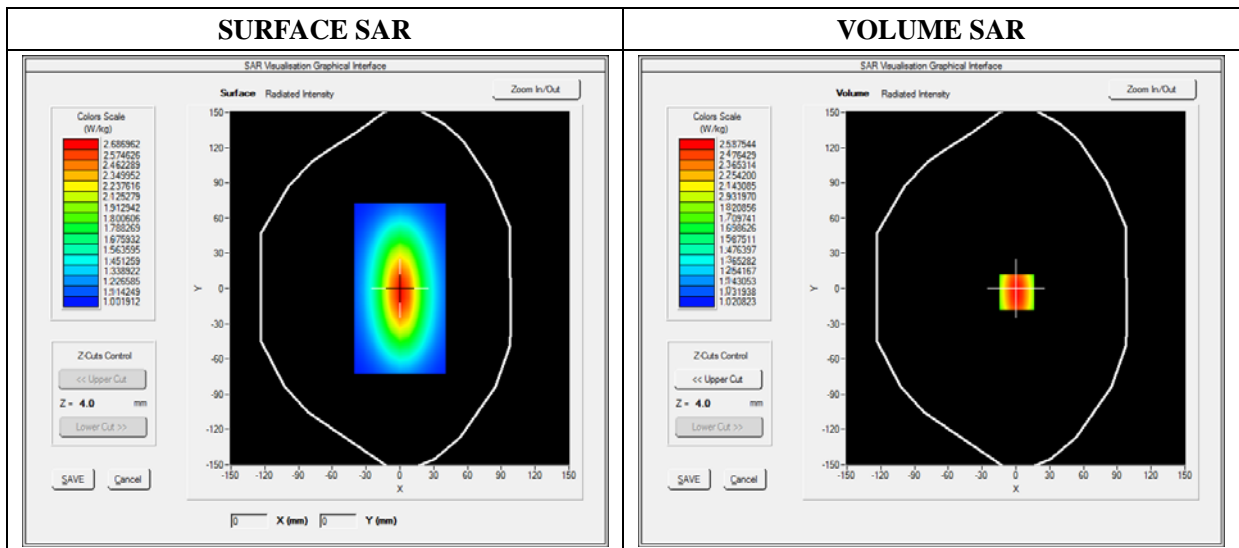
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.28; Calibrated: 06/01/2016

**A. Experimental conditions**

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW750
<b>Signal</b>	Duty Cycle 1:1

**B. SAR Measurement Results**

<b>Frequency (MHz)</b>	750.000000
<b>Relative Permittivity (real part)</b>	54.964739
<b>Conductivity (S/m)</b>	0.931048
<b>Power Variation (%)</b>	0.034745
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

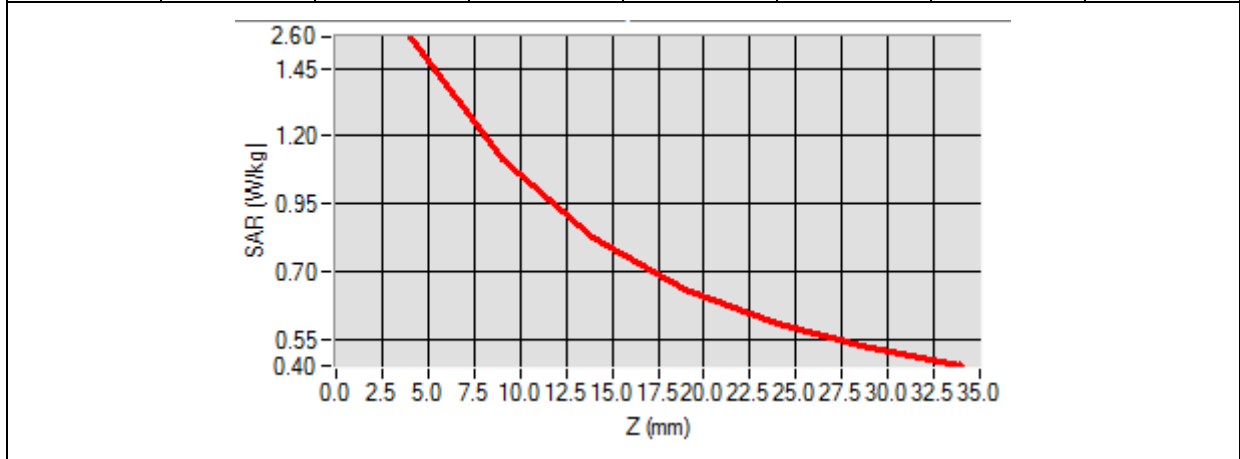


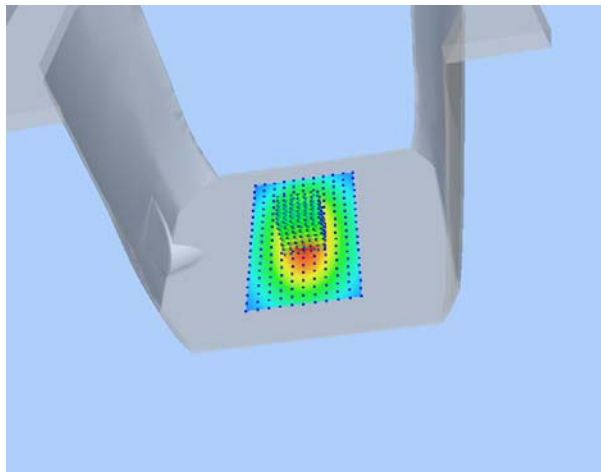
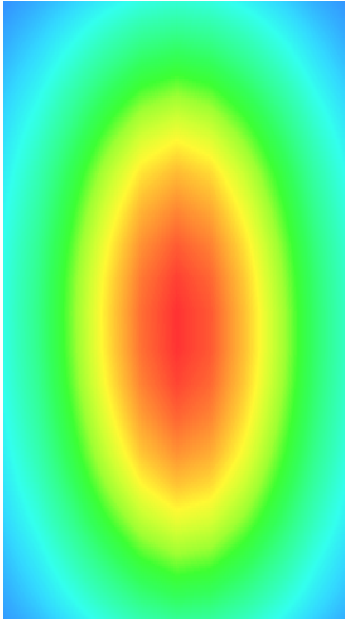
Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	1.000865
SAR 1g (W/Kg)	2.124211

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	2.5132	1.1087	0.8214	0.5160	0.4875	0.4864



3D screen shot	Hot spot position
	

# MEASUREMENT 7

## For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 21 seconds

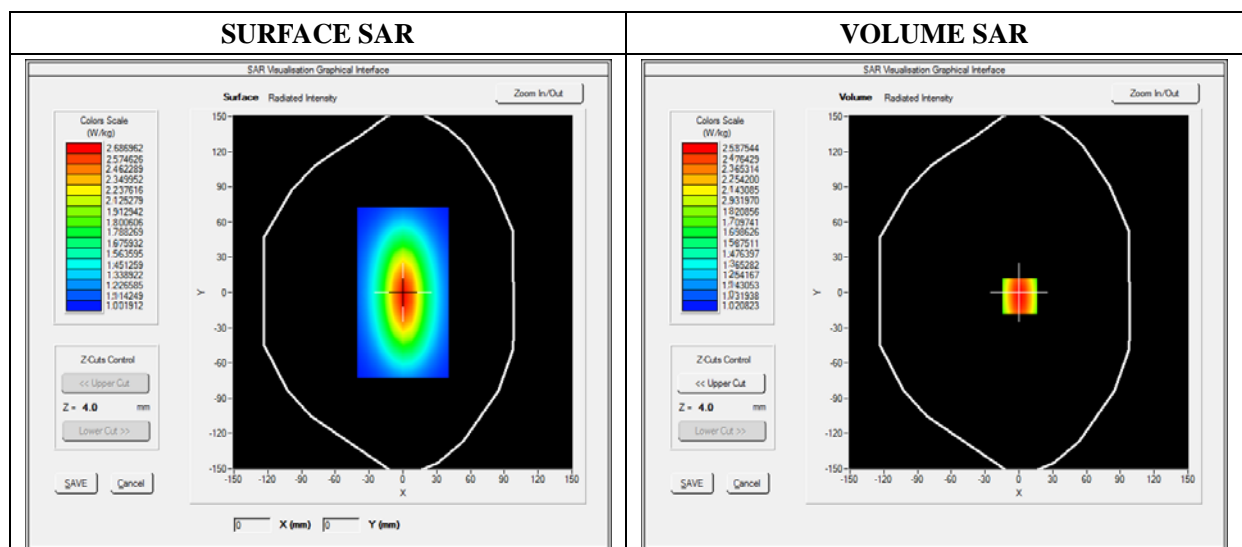
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2016

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Validation plane
Device Position	Dipole
Band	CW835
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

Frequency (MHz)	835.000000
Relative Permittivity (real part)	54.851214
Conductivity (S/m)	0.951454
Power Variation (%)	0.901472
Ambient Temperature	21.1
Liquid Temperature	21.3

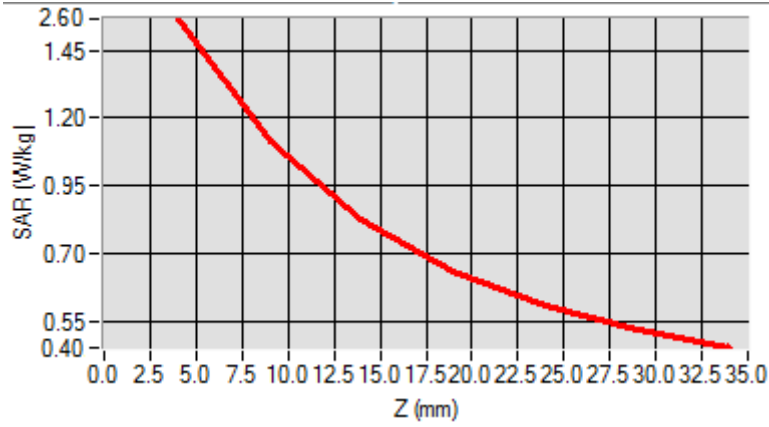


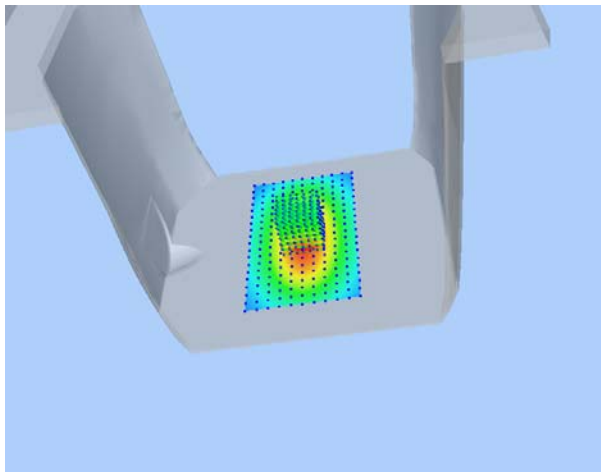
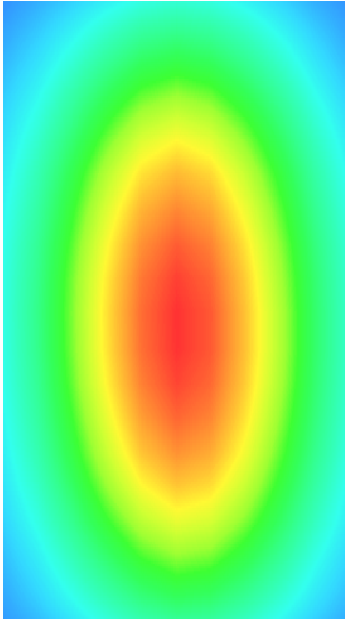
Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	1.028956
SAR 1g (W/Kg)	2.354211

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	2.5789	1.1300	0.8795	0.5940	0.5011	0.5100



3D screen shot	Hot spot position
	

# MEASUREMENT 8

**For Body Liquid**

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 21 seconds

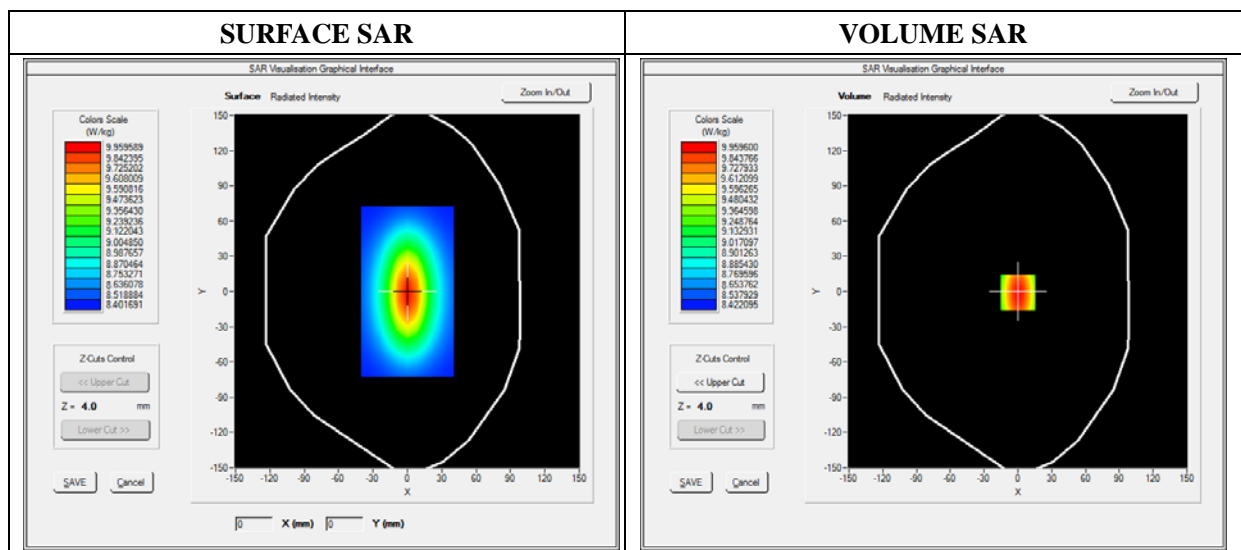
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 06/01/2016

**A. Experimental conditions**

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW1800
<b>Signal</b>	CW (Crest factor: 1.0)

**B. SAR Measurement Results**

<b>Frequency (MHz)</b>	1800.000000
<b>Relative Permittivity (real part)</b>	51.224510
<b>Conductivity (S/m)</b>	1.461261
<b>Power Variation (%)</b>	0.845690
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

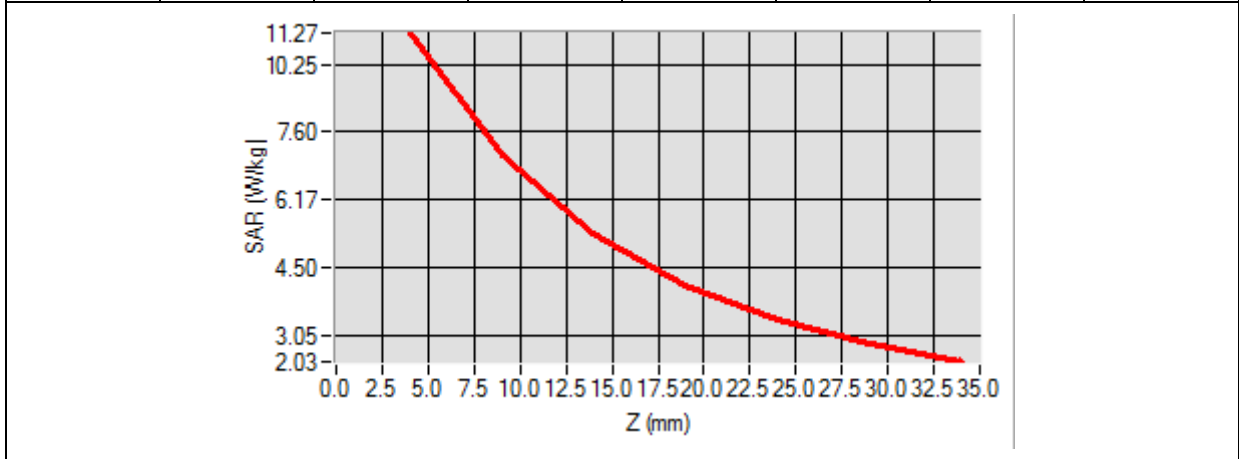


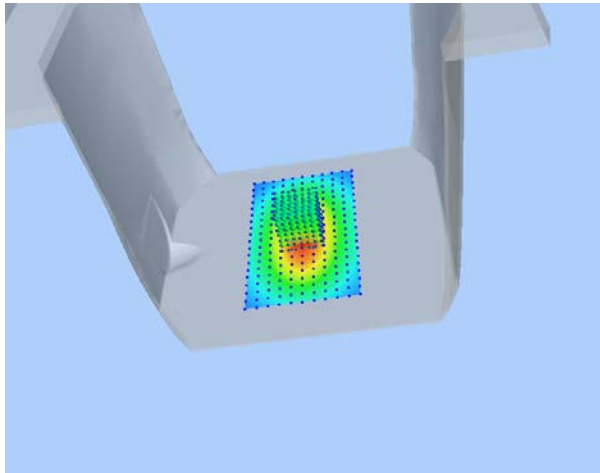
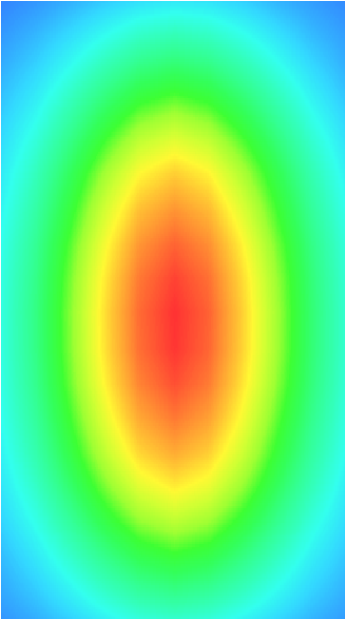
Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	5.221202
SAR 1g (W/Kg)	9.582560

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	11.2425	9.4123	8.0345	6.9125	6.3092	3.9460



3D screen shot	Hot spot position
	

# MEASUREMENT 9

## For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 21 seconds

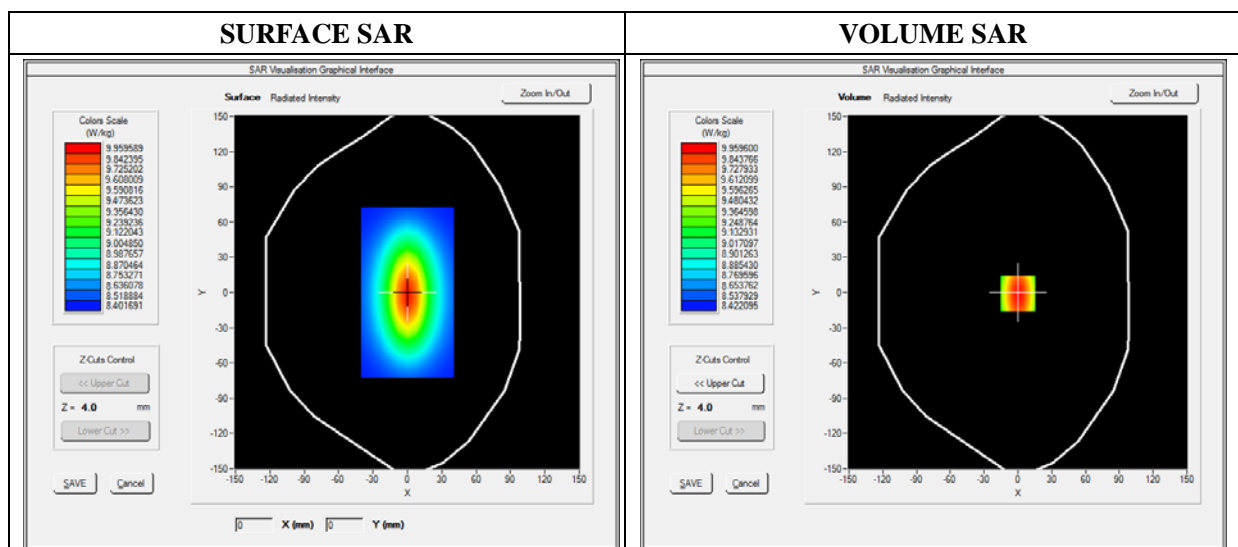
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW1900
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	1900.000000
<b>Relative Permittivity (real part)</b>	52.420415
<b>Conductivity (S/m)</b>	1.501966
<b>Power Variation (%)</b>	0.541872
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

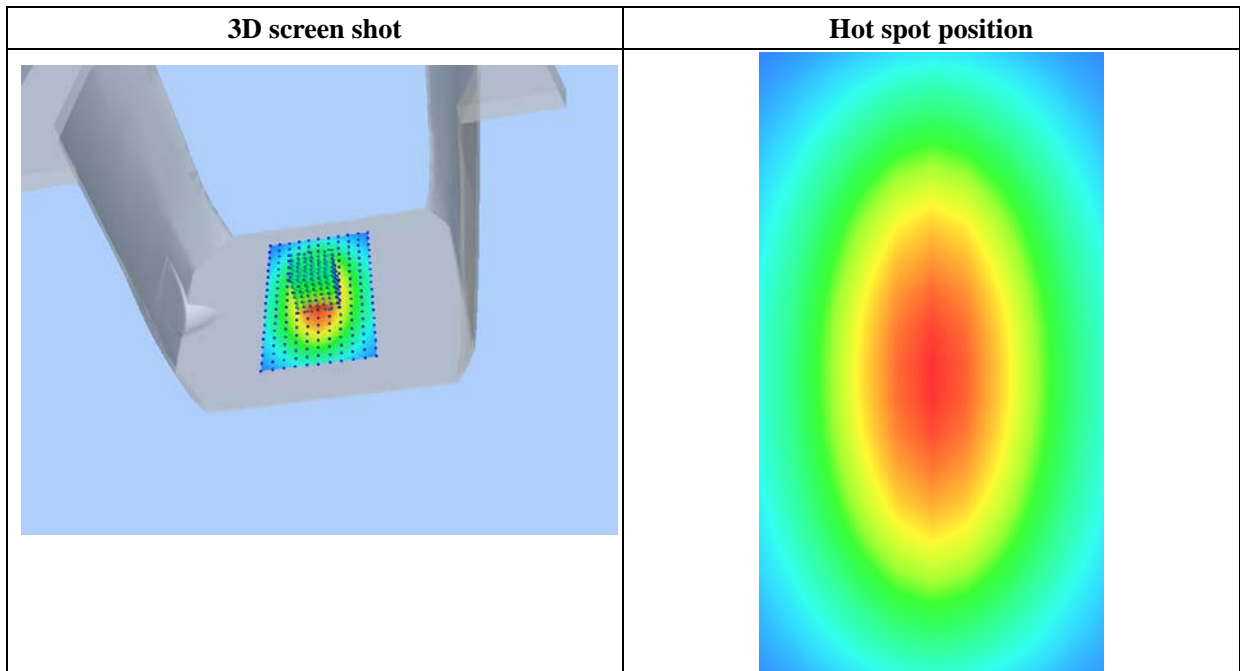
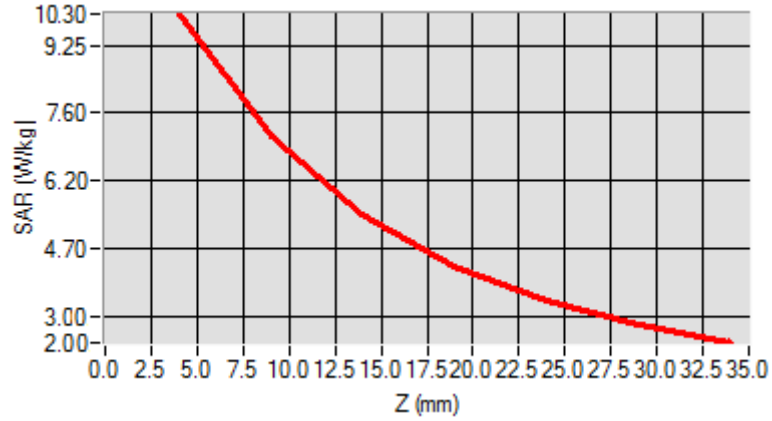


Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	5.134651
SAR 1g (W/Kg)	9.781550

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	10.2031	6.43001	4.9011	4.5325	3.1201	2.5024





# MEASUREMENT 10

**For Body Liquid**

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 21 seconds

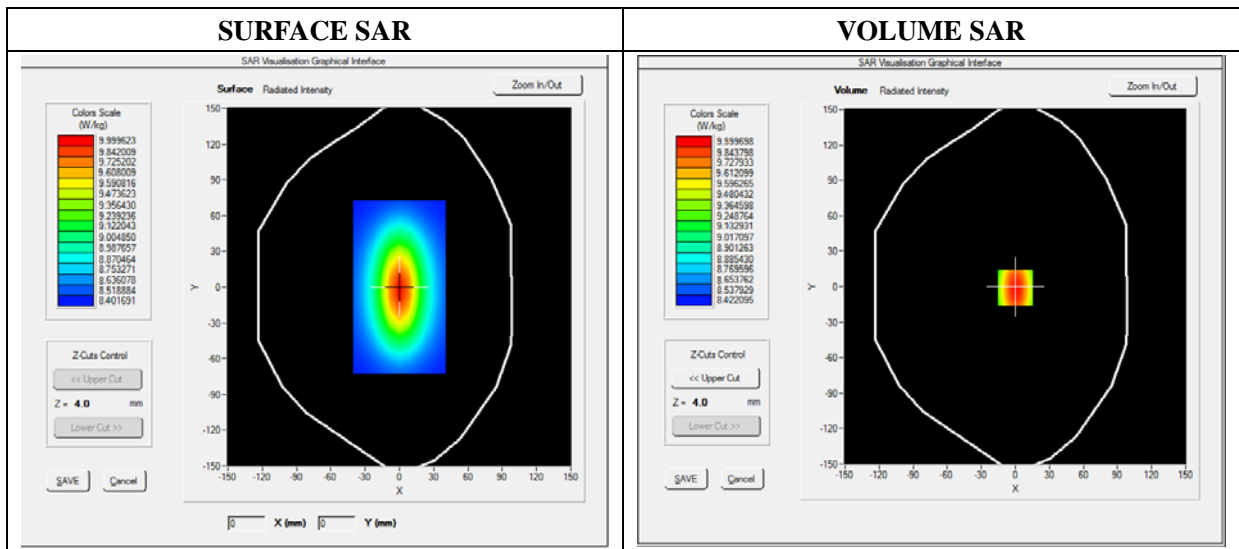
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 06/01/2016

**A. Experimental conditions**

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW2450
<b>Signal</b>	Duty Cycle 1:1

**B. SAR Measurement Results**

<b>Frequency (MHz)</b>	2450.000000
<b>Relative Permittivity (real part)</b>	52.010212
<b>Conductivity (S/m)</b>	1.910255
<b>Power Variation (%)</b>	1.369745
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

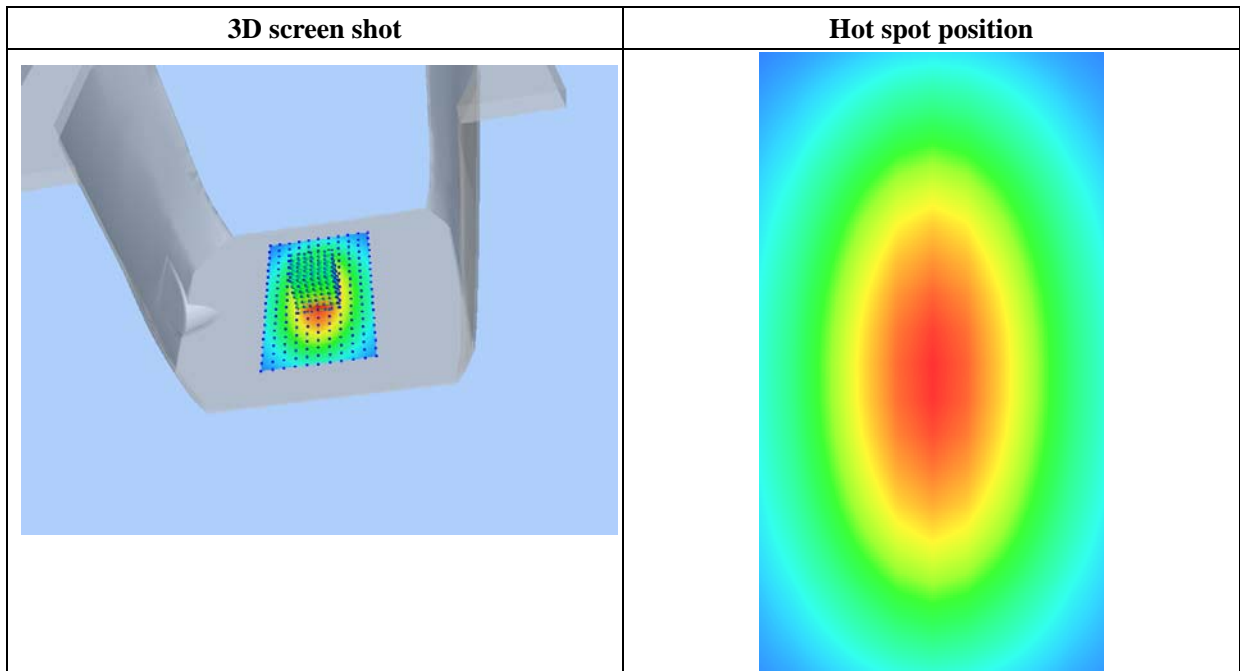
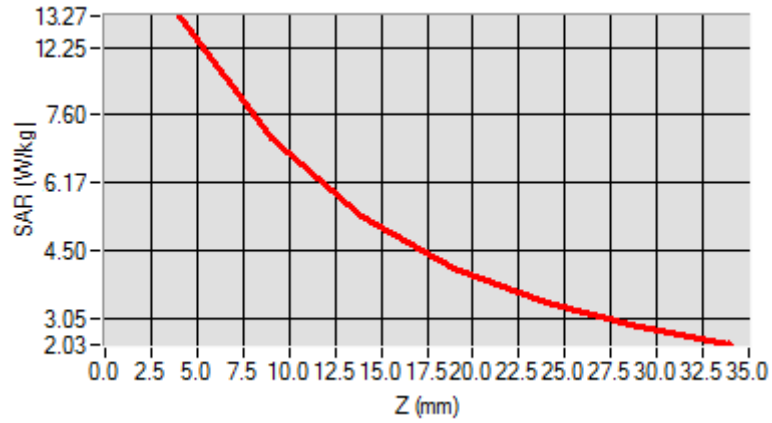


Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	7.119522
SAR 1g (W/Kg)	12.592360

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	13.3911	11.7951	9.2945	8.5400	6.3712	4.6225



## Annex B. Plots of SAR Measurement

<b><u>TYPE</u></b>	<b><u>BAND</u></b>	<b><u>PARAMETERS</u></b>
Phone	GSM850	<u>Measurement 3:</u> Left Head with Cheek device position on Middle Channel in GSM mode
Phone	GSM1900	<u>Measurement 5:</u> Right Head with Cheek device position on Low Channel in GSM mode
Phone	GPRS850_3TX	<u>Measurement 11:</u> Left Head with Cheek device position on Middle Channel in GPRS mode
Phone	GPRS1900_4TX	<u>Measurement 15:</u> Left Head with Cheek device position on Low Channel in GPRS mode
Phone	WCDMA1900_RMC	<u>Measurement 19:</u> Left Head with Cheek device position on Middle Channel in WCDMA mode
Phone	WCDMA850_RMC	<u>Measurement 21:</u> Right Head with Cheek device position on Low Channel in WCDMA mode
Phone	LTE Band 2_RMC	<u>Measurement 27:</u> Left Head with Cheek device position on High Channel in LTE QPSK 20MHz 1RB mode
Phone	LTE Band 4_RMC	<u>Measurement 33:</u> Right Head with Cheek device position on Low Channel in LTE QPSK 20MHz 1RB mode
Phone	LTE Band 7_RMC	<u>Measurement 43:</u> Left Head with Cheek device position on High Channel in LTE QPSK 20MHz 1RB mode
Phone	LTE Band 17_RMC	<u>Measurement 51:</u> Left Head with Cheek device position on Low Channel in LTE QPSK 10MHz 1RB mode
Phone	WiFi_802.11b	<u>Measurement 59:</u> Left Head with Cheek device position on Low Channel in 802.11b mode
Phone	GSM850	<u>Measurement 61:</u> Flat Plane with Back(Body-worn) device position on Middle Channel in GSM mode
Phone	GSM1900	<u>Measurement 64:</u> Flat Plane with Front(Body-worn) device position on Low Channel in GSM mode
Phone	GPRS850_3TX	<u>Measurement 65:</u> Flat Plane with Back device position on Middle Channel in GPRS mode
Phone	GPRS1900_4TX	<u>Measurement 73:</u> Flat Plane with Bottom device position on High Channel in GPRS mode
Phone	WCDMA1900_RMC	<u>Measurement 77:</u> Flat Plane with Bottom side device position on Middle Channel in WCDMA mode
Phone	WCDMA850_RMC	<u>Measurement 80:</u> Flat Plane with Front device position on Low Channel in WCDMA mode
Phone	LTE Band 2_RMC	<u>Measurement 87:</u> Flat Plane with Bottom device position on Middle Channel in LTE QPSK 20MHz 1RB mode
Phone	LTE Band 4_RMC	<u>Measurement 94:</u> Flat Plane with Back device position on Low Channel in LTE QPSK 20MHz 1RB mode

<b>Phone</b>	<b>LTE Band 7_RMC</b>	<u>Measurement 104:</u> Flat Plane with Back device position on Middle Channel in LTE QPSK 20MHz 1RB mode
<b>Phone</b>	<b>LTE Band 17_RMC</b>	<u>Measurement 113:</u> Flat Plane with Back device position on Low Channel in LTE QPSK 10MHz 1RB mode
<b>Phone</b>	<b>WiFi_802.11b</b>	<u>Measurement 122:</u> Flat Plane with Front side device position on Low Channel in 802.11b mode
<i>Remark: SAR plot is showed the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.</i>		

# MEASUREMENT 3

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 11 minutes 48 seconds

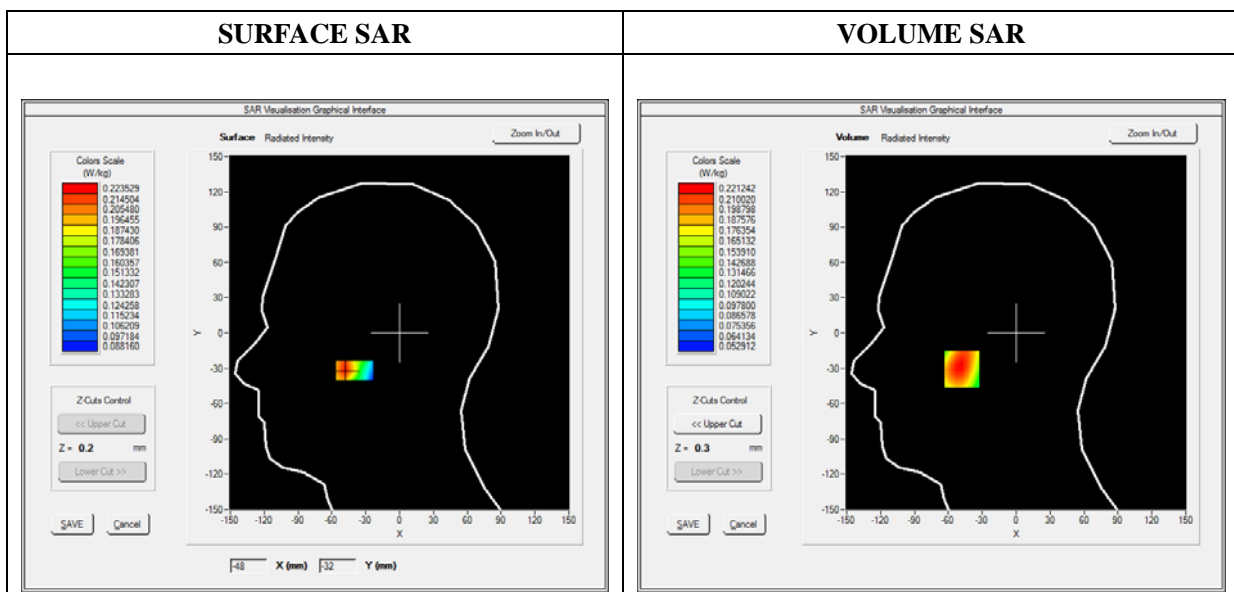
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2016

## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	GSM850
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

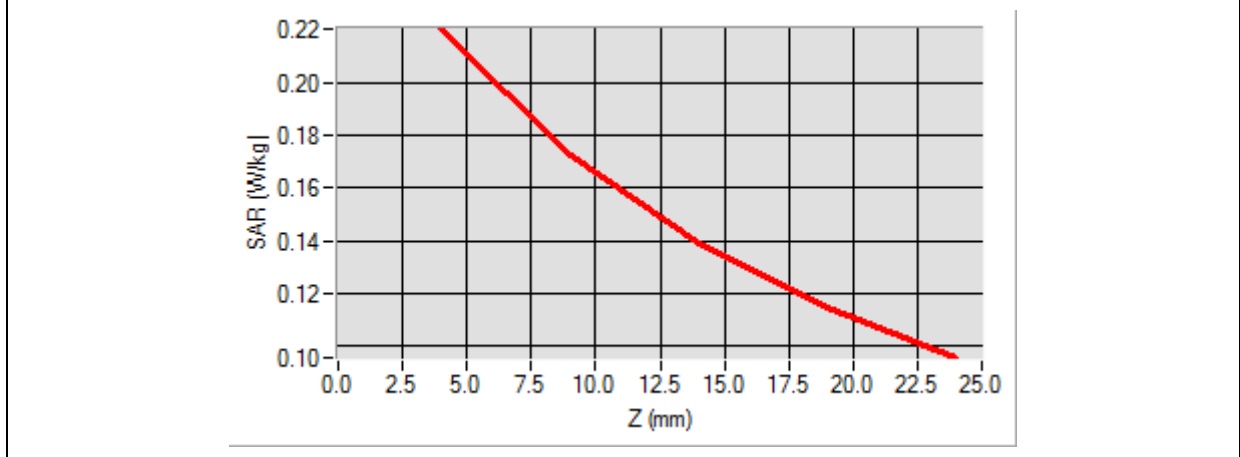
<b>Frequency (MHz)</b>	836.600000
<b>Relative Permittivity (real part)</b>	41.110245
<b>Conductivity (S/m)</b>	0.871245
<b>Power Variation (%)</b>	1.144536
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

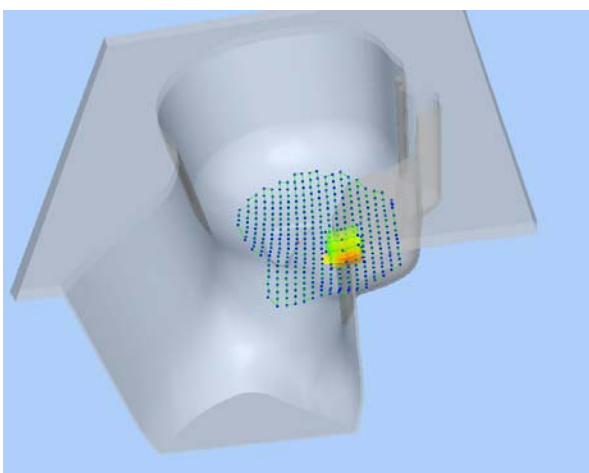
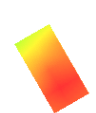


Maximum location: X=-48.00, Y=-31.00

SAR 10g (W/Kg)	0.158831
SAR 1g (W/Kg)	0.213064

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.2203	0.1727	0.1388	0.1147



3D screen shot	Hot spot position
	

# MEASUREMENT 5

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 11 minutes 48 seconds

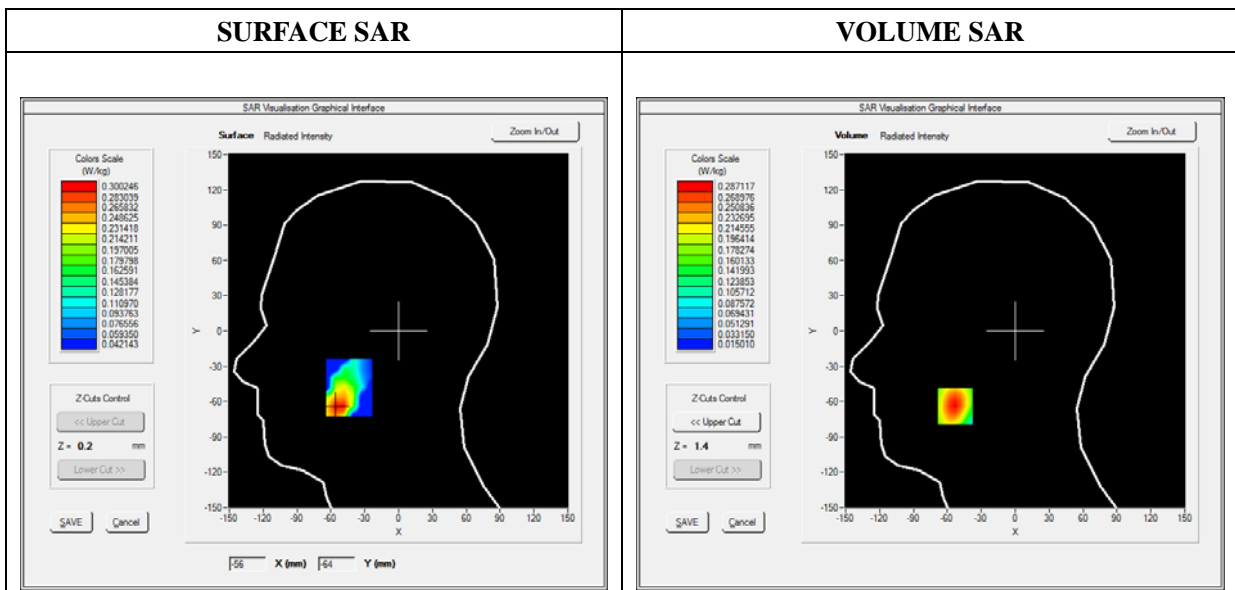
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Cheek
<b>Band</b>	GSM1900
<b>Channels</b>	Low
<b>Signal</b>	TDMA (Crest factor: 8.0)

### B. SAR Measurement Results

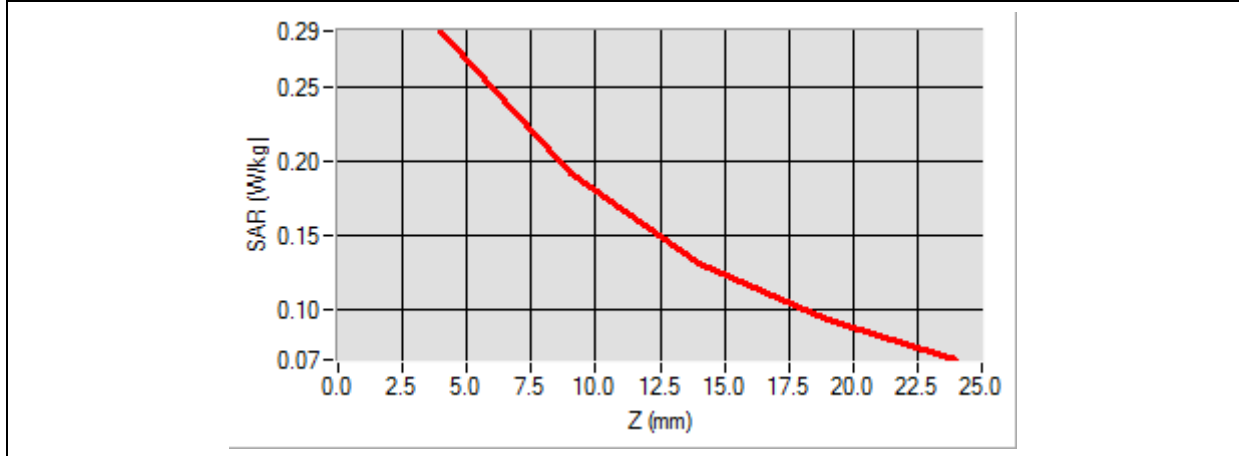
<b>Frequency (MHz)</b>	1850.200000
<b>Relative Permittivity (real part)</b>	38.560124
<b>Conductivity (S/m)</b>	1.380369
<b>Power Variation (%)</b>	1.442440
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

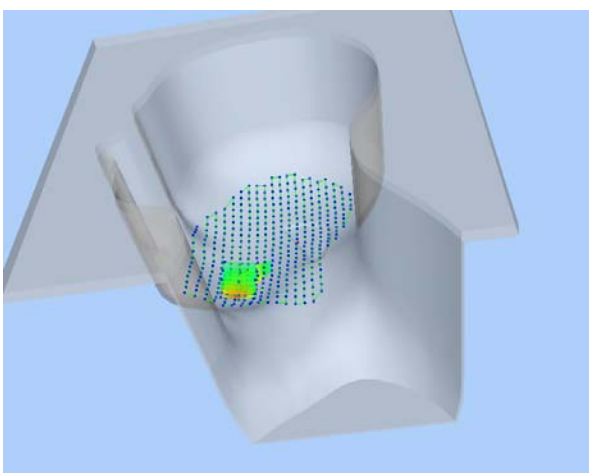
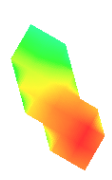


Maximum location: X=-53.00, Y=-64.00

SAR 10g (W/Kg)	0.167950
SAR 1g (W/Kg)	0.268727

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.2871	0.1915	0.1309	0.0933



3D screen shot	Hot spot position
	



# MEASUREMENT 11

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 11 minutes 48 seconds

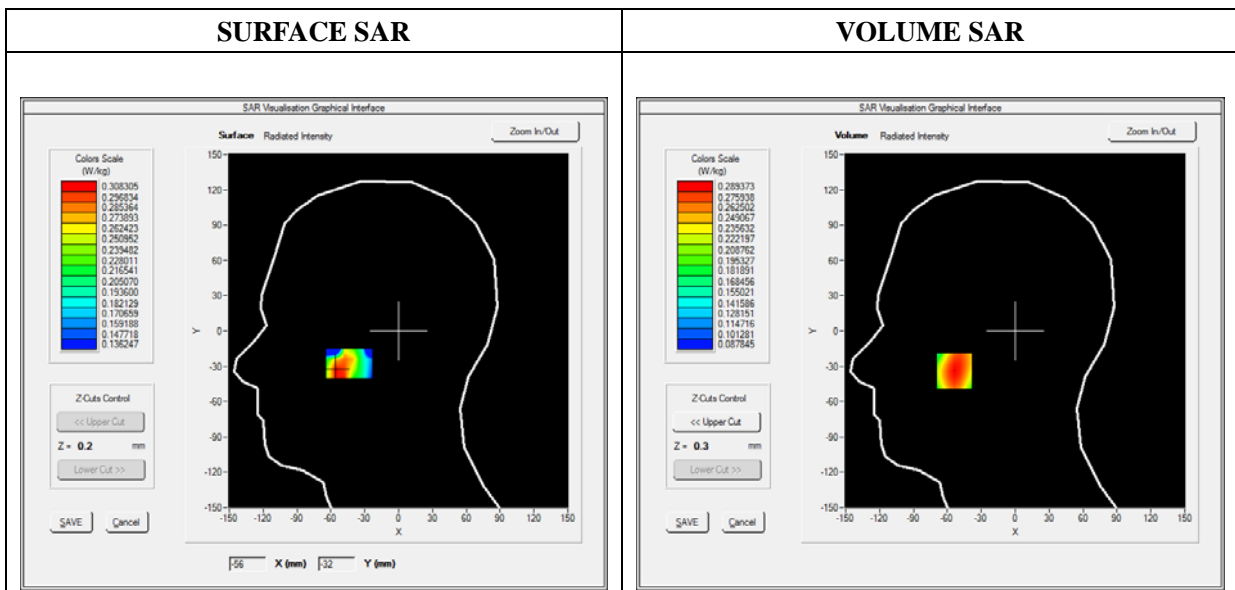
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	GPRS850_3TX
<b>Channels</b>	Middle
<b>Signal</b>	Duty Cycle: 1:2.66

### B. SAR Measurement Results

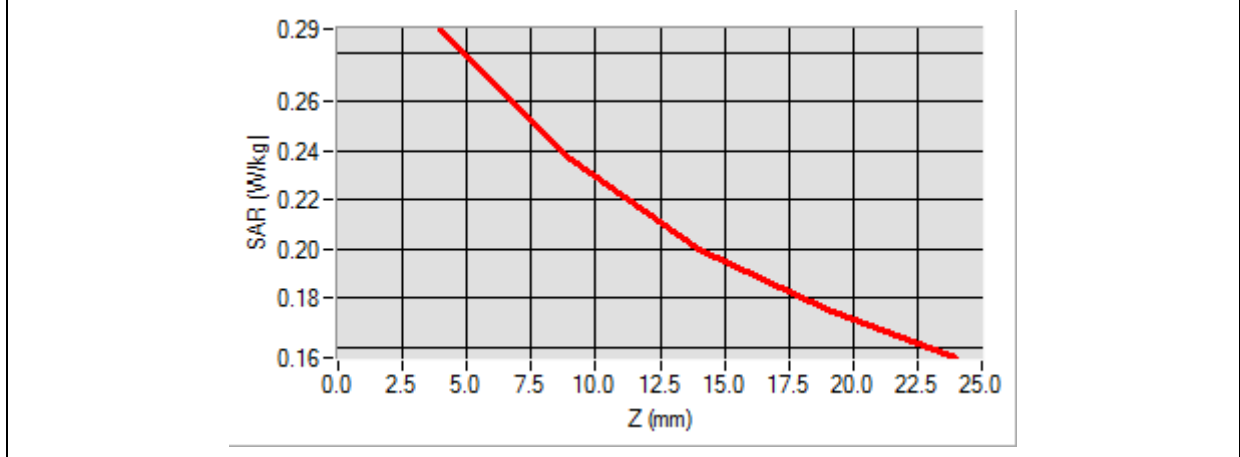
<b>Frequency (MHz)</b>	836.600000
<b>Relative Permittivity (real part)</b>	41.110245
<b>Conductivity (S/m)</b>	0.871245
<b>Power Variation (%)</b>	1.903833
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

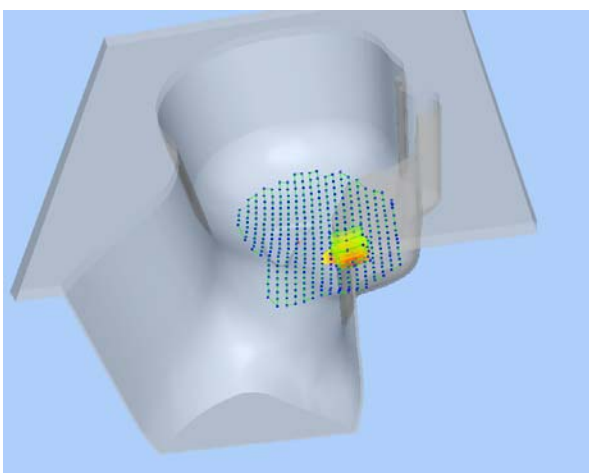
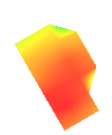


Maximum location: X=-54.00, Y=-34.00

SAR 10g (W/Kg)	0.218839
SAR 1g (W/Kg)	0.279674

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.2894	0.2367	0.2001	0.1751



3D screen shot	Hot spot position
	

# MEASUREMENT 15

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

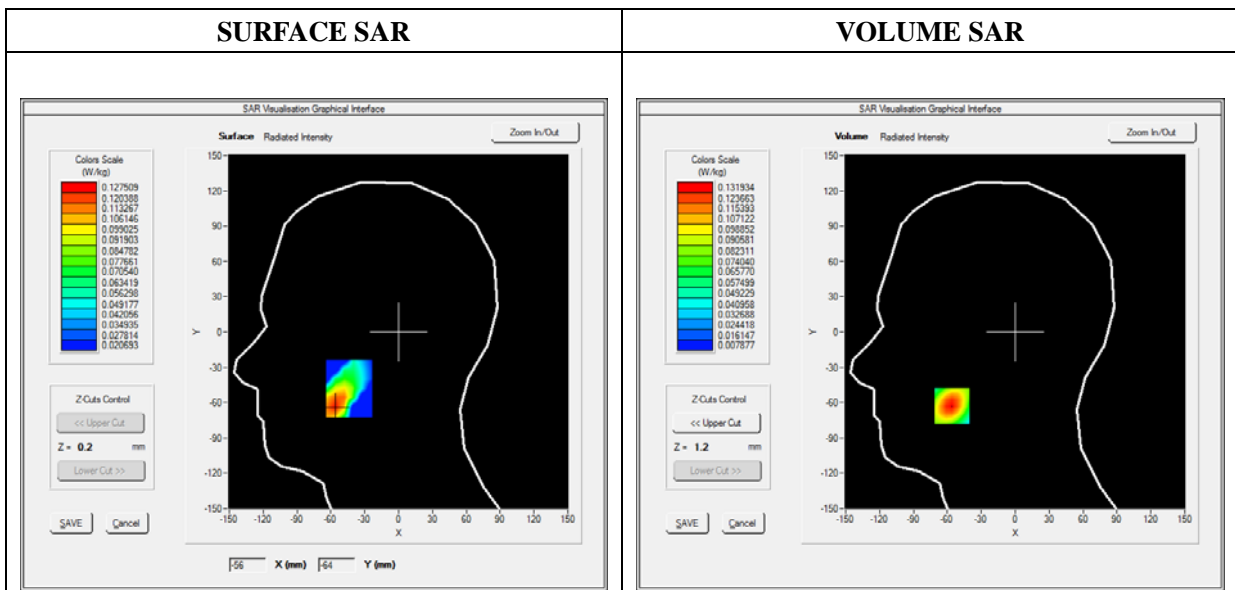
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	GPRS1900_4TX
<b>Channels</b>	Low
<b>Signal</b>	Duty Cycle: 1:2

### B. SAR Measurement Results

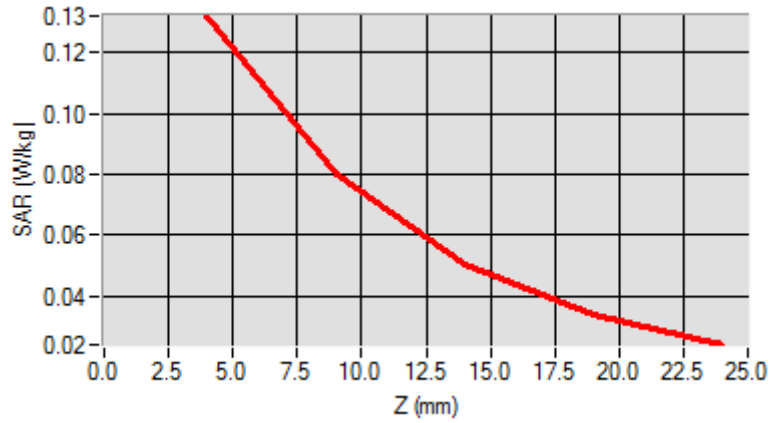
<b>Frequency (MHz)</b>	1850.200000
<b>Relative Permittivity (real part)</b>	38.560124
<b>Conductivity (S/m)</b>	1.380369
<b>Power Variation (%)</b>	1.536272
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

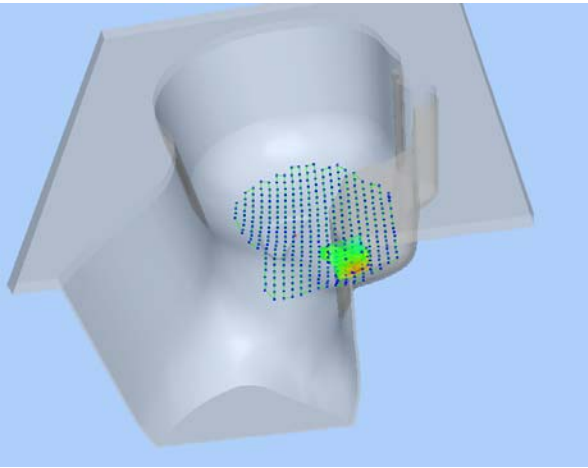
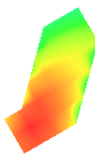


Maximum location: X=-56.00, Y=-63.00

SAR 10g (W/Kg)	0.072192
SAR 1g (W/Kg)	0.122853

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.1319	0.0797	0.0501	0.0341



3D screen shot	Hot spot position
	

# MEASUREMENT 19

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

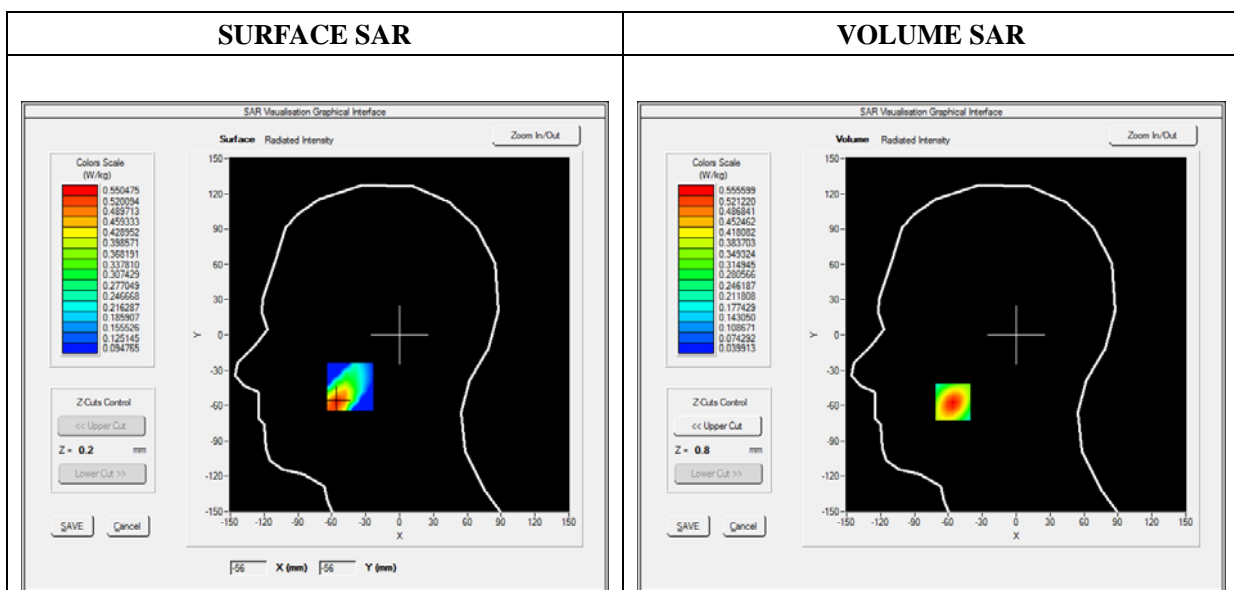
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2016

## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	WCDMA1900_RMC
<b>Channels</b>	Middle
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

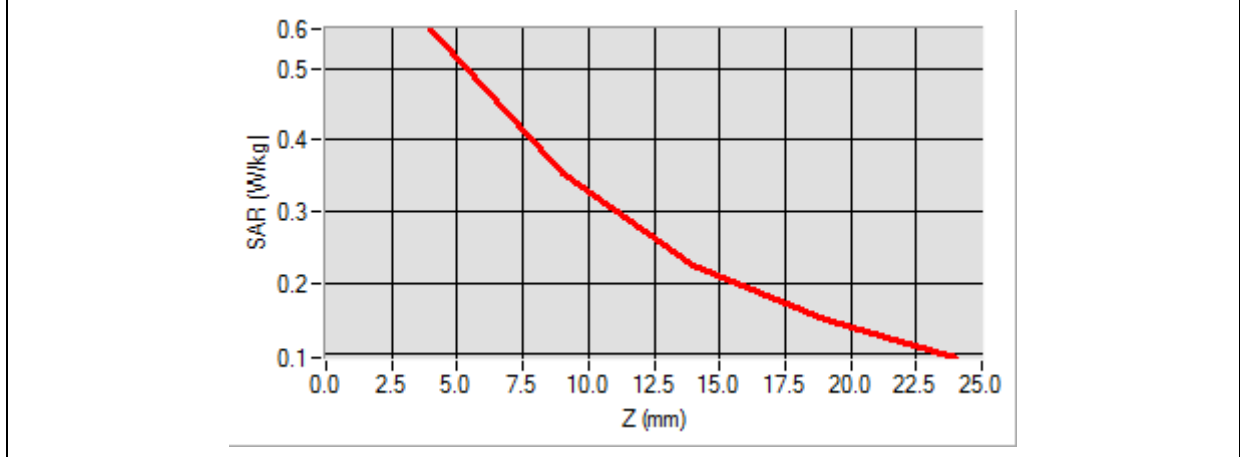
<b>Frequency (MHz)</b>	1880.000000
<b>Relative Permittivity (real part)</b>	38.560124
<b>Conductivity (S/m)</b>	1.380369
<b>Power Variation (%)</b>	1.524540
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

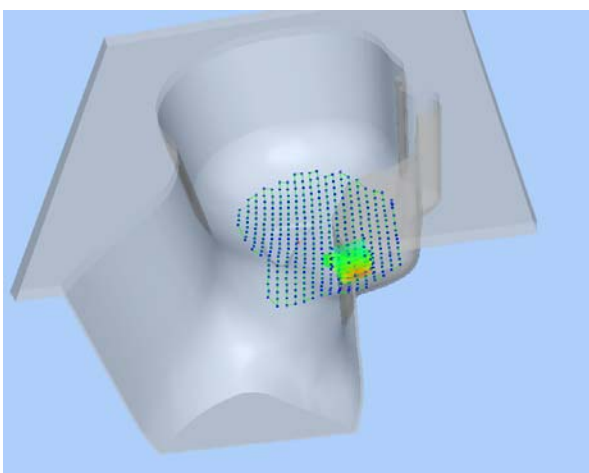
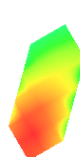


Maximum location: X=-56.00, Y=-57.00

SAR 10g (W/Kg)	0.305235
SAR 1g (W/Kg)	0.514200

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.5556	0.3523	0.2256	0.1481



3D screen shot	Hot spot position
	

# MEASUREMENT 21

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

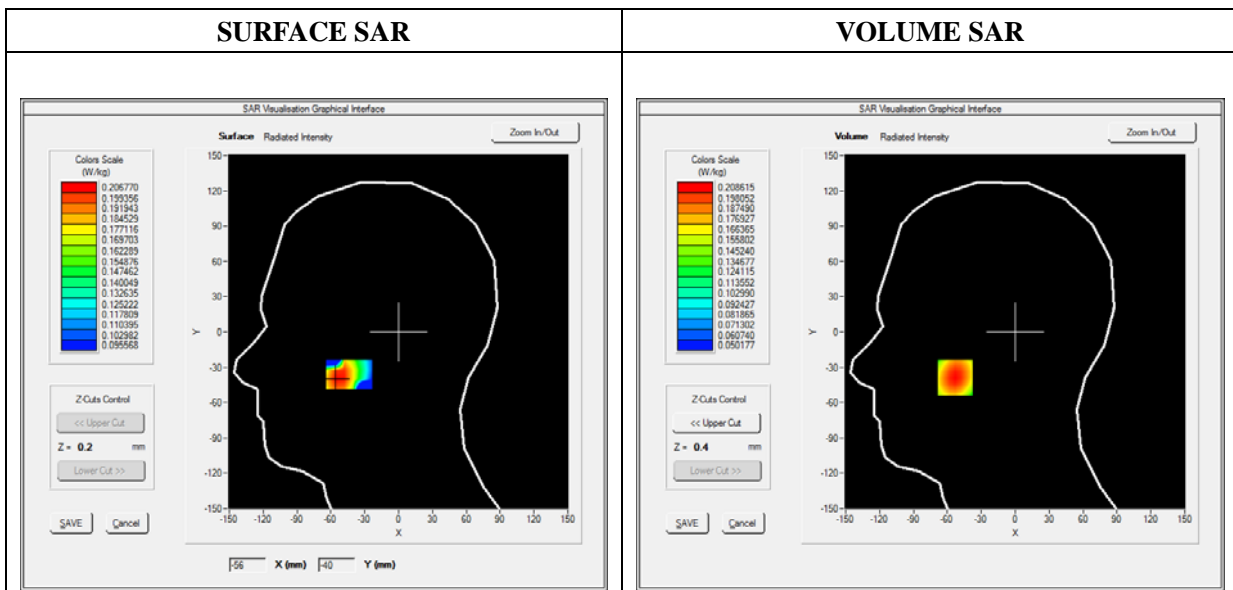
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Cheek
<b>Band</b>	WCDMA850_RMC
<b>Channels</b>	Low
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

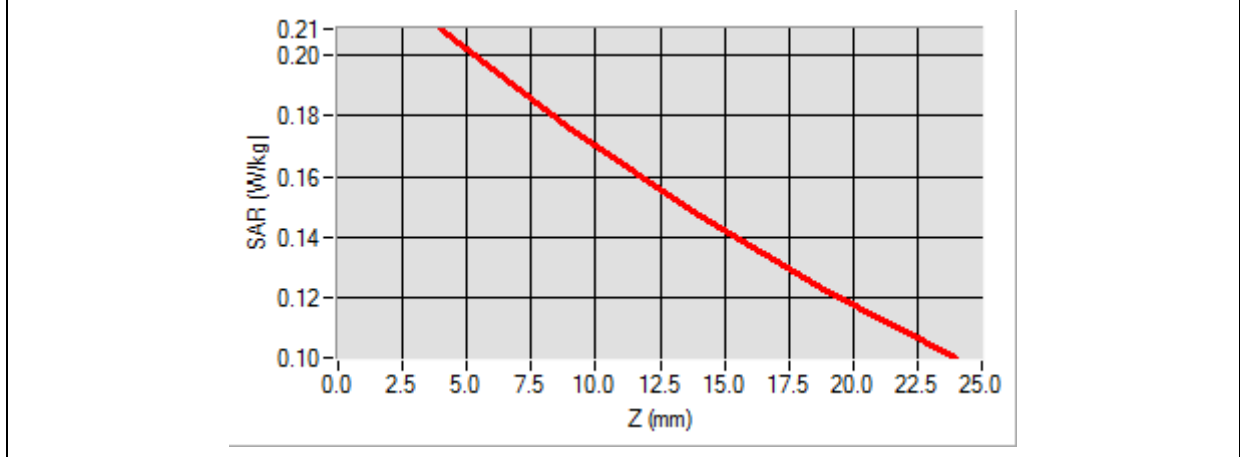
<b>Frequency (MHz)</b>	826.400000
<b>Relative Permittivity (real part)</b>	41.110245
<b>Conductivity (S/m)</b>	0.871245
<b>Power Variation (%)</b>	1.342427
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

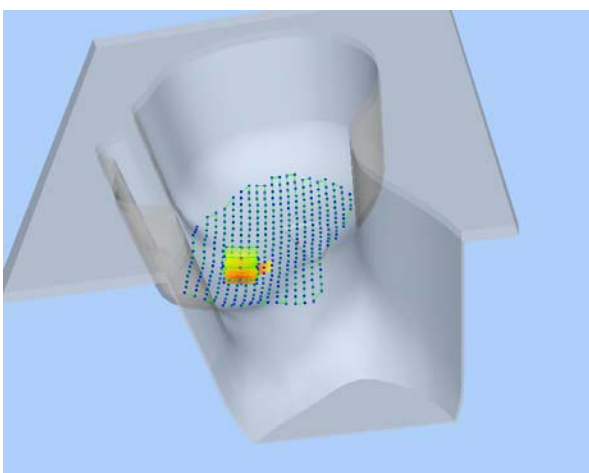



Maximum location: X=-53.00, Y=-39.00

SAR 10g (W/Kg)	0.156650
SAR 1g (W/Kg)	0.200185

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.2086	0.1756	0.1471	0.1224



3D screen shot	Hot spot position
	



# MEASUREMENT 27

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

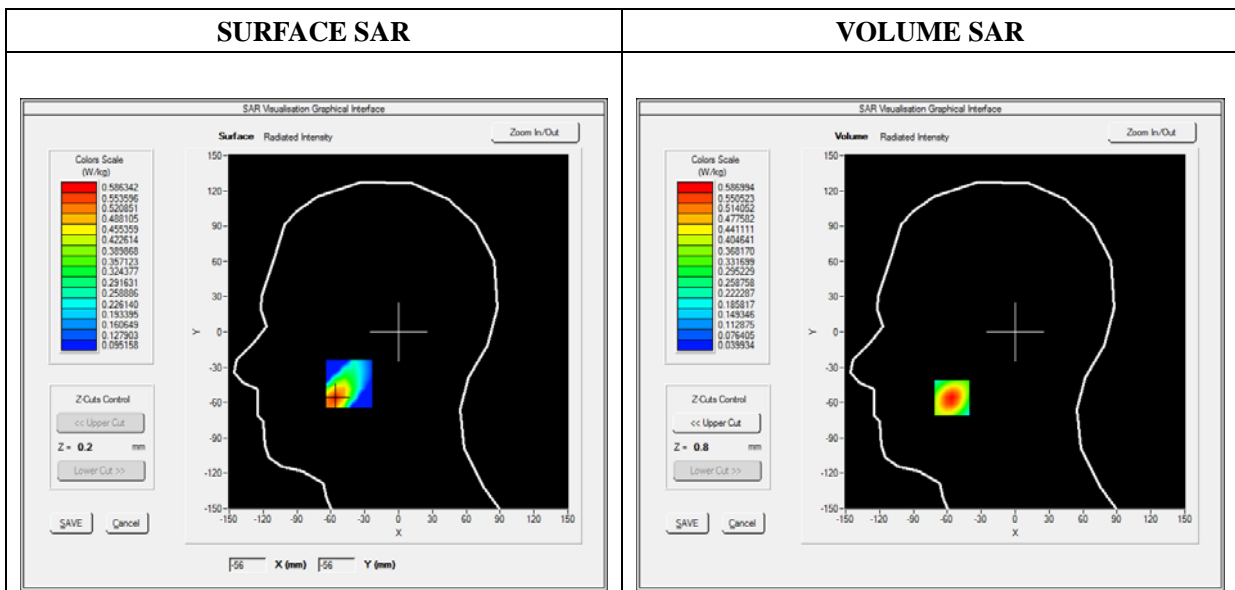
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	LTE Band 2_RMC
<b>Channels</b>	QPSK, 20MHz, 1RB, High
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

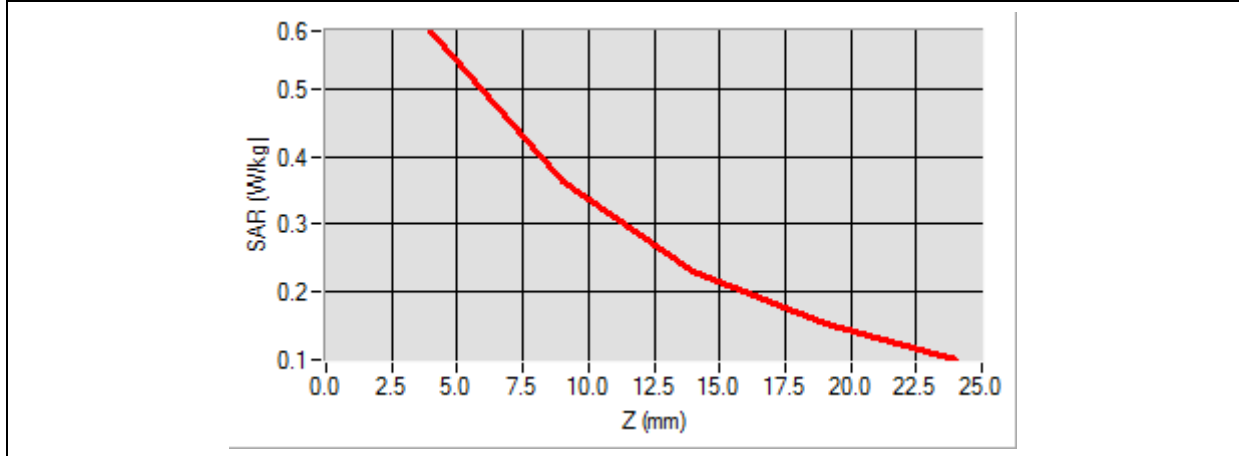
<b>Frequency (MHz)</b>	1900.000000
<b>Relative Permittivity (real part)</b>	38.560124
<b>Conductivity (S/m)</b>	1.380369
<b>Power Variation (%)</b>	1.743564
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

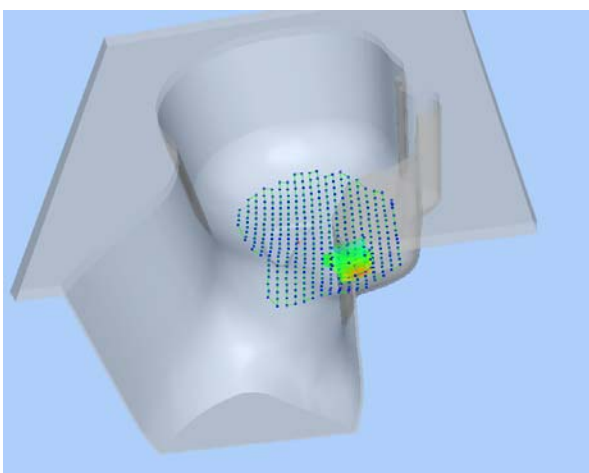
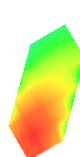


Maximum location: X=-56.00, Y=-56.00

SAR 10g (W/Kg)	0.315616
SAR 1g (W/Kg)	0.541446

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.5870	0.3651	0.2308	0.1515



3D screen shot	Hot spot position
	

## MEASUREMENT 33

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

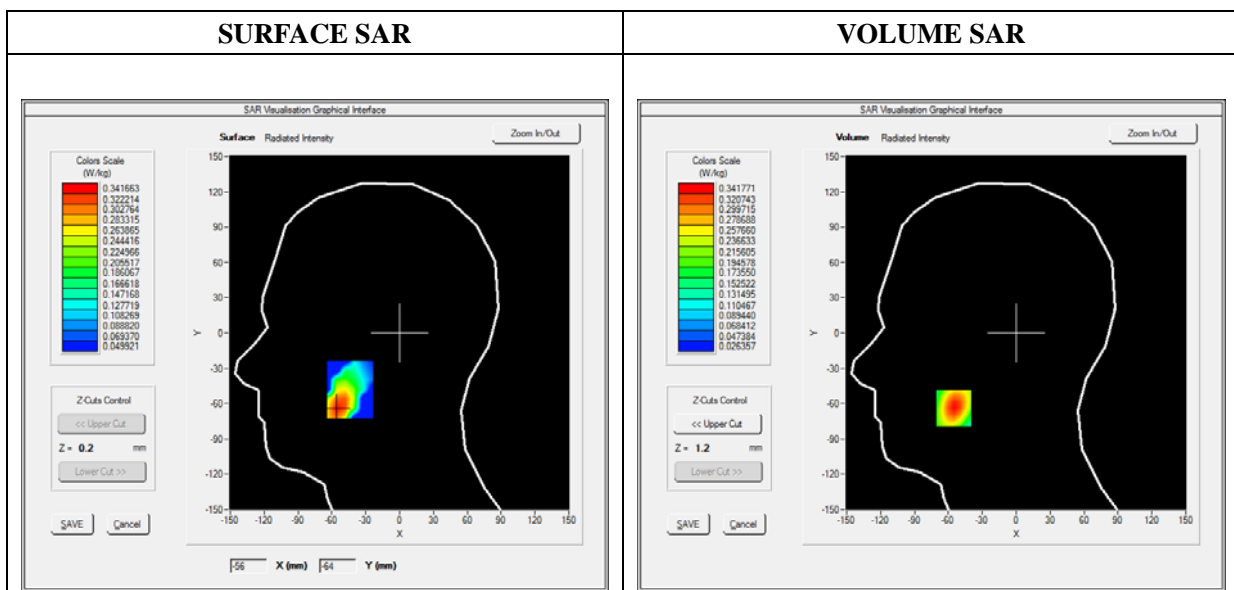
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Cheek
<b>Band</b>	LTE Band 4_RMC
<b>Channels</b>	QPSK, 20MHz, 1RB, Low
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

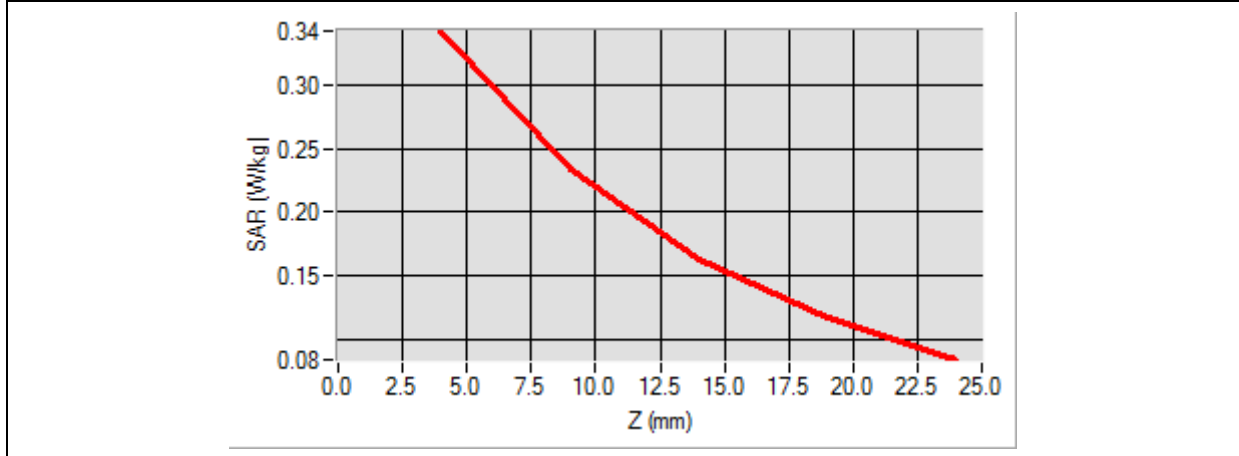
<b>Frequency (MHz)</b>	1720.000000
<b>Relative Permittivity (real part)</b>	39.024890
<b>Conductivity (S/m)</b>	1.371250
<b>Power Variation (%)</b>	1.374628
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

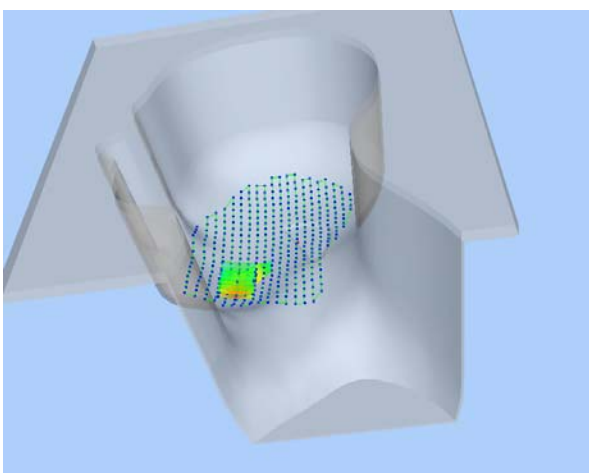
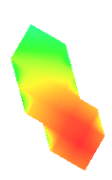


Maximum location: X=-55.00, Y=-64.00

SAR 10g (W/Kg)	0.202536
SAR 1g (W/Kg)	0.319479

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.3418	0.2341	0.1635	0.1178



3D screen shot	Hot spot position
	

# MEASUREMENT 43

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

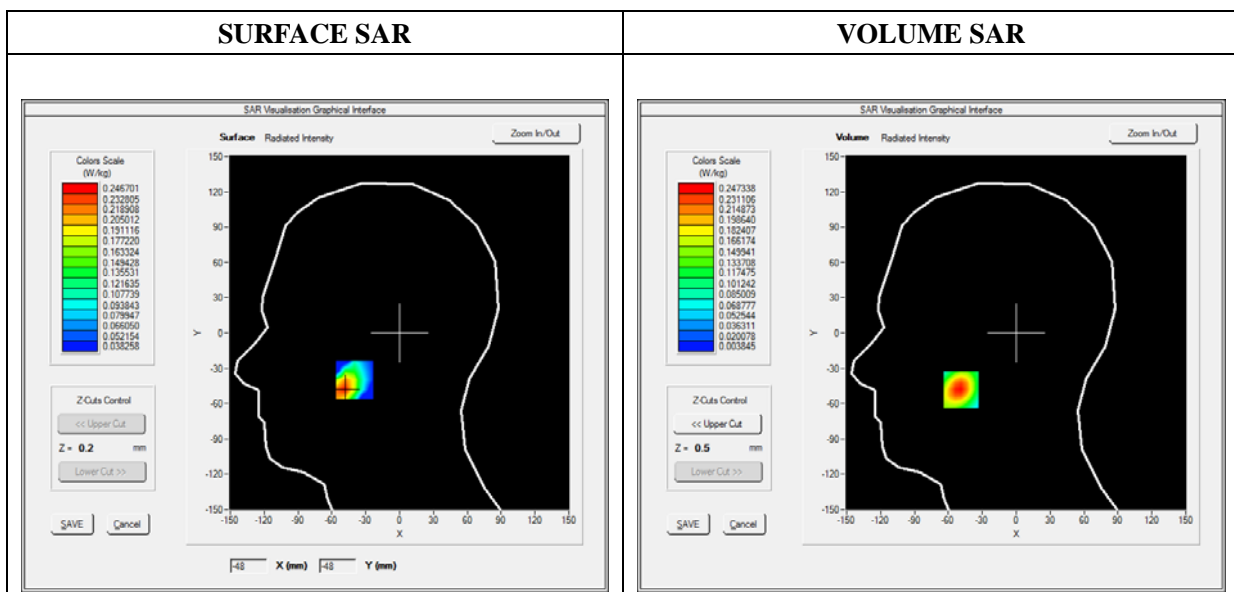
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.64; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	LTE Band 7_RMC
<b>Channels</b>	QPSK, 20MHz, 1RB, High
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

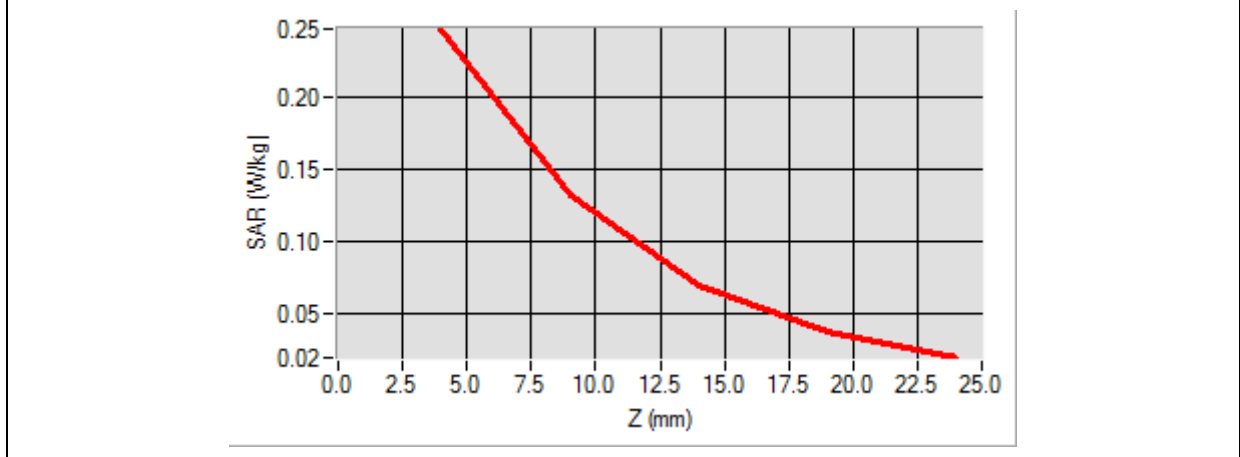
<b>Frequency (MHz)</b>	2560.000000
<b>Relative Permittivity (real part)</b>	38.153660
<b>Conductivity (S/m)</b>	1.740236
<b>Power Variation (%)</b>	0.924535
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

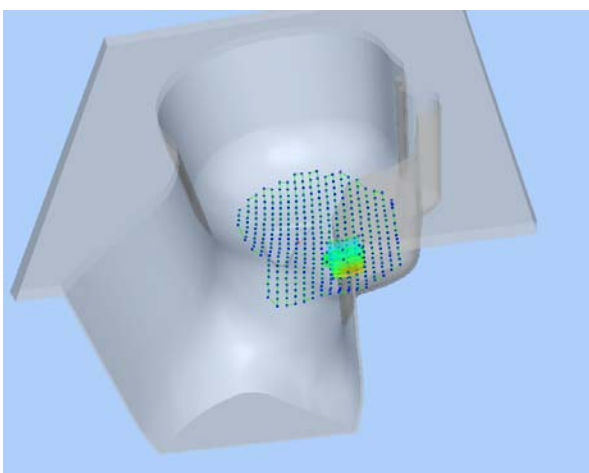
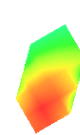


Maximum location: X=-49.00, Y=-48.00

SAR 10g (W/Kg)	0.117837
SAR 1g (W/Kg)	0.228083

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.2473	0.1312	0.0687	0.0369



3D screen shot	Hot spot position
	

# MEASUREMENT 51

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

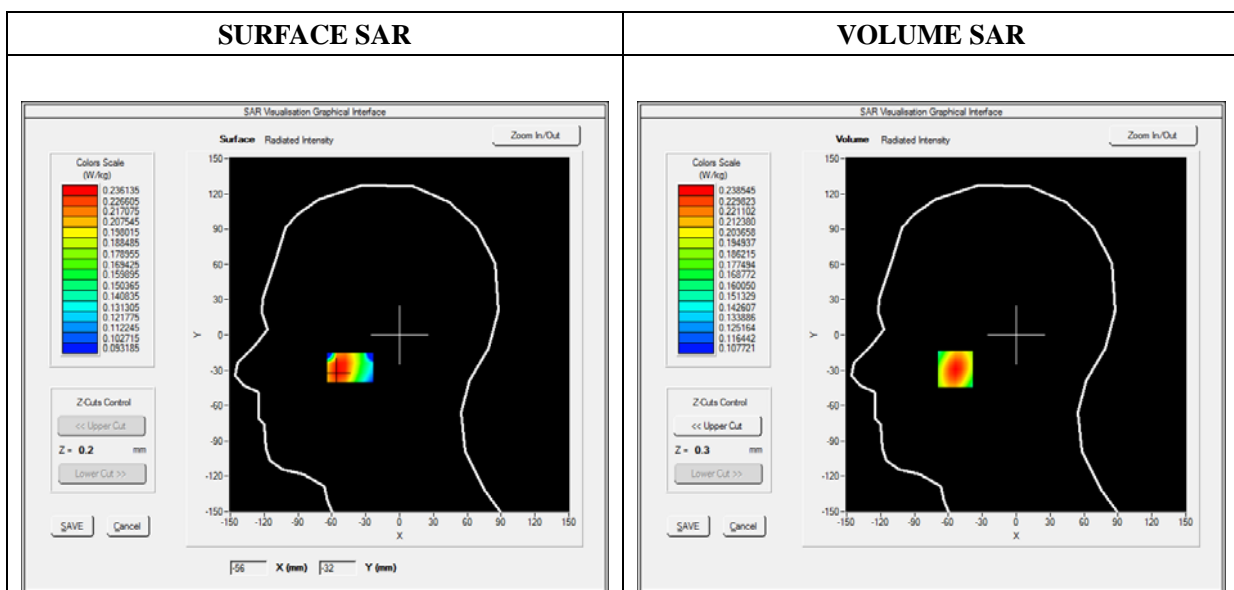
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.99; Calibrated: 06/01/2016

## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	LTE Band 17_RMC
<b>Channels</b>	QPSK, 10MHz, Low
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

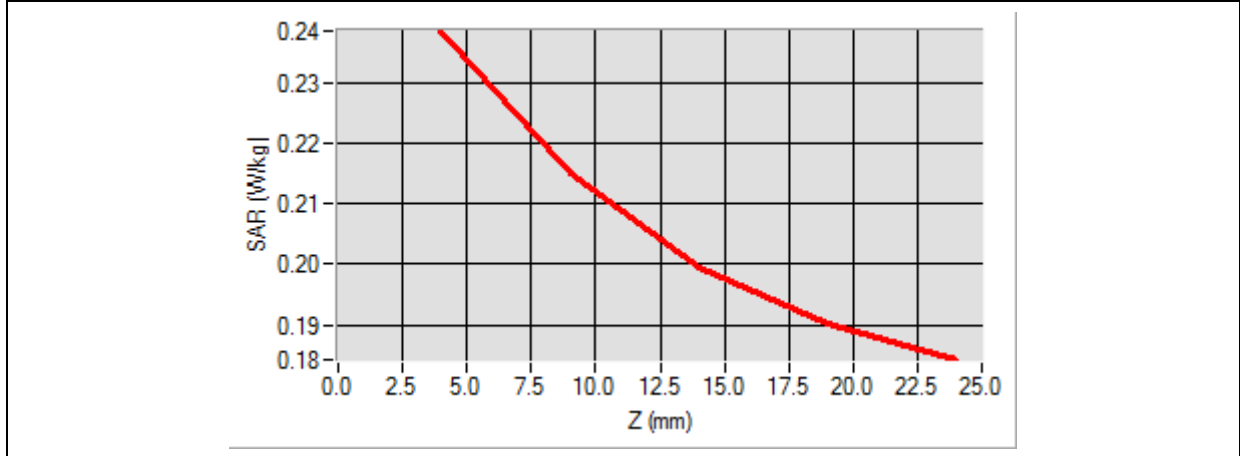
<b>Frequency (MHz)</b>	709.000000
<b>Relative Permittivity (real part)</b>	41.320574
<b>Conductivity (S/m)</b>	0.862373
<b>Power Variation (%)</b>	1.422112
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

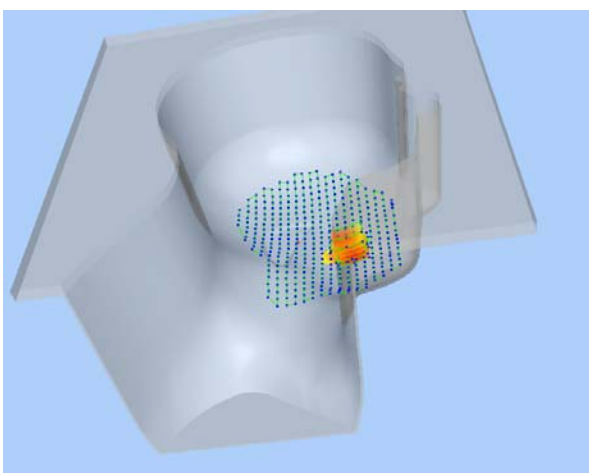
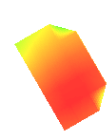


Maximum location: X=-54.00, Y=-29.00

SAR 10g (W/Kg)	0.203421
SAR 1g (W/Kg)	0.231724

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.2385	0.2149	0.1994	0.1903



3D screen shot	Hot spot position
	



# MEASUREMENT 59

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

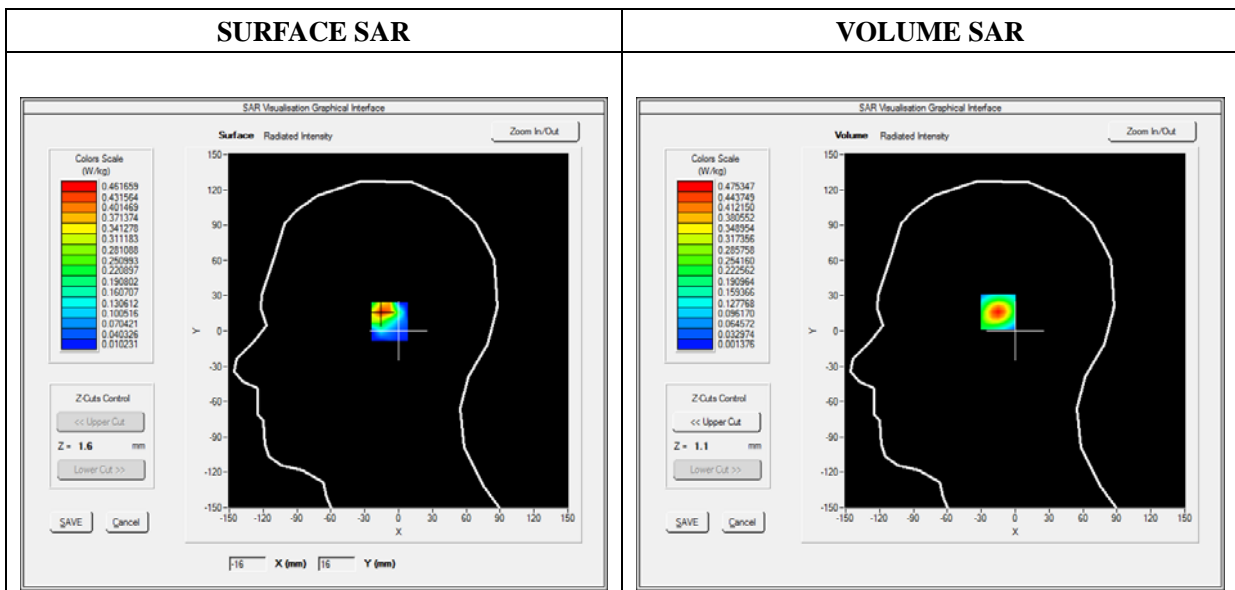
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.64; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	WiFi_802.11b
<b>Channels</b>	Low
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

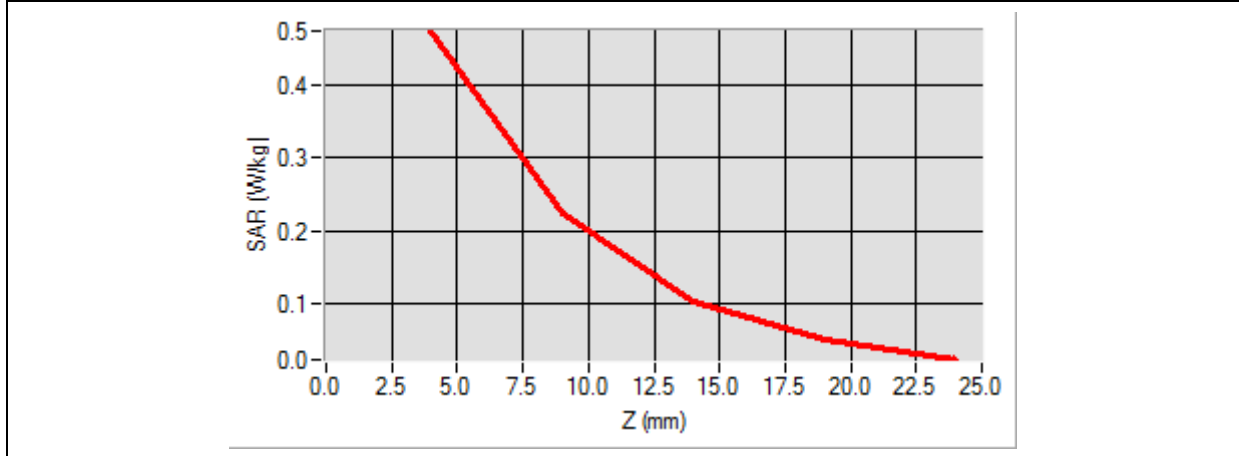
<b>Frequency (MHz)</b>	2412.000000
<b>Relative Permittivity (real part)</b>	38.153660
<b>Conductivity (S/m)</b>	1.740236
<b>Power Variation (%)</b>	3.234772
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

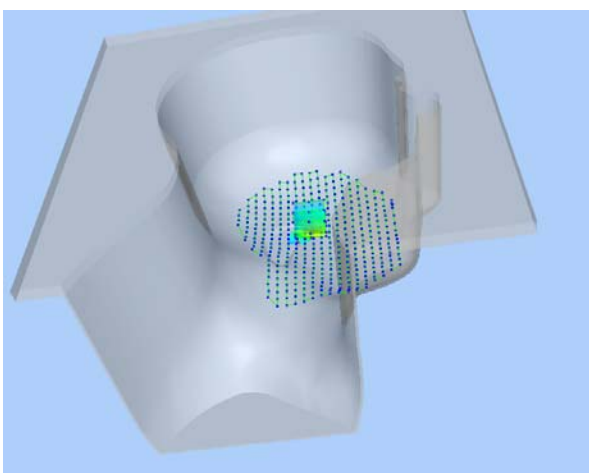
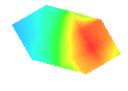


Maximum location: X=-14.00, Y=17.00

SAR 10g (W/Kg)	0.192413
SAR 1g (W/Kg)	0.422385

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.4753	0.2236	0.1023	0.0489



<p><b>3D screen shot</b></p>	<p><b>Hot spot position</b></p>
	

# MEASUREMENT 61

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

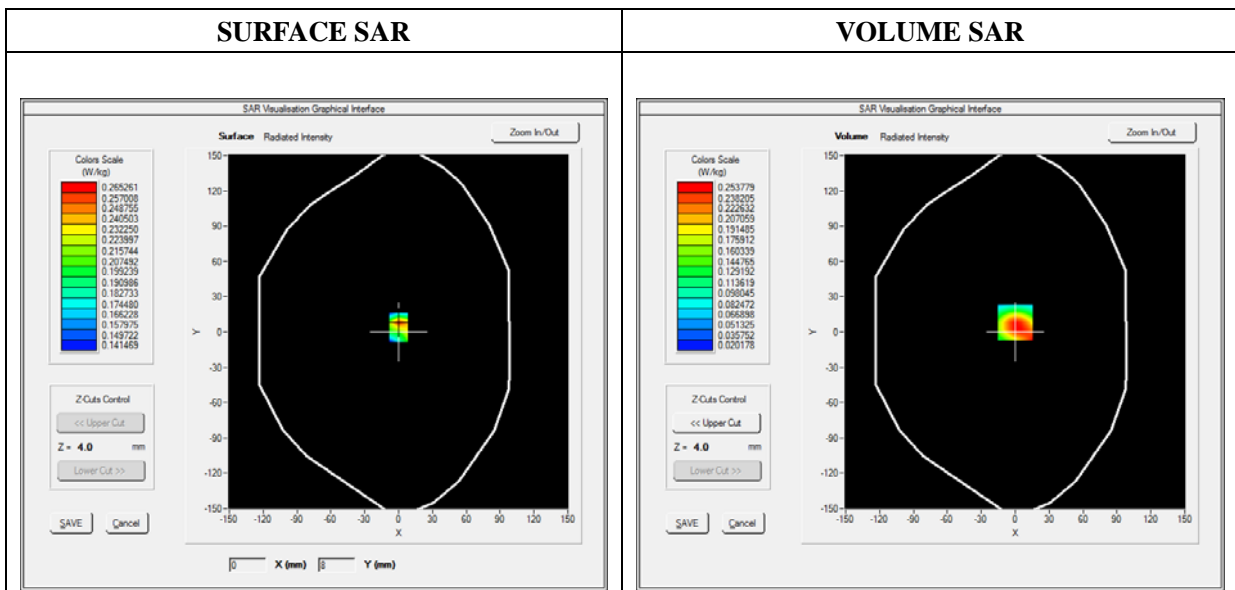
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Back(Body-worn)
<b>Band</b>	GSM850
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

### B. SAR Measurement Results

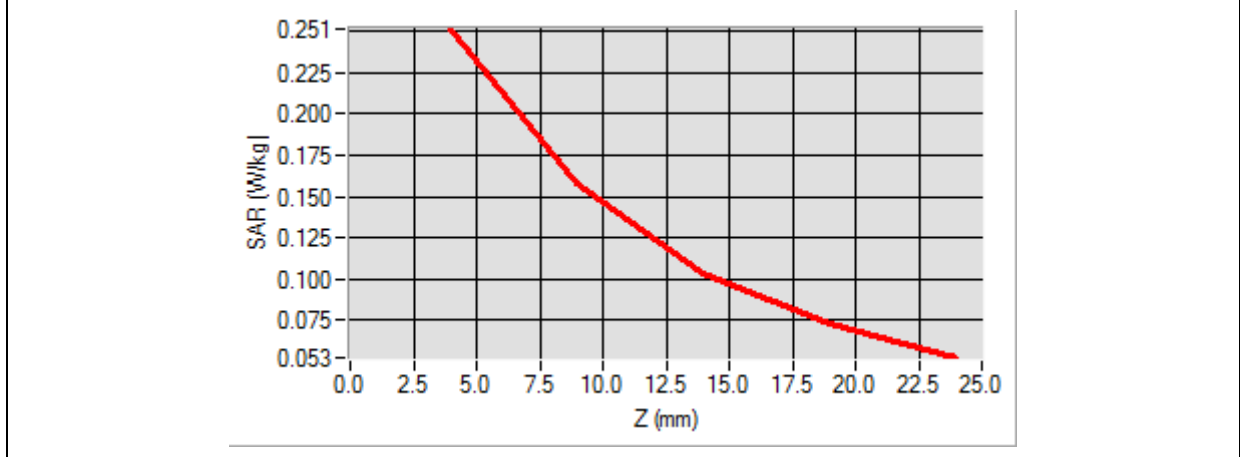
<b>Frequency (MHz)</b>	836.600000
<b>Relative Permittivity (real part)</b>	54.851214
<b>Conductivity (S/m)</b>	0.951454
<b>Power Variation (%)</b>	0.901472
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

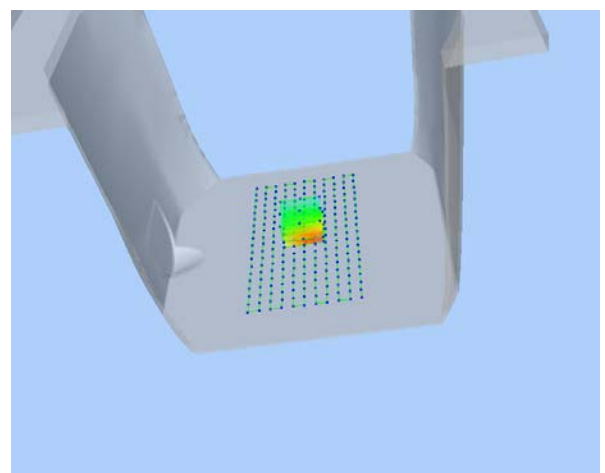



Maximum location: X=0.00, Y=8.00

SAR 10g (W/Kg)	0.164198
SAR 1g (W/Kg)	0.261109

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.2514	0.1582	0.1035	0.0727



3D screen shot	Hot spot position
	

# MEASUREMENT 64

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

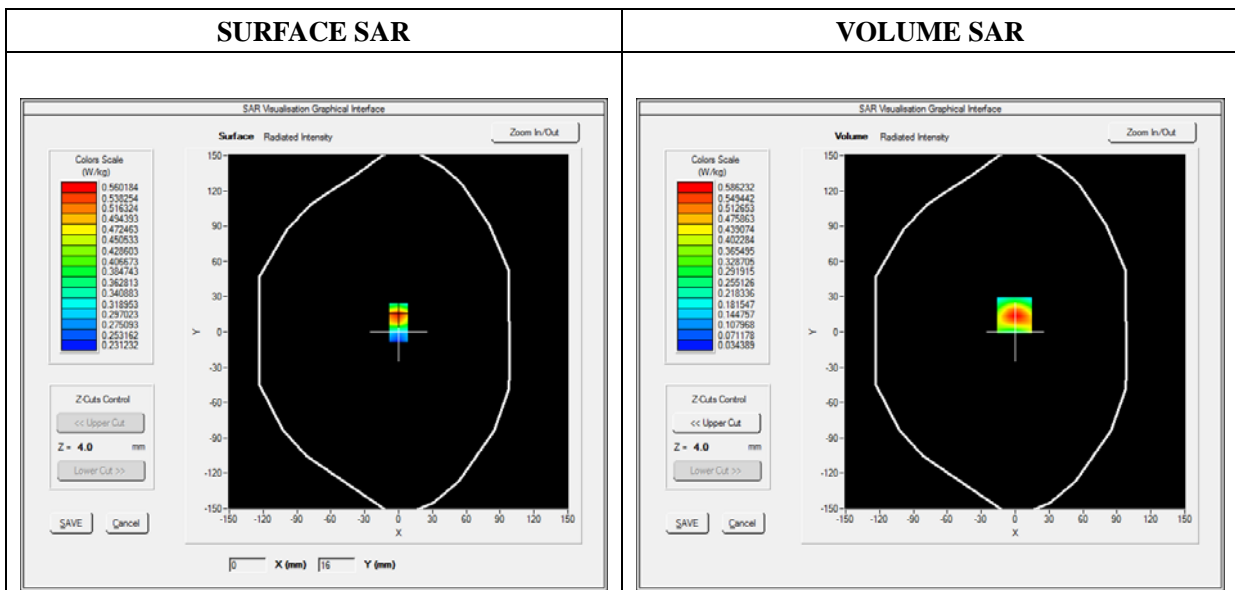
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Front(Body-worn)
<b>Band</b>	GSM1900
<b>Channels</b>	Low
<b>Signal</b>	TDMA (Crest factor: 8.0)

### B. SAR Measurement Results

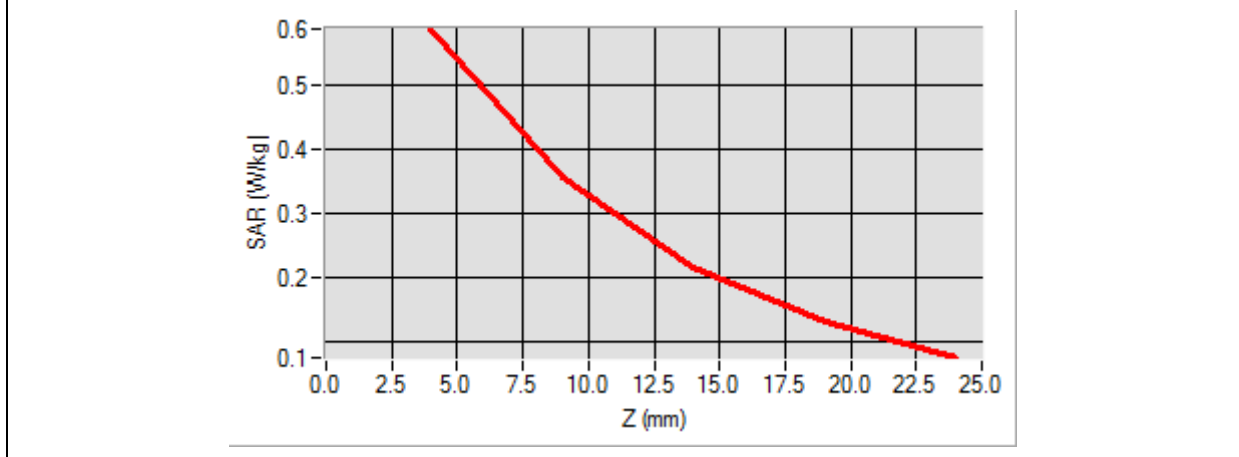
<b>Frequency (MHz)</b>	1850.200000
<b>Relative Permittivity (real part)</b>	52.420415
<b>Conductivity (S/m)</b>	1.501966
<b>Power Variation (%)</b>	1.474622
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

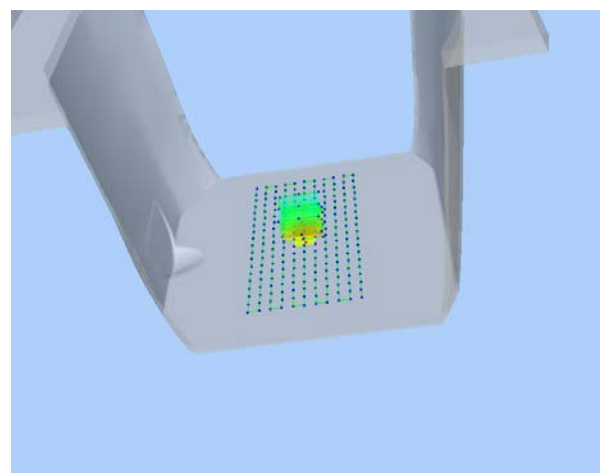



Maximum location: X=-1.00, Y=14.00

SAR 10g (W/Kg)	0.366188
SAR 1g (W/Kg)	0.653250

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.5862	0.3570	0.2159	0.1311



3D screen shot	Hot spot position
	

# MEASUREMENT 65

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

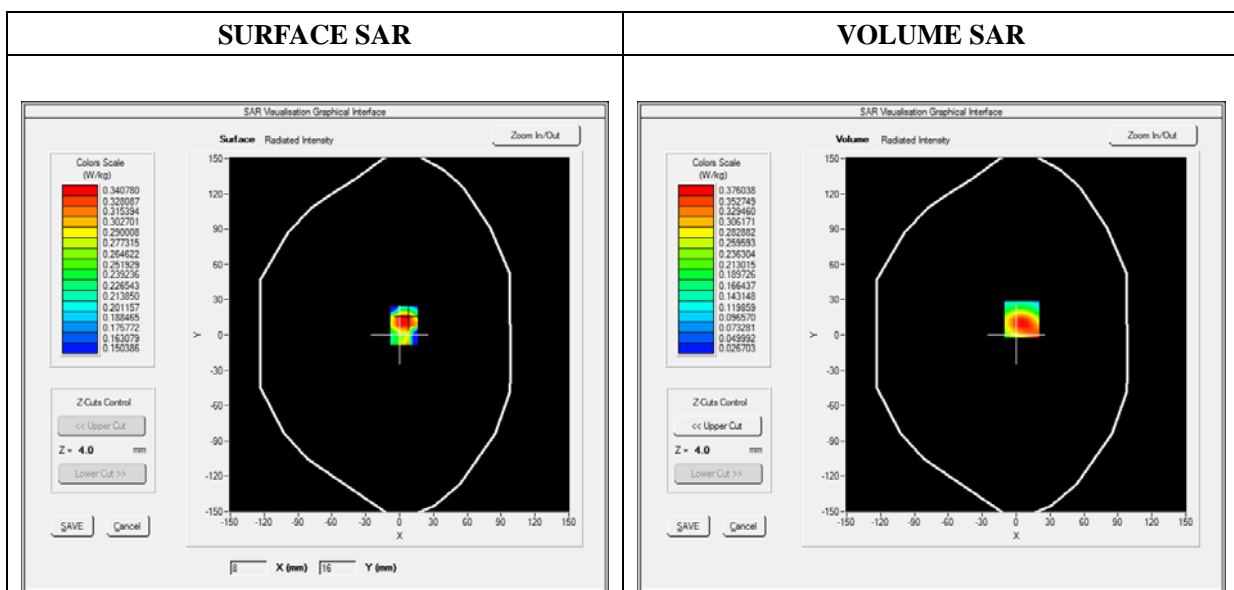
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2016

## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Back
<b>Band</b>	GPRS850_3TX
<b>Channels</b>	Middle
<b>Signal</b>	Duty Cycle: 1:2.66

## B. SAR Measurement Results

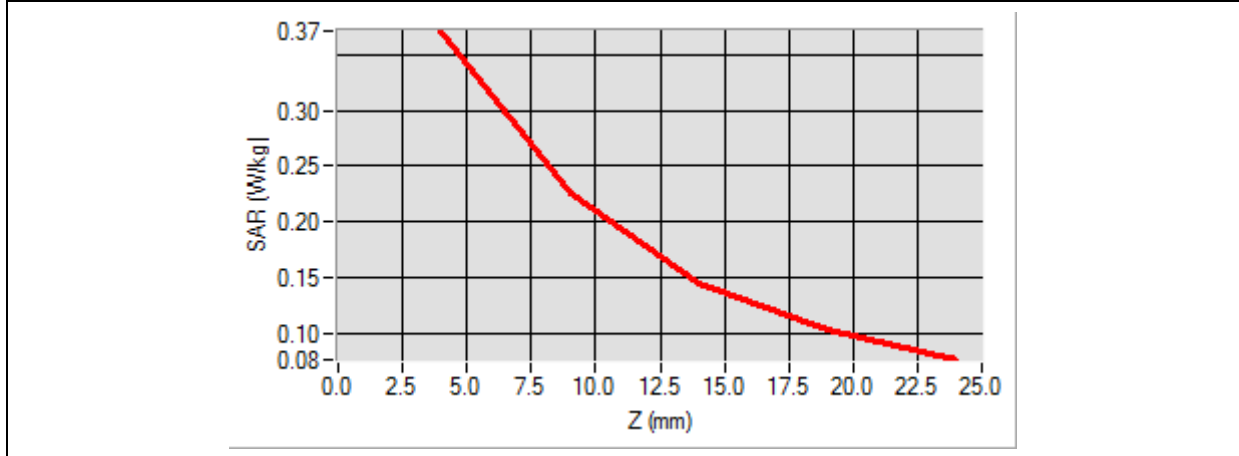
<b>Frequency (MHz)</b>	836.600000
<b>Relative Permittivity (real part)</b>	54.851214
<b>Conductivity (S/m)</b>	0.951454
<b>Power Variation (%)</b>	0.901472
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

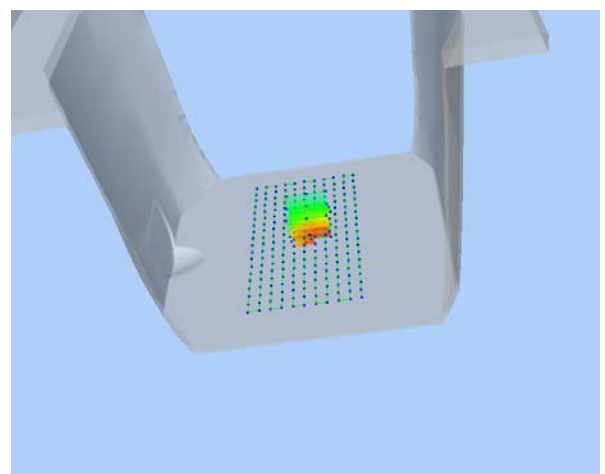
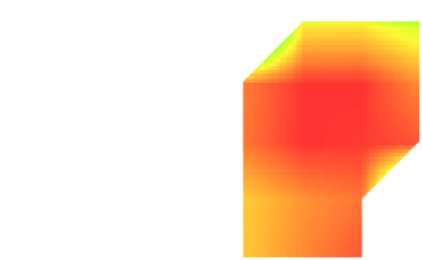


Maximum location: X=5.00, Y=13.00

SAR 10g (W/Kg)	0.221961
SAR 1g (W/Kg)	0.355453

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.3712	0.2258	0.1449	0.1022



3D screen shot	Hot spot position
	



# MEASUREMENT 73

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

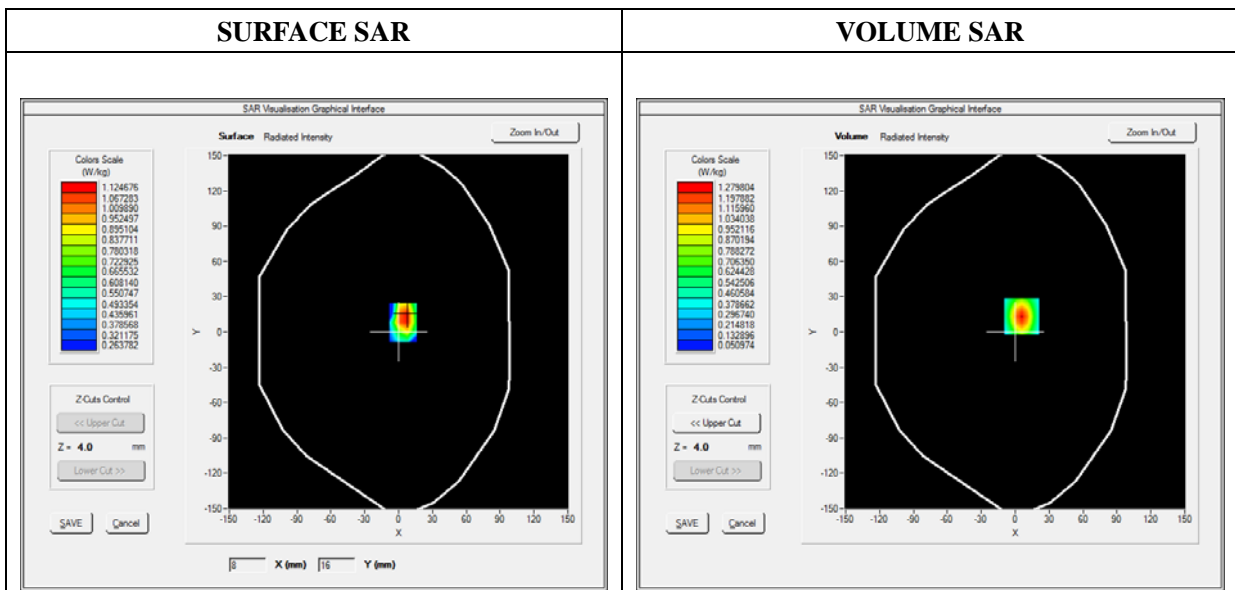
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Bottom
<b>Band</b>	GPRS1900_4TX
<b>Channels</b>	High
<b>Signal</b>	Duty Cycle: 1:2

### B. SAR Measurement Results

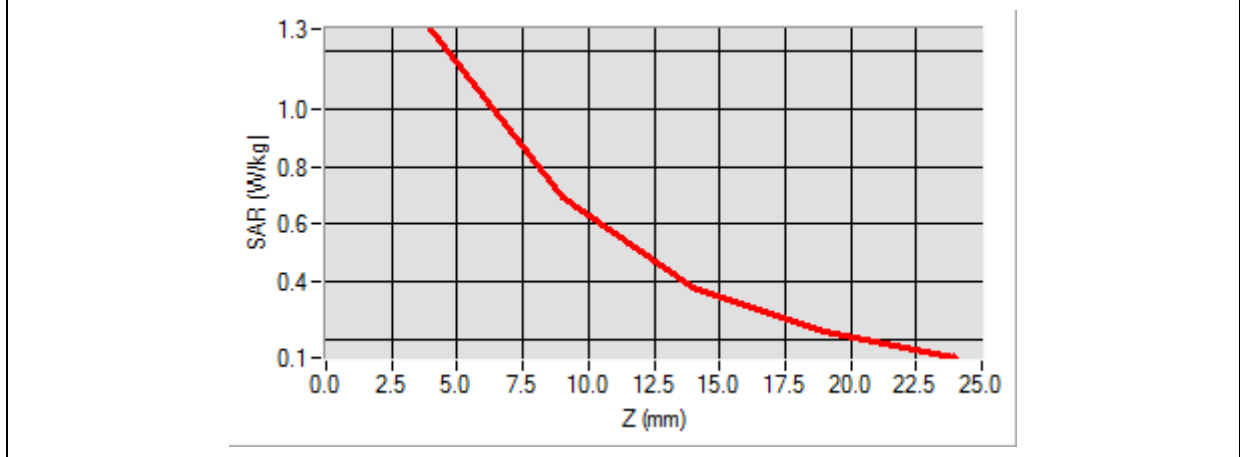
<b>Frequency (MHz)</b>	1909.800000
<b>Relative Permittivity (real part)</b>	52.420415
<b>Conductivity (S/m)</b>	1.501966
<b>Power Variation (%)</b>	2.483762
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

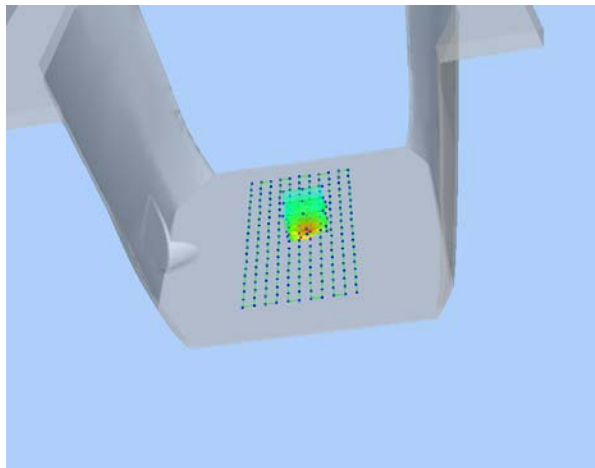
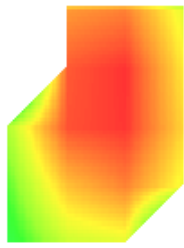


**Maximum location: X=6.00, Y=13.00**

<b>SAR 10g (W/Kg)</b>	<b>0.589954</b>
<b>SAR 1g (W/Kg)</b>	<b>1.151694</b>

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>
<b>SAR (W/Kg)</b>	<b>0.0000</b>	<b>1.2798</b>	<b>0.6938</b>	<b>0.3823</b>	<b>0.2259</b>



3D screen shot	Hot spot position
	

# MEASUREMENT 77

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

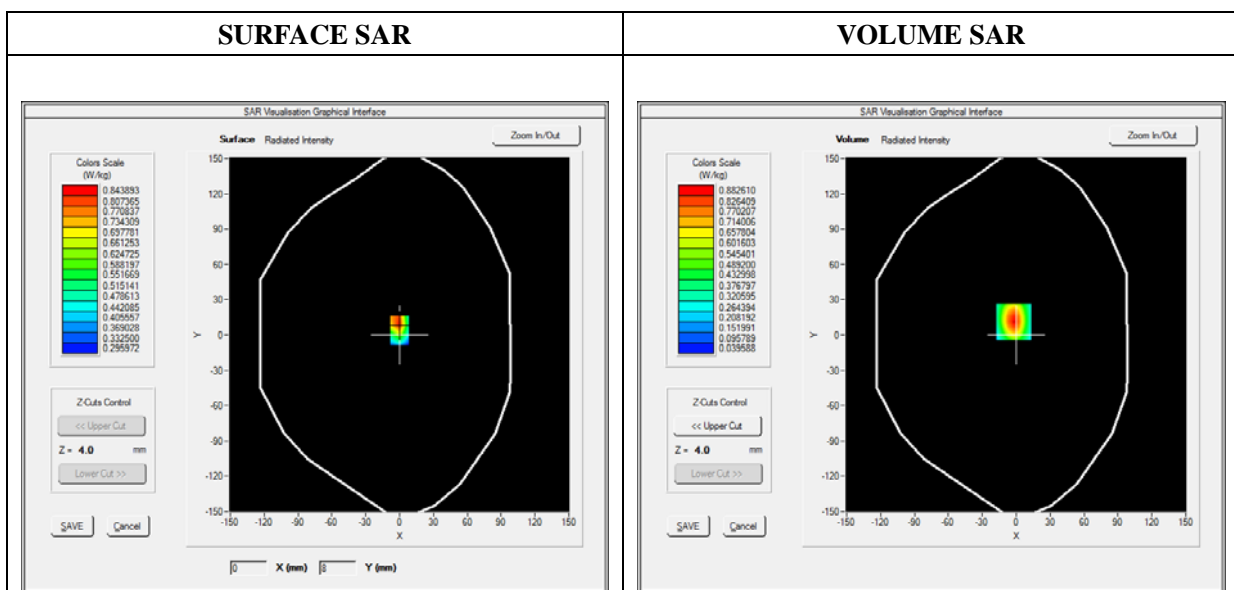
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2016

## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Bottom
<b>Band</b>	WCDMA1900_RMC
<b>Channels</b>	Middle
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

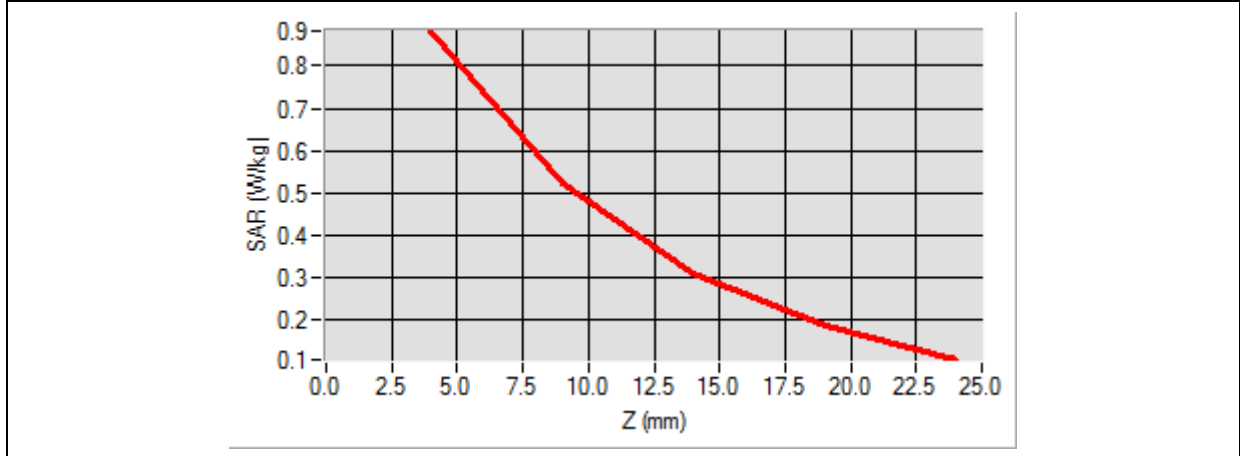
<b>Frequency (MHz)</b>	1880.000000
<b>Relative Permittivity (real part)</b>	52.420415
<b>Conductivity (S/m)</b>	1.501966
<b>Power Variation (%)</b>	1.847552
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

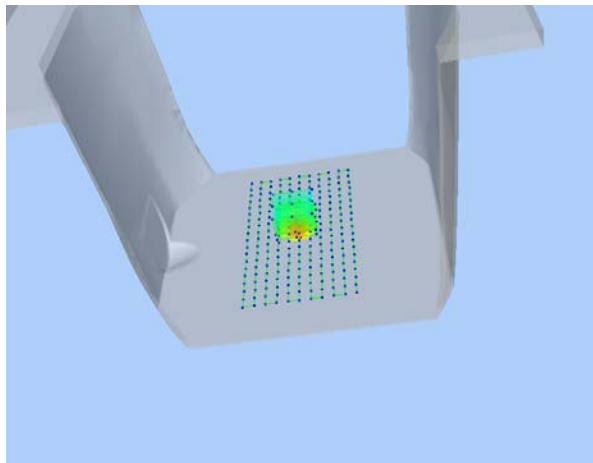



Maximum location: X=-2.00, Y=11.00

SAR 10g (W/Kg)	0.430193
SAR 1g (W/Kg)	0.798826

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.8826	0.5219	0.3079	0.1847



3D screen shot	Hot spot position
	

# MEASUREMENT 80

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

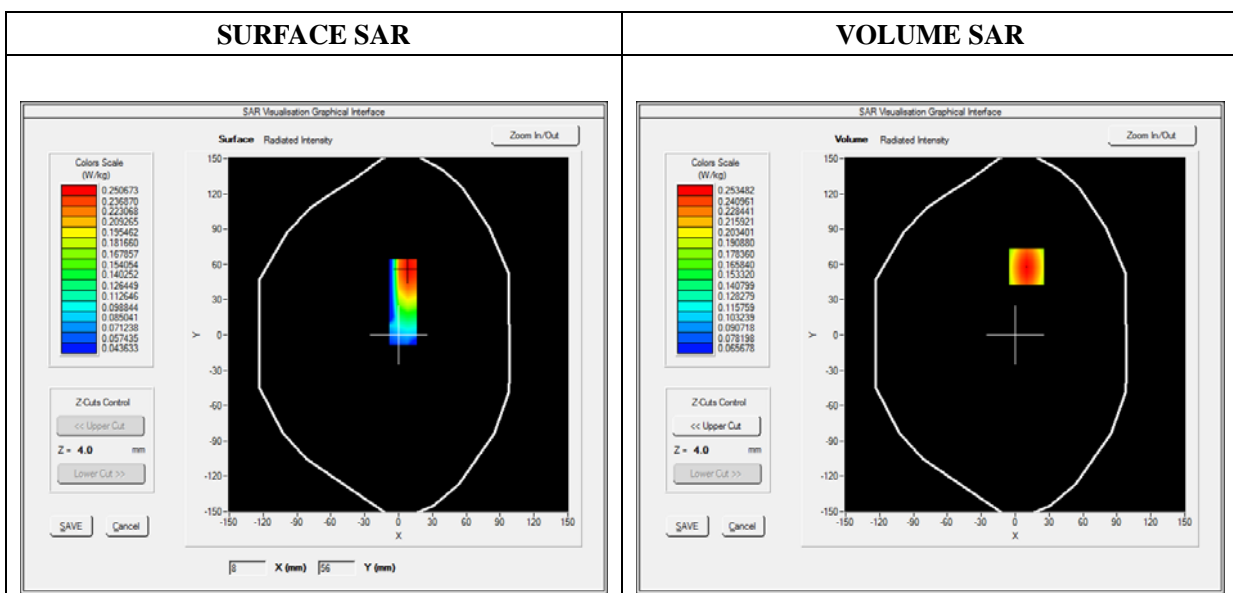
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Front
<b>Band</b>	WCDMA850_RMC
<b>Channels</b>	Low
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

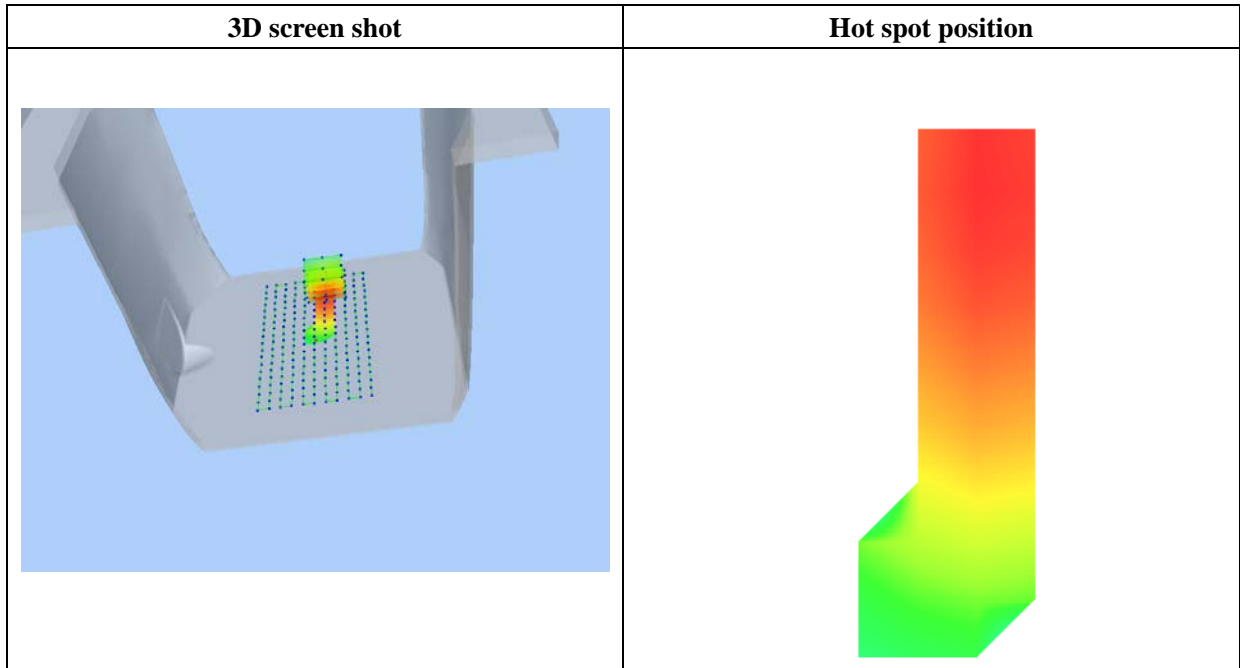
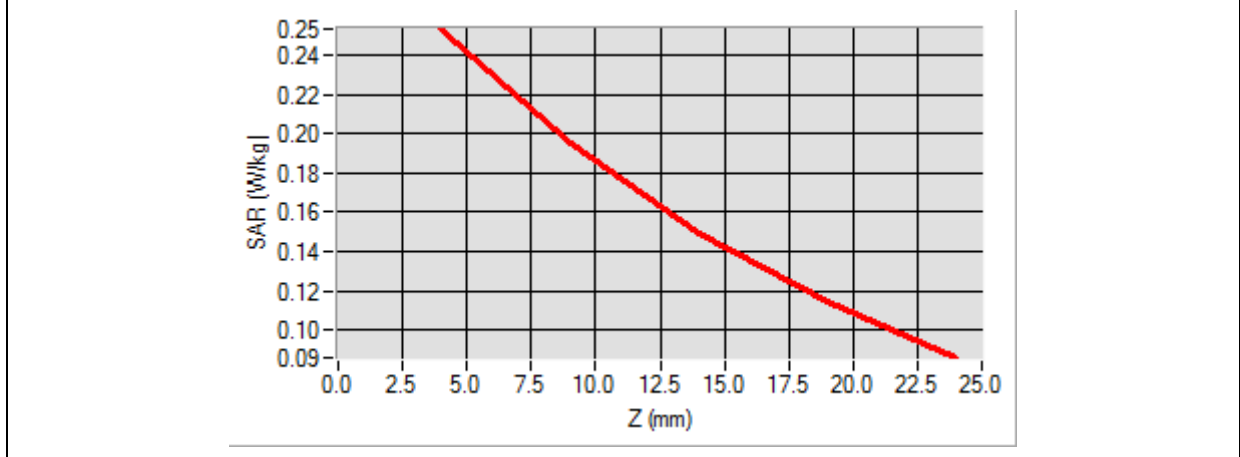
<b>Frequency (MHz)</b>	826.400000
<b>Relative Permittivity (real part)</b>	54.851214
<b>Conductivity (S/m)</b>	0.951454
<b>Power Variation (%)</b>	2.341234
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3



Maximum location: X=10.00, Y=58.00

SAR 10g (W/Kg)	0.177476
SAR 1g (W/Kg)	0.232727

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.2535	0.1948	0.1495	0.1145



# MEASUREMENT 87

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

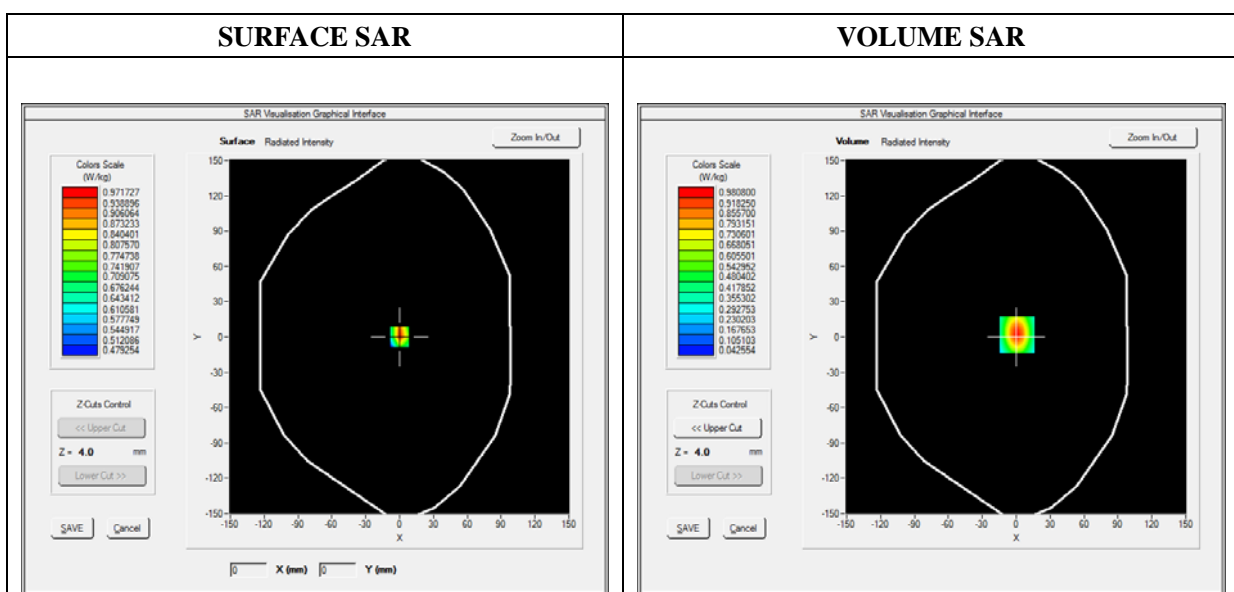
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2016

## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Bottom
<b>Band</b>	LTE Band 2_RMC
<b>Channels</b>	QPSK, 20MHz, 1RB, Middle
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

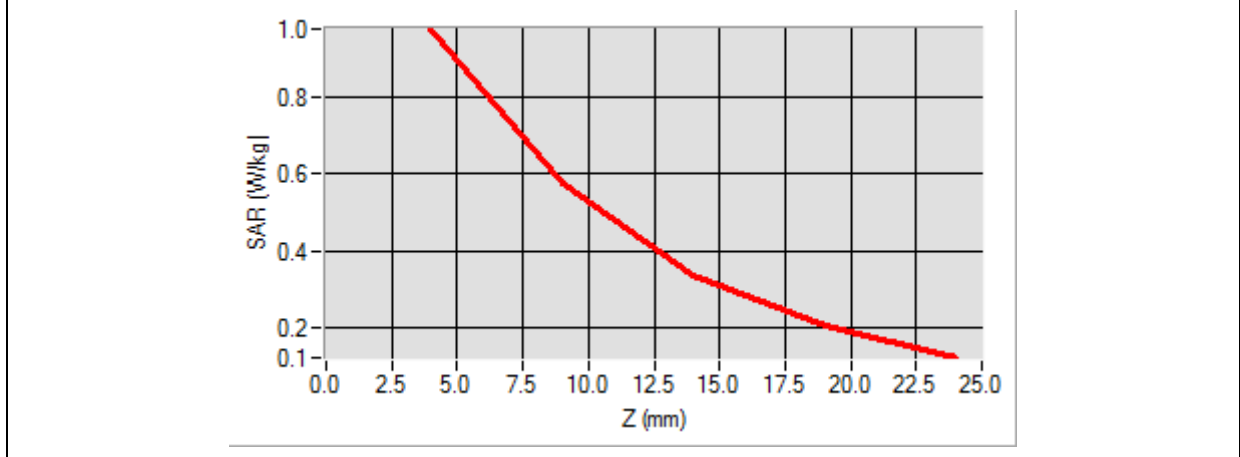
<b>Frequency (MHz)</b>	1880.000000
<b>Relative Permittivity (real part)</b>	52.420415
<b>Conductivity (S/m)</b>	1.501966
<b>Power Variation (%)</b>	1.523573
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

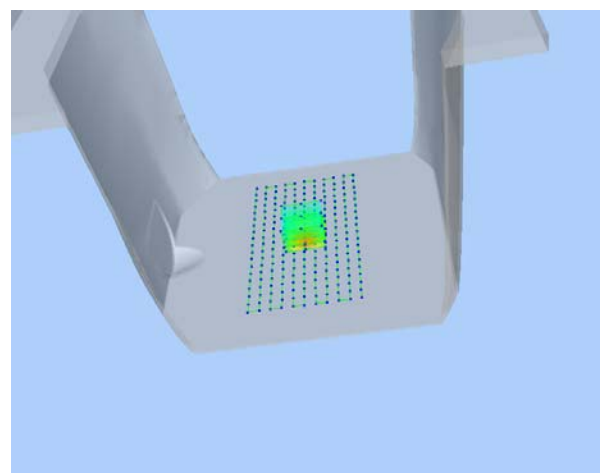



Maximum location: X=1.00, Y=2.00

SAR 10g (W/Kg)	0.520313
SAR 1g (W/Kg)	0.967546

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.9808	0.5738	0.3366	0.2030



3D screen shot	Hot spot position
	



# MEASUREMENT 94

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

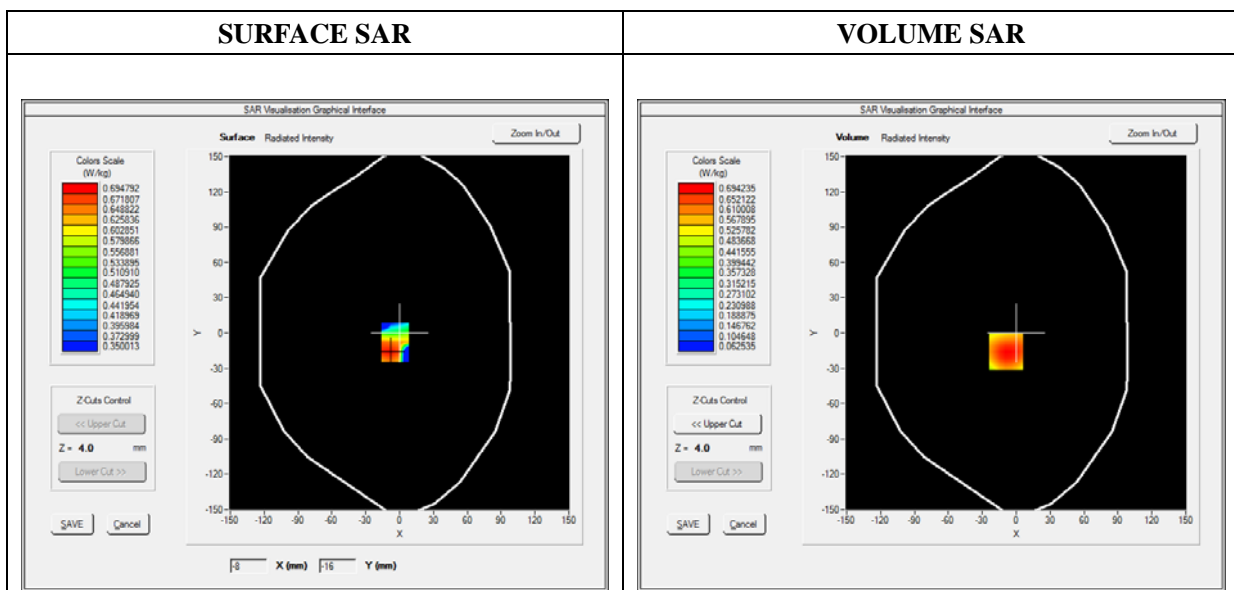
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 06/01/2016

## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Back
<b>Band</b>	LTE Band 4_RMC
<b>Channels</b>	QPSK, 20MHz, 1RB, Low
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

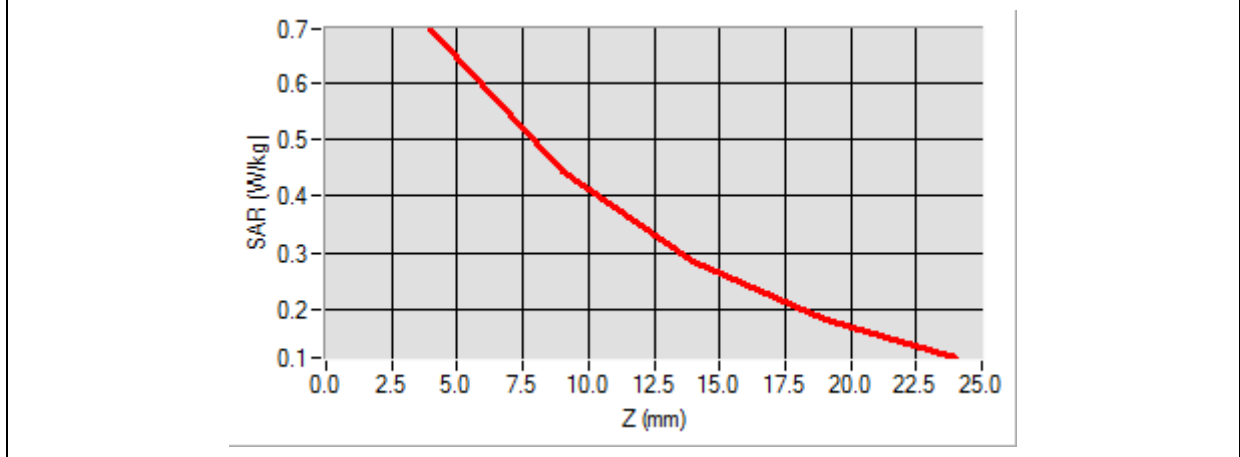
<b>Frequency (MHz)</b>	1720.000000
<b>Relative Permittivity (real part)</b>	51.224510
<b>Conductivity (S/m)</b>	1.461261
<b>Power Variation (%)</b>	0.858383
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

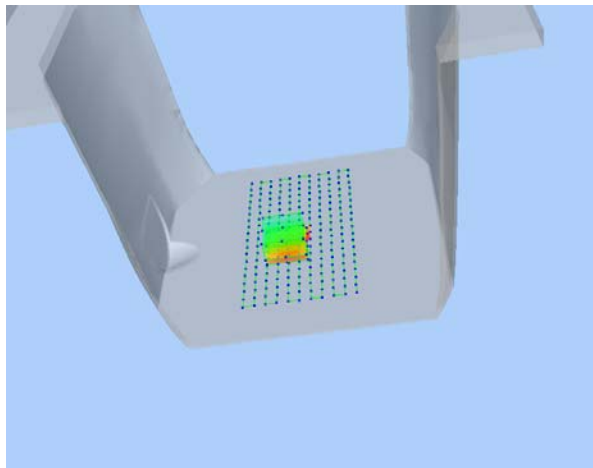



**Maximum location: X=-9.00, Y=-16.00**

<b>SAR 10g (W/Kg)</b>	<b>0.457581</b>
<b>SAR 1g (W/Kg)</b>	<b>0.717673</b>

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>
<b>SAR (W/Kg)</b>	<b>0.0000</b>	<b>0.6942</b>	<b>0.4430</b>	<b>0.2833</b>	<b>0.1835</b>



3D screen shot	Hot spot position
	

# MEASUREMENT 104

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

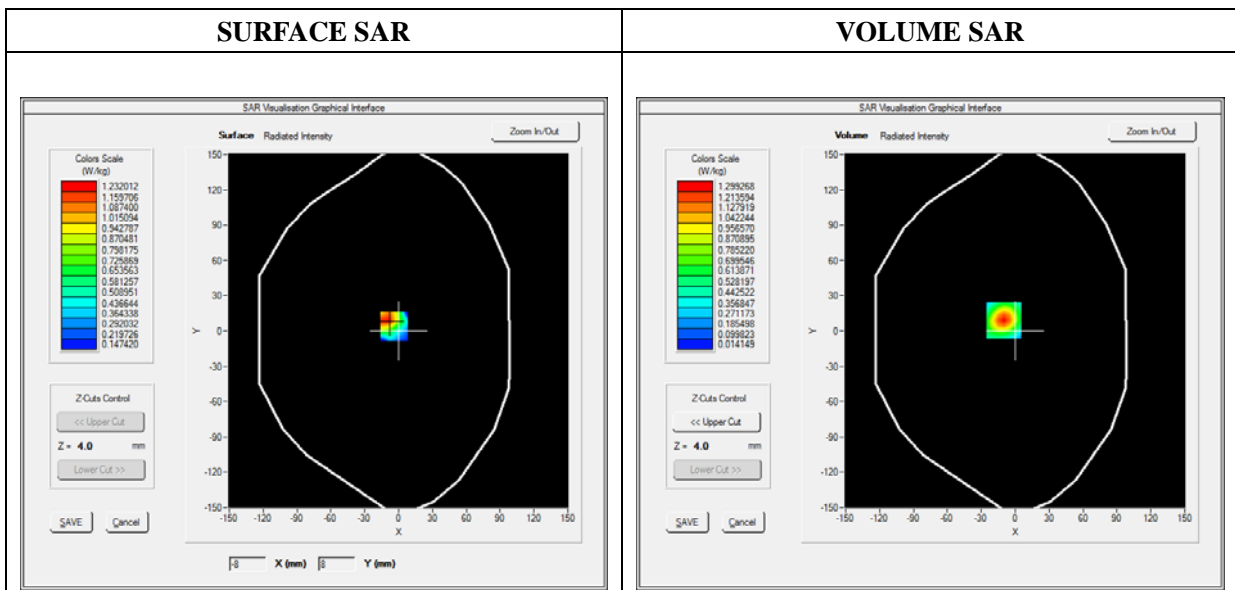
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Back
<b>Band</b>	LTE Band 7_RMC
<b>Channels</b>	QPSK, 20MHz, 1RB, Middle
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

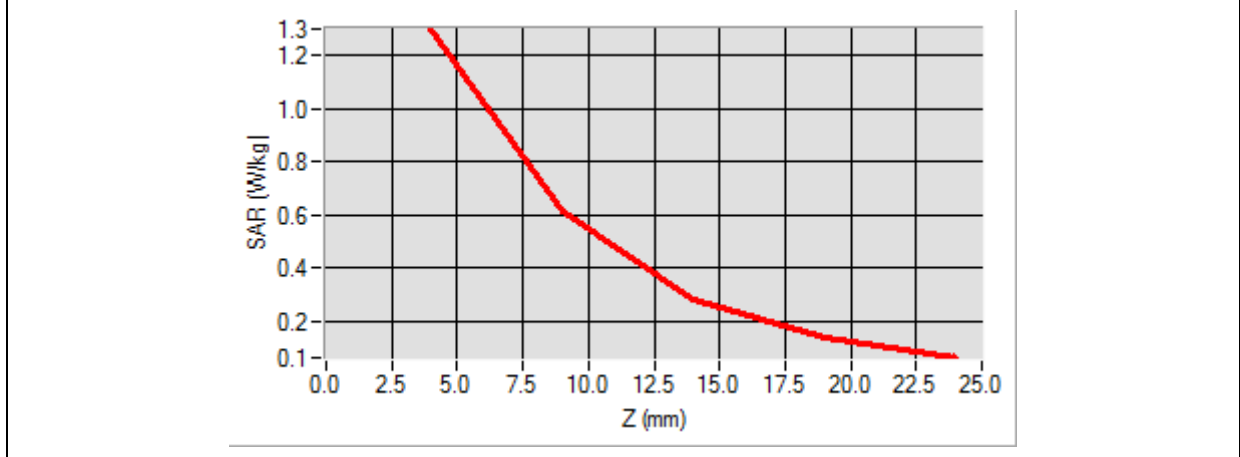
<b>Frequency (MHz)</b>	2535.000000
<b>Relative Permittivity (real part)</b>	52.010212
<b>Conductivity (S/m)</b>	1.910255
<b>Power Variation (%)</b>	3.672346
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

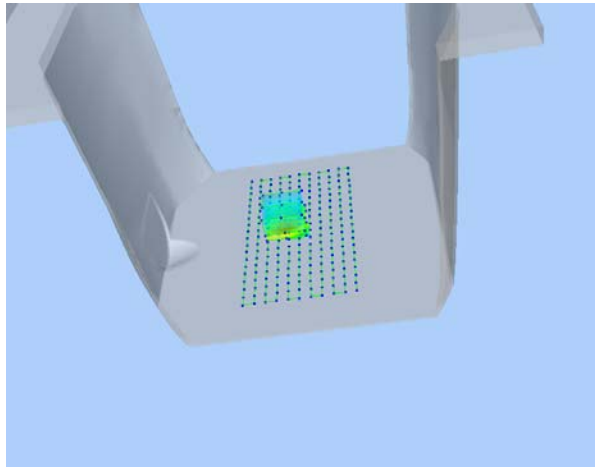
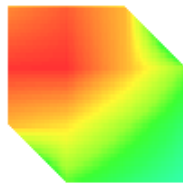


Maximum location: X=-10.00, Y=9.00

SAR 10g (W/Kg)	0.543677
SAR 1g (W/Kg)	1.169981

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	1.2993	0.6128	0.2818	0.1361



3D screen shot	Hot spot position
	

# MEASUREMENT 113

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

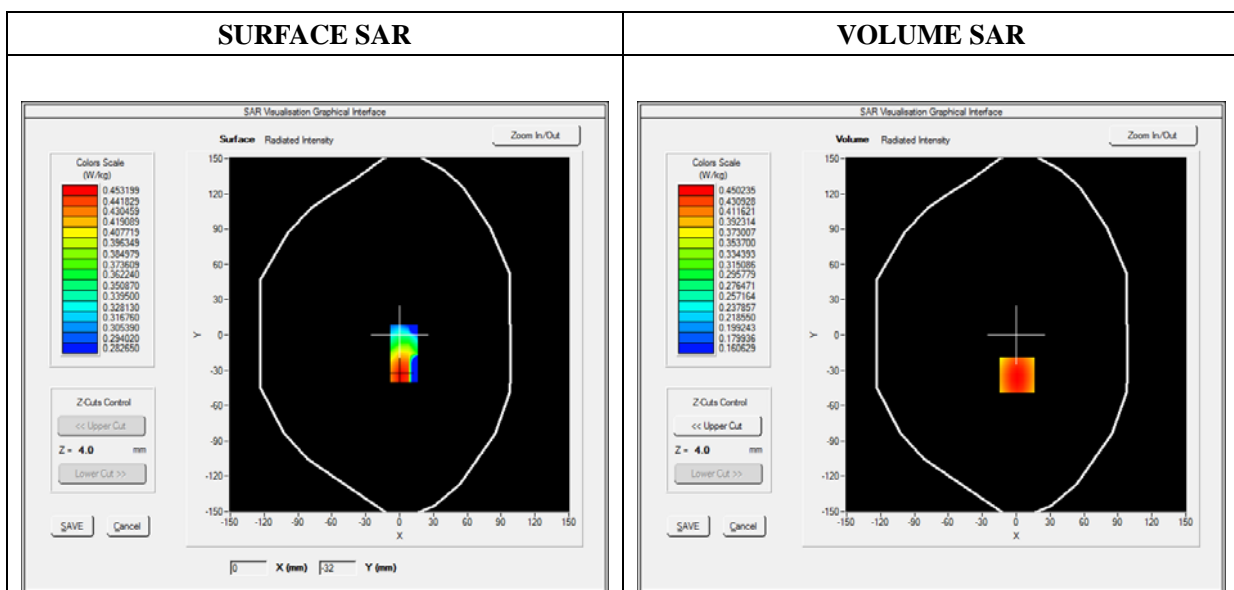
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.28; Calibrated: 06/01/2016

## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Back
<b>Band</b>	LTE Band 17_RMC
<b>Channels</b>	QPSK, 10MHz, Low
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

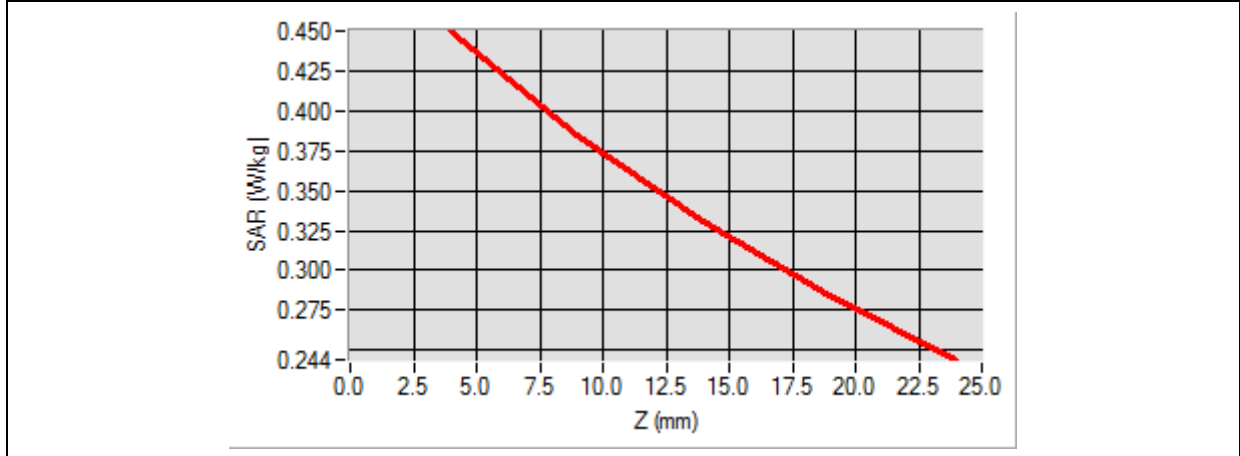
<b>Frequency (MHz)</b>	709.000000
<b>Relative Permittivity (real part)</b>	54.964739
<b>Conductivity (S/m)</b>	0.931048
<b>Power Variation (%)</b>	0.954431
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

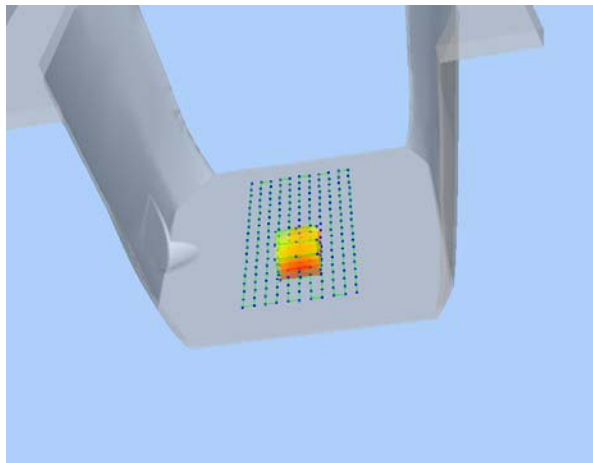



Maximum location: X=1.00, Y=-34.00

SAR 10g (W/Kg)	0.362477
SAR 1g (W/Kg)	0.438553

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.4502	0.3853	0.3308	0.2847



3D screen shot	Hot spot position
	

# MEASUREMENT 122

Type: Phone measurement (Complete)

Date of measurement: 10/17/2016

Measurement duration: 12 minutes 3 seconds

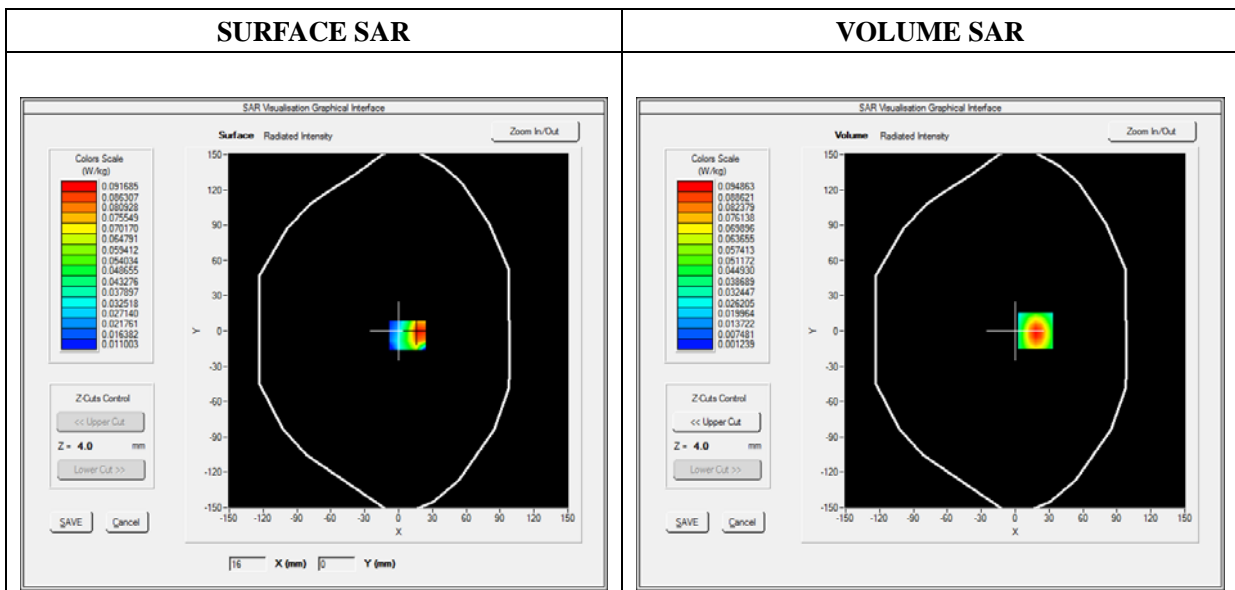
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 06/01/2016

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Front
<b>Band</b>	WiFi_802.11b
<b>Channels</b>	Low
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

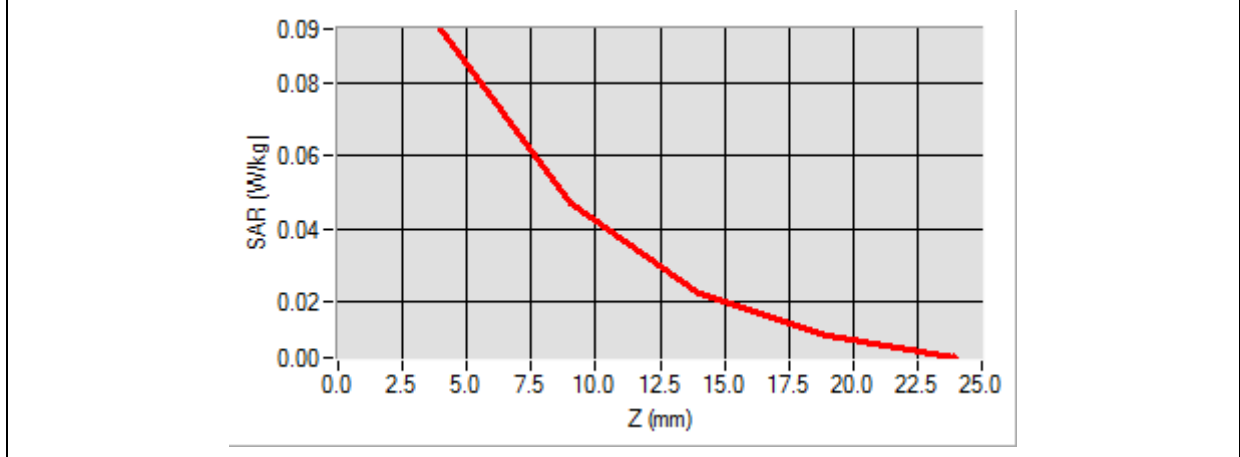
<b>Frequency (MHz)</b>	2412.000000
<b>Relative Permittivity (real part)</b>	52.010212
<b>Conductivity (S/m)</b>	1.910255
<b>Power Variation (%)</b>	2.492743
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

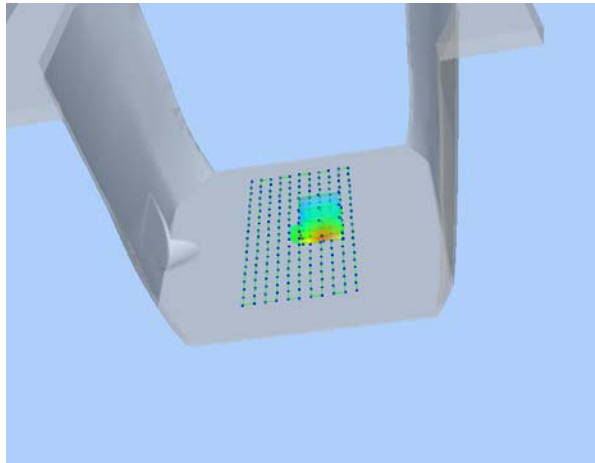
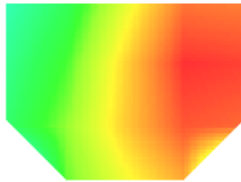


Maximum location: X=18.00, Y=0.00

SAR 10g (W/Kg)	0.042855
SAR 1g (W/Kg)	0.086871

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	0.0949	0.0471	0.0225	0.0108



<p><b>3D screen shot</b></p>	<p><b>Hot spot position</b></p>
	



## Annex C. EUT Photos

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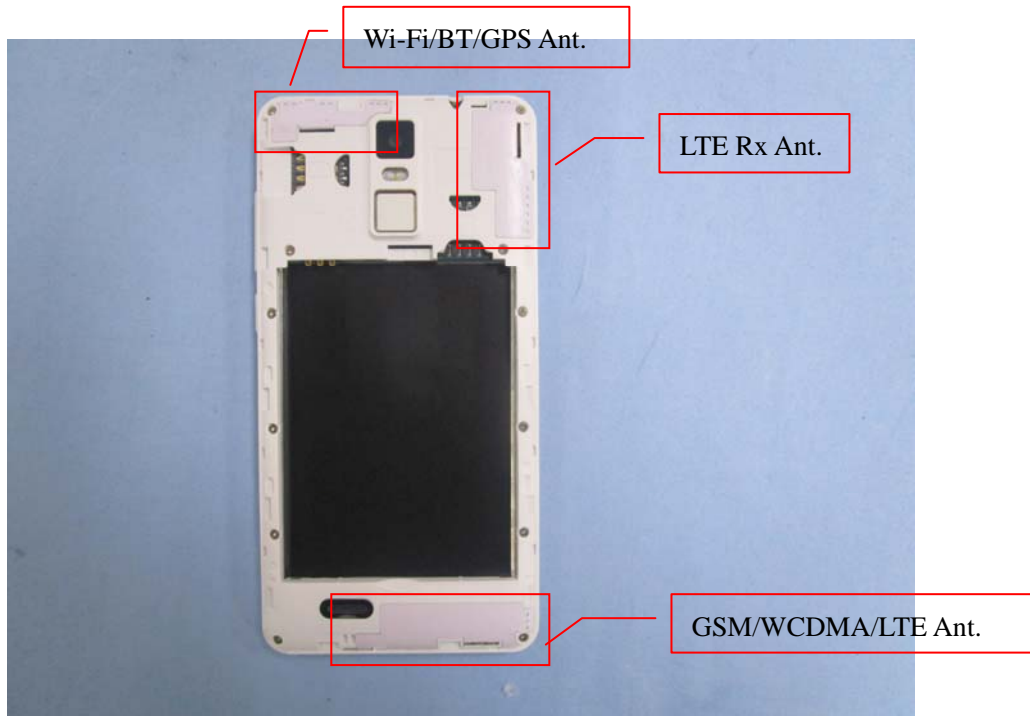
### EUT View Front



### EUT View Back



## Antenna View

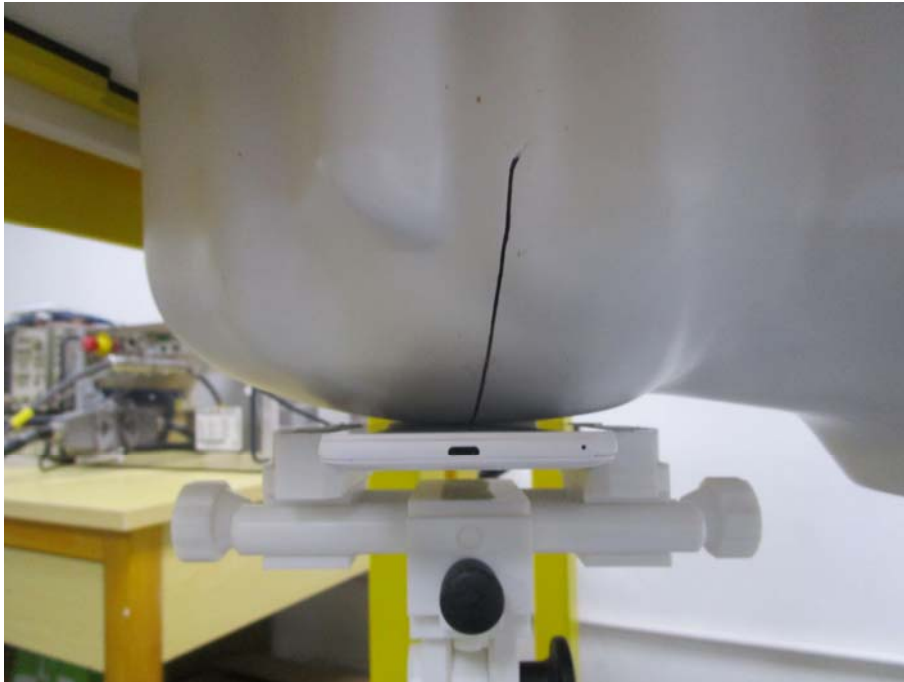


## Annex D. Test Setup Photos

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### Head Exposure Conditions

**Cheek**



**Tilt**



**Cheek**



**Tilt**



## Body-worn & Hotspot mode Exposure Conditions

### Body Front

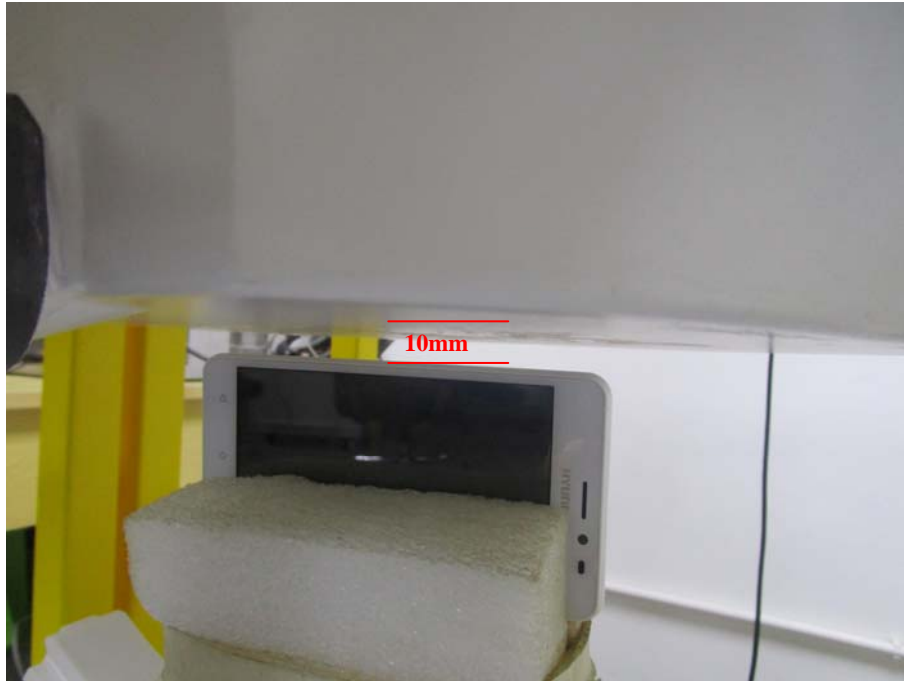


### Body Back



## Hotspot Exposure Conditions

### Body Left



### Body Right



### Body Top



### Body Bottom



## Annex E. Calibration Certificate

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*Please refer to the exhibit for the calibration certificate*

**\*\*\*\*\* END OF REPORT \*\*\*\*\***