

# FCC SAR

## Measurement and Test Report

For

**BBB Inc.**

28, Yatap-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea

**FCC ID: 2AKGP-EZ100W**

**Test Standards:** FCC Part 2.1093  
ANSI / IEEE C95.1 ::2005+A1:2010  
ANSI / IEEE C95.3 : 2002(R2008)  
IEEE 1528 :2013

**Product Description:** Mobile Phone

**Tested Model:** EZ-100

**Report No.:** STR17118174H

**Sample Received Date:** 2017-11-24

**Tested Date:** 2017-11-27 to 2017-12-04

**Issued Date:** 2017-12-06

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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM Test Technology Co., Ltd.

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## 1. General Information

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

#### Client Information

Applicant: BBB Inc.  
Address of applicant: 28, Yatap-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea

Manufacturer: BBB Inc.  
Address of manufacturer: 28, Yatap-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea

General Description of EUT:	
Product Name:	Mobile Phone
Brand Name:	elemark, Mobihealth
Model No.:	EZ-100
Adding Model(s):	/
Rated Voltage:	DC 3.8V by Battery
Battery Capacity:	3000mAh
Device Category:	Portable Device
<i>The EUT Main board support GSM850/ PCS1900, WCDMA Band 2/5, LTE Band 4/7 function. It is intended for speech, Multimedia Message Service (MMS) transmission. It is equipped with GPRS/EDGE class 12 for GSM850/900/DCS1800/PCS1900, GPS, FM, Bluetooth and Wi-Fi functions. For more information see the following datasheet</i>	
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

Technical Characteristics of EUT:	
<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: 32.36dBm, GSM1900: 30.16dBm EDGE850: 27.33dBm, EDGE1900: 26.78dBm
Type of Modulation:	GMSK, 8PSK
Type of Antenna:	Integral Antenna
Antenna Gain:	GSM850: 1.55dBi; GSM1900: 2.51dBi
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
RF Output Power:	WCDMA Band 2: 22.59dBm, WCDMA Band 5: 22.98dBm
Type of Modulation:	BPSK
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band 2: 2.49dBi, WCDMA Band 5: 1.51dBi
<b>4G</b>	
Support Networks:	FDD-LTE
Support Band:	FDD-LTE Band 4, 7
Uplink Frequency:	FDD-LTE Band 4: Tx: 1710-1755MHz, FDD-LTE Band 7: Tx: 2500-2570MHz,
Downlink Frequency:	FDD-LTE Band 4: Rx: 2110-2155MHz, FDD-LTE Band 7: Rx: 2620-2690MHz,
RF Output Power:	FDD-LTE Band 4: 24.02dBm, FDD-LTE Band 7: 23.59dBm
Type of Modulation:	QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	FDD-LTE Band 4: 1.90dBi, FDD-LTE Band 7: 2.76dBi,
<b>WIFI(2.4G)</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:	10.97dBm (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:	2.51dBi
<b>Bluetooth</b>	
Bluetooth Version:	V4.0
Frequency Range:	2402-2480MHz
RF Output Power:	0.427dBm (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:	2.51dBi
<b>WIFI(5G)</b>	
Support Standards:	802.11a, 802.11n-HT20/40
Frequency Range:	Band 1: 5150-5250MHz, Band 2: 5250-5350MHz, Band 3: 5470-5725MHz Band 4: 5725-5850MHz
RF Output Power:	8.52dBm (Conducted)
Type of Modulation:	QPSK, 16QAM, 64QAM
Type of Antenna:	Internal Antenna
Antenna Gain:	1.92dBi

## 1.2 Test Standards

The following report is prepared on behalf of the BBB Inc. 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.: 125990**

Shenzhen SEM Test Technology Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

### **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.

## 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	<b>0.566</b>	<b>1.197</b>	<b>1.197</b>	1.6
WCDMA	0.209	0.473	0.473	1.6
FDD-LTE	0.103	0.404	0.545	1.6
WLAN 2.4G	0.141	0.106	0.106	1.6
WLAN 5.2G	0.327	0.082	/	1.6
Simultaneous Transmission	0.893	<b>1.325</b>	1.266	1.6

### Extremity SAR

Frequency Band	Extremity SAR	SAR <sub>10g</sub> Limit (W/kg)
	Maximum SAR <sub>10g</sub> (W/kg)	
GSM	/	4.0
WCDMA	/	4.0
FDD-LTE	/	4.0
WLAN 2.4G	/	4.0
WLAN 5.2G	<b>0.106</b>	4.0
Simultaneous Transmission	0.106	4.0

### Remark:

*The highest reported SAR values for head, body-worn accessory, wireless router(hotspot), Extremity SAR, and simultaneous transmission conditions are **0.566W/kg**, **1.197W/kg**, **1.197W/kg**, **0.106W/kg**, and **1.325W/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.

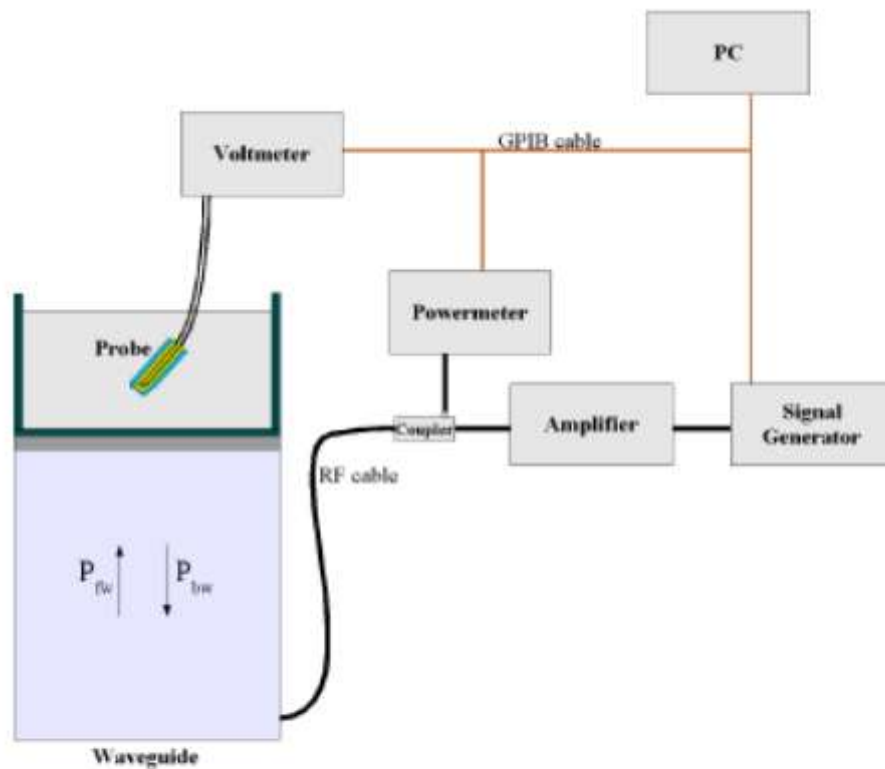
### 4.2 Probe

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, Antennessa 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<sub>fw</sub> = Forward Power

P<sub>bw</sub> = Backward Power

a and b = Waveguide dimensions

l = Skin depth

Keithley configuration:

Rate = Medium; Filter = ON; RDGS = 10; Filter type = Moving Average; Range auto after each calibration, a SAR measurement is performed on a validation dipole and compared with a NPL calibrated probe, to verify it.

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

$$CF(N)=SAR(N)/Vlin(N) \text{ (N=1,2,3)}$$

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

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

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.

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

Where:

$\sigma$  = simulated tissue conductivity,

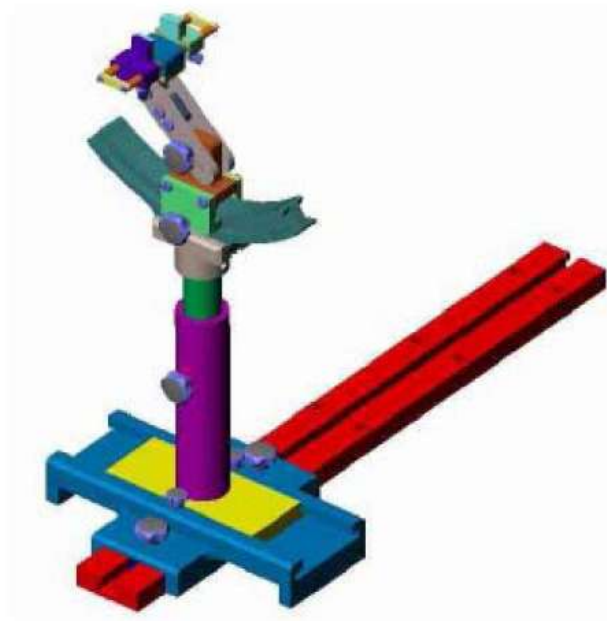
$\rho$  = Tissue density (1.25 g/cm<sup>3</sup> for brain tissue)

#### 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	MVG	SSE5	SN 09/13 EP168	2017-06-01	2018-05-31
E-Field Probe	MVG	SSE2	SN 08/16 EPGO298	2017-09-18	2018-09-17
835MHz Dipole	MVG	SID835	SN 47/12 DIP 0G835-204	2017-03-16	2018-03-15
1800MHz Dipole	MVG	SID1800	SN 47/12 DIP 1G800-206	2017-03-16	2018-03-15
1900MHz Dipole	MVG	SID1900	SN 47/12 DIP 1G900-207	2017-03-16	2018-03-15
2450MHz Dipole	MVG	SID2450	SN 13/15 DIP 2G450-364	2017-03-16	2018-03-15
2600MHz Dipole	MVG	SID2600	SN 13/15 DIP 2G600-365	2017-03-16	2018-03-15
5 GHz Waveguide	MVG	SWG5500	SN 49/16 WGA45	2017-08-07	2018-08-06
Dielectric Probe Kit	MVG	SCLMP	SN 47/12 OCPG49	2017-03-16	2018-03-15
SAM Phantom	MVG	SAM	SN/ 47/12 SAM95	N/A	N/A
MULTIMETER	KEITHLEY	Keithley 2000	4006367	2017-06-12	2018-06-11
Signal Generator	Rohde & Schwarz	SMR20	100047	2017-06-12	2018-06-11
Universal Tester	Rohde & Schwarz	CMU200	112012	2017-06-12	2018-06-11
Network Analyzer	HP	8753C	2901A00831	2017-06-12	2018-06-11
Directional Couplers	Agilent	778D	20160	2017-06-12	2018-06-11

## 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 (%)	Sugar (%)	HEC (%)	Preventol (%)	DGBE (%)
<b>Head</b>						
835	40.3	1.4	57.9	0.2	0.2	0
1700-1900	55.2	0.3	0	0	0	44.5
2450	55.0	0.1	0	0	0	44.9
2600	54.9	0.1	0	0	0	45.0
<b>Body</b>						
835	50.8	0.9	48.1	0.1	0.1	0
1700-1900	70.2	0.4	0	0	0	29.4
2450	68.6	0.1	0	0	0	31.3
2600	68.2	0.1	0	0	0	31.7

Frequency (MHz)	Water (%)	Hexyl Carbitol (%)	Triton X-100 (%)
<b>Head</b>			
5200	65.52	17.24	17.24
<b>Body</b>			
5200	78.6	10.7	10.7

## 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>1750</b>	<b>1.37</b>	<b>40.1</b>	<b>1.49</b>	<b>53.4</b>
<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
<b>5200</b>	<b>4.66</b>	<b>36.0</b>	<b>5.30</b>	<b>49.0</b>
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 (%)		
835	21.2	0.87	0.90	-3.33	41.11	41.50	-0.94	$\pm 5$	2017-11-27
1750	21.3	1.37	1.37	0.00	39.02	40.1	-2.69	$\pm 5$	2017-11-28
1800	21.3	1.37	1.40	-2.14	39.02	40.0	-2.45	$\pm 5$	2017-11-28
1900	21.3	1.38	1.40	-1.43	38.56	40.00	-3.60	$\pm 5$	2017-11-28
2450	21.3	1.74	1.80	-3.33	38.15	39.20	-2.68	$\pm 5$	2017-11-29
2600	21.3	1.93	1.96	-1.53	38.63	39.0	-0.95	$\pm 5$	2017-11-29
5200	21.3	4.87	4.66	4.51	35.6	36.0	-1.11	$\pm 5$	2017-11-30

Body Tissue Simulating Liquid									
Freq. MHz.	Temp. (°C)	Conductivity			Permittivity			Limit (%)	Date
		Reading ( $\sigma$ )	Target ( $\sigma$ )	Delta (%)	Reading ( $\epsilon_r$ )	Target ( $\epsilon_r$ )	Delta (%)		
835	21.2	0.95	0.97	-2.06	54.85	55.20	-0.63	$\pm 5$	2017-11-27
1750	21.3	1.46	1.49	-2.01	51.22	53.40	-4.08	$\pm 5$	2017-11-28
1800	21.3	1.46	1.52	-3.95	51.22	53.30	-3.90	$\pm 5$	2017-11-28
1900	21.3	1.50	1.52	-1.32	52.42	53.30	-1.65	$\pm 5$	2017-11-28
2450	21.3	1.91	1.95	-2.05	52.01	52.70	-1.31	$\pm 5$	2017-11-29
2600	21.3	2.12	2.16	-1.85	52.24	52.50	-0.50	$\pm 5$	2017-11-29
5200	21.3	5.16	5.30	-2.64	48.50	49.0	-1.02	$\pm 5$	2017-11-30



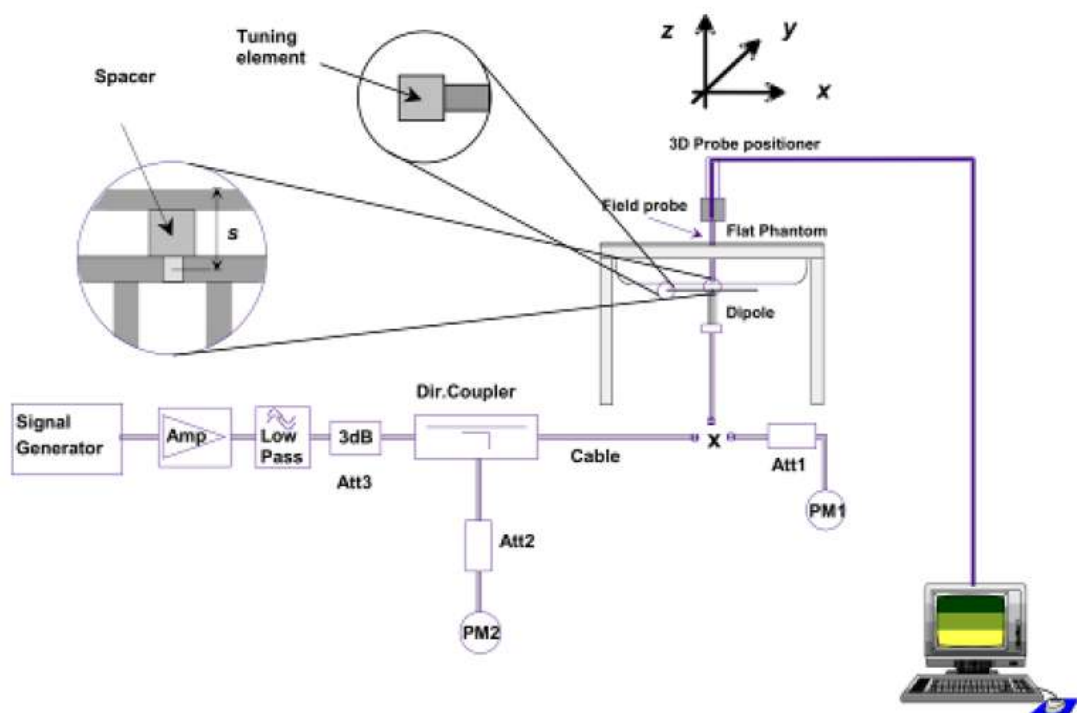
## 6. SAR Measurement Evaluation

### 6.1 Purpose of System Performance Check

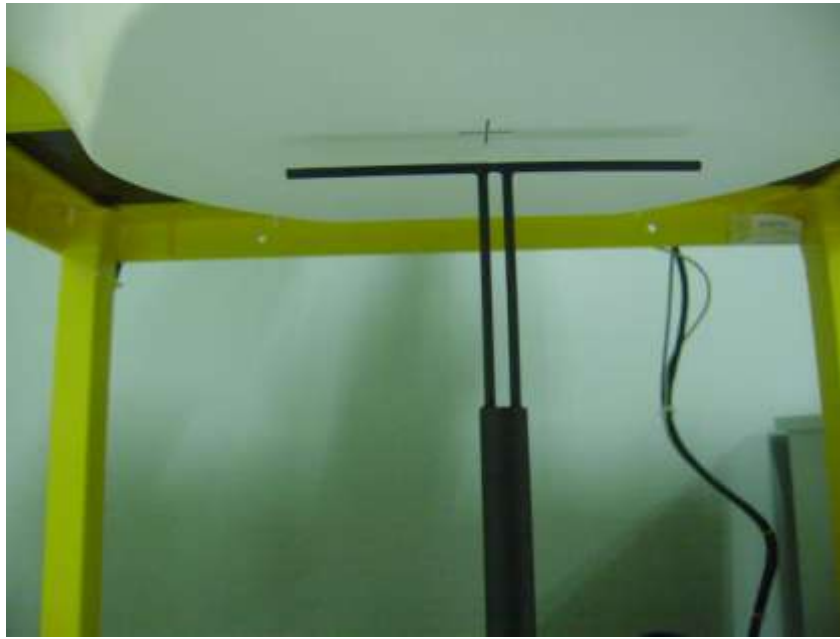
The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system 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.

The output power on 5 GHz Waveguide must be calibrated to 20 dBm (100mW) before 5 GHz Waveguide 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				
835	9.65	2.41	9.64	-0.10
1800	38.49	9.61	38.44	-0.13
1900	39.59	9.91	39.64	0.13
2450	53.76	13.45	53.8	0.07
2600	55.07	13.67	54.68	-0.71
Body				
835	9.36	2.35	9.4	0.43
1800	38.29	9.58	38.32	0.08
1900	39.01	9.78	39.12	0.28
2450	50.33	12.59	50.36	0.06
2600	53.92	13.43	53.72	-0.37

Frequency	Liquid	Power (mw)	Targeted SAR1g	Measured SAR1g	Normalized SAR1g	Tolerance
5200	Head	100	161.23	16.946	169.46	5.10
5200	Body	100	154.45	16.681	166.81	8.00

**Remark:** Referring to IEEE 1528-2013, Section 8.2, The system check shall be performed at a test frequency that is within  $\pm 10\%$  or  $\pm 100$  MHz of the compliance test mid-band frequency, so the 1750 MHz system verification is made of 1800MHz Dipole.

#### 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

- 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.
- 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.
- 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.

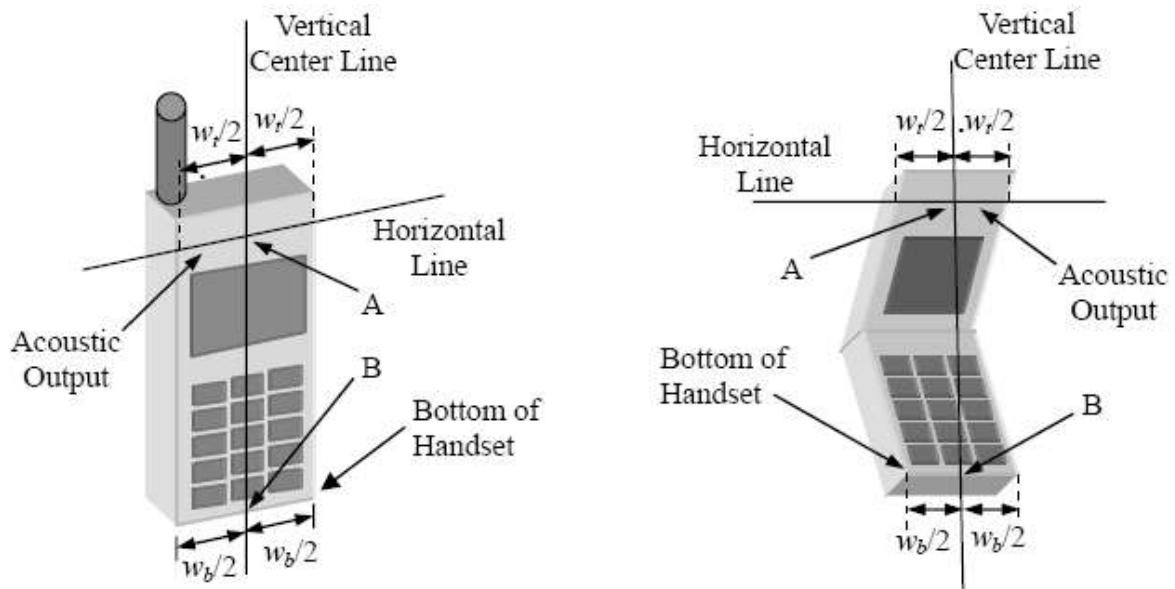


Illustration for Handset Vertical and Horizontal Reference Lines

## 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).

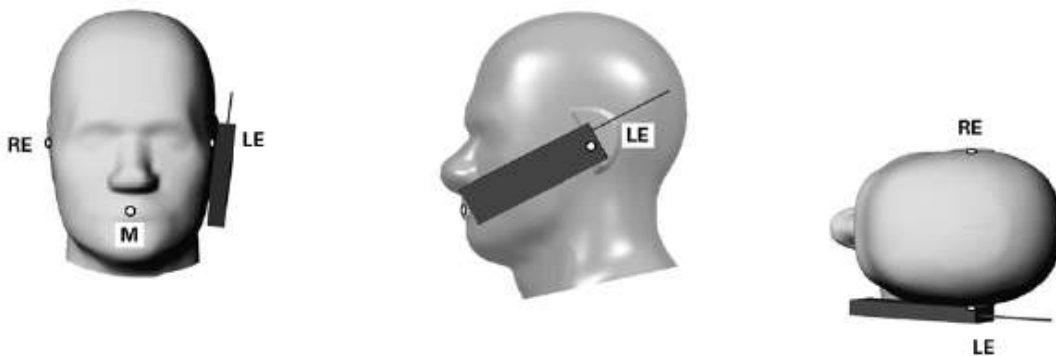


Illustration for Cheek Position

## 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.

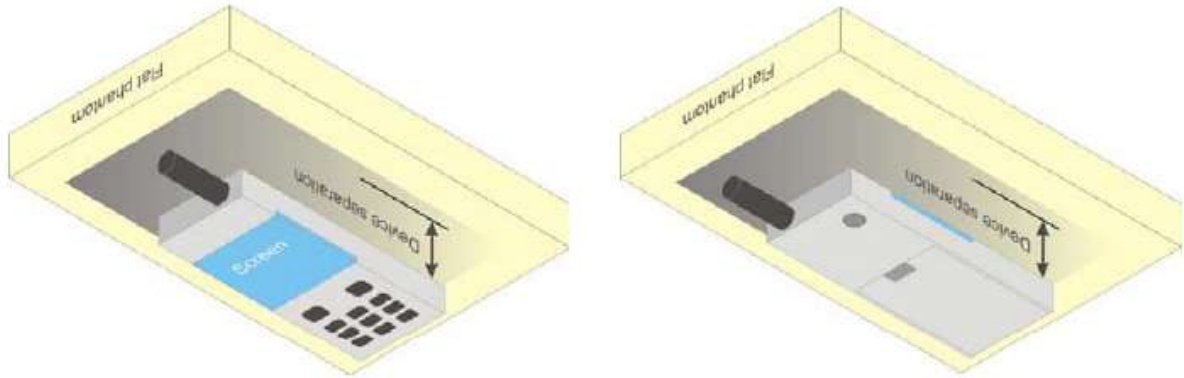
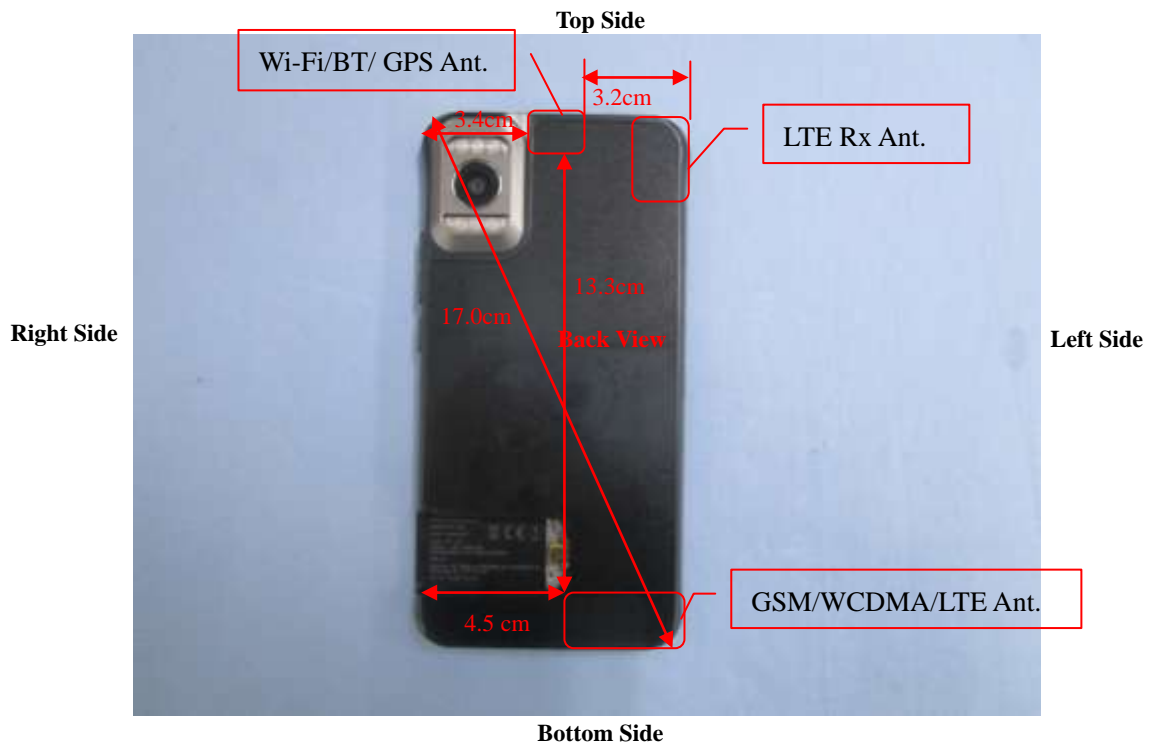


Illustration for Body Worn Position

## 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 2.4GHz	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 2.4GHz	Yes	Yes	No	No	Yes	No

Body-worn SAR tests, Test distance: 10mm		
Antennas	Front	Back
WWAN	Yes	Yes
WLAN 2.4GHz	Yes	Yes

Extremity SAR tests, Test distance: 0mm						
Antennas	Front	Back	Right Side	Left Side	Top Side	Bottom Side
WLAN 5.2GHz	Yes	Yes	No	No	Yes	No

### 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.

2. Referring to KDB 648474 D04 Handset SAR v01r03, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR  $> 1.2 \text{ W/kg}$ ; however, the highest reported SAR is  $1.197 \text{ W/kg} < 1.2 \text{ W/kg}$ , so 2G/3G/4G/2.4GWIFI 10-g extremity SAR is not required.

**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 D 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			Tune-up power (dBm)	PCS1900			Tune-up power (dBm)
Channel	128	190	251		512	661	810	
Frequency (MHz)	824.2	836.6	848.8		1850.2	1880	1909.8	
GSM	32.36	32.32	32.12	32.5	30.16	29.80	29.48	30.5
GPRS (1 slot)	32.36	32.36	32.16	32.5	30.15	29.78	29.49	30.5
GPRS (2 slots)	31.99	31.94	31.73	32.5	29.73	29.36	29.07	30.0
GPRS (3 slots)	30.53	30.43	30.29	31.0	28.34	28.06	27.83	28.5
GPRS (4 slots)	28.36	28.33	28.14	28.5	26.28	26.12	25.96	26.5
EDGE (1 slot)	27.33	27.28	27.17	27.5	26.78	26.07	26.40	27.0
EDGE (2 slots)	26.18	26.28	26.14	26.5	25.69	24.99	24.27	26.0
EDGE (3 slots)	24.22	24.19	24.03	24.5	23.53	22.82	22.26	24.0
EDGE (4 slots)	23.09	23.02	22.91	23.5	22.41	21.75	20.90	23.0

GSM - Source-Based Time-Average Power (dBm)								
Band	GSM850			Tune-up power (dBm)	PCS1900			Tune-up power (dBm)
Channel	128	190	251		512	661	810	
Frequency (MHz)	824.2	836.6	848.8		1850.2	1880	1909.8	
GSM	23.36	23.32	23.12	23.5	21.16	20.80	20.48	21.5
GPRS (1 slot)	23.36	23.36	23.16	23.5	21.15	20.78	20.49	21.5
GPRS (2 slots)	25.99	25.94	25.73	26.5	23.73	23.36	23.07	24.0
GPRS (3 slots)	26.28	26.18	26.04	26.5	24.09	23.81	23.58	24.5
GPRS (4 slots)	25.36	25.33	25.14	25.5	23.28	23.12	22.96	23.5
EDGE (1 slot)	18.33	18.28	18.17	18.5	17.78	17.07	17.40	18.0
EDGE (2 slots)	20.18	20.28	20.14	20.5	19.69	18.99	18.27	20.0
EDGE (3 slots)	19.97	19.94	19.78	20.5	19.28	18.57	18.01	19.5
EDGE (4 slots)	20.09	20.02	19.91	20.5	19.41	18.75	17.90	20.0

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 and GPRS (3TX slots) should be evaluated, therefore the EUT was set in GSM and GPRS (3TX slots) 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 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.
5. This device supports VOIP capability through 3rd party apps software.

WCDMA - Average Power (dBm)								
Band	WCDMA Band II				WCDMA Band V			
Channel	9262	9400	9538	Tune-up	4132	4182	4233	Tune-up
Frequency (MHz)	1852.4	1880.0	1907.6	power (dBm)	826.4	836.6	846.6	power (dBm)
RMC 12.2k	21.53	22.59	21.85	23.0	22.98	22.94	22.91	23.5
HSDPA Subtest-1	20.40	21.77	20.45	22.0	21.98	21.95	21.98	22.5
HSDPA Subtest-2	20.38	21.76	20.43	22.0	21.96	21.93	21.95	22.5
HSDPA Subtest-3	20.38	21.75	20.43	22.0	21.96	21.93	21.95	22.5
HSDPA Subtest-4	20.38	21.75	20.42	22.0	21.97	21.94	21.96	22.5
HSUPA Subtest-1	20.40	21.74	20.45	22.0	22.06	22.02	21.98	22.5
HSUPA Subtest-2	20.38	21.73	20.42	22.0	22.05	22.01	21.97	22.5
HSUPA Subtest-3	20.38	21.73	20.41	22.0	22.05	22.01	21.97	22.5
HSUPA Subtest-4	20.38	21.72	20.42	22.0	22.05	22.01	21.96	22.5
HSUPA Subtest-5	20.39	21.72	20.42	22.0	22.04	22.01	21.96	22.5

**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 4:**

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	Tune-up power (dBm)
		Size	Offset		
QPSK	LCH	1	0	23.16	24.5
		1	3	23.16	24.5
		1	5	23.09	24.5
		3	0	23.06	24.5
		3	2	23.05	24.5
		3	3	23.02	24.5
		6	0	22.18	24.5
	MCH	1	0	22.79	24.5
		1	3	22.87	24.5
		1	5	22.80	24.5
		3	0	22.87	24.5
		3	2	22.80	24.5
		3	3	22.85	24.5
		6	0	21.79	24.5
	HCH	1	0	23.78	24.5
		1	3	23.88	24.5
		1	5	23.85	24.5
		3	0	22.05	24.5
		3	2	22.26	24.5
		3	3	22.56	24.5
		6	0	22.28	24.5
16QAM	LCH	1	0	22.11	24.5
		1	3	22.20	24.5
		1	5	22.07	24.5
		3	0	22.07	24.5
		3	2	22.03	24.5
		3	3	22.01	24.5
		6	0	21.00	24.5
	MCH	1	0	22.17	24.5
		1	3	22.25	24.5
		1	5	22.19	24.5
		3	0	21.84	24.5
		3	2	21.82	24.5
		3	3	21.89	24.5
		6	0	20.75	24.5
	HCH	1	0	22.91	24.5

		1	3	23.09	24.5
		1	5	22.95	24.5
		3	0	22.81	24.5
		3	2	22.79	24.5
		3	3	22.85	24.5
		6	0	21.96	24.5

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	Tune-up power (dBm)
		Size	Offset		
QPSK	LCH	1	0	23.00	24.5
		1	7	23.02	24.5
		1	14	22.88	24.5
		8	0	22.13	24.5
		8	4	22.09	24.5
		8	7	22.07	24.5
		15	0	22.03	24.5
	MCH	1	0	22.68	24.5
		1	7	22.81	24.5
		1	14	22.70	24.5
		8	0	21.82	24.5
		8	4	21.84	24.5
		8	7	21.85	24.5
		15	0	21.82	24.5
	HCH	1	0	23.69	24.5
		1	7	23.84	24.5
		1	14	23.82	24.5
		8	0	22.80	24.5
		8	4	22.86	24.5
		8	7	22.88	24.5
		15	0	22.76	24.5
16QAM	LCH	1	0	22.11	24.5
		1	7	22.12	24.5
		1	14	21.97	24.5
		8	0	21.07	24.5
		8	4	21.05	24.5
		8	7	21.01	24.5
		15	0	20.92	24.5
	MCH	1	0	21.97	24.5
		1	7	22.10	24.5
		1	14	22.00	24.5
		8	0	20.89	24.5

		8	4	20.93	24.5
		8	7	20.90	24.5
		15	0	20.81	24.5
	HCH	1	0	22.89	24.5
		1	7	23.06	24.5
		1	14	23.01	24.5
		8	0	21.75	24.5
		8	4	21.80	24.5
		8	7	21.83	24.5
		15	0	21.75	24.5

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	Tune-up power (dBm)
		Size	Offset		
QPSK	LCH	1	0	23.16	24.5
		1	12	23.08	24.5
		1	24	22.93	24.5
		12	0	22.12	24.5
		12	6	22.03	24.5
		12	13	21.98	24.5
		25	0	21.97	24.5
	MCH	1	0	22.77	24.5
		1	12	22.89	24.5
		1	24	22.80	24.5
		12	0	21.86	24.5
		12	6	21.86	24.5
		12	13	21.91	24.5
		25	0	21.82	24.5
	HCH	1	0	23.68	24.5
		1	12	23.89	24.5
		1	24	23.94	24.5
		12	0	22.69	24.5
		12	6	22.74	24.5
		12	13	22.83	24.5
		25	0	22.73	24.5
16QAM	LCH	1	0	22.30	24.5
		1	12	22.24	24.5
		1	24	22.12	24.5
		12	0	21.14	24.5
		12	6	21.08	24.5
		12	13	21.05	24.5
		25	0	20.95	24.5

	MCH	1	0	22.16	24.5
		1	12	22.27	24.5
		1	24	22.18	24.5
		12	0	21.03	24.5
		12	6	21.02	24.5
		12	13	21.06	24.5
		25	0	20.87	24.5
	HCH	1	0	22.54	24.5
		1	12	22.68	24.5
		1	24	22.74	24.5
		12	0	21.72	24.5
		12	6	21.77	24.5
		12	13	21.85	24.5
		25	0	21.73	24.5

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	Tune-up power (dBm)
		Size	Offset		
QPSK	LCH	1	0	23.09	24.5
		1	24	22.88	24.5
		1	49	22.77	24.5
		25	0	21.98	24.5
		25	12	21.89	24.5
		25	25	21.87	24.5
		50	0	21.92	24.5
	MCH	1	0	22.77	24.5
		1	24	22.77	24.5
		1	49	22.82	24.5
		25	0	21.80	24.5
		25	12	21.81	24.5
		25	25	21.87	24.5
		50	0	21.83	24.5
	HCH	1	0	23.33	24.5
		1	24	23.55	24.5
		1	49	23.83	24.5
		25	0	22.45	24.5
		25	12	22.56	24.5
		25	25	22.69	24.5
		50	0	22.56	24.5
16QAM	LCH	1	0	22.18	24.5
		1	24	22.02	24.5
		1	49	21.96	24.5
		25	0	20.93	24.5
		25	12	20.86	24.5
		25	25	20.86	24.5
		50	0	20.89	24.5
	MCH	1	0	22.06	24.5
		1	24	22.06	24.5
		1	49	22.09	24.5
		25	0	20.80	24.5
		25	12	20.85	24.5
		25	25	20.89	24.5
		50	0	20.86	24.5
	HCH	1	0	22.60	24.5
		1	24	22.83	24.5
		1	49	23.08	24.5



		25	0	21.46	24.5
		25	12	21.58	24.5
		25	25	21.69	24.5
		50	0	21.60	24.5

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	Tune-up power (dBm)
		Size	Offset		
QPSK	LCH	1	0	23.11	24.5
		1	37	22.89	24.5
		1	74	22.78	24.5
		37	0	22.16	24.5
		37	18	22.04	24.5
		37	38	21.96	24.5
		75	0	22.06	24.5
	MCH	1	0	22.79	24.5
		1	37	22.87	24.5
		1	74	22.87	24.5
		37	0	21.89	24.5
		37	18	21.89	24.5
		37	38	21.99	24.5
		75	0	21.93	24.5
	HCH	1	0	23.05	24.5
		1	37	23.55	24.5
		1	74	23.89	24.5
		37	0	22.34	24.5
		37	18	22.58	24.5
		37	38	22.80	24.5
		75	0	22.58	24.5
16QAM	LCH	1	0	22.19	24.5
		1	37	22.08	24.5
		1	74	22.05	24.5
		37	0	21.02	24.5
		37	18	20.96	24.5
		37	38	20.89	24.5
		75	0	21.00	24.5
	MCH	1	0	22.08	24.5
		1	37	22.16	24.5
		1	74	22.14	24.5
		37	0	20.88	24.5
		37	18	20.87	24.5
		37	38	20.97	24.5

		75	0	20.93	24.5
	HCH	1	0	22.25	24.5
		1	37	22.68	24.5
		1	74	23.01	24.5
		37	0	21.30	24.5
		37	18	21.51	24.5
		37	38	21.74	24.5
		75	0	21.51	24.5

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	Tune-up power (dBm)
		Size	Offset		
QPSK	LCH	1	0	23.25	24.5
		1	49	22.88	24.5
		1	99	22.91	24.5
		50	0	21.94	24.5
		50	25	21.84	24.5
		50	50	21.85	24.5
		100	0	21.89	24.5
	MCH	1	0	22.92	24.5
		1	49	22.93	24.5
		1	99	23.09	24.5
		50	0	21.84	24.5
		50	25	21.85	24.5
		50	50	21.92	24.5
		100	0	21.88	24.5
	HCH	1	0	22.98	24.5
		1	49	23.36	24.5
		1	99	24.02	24.5
		50	0	23.85	24.5
		50	25	23.85	24.5
		50	50	23.86	24.5
		100	0	22.90	24.5
16QAM	LCH	1	0	22.24	24.5
		1	49	22.03	24.5
		1	99	22.08	24.5
		50	0	20.89	24.5
		50	25	20.83	24.5
		50	50	20.84	24.5
		100	0	20.88	24.5
	MCH	1	0	22.11	24.5
		1	49	22.08	24.5

		1	99	22.23	24.5
		50	0	20.83	24.5
		50	25	20.86	24.5
		50	50	20.93	24.5
		100	0	20.88	24.5
	HCH	1	0	22.27	24.5
		1	49	22.59	24.5
		1	99	23.12	24.5
		50	0	21.12	24.5
		50	25	21.31	24.5
		50	50	21.61	24.5
		100	0	21.30	24.5

**FDD-LTE Band 7:**

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	Tune-up power (dBm)
		Size	Offset		
QPSK	LCH	1	0	22.28	24.0
		1	12	22.48	24.0
		1	24	22.55	24.0
		12	0	21.45	24.0
		12	6	21.50	24.0
		12	13	21.55	24.0
		25	0	21.44	24.0
	MCH	1	0	23.14	24.0
		1	12	23.14	24.0
		1	24	23.07	24.0
		12	0	22.06	24.0
		12	6	22.04	24.0
		12	13	22.04	24.0
		25	0	22.01	24.0
	HCH	1	0	22.06	24.0
		1	12	22.73	24.0
		1	24	22.44	24.0
		12	0	21.13	24.0
		12	6	21.34	24.0
		12	13	21.56	24.0
		25	0	21.38	24.0
16QAM	LCH	1	0	21.64	24.0
		1	12	21.79	24.0
		1	24	21.87	24.0
		12	0	20.52	24.0
		12	6	20.57	24.0
		12	13	20.65	24.0
		25	0	20.42	24.0
	MCH	1	0	22.03	24.0
		1	12	22.04	24.0
		1	24	21.97	24.0
		12	0	21.01	24.0
		12	6	20.98	24.0
		12	13	20.98	24.0
		25	0	20.94	24.0
	HCH	1	0	22.52	24.0

		1	12	22.12	24.0
		1	24	21.81	24.0
		12	0	21.60	24.0
		12	6	21.64	24.0
		12	13	21.29	24.0
		25	0	21.61	24.0

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	Tune-up power (dBm)
		Size	Offset		
QPSK	LCH	1	0	22.36	24.0
		1	24	22.62	24.0
		1	49	22.77	24.0
		25	0	21.51	24.0
		25	12	21.60	24.0
		25	25	21.69	24.0
		50	0	21.58	24.0
	MCH	1	0	23.07	24.0
		1	24	22.97	24.0
		1	49	22.95	24.0
		25	0	22.05	24.0
		25	12	22.02	24.0
		25	25	22.01	24.0
		50	0	22.00	24.0
	HCH	1	0	23.40	24.0
		1	24	23.26	24.0
		1	49	22.11	24.0
		25	0	22.52	24.0
		25	12	22.60	24.0
		25	25	22.37	24.0
		50	0	22.55	24.0
16QAM	LCH	1	0	21.58	24.0
		1	24	21.82	24.0
		1	49	21.96	24.0
		25	0	20.45	24.0
		25	12	20.54	24.0
		25	25	20.61	24.0
		50	0	20.51	24.0
	MCH	1	0	22.26	24.0
		1	24	22.17	24.0
		1	49	22.17	24.0
		25	0	20.97	24.0

		25	12	20.91	24.0
		25	25	20.96	24.0
		50	0	20.90	24.0
	HCH	1	0	22.58	24.0
		1	24	22.70	24.0
		1	49	21.67	24.0
		25	0	21.42	24.0
		25	12	21.50	24.0
		25	25	21.57	24.0
		50	0	21.49	24.0

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	Tune-up power (dBm)
		Size	Offset		
QPSK	LCH	1	0	22.49	24.0
		1	37	22.82	24.0
		1	74	22.89	24.0
		37	0	22.12	24.0
		37	18	22.39	24.0
		37	38	22.46	24.0
		75	0	21.91	24.0
	MCH	1	0	23.13	24.0
		1	37	23.07	24.0
		1	74	22.86	24.0
		37	0	22.23	24.0
		37	18	22.16	24.0
		37	38	22.14	24.0
		75	0	22.18	24.0
	HCH	1	0	23.45	24.0
		1	37	23.51	24.0
		1	74	22.84	24.0
		37	0	21.13	24.0
		37	18	22.02	24.0
		37	38	21.92	24.0
		75	0	22.01	24.0
16QAM	LCH	1	0	21.67	24.0
		1	37	22.09	24.0
		1	74	22.09	24.0
		37	0	20.68	24.0
		37	18	20.83	24.0
		37	38	20.90	24.0
		75	0	20.82	24.0

	MCH	1	0	22.32	24.0
		1	37	22.27	24.0
		1	74	22.13	24.0
		37	0	21.14	24.0
		37	18	21.07	24.0
		37	38	21.04	24.0
		75	0	21.10	24.0
	HCH	1	0	20.96	24.0
		1	37	21.63	24.0
		1	74	21.88	24.0
		37	0	22.02	24.0
		37	18	21.64	24.0
		37	38	21.82	24.0
		75	0	21.65	24.0

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	Tune-up power (dBm)
		Size	Offset		
QPSK	LCH	1	0	21.48	24.0
		1	49	21.79	24.0
		1	99	22.09	24.0
		50	0	20.96	24.0
		50	25	21.25	24.0
		50	50	21.76	24.0
		100	0	21.50	24.0
	MCH	1	0	22.76	24.0
		1	49	23.40	24.0
		1	99	21.52	24.0
		50	0	22.09	24.0
		50	25	22.03	24.0
		50	50	22.02	24.0
		100	0	22.05	24.0
	HCH	1	0	23.59	24.0
		1	49	22.40	24.0
		1	99	22.99	24.0
		50	0	22.72	24.0
		50	25	22.39	24.0
		50	50	21.99	24.0
		100	0	22.41	24.0
16QAM	LCH	1	0	20.25	24.0
		1	49	20.93	24.0
		1	99	21.73	24.0

		50	0	21.07	24.0
		50	25	21.09	24.0
		50	50	21.37	24.0
		100	0	21.05	24.0
	MCH	1	0	22.30	24.0
		1	49	22.23	24.0
		1	99	21.90	24.0
		50	0	21.01	24.0
		50	25	20.96	24.0
		50	50	20.97	24.0
		100	0	21.00	24.0
	HCH	1	0	21.34	24.0
		1	49	21.66	24.0
		1	99	21.99	24.0
		50	0	20.12	24.0
		50	25	20.33	24.0
		50	50	20.61	24.0
		100	0	20.83	24.0

**Remark:**

1. Per KDB941225 D05 v02r05, Start with the largest channel bandwidth then 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.
2. Per KDB941225 D05 v02r05, The procedures required for 1 RB allocation in 5.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.
3. 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 5.2.1 and 5.2.2 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.
4. Per KDB941225 D05 v02r05, For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in 5.2.1, 5.2.2, and 5.2.3 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(2.4G) - Maximum Average Power					
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
802.11b	1Mbps	CH 01	2412	10.97	11.5
		CH 06	2437	10.54	11.5
		CH 11	2462	10.53	11.5
802.11g	54Mbps	CH 01	2412	9.02	9.5
		CH 06	2437	7.53	9.5
		CH 11	2462	8.27	9.5
802.11n (20MHz)	MCS7	CH 01	2412	8.43	9.0
		CH 06	2437	7.4	9.0
		CH 11	2462	8.24	9.0
802.11n (40MHz)	MCS7	CH 03	2422	7.42	8.5
		CH 06	2437	7.08	8.5
		CH 09	2452	8.27	8.5

WLAN(5.2G) - Maximum Average Power				
Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
A20	CH 36	5180	5.76	6.5
	CH 40	5200	6.15	6.5
	CH 48	5240	5.89	6.5
N20	CH 36	5180	7.88	9.0
	CH 40	5200	8.52	9.0
	CH 48	5240	8.51	9.0
N40	CH 38	5190	5.57	6.5
	CH46	5230	6.35	6.5

WLAN(5.3G) - Maximum Average Power				
Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
A20	CH 52	5260	6.57	7.0
	CH 56	5280	6.23	7.0
	CH 64	5320	6.08	7.0
N20	CH 52	5260	5.28	7.5
	CH 56	5280	7.23	7.5
	CH 64	5320	7.16	7.5
N40	CH 54	5270	5.27	5.5
	CH 62	5310	5.31	5.5

WLAN(5.6G) - Maximum Average Power				
Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
A20	CH100	5500	5.05	5.5
	CH120	5600	4.82	5.5
	CH140	5700	5.21	5.5
N20	CH100	5500	5.33	6.0
	CH120	5600	5.87	6.0
	CH140	5700	5.13	6.0
N40	CH102	5510	5.61	6.0
	CH118	5590	4.95	6.0

WLAN(5.8G) - Maximum Average Power				
Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
A20	CH149	5745	5.17	5.5
	CH157	5785	4.9	5.5
	CH165	5825	5.14	5.5
N20	CH149	5745	5.73	6.0
	CH157	5785	5.89	6.0
	CH165	5825	5.39	6.0
N40	CH151	5755	4.79	5.0
	CH159	5795	4.2	5.0

**Remark:**

1. Per KDB 248227 D01 v02r02, For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions.
2. Per KDB 248227 D01 v02r02, For 802.11b DSSS SAR measurements ,when the reported SAR of the highest measured maximum output power channel (see 3.1) for the exposure configuration is  $\leq 0.8$  W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration. When the reported SAR is  $> 0.8$  W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is  $> 1.2$  W/kg, SAR is required for the third channel; i.e., all channels require testing.
- 3 .For OFDM modes (802.11g/n), SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and it is  $\leq 1.2$ W/kg.
4. Per KDB 248227 D01 v02r02, SAR is not required for the following U-NII-1 and U-NII-2A bands conditions.
  - a. When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is  $\leq 1.2$  W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.
  - b. When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to

higher specified maximum output power for the two bands. When the adjusted SAR is  $\leq 1.2$  W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

5. WLAN(5.6G) and WLAN(5.8G) maximum output power is 5.87dBm and 5.89dBm *respectively*, and Maximum Tune-Up output power both is 6.0dBm. So WLAN(5.8G) is more conservative. 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:

$[(\text{max. power of channel, including tune-up tolerance, 4.87mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for

1-g SAR and  $\leq 7.5$  for 10-g extremity SAR,16 where

-  $f(\text{GHz})$  is the RF channel transmit frequency in GHz

- Power and distance are rounded to the nearest mW and mm before calculation17

- The result is rounded to one decimal place for comparison

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	Result	Limit
6.0	3.98	5	5785	1.91	3

The exclusion thresholds is  $1.91 < 3$ , therefore, the RF exposure evaluation is not required.

Bluetooth - Maximum Average Power			
Test Mode	Data Rate	Average Power(dBm)	Tune-up power (dBm)
GFSK	1Mbps	0.427	1.0
Pi/4 QDPSK	2Mbps	-0.049	1.0
8DPSK	3Mbps	0.252	1.0

Bluetooth - Maximum Average Power					
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
BLE	1Mbps	CH 00	2402	-2.767	-5.0
		CH 19	2440	-2.594	-5.0
		CH 39	2480	-4.438	-5.0

**Remark:**

Bluetooth maximum output power is 0.427dBm, and Maximum Tune-Up output power is 1.0dBm. 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:

$[(\text{max. power of channel, including tune-up tolerance, } 4.87\text{mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f}(\text{GHz})] \leq 3.0$  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
1.0	1.26	5	2.402	0.39	3

The exclusion thresholds is  $0.39 < 3$ , 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	128	824.2	32.36	32.5	1.033	0.247	0.255
2.	GSM	Right Tilted	128	824.2	32.36	32.5	1.033	0.064	0.066
3.	GSM	Left Cheek	128	824.2	32.36	32.5	1.033	0.204	0.211
4.	GSM	Left Tilted	128	824.2	32.36	32.5	1.033	0.038	0.039

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	30.16	30.5	1.081	0.099	0.107
6.	GSM	Right Tilted	512	1850.2	30.16	30.5	1.081	0.074	0.080
7.	GSM	Left Cheek	512	1850.2	30.16	30.5	1.081	0.164	0.177
8.	GSM	Left Tilted	512	1850.2	30.16	30.5	1.081	0.078	0.084

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	128	824.2	30.53	31.0	1.114	0.508	0.566
10.	GPRS_3TX	Right Tilted	128	824.2	30.53	31.0	1.114	0.045	0.050
11.	GPRS_3TX	Left Cheek	128	824.2	30.53	31.0	1.114	0.451	0.503
12.	GPRS_3TX	Left Tilted	128	824.2	30.53	31.0	1.114	0.067	0.075

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_3TX	Right Cheek	512	1850.2	28.34	28.5	1.038	0.152	0.158
14.	GPRS_3TX	Right Tilted	512	1850.2	28.34	28.5	1.038	0.037	0.038
15.	GPRS_3TX	Left Cheek	512	1850.2	28.34	28.5	1.038	0.403	0.418
16.	GPRS_3TX	Left Tilted	512	1850.2	28.34	28.5	1.038	0.061	0.063

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	22.59	23.0	1.099	0.084	0.092
18.	RMC	Right Tilted	9400	1880.0	22.59	23.0	1.099	0.041	0.045
19.	RMC	Left Cheek	9400	1880.0	22.59	23.0	1.099	0.190	0.209
20.	RMC	Left Tilted	9400	1880.0	22.59	23.0	1.099	0.037	0.041

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	22.98	23.5	1.127	0.166	0.187
22.	RMC	Right Tilted	4132	826.4	22.98	23.5	1.127	0.064	0.072
23.	RMC	Left Cheek	4132	826.4	22.98	23.5	1.127	0.156	0.176
24.	RMC	Left Tilted	4132	826.4	22.98	23.5	1.127	0.045	0.051

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					
25.	RMC QPSK 20MHz 1RB	Right Cheek	1745.0	24.02	24.5	1.117	0.057	0.064
26.	RMC QPSK 20MHz 1RB	Right Tilted	1745.0	24.02	24.5	1.117	0.006	0.007
27.	RMC QPSK 20MHz 1RB	Left Cheek	1745.0	24.02	24.5	1.117	0.092	0.103
28.	RMC QPSK 20MHz 1RB	Left Tilted	1745.0	24.02	24.5	1.117	0.008	0.009
29.	RMC QPSK 20MHz 50%RB	Right Cheek	1745.0	23.86	24.0	1.033	0.046	0.048
30.	RMC QPSK 20MHz 50%RB	Right Tilted	1745.0	23.86	24.0	1.033	0.005	0.005
31.	RMC QPSK 20MHz 50%RB	Left Cheek	1745.0	23.86	24.0	1.033	0.084	0.087
32.	RMC QPSK 20MHz 50%RB	Left Tilted	1745.0	23.86	24.0	1.033	0.007	0.007

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					
33.	RMC QPSK 20MHz 1RB	Right Cheek	2560.0	23.59	24.0	1.099	0.046	0.051
34.	RMC QPSK 20MHz 1RB	Right Tilted	2560.0	23.59	24.0	1.099	0.006	0.007
35.	RMC QPSK 20MHz 1RB	Left Cheek	2560.0	23.59	24.0	1.099	0.084	0.092
36.	RMC QPSK 20MHz 1RB	Left Tilted	2560.0	23.59	24.0	1.099	0.009	0.010
37.	RMC QPSK 20MHz 50%RB	Right Cheek	2560.0	22.72	23.0	1.067	0.040	0.043
38.	RMC QPSK 20MHz 50%RB	Right Tilted	2560.0	22.72	23.0	1.067	0.004	0.004
39.	RMC QPSK 20MHz 50%RB	Left Cheek	2560.0	22.72	23.0	1.067	0.079	0.084
40.	RMC QPSK 20MHz 50%RB	Left Tilted	2560.0	22.72	23.0	1.067	0.006	0.006

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					
41.	802.11b	Right Cheek	01	2412	10.97	11.5	1.130	0.052	0.059
42.	802.11b	Right Tilted	01	2412	10.97	11.5	1.130	0.024	0.027
43.	802.11b	Left Cheek	01	2412	10.97	11.5	1.130	0.125	0.141
44.	802.11b	Left Tilted	01	2412	10.97	11.5	1.130	0.014	0.016

WLAN 5.2GH – 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					
45.	11n.n20	Right Cheek	40	5200	8.52	9.0	1.117	0.293	0.327
46.	11n.n20	Right Tilted	40	5200	8.52	9.0	1.117	0.041	0.046
47.	11n.n20	Left Cheek	40	5200	8.52	9.0	1.117	0.248	0.277
48.	11n.n20	Left Tilted	40	5200	8.52	9.0	1.117	0.037	0.041

**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					
49.	GSM	Back	128	824.2	32.36	32.5	1.033	0.244	0.252
50.	GSM	Front	128	824.2	32.36	32.5	1.033	0.326	0.337

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					
51.	GSM	Back	512	1850.2	30.16	30.5	1.081	0.300	0.324
52.	GSM	Front	512	1850.2	30.16	30.5	1.081	0.480	0.519

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					
63	RMC 12.2k	Back Side	9400	1880.0	22.59	23.0	1.099	0.318	0.349
64	RMC 12.2k	Front Side	9400	1880.0	22.59	23.0	1.099	0.430	0.473

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					
67	RMC 12.2k	Back Side	4132	826.4	22.98	23.5	1.127	0.180	0.203
68	RMC 12.2k	Front Side	4132	826.4	22.98	23.5	1.127	0.221	0.249

LTE Band 4–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Freque ncy	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
71	RMC QPSK 20MHz 1RB	Back Side	1745.0	24.02	24.5	1.117	0.148	0.165
72	RMC QPSK 20MHz 1RB	Front Side	1745.0	24.02	24.5	1.117	0.190	0.212
75	RMC QPSK 20MHz 50%RB	Back Side	1745.0	23.86	24.0	1.033	0.125	0.129
76	RMC QPSK 20MHz 50%RB	Front Side	1745.0	23.86	24.0	1.033	0.150	0.155



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					
79	RMC QPSK 20MHz 1RB	Back Side	2560.0	23.59	24.0	1.099	0.359	0.395
80	RMC QPSK 20MHz 1RB	Front Side	2560.0	23.59	24.0	1.099	0.368	0.404
83	RMC QPSK 20MHz 50%RB	Back Side	2560.0	22.72	23.0	1.067	0.328	0.350
84	RMC QPSK 20MHz 50%RB	Front Side	2560.0	22.72	23.0	1.067	0.336	0.358

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					
87	802.11b	Back Side	01	2412	10.97	11.5	1.130	0.094	0.106
88	802.11b	Front Side	01	2412	10.97	11.5	1.130	0.061	0.069

WLAN 5.2GHz –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					
90	11n.n20	Back Side	40	5200	8.52	9.0	1.117	0.073	0.082
91	11n.n20	Front Side	40	5200	8.52	9.0	1.117	0.073	0.082

**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					
53.	GPRS_3TX	Back Side	128	824.2	30.53	31.0	1.114	0.553	0.616
54.	GPRS_3TX	Front Side	128	824.2	30.53	31.0	1.114	0.671	0.748
55.	GPRS_3TX	Bottom side	128	824.2	30.53	31.0	1.114	0.470	0.524
56.	GPRS_3TX	Left side	128	824.2	30.53	31.0	1.114	0.048	0.053

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					
57.	GPRS_3TX	Back Side	512	1850.2	28.34	28.5	1.038	0.677	0.702
58.	GPRS_3TX	Front Side	512	1850.2	28.34	28.5	1.038	1.108	1.150
59.	GPRS_3TX	Front Side	661	1880	28.06	28.5	1.107	1.01	1.118
60.	GPRS_3TX	Front Side	810	1909.8	27.83	28.5	1.167	1.026	1.197
61.	GPRS_3TX	Bottom side	512	1850.2	28.34	28.5	1.038	0.697	0.723
62.	GPRS_3TX	Left side	512	1850.2	28.34	28.5	1.038	0.074	0.077

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					
63.	RMC 12.2k	Back Side	9400	1880.0	22.59	23.0	1.099	0.318	0.349
64.	RMC 12.2k	Front Side	9400	1880.0	22.59	23.0	1.099	0.430	0.473
65.	RMC 12.2k	Bottom side	9400	1880.0	22.59	23.0	1.099	0.370	0.407
66.	RMC 12.2k	Left side	9400	1880.0	22.59	23.0	1.099	0.034	0.037

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					
67.	RMC 12.2k	Back Side	4132	826.4	22.98	23.5	1.127	0.18	0.203
68.	RMC 12.2k	Front Side	4132	826.4	22.98	23.5	1.127	0.221	0.249
69.	RMC 12.2k	Bottom side	4132	826.4	22.98	23.5	1.127	0.170	0.192
70.	RMC 12.2k	Left side	4132	826.4	22.98	23.5	1.127	0.044	0.050

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					
71.	RMC QPSK 20MHz 1RB	Back Side	1745.0	24.02	24.5	1.117	0.148	0.165
72.	RMC QPSK 20MHz 1RB	Front Side	1745.0	24.02	24.5	1.117	0.190	0.212
73.	RMC QPSK 20MHz 1RB	Bottom side	1745.0	24.02	24.5	1.117	0.187	0.209
74.	RMC QPSK 20MHz 1RB	Left side	1745.0	24.02	24.5	1.117	0.074	0.083
75.	RMC QPSK 20MHz 50%RB	Back Side	1745.0	23.86	24.0	1.033	0.125	0.129
76.	RMC QPSK 20MHz 50%RB	Front Side	1745.0	23.86	24.0	1.033	0.150	0.155
77.	RMC QPSK 20MHz 50%RB	Bottom side	1745.0	23.86	24.0	1.033	0.164	0.169
78.	RMC QPSK 20MHz 50%RB	Left side	1745.0	23.86	24.0	1.033	0.052	0.054

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					
79.	RMC QPSK 20MHz 1RB	Back Side	2560.0	23.59	24.0	1.099	0.359	0.395
80.	RMC QPSK 20MHz 1RB	Front Side	2560.0	23.59	24.0	1.099	0.368	0.404
81.	RMC QPSK 20MHz 1RB	Bottom side	2560.0	23.59	24.0	1.099	0.496	0.545
82.	RMC QPSK 20MHz 1RB	Left side	2560.0	23.59	24.0	1.099	0.032	0.035
83.	RMC QPSK 20MHz 50%RB	Back Side	2560.0	22.72	23.0	1.067	0.328	0.350
84.	RMC QPSK 20MHz 50%RB	Front Side	2560.0	22.72	23.0	1.067	0.336	0.358
85.	RMC QPSK 20MHz 50%RB	Bottom side	2560.0	22.72	23.0	1.067	0.453	0.483
86.	RMC QPSK 20MHz 50%RB	Left side	2560.0	22.72	23.0	1.067	0.021	0.022

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					
87.	802.11b	Back Side	01	2412	10.97	11.5	1.130	0.094	0.106
88.	802.11b	Front Side	01	2412	10.97	11.5	1.130	0.061	0.069
89.	802.11b	Top Side	01	2412	10.97	11.5	1.130	0.035	0.040

**Remark:**

1. The EUT do not support 5G Hotspot function.

## Extremity SAR

WLAN 5.2GHz –Extremity SAR Test (Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR10g (W/kg)	Scaled SAR10g (W/kg)
			CH.	MHz					
92	11n.n20	Back Side	40	5200	8.52	9.0	1.117	0.095	0.106
93	11n.n20	Front Side	40	5200	8.52	9.0	1.117	0.085	0.095
94	11n.n20	Top Side	40	5200	8.52	9.0	1.117	0.054	0.060

### 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:

1. GSM and WCDMA and LTE share the same antenna, and cannot transmit simultaneously.
2. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3. 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:

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[ $\sqrt{f(\text{GHz})/x}$ ] 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
1.0	1.26	5/10	2.402	7.5	0.052	0.026

#### WIFI(5.8G):

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	X	SAR(1g) 5mm	SAR(1g) 10mm
6.0	3.98	5/10	5785	7.5	0.255	0.128

4. The maximum SAR summation is calculated based on the same configuration and test position.
5. WLAN 2.4GHz and WLAN 5GHz share the same antenna, and cannot transmit simultaneously.

## Head SAR

### WWAN and WLAN

	WWAN		WLAN(2.4G)	Summed SAR (W/kg)
Position	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Right Cheek	GSM850	0.255	0.059	0.314
Right Tilted	GSM850	0.066	0.027	0.093
Left Cheek	GSM850	0.211	0.141	0.352
Left Tilted	GSM850	0.039	0.016	0.055
Right Cheek	GSM1900	0.107	0.059	0.166
Right Tilted	GSM1900	0.080	0.027	0.107
Left Cheek	GSM1900	0.177	0.141	0.318
Left Tilted	GSM1900	0.084	0.016	0.1
Right Cheek	GPRS850	0.566	0.059	0.625
Right Tilted	GPRS850	0.050	0.027	0.077
Left Cheek	GPRS850	0.503	0.141	<b>0.644</b>
Left Tilted	GPRS850	0.075	0.016	0.091
Right Cheek	GPRS1900	0.158	0.059	0.217
Right Tilted	GPRS1900	0.038	0.027	0.065
Left Cheek	GPRS1900	0.418	0.141	0.559
Left Tilted	GPRS1900	0.063	0.016	0.079
Right Cheek	WCDMA Band 2	0.092	0.059	0.151
Right Tilted	WCDMA Band 2	0.045	0.027	0.072
Left Cheek	WCDMA Band 2	0.209	0.141	0.35
Left Tilted	WCDMA Band 2	0.041	0.016	0.057
Right Cheek	WCDMA Band 5	0.187	0.059	0.246
Right Tilted	WCDMA Band 5	0.072	0.027	0.099
Left Cheek	WCDMA Band 5	0.176	0.141	0.317
Left Tilted	WCDMA Band 5	0.051	0.016	0.067
Right Cheek	LTE Band 4	0.064	0.059	0.123
Right Tilted	LTE Band 4	0.007	0.027	0.034
Left Cheek	LTE Band 4	0.103	0.141	0.244
Left Tilted	LTE Band 4	0.009	0.016	0.025
Right Cheek	LTE Band 7	0.051	0.059	0.11
Right Tilted	LTE Band 7	0.007	0.027	0.034
Left Cheek	LTE Band 7	0.092	0.141	0.233
Left Tilted	LTE Band 7	0.010	0.016	0.026

Position	WWAN		WLAN(5.2G)	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Right Cheek	GSM850	0.255	0.327	0.582
Right Tilted	GSM850	0.066	0.046	0.112
Left Cheek	GSM850	0.211	0.277	0.488
Left Tilted	GSM850	0.039	0.041	0.08
Right Cheek	GSM1900	0.107	0.327	0.434
Right Tilted	GSM1900	0.080	0.046	0.126
Left Cheek	GSM1900	0.177	0.277	0.454
Left Tilted	GSM1900	0.084	0.041	0.125
Right Cheek	GPRS850	0.566	0.327	<b>0.893</b>
Right Tilted	GPRS850	0.050	0.046	0.096
Left Cheek	GPRS850	0.503	0.277	0.78
Left Tilted	GPRS850	0.075	0.041	0.116
Right Cheek	GPRS1900	0.158	0.327	0.485
Right Tilted	GPRS1900	0.038	0.046	0.084
Left Cheek	GPRS1900	0.418	0.277	0.695
Left Tilted	GPRS1900	0.063	0.041	0.104
Right Cheek	WCDMA Band 2	0.092	0.327	0.419
Right Tilted	WCDMA Band 2	0.045	0.046	0.091
Left Cheek	WCDMA Band 2	0.209	0.277	0.486
Left Tilted	WCDMA Band 2	0.041	0.041	0.082
Right Cheek	WCDMA Band 5	0.187	0.327	0.514
Right Tilted	WCDMA Band 5	0.072	0.046	0.118
Left Cheek	WCDMA Band 5	0.176	0.277	0.453
Left Tilted	WCDMA Band 5	0.051	0.041	0.092
Right Cheek	LTE Band 4	0.064	0.327	0.391
Right Tilted	LTE Band 4	0.007	0.046	0.053
Left Cheek	LTE Band 4	0.103	0.277	0.38
Left Tilted	LTE Band 4	0.009	0.041	0.05
Right Cheek	LTE Band 7	0.051	0.327	0.378
Right Tilted	LTE Band 7	0.007	0.046	0.053
Left Cheek	LTE Band 7	0.092	0.277	0.369
Left Tilted	LTE Band 7	0.010	0.041	0.051

	WWAN		WLAN(5.8G)	Summed SAR (W/kg)
Position	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Right Cheek	GSM850	0.255	0.255	0.51
Right Tilted	GSM850	0.066	0.255	0.321
Left Cheek	GSM850	0.211	0.255	0.466
Left Tilted	GSM850	0.039	0.255	0.294
Right Cheek	GSM1900	0.107	0.255	0.362
Right Tilted	GSM1900	0.080	0.255	0.335
Left Cheek	GSM1900	0.177	0.255	0.432
Left Tilted	GSM1900	0.084	0.255	0.339
Right Cheek	GPRS850	0.566	0.255	<b>0.821</b>
Right Tilted	GPRS850	0.050	0.255	0.305
Left Cheek	GPRS850	0.503	0.255	0.758
Left Tilted	GPRS850	0.075	0.255	0.33
Right Cheek	GPRS1900	0.158	0.255	0.413
Right Tilted	GPRS1900	0.038	0.255	0.293
Left Cheek	GPRS1900	0.418	0.255	0.673
Left Tilted	GPRS1900	0.063	0.255	0.318
Right Cheek	WCDMA Band 2	0.092	0.255	0.347
Right Tilted	WCDMA Band 2	0.045	0.255	0.3
Left Cheek	WCDMA Band 2	0.209	0.255	0.464
Left Tilted	WCDMA Band 2	0.041	0.255	0.296
Right Cheek	WCDMA Band 5	0.187	0.255	0.442
Right Tilted	WCDMA Band 5	0.072	0.255	0.327
Left Cheek	WCDMA Band 5	0.176	0.255	0.431
Left Tilted	WCDMA Band 5	0.051	0.255	0.306
Right Cheek	LTE Band 4	0.064	0.255	0.319
Right Tilted	LTE Band 4	0.007	0.255	0.262
Left Cheek	LTE Band 4	0.103	0.255	0.358
Left Tilted	LTE Band 4	0.009	0.255	0.264
Right Cheek	LTE Band 7	0.051	0.255	0.306
Right Tilted	LTE Band 7	0.007	0.255	0.262
Left Cheek	LTE Band 7	0.092	0.255	0.347
Left Tilted	LTE Band 7	0.010	0.255	0.265



**WWAN and Bluetooth**

	<b>WWAN</b>		<b>Bluetooth</b>	<b>Summed SAR (W/kg)</b>
<b>Position</b>	<b>Band</b>	<b>Scaled SAR (W/kg)</b>	<b>Scaled SAR (W/kg)</b>	
Right Cheek	GSM850	0.255	0.052	0.307
Right Tilted	GSM850	0.066	0.052	0.118
Left Cheek	GSM850	0.211	0.052	0.263
Left Tilted	GSM850	0.039	0.052	0.091
Right Cheek	GSM1900	0.107	0.052	0.159
Right Tilted	GSM1900	0.080	0.052	0.132
Left Cheek	GSM1900	0.177	0.052	0.229
Left Tilted	GSM1900	0.084	0.052	0.136
Right Cheek	GPRS850	0.566	0.052	<b>0.618</b>
Right Tilted	GPRS850	0.050	0.052	0.102
Left Cheek	GPRS850	0.503	0.052	0.555
Left Tilted	GPRS850	0.075	0.052	0.127
Right Cheek	GPRS1900	0.158	0.052	0.21
Right Tilted	GPRS1900	0.038	0.052	0.09
Left Cheek	GPRS1900	0.418	0.052	0.47
Left Tilted	GPRS1900	0.063	0.052	0.115
Right Cheek	WCDMA Band 2	0.092	0.052	0.144
Right Tilted	WCDMA Band 2	0.045	0.052	0.097
Left Cheek	WCDMA Band 2	0.209	0.052	0.261
Left Tilted	WCDMA Band 2	0.041	0.052	0.093
Right Cheek	WCDMA Band 5	0.187	0.052	0.239
Right Tilted	WCDMA Band 5	0.072	0.052	0.124
Left Cheek	WCDMA Band 5	0.176	0.052	0.228
Left Tilted	WCDMA Band 5	0.051	0.052	0.103
Right Cheek	LTE Band 4	0.064	0.052	0.116
Right Tilted	LTE Band 4	0.007	0.052	0.059
Left Cheek	LTE Band 4	0.103	0.052	0.155
Left Tilted	LTE Band 4	0.009	0.052	0.061
Right Cheek	LTE Band 7	0.051	0.052	0.103
Right Tilted	LTE Band 7	0.007	0.052	0.059
Left Cheek	LTE Band 7	0.092	0.052	0.144
Left Tilted	LTE Band 7	0.010	0.052	0.062

# Body-worn SAR

## WWAN and WLAN

	WWAN		WLAN(2.4G)	Summed SAR (W/kg)
Position	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.616	0.106	0.722
Front	GSM850	0.748	0.069	0.817
Back	GSM1900	0.702	0.106	0.808
Front	GSM1900	1.197	0.069	<b>1.266</b>
Back	WCDMA Band 2	0.349	0.106	0.455
Front	WCDMA Band 2	0.473	0.069	0.542
Back	WCDMA Band 5	0.203	0.106	0.309
Front	WCDMA Band 5	0.249	0.069	0.318
Back	LTE Band 4	0.165	0.106	0.271
Front	LTE Band 4	0.212	0.069	0.281
Back	LTE Band 7	0.395	0.106	0.501
Front	LTE Band 7	0.404	0.069	0.473

	WWAN		WLAN(5.2G)	Summed SAR (W/kg)
Position	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.616	0.082	0.698
Front	GSM850	0.748	0.082	0.83
Back	GSM1900	0.702	0.082	0.784
Front	GSM1900	1.197	0.082	<b>1.279</b>
Back	WCDMA Band 2	0.349	0.082	0.431
Front	WCDMA Band 2	0.473	0.082	0.555
Back	WCDMA Band 5	0.203	0.082	0.285
Front	WCDMA Band 5	0.249	0.082	0.331
Back	LTE Band 4	0.165	0.082	0.247
Front	LTE Band 4	0.212	0.082	0.294
Back	LTE Band 7	0.395	0.082	0.477
Front	LTE Band 7	0.404	0.082	0.486

	WWAN		WLAN(5.8G)	Summed SAR (W/kg)
Position	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.616	0.128	0.744
Front	GSM850	0.748	0.128	0.876
Back	GSM1900	0.702	0.128	0.83
Front	GSM1900	1.197	0.128	<b>1.325</b>
Back	WCDMA Band 2	0.349	0.128	0.477
Front	WCDMA Band 2	0.473	0.128	0.601
Back	WCDMA Band 5	0.203	0.128	0.331
Front	WCDMA Band 5	0.249	0.128	0.377
Back	LTE Band 4	0.165	0.128	0.293
Front	LTE Band 4	0.212	0.128	0.34
Back	LTE Band 7	0.395	0.128	0.523
Front	LTE Band 7	0.404	0.128	0.532

**WWAN and Bluetooth**

	<b>WWAN</b>		<b>Bluetooth</b>	<b>Summed SAR (W/kg)</b>
<b>Position</b>	<b>Band</b>	<b>Scaled SAR (W/kg)</b>	<b>Scaled SAR (W/kg)</b>	
Back	GSM850	0.616	0.026	0.642
Front	GSM850	0.748	0.026	0.774
Back	GSM1900	0.702	0.026	0.728
Front	GSM1900	1.197	0.026	<b>1.223</b>
Back	WCDMA Band 2	0.349	0.026	0.375
Front	WCDMA Band 2	0.473	0.026	0.499
Back	WCDMA Band 5	0.203	0.026	0.229
Front	WCDMA Band 5	0.249	0.026	0.275
Back	LTE Band 4	0.165	0.026	0.191
Front	LTE Band 4	0.212	0.026	0.238
Back	LTE Band 7	0.395	0.026	0.421
Front	LTE Band 7	0.404	0.026	0.43

## Hotspot SAR

### WWAN and WLAN

	WWAN		WLAN(2.4G)	Summed SAR (W/kg)
Position	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.616	0.106	0.722
Front	GSM850	0.748	0.069	0.817
Top side	GSM850	--	0.040	0.040
Bottom side	GSM850	0.524	--	0.524
Right side	GSM850	--	--	--
Left side	GSM850	0.053	--	0.053
Back	GSM1900	0.702	0.106	0.808
Front	GSM1900	1.197	0.069	<b>1.266</b>
Top side	GSM1900	--	0.040	0.040
Bottom side	GSM1900	0.723	--	0.723
Right side	GSM1900	--	--	--
Left side	GSM1900	0.077	--	0.077
Back	WCDMA Band 2	0.349	0.106	0.455
Front	WCDMA Band 2	0.473	0.069	0.542
Top side	WCDMA Band 2	--	0.040	0.040
Bottom side	WCDMA Band 2	0.407	--	0.407
Right side	WCDMA Band 2	--	--	--
Left side	WCDMA Band 2	0.037	--	0.037
Back	WCDMA Band 5	0.203	0.106	0.309
Front	WCDMA Band 5	0.249	0.069	0.318
Top side	WCDMA Band 5	--	0.040	0.040
Bottom side	WCDMA Band 5	0.192	--	0.192
Right side	WCDMA Band 5	--	--	--
Left side	WCDMA Band 5	0.050	--	0.050
Back	LTE Band 4	0.165	0.106	0.271
Front	LTE Band 4	0.212	0.069	0.281
Top side	LTE Band 4	--	0.040	0.040
Bottom side	LTE Band 4	0.209	--	0.209
Right side	LTE Band 4	--	--	--
Left side	LTE Band 4	0.083	--	0.083
Back	LTE Band 7	0.395	0.106	0.501
Front	LTE Band 7	0.404	0.069	0.473
Top side	LTE Band 7	--	0.040	0.040
Bottom side	LTE Band 7	0.545	--	0.545
Right side	LTE Band 7	--	--	--
Left side	LTE Band 7	0.035	--	0.035

**WWAN and Bluetooth**

	WWAN		Bluetooth	Summed SAR (W/kg)
Position	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.616	0.026	0.642
Front	GSM850	0.748	0.026	0.774
Top side	GSM850	--	0.026	0.026
Bottom side	GSM850	0.524	--	0.524
Right side	GSM850	--	--	--
Left side	GSM850	0.053	--	0.053
Back	GSM1900	0.702	0.026	0.728
Front	GSM1900	1.197	0.026	<b>1.223</b>
Top side	GSM1900	--	0.026	0.026
Bottom side	GSM1900	0.723	--	0.723
Right side	GSM1900	--	--	--
Left side	GSM1900	0.077	--	0.077
Back	WCDMA Band 2	0.349	0.026	0.375
Front	WCDMA Band 2	0.473	0.026	0.499
Top side	WCDMA Band 2	--	0.026	0.026
Bottom side	WCDMA Band 2	0.407	--	0.407
Right side	WCDMA Band 2	--	--	--
Left side	WCDMA Band 2	0.037	--	0.037
Back	WCDMA Band 5	0.203	0.026	0.229
Front	WCDMA Band 5	0.249	0.026	0.275
Top side	WCDMA Band 5	--	0.026	0.026
Bottom side	WCDMA Band 5	0.192	--	0.192
Right side	WCDMA Band 5	--	--	--
Left side	WCDMA Band 5	0.050	--	0.050
Back	LTE Band 4	0.165	0.026	0.191
Front	LTE Band 4	0.212	0.026	0.238
Top side	LTE Band 4	--	0.026	0.026
Bottom side	LTE Band 4	0.209	--	0.209
Right side	LTE Band 4	--	--	--
Left side	LTE Band 4	0.083	--	0.083
Back	LTE Band 7	0.395	0.026	0.421
Front	LTE Band 7	0.404	0.026	0.43
Top side	LTE Band 7	--	0.026	0.026
Bottom side	LTE Band 7	0.545	--	0.545
Right side	LTE Band 7	--	--	--
Left side	LTE Band 7	0.035	--	0.035

# Extremity SAR

## WWAN and WLAN

	WWAN		WLAN(5.2G)	Summed SAR (W/kg)
Position	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	--	0.106	<b>0.106</b>
Front	GSM850	--	0.095	0.095
Top side	GSM850	--	0.060	0.060
Bottom side	GSM850	--	--	--
Right side	GSM850	--	--	--
Left side	GSM850	--	--	--
Back	GSM1900	--	0.106	0.106
Front	GSM1900	--	0.095	0.095
Top side	GSM1900	--	0.060	0.060
Bottom side	GSM1900	--	--	--
Right side	GSM1900	--	--	--
Left side	GSM1900	--	--	--
Back	WCDMA Band 2	--	0.106	0.106
Front	WCDMA Band 2	--	0.095	0.095
Top side	WCDMA Band 2	--	0.060	0.060
Bottom side	WCDMA Band 2	--	--	--
Right side	WCDMA Band 2	--	--	--
Left side	WCDMA Band 2	--	--	--
Back	WCDMA Band 5	--	0.106	0.106
Front	WCDMA Band 5	--	0.095	0.095
Top side	WCDMA Band 5	--	0.060	0.060
Bottom side	WCDMA Band 5	--	--	--
Right side	WCDMA Band 5	--	--	--
Left side	WCDMA Band 5	--	--	--
Back	LTE Band 4	--	0.106	0.106
Front	LTE Band 4	--	0.095	0.095
Top side	LTE Band 4	--	0.060	0.060
Bottom side	LTE Band 4	--	--	--
Right side	LTE Band 4	--	--	--
Left side	LTE Band 4	--	--	--
Back	LTE Band 7	--	0.106	0.106
Front	LTE Band 7	--	0.095	0.095
Top side	LTE Band 7	--	0.060	0.060
Bottom side	LTE Band 7	--	--	--
Right side	LTE Band 7	--	--	--
Left side	LTE Band 7	--	--	--

## 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	E.3.2	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: 11/27/2017

Measurement duration: 7 minutes 21 seconds

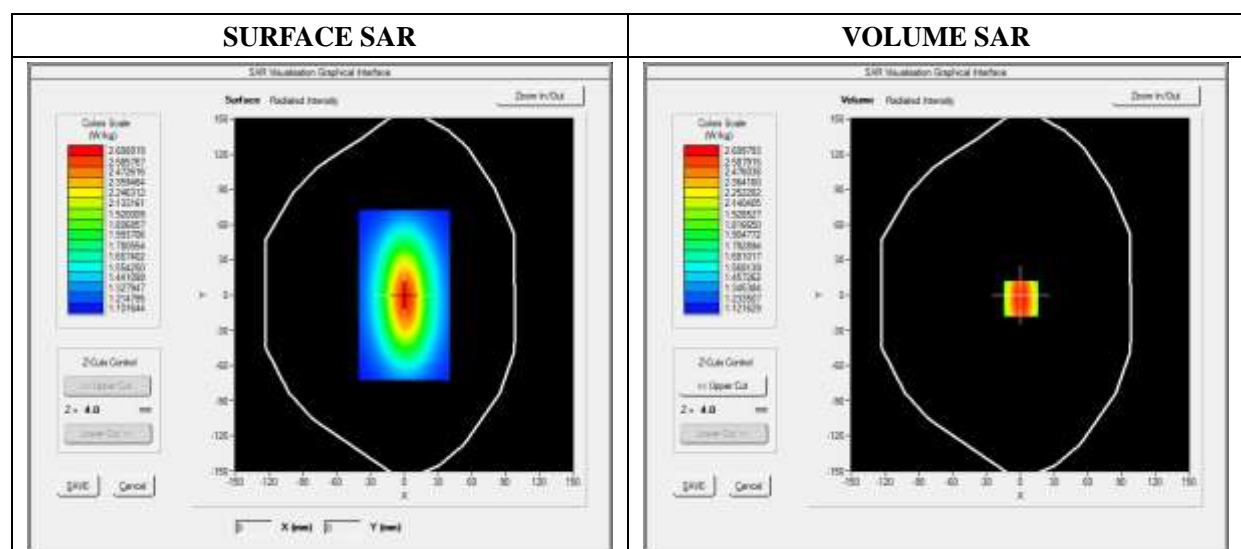
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2017

#### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
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)	41.110245
Conductivity (S/m)	0.871245
Power Variation (%)	0.038437
Ambient Temperature	21.1
Liquid Temperature	21.3

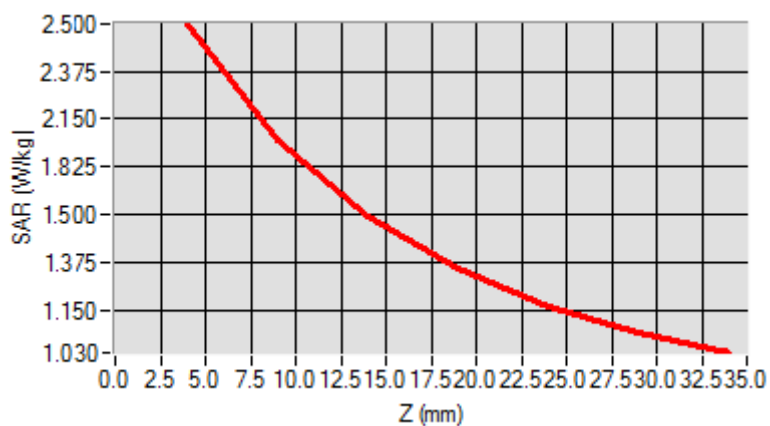


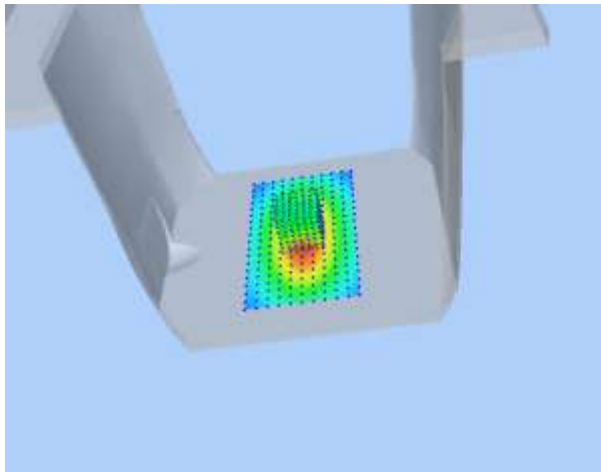
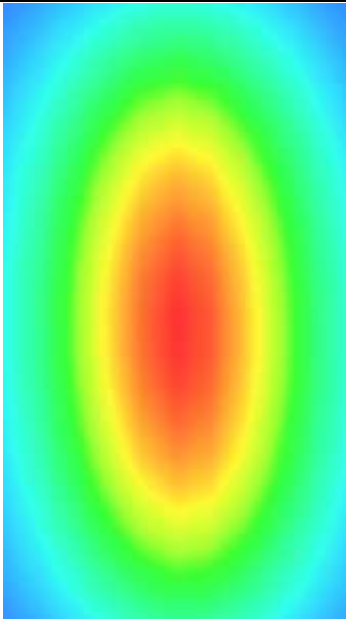
Maximum location: X=0.00, Y=0.00

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 2

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 11/28/2017

Measurement duration: 12 minutes 21 seconds

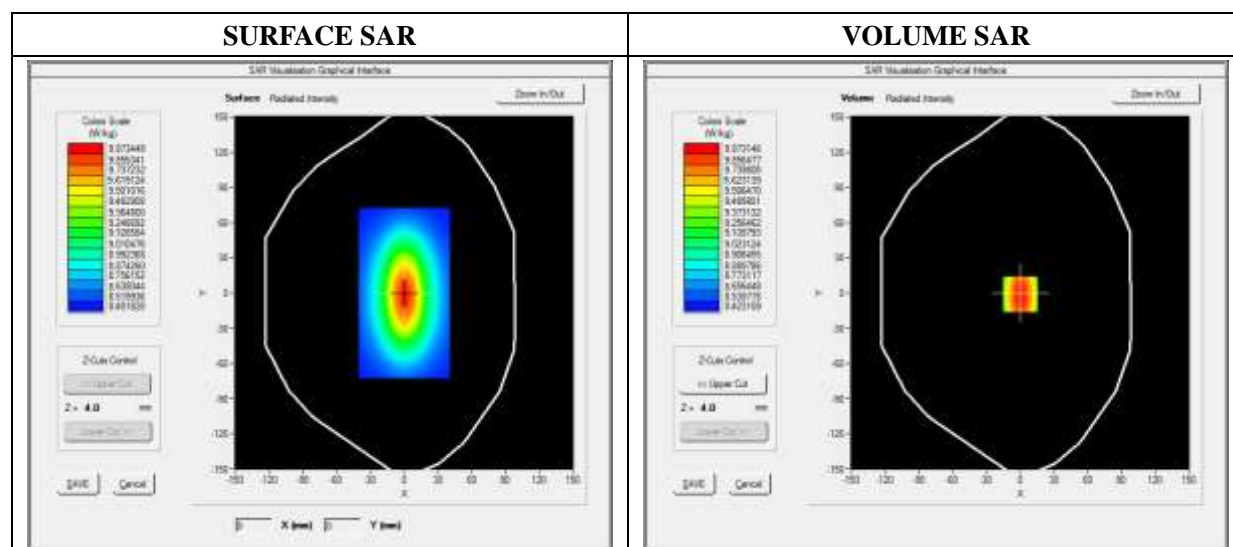
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW1800
Signal	CW (Crest factor: 1.0)

### B. SAR Measurement Results

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

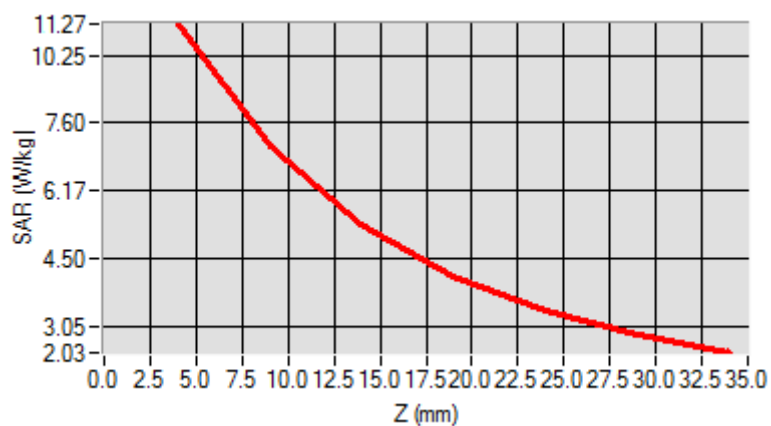


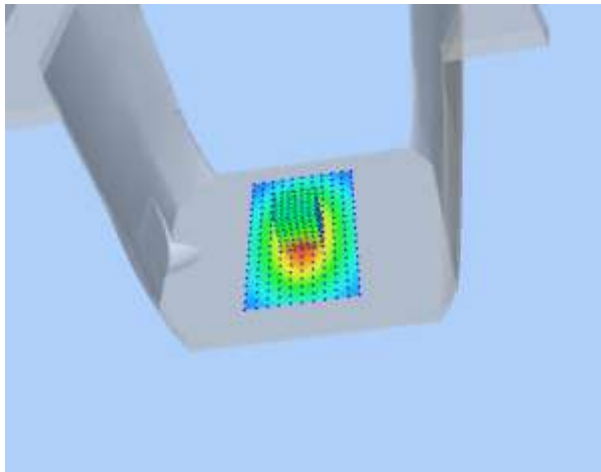
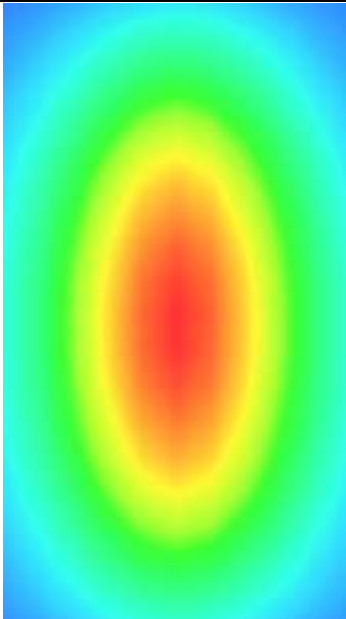
Maximum location: X=0.00, Y=0.00

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



3D screen shot	Hot spot position
	

## MEASUREMENT 3

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 11/28/2017

Measurement duration: 12 minutes 21 seconds

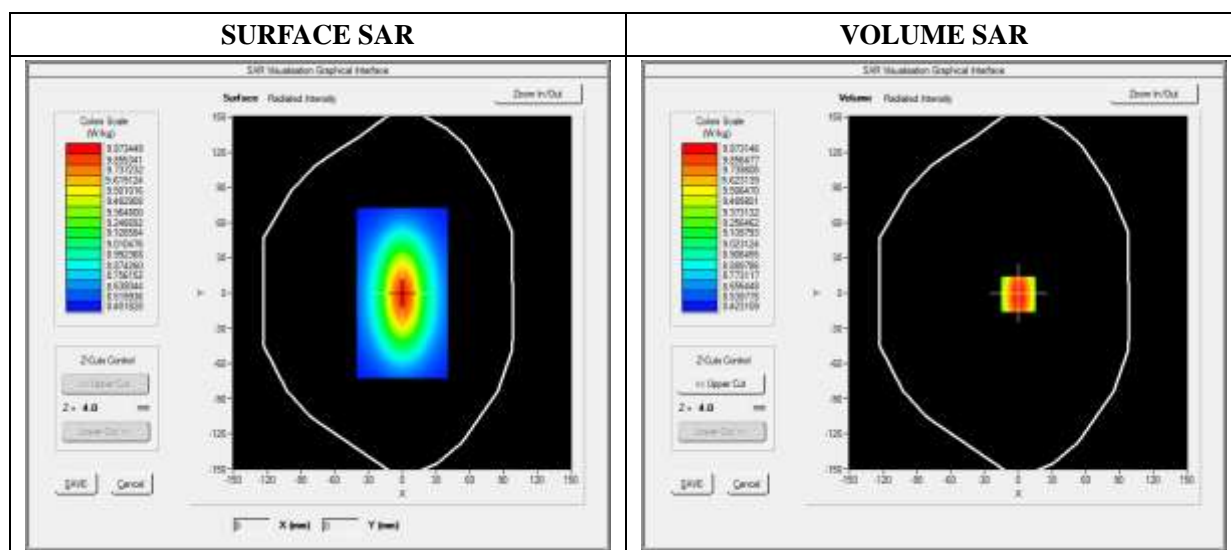
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW1900
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

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

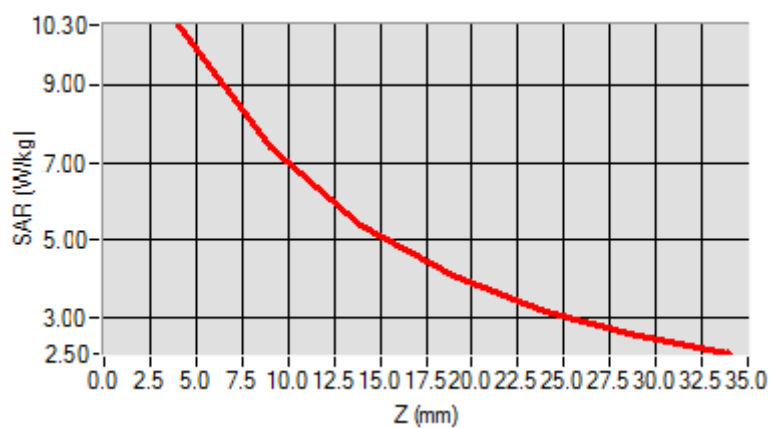


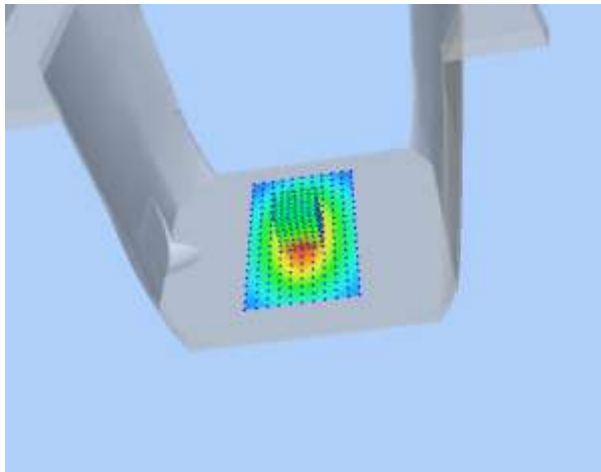
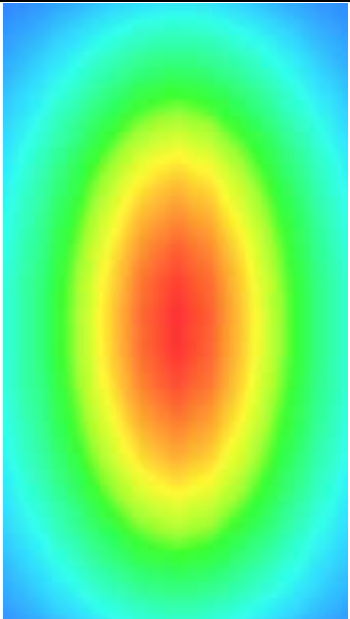
Maximum location: X=0.00, Y=0.00

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 4

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 11/29/2017

Measurement duration: 12 minutes 21 seconds

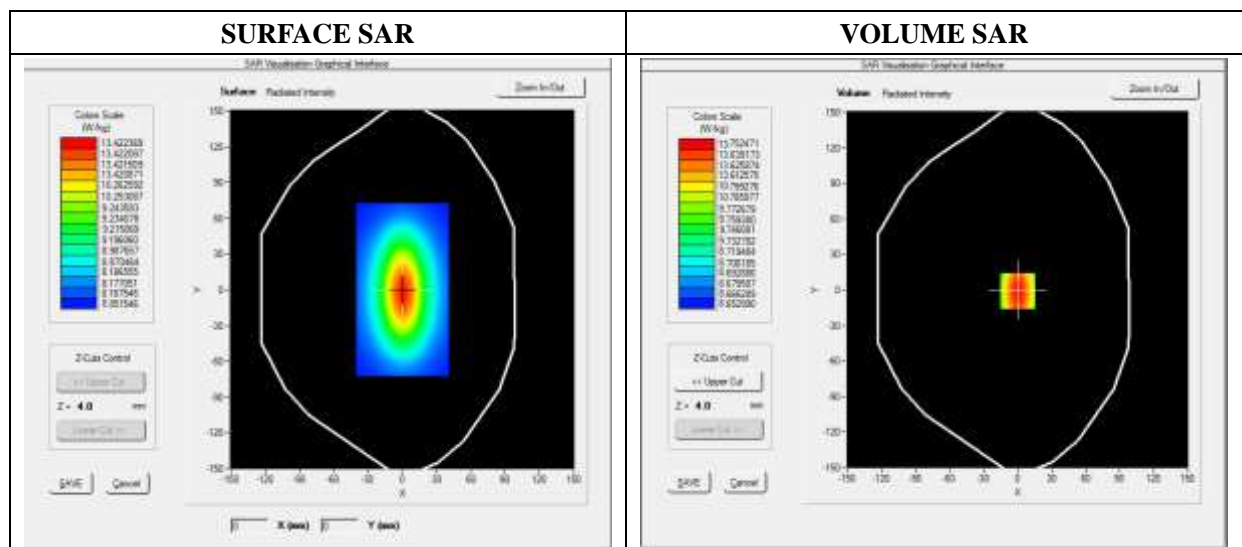
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.64; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

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

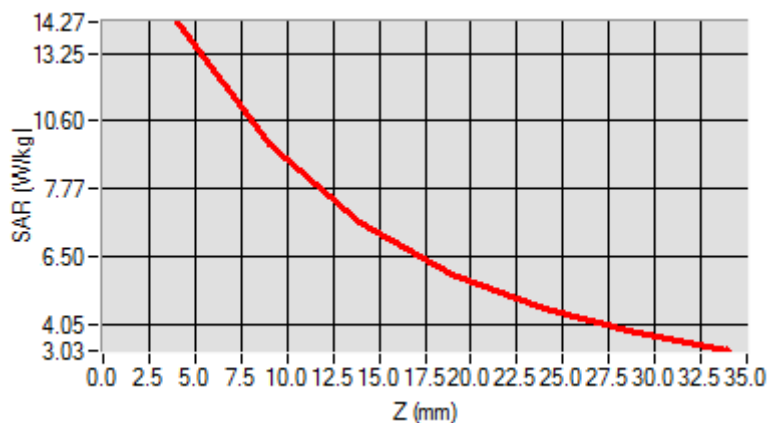


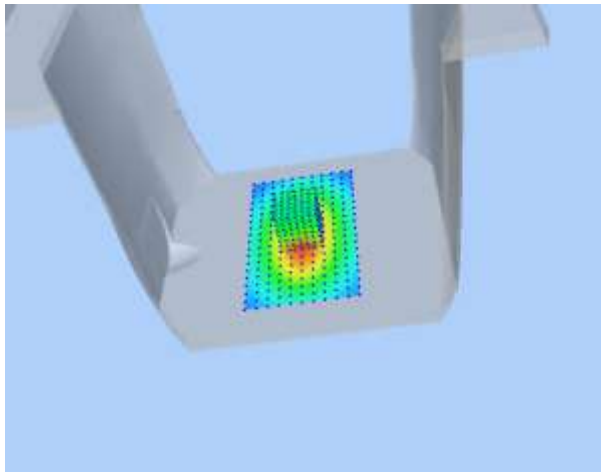
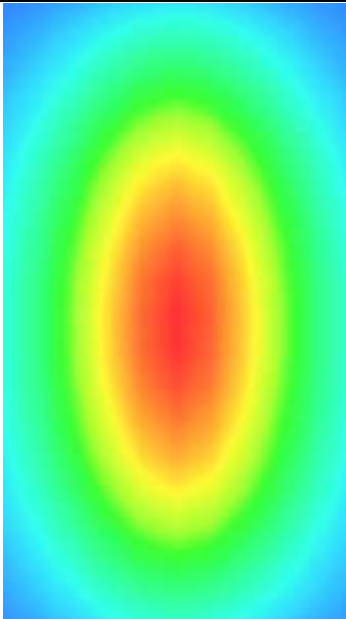
Maximum location: X=0.00, Y=0.00

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



3D screen shot	Hot spot position
	

## MEASUREMENT 5

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 11/29/2017

Measurement duration: 12 minutes 21 seconds

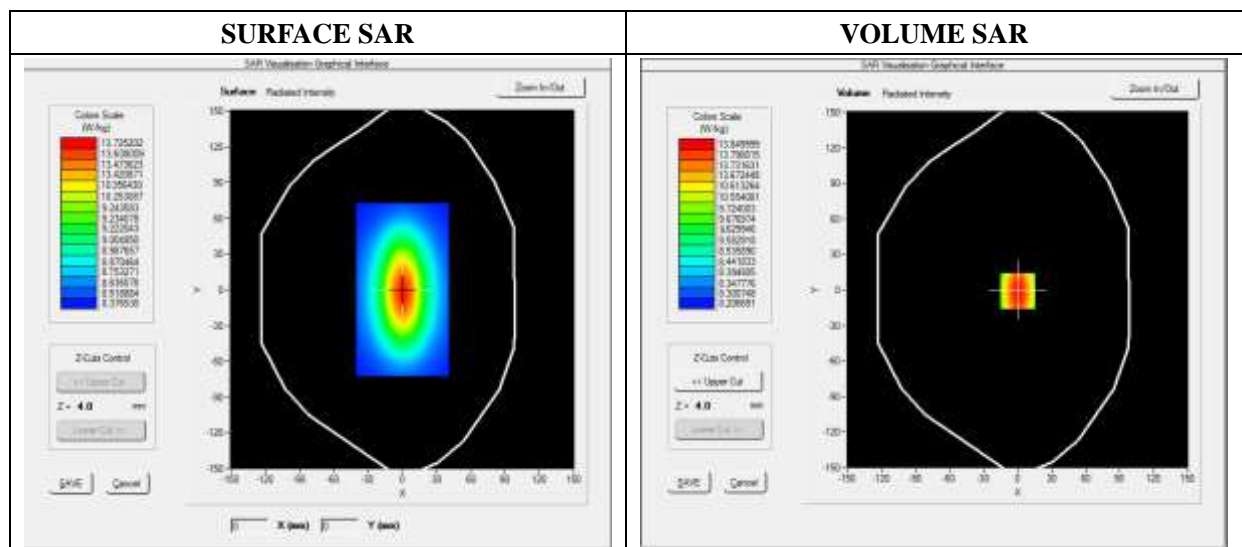
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.37; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW2600
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

Frequency (MHz)	2600.000000
Relative Permittivity (real part)	38.631092
Conductivity (S/m)	1.930182
Power Variation (%)	1.028221
Ambient Temperature	21.1
Liquid Temperature	21.2

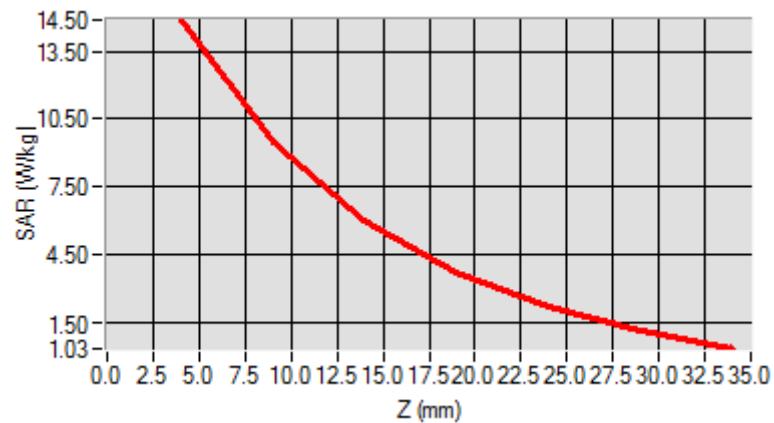


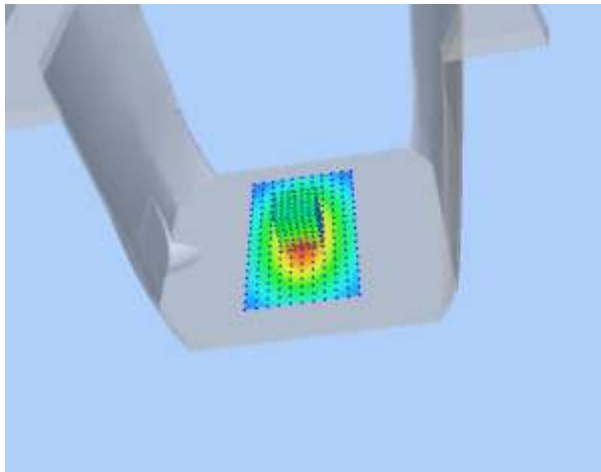
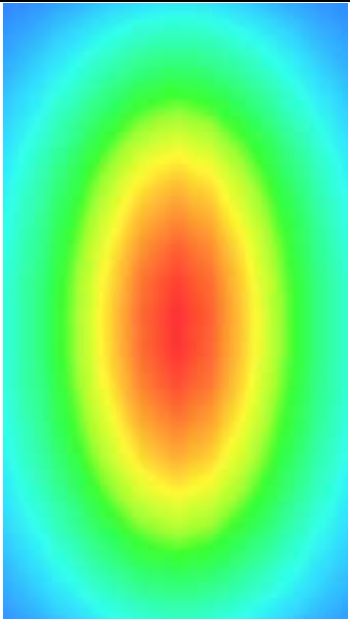
Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	8.270822
SAR 1g (W/Kg)	13.670282

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	14.0426	12.1354	10.2965	7.4854	5.9354	4.5186



3D screen shot	Hot spot position
	

## MEASUREMENT 6

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 11/30/2017

Measurement duration: 12 minutes 21 seconds

E-field Probe: SSE2 - SN 08/16 EPGO298; ConvF: 2.28; Calibrated: 2017/09/18

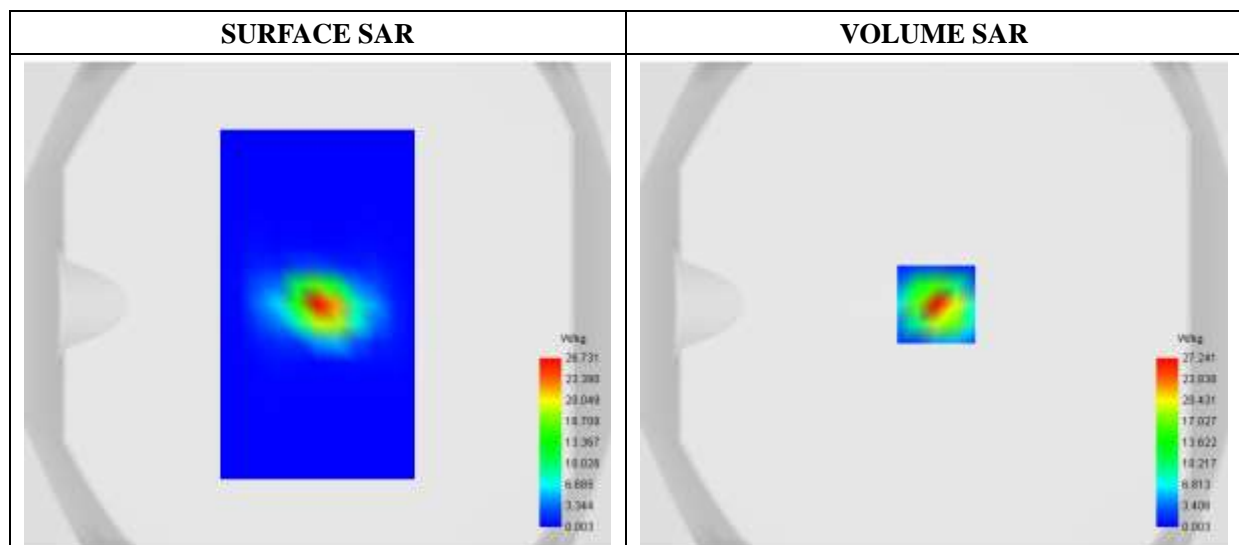
### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5200
Signal	CW (Crest factor: 1.0)

### B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative Permittivity (real part)	35.612911
Conductivity (S/m)	4.871483
Power Variation (%)	0.943782
Ambient Temperature	21.1
Liquid Temperature	21.2

### C. SAR Surface and Volume



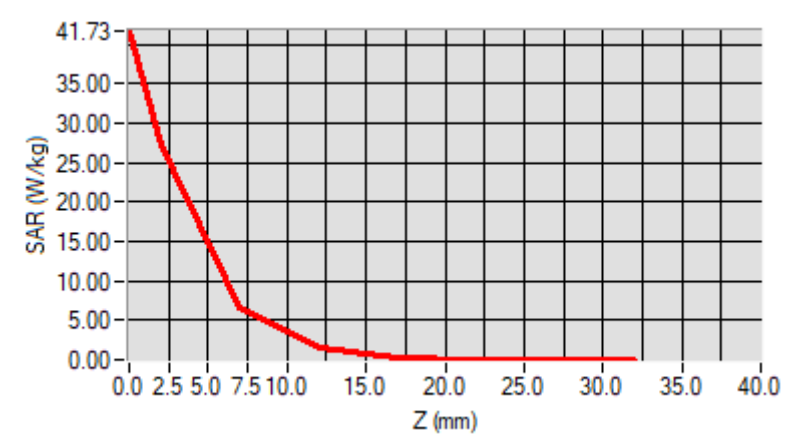
Maximum location: X=1.00, Y=0.00

#### D. SAR 1g & 10g

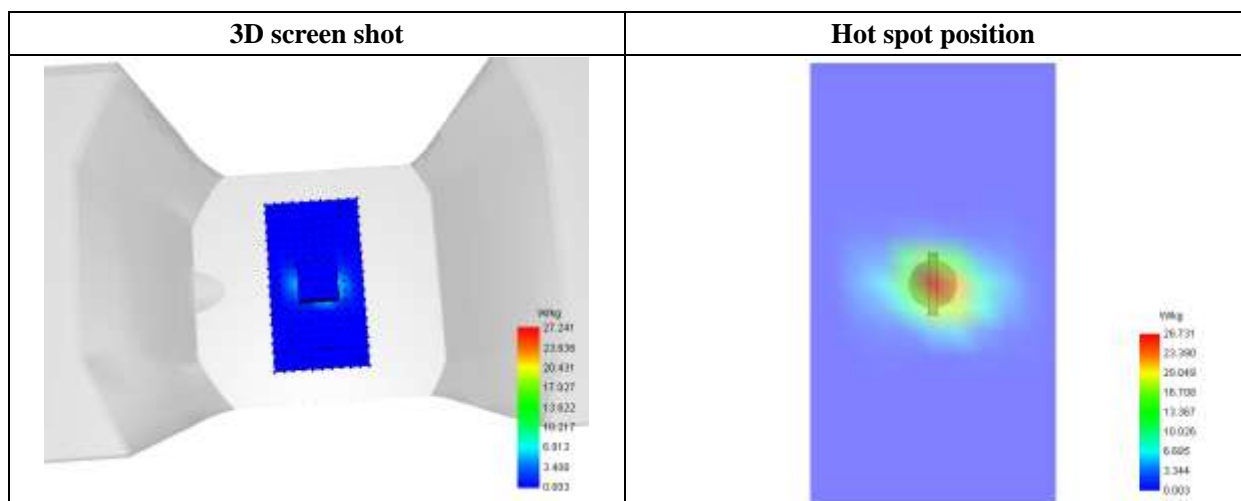
SAR 10g (W/Kg)	5.310334
SAR 1g (W/Kg)	16.946226

#### E. Z Axis Scan

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	41.7264	27.2408	6.5746	1.6234	0.3765	0.0793	0.0129



#### F. 3D Image



## MEASUREMENT 7

### For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 11/27/2017

Measurement duration: 12 minutes 21 seconds

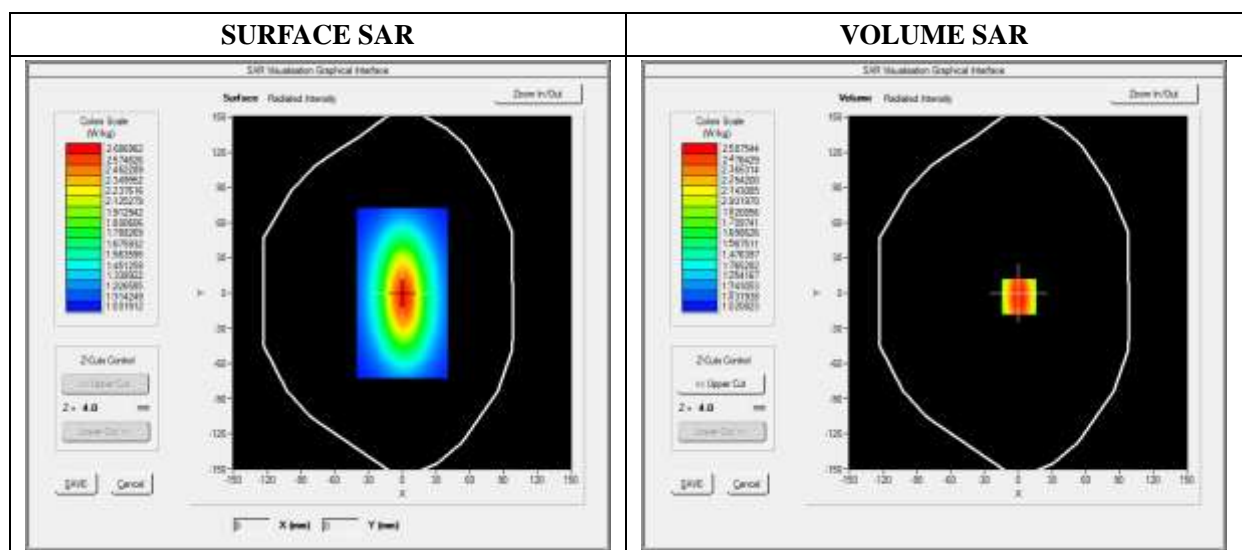
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
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

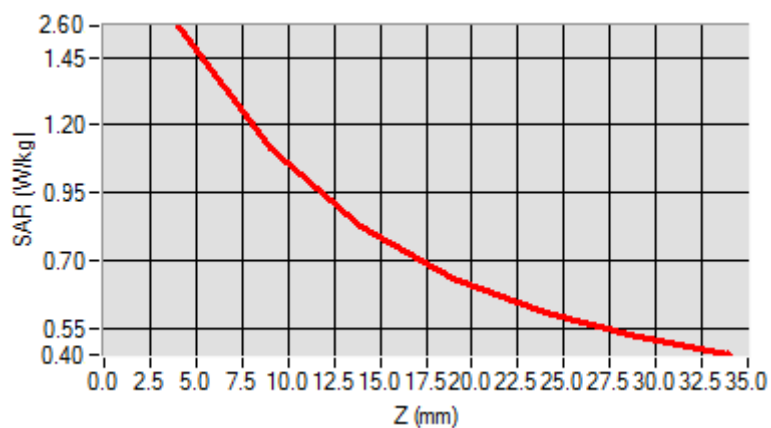


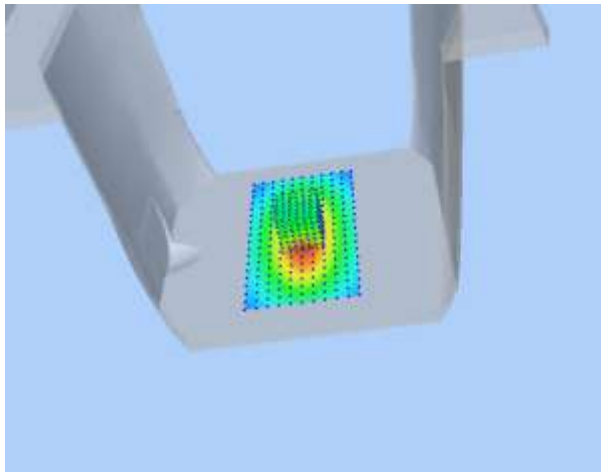
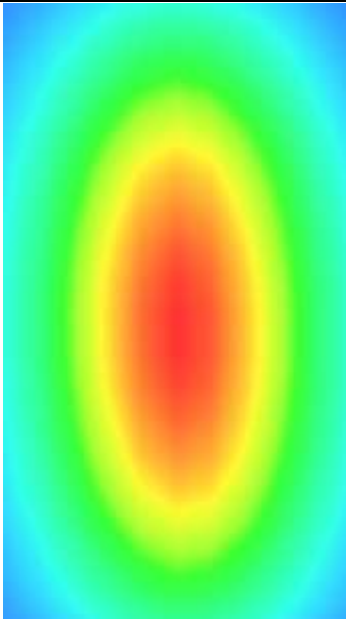
Maximum location: X=0.00, Y=0.00

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: 11/28/2017

Measurement duration: 12 minutes 21 seconds

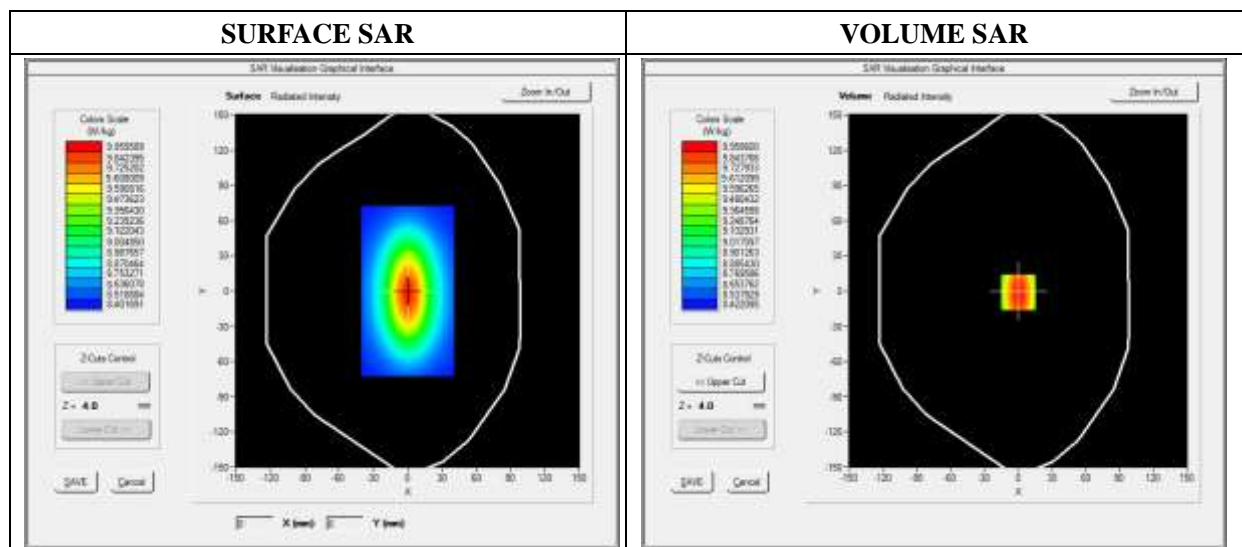
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW1800
Signal	CW (Crest factor: 1.0)

### B. SAR Measurement Results

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

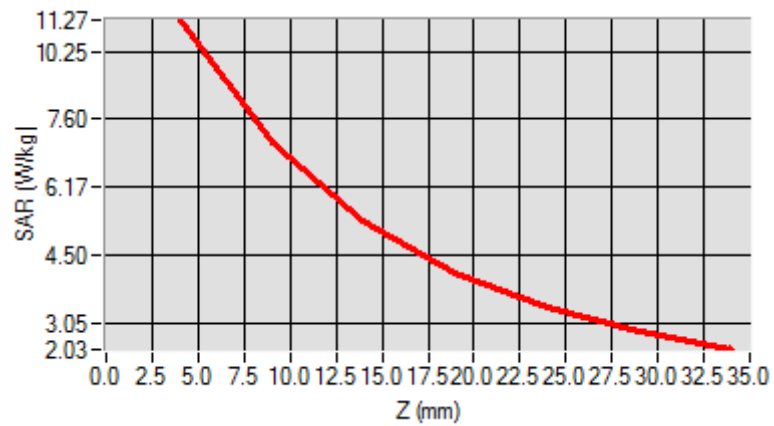


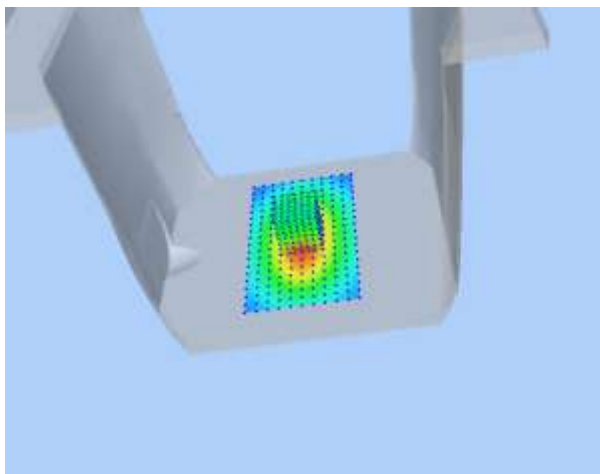
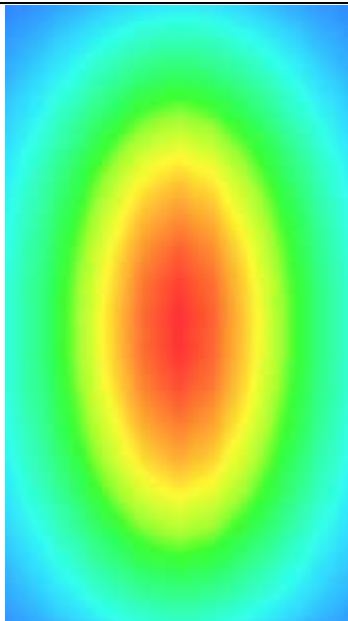
Maximum location: X=0.00, Y=0.00

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: 11/28/2017

Measurement duration: 12 minutes 21 seconds

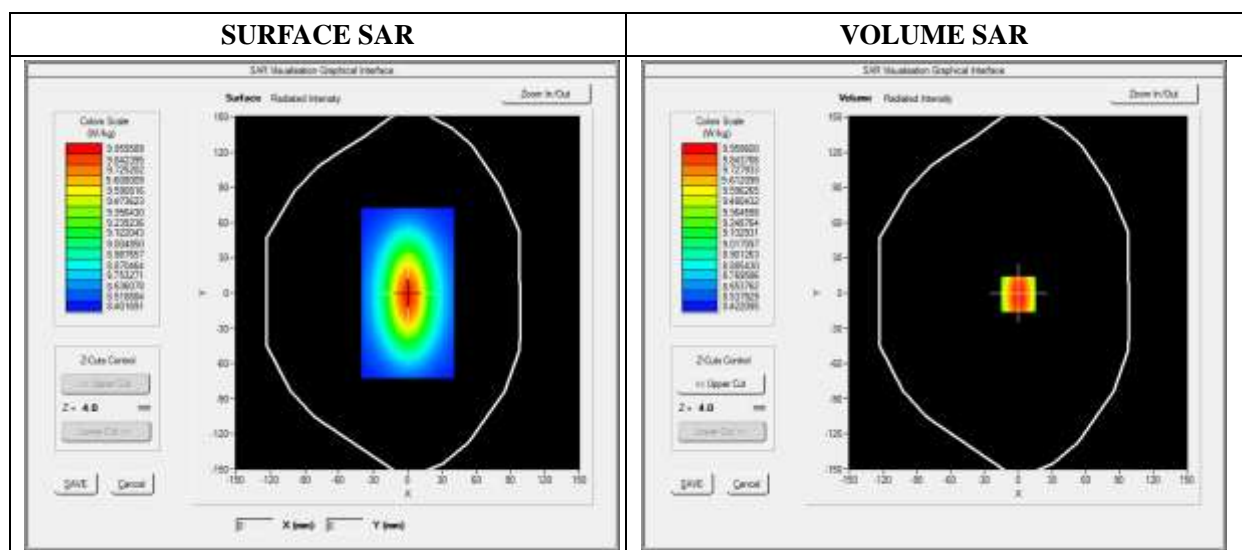
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW1900
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

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

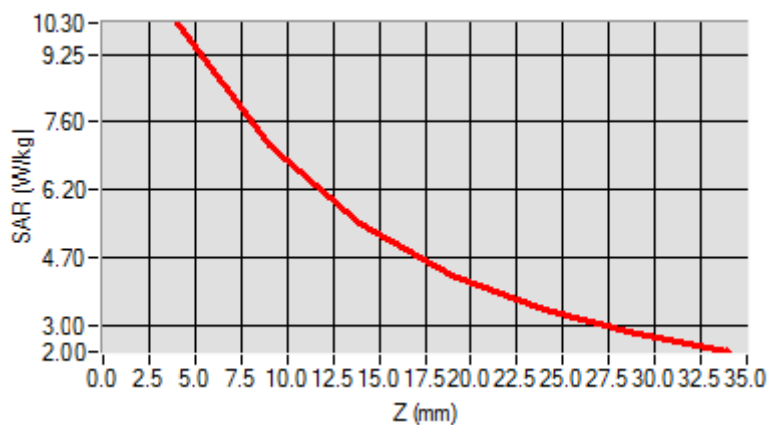


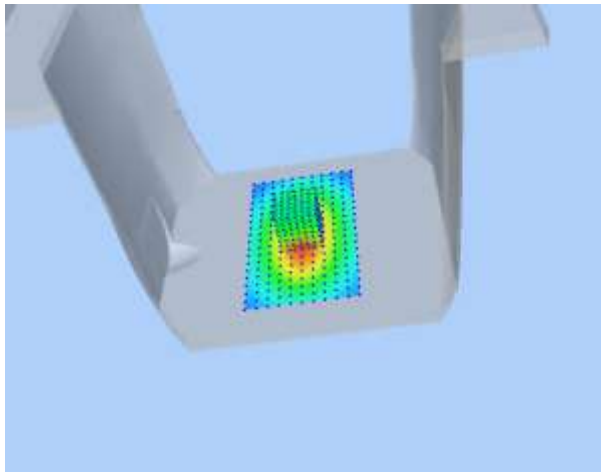
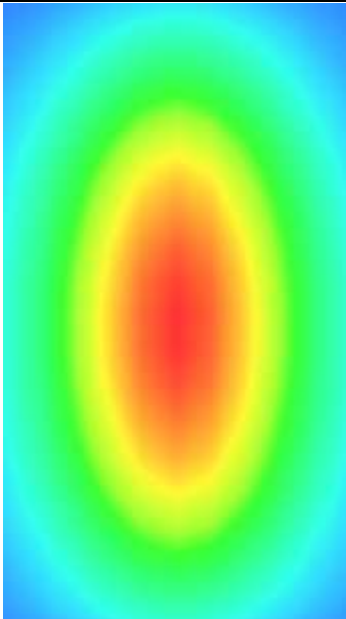
Maximum location: X=0.00, Y=0.00

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



3D screen shot	Hot spot position
	

## MEASUREMENT 10

### For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 11/29/2017

Measurement duration: 12 minutes 21 seconds

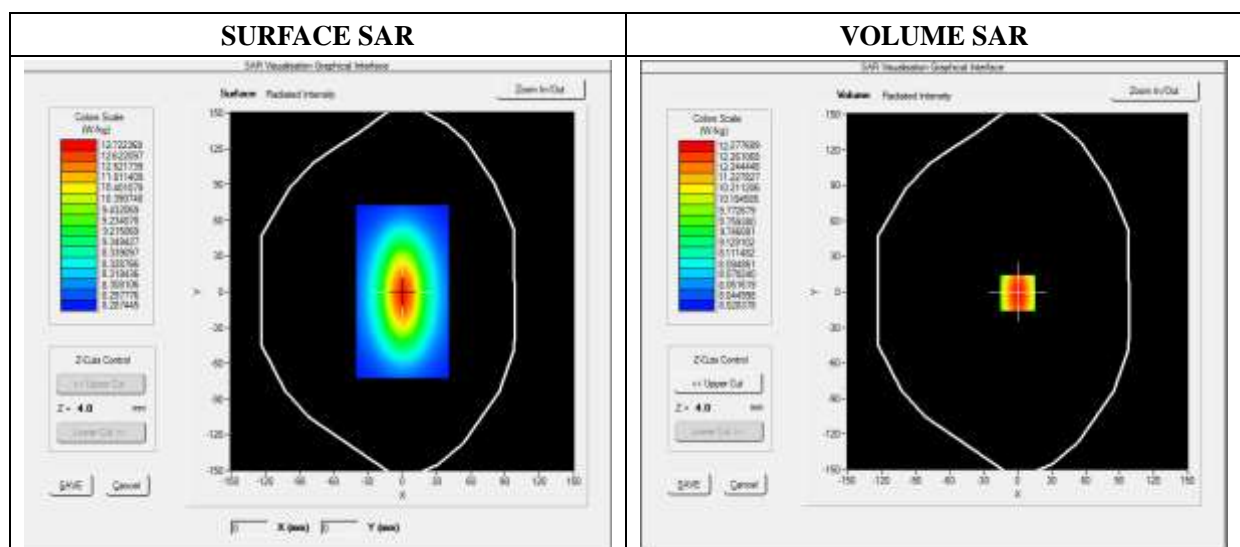
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

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

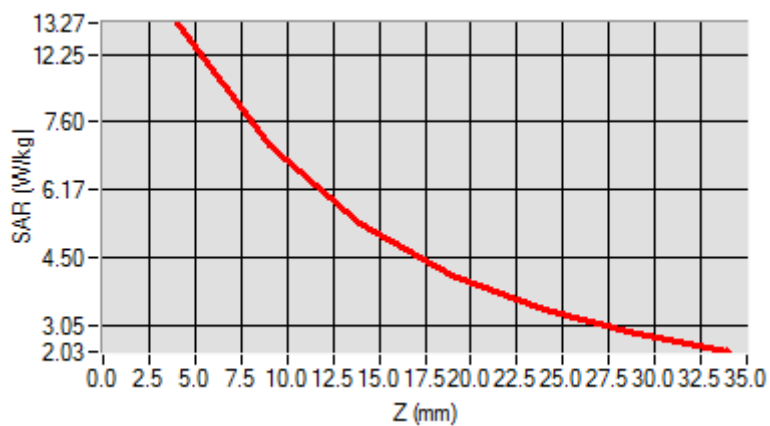


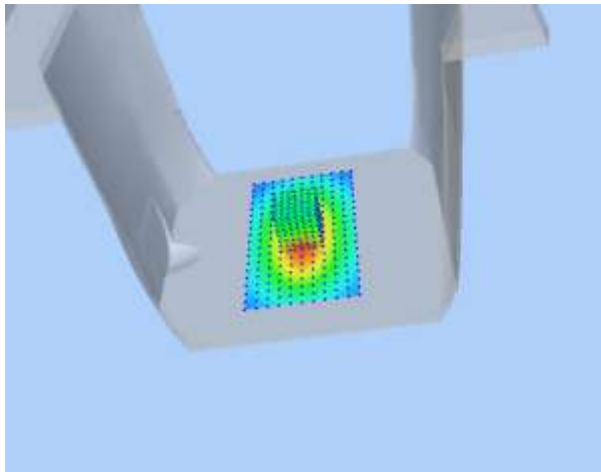
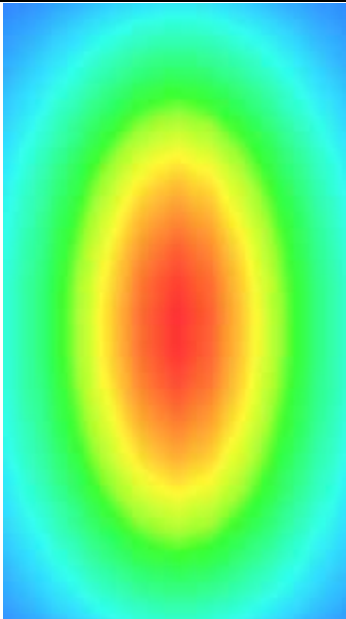
Maximum location: X=0.00, Y=0.00

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	13.1911	11.7951	9.2945	8.5400	6.3712	4.6225



3D screen shot	Hot spot position
	

# MEASUREMENT 11

## For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 11/29/2017

Measurement duration: 12 minutes 21 seconds

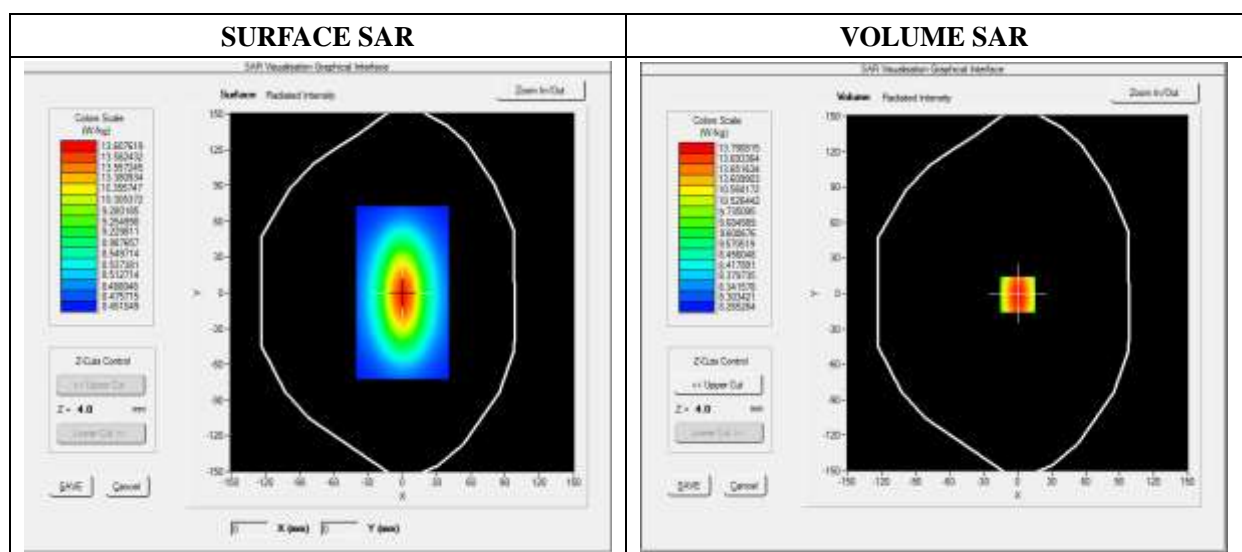
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.58; Calibrated: 06/01/2017

## A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW2600
Signal	Duty Cycle 1:1

## B. SAR Measurement Results

Frequency (MHz)	2600.000000
Relative Permittivity (real part)	52.241202
Conductivity (S/m)	2.120943
Power Variation (%)	1.038832
Ambient Temperature	21.1
Liquid Temperature	21.2

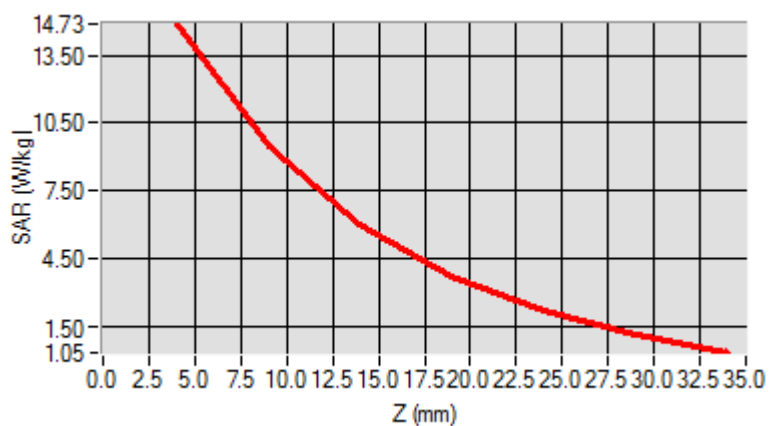


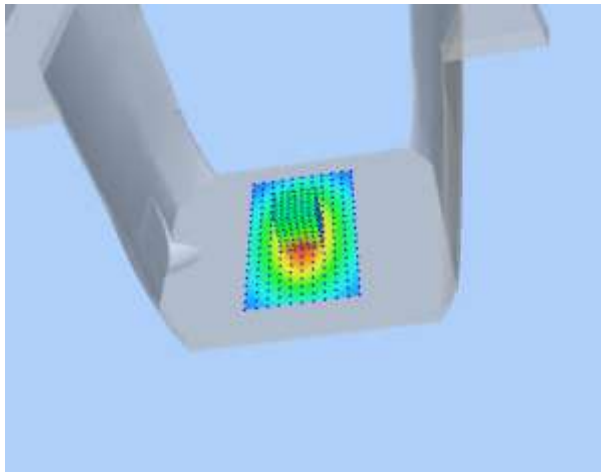
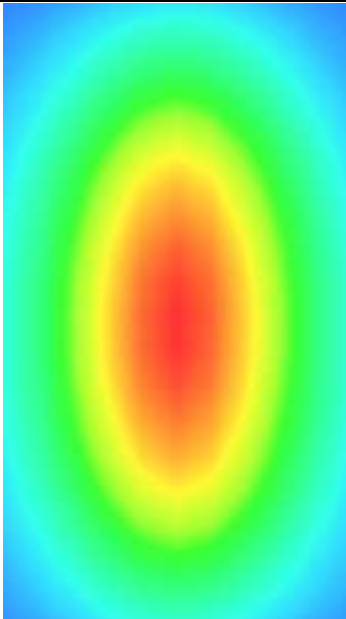
Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	6.083781
SAR 1g (W/Kg)	13.430481

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	13.6473	11.8441	9.3627	8.5782	6.4357	4.6342



3D screen shot	Hot spot position
	



## MEASUREMENT 12

### For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 11/30/2017

Measurement duration: 12 minutes 21 seconds

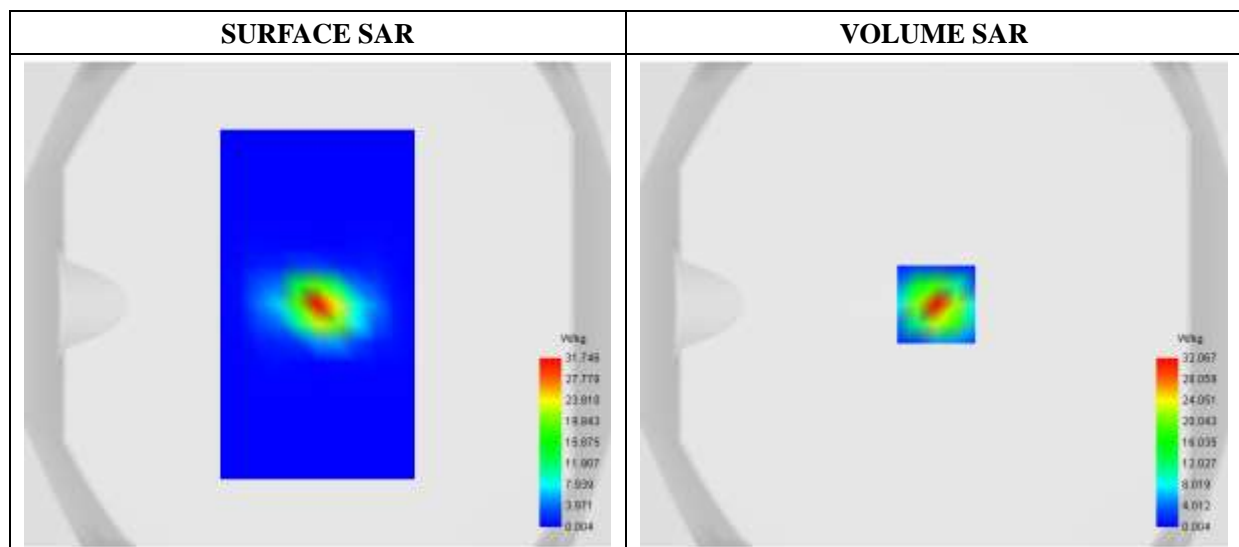
E-field Probe: SSE2 - SN 08/16 EPGO298; ConvF:2.39; Calibrated: 2017/09/18

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5200
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative Permittivity (real part)	48.501939
Conductivity (S/m)	5.161487
Power Variation (%)	0.749201
Ambient Temperature	21.1
Liquid Temperature	21.2



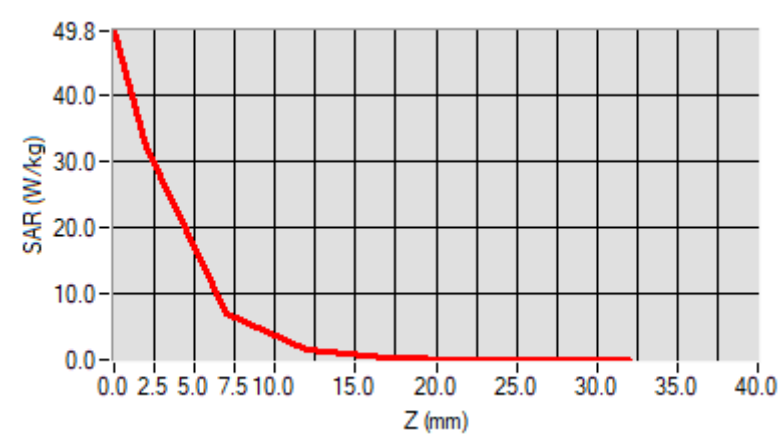
Maximum location: X=1.00, Y=0.00

#### D. SAR 1g & 10g

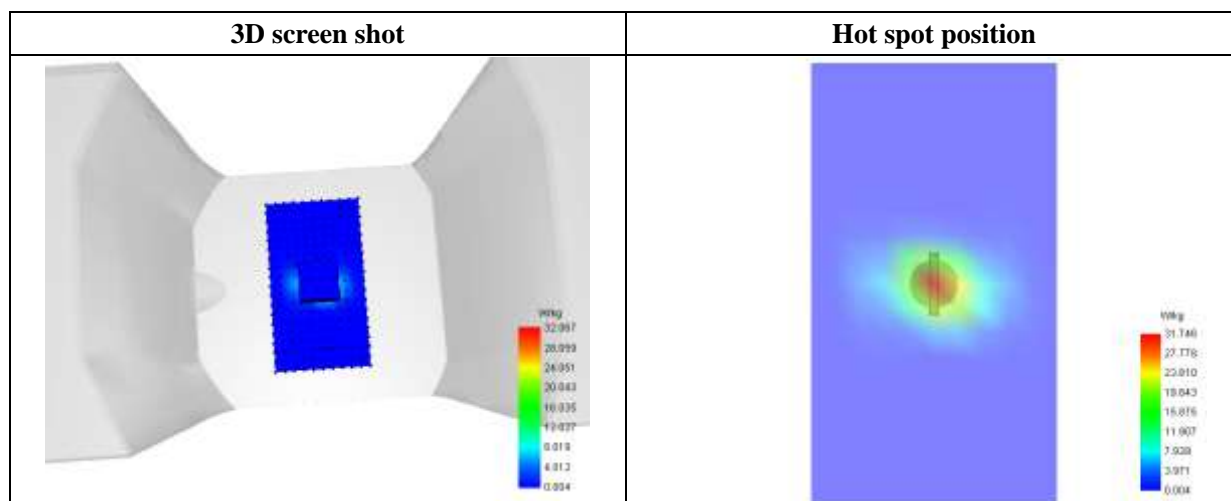
SAR 10g (W/Kg)	6.047588
SAR 1g (W/Kg)	16.681175

#### E. Z Axis Scan

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	49.8193	32.0669	7.0244	1.5969	0.3410	0.0635	0.0070



#### F. 3D Image



## Annex B. Plots of SAR Measurement

<b><u>TYPE</u></b>	<b><u>BAND</u></b>	<b><u>PARAMETERS</u></b>
<b>Phone</b>	<b>GSM850</b>	<u>Measurement 1:</u> Right Head with Cheek device position on Low Channel in GSM mode
<b>Phone</b>	<b>GSM1900</b>	<u>Measurement 7:</u> Left Head with Cheek device position on Low Channel in GSM mode
<b>Phone</b>	<b>GPRS850_3TX</b>	<u>Measurement 9:</u> Right Head with Cheek device position on Low Channel in GPRS mode
<b>Phone</b>	<b>GPRS1900_3TX</b>	<u>Measurement 15:</u> Left Head with Cheek device position on Low Channel in GPRS mode
<b>Phone</b>	<b>WCDMA1900_RMC</b>	<u>Measurement 19:</u> Left Head with Cheek device position on Middle Channel in WCDMA mode
<b>Phone</b>	<b>WCDMA850_RMC</b>	<u>Measurement 21:</u> Right Head with Cheek device position on Low Channel in WCDMA mode
<b>Phone</b>	<b>LTE Band 4_RMC</b>	<u>Measurement 27:</u> Left Head with Cheek device position on High Channel in LTE mode
<b>Phone</b>	<b>LTE Band 7_RMC</b>	<u>Measurement 35:</u> Left Head with Cheek device position on High Channel in LTE mode
<b>Phone</b>	<b>WiFi(2.4G)_802.11b</b>	<u>Measurement 43:</u> Left Head with Cheek device position on Low Channel in 802.11b mode
<b>Phone</b>	<b>WiFi(5.2G)_802.11n</b>	<u>Measurement 45:</u> Right Head with Cheek device position on Middle Channel in 802.11n mode
<b>Phone</b>	<b>GSM850</b>	<u>Measurement 50:</u> Flat Plane with Front(Body-worn) device position on Low Channel in GSM mode
<b>Phone</b>	<b>GSM1900</b>	<u>Measurement 52:</u> Flat Plane with Front(Body-worn) device position on Low Channel in GSM mode
<b>Phone</b>	<b>GPRS850_3TX</b>	<u>Measurement 54:</u> Flat Plane with Front device position on Low Channel in GPRS mode
<b>Phone</b>	<b>GPRS1900_3TX</b>	<u>Measurement 58:</u> Flat Plane with Front device position on Low Channel in GPRS mode
<b>Phone</b>	<b>WCDMA1900_RMC</b>	<u>Measurement 64:</u> Flat Plane with Front side device position on Middle Channel in WCDMA mode
<b>Phone</b>	<b>WCDMA850_RMC</b>	<u>Measurement 68:</u> Flat Plane with Front device position on Low Channel in WCDMA mode
<b>Phone</b>	<b>LTE Band 4_RMC</b>	<u>Measurement 72:</u> Flat Plane with Front device position on High Channel in LTE mode
<b>Phone</b>	<b>LTE Band 7_RMC</b>	<u>Measurement 80:</u> Flat Plane with Front device position on High Channel in LTE mode
<b>Phone</b>	<b>LTE Band 7_RMC</b>	<u>Measurement 81:</u> Flat Plane with Bottom device position on High Channel in LTE mode
<b>Phone</b>	<b>WiFi(2.4G)_802.11b</b>	<u>Measurement 87:</u> Flat Plane with Back side device

		position on Low Channel in 802.11b mode
<b>Phone</b>	<b>WiFi(5.2G)_802.11n</b>	<u>Measurement 90:</u> Flat Plane with Back side device position on Middle Channel in 802.11n mode
<i>Remark: SAR plot is showed the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.</i>		

#### Extremity SAR

<b><u>TYPE</u></b>	<b><u>BAND</u></b>	<b><u>PARAMETERS</u></b>
<b>Phone</b>	<b>WiFi(5.2G)_802.11n</b>	<u>Measurement 92:</u> Flat Plane with Back side device position on Middle Channel in 802.11n mode
<i>Remark: SAR plot is showed the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.</i>		

# MEASUREMENT 1

Type: Phone measurement (Complete)

Date of measurement: 11/27/2017

Measurement duration: 11 minutes 48 seconds

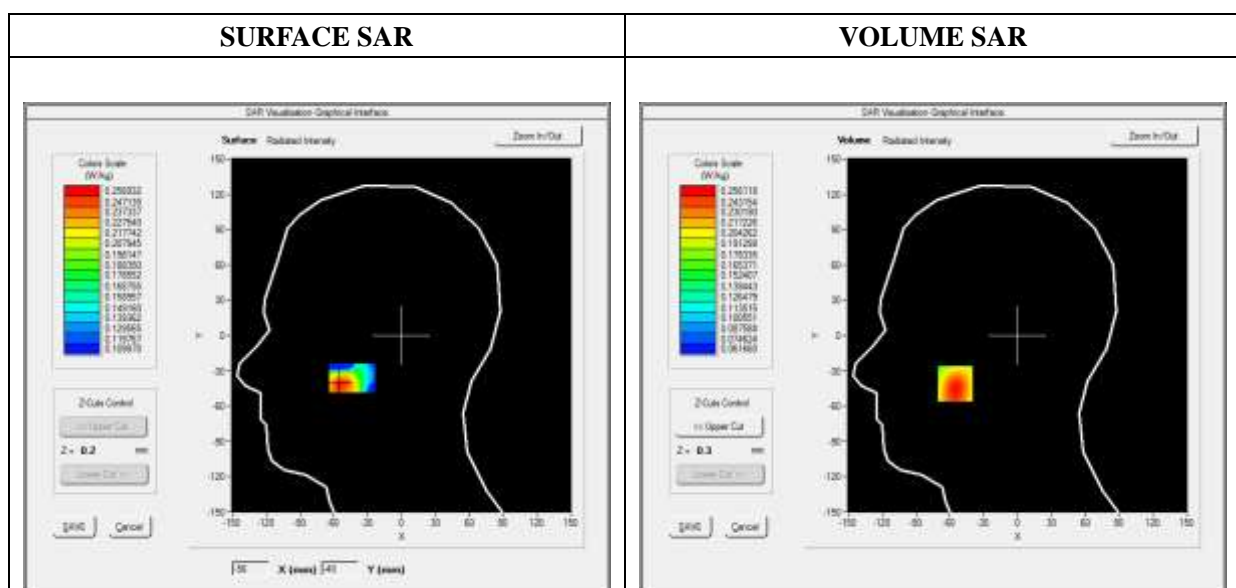
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2017

## A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Right head
Device Position	Cheek
Band	GSM850
Channels	Low
Signal	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

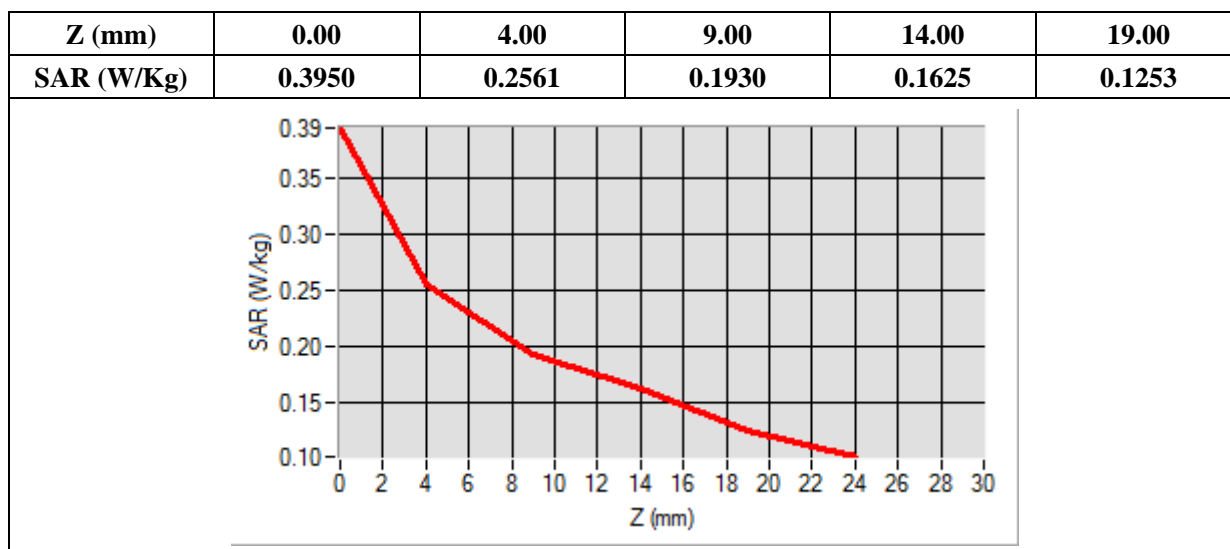
Frequency (MHz)	824.200000
Relative Permittivity (real part)	41.110245
Conductivity (S/m)	0.871245
Power Variation (%)	1.144536
Ambient Temperature	21.1
Liquid Temperature	21.3

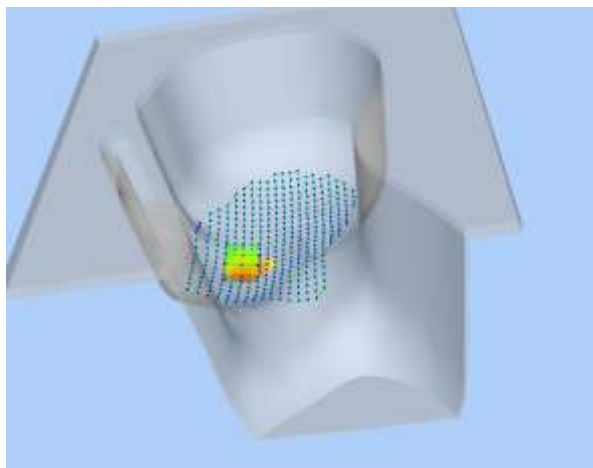



Maximum location: X=-55.00, Y=-41.00

SAR Peak: 0.31 W/kg

SAR 10g (W/Kg)	0.187242
SAR 1g (W/Kg)	0.247436



3D screen shot	Hot spot position
	

## MEASUREMENT 7

Type: Phone measurement (Complete)

Date of measurement: 11/28/2017

Measurement duration: 11 minutes 48 seconds

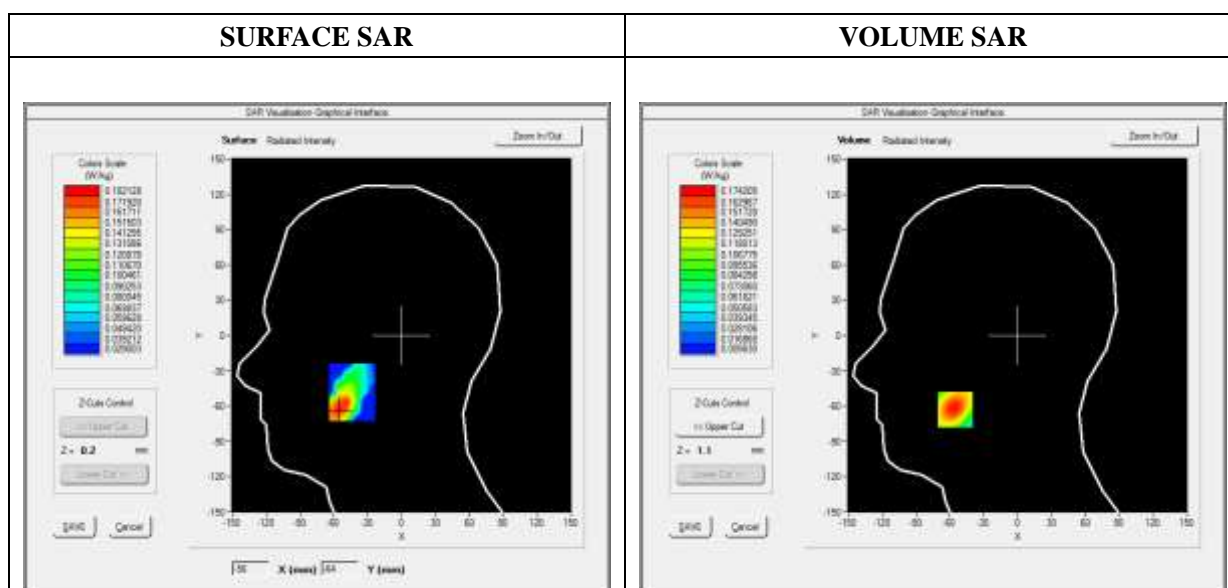
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	GSM1900
Channels	Low
Signal	TDMA (Crest factor: 8.0)

### B. SAR Measurement Results

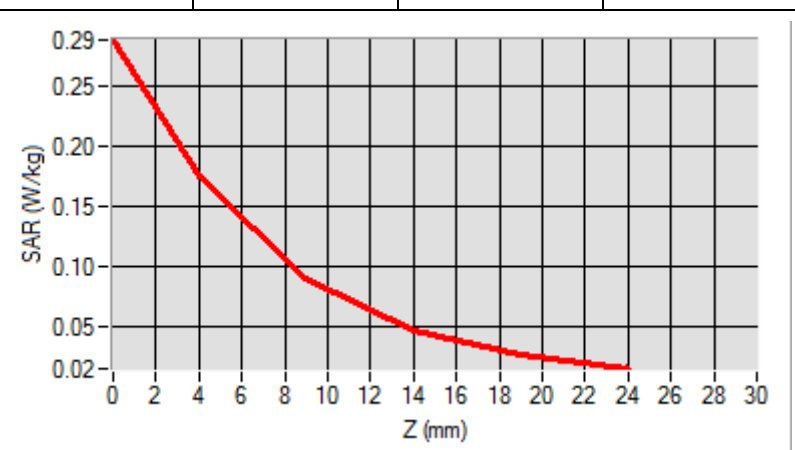
Frequency (MHz)	1850.200000
Relative Permittivity (real part)	38.560124
Conductivity (S/m)	1.380369
Power Variation (%)	1.442440
Ambient Temperature	21.1
Liquid Temperature	21.3

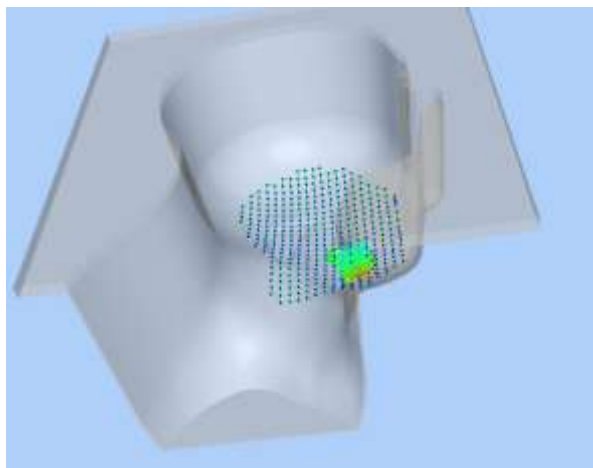



Maximum location: X=-55.00, Y=-63.00

SAR Peak: 0.29 W/kg

SAR 10g (W/Kg)	0.087931
SAR 1g (W/Kg)	0.163852

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2880	0.1742	0.0897	0.0468	0.0266
					

3D screen shot	Hot spot position
	



## MEASUREMENT 9

Type: Phone measurement (Complete)

Date of measurement: 11/27/2017

Measurement duration: 12 minutes 3 seconds

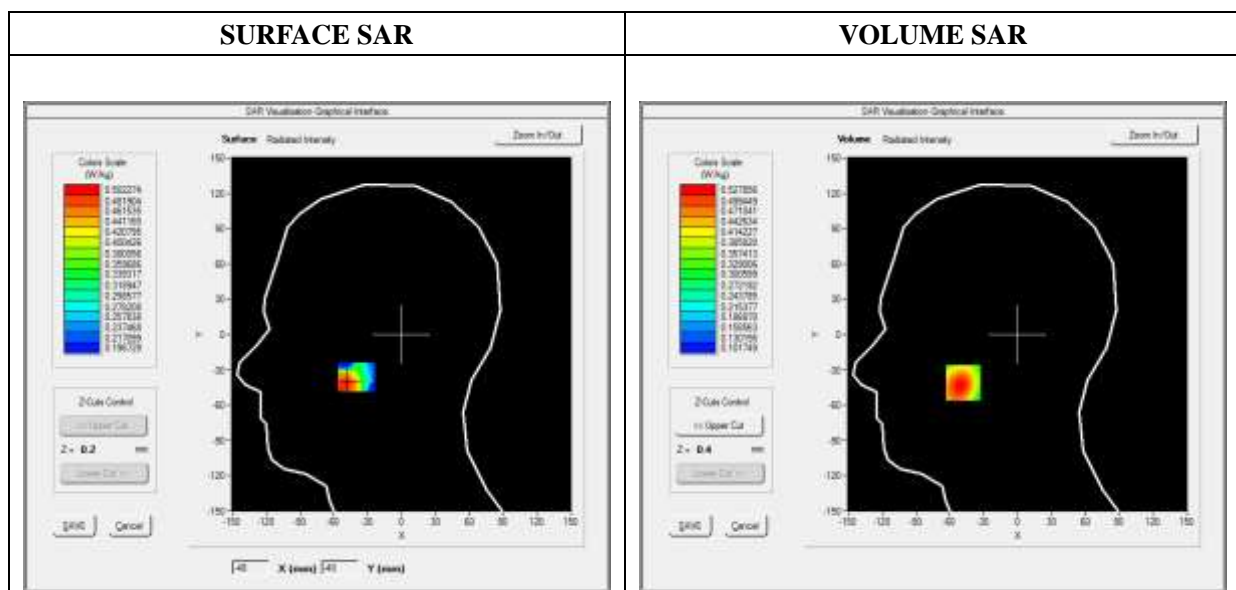
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Right head
Device Position	Cheek
Band	GPRS850_3TX
Channels	Low
Signal	Duty Cycle: 1:2.66

### B. SAR Measurement Results

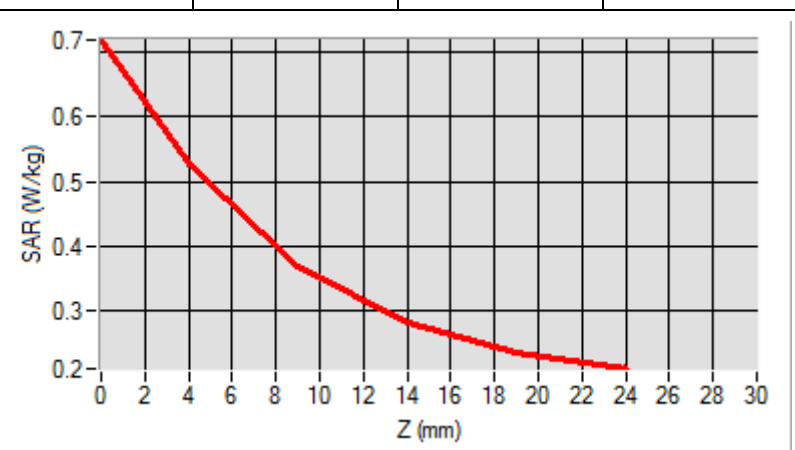
Frequency (MHz)	824.200000
Relative Permittivity (real part)	38.560124
Conductivity (S/m)	1.380369
Power Variation (%)	1.536272
Ambient Temperature	21.1
Liquid Temperature	21.3

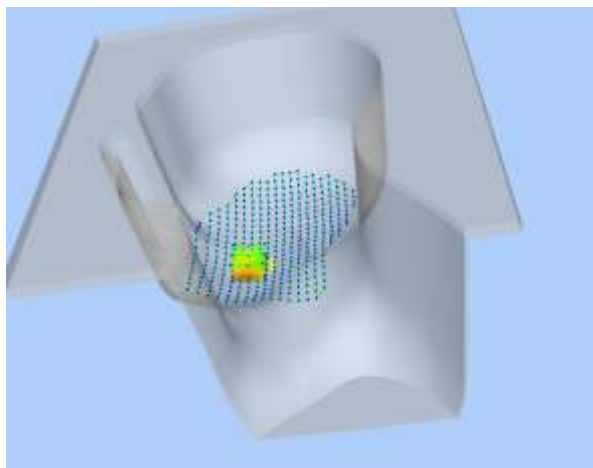



Maximum location: X=-48.00, Y=-41.00

SAR Peak: 0.73 W/kg

SAR 10g (W/Kg)	0.356958
SAR 1g (W/Kg)	0.508380

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7188	0.5279	0.3705	0.2817	0.2371
					

3D screen shot	Hot spot position
	

## MEASUREMENT 15

Type: Phone measurement (Complete)

Date of measurement: 11/28/2017

Measurement duration: 12 minutes 3 seconds

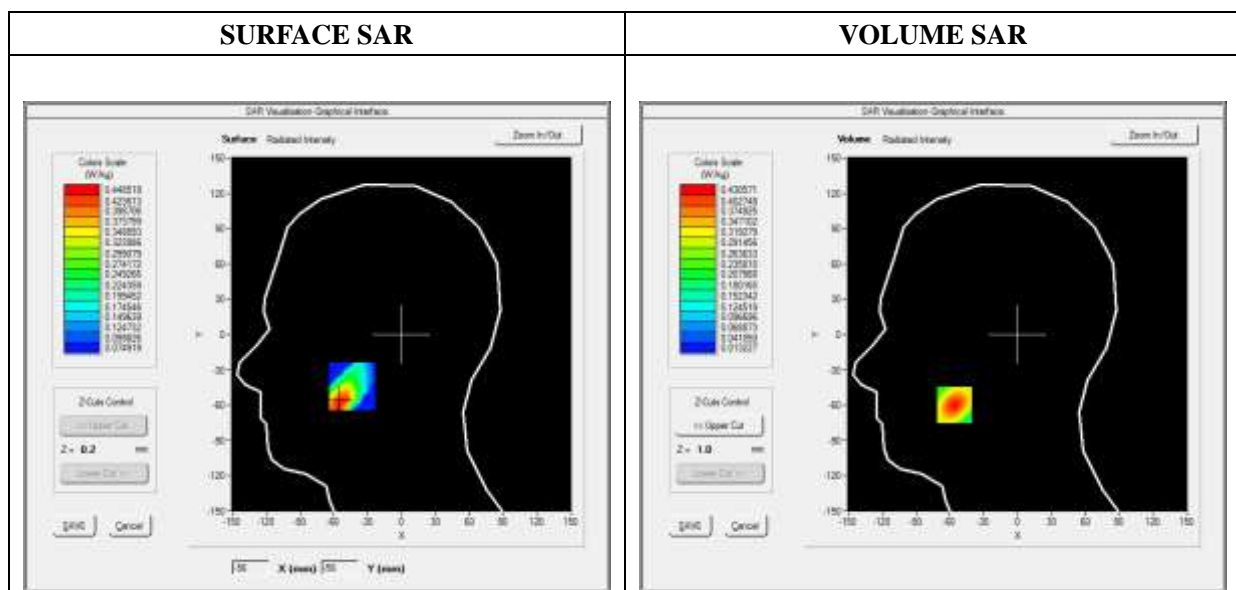
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	GPRS1900_3TX
Channels	Low
Signal	Duty Cycle: 1:2.66

### B. SAR Measurement Results

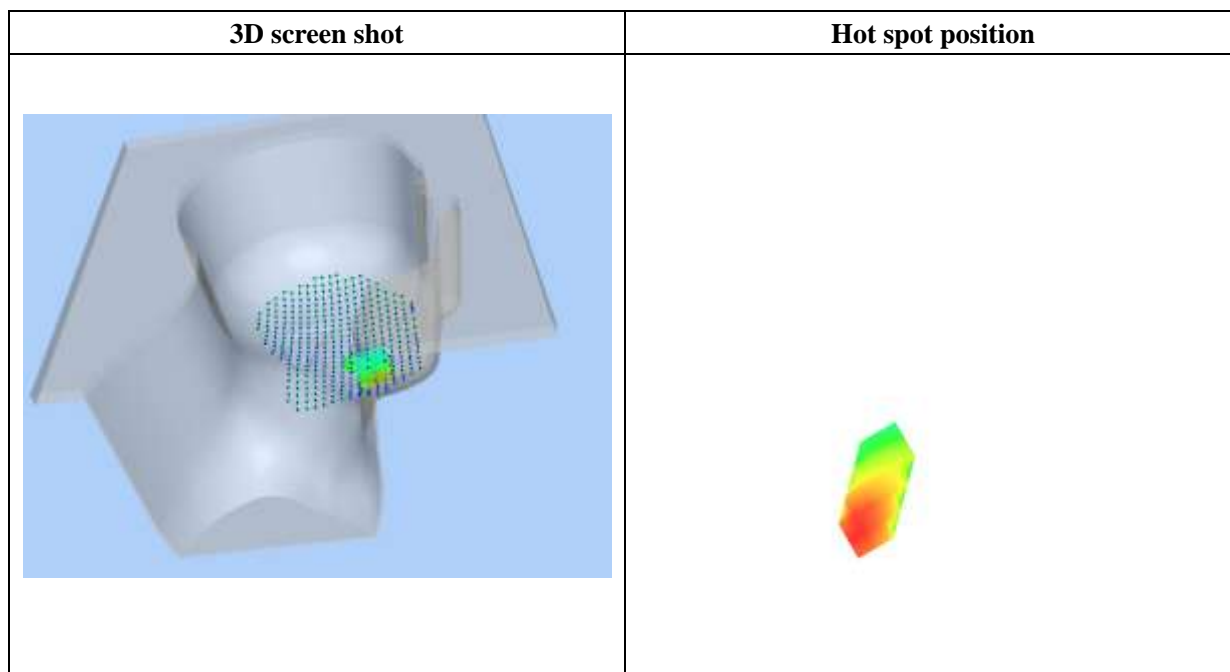
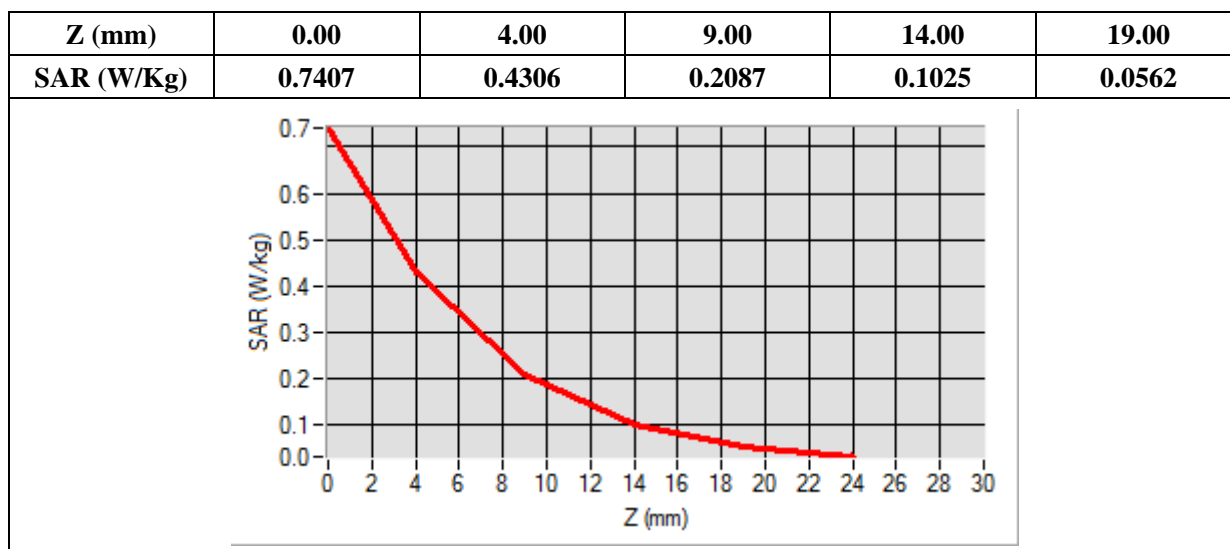
Frequency (MHz)	1850.200000
Relative Permittivity (real part)	38.560124
Conductivity (S/m)	1.380369
Power Variation (%)	1.536272
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=-56.00, Y=-60.00

SAR Peak: 0.74 W/kg

SAR 10g (W/Kg)	0.211599
SAR 1g (W/Kg)	0.402714



## MEASUREMENT 19

Type: Phone measurement (Complete)

Date of measurement: 11/28/2017

Measurement duration: 12 minutes 3 seconds

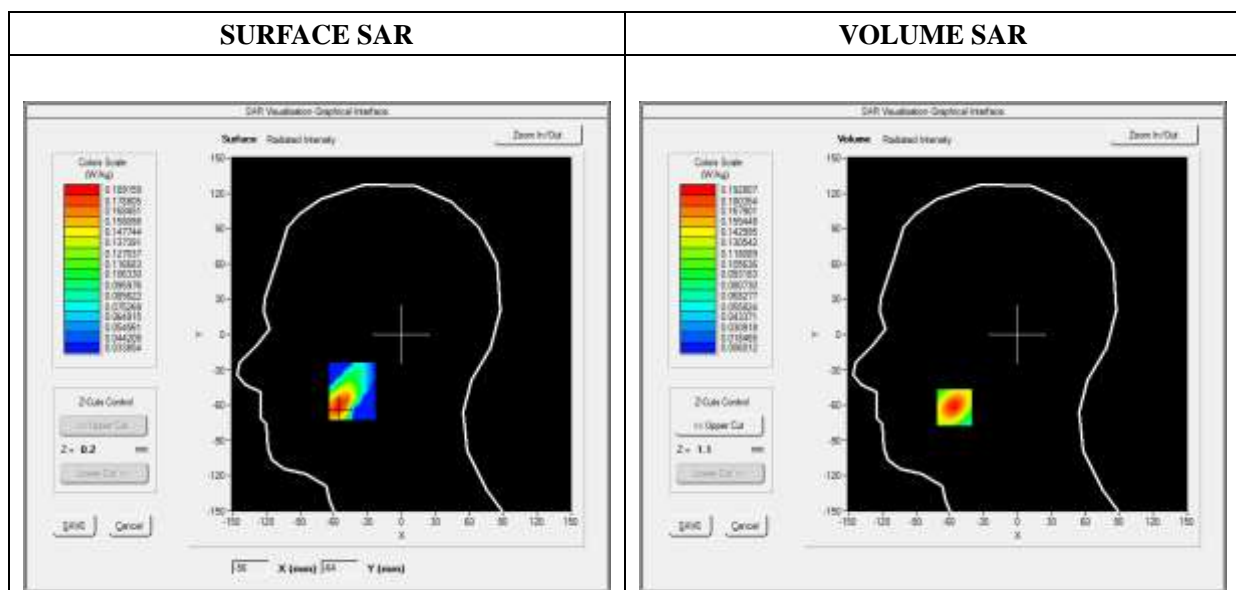
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	WCDMA1900_RMC
Channels	Middle
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

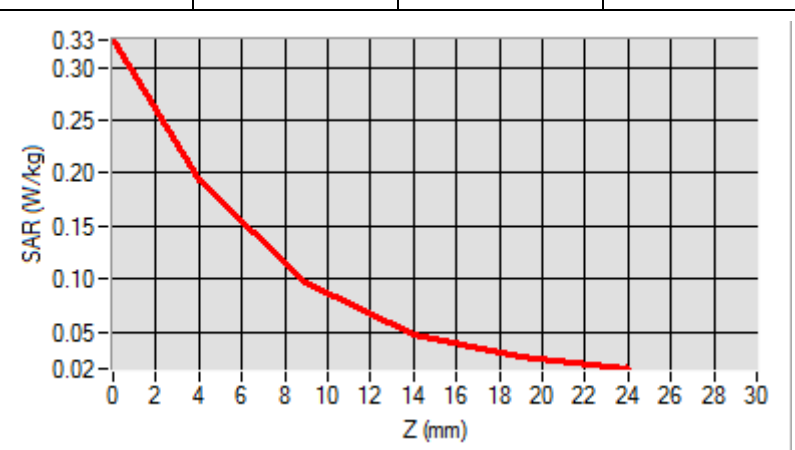
Frequency (MHz)	1880.000000
Relative Permittivity (real part)	38.560124
Conductivity (S/m)	1.380369
Power Variation (%)	1.524540
Ambient Temperature	21.1
Liquid Temperature	21.3

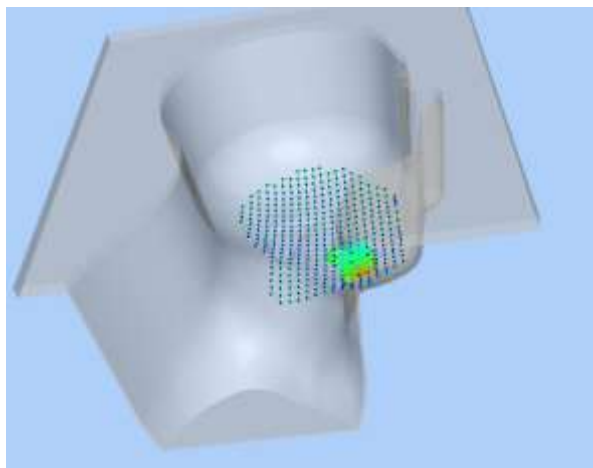
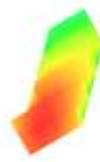


Maximum location: X=-56.00, Y=-62.00

SAR Peak: 0.33 W/kg

SAR 10g (W/Kg)	0.094712
SAR 1g (W/Kg)	0.189947

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3257	0.1928	0.0961	0.0485	0.0270
					

3D screen shot	Hot spot position
	

## MEASUREMENT 21

Type: Phone measurement (Complete)

Date of measurement: 11/27/2017

Measurement duration: 12 minutes 3 seconds

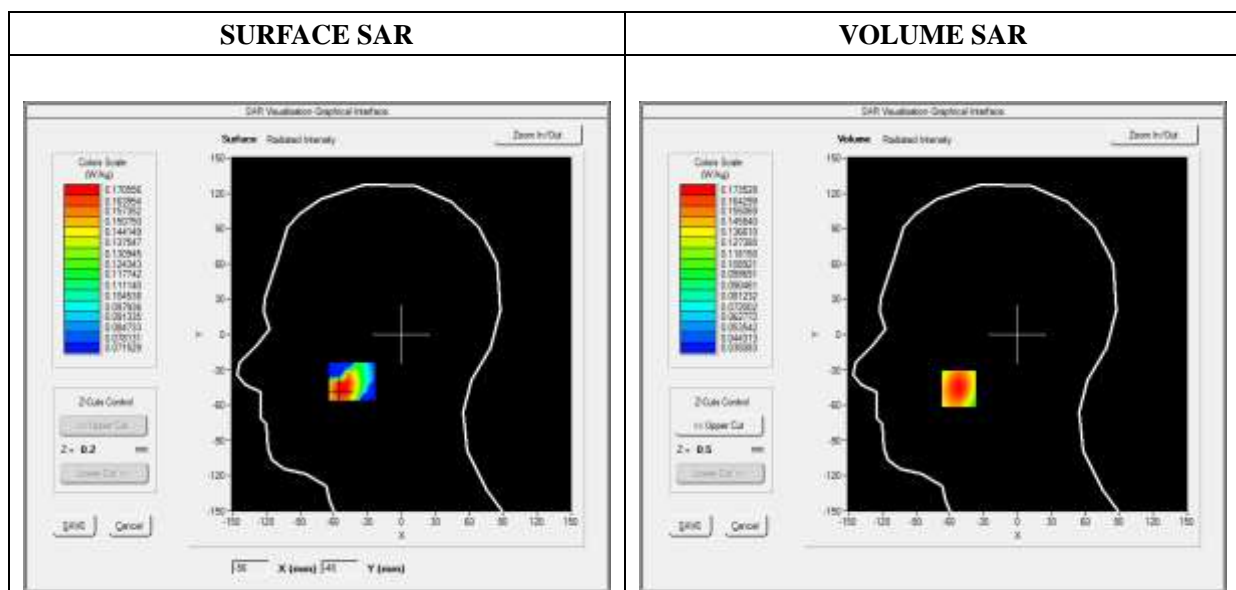
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Right head
Device Position	Cheek
Band	WCDMA850_RMC
Channels	Low
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

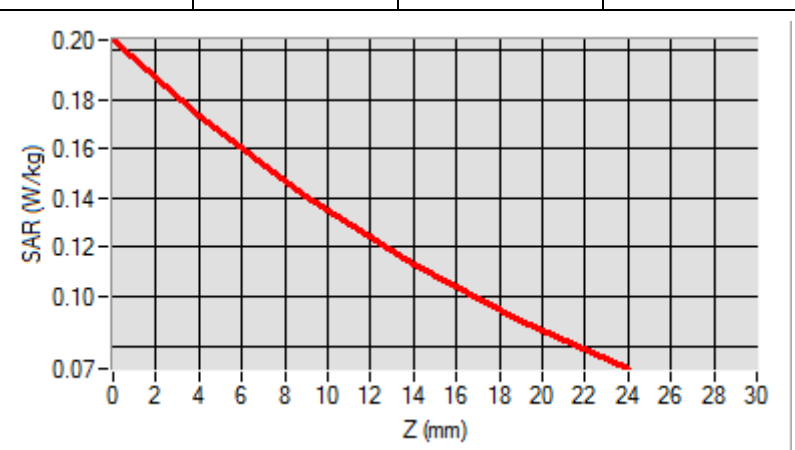
Frequency (MHz)	826.400000
Relative Permittivity (real part)	41.110245
Conductivity (S/m)	0.871245
Power Variation (%)	1.342427
Ambient Temperature	21.1
Liquid Temperature	21.3

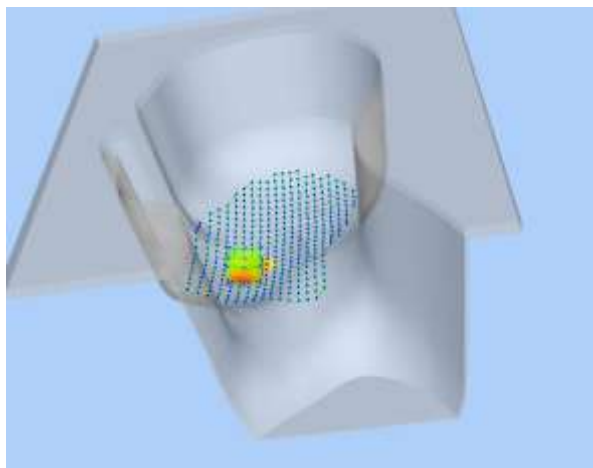



Maximum location: X=-52.00, Y=-46.00

SAR Peak: 0.20 W/kg

SAR 10g (W/Kg)	0.125311
SAR 1g (W/Kg)	0.166125

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2040	0.1735	0.1408	0.1134	0.0905
					

3D screen shot	Hot spot position
	



## MEASUREMENT 27

Type: Phone measurement (Complete)

Date of measurement: 11/28/2017

Measurement duration: 12 minutes 3 seconds

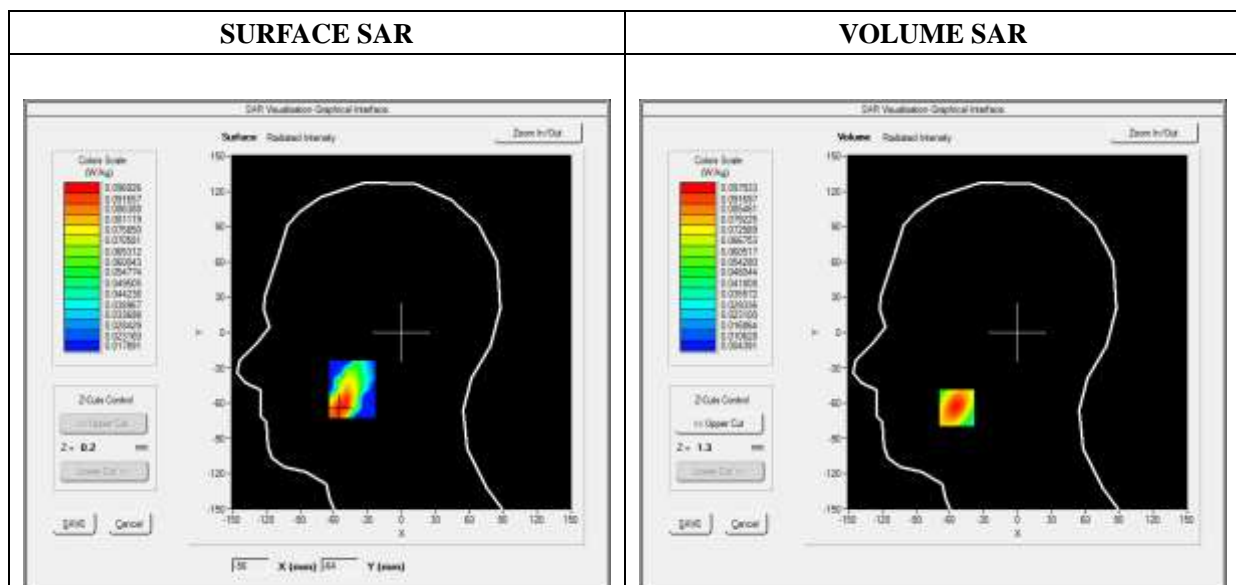
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	LTE Band 4_RMC
Channels	QPSK, 20MHz, 1RB, High
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

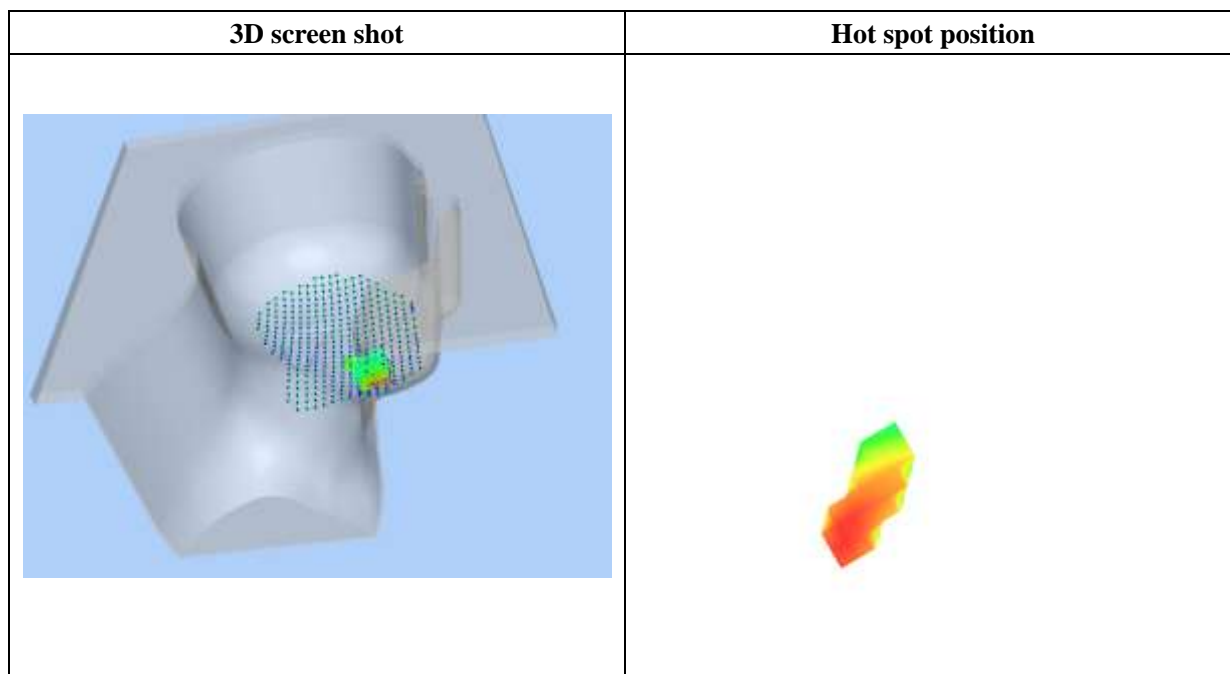
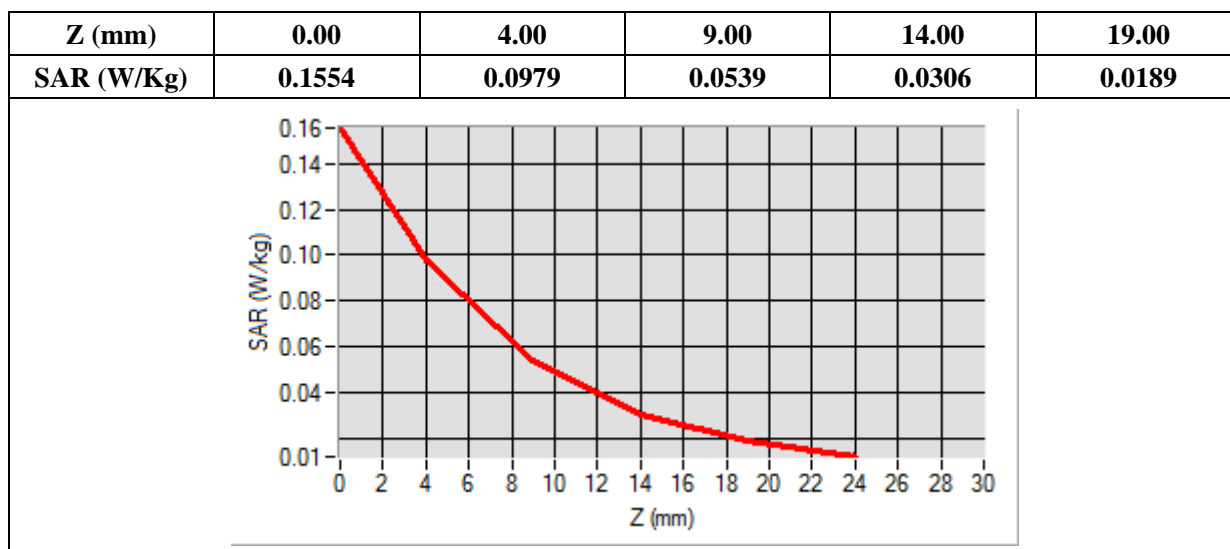
Frequency (MHz)	1745.000000
Relative Permittivity (real part)	39.024890
Conductivity (S/m)	1.371250
Power Variation (%)	1.374628
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=-54.00, Y=-64.00

SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)	0.051394
SAR 1g (W/Kg)	0.091778



## MEASUREMENT 35

Type: Phone measurement (Complete)

Date of measurement: 11/29/2017

Measurement duration: 12 minutes 3 seconds

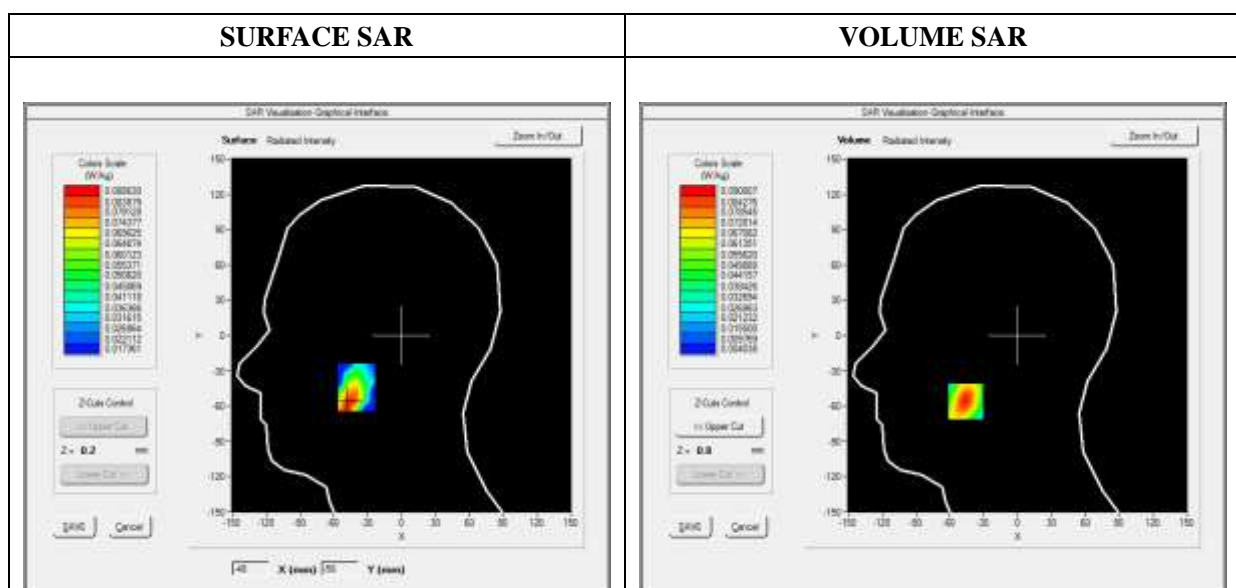
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.37; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	LTE Band 7_RMC
Channels	QPSK, 20MHz, 1RB, High
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

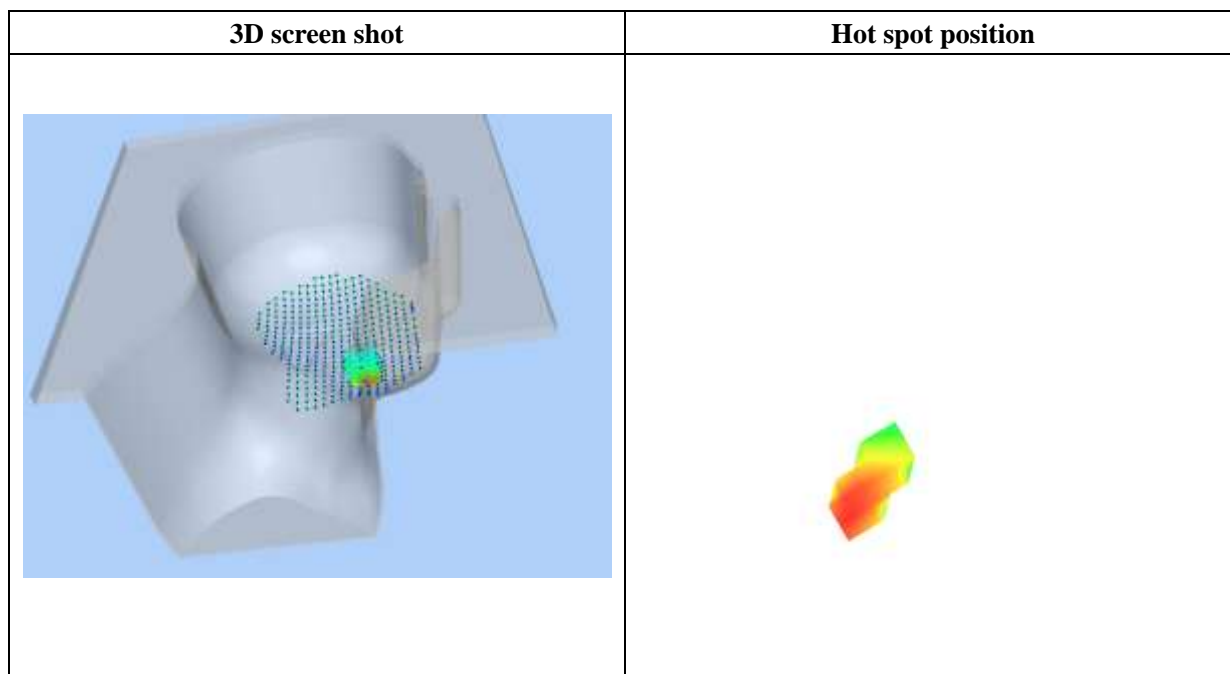
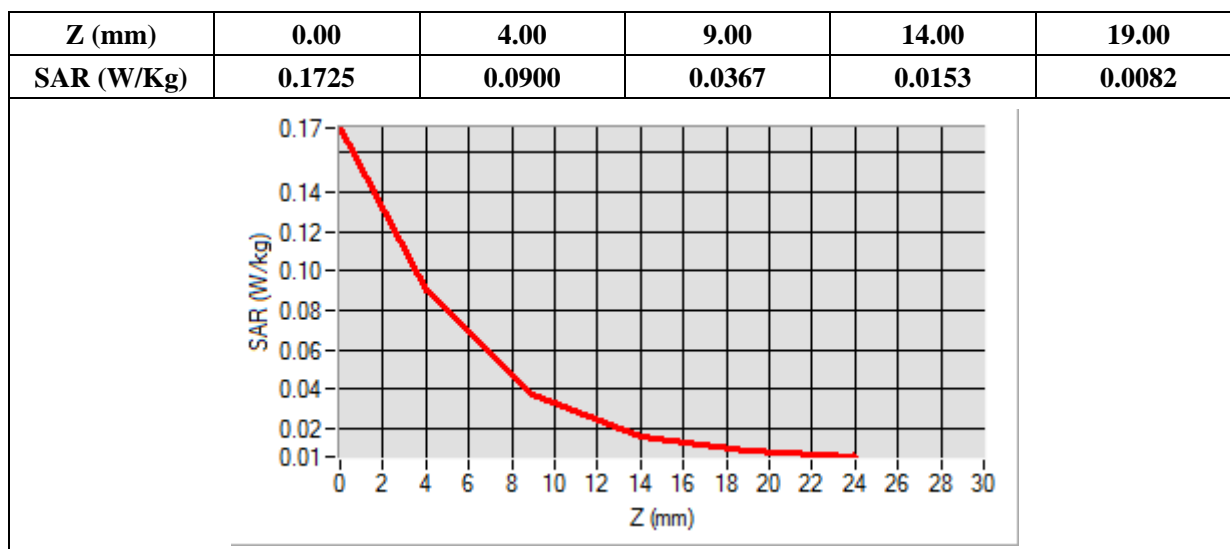
Frequency (MHz)	2560.000000
Relative Permittivity (real part)	38.631092
Conductivity (S/m)	1.930182
Power Variation (%)	0.924535
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=-46.00, Y=-56.00

SAR Peak: 0.17 W/kg

SAR 10g (W/Kg)	0.040588
SAR 1g (W/Kg)	0.084450



## MEASUREMENT 43

Type: Phone measurement (Complete)

Date of measurement: 11/29/2017

Measurement duration: 12 minutes 3 seconds

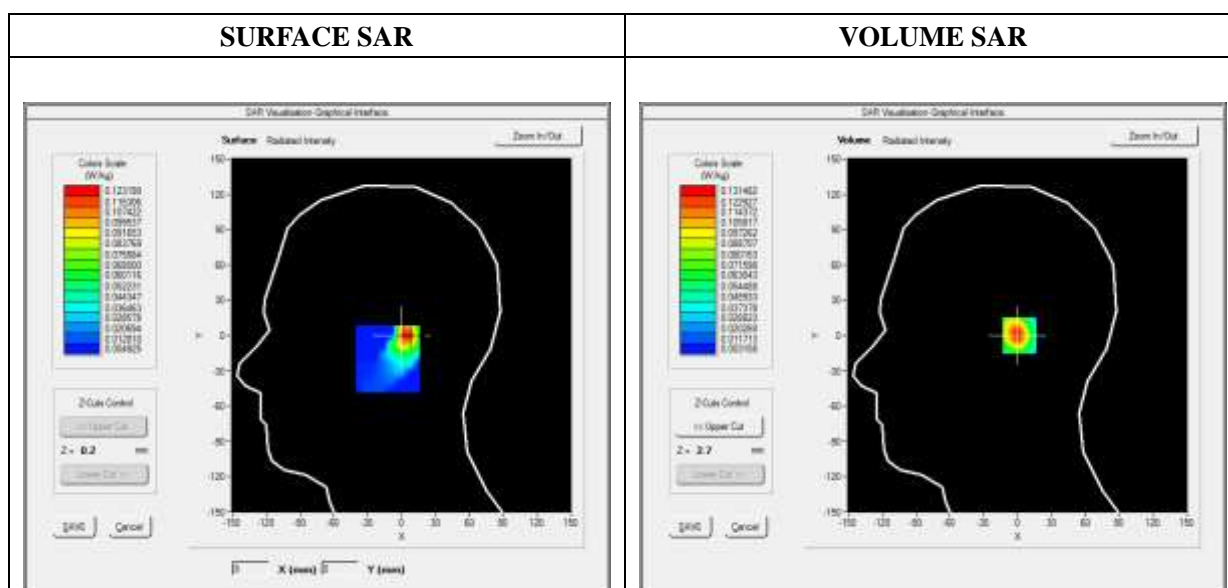
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.64; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Left head
Device Position	Cheek
Band	WiFi_802.11b
Channels	Low
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

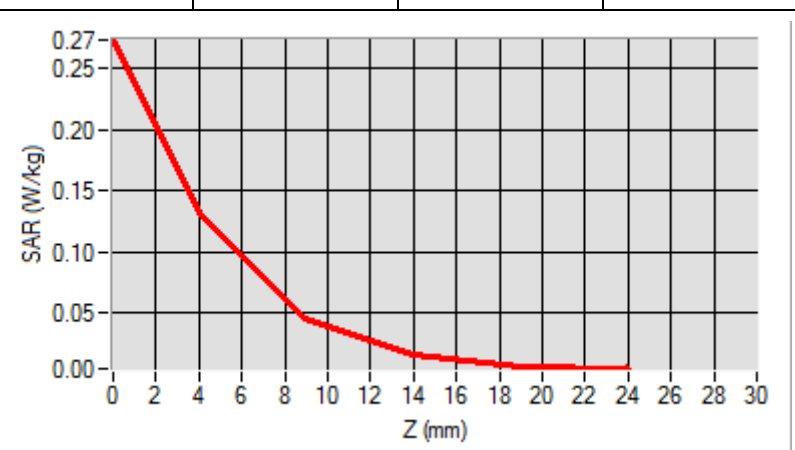
Frequency (MHz)	2412.000000
Relative Permittivity (real part)	38.153660
Conductivity (S/m)	1.740236
Power Variation (%)	3.234772
Ambient Temperature	21.1
Liquid Temperature	21.2

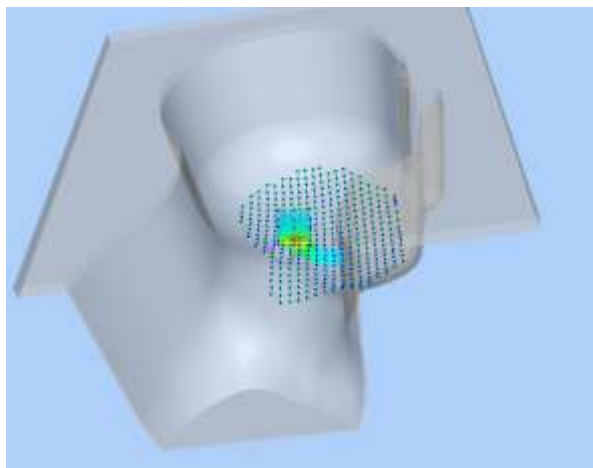



Maximum location: X=5.00, Y=0.00

SAR Peak: 0.27 W/kg

SAR 10g (W/Kg)	0.054692
SAR 1g (W/Kg)	0.124624

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2734	0.1315	0.0454	0.0148	0.0063
					

3D screen shot	Hot spot position
	

## MEASUREMENT 45

Type: Phone measurement (Complete)

Date of measurement: 11/30/2017

Measurement duration: 12 minutes 3 seconds

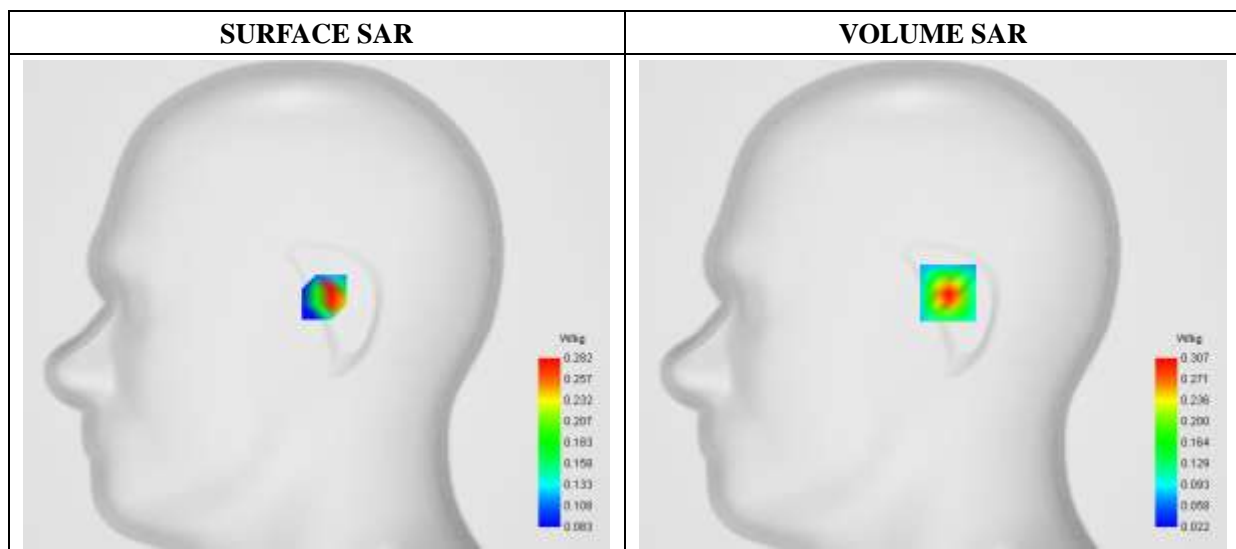
E-field Probe: SSE2 - SN 08/16 EPGO298; ConvF: 2.28; Calibrated: 2017/09/18

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Right head
Device Position	Cheek
Band	WiFi(5.2G)_802.11n
Channels	Middle
Signal	Duty Cycle: 1:1

### B. SAR Measurement Results

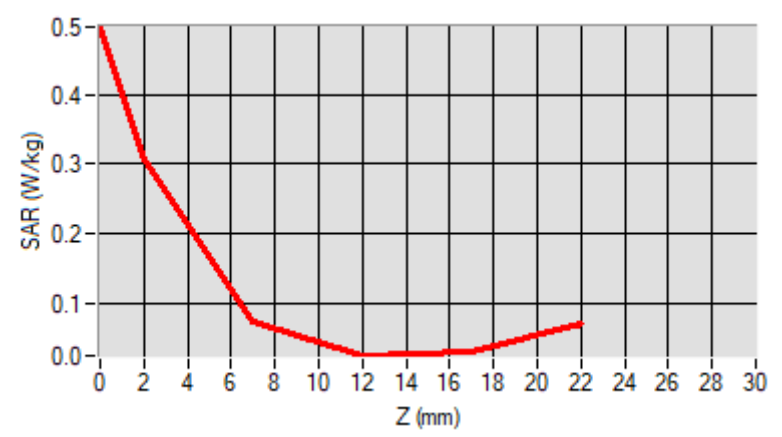
Frequency (MHz)	5200.000000
Relative Permittivity (real part)	36.082911
Conductivity (S/m)	4.661483
Power Variation (%)	1.083921
Ambient Temperature	21.1
Liquid Temperature	21.2

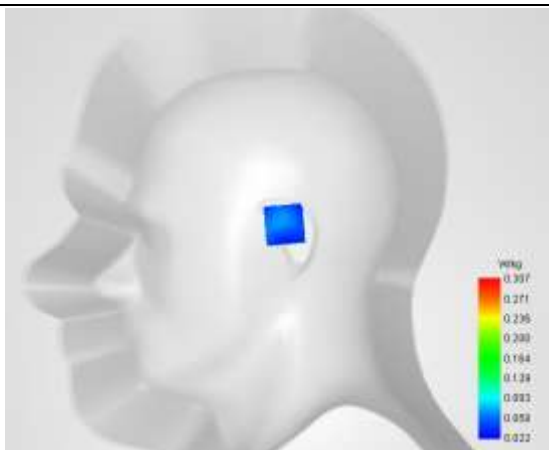
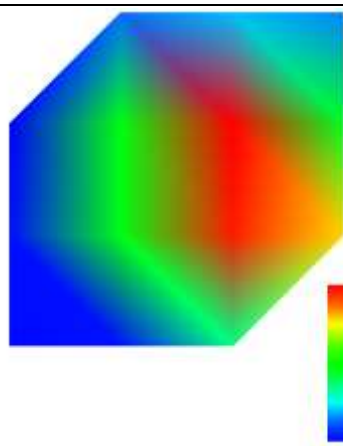


Maximum location: X=8.00, Y=6.00

SAR 10g (W/Kg)	0.126096
SAR 1g (W/Kg)	0.293430

Z (mm)	0.00	2.00	7.00	12.00	17.00
SAR (W/Kg)	0.4981	0.3066	0.0738	0.0234	0.0305



3D screen shot	Hot spot position
	



## MEASUREMENT 50

Type: Phone measurement (Complete)

Date of measurement: 11/27/2017

Measurement duration: 12 minutes 3 seconds

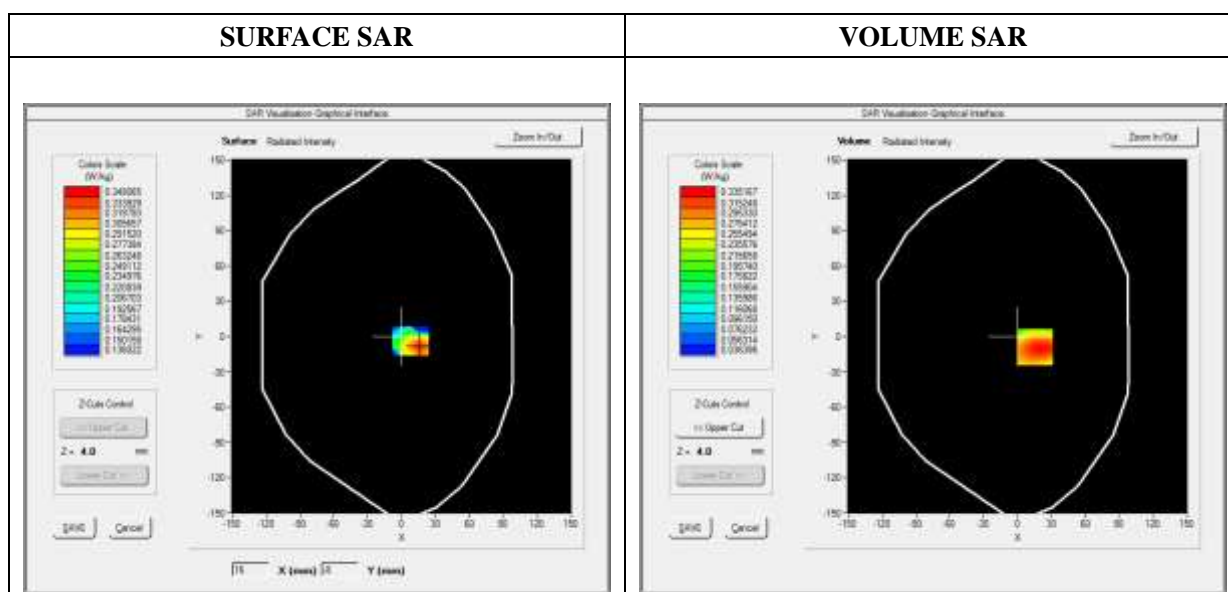
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat Plane
Device Position	Front(Body-worn)
Band	GSM850
Channels	Low
Signal	TDMA (Crest factor: 8.0)

### B. SAR Measurement Results

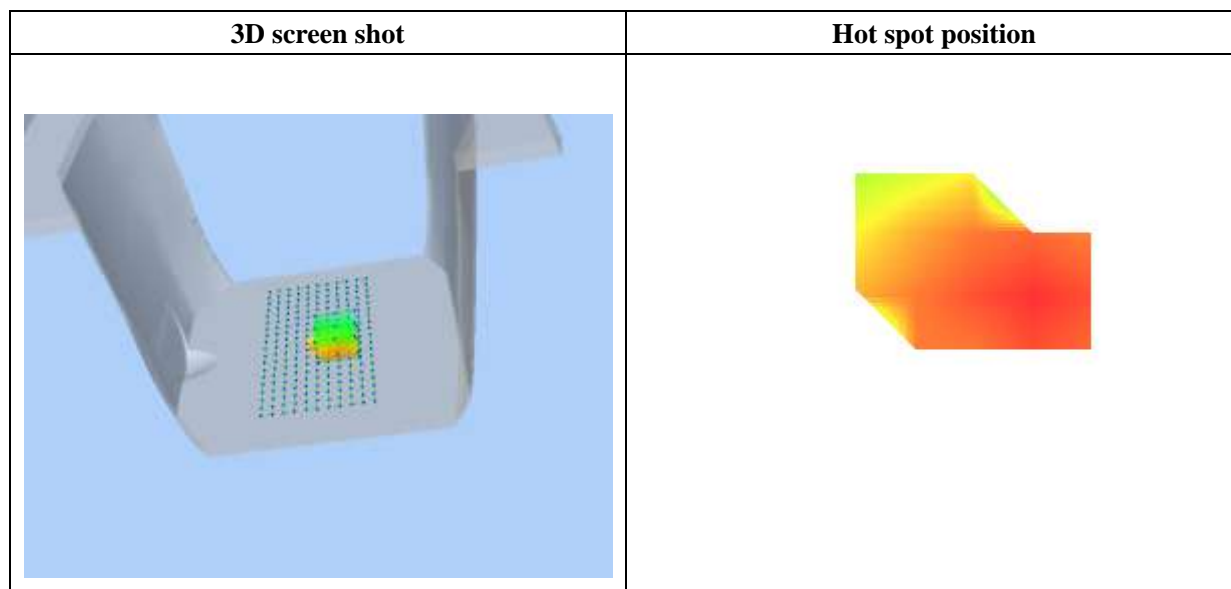
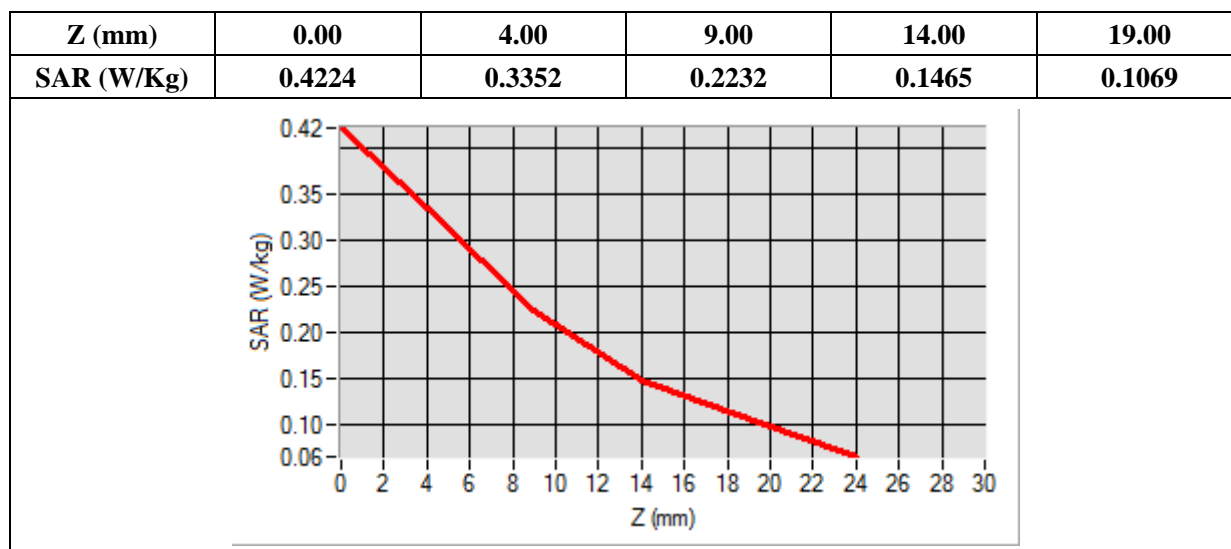
Frequency (MHz)	824.200000
Relative Permittivity (real part)	54.851214
Conductivity (S/m)	0.951454
Power Variation (%)	0.901472
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=16.00, Y=-9.00

SAR Peak: 0.51 W/kg

SAR 10g (W/Kg)	0.211914
SAR 1g (W/Kg)	0.326484



## MEASUREMENT 52

Type: Phone measurement (Complete)

Date of measurement: 11/28/2017

Measurement duration: 12 minutes 3 seconds

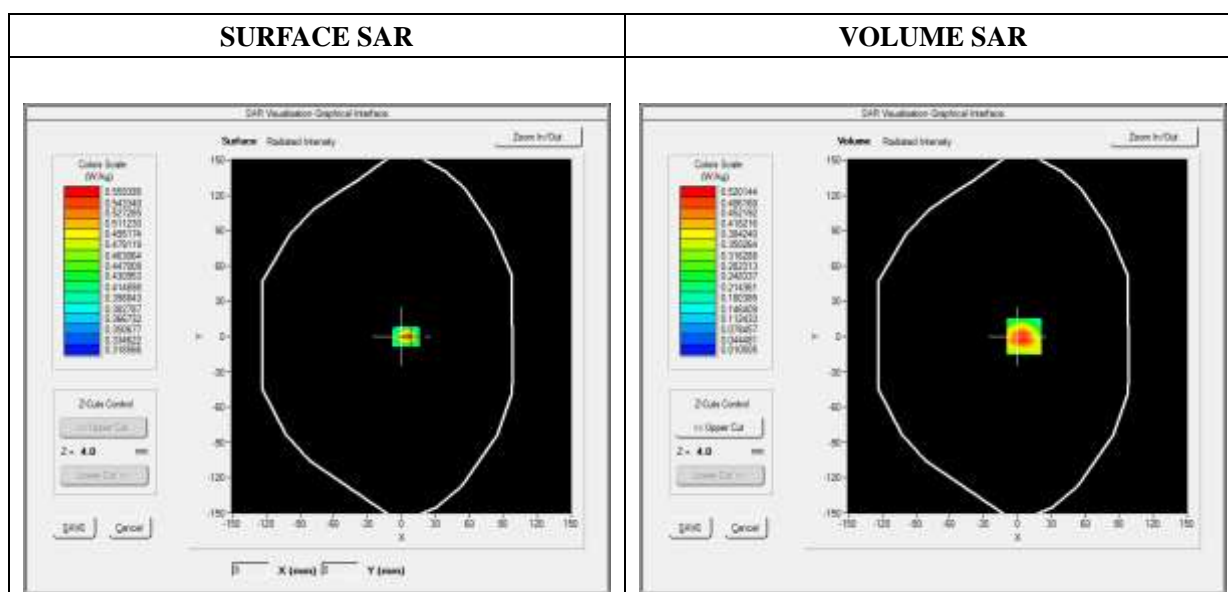
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat Plane
Device Position	Front(Body-worn)
Band	GSM1900
Channels	Low
Signal	TDMA (Crest factor: 8.0)

### B. SAR Measurement Results

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

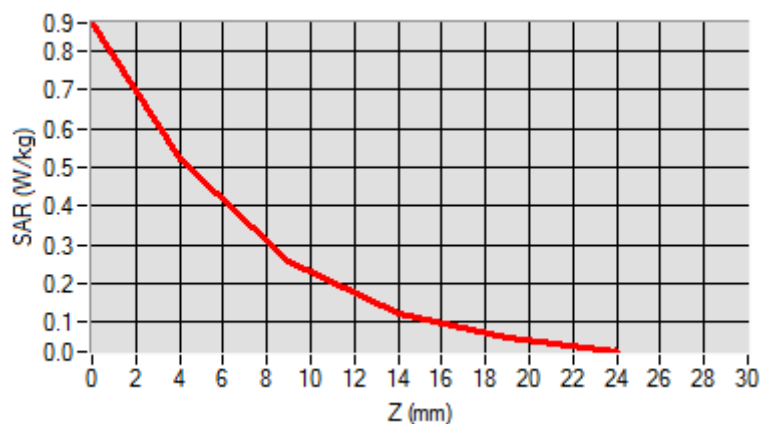


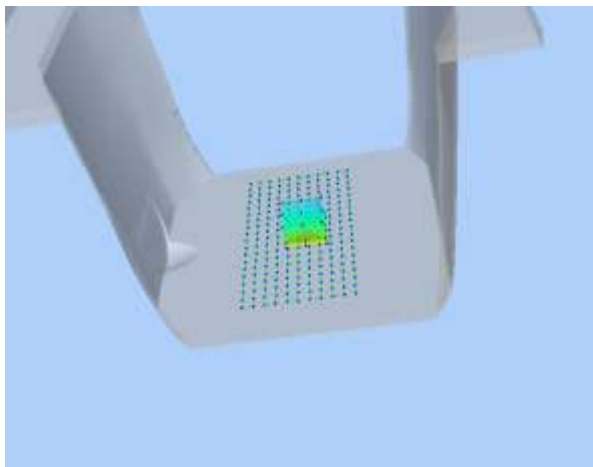

Maximum location: X=6.00, Y=0.00

SAR Peak: 0.88 W/kg

SAR 10g (W/Kg)	0.242206
SAR 1g (W/Kg)	0.480306

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8722	0.5201	0.2573	0.1224	0.0581



3D screen shot	Hot spot position
	

## MEASUREMENT 54

Type: Phone measurement (Complete)

Date of measurement: 11/27/2017

Measurement duration: 12 minutes 3 seconds

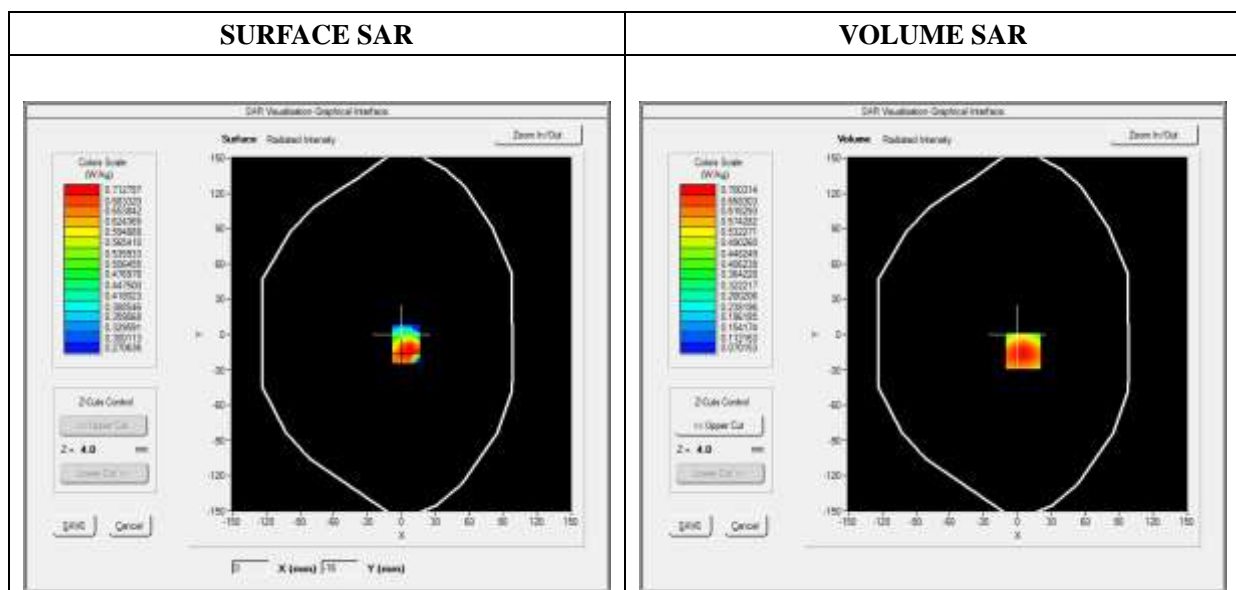
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat plane
Device Position	Front
Band	GPRS850_3TX
Channels	Low
Signal	Duty Cycle: 1:2.66

### B. SAR Measurement Results

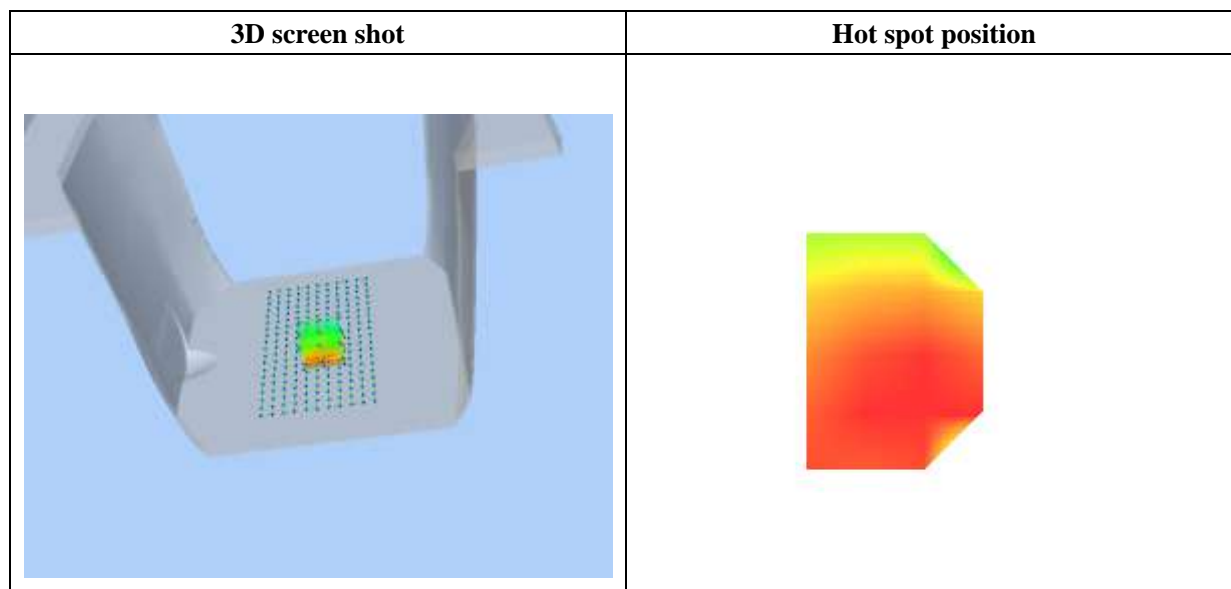
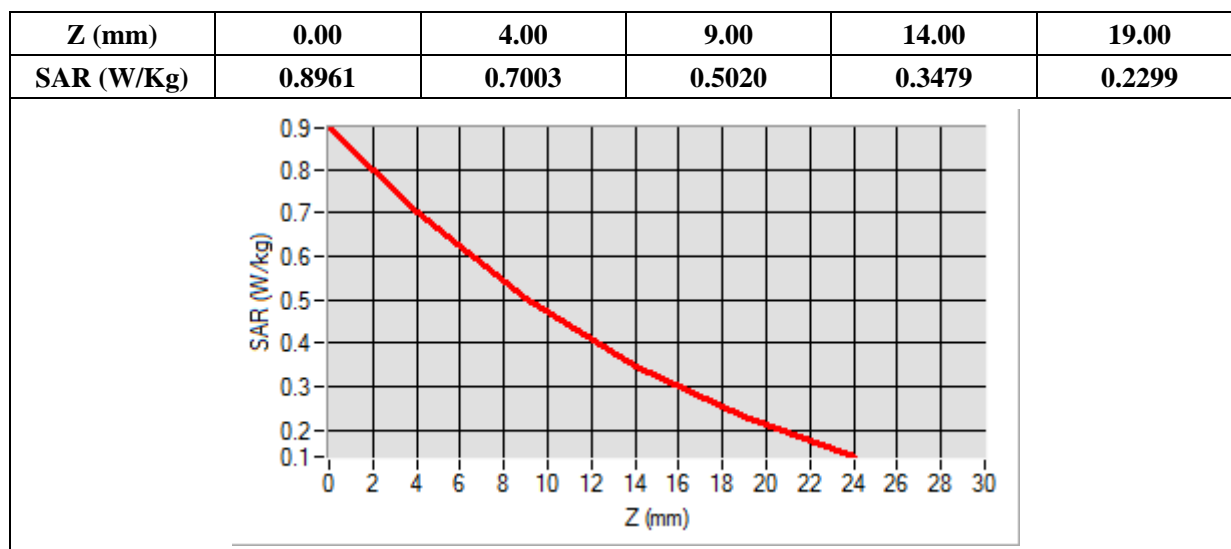
Frequency (MHz)	824.200000
Relative Permittivity (real part)	54.851214
Conductivity (S/m)	0.951454
Power Variation (%)	0.901472
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=5.00, Y=-14.00

SAR Peak: 0.90 W/kg

SAR 10g (W/Kg)	0.449656
SAR 1g (W/Kg)	0.670799



## MEASUREMENT 58

Type: Phone measurement (Complete)

Date of measurement: 11/28/2017

Measurement duration: 12 minutes 3 seconds

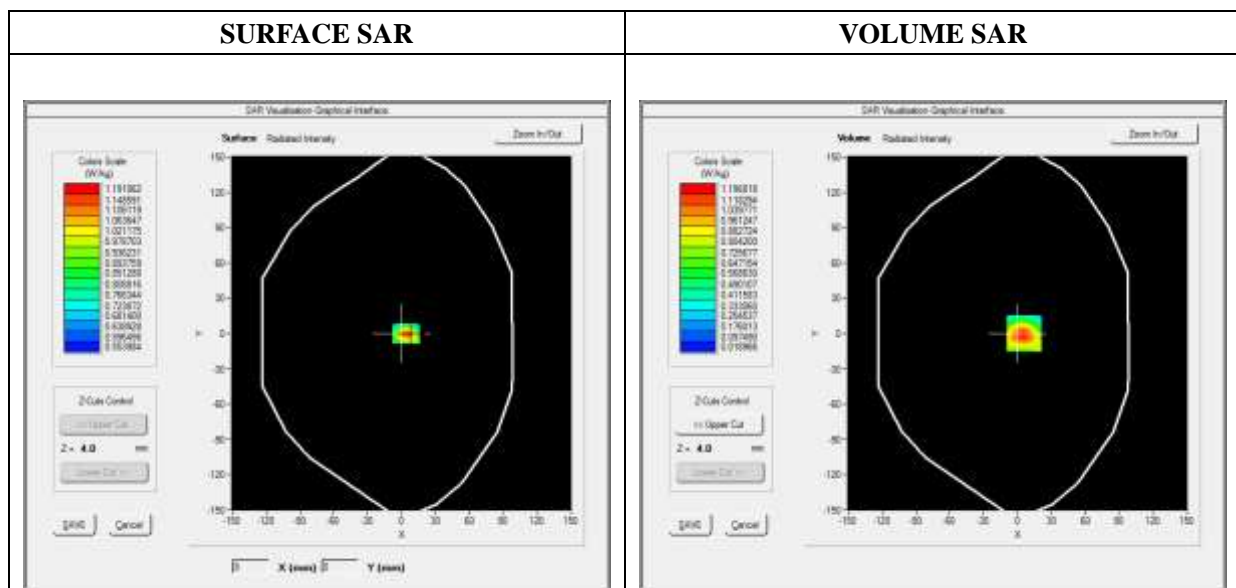
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat plane
Device Position	Front
Band	GPRS1900_3TX
Channels	Low
Signal	Duty Cycle: 1:2.66

### B. SAR Measurement Results

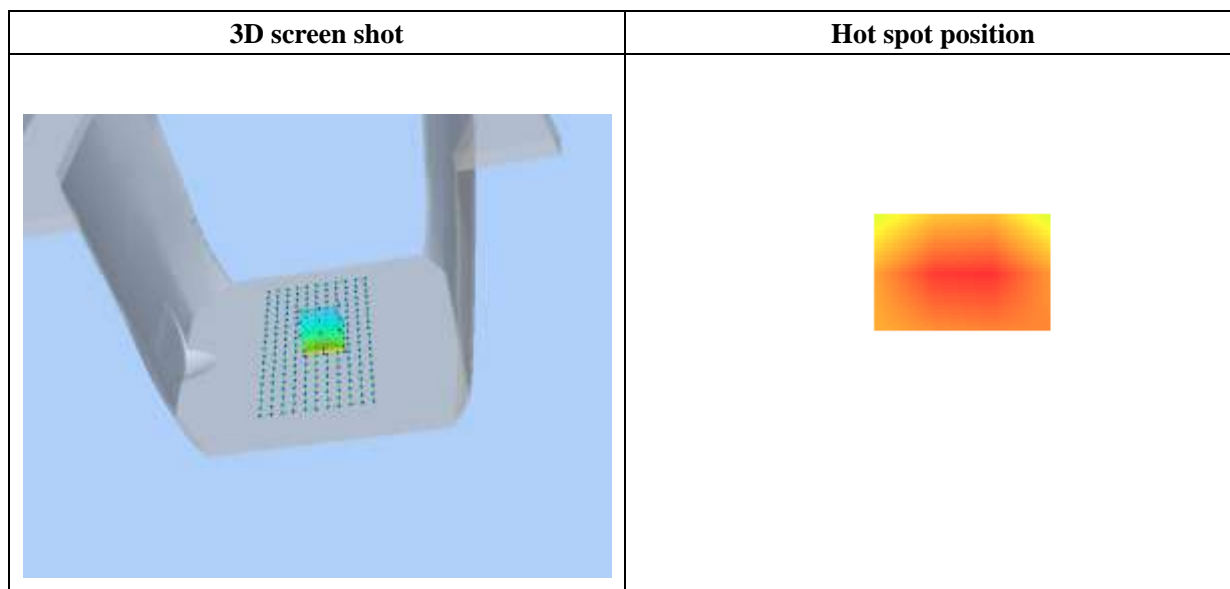
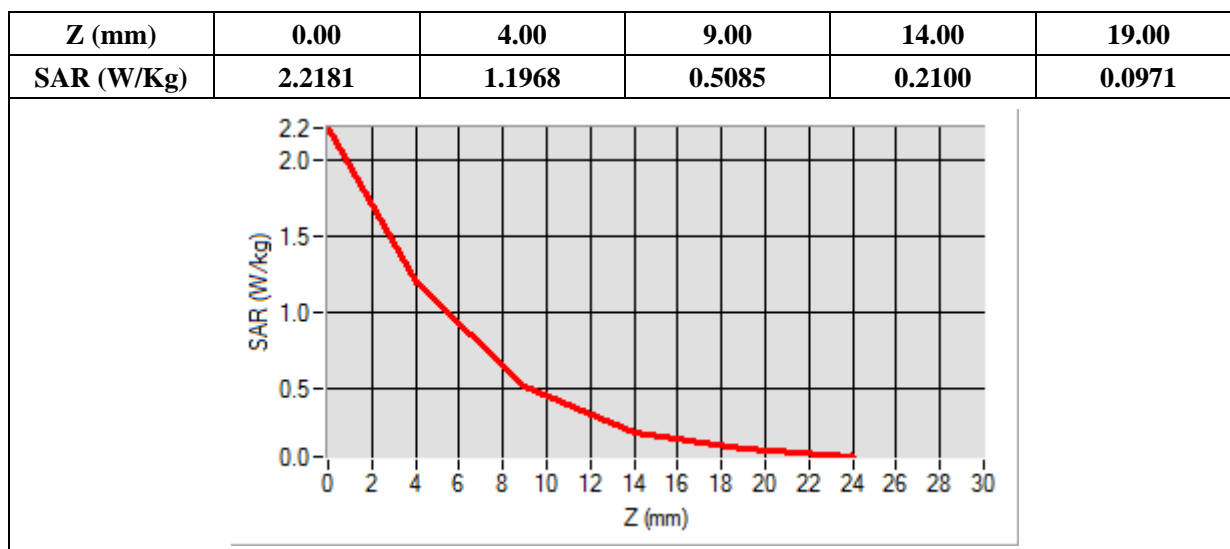
Frequency (MHz)	1850.200000
Relative Permittivity (real part)	52.420415
Conductivity (S/m)	1.501966
Power Variation (%)	2.483762
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=6.00, Y=0.00

SAR Peak: 2.23 W/kg

SAR 10g (W/Kg)	0.521791
SAR 1g (W/Kg)	1.107794





## MEASUREMENT 64

Type: Phone measurement (Complete)

Date of measurement: 11/28/2017

Measurement duration: 12 minutes 3 seconds

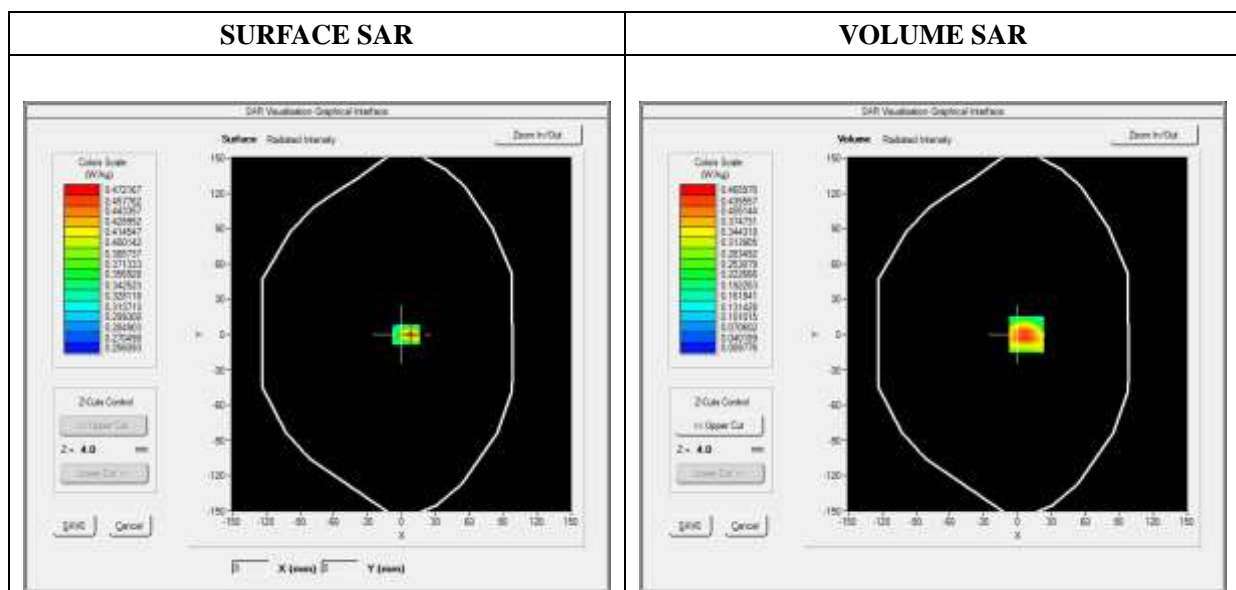
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat Plane
Device Position	Front
Band	WCDMA1900_RMC
Channels	Middle
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

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

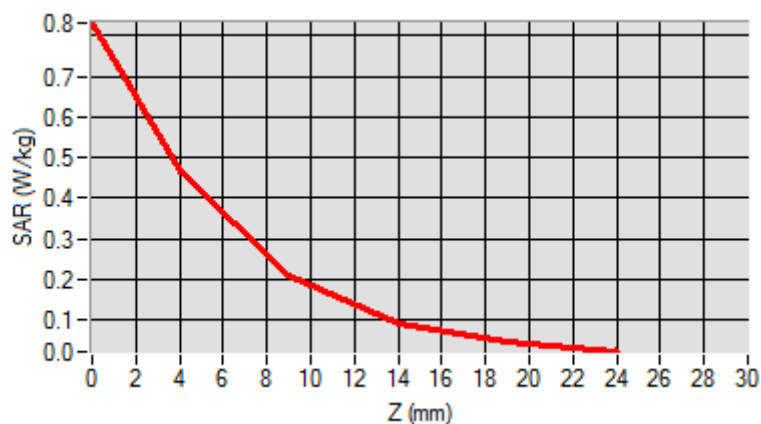


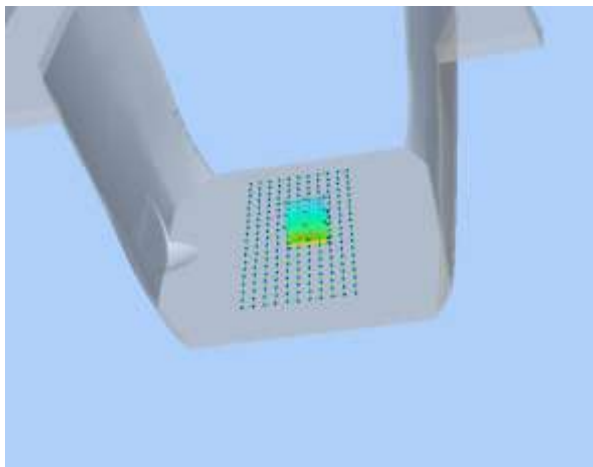

Maximum location: X=8.00, Y=0.00

SAR Peak: 0.83 W/kg

SAR 10g (W/Kg)	0.210968
SAR 1g (W/Kg)	0.430126

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8321	0.4660	0.2107	0.0934	0.0451



3D screen shot	Hot spot position
	

## MEASUREMENT 68

Type: Phone measurement (Complete)

Date of measurement: 11/27/2017

Measurement duration: 12 minutes 3 seconds

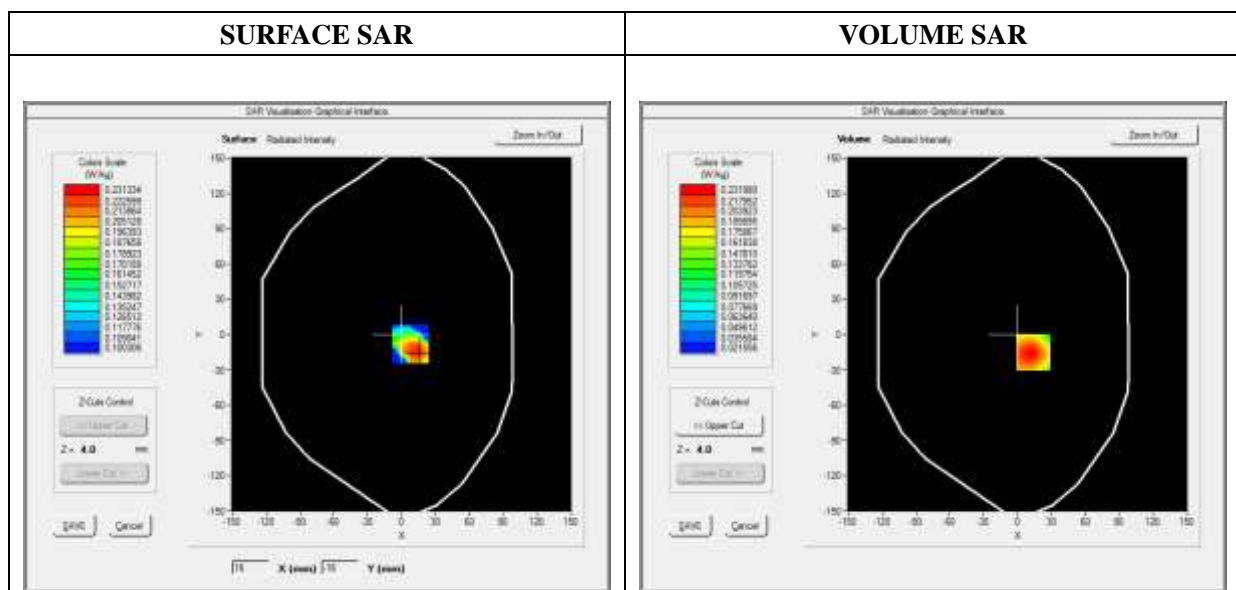
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat Plane
Device Position	Front
Band	WCDMA850_RMC
Channels	Low
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

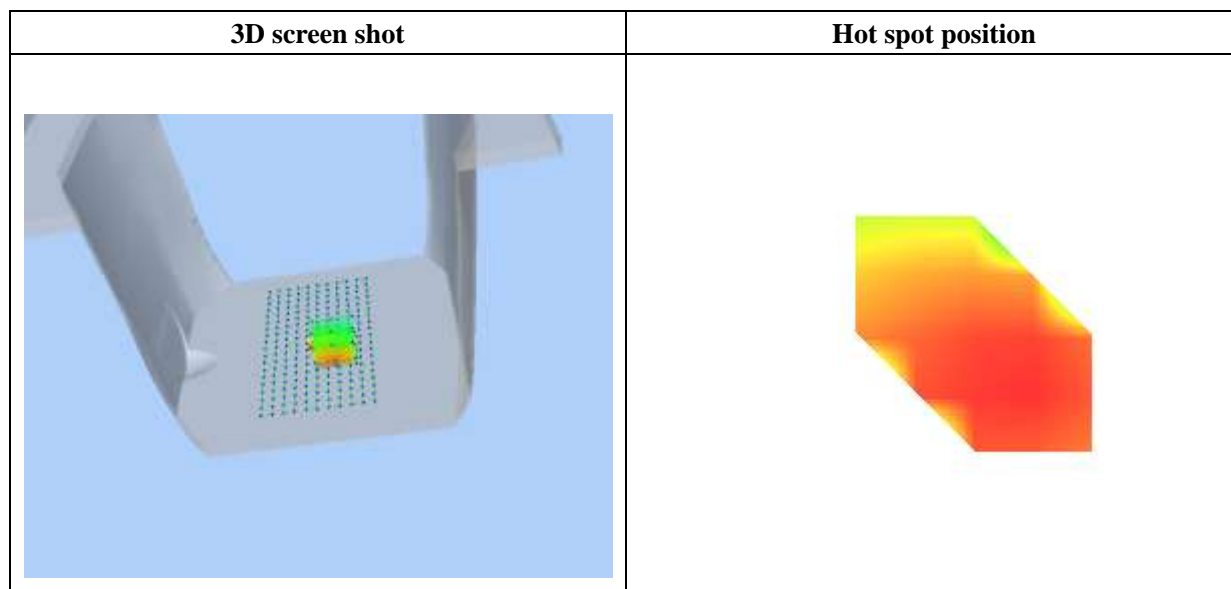
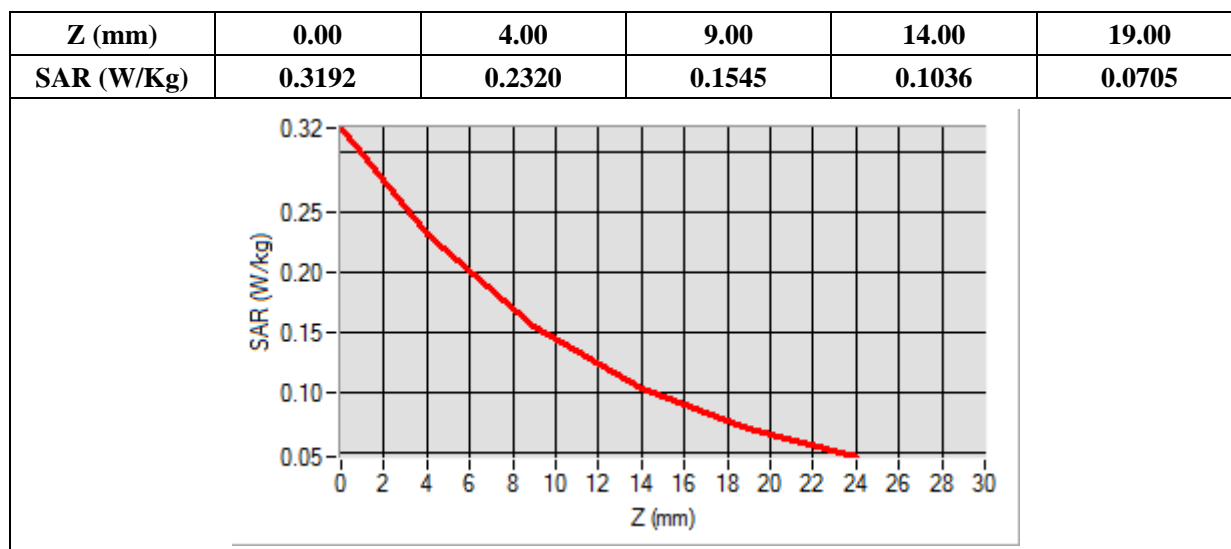
Frequency (MHz)	826.400000
Relative Permittivity (real part)	54.851214
Conductivity (S/m)	0.951454
Power Variation (%)	2.341234
Ambient Temperature	21.1
Liquid Temperature	21.3



Maximum location: X=14.00, Y=-15.00

SAR Peak: 0.32 W/kg

SAR 10g (W/Kg)	0.145549
SAR 1g (W/Kg)	0.220943



## MEASUREMENT 72

Type: Phone measurement (Complete)

Date of measurement: 11/28/2017

Measurement duration: 12 minutes 3 seconds

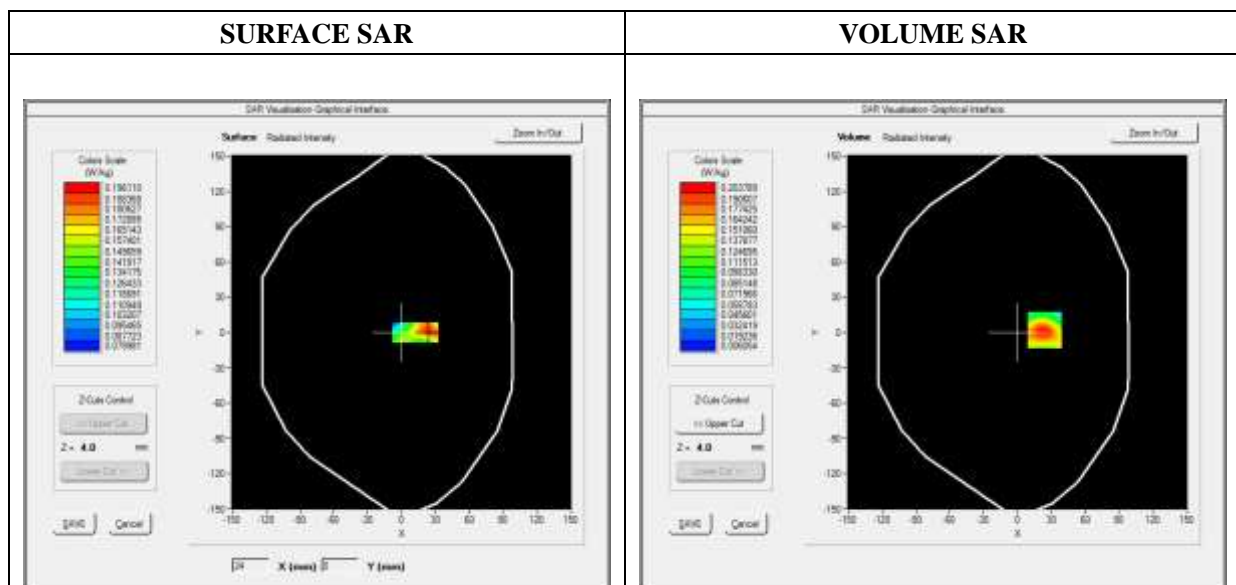
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat Plane
Device Position	Front
Band	LTE Band 4_RMC
Channels	QPSK, 20MHz, 1RB, High
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

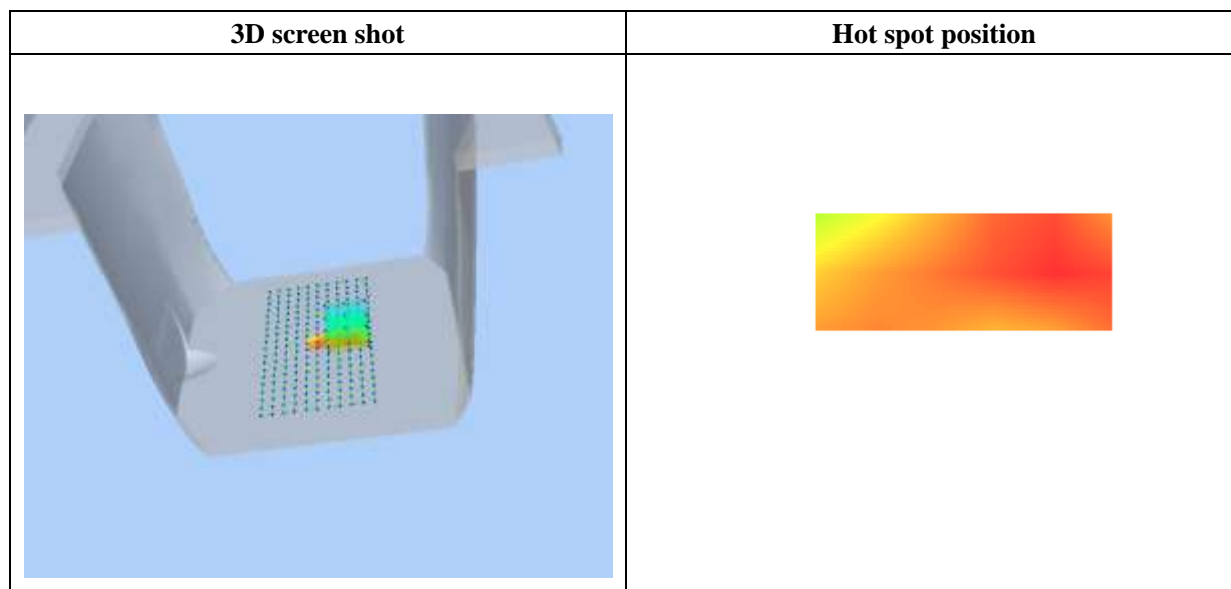
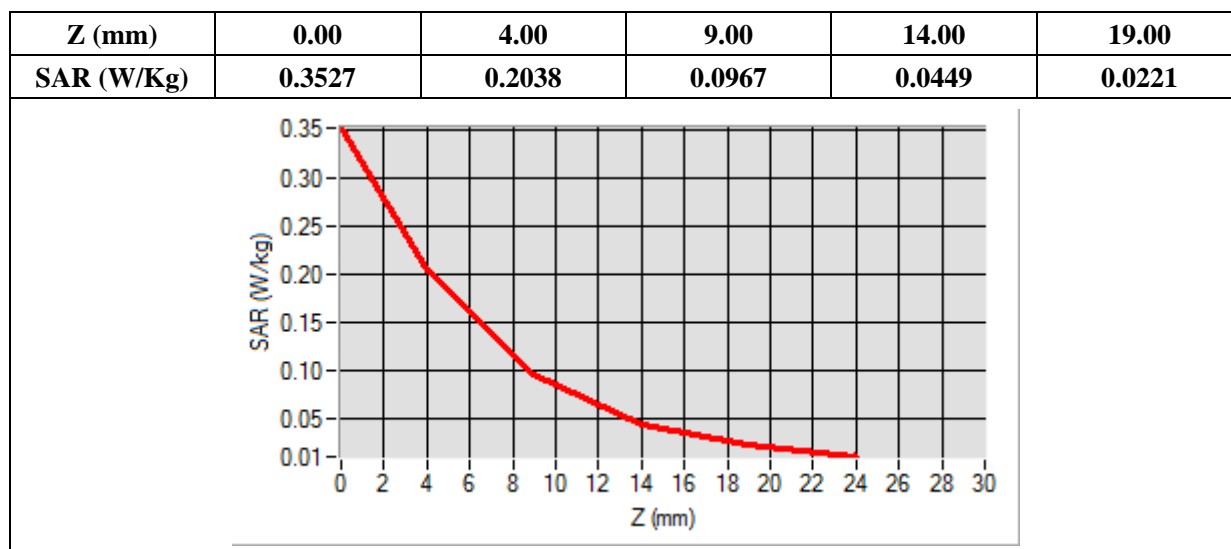
Frequency (MHz)	1745.000000
Relative Permittivity (real part)	51.224510
Conductivity (S/m)	1.461261
Power Variation (%)	0.858383
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=24.00, Y=2.00

SAR Peak: 0.35 W/kg

SAR 10g (W/Kg)	0.096129
SAR 1g (W/Kg)	0.189816



## MEASUREMENT 80

Type: Phone measurement (Complete)

Date of measurement: 11/29/2017

Measurement duration: 12 minutes 3 seconds

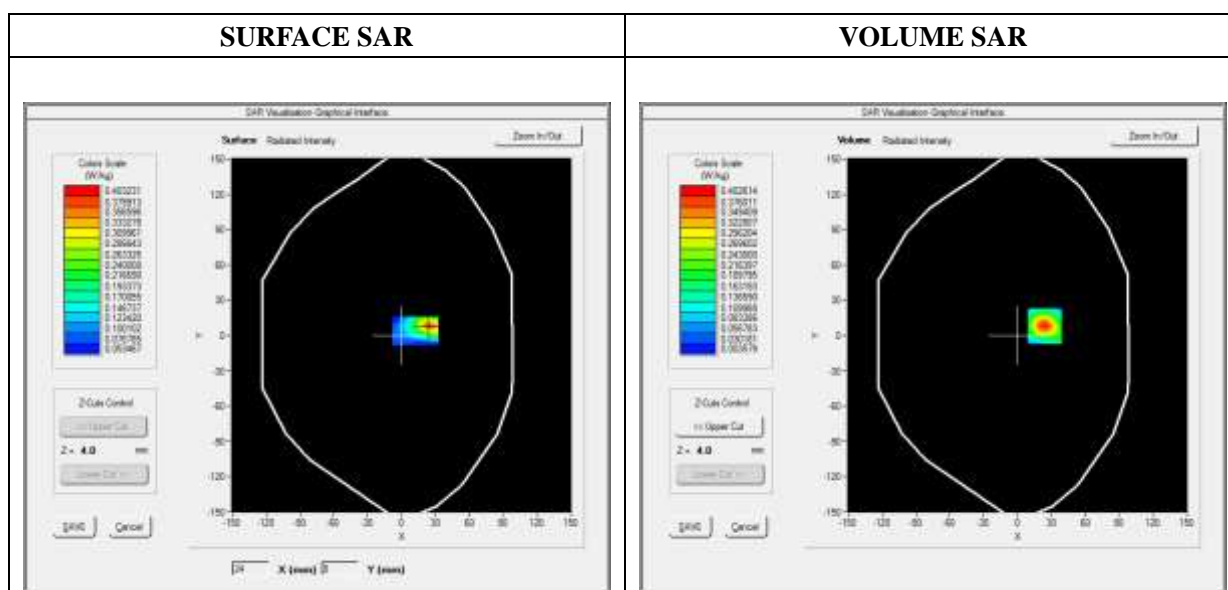
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.58; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat Plane
Device Position	Front
Band	LTE Band 7_RMC
Channels	QPSK, 20MHz, 1RB, High
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

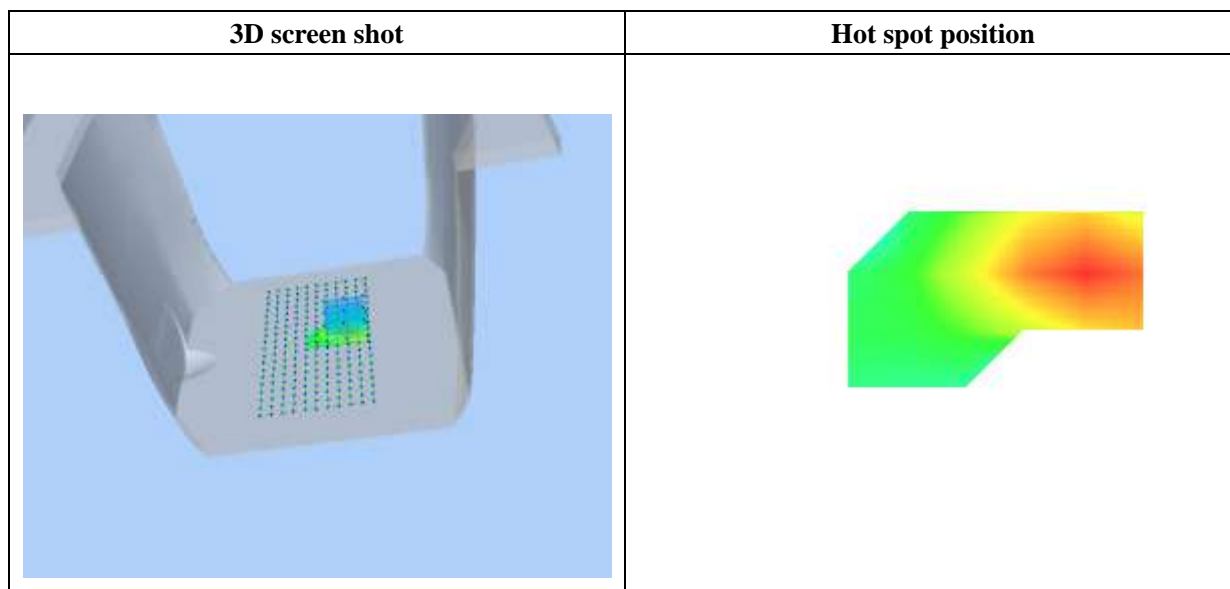
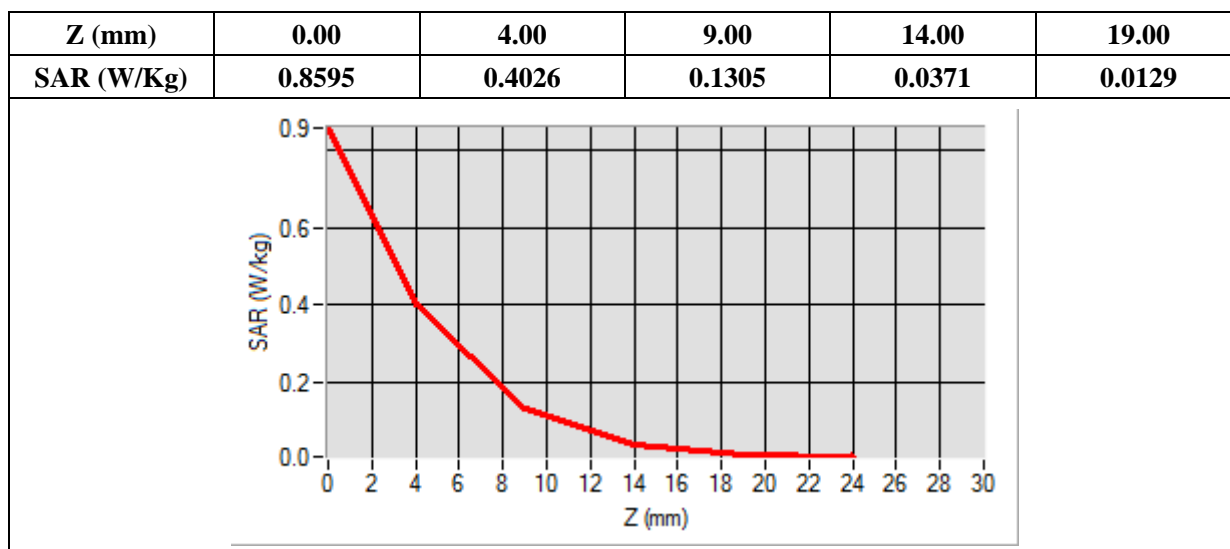
Frequency (MHz)	2560.000000
Relative Permittivity (real part)	52.241202
Conductivity (S/m)	2.120943
Power Variation (%)	3.672346
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=24.00, Y=8.00

SAR Peak: 0.85 W/kg

SAR 10g (W/Kg)	0.147337
SAR 1g (W/Kg)	0.367920





# MEASUREMENT 81

Type: Phone measurement (Complete)

Date of measurement: 11/29/2017

Measurement duration: 12 minutes 3 seconds

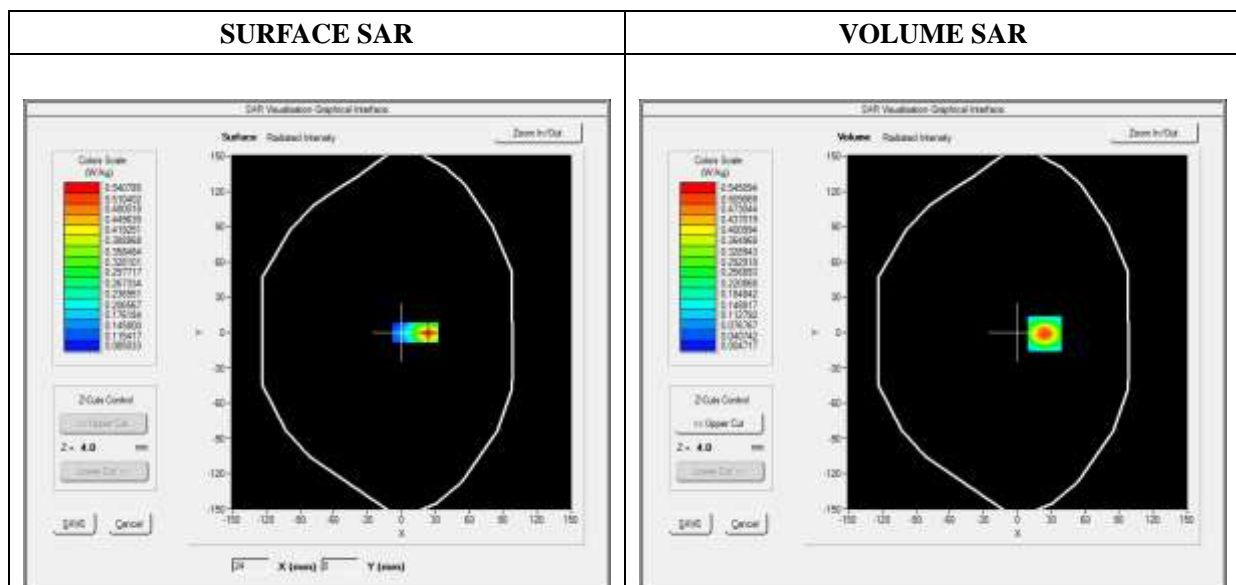
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.58; Calibrated: 06/01/2017

## A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat Plane
Device Position	Bottom
Band	LTE Band 7_RMC
Channels	QPSK, 20MHz, 1RB, High
Signal	Duty Cycle 1:1

## B. SAR Measurement Results

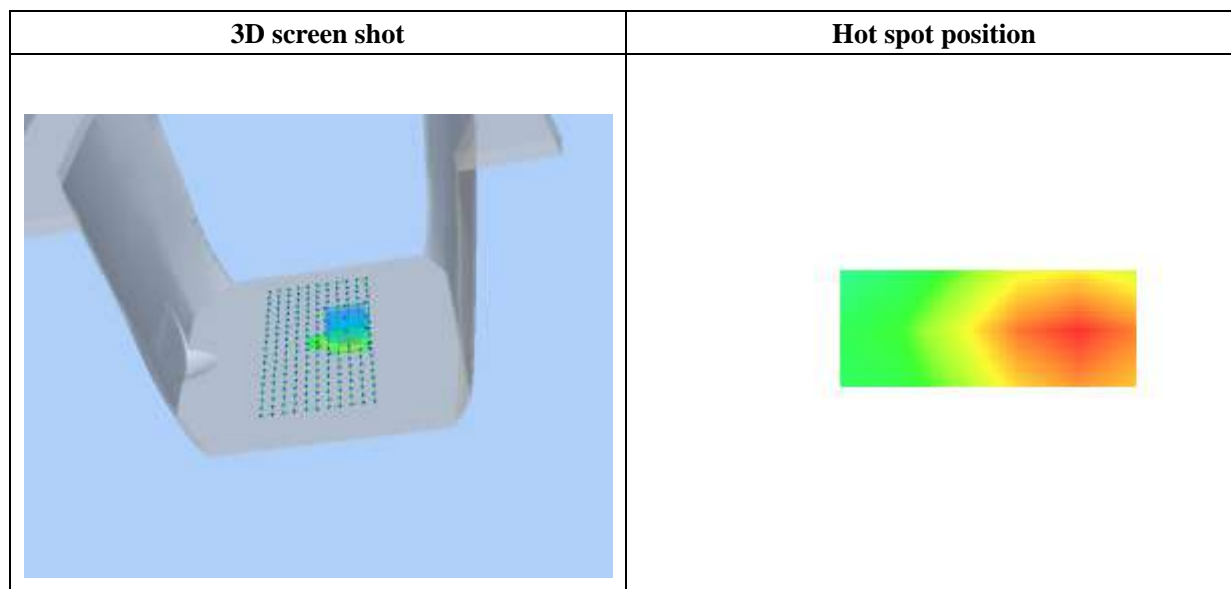
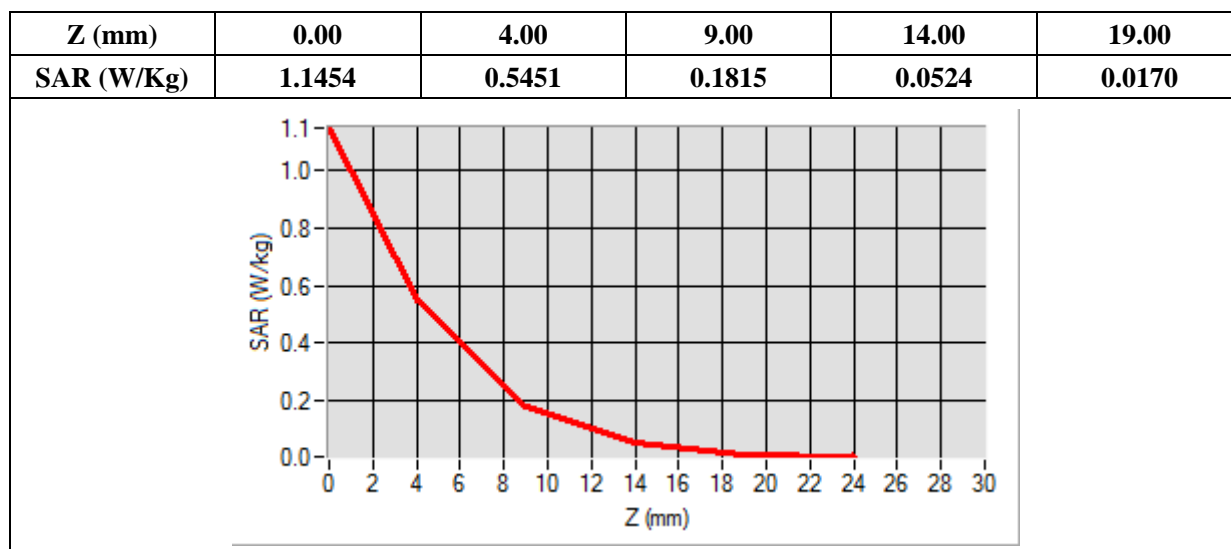
Frequency (MHz)	2560.000000
Relative Permittivity (real part)	52.241202
Conductivity (S/m)	2.120943
Power Variation (%)	0.947833
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=24.00, Y=-1.00

SAR Peak: 1.14 W/kg

SAR 10g (W/Kg)	0.199752
SAR 1g (W/Kg)	0.496121



## MEASUREMENT 87

Type: Phone measurement (Complete)

Date of measurement: 11/29/2017

Measurement duration: 12 minutes 3 seconds

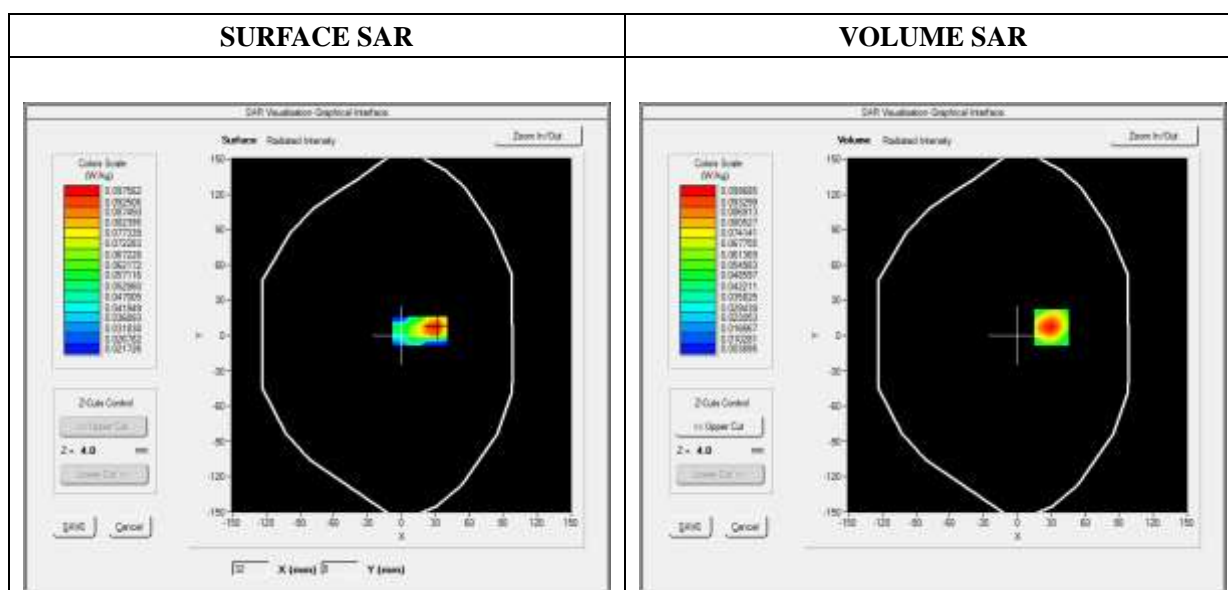
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 06/01/2017

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat Plane
Device Position	Back
Band	WiFi_802.11b
Channels	Low
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

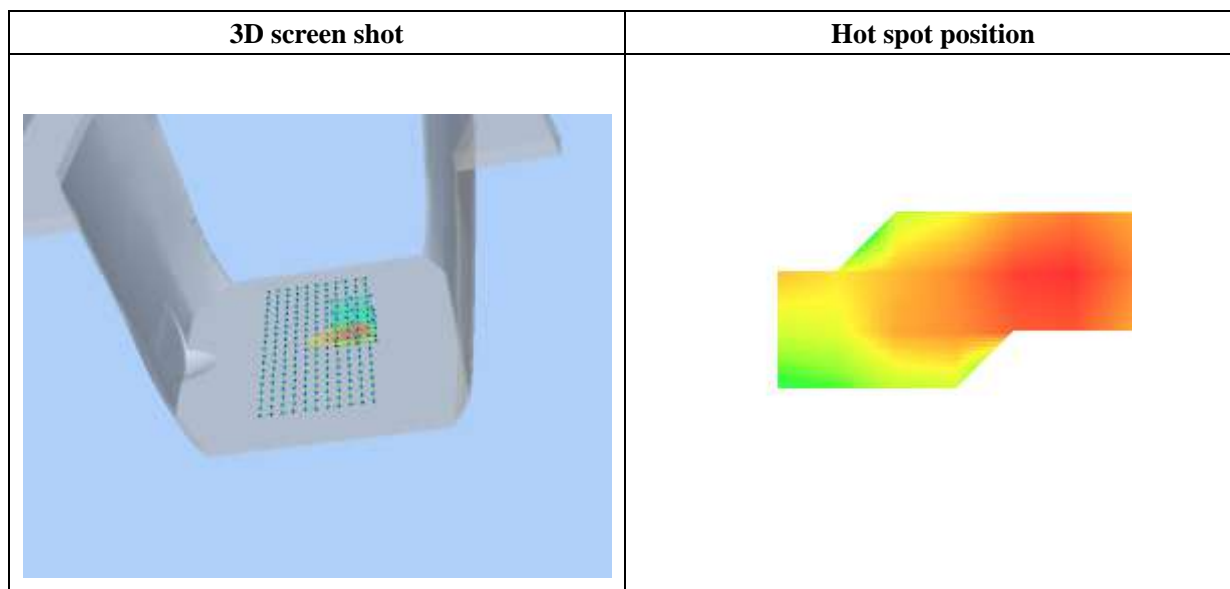
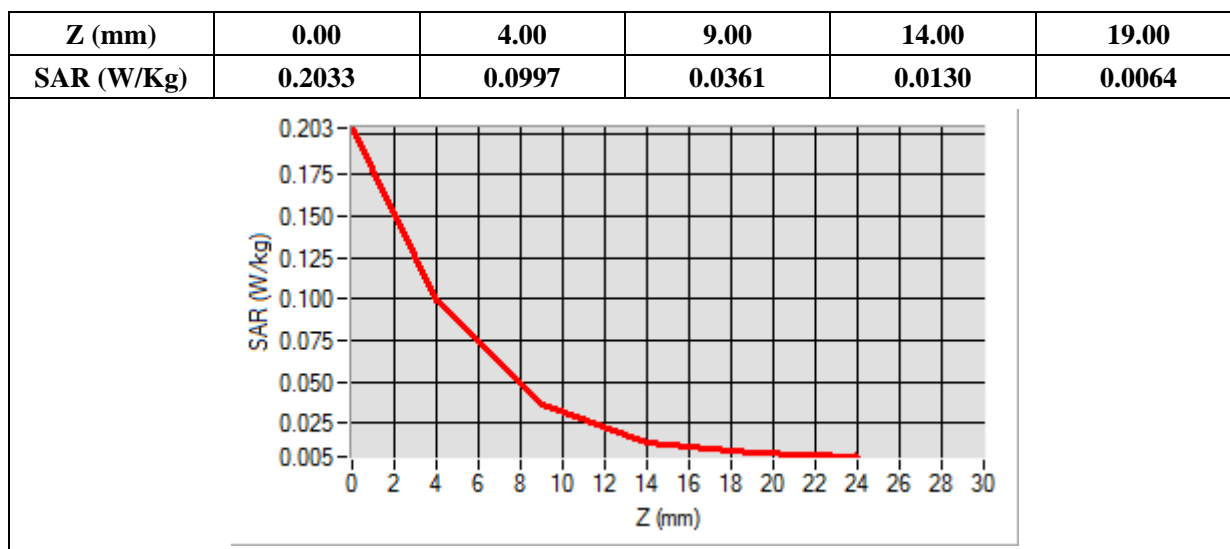
Frequency (MHz)	2412.000000
Relative Permittivity (real part)	52.010212
Conductivity (S/m)	1.910255
Power Variation (%)	2.492743
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=30.00, Y=7.00

SAR Peak: 0.20 W/kg

SAR 10g (W/Kg)	0.044064
SAR 1g (W/Kg)	0.094452



## MEASUREMENT 90

Type: Phone measurement (Complete)

Date of measurement: 11/30/2017

Measurement duration: 12 minutes 3 seconds

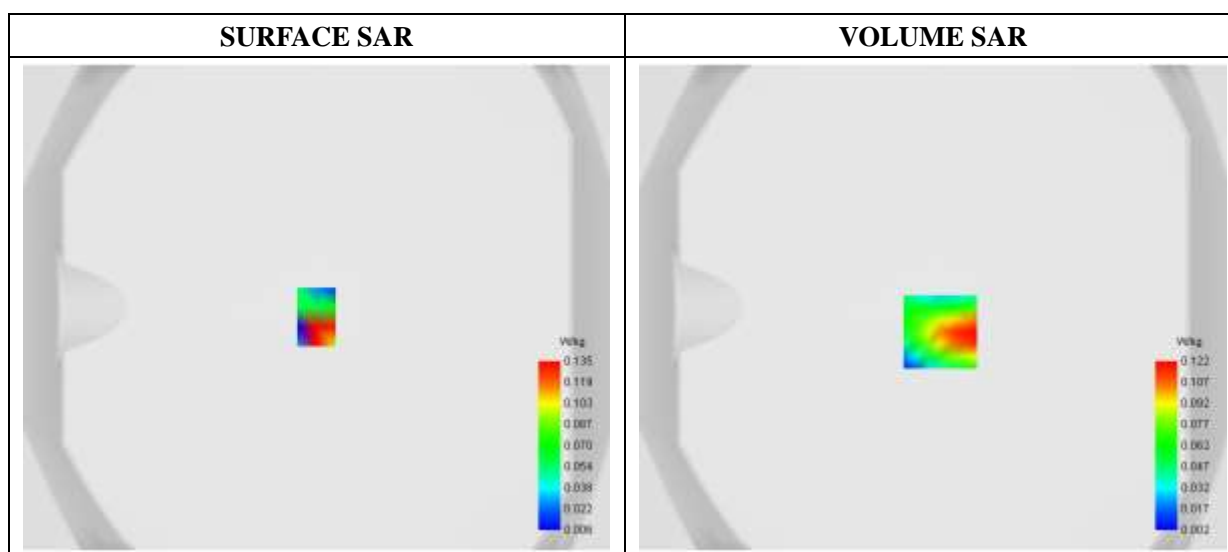
E-field Probe: SSE2 - SN 08/16 EPGO298; ConvF: 2.39; Calibrated: 2017/09/18

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Back
Band	WiFi(5.2G)_802.11n
Channels	Middle
Signal	Duty Cycle: 1:1

### B. SAR Measurement Results

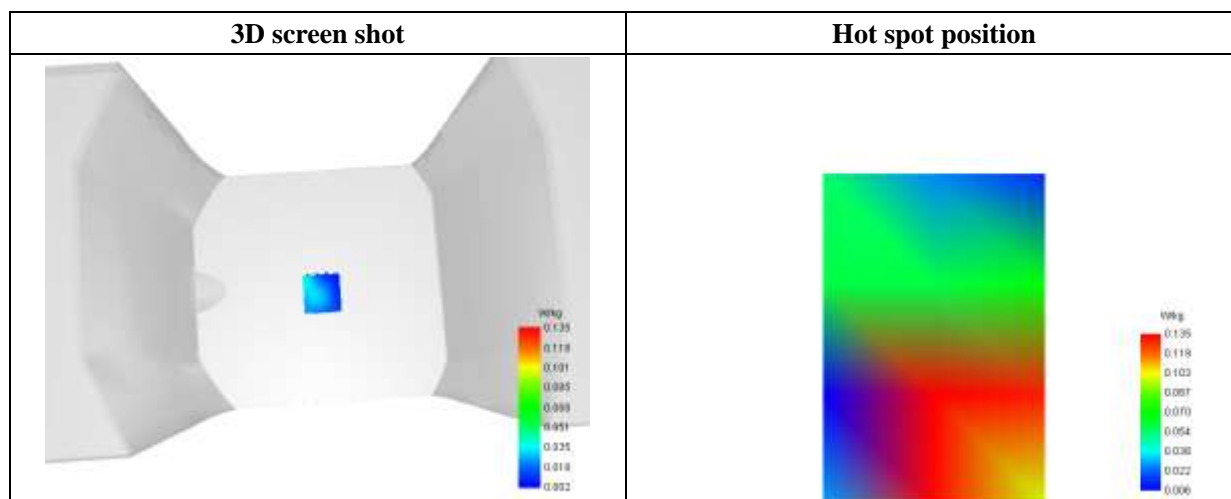
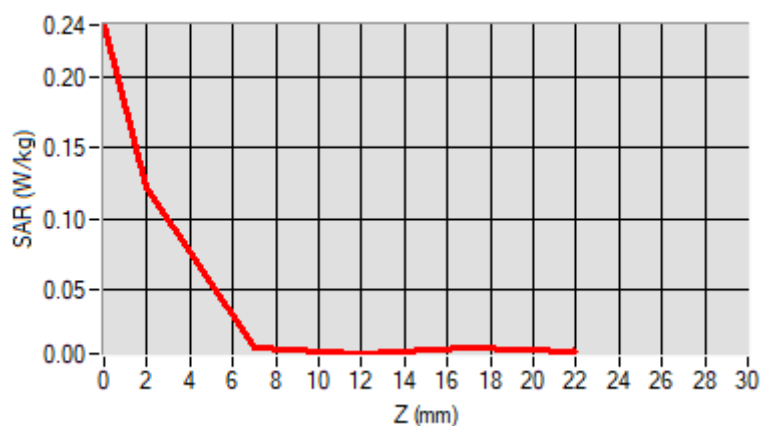
Frequency (MHz)	5200.000000
Relative Permittivity (real part)	36.082911
Conductivity (S/m)	4.661483
Power Variation (%)	0.542660
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=3.00, Y=-10.00

SAR 10g (W/Kg)	0.036375
SAR 1g (W/Kg)	0.073100

Z (mm)	0.00	2.00	7.00	12.00	17.00
SAR (W/Kg)	0.2359	0.1217	0.0092	0.0050	0.0085



## MEASUREMENT 92

Type: Phone measurement (Complete)

Date of measurement: 11/30/2017

Measurement duration: 12 minutes 3 seconds

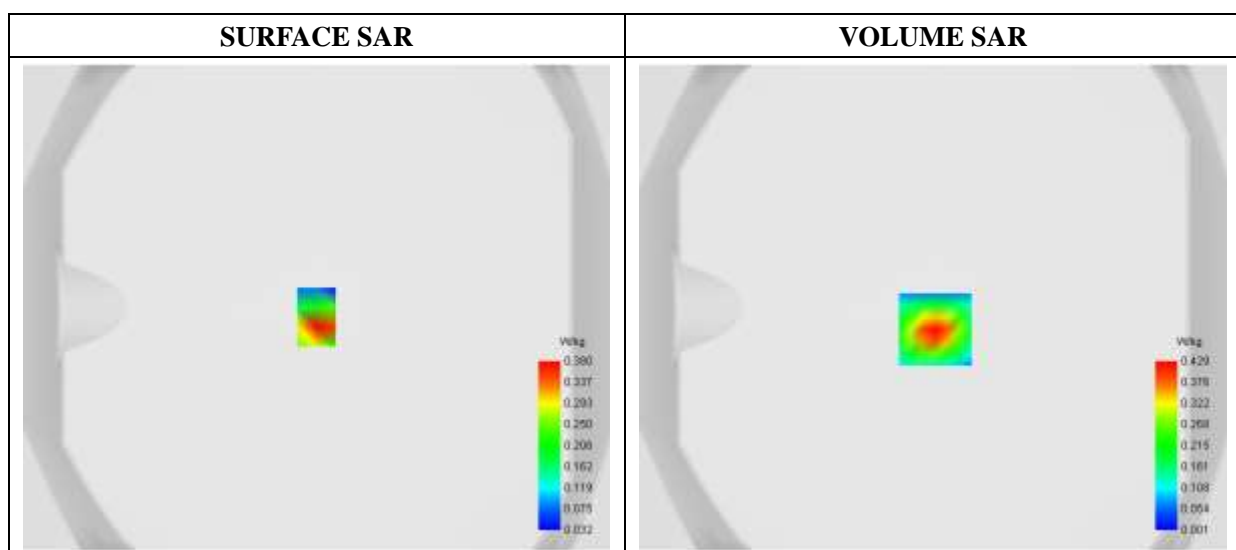
E-field Probe: SSE2 - SN 08/16 EPGO298; ConvF: 2.39; Calibrated: 2017/09/18

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Back
Band	WiFi(5.2G)_802.11n
Channels	Middle
Signal	Duty Cycle: 1:1

### B. SAR Measurement Results

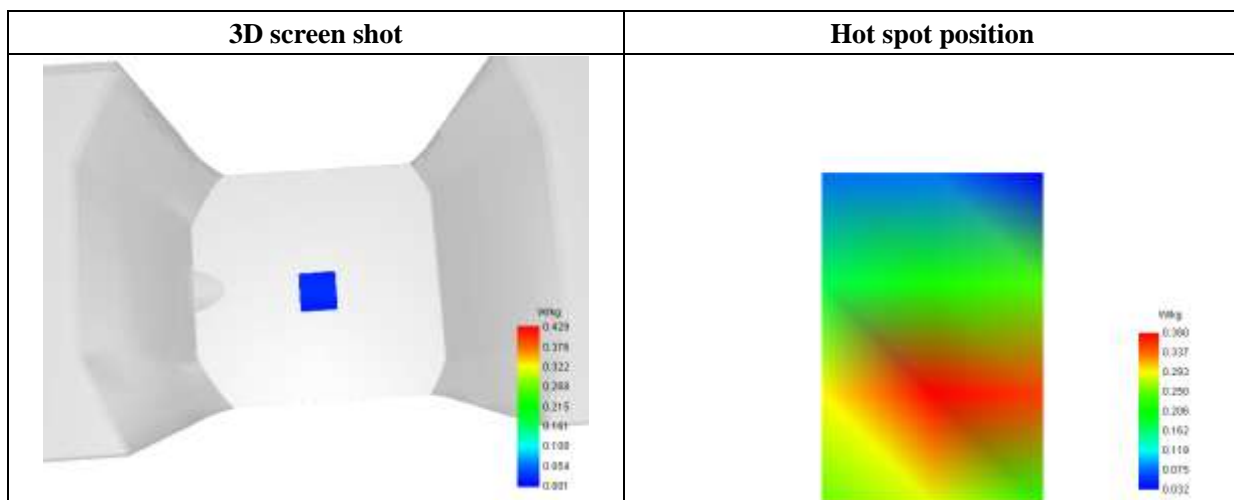
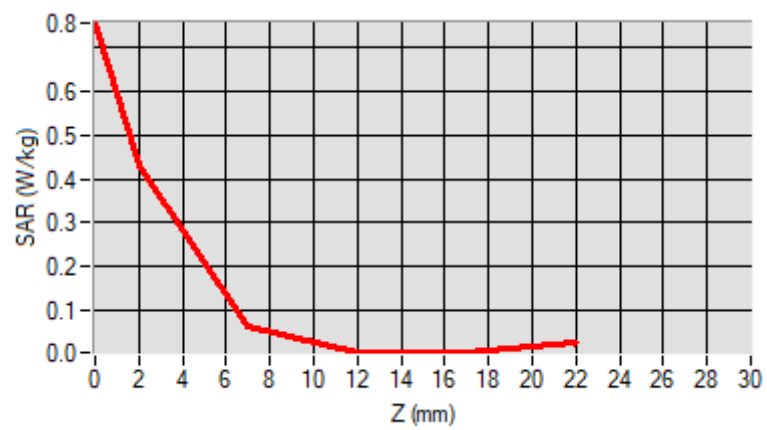
Frequency (MHz)	5200.000000
Relative Permittivity (real part)	36.082911
Conductivity (S/m)	4.661483
Power Variation (%)	0.542660
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=1.00, Y=-9.00

SAR 10g (W/Kg)	0.095180
SAR 1g (W/Kg)	0.241121

Z (mm)	0.00	2.00	7.00	12.00	17.00
SAR (W/Kg)	0.7538	0.4292	0.0652	0.0052	0.0056

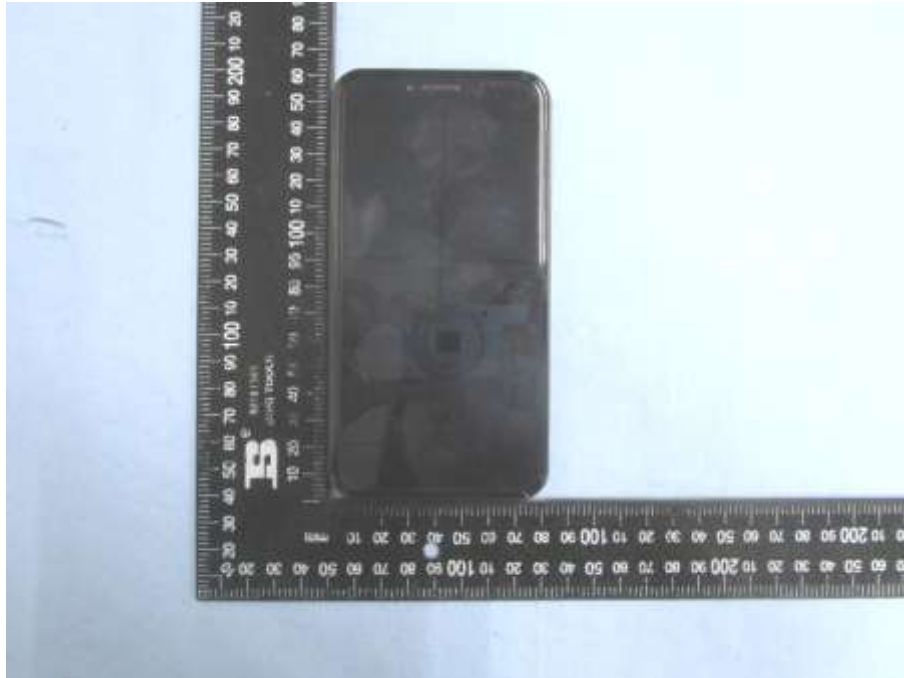




## Annex C. EUT Photos

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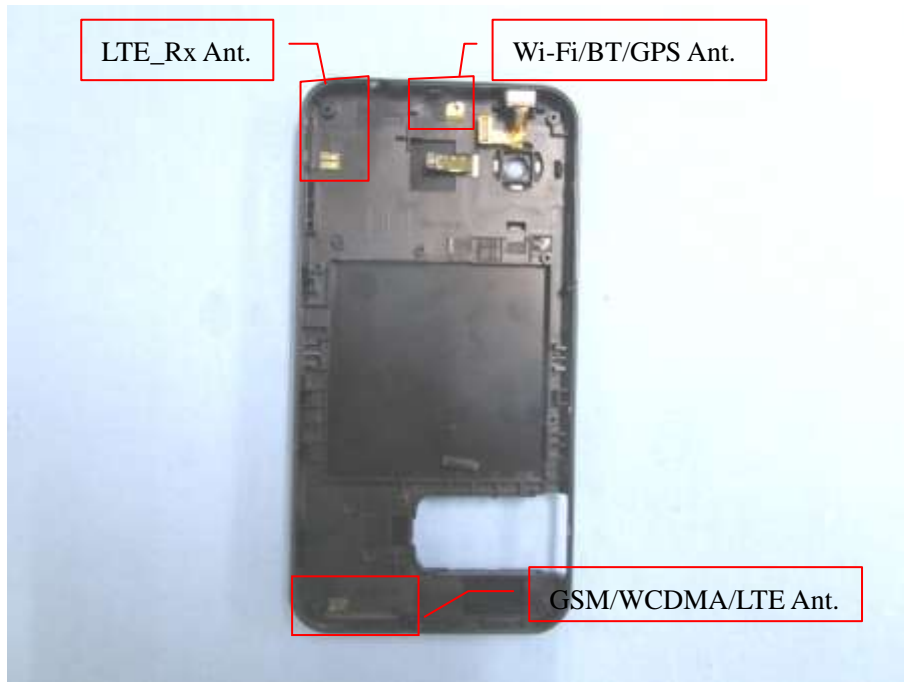
### EUT View Front



### 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

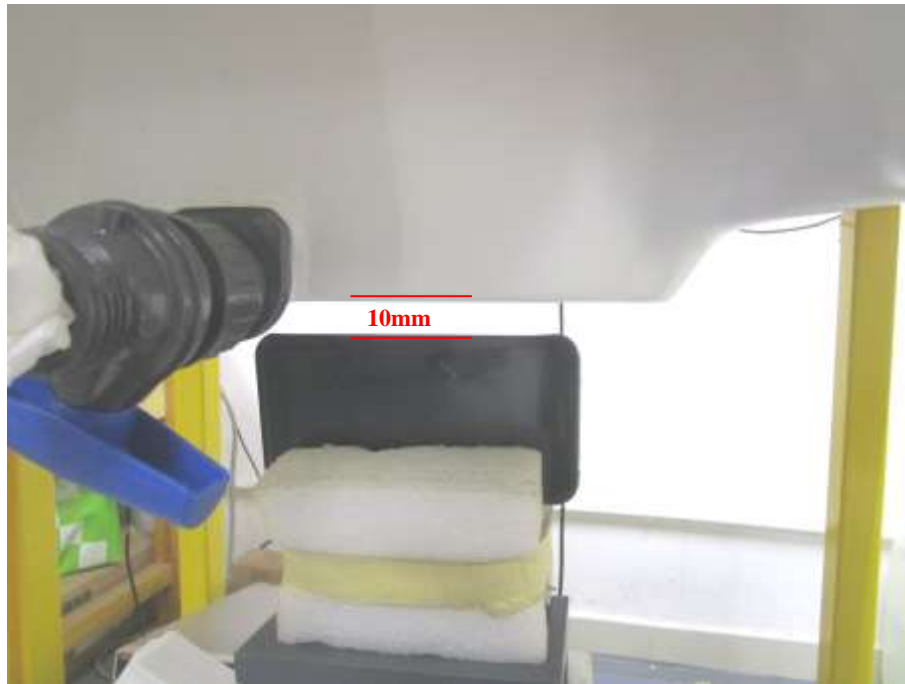


### Body Back



## Hotspot Exposure Conditions

### Body Left



### Body Top



### Body Bottom



## Annex E. Calibration Certificate

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*Please refer to the exhibit for the calibration certificate*

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