

**FCC SAR**  
**Measurement and Test Report**  
**For**  
**Hyundai Corporation**  
**25, Yulgok-ro 2-Gil, Jongno-gu, Seoul, South Korea**

**FCC ID: RQQHLT-FS50402**

<b>Test Standards:</b>	FCC Part 2.1093 ANSI / IEEE C95.1 ::2005+A1:2010 ANSI / IEEE C95.3 : 2002(R2008) <u>IEEE 1528 :2013</u>
<b>Product Description:</b>	<u>4G Smart Phone</u>
<b>Tested Model:</b>	<u>L503F</u>
<b>Report No.:</b>	<u>STR18088022H</u>
<b>Sample Received Date:</b>	<u>2018-08-27</u>
<b>Tested Date:</b>	<u>2018-08-27 to 2018-08-31</u>
<b>Issued Date:</b>	<u>2018-09-03</u>
<b>Tested By:</b>	<u>Lucy Wei / Engineer</u> <i>Lucy wei</i>
<b>Reviewed By:</b>	<u>Silin Chen / EMC Manager</u> <i>Silin chen</i>
<b>Approved &amp; Authorized By:</b>	<u>Jandy So / PSQ Manager</u> <i>Jandyso</i>
<b>Prepared By:</b>	
<b>Shenzhen SEM Test Technology Co., Ltd.</b> 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C. (518101) Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn	

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.

**TABLE OF CONTENTS**

**1. General Information .....3**

    1.1 Product Description for Equipment Under Test (EUT) .....3

    1.2 Test Standards .....6

    1.3 Test Methodology .....6

    1.4 Test Facility .....6

**2. Summary of Test Results .....7**

**3. Specific Absorption Rate (SAR).....8**

    3.1 Introduction.....8

    3.2 SAR Definition .....8

**4. SAR Measurement System .....9**

    4.1 The Measurement System .....9

    4.2 Probe .....9

    4.3 Probe Calibration Process .....11

    4.4 Phantom .....12

    4.5 Device Holder .....12

    4.6 Test Equipment List .....13

**5. Tissue Simulating Liquids .....14**

    5.1 Composition of Tissue Simulating Liquid .....14

    5.2 Tissue Dielectric Parameters for Head and Body Phantoms .....15

    5.3 Tissue Calibration Result .....16

**6. SAR Measurement Evaluation .....17**

    6.1 Purpose of System Performance Check .....17

    6.2 System Setup .....17

    6.3 Validation Results .....18

**7. EUT Testing Position .....19**

    7.1 Define Two Imaginary Lines on The Handset .....19

    7.2 Cheek Position .....20

    7.3 Tilted Position .....20

    7.4 Body Worn Position .....21

    7.5 EUT Antenna Position .....21

    7.6 EUT Testing Position .....23

**8. SAR Measurement Procedures .....24**

    8.1 Measurement Procedures .....24

    8.2 Spatial Peak SAR Evaluation .....24

    8.3 Area & Zoom Scan Procedures .....25

    8.4 Volume Scan Procedures .....25

    8.5 SAR Averaged Methods .....25

    8.6 Power Drift Monitoring .....25

**9. SAR Test Result .....26**

    9.1 Conducted RF Output Power .....26

    9.2 Test Results for Standalone SAR Test .....49

    9.3 Simultaneous Multi-band Transmission SAR Analysis .....59

**10. Measurement Uncertainty .....65**

    10.1 Uncertainty for EUT SAR Test .....65

    10.2 Uncertainty for System Performance Check .....66

**Annex A. Plots of System Performance Check .....68**

**Annex B. Plots of SAR Measurement .....88**

**Annex C. EUT Photos .....130**

**Annex D. Test Setup Photos .....132**

**Annex E. Calibration Certificate .....137**

## 1. General Information

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

#### Client Information

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

Manufacturer: Guizhou Fortuneship Technology Co., Ltd  
Address of manufacturer: 2nd Floor, Factory Building 4, Hi-Tech Industrial Park, Xinpu Economic Development Zone, Xinpu New District, Zunyi City, Guizhou Province, P. R. China

General Description of EUT:	
Product Name:	4G Smart Phone
Brand Name:	HYUNDAI
Model No.:	L503F
Adding Model(s):	L503FS
Rated Voltage:	DC 3.7V by Battery
Battery:	2200mAh
Software Version:	HYUNDAI_L503F_V8.1.1_20180706
Hardware Version:	FS273-MB-V1.0
Device Category:	Portable Device
<p><i>The EUT Main board support GSM850/PCS1900, WCDMA Band 2/5, FDD LTE Band 2/4/7 function. It is intended for speech, Multimedia Message Service (MMS) transmission. It is equipped with GPRS/EDGE class 12 for GSM850/PCS1900, GPS, FM, Bluetooth and Wi-Fi functions. For more information see the following datasheet.</i></p>	
<p><i>Note: The test data is gathered from a production sample provided by the manufacturer. The main-test model L503F has two SIM card slots, adding model L503FS has only one SIM card slots, but the circuit and the electronic construction do not change, declared by the manufacturer. The two models are test and only the worst case model is showed in the test report.</i></p>	

<b>Technical Characteristics of EUT:</b>	
<b>2G</b>	
Support Networks:	GSM, GPRS, EDGE
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS/EDGE 850: 824~849MHz GSM/GPRS/EDGE 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS/EDGE 850: 869~894MHz GSM/GPRS/EDGE 1900: 1930~1990MHz
Max RF Output Power:	GSM850: 33.12dBm, GSM1900: 29.58dBm EDGE850: 25.54dBm, EDGE1900: 25.68dBm
Type of Modulation:	GMSK, 8PSK
Type of Antenna:	Integral Antenna
Antenna Gain:	GSM850: 0.48dBi; GSM1900: 0.53dBi
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: 21.74dBm, WCDMA Band 5: 22.49dBm
Type of Modulation:	BPSK
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band 2: .0.54dBi, WCDMA Band 5: 0.49dBi
<b>4G</b>	
Support Networks:	FDD-LTE
Support Band:	FDD-LTE Band 2, 4, 7
Uplink Frequency:	FDD-LTE Band 2: Tx: 1850-1910MHz, FDD-LTE Band 4: Tx: 1710-1755MHz, FDD-LTE Band 7: Tx: 2500-2570MHz,
Downlink Frequency:	FDD-LTE Band 2: Rx: 1930-1990MHz, FDD-LTE Band 4: Rx: 2110-2155MHz, FDD-LTE Band 7: Rx: 2620-2690MHz,
RF Output Power:	FDD-LTE Band 2: 23.22dBm, FDD-LTE Band 4: 23.02dBm, FDD-LTE Band 7: 22.80dBm
Type of Modulation:	QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	FDD-LTE Band 2: 0.53dBi, FDD-LTE Band 4: 0.56dBi,

	FDD-LTE Band 7: 0.56dBi,
<b>WIFI</b>	
Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 11b/g/n(HT20)
RF Output Power:	12.53dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 72.2Mbps
Quantity of Channels:	11
Channel Separation:	5MHz
Antenna Type:	Integral Antenna
Antenna Gain:	0.45dBi
<b>Bluetooth</b>	
Bluetooth Version:	V4.0
Frequency Range:	2402-2480MHz
RF Output Power:	4.295dBm (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:	0.45dBi

## 1.2 Test Standards

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

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

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

## 1.3 Test Methodology

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

## 1.4 Test Facility

### **FCC – Registration No.: 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>0.771</b>	1.053	<b>1.155</b>	1.6
WCDMA	0.385	<b>1.111</b>	1.111	1.6
FDD-LTE	0.512	1.003	1.003	1.6
WLAN 2.4G	0.495	0.160	0.160	1.6
Simultaneous Transmission	1.266	1.271	<b>1.315</b>	1.6

**Remark:**

*The highest reported SAR values for head, body-worn accessory, wireless router(hotspot), and simultaneous transmission conditions are **0.771W/kg, 1.111W/kg, 1.155W/kg, and 1.315W/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)

---

#### 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

---

### 4.1 The Measurement System

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

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

The following figure shows the system.



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

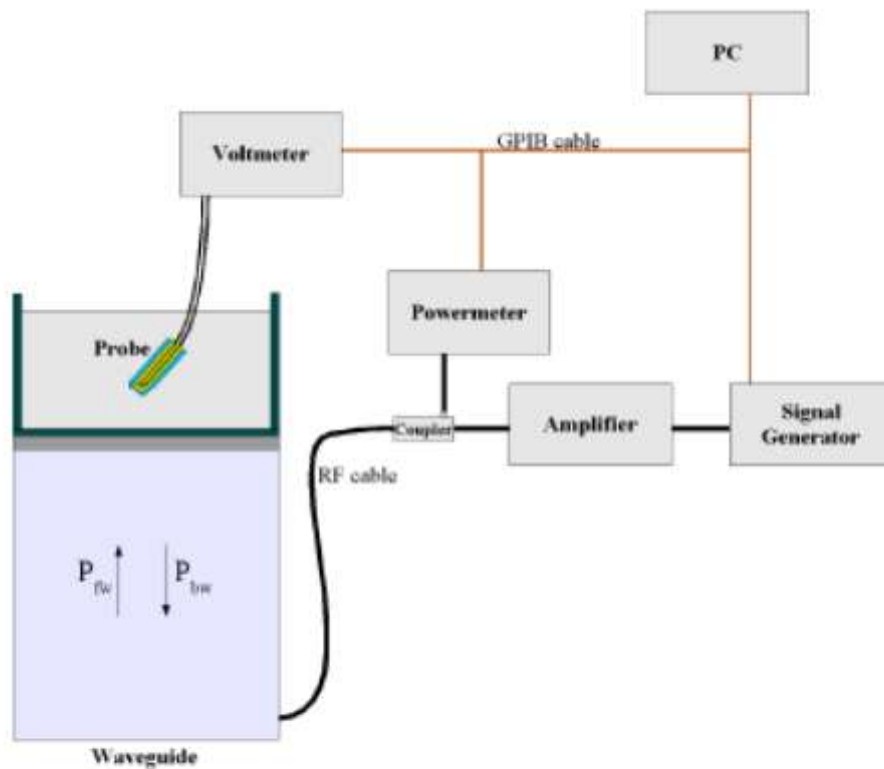
### 4.2 Probe

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

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

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

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



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

Where :

$P_{fw}$  = Forward Power

$P_{bw}$  = Backward Power

a and b = Waveguide dimensions

$\delta$  = Skin depth

Keithley configuration:

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

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

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

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

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

where DCP is the diode compression point in mV.

### 4.3 Probe Calibration Process

#### Dosimetric Assessment Procedure

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

#### Free Space Assessment Procedure

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

#### Temperature Assessment Procedure

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

Where:

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

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

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

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

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

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

Where:

$\sigma$  = simulated tissue conductivity,

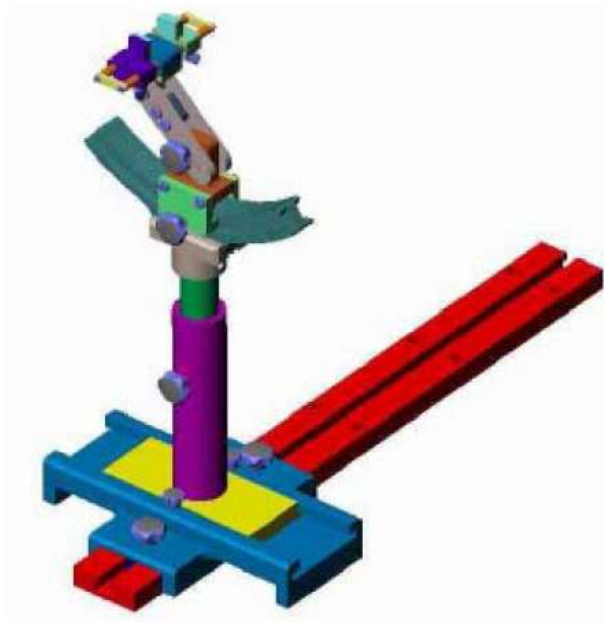
$\rho$  = Tissue density (1.25 g/cm<sup>3</sup> for brain tissue)

#### 4.4 Phantom

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

#### 4.5 Device Holder

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



System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005

#### 4.6 Test Equipment List

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
E-Field Probe	SATIMO	SSE5	SN 09/13 EP168	2018-06-01	2019-05-31
835MHz Dipole	SATIMO	SID835	SN 47/12 DIP 0G835-204	2018-03-20	2019-03-19
1800MHz Dipole	SATIMO	SID1800	SN 47/12 DIP 1G800-206	2018-03-20	2019-03-19
1900MHz Dipole	SATIMO	SID1900	SN 47/12 DIP 1G900-207	2018-03-20	2019-03-19
2450MHz Dipole	SATIMO	SID2450	SN 13/15 DIP 2G450-364	2018-03-20	2019-03-19
2600MHz Dipole	SATIMO	SID2600	SN 13/15 DIP 2G600-365	2018-03-20	2019-03-19
Dielectric Probe Kit	SATIMO	SCLMP	SN 47/12 OCPG49	2018-03-20	2019-03-19
SAM Phantom	SATIMO	SAM	SN/ 47/12 SAM95	N/A	N/A
MULTIMETER	KEITHLEY	Keithley 2000	4006367	2018-05-22	2019-05-21
Signal Generator	Rohde & Schwarz	SMR20	100047	2018-05-22	2019-05-21
Universal Tester	Rohde & Schwarz	CMU200	112012	2018-05-22	2019-05-21
Communications Tester	Rohde & Schwarz	CMW500	148650	2018-05-22	2019-05-21
Network Analyzer	HP	8753C	2901A00831	2018-05-22	2019-05-21
Directional Couplers	Agilent	778D	20160	2018-05-22	2019-05-21

## 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

## 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
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	±5	2018-08-27
1750	21.3	1.37	1.37	0.00	39.02	40.1	-2.69	±5	2018-08-28
1800	21.3	1.37	1.40	-2.14	39.02	40.0	-2.45	±5	2018-08-28
1900	21.3	1.38	1.40	-1.43	38.56	40.00	-3.60	±5	2018-08-28
2450	21.3	1.74	1.80	-3.33	38.15	39.20	-2.68	±5	2018-08-29
2600	21.3	1.93	1.96	-1.53	38.63	39.0	-0.95	±5	2018-08-29

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	±5	2018-08-27
1750	21.3	1.46	1.49	-2.01	51.22	53.40	-4.08	±5	2018-08-28
1800	21.3	1.46	1.52	-3.95	51.22	53.30	-3.90	±5	2018-08-28
1900	21.3	1.50	1.52	-1.32	52.42	53.30	-1.65	±5	2018-08-28
2450	21.3	1.91	1.95	-2.05	52.01	52.70	-1.31	±5	2018-08-29
2600	21.3	2.12	2.16	-1.85	52.24	52.50	-0.50	±5	2018-08-29



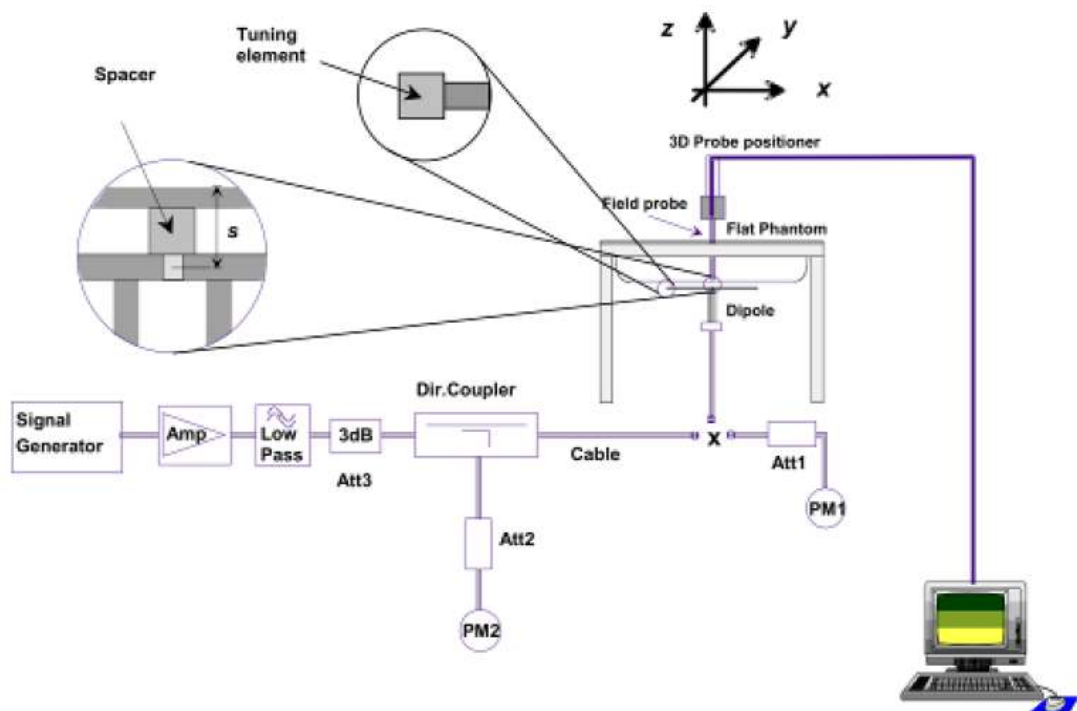
## 6. SAR Measurement Evaluation

### 6.1 Purpose of System Performance Check

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

### 6.2 System Setup

In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator at frequency 835 MHz and 1900 MHz. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom.



System Verification Setup Block Diagram



**Setup Photo of Dipole Antenna**

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

### 6.3 Validation Results

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

Frequency	Targeted SAR <sub>1g</sub>	Measured SAR <sub>1g</sub>	Normalized SAR <sub>1g</sub>	Tolerance
MHz	(W/kg)	(W/kg)	(W/kg)	(%)
Head				
835	9.67	2.41	9.64	-0.31
1800	38.51	9.61	38.44	-0.18
1900	39.58	9.91	39.64	0.15
2450	53.69	13.45	53.8	0.20
2600	55.13	13.67	54.68	-0.82
Body				
835	9.38	2.35	9.4	0.21
1800	38.31	9.58	38.32	0.03
1900	39.10	9.78	39.12	0.05
2450	50.41	12.59	50.36	-0.10
2600	53.89	13.43	53.72	-0.32

**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

- (a) The vertical centerline passes through two points on the front side of the handset - the midpoint of the width  $w_t$  of the handset at the level of the acoustic output, and the midpoint of the width  $w_b$  of the bottom of the handset.
- (b) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.
- (c) The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

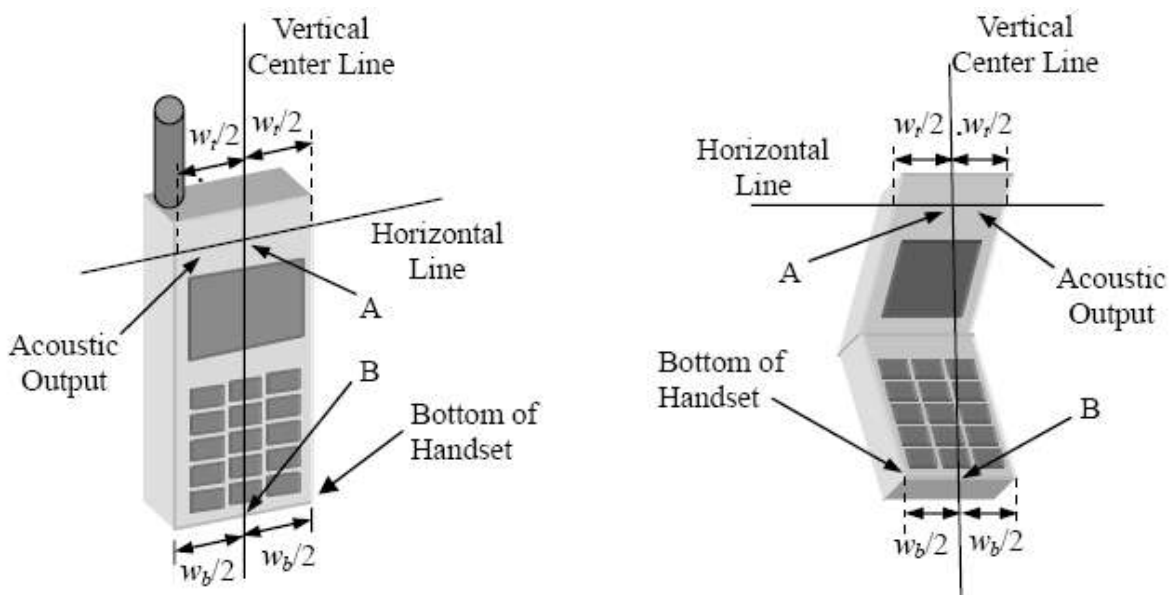


Illustration for Handset Vertical and Horizontal Reference Lines

## 7.2 Cheek Position

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

(b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see Fig. 7.2).



Illustration for Cheek Position

## 7.3 Tilted Position

(a) To position the device in the “cheek” position described above.

(b) While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see Fig. 7.3).



Illustration for Tilted Position

## 7.4 Body Worn Position

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

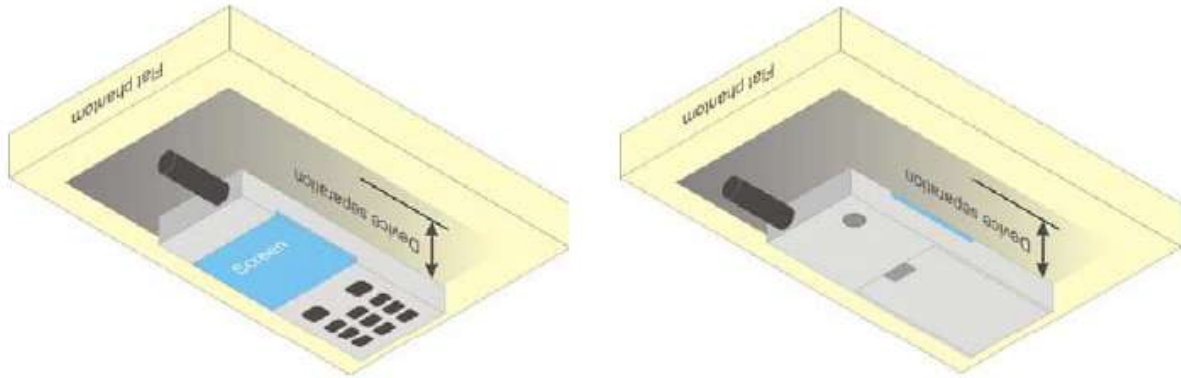
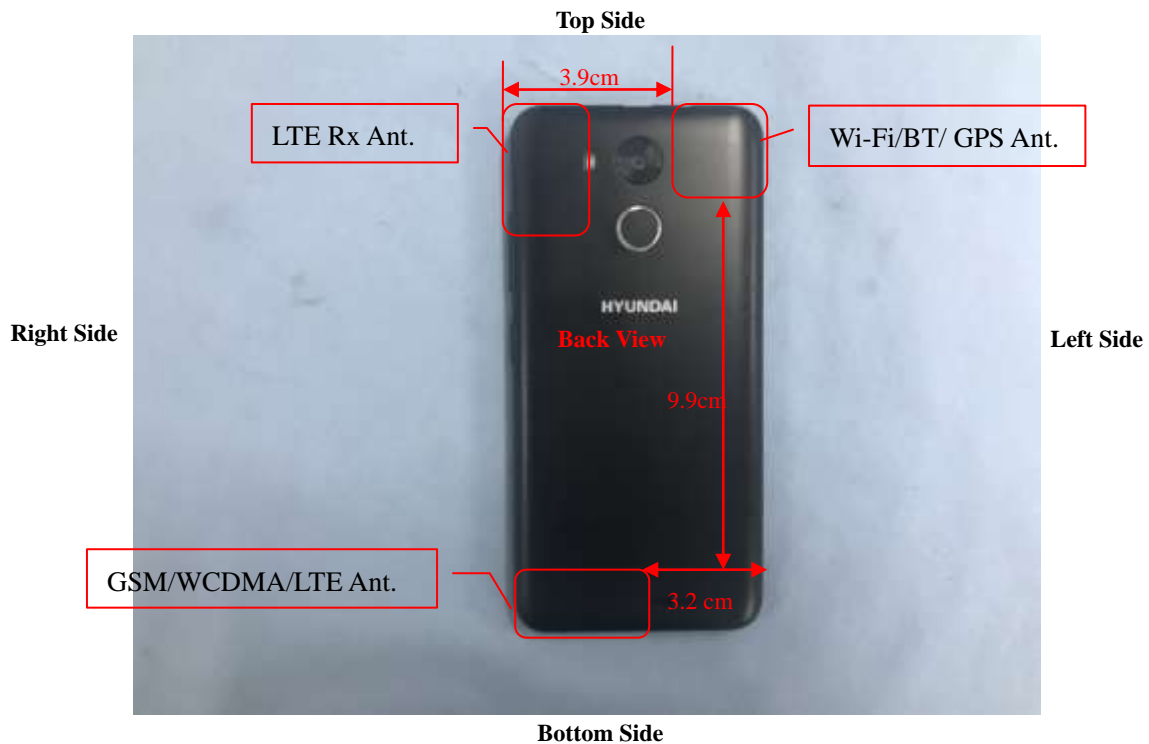


Illustration for Body Worn Position

## 7.5 EUT Antenna Position





**Block Diagram for EUT Antenna Position**

## 7.6 EUT Testing Position

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

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

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

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

**Remark:**

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

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

---

## 8. SAR Measurement Procedures

---

### 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	33.06	33.12	33.08	33.5	29.28	29.39	29.55	30.0
GPRS (1 slot)	33.07	33.1	33.09	33.5	29.31	29.41	29.58	30.0
GPRS (2 slots)	31.02	31.07	31.11	31.5	27.34	27.17	27.37	27.5
GPRS (3 slots)	29.15	29.26	29.33	29.5	25.76	25.65	25.82	26.0
GPRS (4 slots)	27.07	27.17	27.31	27.5	23.78	23.63	23.81	24.0
EDGE (1 slot)	25.07	25.46	25.54	26.0	25.68	24.55	24.45	26.0
EDGE (2 slots)	25	25.33	25.42	26.0	25.25	23.69	23.32	25.5
EDGE (3 slots)	24.09	24.42	24.49	25.0	24.35	23.05	22.41	24.5
EDGE (4 slots)	21.78	22.11	22.14	22.5	23.91	22.68	21.67	24.5

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	24.06	24.12	24.08	24.5	20.28	20.39	20.55	21.0
GPRS (1 slot)	24.07	24.10	24.09	24.5	20.31	20.41	20.58	21.0
GPRS (2 slots)	25.02	25.07	25.11	25.5	21.34	21.17	21.37	21.5
GPRS (3 slots)	24.90	25.01	25.08	25.5	21.51	21.40	21.57	22.0
GPRS (4 slots)	24.07	24.17	24.31	24.5	20.78	20.63	20.81	21.0
EDGE (1 slot)	16.07	16.46	16.54	17.0	16.68	15.55	15.45	17.0
EDGE (2 slots)	19.00	19.33	19.42	20.0	19.25	17.69	17.32	19.5
EDGE (3 slots)	19.84	20.17	20.24	20.5	20.10	18.80	18.16	20.5
EDGE (4 slots)	18.78	19.11	19.14	19.5	20.91	19.68	18.67	21.0

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:

- For Head SAR testing, GSM and GPRS (2TX slots) and GPRS (3TX slots) should be evaluated, therefore the EUT was set in GSM and GPRS (2TX slots) for GSM850 and GPRS (3TX slots) for GSM1900 due to its highest source-based time-average power.
- For Body SAR testing, GPRS should be evaluated, therefore the EUT was set in GPRS (2TX slots) for GSM850 and

GPRS (3TX slots) for GSM1900 due to its highest source-based time-average power.

3. Per KDB 447498 D01 v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
4. The DUT do not support DTM function.
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 power (dBm)	4132	4182	4233	Tune-up power (dBm)
Frequency (MHz)	1852.4	1880.0	1907.6		826.4	836.6	846.6	
RMC 12.2k	21.71	21.74	21.73	22.0	22.33	22.25	22.49	23.0
HSDPA Subtest-1	20.53	20.91	20.87	21.5	21.75	22.23	21.71	22.5
HSDPA Subtest-2	20.51	20.89	20.86	21.5	21.73	22.21	21.68	22.5
HSDPA Subtest-3	20.52	20.87	20.85	21.5	21.72	22.20	21.67	22.5
HSDPA Subtest-4	50.51	20.80	20.85	21.5	21.72	22.20	21.67	22.5
HSUPA Subtest-1	20.59	20.90	20.91	21.5	21.78	21.29	21.73	22.5
HSUPA Subtest-2	20.55	20.88	20.87	21.5	21.75	21.28	21.72	22.5
HSUPA Subtest-3	20.56	20.87	20.86	21.5	21.76	21.26	21.71	22.5
HSUPA Subtest-4	20.54	20.87	20.87	21.5	21.75	21.26	21.71	22.5
HSUPA Subtest-5	20.54	20.87	20.86	21.5	21.76	21.27	21.72	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 2:**

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	21.82	0
		1	3	21.87	0
		1	5	21.89	0
		3	0	21.91	0
		3	2	21.97	0
		3	3	21.88	0
		6	0	21.35	1
	MCH	1	0	22.6	0
		1	3	22.56	0
		1	5	22.54	0
		3	0	22.28	0
		3	2	22.36	0
		3	3	22.26	0
		6	0	22.01	1
	HCH	1	0	23.00	0
		1	3	23.08	0
		1	5	23.04	0
		3	0	22.04	0
		3	2	22.14	0
		3	3	22.06	0
		6	0	22.35	1
16QAM	LCH	1	0	22.48	1
		1	3	22.47	1
		1	5	22.5	1
		3	0	21.58	1
		3	2	21.6	1
		3	3	21.6	1
		6	0	21.15	2
	MCH	1	0	22.25	1
		1	3	22.27	1
		1	5	22.33	1
		3	0	22.13	1
		3	2	22.08	1
		3	3	22.1	1
		6	0	20.93	2
HCH	1	0	22.47	1	
	1	3	22.01	1	

		1	5	22.32	1
		3	0	21.48	1
		3	2	21.49	1
		3	3	21.01	1
		6	0	21.25	2

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	21.62	0
		1	7	21.8	0
		1	14	21.89	0
		8	0	21.29	1
		8	4	21.31	1
		8	7	21.4	1
		15	0	21.44	1
	MCH	1	0	22.49	0
		1	7	22.56	0
		1	14	22.63	0
		8	0	22.14	1
		8	4	22.11	1
		8	7	22.01	1
		15	0	22.07	1
	HCH	1	0	23.01	0
		1	7	23.03	0
		1	14	23.1	0
		8	0	22.17	1
		8	4	22.32	1
		8	7	22.15	1
		15	0	22.14	1
16QAM	LCH	1	0	22.35	1
		1	7	22.38	1
		1	14	22.43	1
		8	0	21.09	2
		8	4	21.21	2
		8	7	21.14	2
		15	0	21.23	2
	MCH	1	0	22.38	1
		1	7	22.25	1
		1	14	22.32	1
		8	0	21.12	2
		8	4	21.18	2
		8	7	21.23	2

	HCH	15	0	21.15	2
		1	0	22.32	1
		1	7	22.14	1
		1	14	21.52	1
		8	0	21.35	2
		8	4	21.21	2
		8	7	21.02	2
		15	0	21.35	2

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	21.94	0
		1	12	22	0
		1	24	21.99	0
		12	0	21.46	1
		12	6	21.46	1
		12	13	21.5	1
		25	0	21.4	1
	MCH	1	0	22.43	0
		1	12	22.55	0
		1	24	22.48	0
		12	0	22.02	1
		12	6	22.07	1
		12	13	22.19	1
		25	0	22.05	1
	HCH	1	0	23.19	0
		1	12	23.19	0
		1	24	23.21	0
		12	0	22.15	1
		12	6	22.32	1
		12	13	22.05	1
		25	0	22.14	1
16QAM	LCH	1	0	21.19	1
		1	12	21.28	1
		1	24	21.39	1
		12	0	21.23	2
		12	6	21.22	2
		12	13	21.32	2
		25	0	21.4	2
	MCH	1	0	21.65	1
		1	12	21.78	1
		1	24	21.65	1

		12	0	21.2	2
		12	6	21.26	2
		12	13	21.28	2
		25	0	21.3	2
	HCH	1	0	22.19	1
		1	12	22.24	1
		1	24	22.26	1
		12	0	21.05	2
		12	6	21.21	2
		12	13	21.32	2
		25	0	21.47	2

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.45	0
		1	24	21.92	0
		1	49	22	0
		25	0	21.38	1
		25	12	21.42	1
		25	25	21.57	1
		50	0	21.45	1
	MCH	1	0	22.59	0
		1	24	22.71	0
		1	49	22.82	0
		25	0	21.98	1
		25	12	22.15	1
		25	25	22.11	1
		50	0	22.16	1
	HCH	1	0	23.03	0
		1	24	23.07	0
		1	49	23.19	0
		25	0	22.25	1
		25	12	22.17	1
		25	25	22.02	1
		50	0	22.14	1
16QAM	LCH	1	0	22.34	1
		1	24	22.44	1
		1	49	22.32	1
		25	0	21.31	2
		25	12	21.23	2
		25	25	20.32	2
		50	0	21.21	2

	MCH	1	0	22.14	1
		1	24	21.65	1
		1	49	21.58	1
		25	0	21.2	2
		25	12	21.24	2
		25	25	21.29	2
		50	0	21.24	2
	HCH	1	0	22.15	1
		1	24	22.24	1
		1	49	22.32	1
		25	0	21.24	2
		25	12	21.21	2
		25	25	21.02	2
		50	0	21.35	2

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	21.87	0
		1	37	21.95	0
		1	74	22.07	0
		37	0	21.47	1
		37	18	21.48	1
		37	38	21.67	1
		75	0	21.55	1
	MCH	1	0	22.5	0
		1	37	22.65	0
		1	74	22.8	0
		37	0	22	1
		37	18	22.16	1
		37	38	22.1	1
		75	0	22.04	1
	HCH	1	0	22.95	0
		1	37	23.03	0
		1	74	23.1	0
		37	0	21.47	1
		37	18	21.46	1
		37	38	21.02	1
		75	0	21.32	1
16QAM	LCH	1	0	22.35	1
		1	37	22.46	1
		1	74	22.32	1
		37	0	21.24	2



		37	18	21.26	2
		37	38	21.02	2
		75	0	21.36	2
	MCH	1	0	22.32	1
		1	37	22.14	1
		1	74	22.32	1
		37	0	21.16	2
		37	18	21.22	2
		37	38	21.3	2
		75	0	21.22	2
	HCH	1	0	22.05	1
		1	37	22.06	1
		1	74	22.14	1
		37	0	21.12	2
37		18	21.22	2	
37		38	21.1	2	
75		0	21.15	2	

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.59	0
		1	49	22.82	0
		1	99	22.97	0
		50	0	21.46	1
		50	25	21.58	1
		50	50	21.69	1
		100	0	21.56	1
	MCH	1	0	22.78	0
		1	49	22.84	0
		1	99	23	0
		50	0	21.94	1
		50	25	22.14	1
		50	50	22.13	1
		100	0	22.18	1
	HCH	1	0	23.12	0
		1	49	23.12	0
		1	99	23.22	0
		50	0	22.3	1
		50	25	22.36	1
		50	50	22.39	1
		100	0	22.38	1
16QAM	LCH	1	0	21.09	1

		1	49	21.22	1
		1	99	21.5	1
		50	0	21.26	2
		50	25	21.36	2
		50	50	20.73	2
		100	0	20.31	2
	MCH	1	0	21.62	1
		1	49	21.9	1
		1	99	22.05	1
		50	0	21.11	2
		50	25	21.21	2
		50	50	21.31	2
	HCH	100	0	21.2	2
		1	0	22.1	1
		1	49	22.28	1
		1	99	22.42	1
		50	0	21.48	2
		50	25	21.06	2
		50	50	21.32	2
	100	0	21.31	2	

**FDD-LTE Band 4:**

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)	
		Size	Offset			
QPSK	LCH	1	0	22.78	0	
		1	3	22.75	0	
		1	5	22.78	0	
		3	0	21.93	0	
		3	2	21.87	0	
		3	3	21.79	0	
		6	0	21.26	1	
	MCH	1	0	22.4	0	
		1	3	22.37	0	
		1	5	22.46	0	
		3	0	21.77	0	
		3	2	21.61	0	
		3	3	21.71	0	
	HCH	6	0	21.63	1	
		1	0	22.35	0	
			1	3	22.01	0

		1	5	22.03	0
		3	0	21.68	0
		3	2	21.74	0
		3	3	21.85	0
		6	0	21.7	1
16QAM	LCH	1	0	22.25	1
		1	3	22.14	1
		1	5	22.12	1
		3	0	21.12	1
		3	2	21.52	1
		3	3	21.51	1
		6	0	20.94	2
	MCH	1	0	22.39	1
		1	3	22.4	1
		1	5	22.42	1
		3	0	21.67	1
		3	2	21.66	1
		3	3	21.62	1
		6	0	20.58	2
	HCH	1	0	21.63	1
		1	3	21.69	1
		1	5	21.73	1
		3	0	21.16	1
		3	2	21.22	1
		3	3	21.21	1
		6	0	20.52	2

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.76	0
		1	7	22.73	0
		1	14	22.73	0
		8	0	22.28	1
		8	4	22.28	1
		8	7	22.24	1
		15	0	22.34	1
	MCH	1	0	22.47	0
		1	7	22.47	0
		1	14	22.48	0
		8	0	21.78	1
		8	4	21.72	1
		8	7	21.62	1

	HCH	15	0	21.69	1
		1	0	22.06	0
		1	7	22.32	0
		1	14	22.03	0
		8	0	21.64	1
		8	4	21.75	1
		8	7	21.77	1
		15	0	21.76	1
16QAM	LCH	1	0	21.87	1
		1	7	21.68	1
		1	14	21.87	1
		8	0	21.09	2
		8	4	21.03	2
		8	7	21.02	2
		15	0	21.08	2
	MCH	1	0	21.65	1
		1	7	22.17	1
		1	14	21.74	1
		8	0	20.73	2
		8	4	20.79	2
		8	7	20.68	2
		15	0	20.65	2
	HCH	1	0	22.35	1
		1	7	22.34	1
		1	14	22.29	1
		8	0	20.68	2
		8	4	20.69	2
		8	7	20.69	2
		15	0	20.61	2

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.83	0
		1	12	22.79	0
		1	24	22.8	0
		12	0	22.16	1
		12	6	22.11	1
		12	13	22.24	1
		25	0	22.32	1
	MCH	1	0	22.21	0
		1	12	22.23	0
		1	24	22.14	0

		12	0	21.68	1	
		12	6	21.7	1	
		12	13	21.73	1	
		25	0	21.78	1	
	HCH	1	0	22.24	0	
		1	12	22.24	0	
		1	24	22.25	0	
		12	0	21.81	1	
		12	6	21.68	1	
		12	13	21.72	1	
		25	0	21.83	1	
		16QAM	LCH	1	0	22.2
	1			12	22.17	1
1	24			22.18	1	
12	0			21.13	2	
12	6			21.12	2	
12	13			21.05	2	
25	0			21.28	2	
MCH	1		0	22.49	1	
	1		12	22.48	1	
	1		24	22.36	1	
	12		0	20.87	2	
	12		6	20.89	2	
	12		13	20.86	2	
	25		0	20.91	2	
HCH	1	0	21.43	1		
	1	12	21.43	1		
	1	24	21.33	1		
	12	0	20.52	2		
	12	6	20.51	2		
	12	13	20.5	2		
	25	0	20.69	2		

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.73	0
		1	24	22.66	0
		1	49	22.8	0
		25	0	22.34	1
		25	12	22.24	1
		25	25	22.24	1
		50	0	22.15	1
	MCH	1	0	22.36	0
		1	24	22.27	0
		1	49	22.23	0
		25	0	21.8	1
		25	12	21.69	1
		25	25	21.57	1
		50	0	21.69	1
	HCH	1	0	22.2	0
		1	24	22.13	0
		1	49	22.25	0
		25	0	21.38	1
		25	12	21.62	1
		25	25	21.76	1
		50	0	21.64	1
16QAM	LCH	1	0	22.32	1
		1	24	22.14	1
		1	49	21.65	1
		25	0	21.08	2
		25	12	21.08	2
		25	25	21.05	2
		50	0	21.09	2
	MCH	1	0	21.5	1
		1	24	22.42	1
		1	49	22.44	1
		25	0	20.92	2
		25	12	20.82	2
		25	25	20.82	2
		50	0	20.91	2
HCH	1	0	21.72	1	
	1	24	21.63	1	
	1	49	21.7	1	
	25	0	20.58	2	

		25	12	20.49	2
		25	25	20.62	2
		50	0	20.66	2

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.75	0
		1	37	22.63	0
		1	74	22.43	0
		37	0	22.28	1
		37	18	22.3	1
		37	38	21.96	1
		75	0	21.3	1
	MCH	1	0	22.39	0
		1	37	22.26	0
		1	74	22.16	0
		37	0	21.79	1
		37	18	21.63	1
		37	38	21.74	1
		75	0	21.73	1
	HCH	1	0	22.25	0
		1	37	22.07	0
		1	74	22.12	0
		37	0	21.65	1
		37	18	21.56	1
		37	38	21.63	1
		75	0	21.49	1
16QAM	LCH	1	0	22.15	1
		1	37	22.27	1
		1	74	22.35	1
		37	0	21.13	2
		37	18	21.05	2
		37	38	21.03	2
		75	0	21.1	2
	MCH	1	0	22.47	1
		1	37	22.32	1
		1	74	22.47	1
		37	0	20.92	2
		37	18	20.82	2
		37	38	20.86	2
		75	0	20.94	2
HCH	1	0	21.91	1	

		1	37	21.76	1
		1	74	21.7	1
		37	0	20.55	2
		37	18	20.61	2
		37	38	20.57	2
		75	0	20.59	2

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.95	0
		1	49	23.02	0
		1	99	22.56	0
		50	0	22.38	1
		50	25	22.07	1
		50	50	21.97	1
		100	0	22.32	1
	MCH	1	0	22.99	0
		1	49	22.6	0
		1	99	22.5	0
		50	0	21.76	1
		50	25	21.83	1
		50	50	21.66	1
		100	0	21.64	1
	HCH	1	0	22.39	0
		1	49	22.85	0
		1	99	22.07	0
		50	0	21.61	1
		50	25	21.58	1
		50	50	21.69	1
		100	0	21.51	1
16QAM	LCH	1	0	21.95	1
		1	49	21.81	1
		1	99	21.56	1
		50	0	21.12	2
		50	25	20.96	2
		50	50	21	2
		100	0	20.99	2
	MCH	1	0	21.96	1
		1	49	21.83	1
		1	99	21.82	1
		50	0	20.91	2
		50	25	20.86	2



		50	50	20.81	2
		100	0	20.85	2
	HCH	1	0	22.26	1
		1	49	22.11	1
		1	99	22.13	1
		50	0	20.71	2
		50	25	20.7	2
		50	50	20.6	2
		100	0	20.62	2

**FDD-LTE Band 7:**

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.5	0
		1	12	22.48	0
		1	24	22.54	0
		12	0	21.35	1
		12	6	21.34	1
		12	13	21.33	1
		25	0	21.65	1
	MCH	1	0	21.97	0
		1	12	22.02	0
		1	24	22.01	0
		12	0	21.7	1
		12	6	21.74	1
		12	13	21.65	1
		25	0	21.66	1
	HCH	1	0	22.17	0
		1	12	22.2	0
		1	24	22.14	0
		12	0	21.43	1
		12	6	21.53	1
		12	13	21.52	1
		25	0	21.35	1
16QAM	LCH	1	0	21.03	1
		1	12	21.11	1
		1	24	21.08	1
		12	0	20.55	2
		12	6	20.55	2
		12	13	20.54	2
		25	0	20.63	2
	MCH	1	0	21.37	1
		1	12	21.41	1
		1	24	21.33	1
		12	0	20.34	2
		12	6	20.39	2
		12	13	20.33	2
		25	0	20.6	2
HCH	1	0	21.74	1	
	1	12	21.73	1	

		1	24	21.65	1
		12	0	20.75	2
		12	6	20.82	2
		12	13	20.72	2
		25	0	20.79	2

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.48	0
		1	24	22.44	0
		1	49	22.36	0
		25	0	21.65	1
		25	12	21.45	1
		25	25	21.02	1
		50	0	21.43	1
	MCH	1	0	22.47	0
		1	24	22.43	0
		1	49	22.39	0
		25	0	21.85	1
		25	12	21.76	1
		25	25	21.87	1
		50	0	21.8	1
	HCH	1	0	21.93	0
		1	24	21.96	0
		1	49	21.82	0
		25	0	21.49	1
		25	12	21.54	1
		25	25	21.49	1
		50	0	21.5	1
16QAM	LCH	1	0	21.32	1
		1	24	21.15	1
		1	49	21.35	1
		25	0	20.7	2
		25	12	20.58	2
		25	25	20.7	2
		50	0	20.79	2
	MCH	1	0	21.11	1
		1	24	21.07	1
		1	49	21.35	1
		25	0	20.39	2
		25	12	20.5	2
		25	25	20.47	2

		50	0	20.54	2
	HCH	1	0	21.28	1
		1	24	21.17	1
		1	49	21	1
		25	0	20.85	2
		25	12	20.74	2
		25	25	20.75	2
		50	0	20.35	2

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.53	0
		1	37	22.43	0
		1	74	22.26	0
		37	0	21.49	1
		37	18	21.46	1
		37	38	21.34	1
		75	0	21.52	1
	MCH	1	0	22.31	0
		1	37	22.26	0
		1	74	22.13	0
		37	0	21.54	1
		37	18	21.75	1
		37	38	21.74	1
		75	0	21.77	1
	HCH	1	0	22.06	0
		1	37	21.99	0
		1	74	21.9	0
		37	0	21.45	1
		37	18	21.58	1
		37	38	21.54	1
		75	0	21.53	1
16QAM	LCH	1	0	21.65	1
		1	37	21.54	1
		1	74	21.36	1
		37	0	20.83	2
		37	18	20.84	2
		37	38	20.62	2
		75	0	20.77	2
	MCH	1	0	21.13	1
		1	37	21.32	1
		1	74	21.15	1

		37	0	20.36	2
		37	18	20.48	2
		37	38	20.45	2
		75	0	20.54	2
	HCH	1	0	21.25	1
		1	37	21.26	1
		1	74	21.02	1
		37	0	20.82	2
		37	18	20.89	2
		37	38	20.69	2
		75	0	20.73	2

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Average Power [dBm]	MPR (dB)
		Size	Offset		
QPSK	LCH	1	0	22.80	0
		1	49	22.69	0
		1	99	22.68	0
		50	0	21.87	1
		50	25	21.89	1
		50	50	21.66	1
		100	0	21.75	1
	MCH	1	0	22.56	0
		1	49	22.51	0
		1	99	22.38	0
		50	0	21.88	1
		50	25	21.8	1
		50	50	21.81	1
		100	0	21.6	1
	HCH	1	0	22.01	0
		1	49	21.98	0
		1	99	21.9	0
		50	0	21.63	1
		50	25	21.56	1
		50	50	21.52	1
		100	0	21.48	1
16QAM	LCH	1	0	21.33	1
		1	49	21.21	1
		1	99	21.18	1
		50	0	20.74	2
		50	25	20.64	2
		50	50	20.55	2
		100	0	20.65	2

	MCH	1	0	21.34	1
		1	49	21.93	1
		1	99	21.94	1
		50	0	20.57	2
		50	25	20.48	2
		50	50	20.44	2
		100	0	20.55	2
	HCH	1	0	21.24	1
		1	49	21.19	1
		1	99	21.08	1
		50	0	20.79	2
		50	25	20.69	2
		50	50	20.65	2
		100	0	20.64	2

**Remark:**

- 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. 6 When the reported SAR of a required test channel is  $> 1.45$  W/kg, SAR is required for all three RB offset configurations for that required test channel.
- Per KDB941225 D05 v02r05, The procedures required for 1 RB allocation in 5.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.
- Per KDB941225 D05 v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations, and the highest reported SAR for 1 RB and 50% RB allocation in 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.
- 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 - Maximum Average Power					
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
802.11b	1Mbps	CH 01	2412	11.16	13.0
		CH 06	2437	11.3	13.0
		CH 11	2462	12.53	13.0
802.11g	54Mbps	CH 01	2412	8.79	11.0
		CH 06	2437	9.72	11.0
		CH 11	2462	10.59	11.0
802.11n (20MHz)	MCS7	CH 01	2412	7.65	9.5
		CH 06	2437	8.54	9.5
		CH 11	2462	9.41	9.5

**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.

Bluetooth - Maximum Average Power			
Test Mode	Data Rate	Average Power(dBm)	Tune-up power (dBm)
GFSK	1Mbps	3.694	4.5
Pi/4 QDPSK	2Mbps	4.227	4.5
8DPSK	3Mbps	4.295	4.5

Bluetooth - Maximum Average Power					
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
BLE	1Mbps	CH 00	2402	1.299	2.0
		CH 19	2440	1.461	2.0
		CH 39	2480	0.558	2.0

**Remark:**

Bluetooth maximum output power is 4.295dBm, and Maximum Tune-Up output power is 4.5dBm. Per KDB 447498 D01 V06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, } 4.87\text{mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  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
4.5	2.82	5	2.402	0.87	3

The exclusion thresholds is  $0.87 < 3$ , therefore, the RF exposure evaluation is not required.



## 9.2 Test Results for Standalone SAR Test

### Head SAR

GSM850 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
1.	GSM	Right Cheek	190	836.6	33.12	33.5	1.091	0.553	0.604
2.	GSM	Right Tilted	190	836.6	33.12	33.5	1.091	0.125	0.136
3.	GSM	Left Cheek	190	836.6	33.12	33.5	1.091	0.571	0.623
4.	GSM	Left Tilted	190	836.6	33.12	33.5	1.091	0.133	0.145

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	810	1909.8	29.55	30.0	1.109	0.134	0.149
6.	GSM	Right Tilted	810	1909.8	29.55	30.0	1.109	0.022	0.024
7.	GSM	Left Cheek	810	1909.8	29.55	30.0	1.109	0.266	0.295
8.	GSM	Left Tilted	810	1909.8	29.55	30.0	1.109	0.058	0.064

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_2TX	Right Cheek	251	848.8	31.11	31.5	1.094	0.705	0.771
10.	GPRS_2TX	Right Tilted	251	848.8	31.11	31.5	1.094	0.251	0.275
11.	GPRS_2TX	Left Cheek	251	848.8	31.11	31.5	1.094	0.678	0.742
12.	GPRS_2TX	Left Tilted	251	848.8	31.11	31.5	1.094	0.145	0.159

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	810	1909.8	25.82	26.0	1.042	0.173	0.180
14.	GPRS_3TX	Right Tilted	810	1909.8	25.82	26.0	1.042	0.022	0.023
15.	GPRS_3TX	Left Cheek	810	1909.8	25.82	26.0	1.042	0.296	0.309
16.	GPRS_3TX	Left Tilted	810	1909.8	25.82	26.0	1.042	0.037	0.039

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	21.74	22.0	1.062	0.204	0.217
18.	RMC	Right Tilted	9400	1880.0	21.74	22.0	1.062	0.036	0.038
19.	RMC	Left Cheek	9400	1880.0	21.74	22.0	1.062	0.260	0.276
20.	RMC	Left Tilted	9400	1880.0	21.74	22.0	1.062	0.041	0.044

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	4233	846.6	22.49	23.0	1.125	0.342	0.385
22.	RMC	Right Tilted	4233	846.6	22.49	23.0	1.125	0.125	0.141
23.	RMC	Left Cheek	4233	846.6	22.49	23.0	1.125	0.342	0.385
24.	RMC	Left Tilted	4233	846.6	22.49	23.0	1.125	0.102	0.115

LTE 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)	
	Modulation, Bandwidth, RB		MHz						
25.	RMC QPSK 20MHz 1RB	Right Cheek	1900.0	23.22	23.5	1.067	0.377	0.402	
26.	RMC QPSK 20MHz 1RB	Right Tilted	1900.0	23.22	23.5	1.067	0.102	0.109	
27.	RMC QPSK 20MHz 1RB	Left Cheek	1900.0	23.22	23.5	1.067	0.364	0.388	
28.	RMC QPSK 20MHz 1RB	Left Tilted	1900.0	23.22	23.5	1.067	0.098	0.105	
29.	RMC QPSK 20MHz 50%RB	Right Cheek	1900.0	22.39	22.5	1.026	0.098	0.101	
30.	RMC QPSK 20MHz 50%RB	Right Tilted	1900.0	22.39	22.5	1.026	0.054	0.055	
31.	RMC QPSK 20MHz 50%RB	Left Cheek	1900.0	22.39	22.5	1.026	0.068	0.070	
32.	RMC QPSK 20MHz 50%RB	Left Tilted	1900.0	22.39	22.5	1.026	0.033	0.034	

LTE Band 4– Head SAR Test								
Plot No.	Mode	Test Position Head	Freque ncy	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
33.	RMC QPSK 20MHz 1RB	Right Cheek	1720.0	23.02	23.5	1.117	0.039	0.044
34.	RMC QPSK 20MHz 1RB	Right Tilted	1720.0	23.02	23.5	1.117	0.02	0.022
35.	RMC QPSK 20MHz 1RB	Left Cheek	1720.0	23.02	23.5	1.117	0.075	0.084
36.	RMC QPSK 20MHz 1RB	Left Tilted	1720.0	23.02	23.5	1.117	0.025	0.028
37.	RMC QPSK 20MHz 50%RB	Right Cheek	1720.0	22.38	22.5	1.028	0.023	0.024
38.	RMC QPSK 20MHz 50%RB	Right Tilted	1720.0	22.38	22.5	1.028	0.015	0.015
39.	RMC QPSK 20MHz 50%RB	Left Cheek	1720.0	22.38	22.5	1.028	0.062	0.064
40.	RMC QPSK 20MHz 50%RB	Left Tilted	1720.0	22.38	22.5	1.028	0.029	0.030

LTE Band 7– Head SAR Test								
Plot No.	Mode	Test Position Head	Freque ncy	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth		MHz					
41.	RMC QPSK 20MHz 1RB	Right Cheek	2510.0	22.80	23.0	1.047	0.489	0.512
42.	RMC QPSK 20MHz 1RB	Right Tilted	2510.0	22.80	23.0	1.047	0.211	0.221
43.	RMC QPSK 20MHz 1RB	Left Cheek	2510.0	22.80	23.0	1.047	0.385	0.403
44.	RMC QPSK 20MHz 1RB	Left Tilted	2510.0	22.80	23.0	1.047	0.105	0.110
45.	RMC QPSK 20MHz 50%RB	Right Cheek	2510.0	21.89	22.0	1.026	0.201	0.206
46.	RMC QPSK 20MHz 50%RB	Right Tilted	2510.0	21.89	22.0	1.026	0.1	0.103
47.	RMC QPSK 20MHz 50%RB	Left Cheek	2510.0	21.89	22.0	1.026	0.123	0.126
48.	RMC QPSK 20MHz 50%RB	Left Tilted	2510.0	21.89	22.0	1.026	0.052	0.053

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					
49.	802.11b	Right Cheek	11	2462	12.53	13.0	1.114	0.444	0.495
50.	802.11b	Right Tilted	11	2462	12.53	13.0	1.114	0.11	0.123
51.	802.11b	Left Cheek	11	2462	12.53	13.0	1.114	0.161	0.179
52.	802.11b	Left Tilted	11	2462	12.53	13.0	1.114	0.051	0.057

**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					
53.	GSM	Back	190	836.6	33.12	33.5	1.091	0.597	0.652
54.	GSM	Front	190	836.6	33.12	33.5	1.091	0.522	0.570

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					
55.	GSM	Back	810	1909.8	29.55	30.0	1.109	0.949	1.053
56.	GSM	Back	512	1850.2	29.28	30.0	1.180	0.706	0.833
57.	GSM	Back	661	1880.0	29.39	30.0	1.151	0.906	1.043
58.	GSM	Front	810	1909.8	29.55	30.0	1.109	0.381	0.423

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					
71	RMC 12.2k	Back Side	9400	1880.0	21.74	22.0	1.062	1.024	1.087
72	RMC 12.2k	Back Side	9262	1852.4	21.71	22.0	1.069	0.994	1.063
73	RMC 12.2k	Back Side	9538	1907.6	21.73	22.0	1.064	1.044	1.111
74	RMC 12.2k	Front Side	9400	1880.0	21.74	22.0	1.062	0.462	0.491

WCDMA Band 5 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
79	RMC 12.2k	Back Side	4233	846.6	22.49	23.0	1.125	0.407	0.458
80	RMC 12.2k	Front Side	4233	846.6	22.49	23.0	1.125	0.349	0.392

LTE Band 2–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
83	RMC QPSK 20MHz 1RB	Back Side	1900.0	23.22	23.5	1.067	0.921	0.982
84	RMC QPSK 20MHz 1RB	Back Side	1860.0	22.97	23.5	1.130	0.75	0.847
85	RMC QPSK 20MHz 1RB	Back Side	1880.0	23	23.5	1.122	0.85	0.954
86	RMC QPSK 20MHz 1RB	Front Side	1900.0	23.22	23.5	1.067	0.473	0.504
89	RMC QPSK 20MHz 50%RB	Back Side	1900.0	22.39	22.5	1.026	0.641	0.657
90	RMC QPSK 20MHz 50%RB	Front Side	1900.0	22.39	22.5	1.026	0.205	0.210

LTE Band 4–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
94	RMC QPSK 20MHz 1RB	Back Side	1720.0	23.02	23.5	1.117	0.251	0.280
95	RMC QPSK 20MHz 1RB	Front Side	1720.0	23.02	23.5	1.117	0.077	0.086
98	RMC QPSK 20MHz 50%RB	Back Side	1720.0	22.38	22.5	1.028	0.201	0.207
99	RMC QPSK 20MHz 50%RB	Front Side	1720.0	22.38	22.5	1.028	0.015	0.015

LTE Band 7–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
102	RMC QPSK 20MHz 1RB	Back Side	2510.0	22.80	23.0	1.047	0.958	1.003
103	RMC QPSK 20MHz 1RB	Back Side	2535.0	22.56	23.0	1.107	0.797	0.882
104	RMC QPSK 20MHz 1RB	Back Side	2560.0	22.01	23.0	1.256	0.677	0.850
105	RMC QPSK 20MHz 1RB	Front Side	2510.0	22.80	23.0	1.047	0.593	0.621
110	RMC QPSK 20MHz 50%RB	Back Side	2510.0	21.89	22.0	1.026	0.621	0.637
111	RMC QPSK 20MHz 50%RB	Front Side	2510.0	21.89	22.0	1.026	0.597	0.612

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					
115	802.11b	Back Side	11	2462	12.53	13.0	1.114	0.144	0.160
116	802.11b	Front Side	11	2462	12.53	13.0	1.114	0.053	0.059

**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					
59.	GPRS_2TX	Back Side	251	848.8	31.11	31.5	1.094	0.727	0.795
60.	GPRS_2TX	Front Side	251	848.8	31.11	31.5	1.094	0.645	0.706
61.	GPRS_2TX	Bottom side	251	848.8	31.11	31.5	1.094	0.286	0.313
62.	GPRS_2TX	Right side	251	848.8	31.11	31.5	1.094	0.103	0.113

GSM1900 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
63.	GPRS_3TX	Back Side	810	1909.8	25.82	26.0	1.042	1.108	1.155
64.	GPRS_3TX	Back Side	512	1850.2	25.76	26.0	1.057	0.889	0.940
65.	GPRS_3TX	Back Side	661	1880.0	25.65	26.0	1.084	0.989	1.072
66.	GPRS_3TX	Front Side	810	1909.8	25.82	26.0	1.042	0.247	0.257
67.	GPRS_3TX	Bottom side	810	1909.8	25.82	26.0	1.042	0.913	0.952
68.	GPRS_3TX	Bottom side	512	1850.2	25.76	26.0	1.057	0.791	0.836
69.	GPRS_3TX	Bottom side	661	1880.0	25.65	26.0	1.084	0.852	0.924
70.	GPRS_3TX	Right side	810	1909.8	25.82	26.0	1.042	0.236	0.246

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					
71.	RMC 12.2k	Back Side	9400	1880.0	21.74	22.0	1.062	1.024	1.087
72.	RMC 12.2k	Back Side	9262	1852.4	21.71	22.0	1.069	0.994	1.063
73.	RMC 12.2k	Back Side	9538	1907.6	21.73	22.0	1.064	1.044	1.111
74.	RMC 12.2k	Front Side	9400	1880.0	21.74	22.0	1.062	0.462	0.491
75.	RMC 12.2k	Bottom side	9400	1880.0	21.74	22.0	1.062	0.811	0.861
76.	RMC 12.2k	Bottom side	9262	1852.4	21.71	22.0	1.069	0.838	0.896
77.	RMC 12.2k	Bottom side	9538	1907.6	21.73	22.0	1.064	0.8	0.851
78.	RMC 12.2k	Right side	9400	1880.0	21.74	22.0	1.062	0.237	0.252

WCDMA Band 5 – Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
79.	RMC 12.2k	Back Side	4233	846.6	22.49	23.0	1.125	0.407	0.458
80.	RMC 12.2k	Front Side	4233	846.6	22.49	23.0	1.125	0.349	0.392
81.	RMC 12.2k	Bottom side	4233	846.6	22.49	23.0	1.125	0.156	0.175
82.	RMC 12.2k	Right side	4233	846.6	22.49	23.0	1.125	0.025	0.028

LTE Band 2–Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)	
	Modulation, Bandwidth, RB		MHz						
83.	RMC QPSK 20MHz 1RB	Back Side	1900.0	23.22	23.5	1.067	0.921	0.982	
84.	RMC QPSK 20MHz 1RB	Back Side	1860.0	22.97	23.5	1.130	0.75	0.847	
85.	RMC QPSK 20MHz 1RB	Back Side	1880.0	23	23.5	1.122	0.85	0.954	
86.	RMC QPSK 20MHz 1RB	Front Side	1900.0	23.22	23.5	1.067	0.473	0.504	
87.	RMC QPSK 20MHz 1RB	Bottom Side	1900.0	23.22	23.5	1.067	0.732	0.781	
88.	RMC QPSK 20MHz 1RB	Right side	1900.0	23.22	23.5	1.067	0.122	0.130	
89.	RMC QPSK 20MHz 50%RB	Back Side	1900.0	22.39	22.5	1.026	0.641	0.657	
90.	RMC QPSK 20MHz 50%RB	Front Side	1900.0	22.39	22.5	1.026	0.205	0.210	
91.	RMC QPSK 20MHz 50%RB	Bottom side	1900.0	22.39	22.5	1.026	0.465	0.477	
92.	RMC QPSK 20MHz 50%RB	Right side	1900.0	22.39	22.5	1.026	0.068	0.070	
93.	RMC QPSK 20MHz 100%RB	Back Side	1900.0	22.38	22.5	1.028	0.613	0.630	

LTE Band 4–Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)	
	Modulation, Bandwidth, RB		MHz						
94.	RMC QPSK 20MHz 1RB	Back Side	1720.0	23.02	23.5	1.117	0.251	0.280	
95.	RMC QPSK 20MHz 1RB	Front Side	1720.0	23.02	23.5	1.117	0.077	0.086	
96.	RMC QPSK 20MHz 1RB	Bottom side	1720.0	23.02	23.5	1.117	0.143	0.160	
97.	RMC QPSK 20MHz 1RB	Right side	1720.0	23.02	23.5	1.117	0.071	0.079	
98.	RMC QPSK 20MHz 50%RB	Back Side	1720.0	22.38	22.5	1.028	0.201	0.207	
99.	RMC QPSK 20MHz 50%RB	Front Side	1720.0	22.38	22.5	1.028	0.015	0.015	
100.	RMC QPSK 20MHz 50%RB	Bottom side	1720.0	22.38	22.5	1.028	0.11	0.113	
101.	RMC QPSK 20MHz 50%RB	Right side	1720.0	22.38	22.5	1.028	0.038	0.039	

LTE Band 7–Body SAR Test (Gap: 10mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
	Modulation, Bandwidth, RB		MHz					
102.	RMC QPSK 20MHz 1RB	Back Side	2510.0	22.80	23.0	1.047	0.958	1.003
103.	RMC QPSK 20MHz 1RB	Back Side	2535.0	22.56	23.0	1.107	0.797	0.882
104.	RMC QPSK 20MHz 1RB	Back Side	2560.0	22.01	23.0	1.256	0.677	0.850
105.	RMC QPSK 20MHz 1RB	Front Side	2510.0	22.80	23.0	1.047	0.593	0.621
106.	RMC QPSK 20MHz 1RB	Bottom Side	2510.0	22.80	23.0	1.047	0.801	0.839
107.	RMC QPSK 20MHz 1RB	Bottom Side	2535.0	22.56	23.0	1.107	0.599	0.663
108.	RMC QPSK 20MHz 1RB	Bottom Side	2560.0	22.01	23.0	1.256	0.657	0.825
109.	RMC QPSK 20MHz 1RB	Right side	2510.0	24.60	25.0	1.096	0.135	0.148
110.	RMC QPSK 20MHz 50%RB	Back Side	2510.0	21.89	22.0	1.026	0.621	0.637
111.	RMC QPSK 20MHz 50%RB	Front Side	2510.0	21.89	22.0	1.026	0.597	0.612
112.	RMC QPSK 20MHz 50%RB	Bottom side	2510.0	21.89	22.0	1.026	0.508	0.521
113.	RMC QPSK 20MHz 50%RB	Right side	2510.0	21.89	22.0	1.026	0.122	0.125
114.	RMC QPSK 20MHz 100%RB	Back Side	2510.0	21.75	22.0	1.059	0.610	0.646

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					
115.	802.11b	Back Side	11	2462	12.53	13.0	1.114	0.144	0.160
116.	802.11b	Front Side	11	2462	12.53	13.0	1.114	0.053	0.059
117.	802.11b	Left side	11	2462	12.53	13.0	1.114	0.011	0.012
118.	802.11b	Top Side	11	2462	12.53	13.0	1.114	0.033	0.037



**Repeated SAR**

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					
119.	GSM	Back	810	1909.8	29.55	30.0	1.109	0.935	1.037

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					
120.	GPRS_3TX	Back Side	810	1909.8	25.82	26.0	1.042	1.098	1.144

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					
121.	RMC 12.2k	Back Side	9538	1907.6	21.73	22.0	1.064	1.021	1.086

LTE Band 2–Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Freque	Output Power (dBm)	Rate d Limit (dBm )	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)	
	Modulation, Bandwidth, RB		ncy MHz						
122.	RMC QPSK 20MHz 1RB	Back Side	1900.0	23.22	23.5	1.067	0.915	0.976	

LTE Band 7–Body SAR Test (Gap: 10mm)									
Plot No.	Mode	Test Position Body	Freque	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)	
	Modulation, Bandwidth, RB		ncy MHz						
123.	RMC QPSK 20MHz 1RB	Back Side	2510.0	22.80	23.0	1.047	0.948	0.993	

**Remark:**

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

$\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .

### 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/Data) + WLAN(Data)	Yes	Yes	Yes
2	WCDMA (Voice/Data)+ WLAN(Data)	Yes	Yes	Yes
3	LTE(Data) + WLAN(Data)	Yes	Yes	Yes
4	GSM(Voice/Data) + Bluetooth(Data)	Yes	Yes	-
5	WCDMA(Voice) + Bluetooth(Data)	Yes	Yes	-
6	LTE(Data) + Bluetooth(Data)	Yes	Yes	-

#### Remark:

1. GSM ,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) $^{1/x}$  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
4.5	2.82	5/10	2.402	7.5	0.117	0.058

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

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

Position	WWAN		WLAN	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Right Cheek	GSM850	0.604	0.495	1.099
Right Tilted	GSM850	0.136	0.123	0.259
Left Cheek	GSM850	0.623	0.179	0.802
Left Tilted	GSM850	0.145	0.057	0.202
Right Cheek	GSM1900	0.149	0.495	0.644
Right Tilted	GSM1900	0.024	0.123	0.147
Left Cheek	GSM1900	0.295	0.179	0.474
Left Tilted	GSM1900	0.064	0.057	0.121
Right Cheek	GPRS850	0.771	0.495	<b>1.266</b>
Right Tilted	GPRS850	0.275	0.123	0.398
Left Cheek	GPRS850	0.742	0.179	0.921
Left Tilted	GPRS850	0.159	0.057	0.216
Right Cheek	GPRS1900	0.180	0.495	0.675
Right Tilted	GPRS1900	0.023	0.123	0.146
Left Cheek	GPRS1900	0.309	0.179	0.488
Left Tilted	GPRS1900	0.039	0.057	0.096
Right Cheek	WCDMA Band 2	0.217	0.495	0.712
Right Tilted	WCDMA Band 2	0.038	0.123	0.161
Left Cheek	WCDMA Band 2	0.276	0.179	0.455
Left Tilted	WCDMA Band 2	0.044	0.057	0.101
Right Cheek	WCDMA Band 5	0.385	0.495	0.88
Right Tilted	WCDMA Band 5	0.141	0.123	0.264
Left Cheek	WCDMA Band 5	0.385	0.179	0.564
Left Tilted	WCDMA Band 5	0.115	0.057	0.172
Right Cheek	LTE Band 2	0.402	0.495	0.897
Right Tilted	LTE Band 2	0.109	0.123	0.232
Left Cheek	LTE Band 2	0.388	0.179	0.567
Left Tilted	LTE Band 2	0.105	0.057	0.162
Right Cheek	LTE Band 4	0.044	0.495	0.539
Right Tilted	LTE Band 4	0.022	0.123	0.145
Left Cheek	LTE Band 4	0.084	0.179	0.263
Left Tilted	LTE Band 4	0.028	0.057	0.085
Right Cheek	LTE Band 7	0.512	0.495	1.007
Right Tilted	LTE Band 7	0.221	0.123	0.344
Left Cheek	LTE Band 7	0.403	0.179	0.582
Left Tilted	LTE Band 7	0.110	0.057	0.167

**WWAN and Bluetooth**

Position	WWAN		Bluetooth	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Right Cheek	GSM850	0.604	0.117	0.721
Right Tilted	GSM850	0.136	0.117	0.253
Left Cheek	GSM850	0.623	0.117	0.74
Left Tilted	GSM850	0.145	0.117	0.262
Right Cheek	GSM1900	0.149	0.117	0.266
Right Tilted	GSM1900	0.024	0.117	0.141
Left Cheek	GSM1900	0.295	0.117	0.412
Left Tilted	GSM1900	0.064	0.117	0.181
Right Cheek	GPRS850	0.771	0.117	<b>0.888</b>
Right Tilted	GPRS850	0.275	0.117	0.392
Left Cheek	GPRS850	0.742	0.117	0.859
Left Tilted	GPRS850	0.159	0.117	0.276
Right Cheek	GPRS1900	0.180	0.117	0.297
Right Tilted	GPRS1900	0.023	0.117	0.14
Left Cheek	GPRS1900	0.309	0.117	0.426
Left Tilted	GPRS1900	0.039	0.117	0.156
Right Cheek	WCDMA Band 2	0.217	0.117	0.334
Right Tilted	WCDMA Band 2	0.038	0.117	0.155
Left Cheek	WCDMA Band 2	0.276	0.117	0.393
Left Tilted	WCDMA Band 2	0.044	0.117	0.161
Right Cheek	WCDMA Band 5	0.385	0.117	0.502
Right Tilted	WCDMA Band 5	0.141	0.117	0.258
Left Cheek	WCDMA Band 5	0.385	0.117	0.502
Left Tilted	WCDMA Band 5	0.115	0.117	0.232
Right Cheek	LTE Band 2	0.402	0.117	0.519
Right Tilted	LTE Band 2	0.109	0.117	0.226
Left Cheek	LTE Band 2	0.388	0.117	0.505
Left Tilted	LTE Band 2	0.105	0.117	0.222
Right Cheek	LTE Band 4	0.044	0.117	0.161
Right Tilted	LTE Band 4	0.022	0.117	0.139
Left Cheek	LTE Band 4	0.084	0.117	0.201
Left Tilted	LTE Band 4	0.028	0.117	0.145
Right Cheek	LTE Band 7	0.512	0.117	0.629
Right Tilted	LTE Band 7	0.221	0.117	0.338
Left Cheek	LTE Band 7	0.403	0.117	0.52
Left Tilted	LTE Band 7	0.110	0.117	0.227

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

Position	WWAN		WLAN	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.652	0.160	0.812
Front	GSM850	0.570	0.059	0.629
Back	GSM1900	1.053	0.160	1.213
Front	GSM1900	0.423	0.059	0.482
Back	WCDMA Band 2	1.111	0.160	<b>1.271</b>
Front	WCDMA Band 2	0.491	0.059	0.55
Back	WCDMA Band 5	0.458	0.160	0.618
Front	WCDMA Band 5	0.392	0.059	0.451
Back	LTE Band 2	0.982	0.160	1.142
Front	LTE Band 2	0.504	0.059	0.563
Back	LTE Band 4	0.280	0.160	0.44
Front	LTE Band 4	0.086	0.059	0.145
Back	LTE Band 7	1.003	0.160	1.163
Front	LTE Band 7	0.621	0.059	0.68

**WWAN and Bluetooth**

Position	WWAN		Bluetooth	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.652	0.058	0.71
Front	GSM850	0.570	0.058	0.628
Back	GSM1900	1.053	0.058	1.111
Front	GSM1900	0.423	0.058	0.481
Back	WCDMA Band 2	1.111	0.058	<b>1.169</b>
Front	WCDMA Band 2	0.491	0.058	0.549
Back	WCDMA Band 5	0.458	0.058	0.516
Front	WCDMA Band 5	0.392	0.058	0.45
Back	LTE Band 2	0.982	0.058	1.04
Front	LTE Band 2	0.504	0.058	0.562
Back	LTE Band 4	0.280	0.058	0.338
Front	LTE Band 4	0.086	0.058	0.144
Back	LTE Band 7	1.003	0.058	1.061
Front	LTE Band 7	0.621	0.058	0.679

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

Position	WWAN		WLAN	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	GSM850	0.795	0.160	0.955
Front	GSM850	0.706	0.059	0.765
Top side	GSM850	--	0.037	0.037
Bottom side	GSM850	0.313	--	0.313
Right side	GSM850	0.113	--	0.113
Left side	GSM850	--	0.012	0.012
Back	GSM1900	1.155	0.160	<b>1.315</b>
Front	GSM1900	0.257	0.059	0.316
Top side	GSM1900	--	0.037	0.037
Bottom side	GSM1900	0.952	--	0.952
Right side	GSM1900	0.246	--	0.246
Left side	GSM1900	--	0.012	0.012
Back	WCDMA Band 2	1.111	0.160	1.271
Front	WCDMA Band 2	0.491	0.059	0.55
Top side	WCDMA Band 2	--	0.037	0.037
Bottom side	WCDMA Band 2	0.896	--	0.896
Right side	WCDMA Band 2	0.252	--	0.252
Left side	WCDMA Band 2	--	0.012	0.012
Back	WCDMA Band 5	0.458	0.160	0.618
Front	WCDMA Band 5	0.392	0.059	0.451
Top side	WCDMA Band 5	--	0.037	0.037
Bottom side	WCDMA Band 5	0.175	--	0.175
Right side	WCDMA Band 5	0.028	--	0.028
Left side	WCDMA Band 5	--	0.012	0.012
Back	LTE Band 2	0.982	0.160	1.142
Front	LTE Band 2	0.504	0.059	0.563
Top side	LTE Band 2	--	0.037	0.037
Bottom side	LTE Band 2	0.781	--	0.781
Right side	LTE Band 2	0.130	--	0.130
Left side	LTE Band 2	--	0.012	0.012
Back	LTE Band 4	0.280	0.160	0.44
Front	LTE Band 4	0.086	0.059	0.145
Top side	LTE Band 4	--	0.037	0.037
Bottom side	LTE Band 4	0.160	--	0.160
Right side	LTE Band 4	0.079	--	0.079
Left side	LTE Band 4	--	0.012	0.012
Back	LTE Band 7	1.003	0.160	1.163

---

---

Front	LTE Band 7	0.621	0.059	0.68
Top side	LTE Band 7	--	0.037	0.037
Bottom side	LTE Band 7	0.839	--	0.839
Right side	LTE Band 7	0.148	--	0.148
Left side	LTE Band 7	--	0.012	0.012



## 10. Measurement Uncertainty

### 10.1 Uncertainty for EUT SAR Test

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

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

## 10.2 Uncertainty for System Performance Check

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

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

## Annex A. Plots of System Performance Check

# MEASUREMENT 1

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/27/2018

Measurement duration: 7 minutes 21 seconds

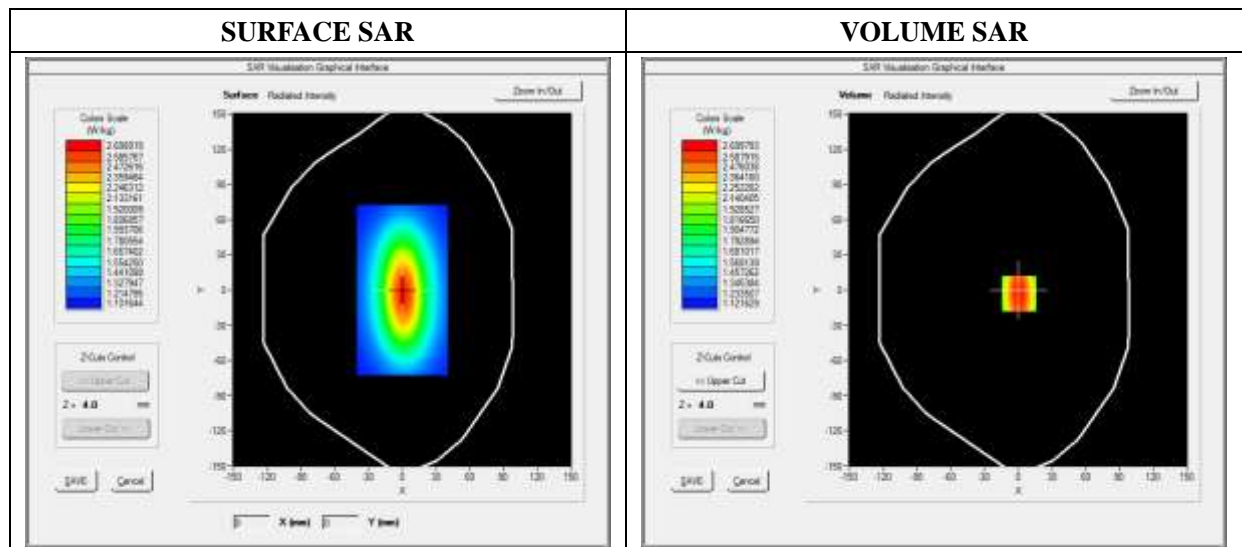
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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

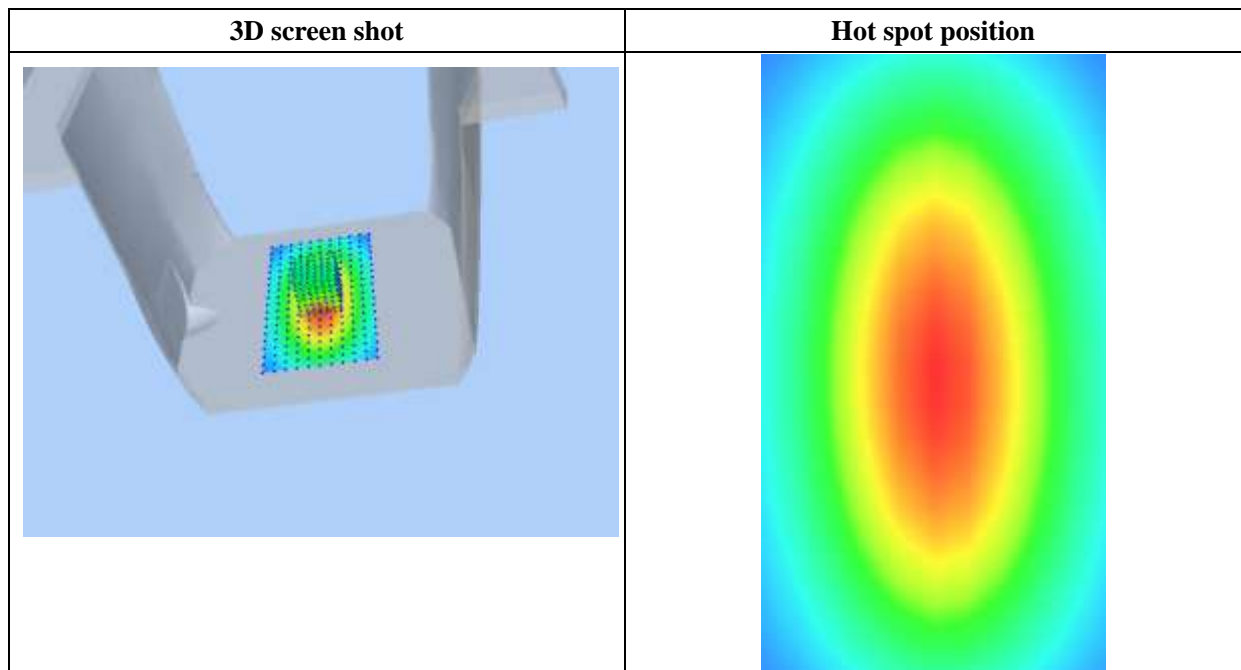
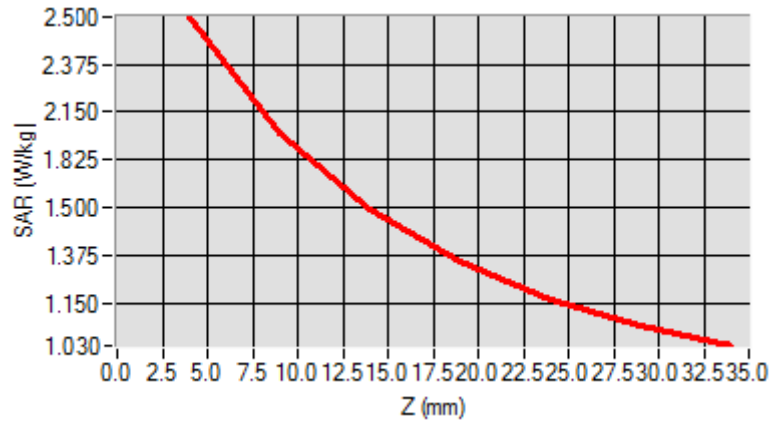


Maximum location: X=0.00, Y=0.00

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



## MEASUREMENT 2

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/28/2018

Measurement duration: 12 minutes 21 seconds

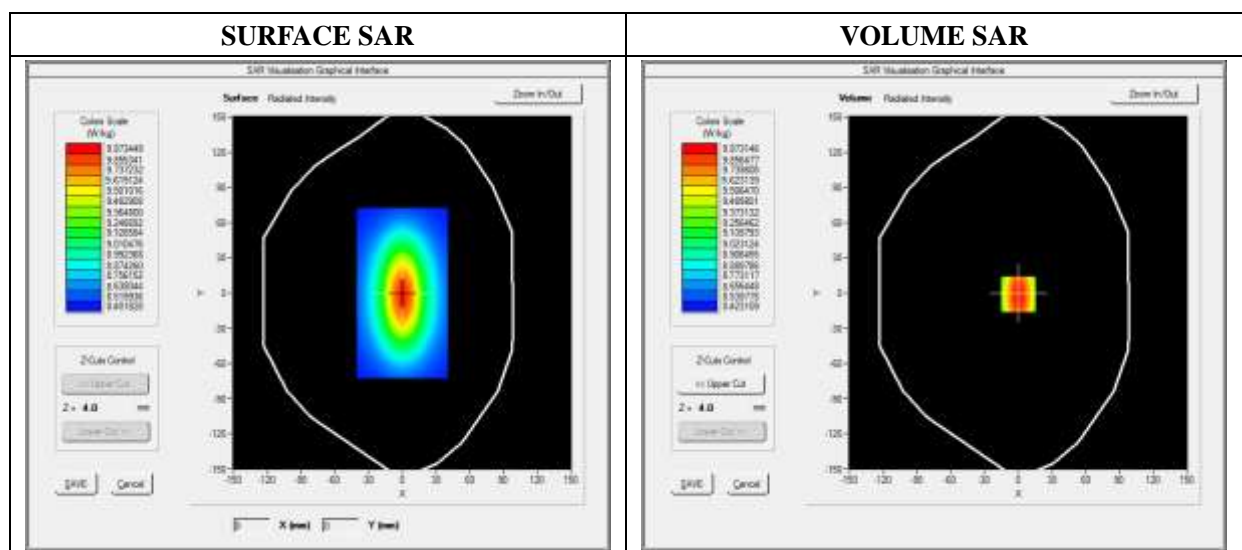
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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

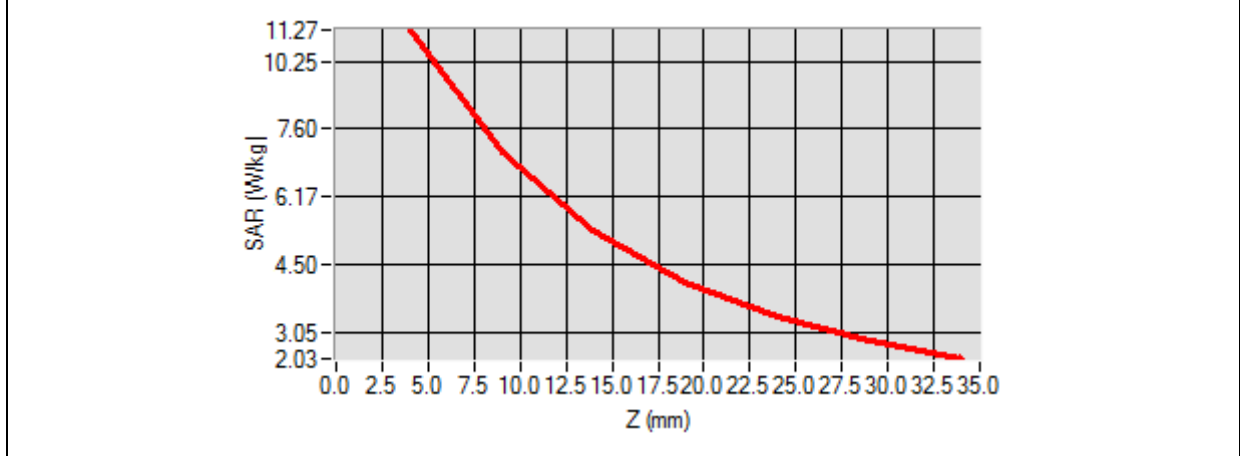


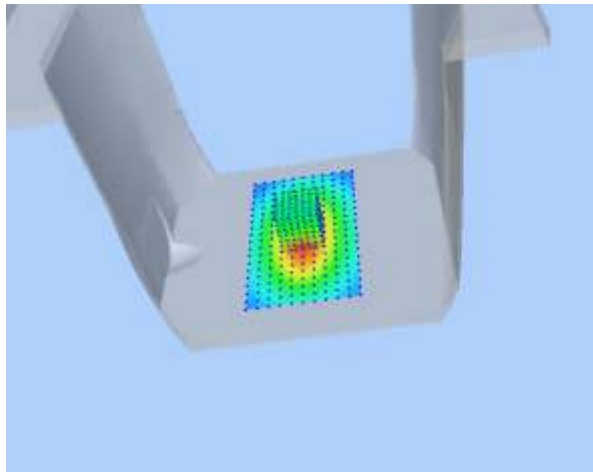
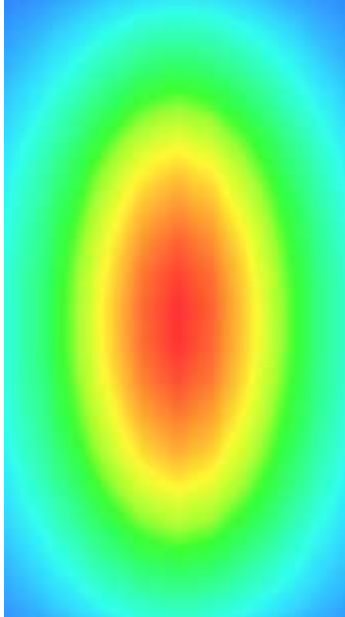
Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

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



3D screen shot	Hot spot position
	

## MEASUREMENT 3

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/28/2018

Measurement duration: 12 minutes 21 seconds

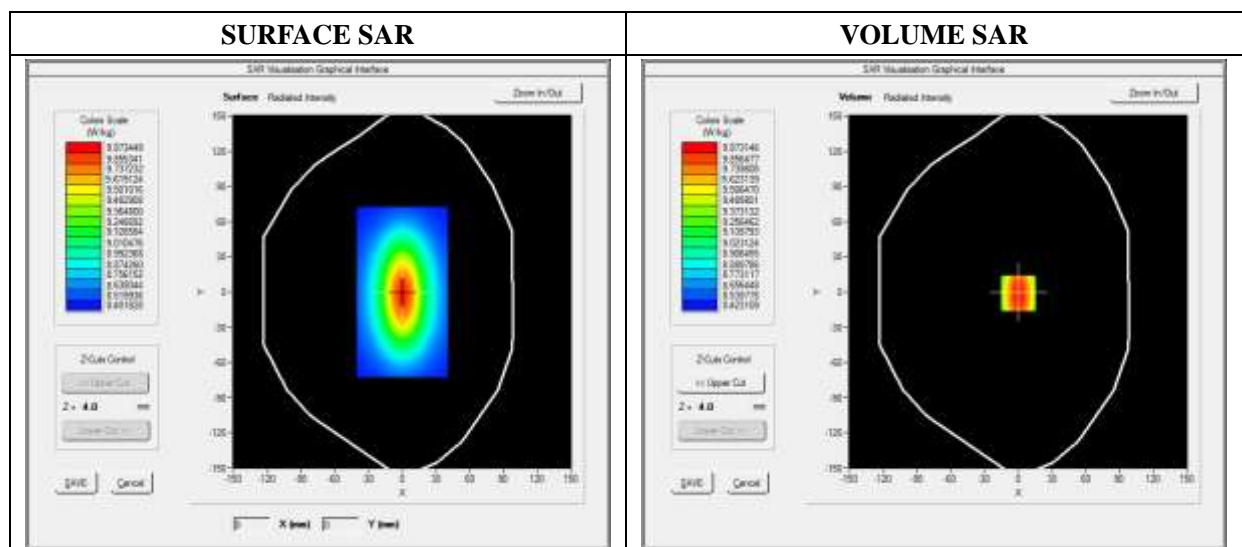
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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



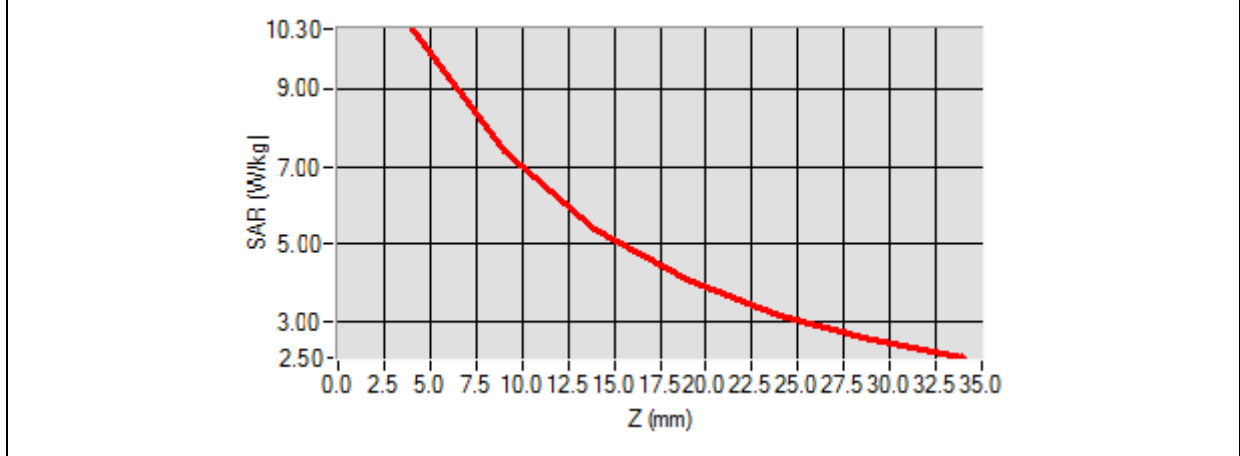


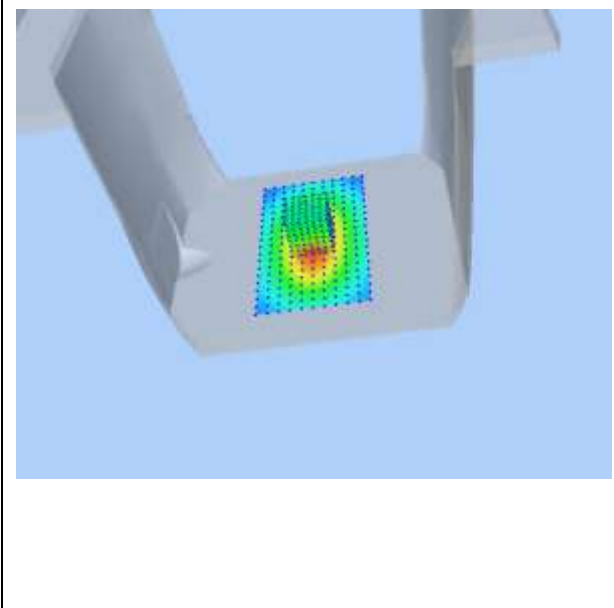
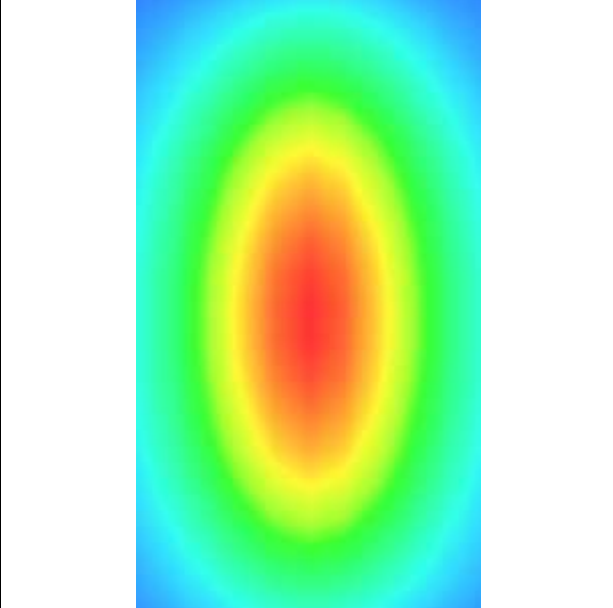
Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

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



3D screen shot	Hot spot position
	

# MEASUREMENT 4

## For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/29/2018

Measurement duration: 12 minutes 21 seconds

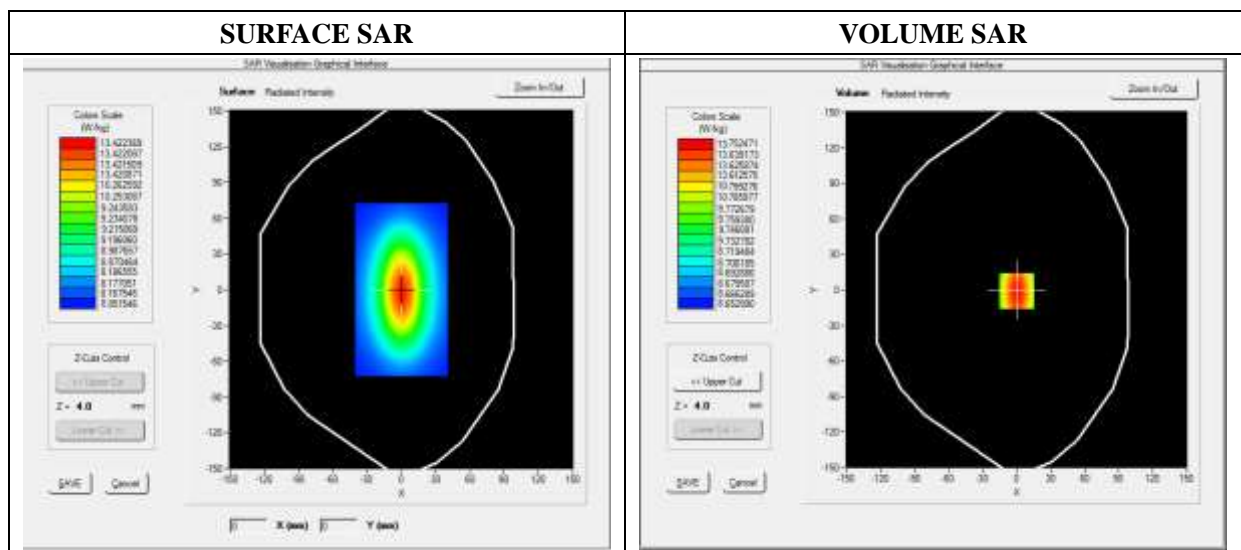
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.64; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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

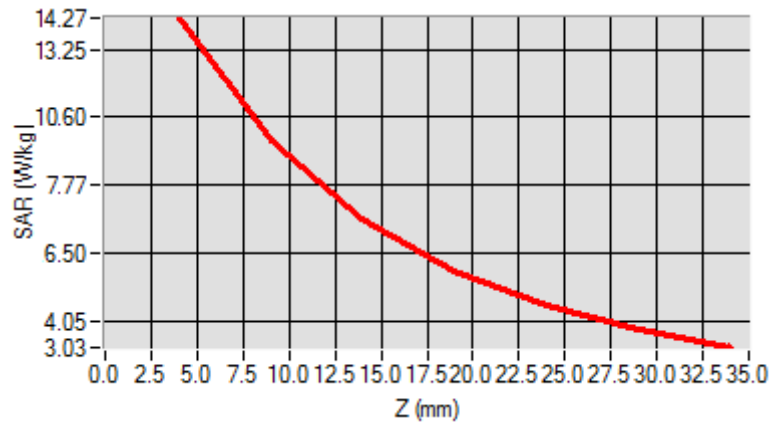


Maximum location: X=0.00, Y=0.00

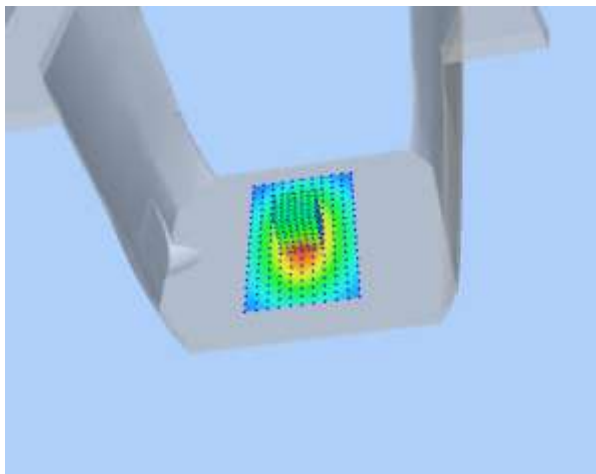
SAR 10g (W/Kg)	8.020427
SAR 1g (W/Kg)	13.452457

Z Axis Scan

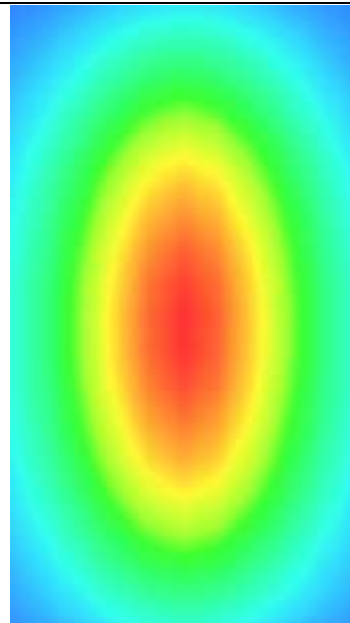
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	14.1034	12.0012	10.2624	7.4715	5.9022	4.5114



3D screen shot



Hot spot position



# MEASUREMENT 5

## For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/29/2018

Measurement duration: 12 minutes 21 seconds

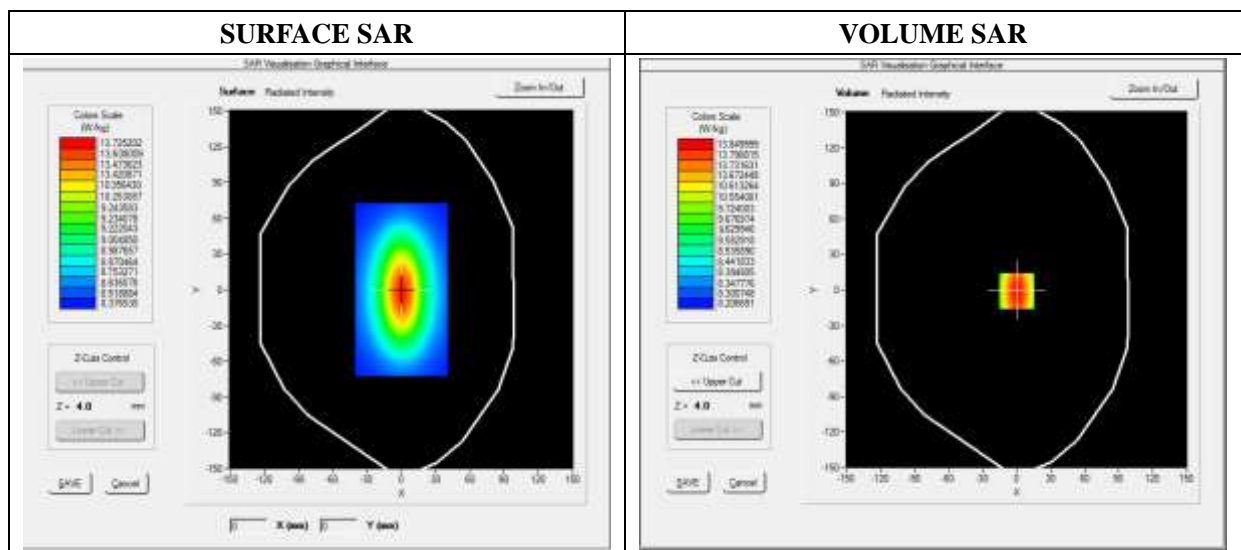
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.37; Calibrated: 06/01/2018

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW2600
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

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

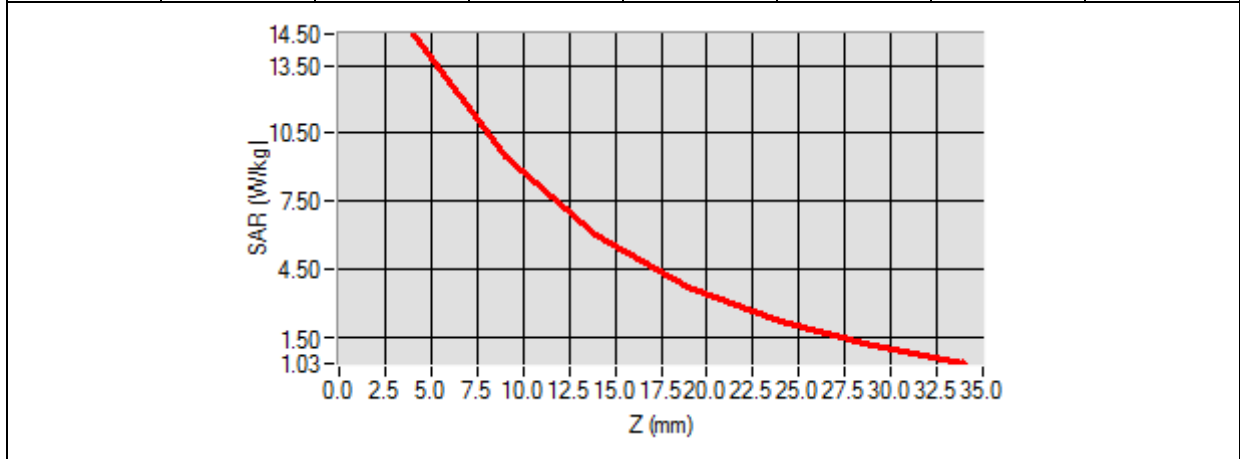


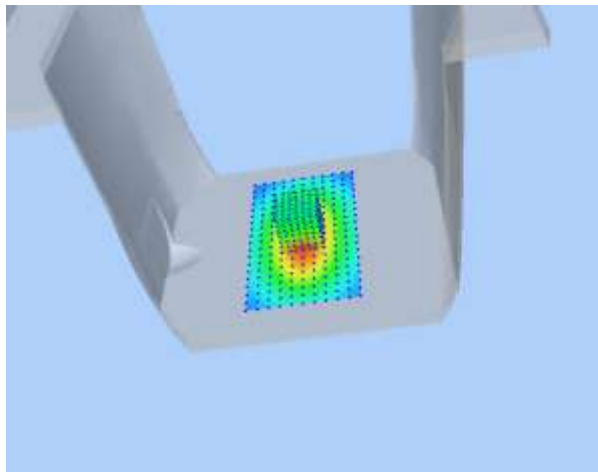
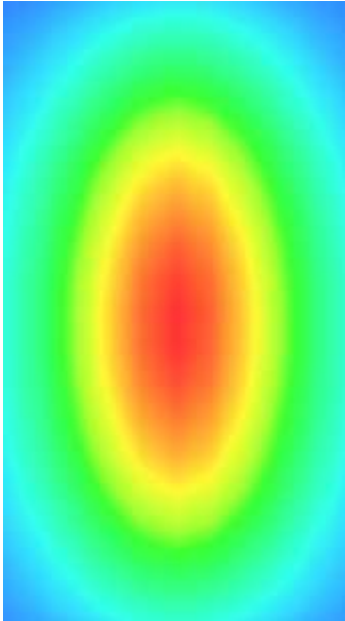
Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	8.270822
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 Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/27/2018

Measurement duration: 12 minutes 21 seconds

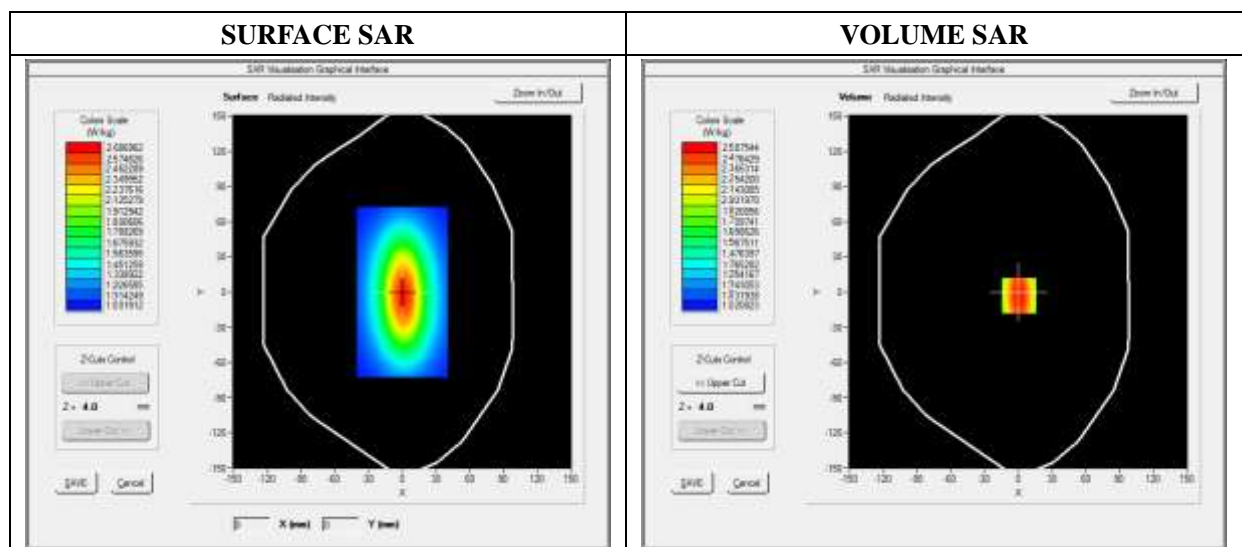
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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

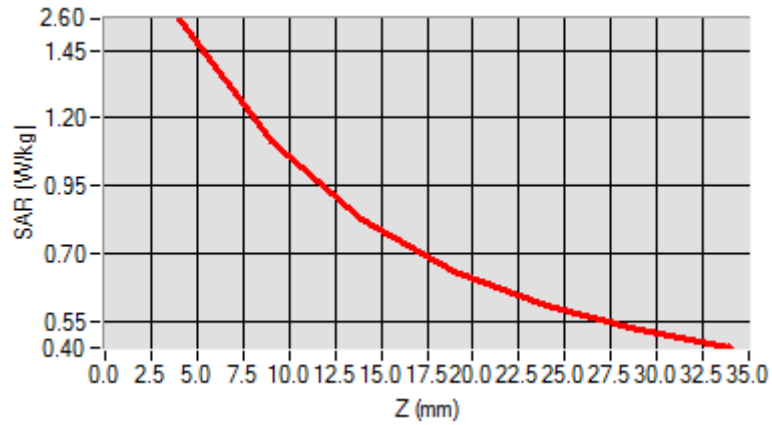


Maximum location: X=0.00, Y=0.00

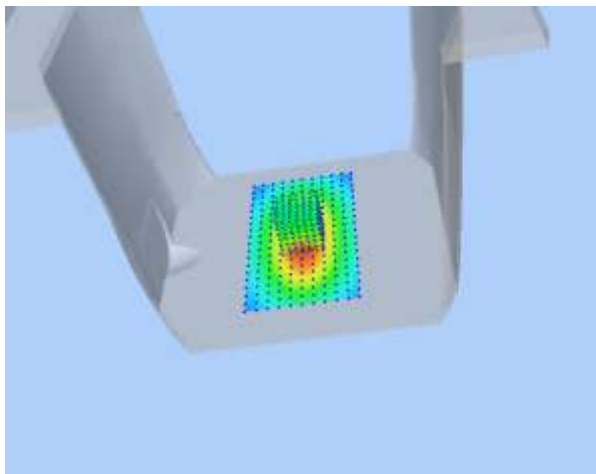
SAR 10g (W/Kg)	1.028956
SAR 1g (W/Kg)	2.354211

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 7

## For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/28/2018

Measurement duration: 12 minutes 21 seconds

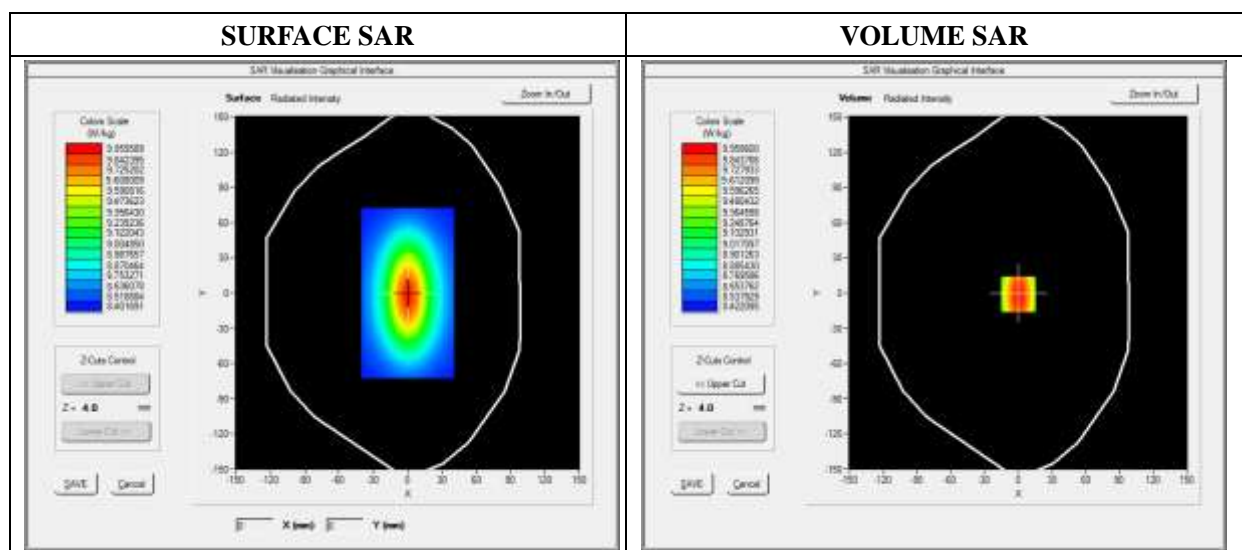
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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



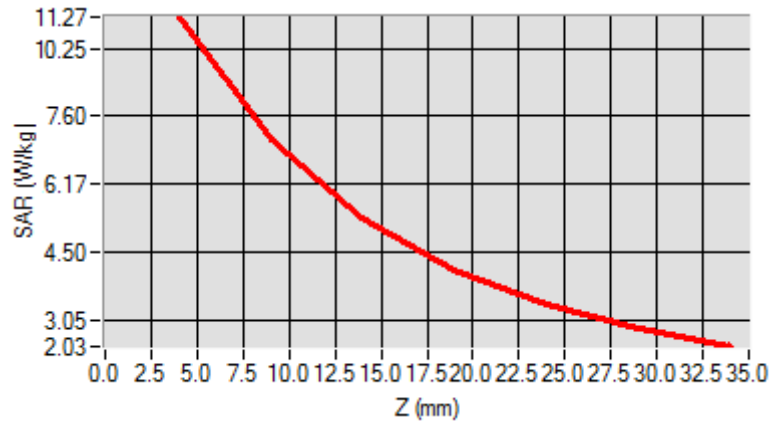


Maximum location: X=0.00, Y=0.00

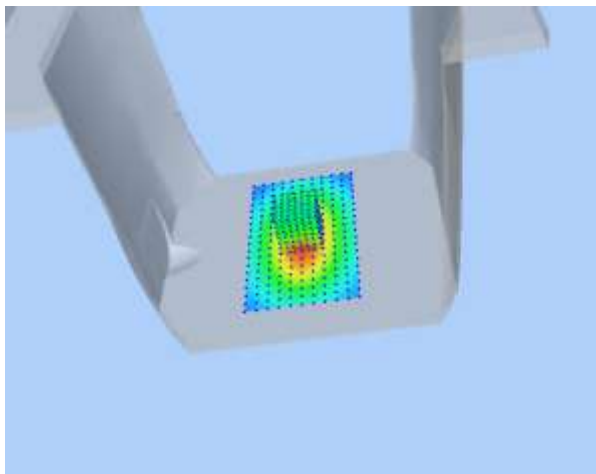
SAR 10g (W/Kg)	5.221202
SAR 1g (W/Kg)	9.582560

Z Axis Scan

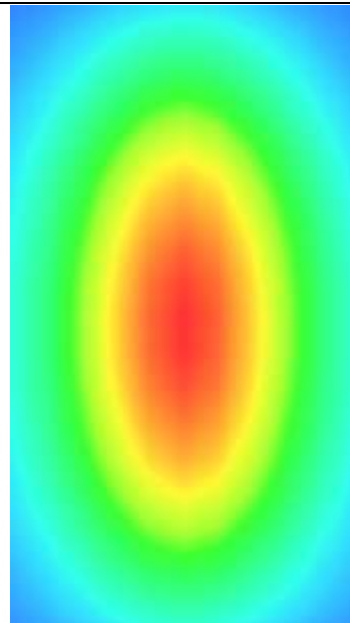
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	11.2425	9.4123	8.0345	6.9125	6.3092	3.9460



3D screen shot



Hot spot position



# MEASUREMENT 8

**For Body Liquid**

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/28/2018

Measurement duration: 12 minutes 21 seconds

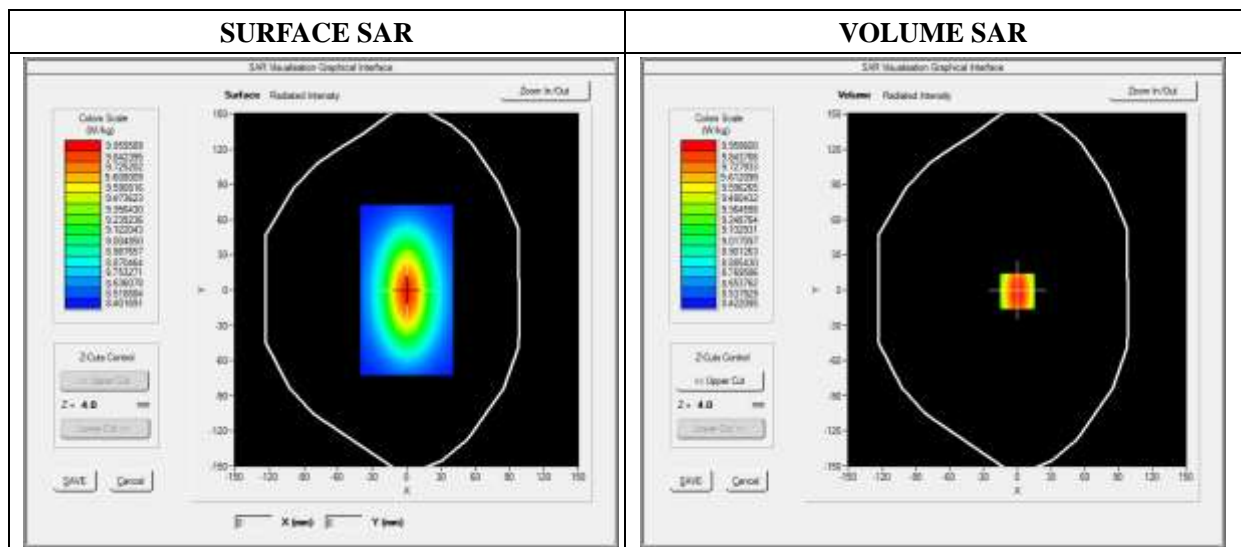
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

**A. Experimental conditions**

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

**B. SAR Measurement Results**

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

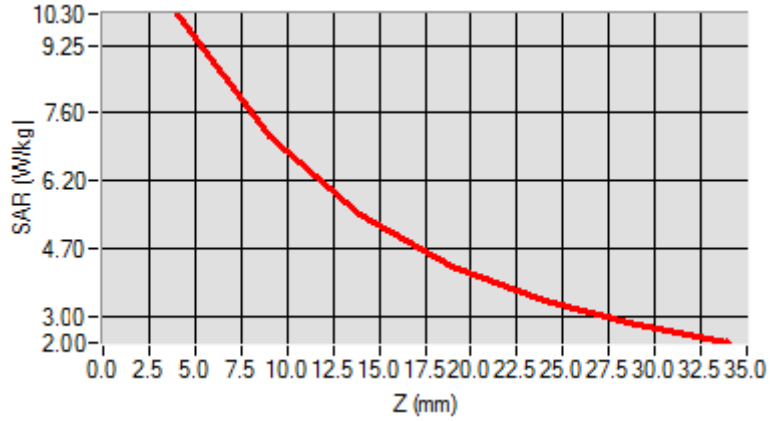


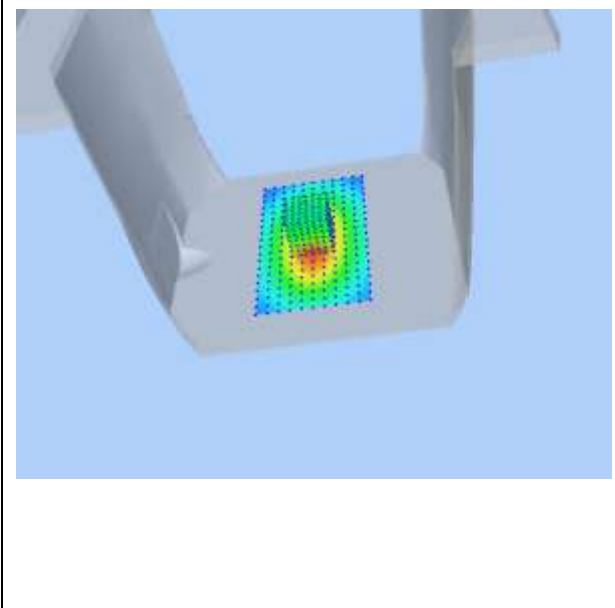
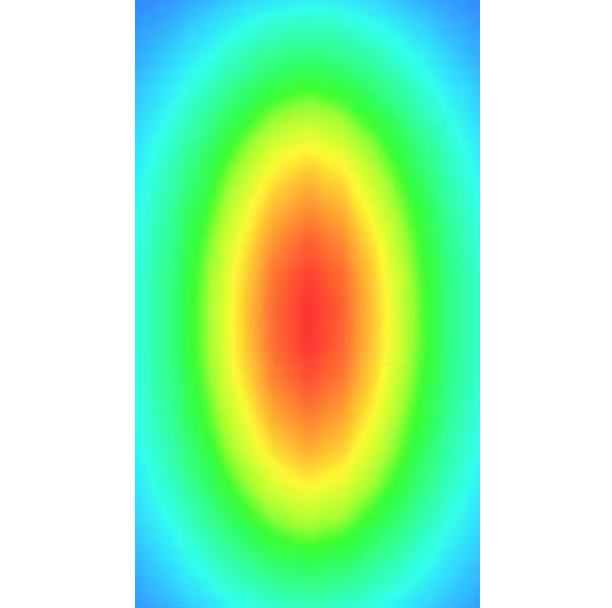
Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

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



3D screen shot	Hot spot position
	

# MEASUREMENT 9

## For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/29/2018

Measurement duration: 12 minutes 21 seconds

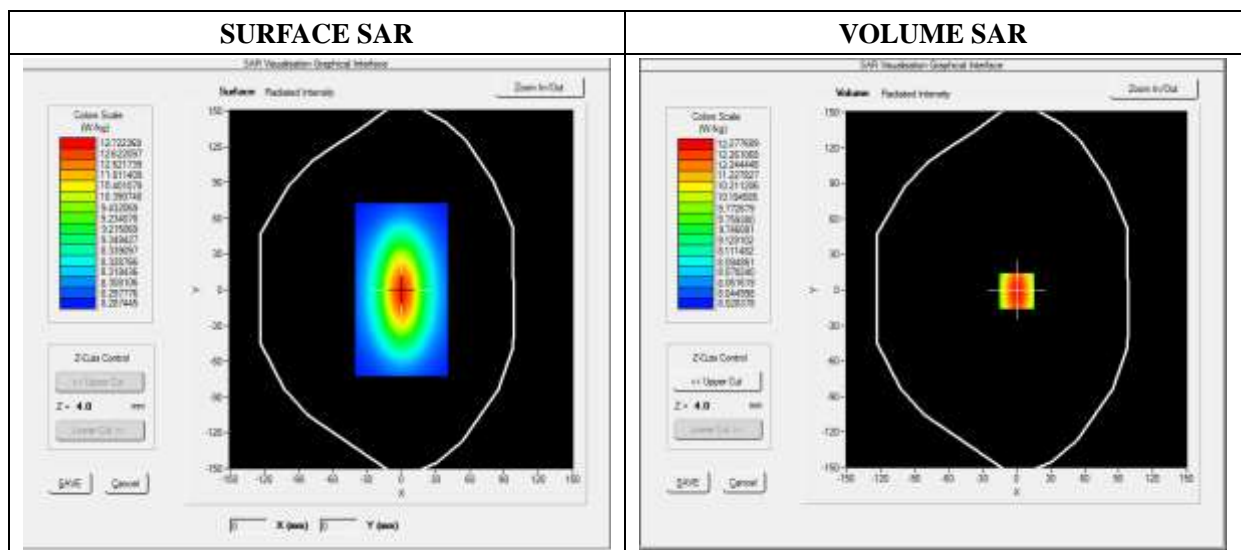
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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

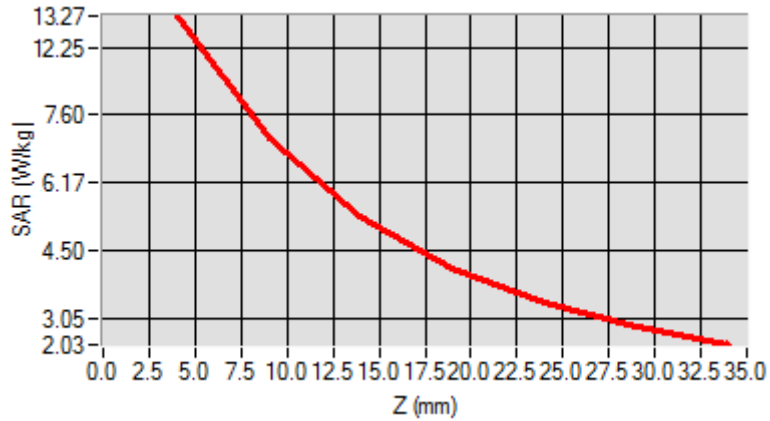


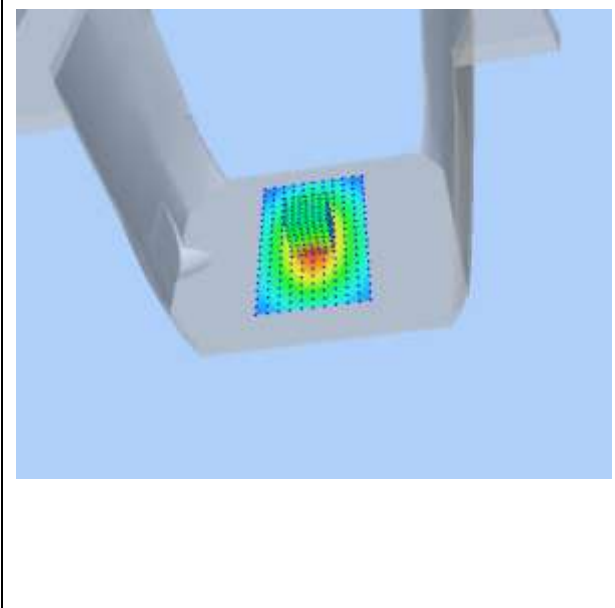
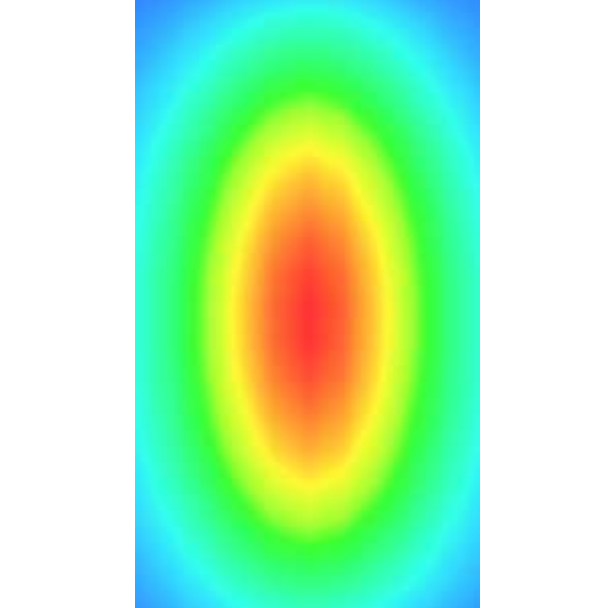
Maximum location: X=0.00, Y=0.00

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

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	13.1911	11.7951	9.2945	8.5400	6.3712	4.6225



3D screen shot	Hot spot position
	

# MEASUREMENT 10

## For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 08/29/2018

Measurement duration: 12 minutes 21 seconds

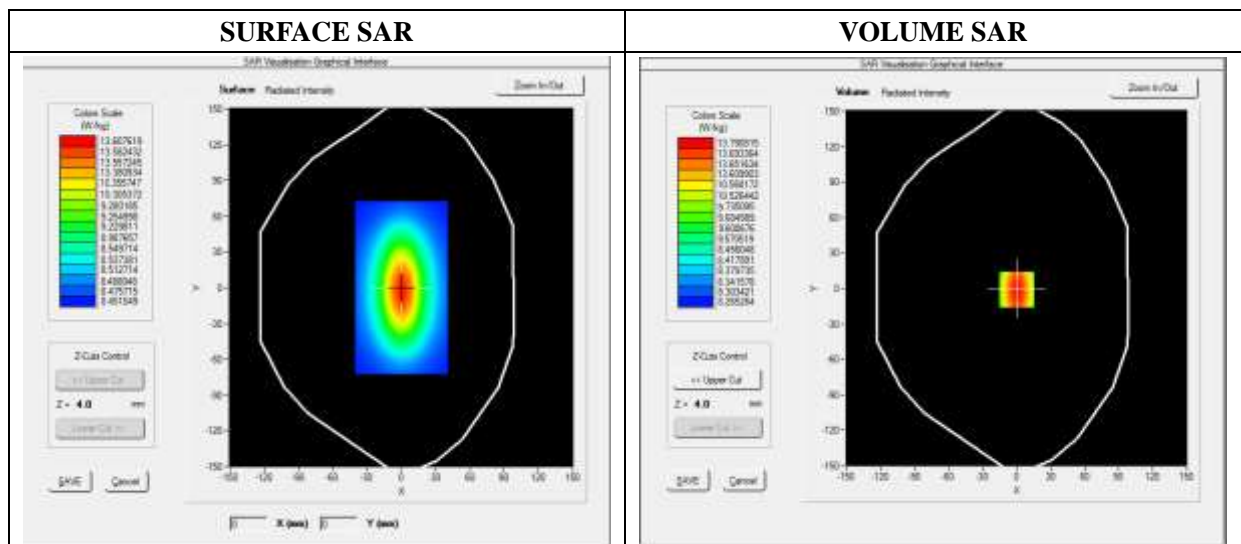
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.58; Calibrated: 06/01/2018

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW2600
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

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

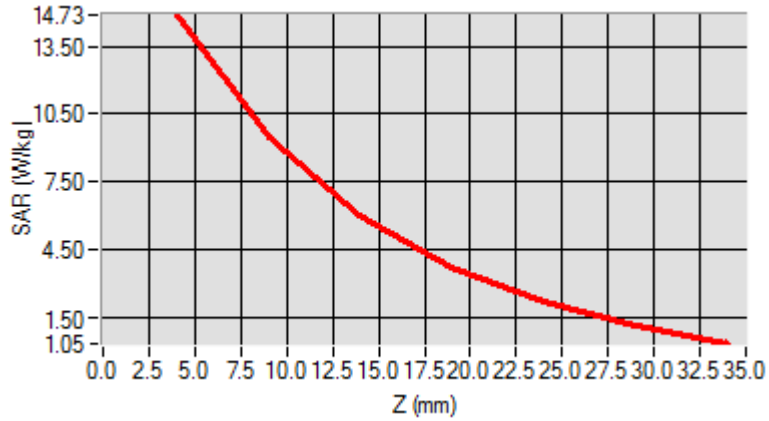


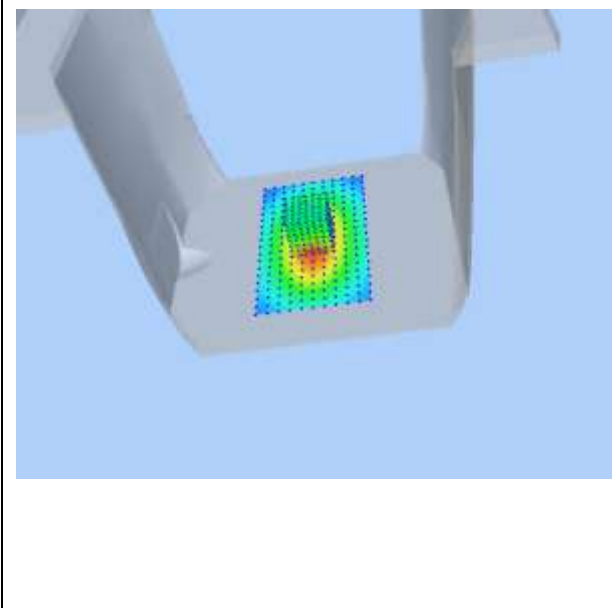
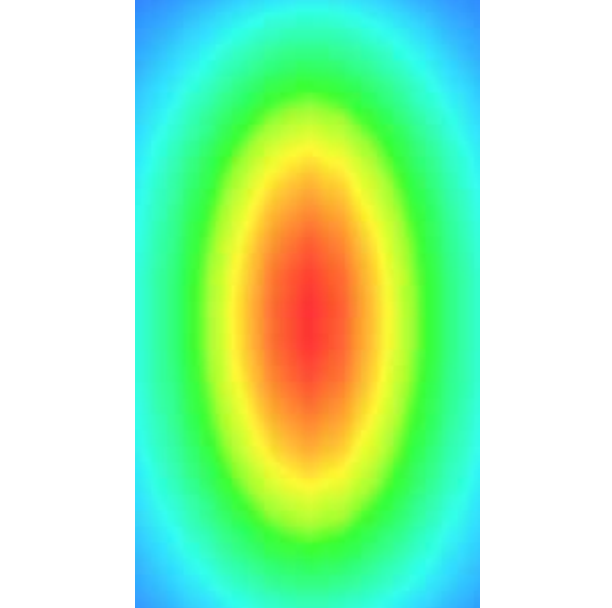
Maximum location: X=0.00, Y=0.00

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
	

## Annex B. Plots of SAR Measurement

<b><u>TYPE</u></b>	<b><u>BAND</u></b>	<b><u>PARAMETERS</u></b>
Phone	GSM850	<u>Measurement 3:</u> Left Head with Cheek device position on Middle Channel in GSM mode
Phone	GSM1900	<u>Measurement 7:</u> Left Head with Cheek device position on High Channel in GSM mode
Phone	GPRS850_2TX	<u>Measurement 9:</u> Right Head with Cheek device position on High Channel in GPRS mode
Phone	GPRS1900_3TX	<u>Measurement 15:</u> Left Head with Cheek device position on High Channel in GPRS mode
Phone	WCDMA1900_RMC	<u>Measurement 19:</u> Left Head with Cheek device position on Middle Channel in WCDMA mode
Phone	WCDMA850_RMC	<u>Measurement 23:</u> Left Head with Cheek device position on High Channel in WCDMA mode
Phone	LTE Band 2_RMC	<u>Measurement 25:</u> Right Head with Cheek device position on High Channel in LTE mode
Phone	LTE Band 4_RMC	<u>Measurement 35:</u> Left Head with Cheek device position on Low Channel in LTE mode
Phone	LTE Band 7_RMC	<u>Measurement 41:</u> Right Head with Cheek device position on Low Channel in LTE mode
Phone	WiFi_802.11b	<u>Measurement 49:</u> Right Head with Cheek device position on High Channel in 802.11b mode
Phone	GSM850	<u>Measurement 53:</u> Flat Plane with Back(Body-worn) device position on Middle Channel in GSM mode
Phone	GSM1900	<u>Measurement 55:</u> Flat Plane with Back(Body-worn) device position on High Channel in GSM mode
Phone	GPRS850_2TX	<u>Measurement 59:</u> Flat Plane with Back device position on High Channel in GPRS mode
Phone	GPRS1900_3TX	<u>Measurement 63:</u> Flat Plane with Back device position on High Channel in GPRS mode
Phone	WCDMA1900_RMC	<u>Measurement 73:</u> Flat Plane with Back side device position on High Channel in WCDMA mode
Phone	WCDMA850_RMC	<u>Measurement 79:</u> Flat Plane with Back device position on High Channel in WCDMA mode
Phone	LTE Band 2_RMC	<u>Measurement 83:</u> Flat Plane with Back device position on High Channel in LTE mode
Phone	LTE Band 4_RMC	<u>Measurement 94:</u> Flat Plane with Back device position on Low Channel in LTE mode
Phone	LTE Band 7_RMC	<u>Measurement 102:</u> Flat Plane with Back device position on Low Channel in LTE mode
Phone	WiFi_802.11b	<u>Measurement 115:</u> Flat Plane with Back side device



		position on High Channel in 802.11b mode
--	--	--

*Remark: SAR plot is showed the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.*

## MEASUREMENT 3

Type: Phone measurement (Complete)

Date of measurement: 08/27/2018

Measurement duration: 11 minutes 48 seconds

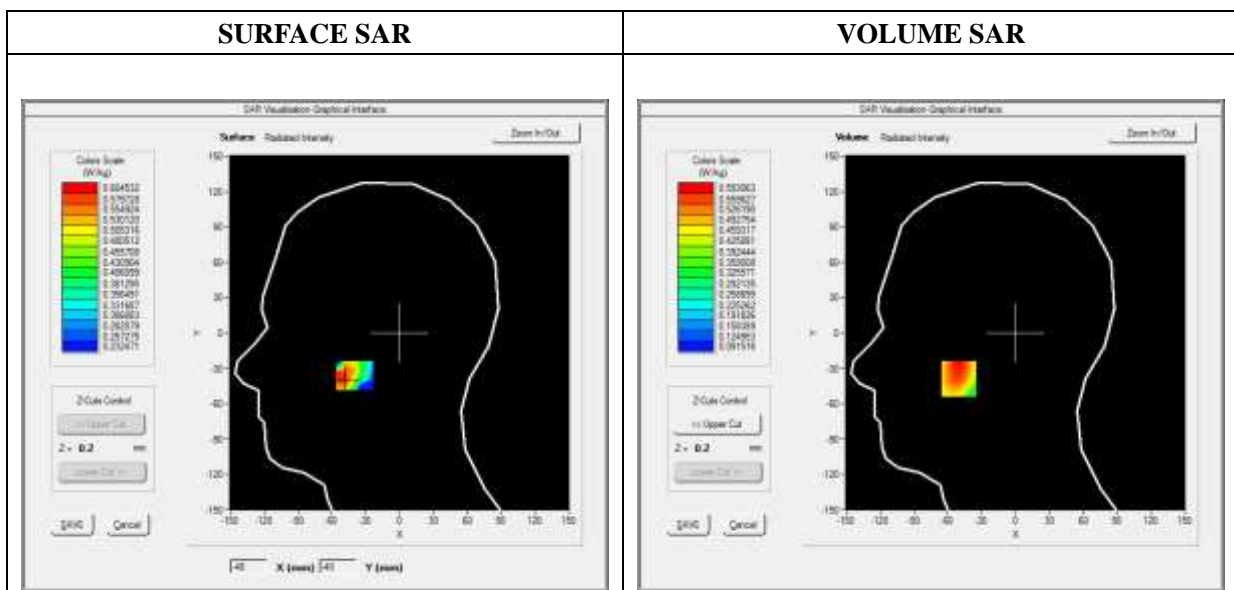
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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

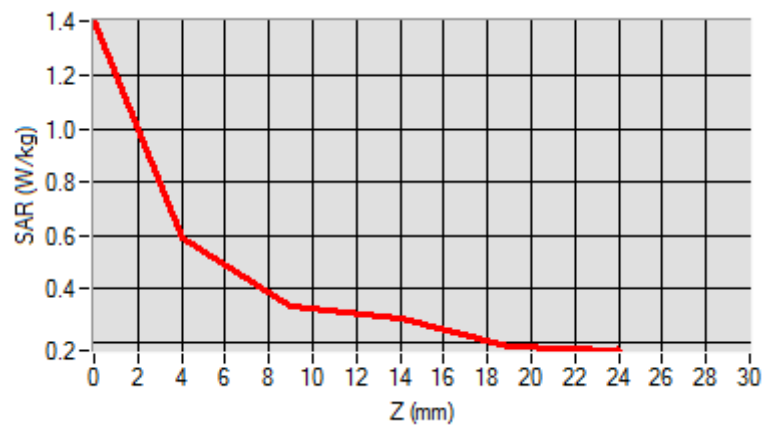


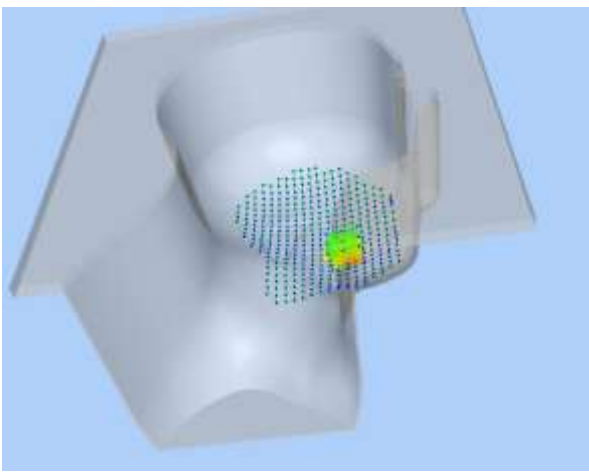

Maximum location: X=-50.00, Y=-39.00

SAR Peak: 0.81 W/kg

SAR 10g (W/Kg)	0.408543
SAR 1g (W/Kg)	0.570915

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.4031	0.5931	0.3336	0.2892	0.1873



3D screen shot	Hot spot position
	

# MEASUREMENT 7

Type: Phone measurement (Complete)

Date of measurement: 08/28/2018

Measurement duration: 11 minutes 48 seconds

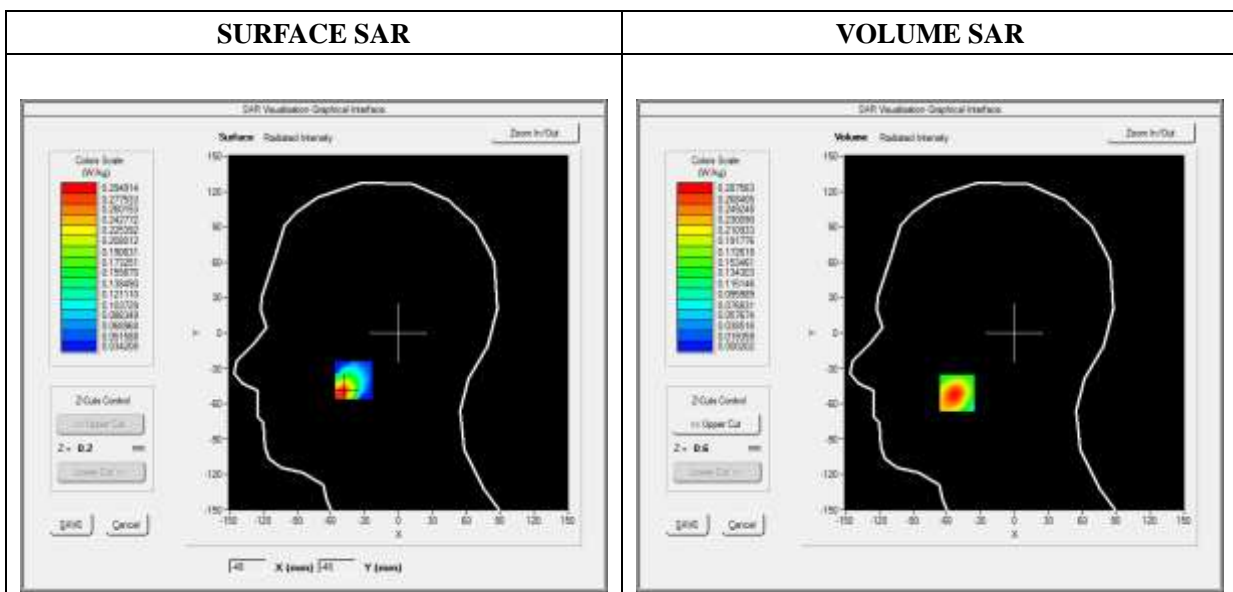
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

## A. Experimental conditions

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

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	1909.800000
<b>Relative Permittivity (real part)</b>	38.560124
<b>Conductivity (S/m)</b>	1.380369
<b>Power Variation (%)</b>	1.442440
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

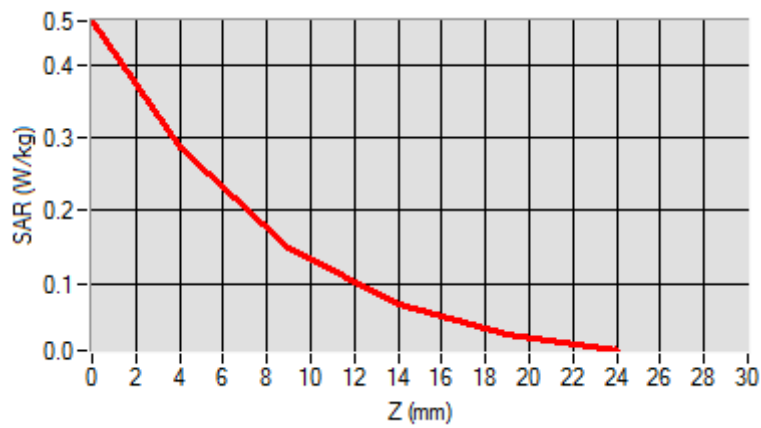


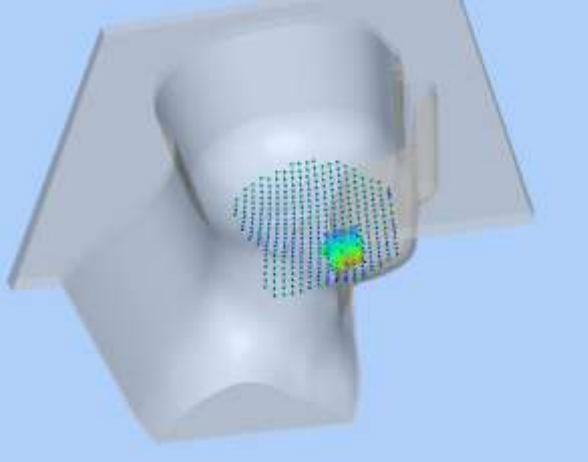

Maximum location: X=-51.00, Y=-51.00

SAR Peak: 0.46 W/kg

SAR 10g (W/Kg)	0.135591
SAR 1g (W/Kg)	0.265860

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4590	0.2876	0.1505	0.0726	0.0312



3D screen shot	Hot spot position
	

# MEASUREMENT 9

Type: Phone measurement (Complete)

Date of measurement: 08/27/2018

Measurement duration: 12 minutes 3 seconds

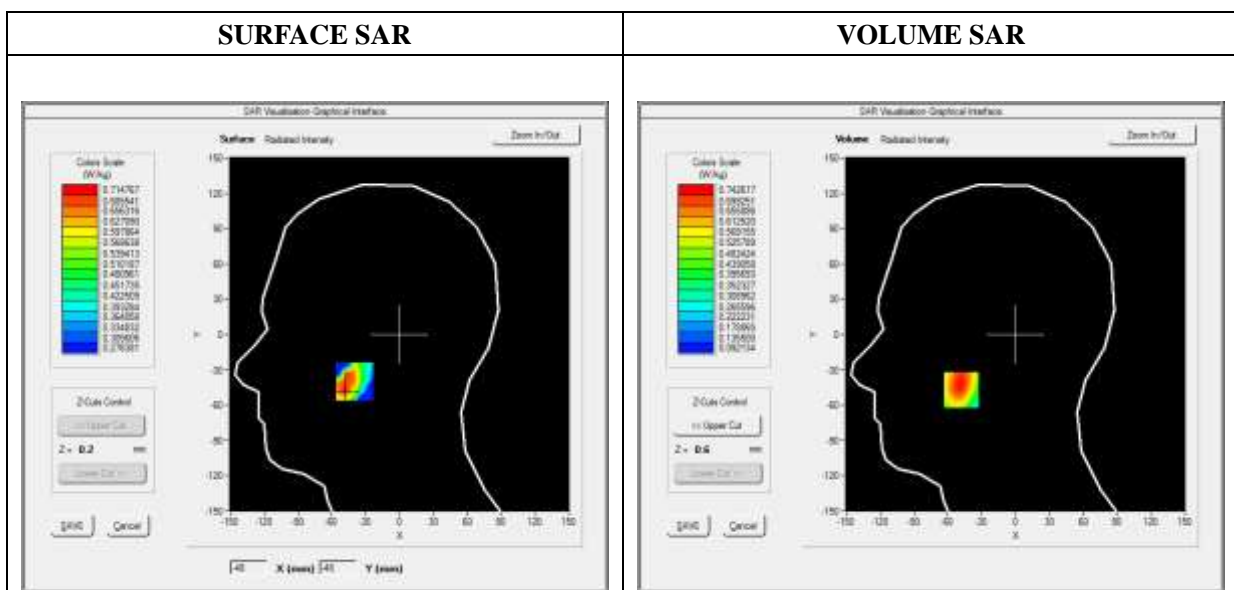
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2018

## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Cheek
<b>Band</b>	GPRS850_2TX
<b>Channels</b>	High
<b>Signal</b>	Duty Cycle: 1:4

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	848.800000
<b>Relative Permittivity (real part)</b>	38.560124
<b>Conductivity (S/m)</b>	1.380369
<b>Power Variation (%)</b>	1.536272
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

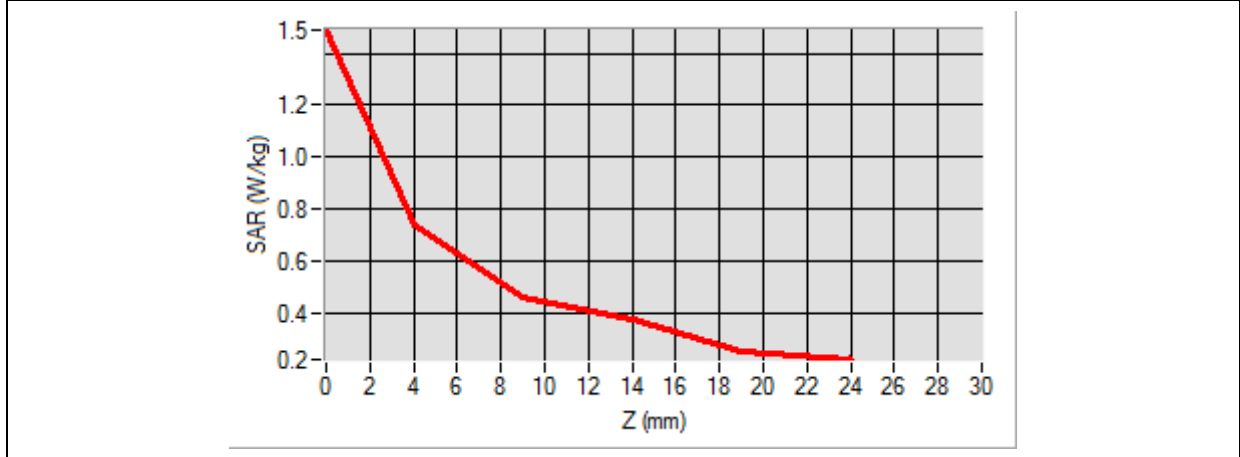


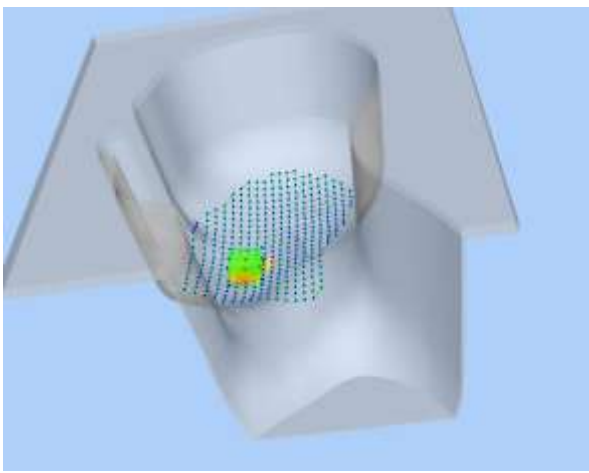

**Maximum location: X=-48.00, Y=-47.00**

**SAR Peak: 1.00 W/kg**

<b>SAR 10g (W/Kg)</b>	<b>0.481731</b>
<b>SAR 1g (W/Kg)</b>	<b>0.704674</b>

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>
<b>SAR (W/Kg)</b>	<b>1.4888</b>	<b>0.7426</b>	<b>0.4645</b>	<b>0.3787</b>	<b>0.2546</b>



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

# MEASUREMENT 15

Type: Phone measurement (Complete)

Date of measurement: 08/28/2018

Measurement duration: 12 minutes 3 seconds

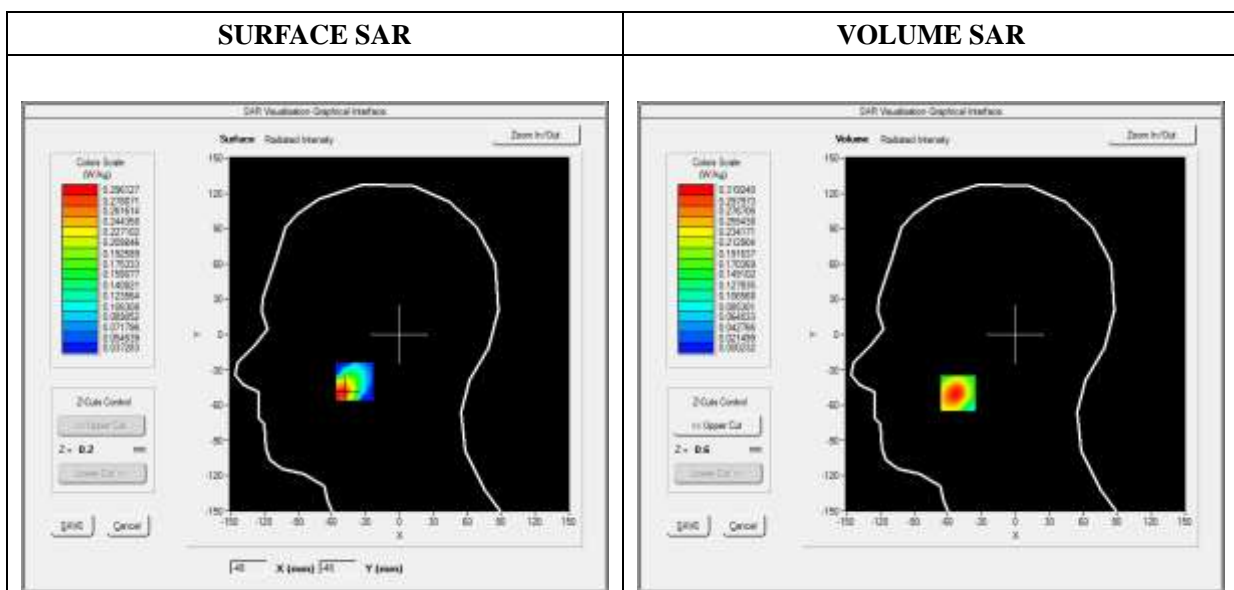
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	GPRS1900_3TX
<b>Channels</b>	High
<b>Signal</b>	Duty Cycle: 1:2.66

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	1909.800000
<b>Relative Permittivity (real part)</b>	38.560124
<b>Conductivity (S/m)</b>	1.380369
<b>Power Variation (%)</b>	1.536272
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3



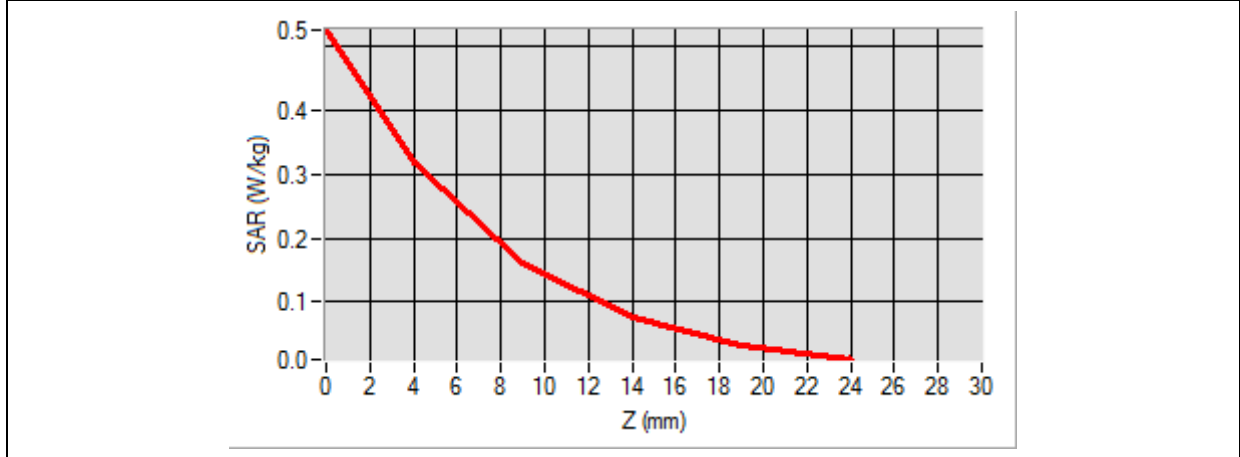


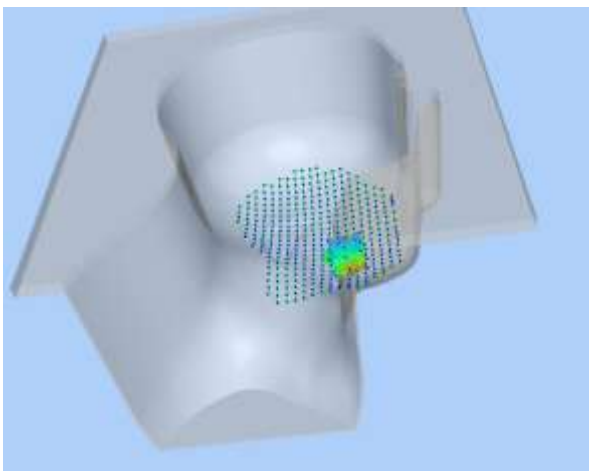
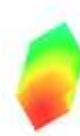
**Maximum location: X=-51.00, Y=-50.00**

**SAR Peak: 0.53 W/kg**

<b>SAR 10g (W/Kg)</b>	<b>0.148269</b>
<b>SAR 1g (W/Kg)</b>	<b>0.295870</b>

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>
<b>SAR (W/Kg)</b>	<b>0.5258</b>	<b>0.3192</b>	<b>0.1601</b>	<b>0.0745</b>	<b>0.0317</b>



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

# MEASUREMENT 19

Type: Phone measurement (Complete)

Date of measurement: 08/28/2018

Measurement duration: 12 minutes 3 seconds

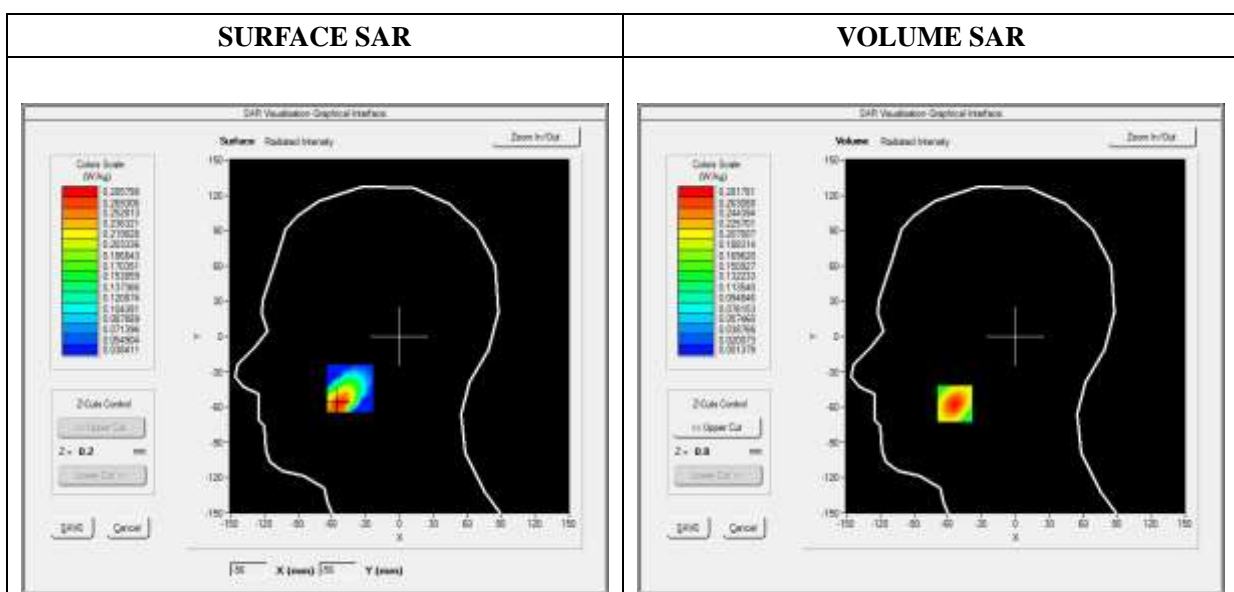
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

## A. Experimental conditions

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

## B. SAR Measurement Results

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

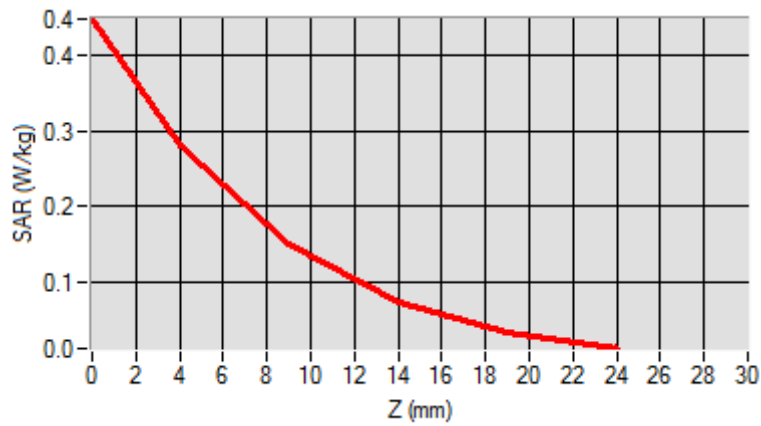


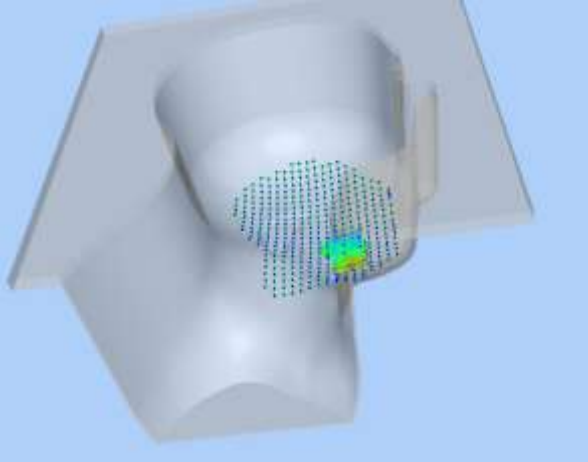
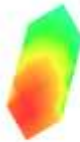
Maximum location: X=-54.00, Y=-57.00

SAR Peak: 0.45 W/kg

SAR 10g (W/Kg)	0.135330
SAR 1g (W/Kg)	0.260430

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4476	0.2818	0.1496	0.0749	0.0349



3D screen shot	Hot spot position
	

## MEASUREMENT 23

Type: Phone measurement (Complete)

Date of measurement: 08/27/2018

Measurement duration: 12 minutes 3 seconds

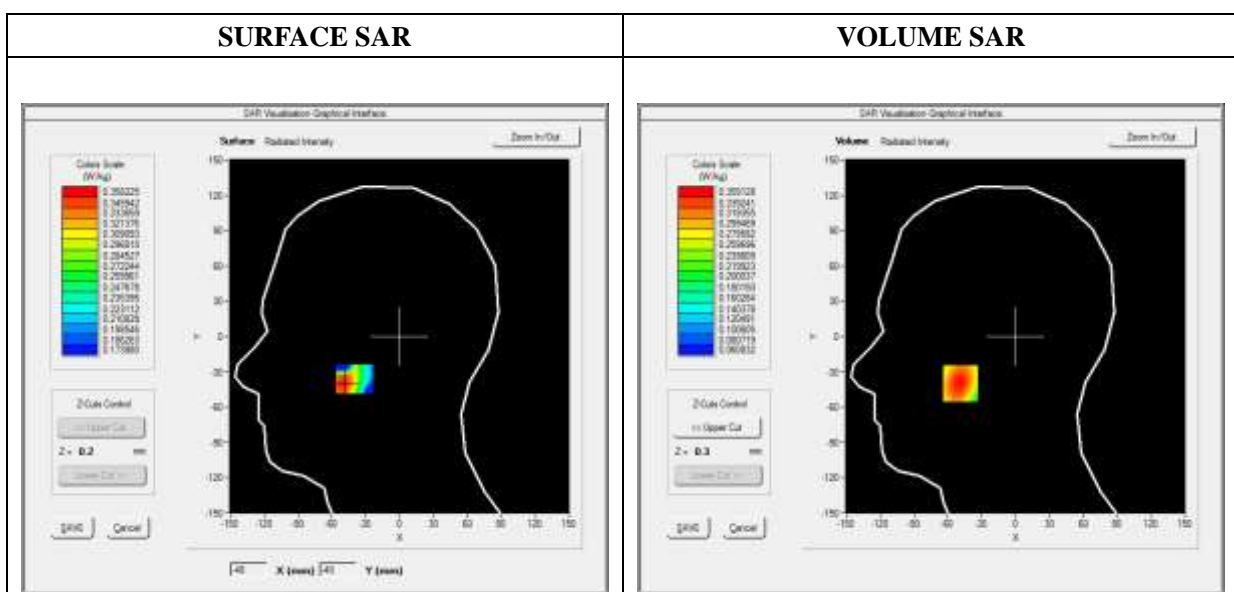
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.93; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	846.600000
<b>Relative Permittivity (real part)</b>	41.110245
<b>Conductivity (S/m)</b>	0.871245
<b>Power Variation (%)</b>	1.342427
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

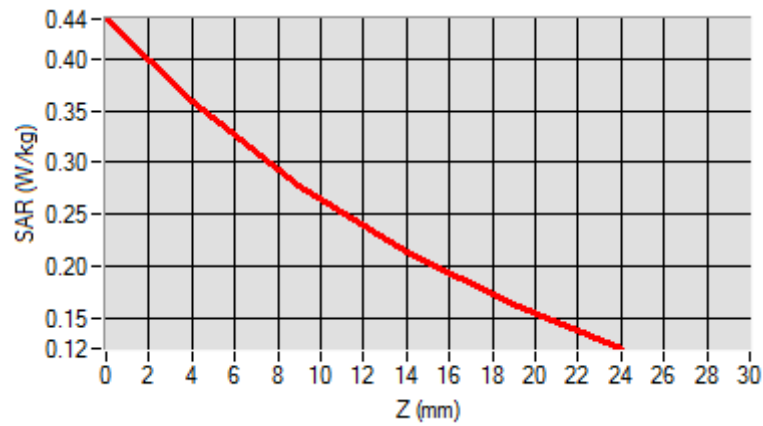


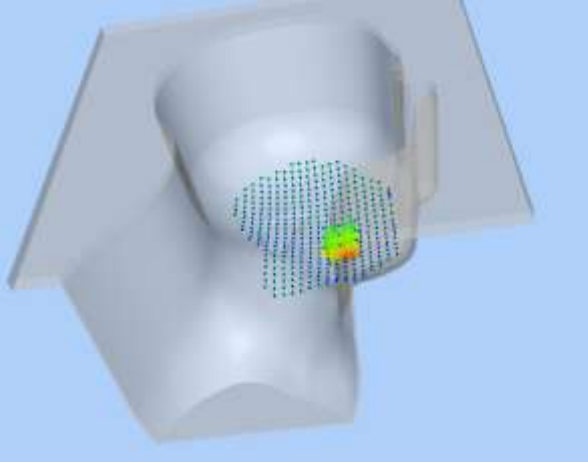

Maximum location: X=-49.00, Y=-40.00

SAR Peak: 0.44 W/kg

SAR 10g (W/Kg)	0.247077
SAR 1g (W/Kg)	0.342043

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4383	0.3591	0.2779	0.2136	0.1626



3D screen shot	Hot spot position
	

## MEASUREMENT 25

Type: Phone measurement (Complete)

Date of measurement: 08/28/2018

Measurement duration: 12 minutes 3 seconds

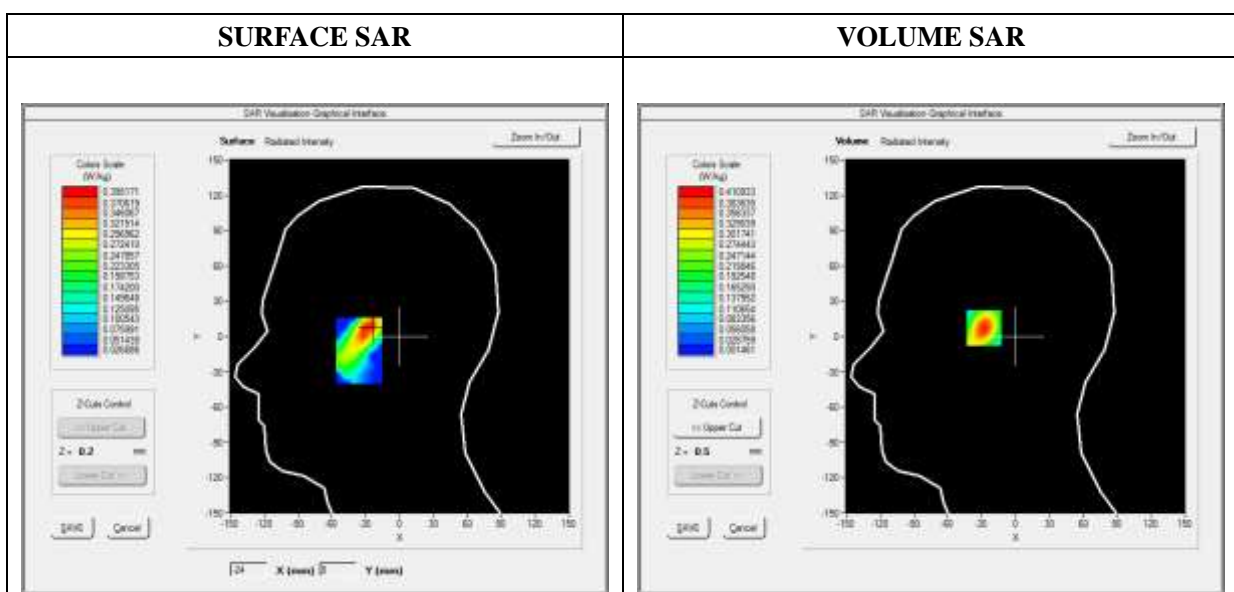
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.35; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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

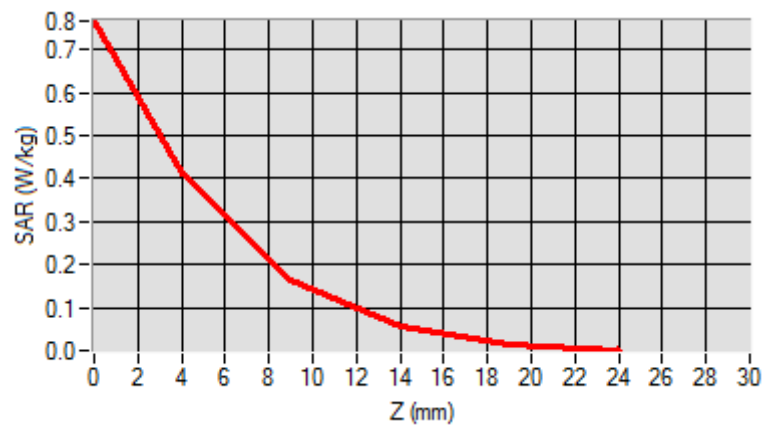


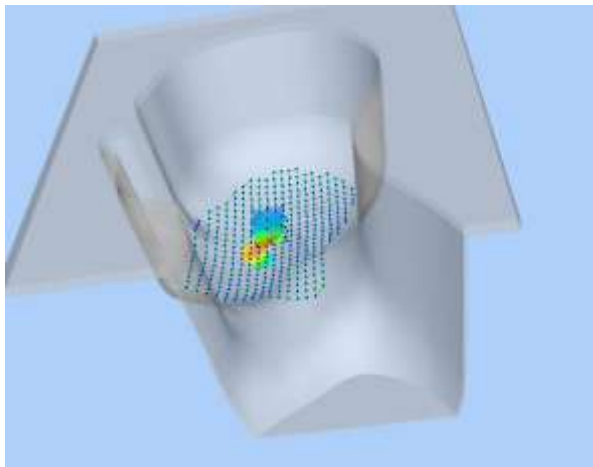
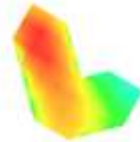
Maximum location: X=-27.00, Y=8.00

SAR Peak: 0.76 W/kg

SAR 10g (W/Kg)	0.169386
SAR 1g (W/Kg)	0.377005

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7655	0.4109	0.1668	0.0576	0.0160



3D screen shot	Hot spot position
	

# MEASUREMENT 35

Type: Phone measurement (Complete)

Date of measurement: 08/28/2018

Measurement duration: 12 minutes 3 seconds

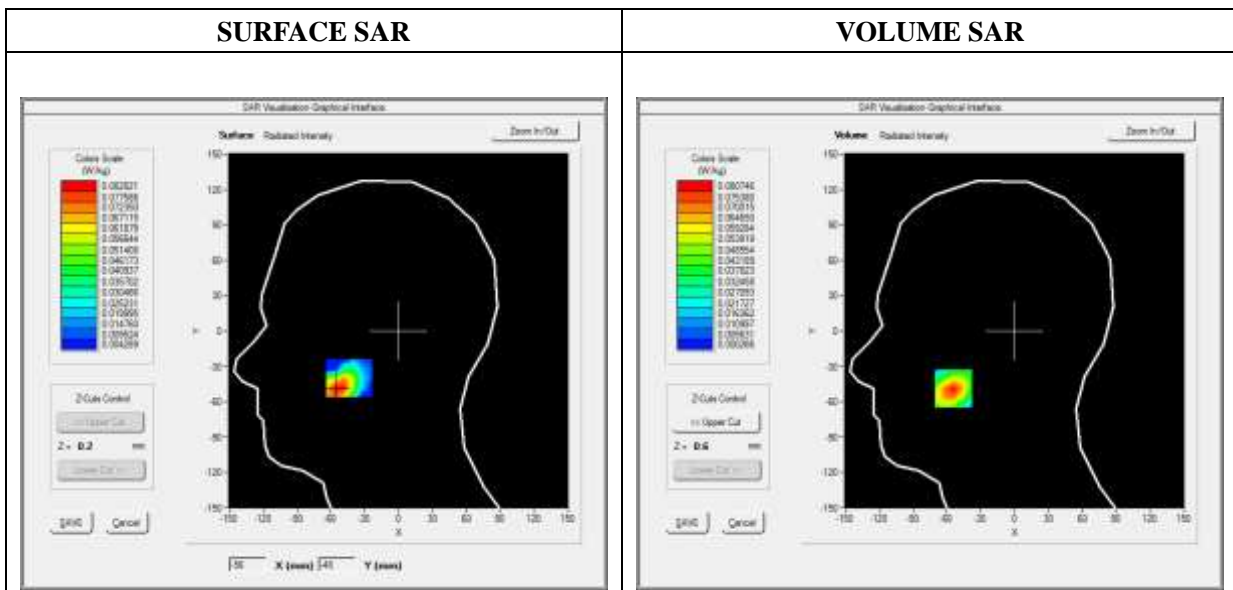
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.84; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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



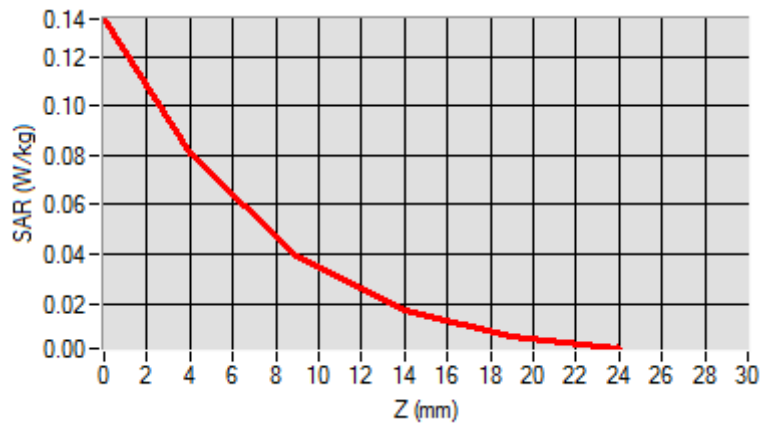


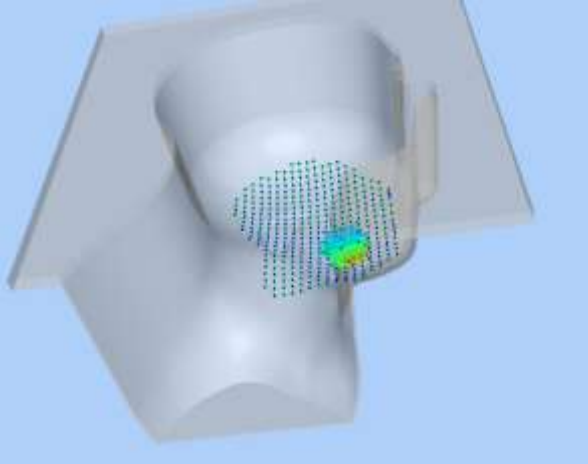
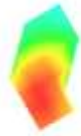
Maximum location: X=-54.00, Y=-49.00

SAR Peak: 0.14 W/kg

SAR 10g (W/Kg)	0.036041
SAR 1g (W/Kg)	0.075184

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1353	0.0807	0.0392	0.0174	0.0068



3D screen shot	Hot spot position
	

# MEASUREMENT 41

Type: Phone measurement (Complete)

Date of measurement: 08/29/2018

Measurement duration: 12 minutes 3 seconds

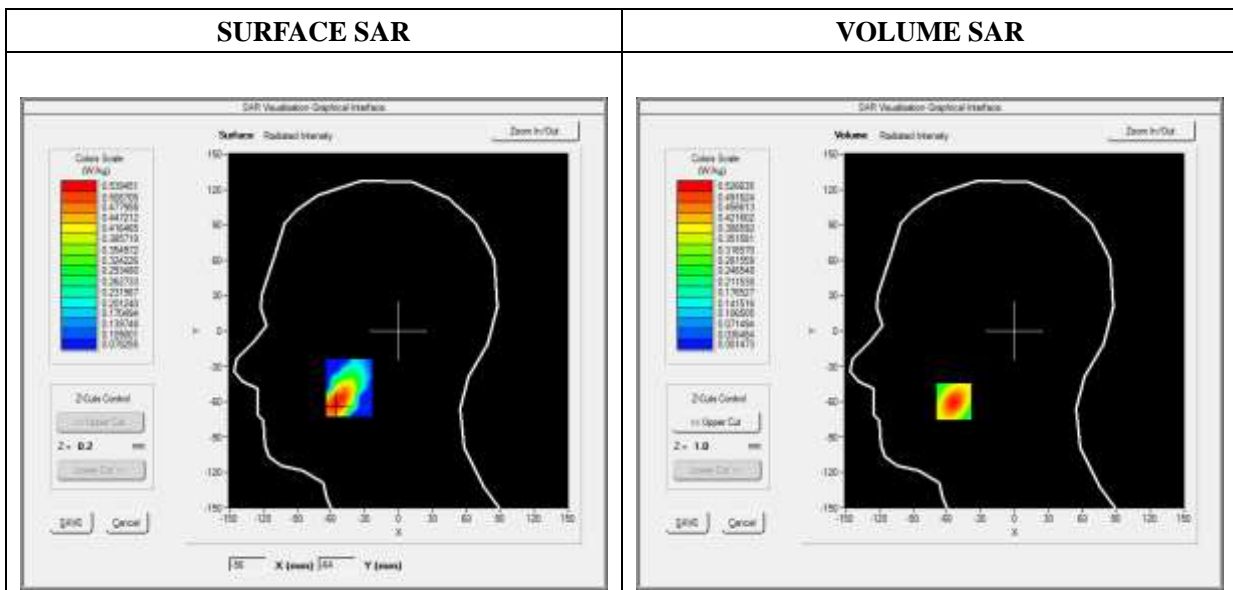
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.37; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	2510.000000
<b>Relative Permittivity (real part)</b>	38.631092
<b>Conductivity (S/m)</b>	1.930182
<b>Power Variation (%)</b>	0.924535
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

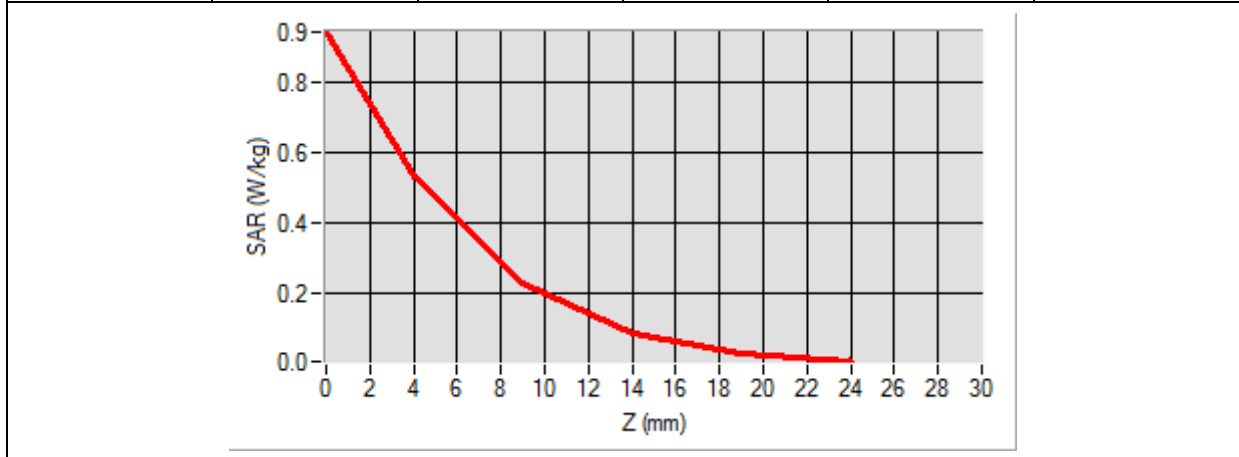


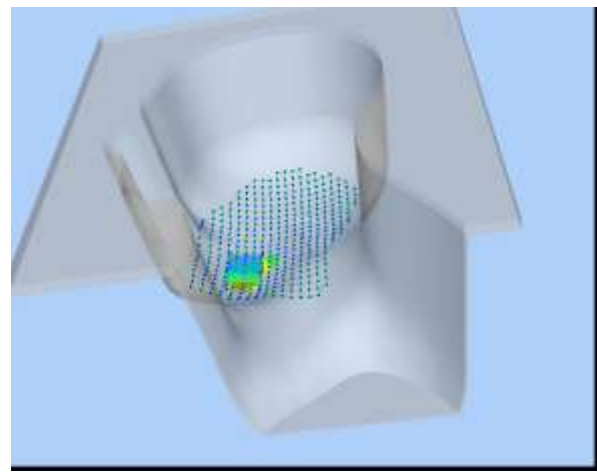
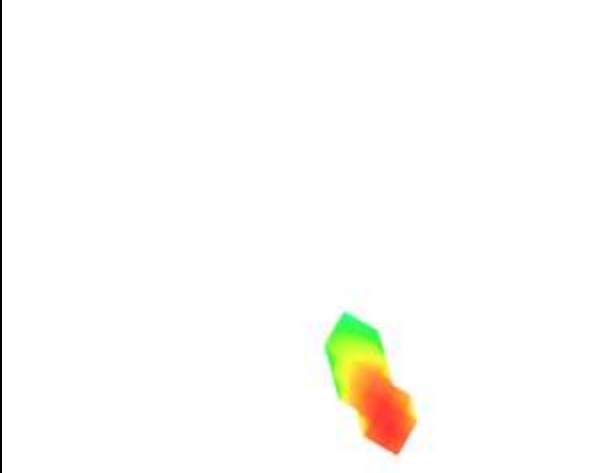
Maximum location: X=-54.00, Y=-60.00

SAR Peak: 0.94 W/kg

SAR 10g (W/Kg)	0.233642
SAR 1g (W/Kg)	0.489397

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.9418	0.5266	0.2281	0.0847	0.0247



3D screen shot	Hot spot position
	

# MEASUREMENT 49

Type: Phone measurement (Complete)

Date of measurement: 08/29/2018

Measurement duration: 12 minutes 3 seconds

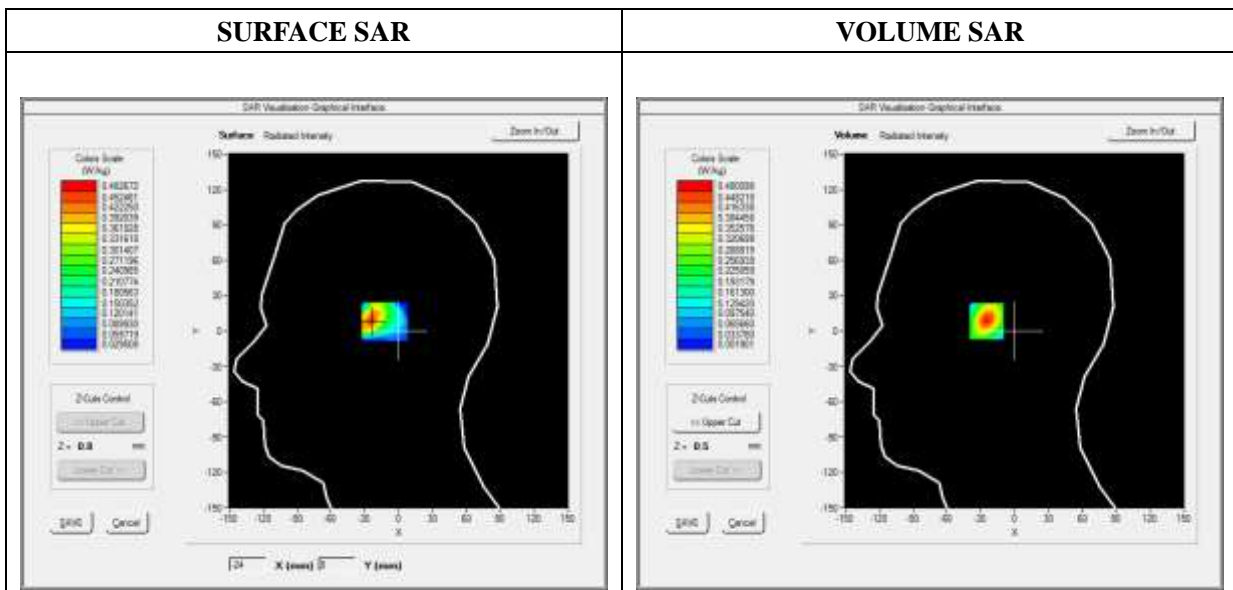
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.64; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	2462.000000
<b>Relative Permittivity (real part)</b>	38.153660
<b>Conductivity (S/m)</b>	1.740236
<b>Power Variation (%)</b>	3.234772
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

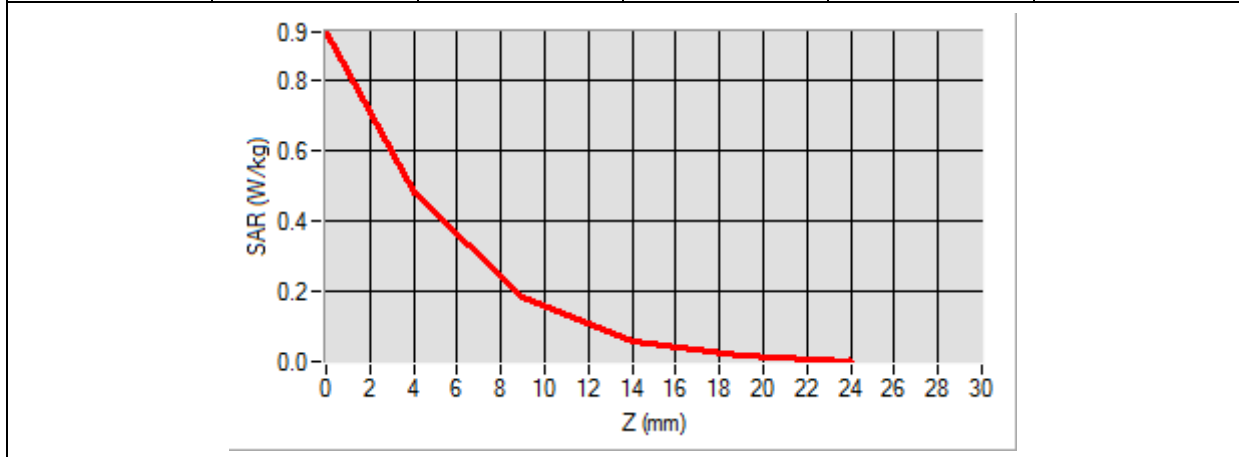


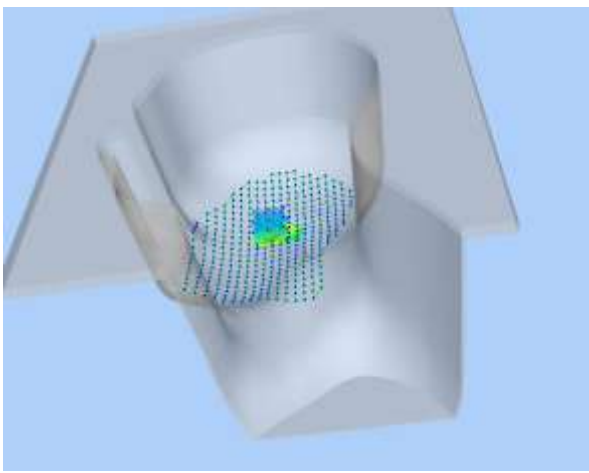

Maximum location: X=-24.00, Y=9.00

SAR Peak: 0.94 W/kg

SAR 10g (W/Kg)	0.192726
SAR 1g (W/Kg)	0.444030

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.9345	0.4801	0.1823	0.0598	0.0178



3D screen shot	Hot spot position
	

## MEASUREMENT 53

Type: Phone measurement (Complete)

Date of measurement: 08/27/2018

Measurement duration: 12 minutes 3 seconds

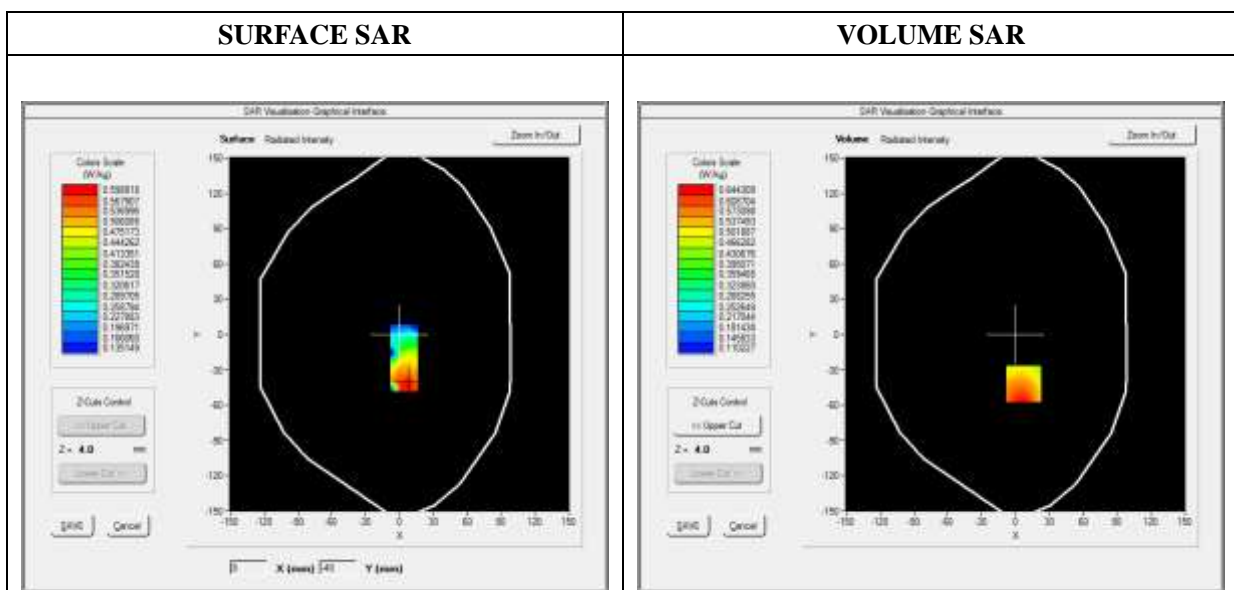
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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

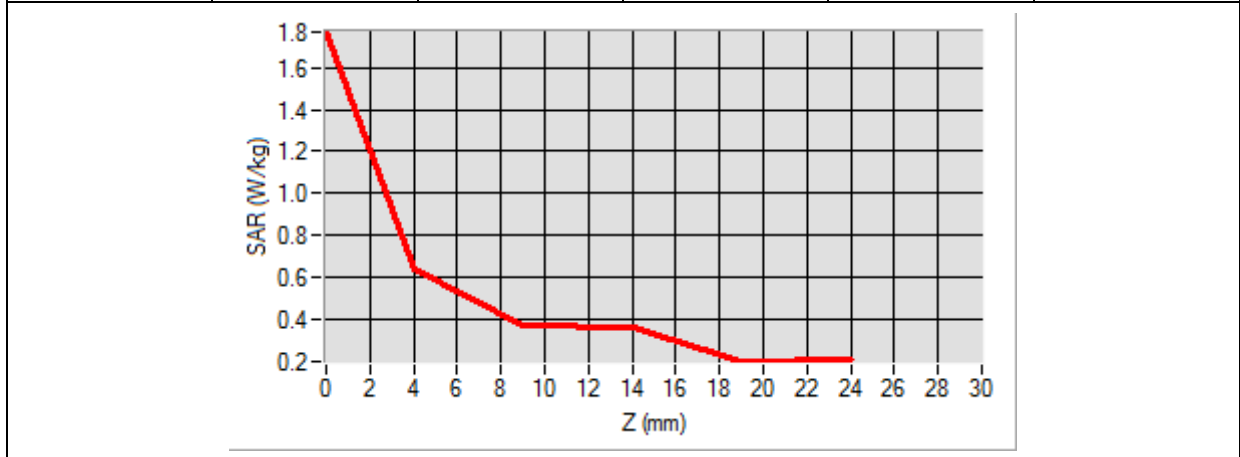


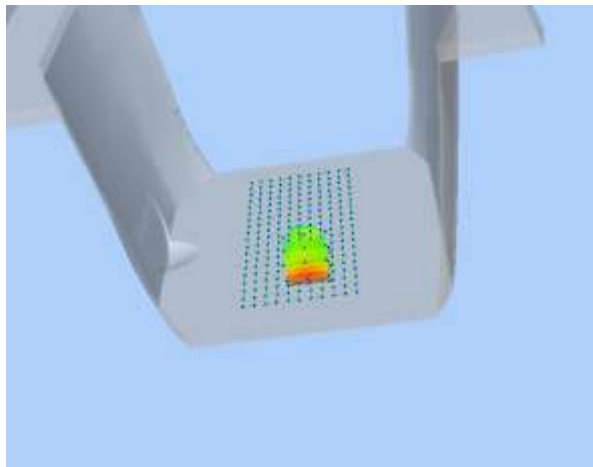

Maximum location: X=7.00, Y=-42.00

SAR Peak: 0.82 W/kg

SAR 10g (W/Kg)	0.436792
SAR 1g (W/Kg)	0.597420

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.7683	0.6443	0.3755	0.3610	0.2009



3D screen shot	Hot spot position
	

## MEASUREMENT 55

Type: Phone measurement (Complete)

Date of measurement: 08/28/2018

Measurement duration: 12 minutes 3 seconds

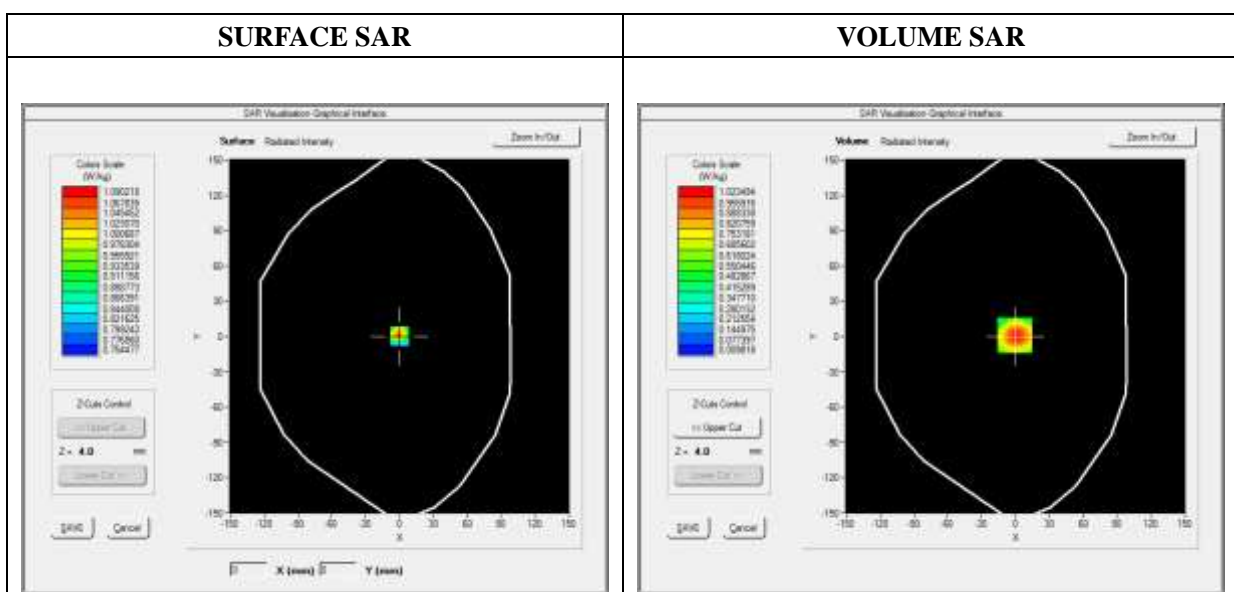
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	1909.800000
<b>Relative Permittivity (real part)</b>	52.420415
<b>Conductivity (S/m)</b>	1.501966
<b>Power Variation (%)</b>	1.474622
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3



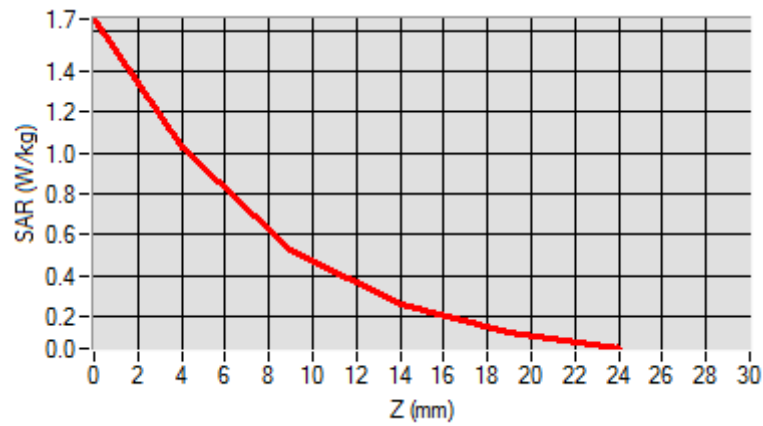


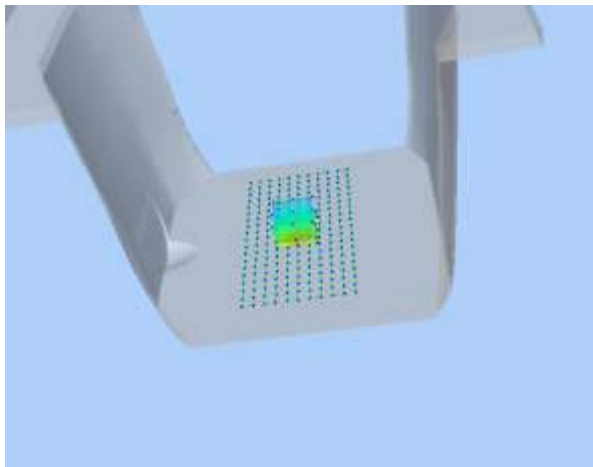

**Maximum location: X=-1.00, Y=1.00**

**SAR Peak: 1.67 W/kg**

<b>SAR 10g (W/Kg)</b>	<b>0.487180</b>
<b>SAR 1g (W/Kg)</b>	<b>0.948829</b>

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>
<b>SAR (W/Kg)</b>	<b>1.6589</b>	<b>1.0235</b>	<b>0.5273</b>	<b>0.2548</b>	<b>0.1145</b>



3D screen shot	Hot spot position
	

## MEASUREMENT 59

Type: Phone measurement (Complete)

Date of measurement: 08/27/2018

Measurement duration: 12 minutes 3 seconds

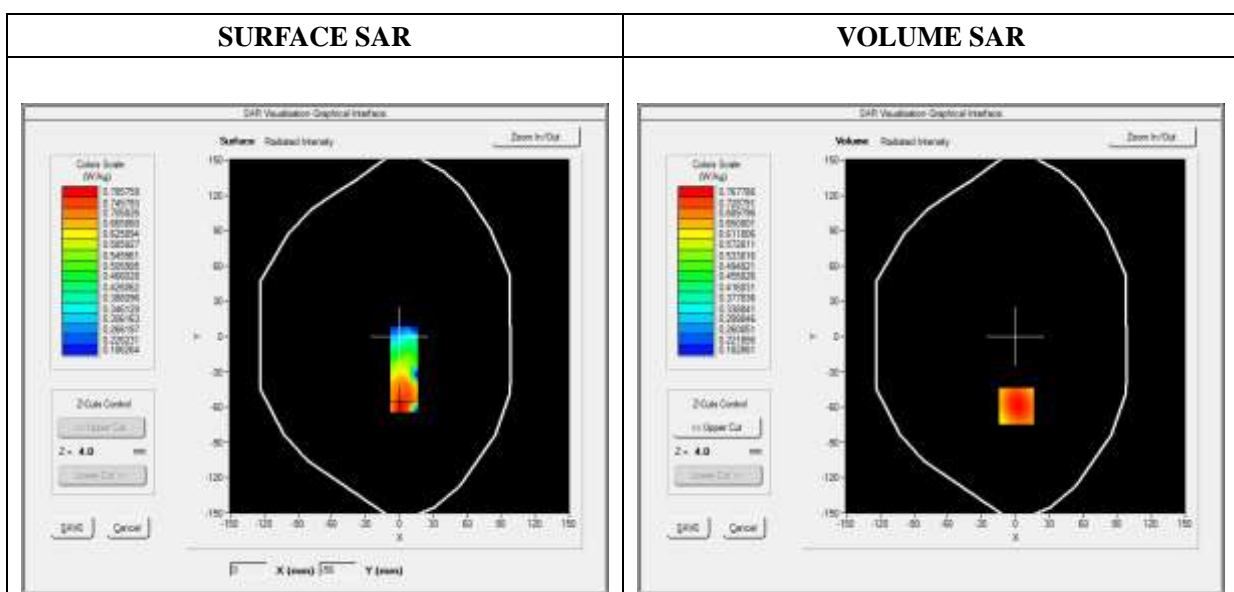
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Back
<b>Band</b>	GPRS850_2TX
<b>Channels</b>	High
<b>Signal</b>	Duty Cycle: 1:4

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	848.800000
<b>Relative Permittivity (real part)</b>	54.851214
<b>Conductivity (S/m)</b>	0.951454
<b>Power Variation (%)</b>	0.901472
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

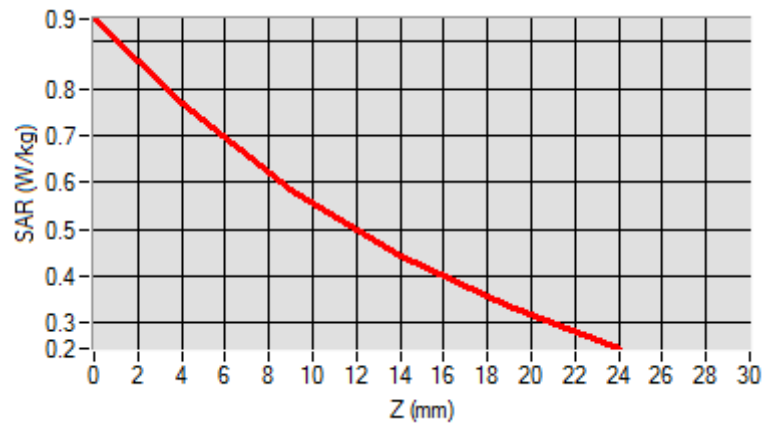


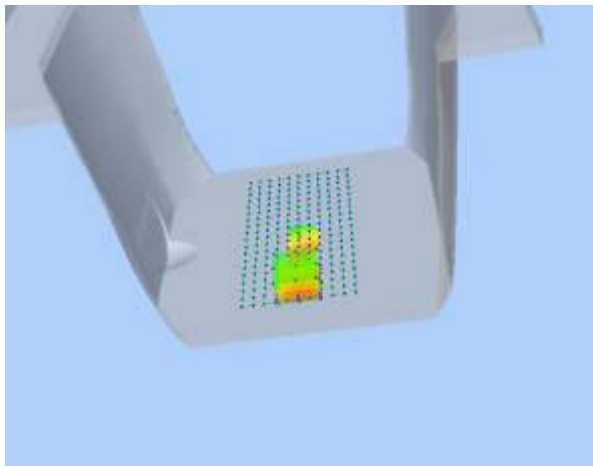

Maximum location: X=1.00, Y=-59.00

SAR Peak: 0.95 W/kg

SAR 10g (W/Kg)	0.538360
SAR 1g (W/Kg)	0.727171

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.9486	0.7678	0.5855	0.4445	0.3351



3D screen shot	Hot spot position
	

## MEASUREMENT 63

Type: Phone measurement (Complete)

Date of measurement: 08/28/2018

Measurement duration: 12 minutes 3 seconds

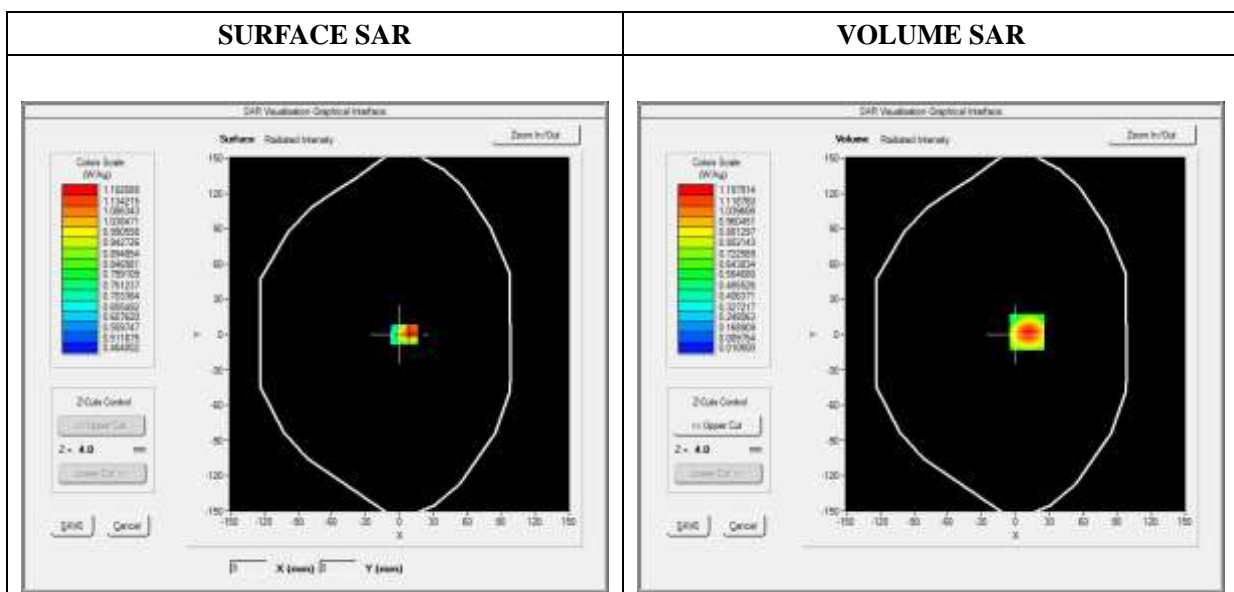
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Back
<b>Band</b>	GPRS1900_3TX
<b>Channels</b>	High
<b>Signal</b>	Duty Cycle: 1:2.66

### B. SAR Measurement Results

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

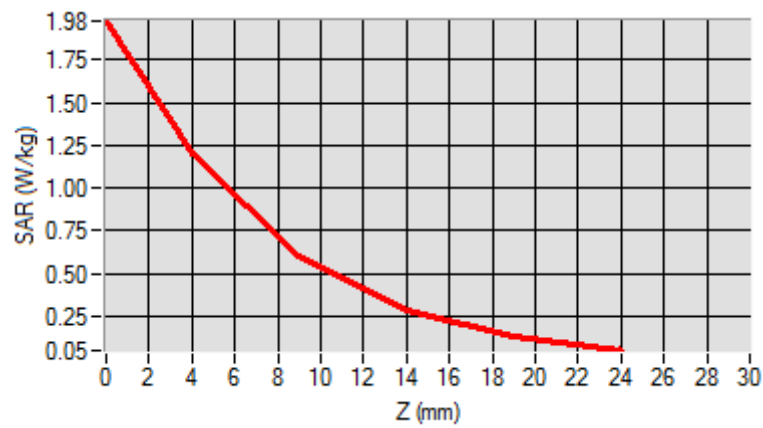


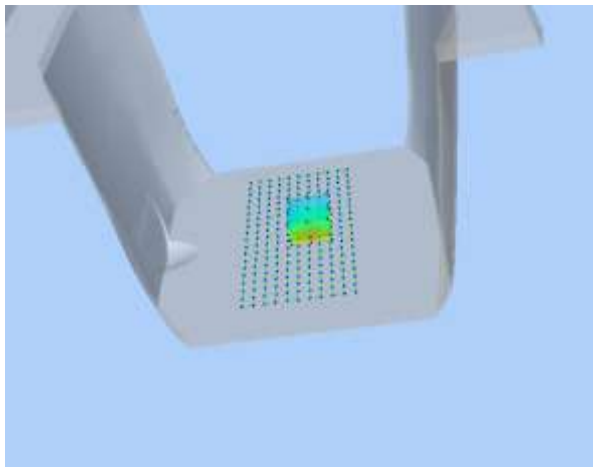

**Maximum location: X=10.00, Y=2.00**

**SAR Peak: 1.98 W/kg**

<b>SAR 10g (W/Kg)</b>	<b>0.561298</b>
<b>SAR 1g (W/Kg)</b>	<b>1.107618</b>

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>
<b>SAR (W/Kg)</b>	<b>1.9786</b>	<b>1.1979</b>	<b>0.6028</b>	<b>0.2873</b>	<b>0.1312</b>



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

# MEASUREMENT 73

Type: Phone measurement (Complete)

Date of measurement: 08/28/2018

Measurement duration: 12 minutes 3 seconds

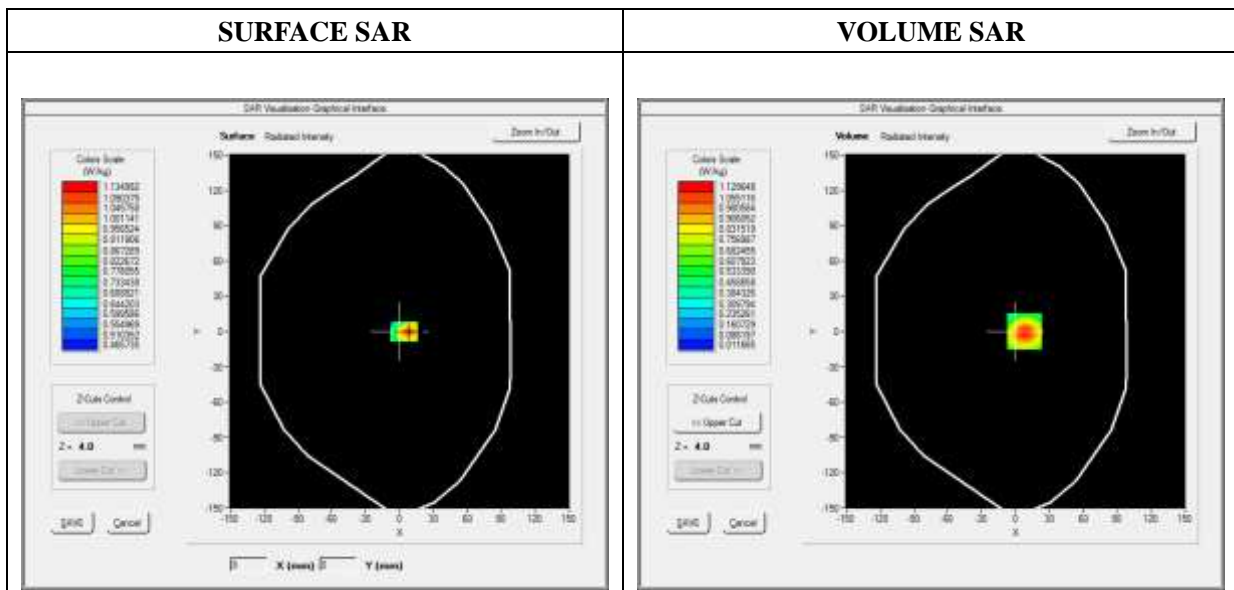
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

## A. Experimental conditions

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

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	1907.600000
<b>Relative Permittivity (real part)</b>	52.420415
<b>Conductivity (S/m)</b>	1.501966
<b>Power Variation (%)</b>	1.847552
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

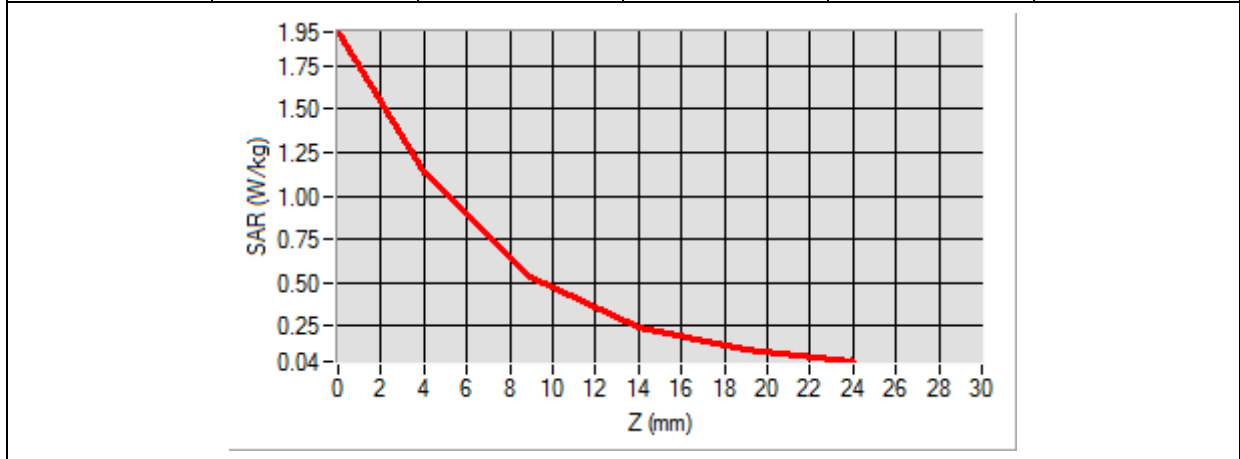


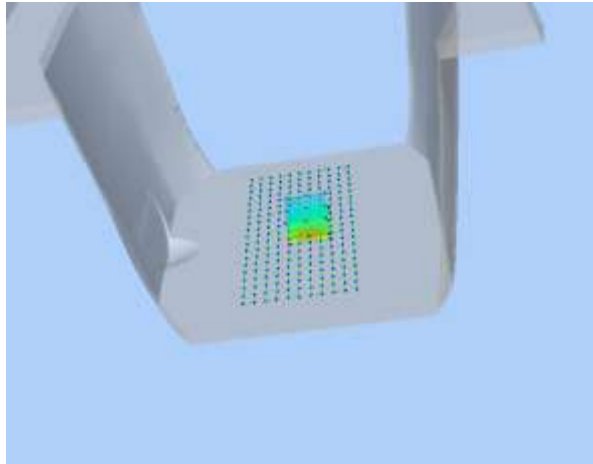

**Maximum location: X=8.00, Y=0.00**

**SAR Peak: 1.95 W/kg**

<b>SAR 10g (W/Kg)</b>	<b>0.514824</b>
<b>SAR 1g (W/Kg)</b>	<b>1.043810</b>

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>
<b>SAR (W/Kg)</b>	<b>1.9476</b>	<b>1.1296</b>	<b>0.5338</b>	<b>0.2396</b>	<b>0.1065</b>



3D screen shot	Hot spot position
	

## MEASUREMENT 79

Type: Phone measurement (Complete)

Date of measurement: 08/27/2018

Measurement duration: 12 minutes 3 seconds

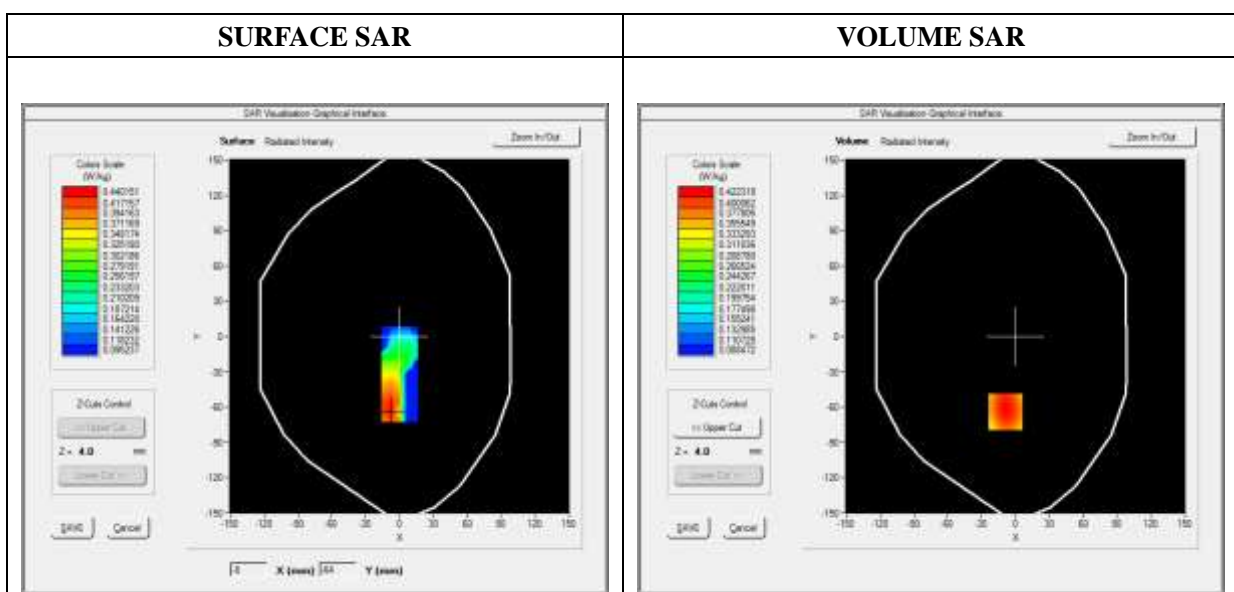
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 7.13; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	846.600000
<b>Relative Permittivity (real part)</b>	54.851214
<b>Conductivity (S/m)</b>	0.951454
<b>Power Variation (%)</b>	2.341234
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3



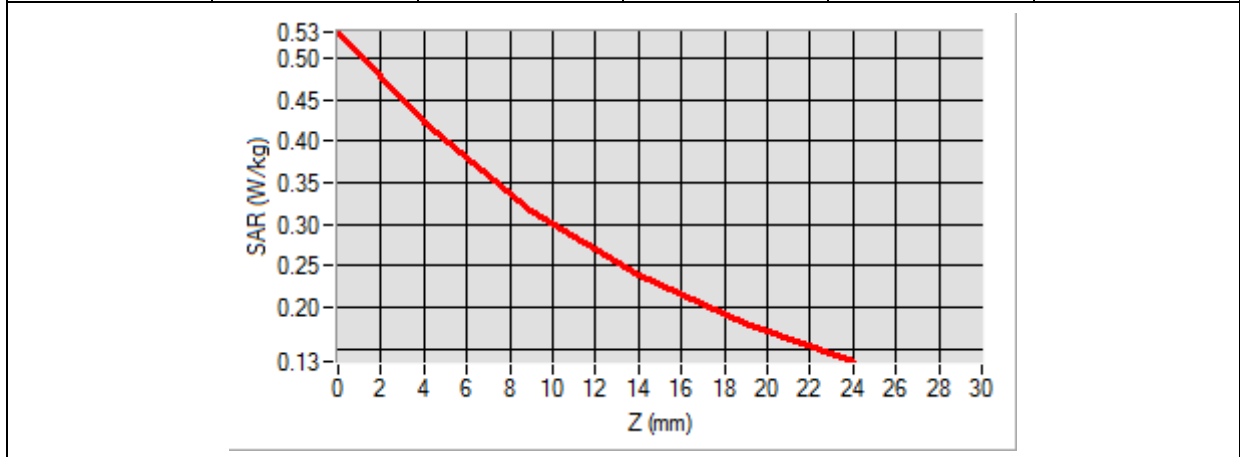


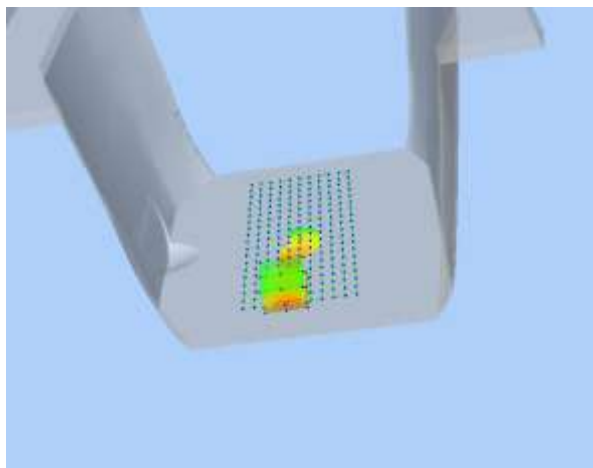

**Maximum location: X=-9.00, Y=-64.00**

**SAR Peak: 0.53 W/kg**

<b>SAR 10g (W/Kg)</b>	<b>0.293643</b>
<b>SAR 1g (W/Kg)</b>	<b>0.406576</b>

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>
<b>SAR (W/Kg)</b>	<b>0.5310</b>	<b>0.4223</b>	<b>0.3166</b>	<b>0.2385</b>	<b>0.1806</b>



3D screen shot	Hot spot position
	

## MEASUREMENT 83

Type: Phone measurement (Complete)

Date of measurement: 08/28/2018

Measurement duration: 12 minutes 3 seconds

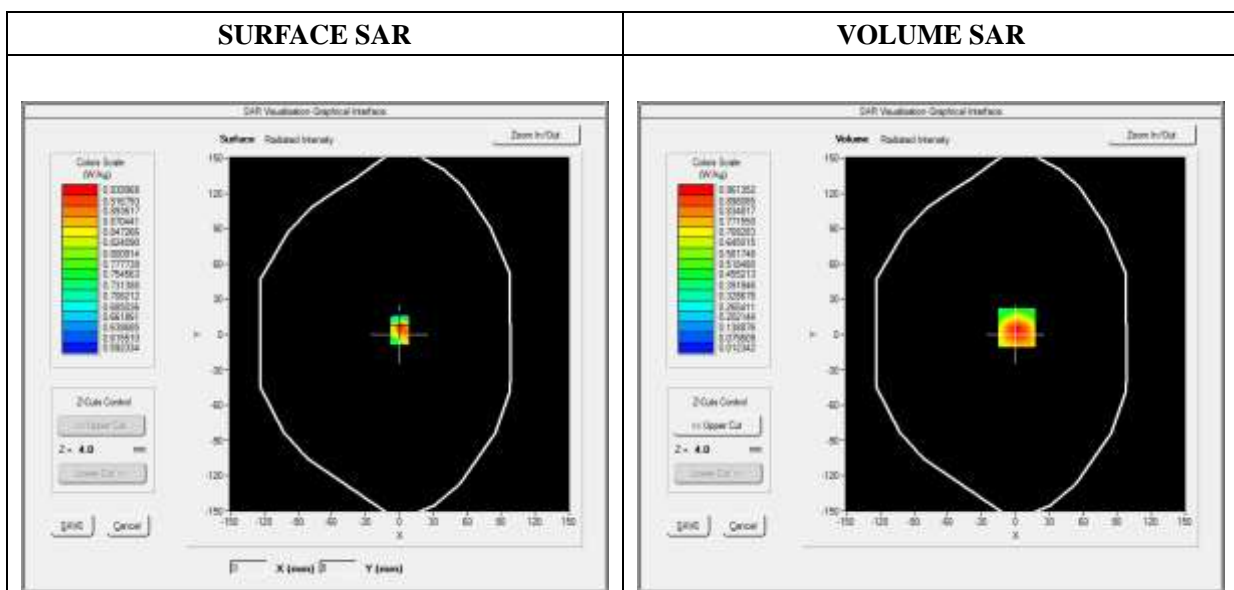
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.55; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	1900.000000
<b>Relative Permittivity (real part)</b>	52.420415
<b>Conductivity (S/m)</b>	1.501966
<b>Power Variation (%)</b>	1.523573
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.3

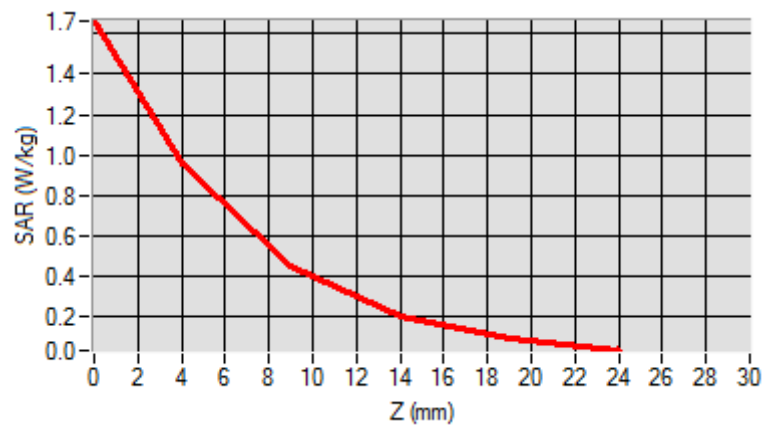


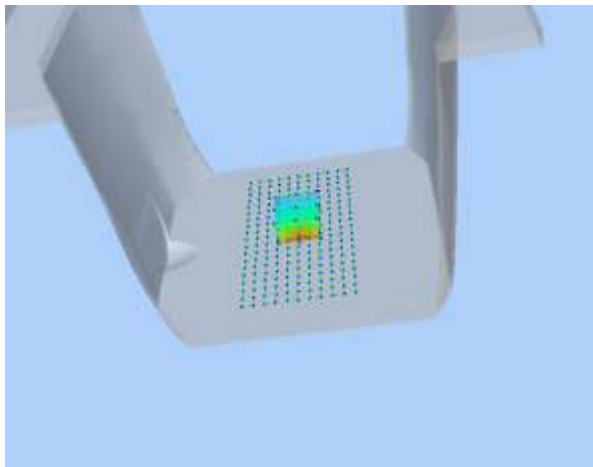

Maximum location: X=1.00, Y=6.00

SAR Peak: 1.69 W/kg

SAR 10g (W/Kg)	0.470528
SAR 1g (W/Kg)	0.920929

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.6623	0.9614	0.4528	0.2032	0.0911



3D screen shot	Hot spot position
	

# MEASUREMENT 94

Type: Phone measurement (Complete)

Date of measurement: 08/28/2018

Measurement duration: 12 minutes 3 seconds

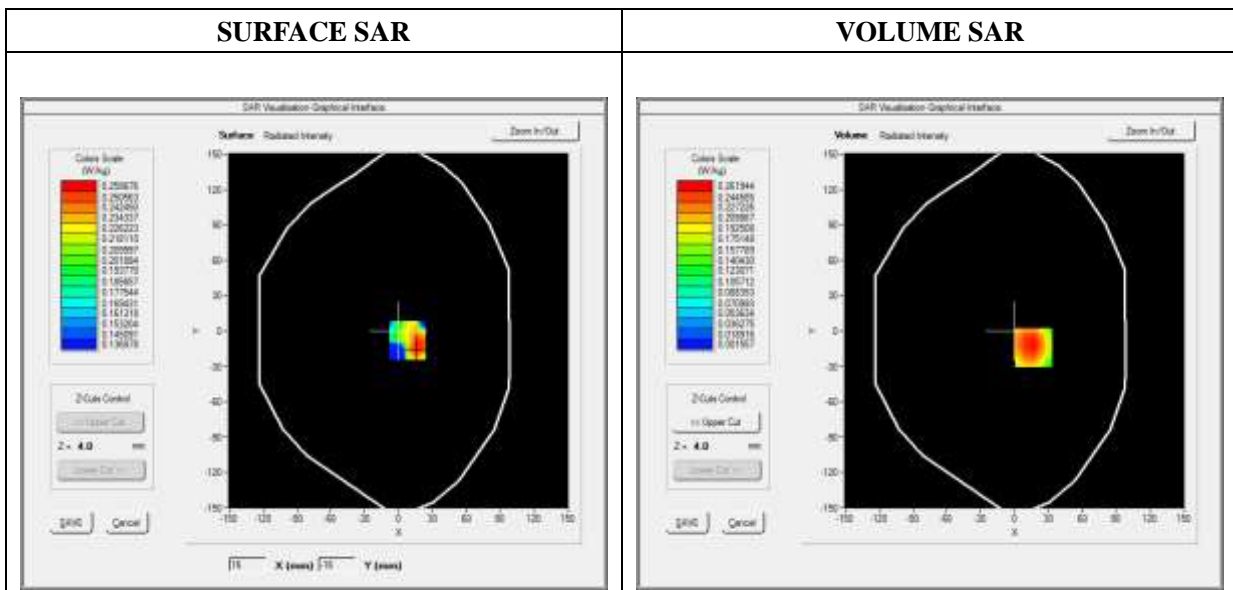
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 6.06; Calibrated: 06/01/2018

### A. Experimental conditions

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

### B. SAR Measurement Results

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

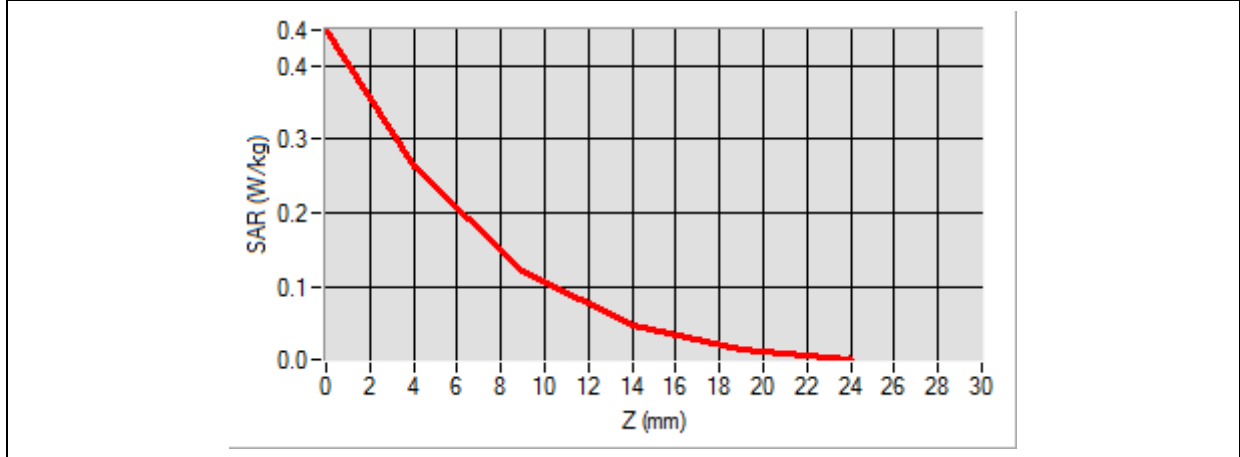


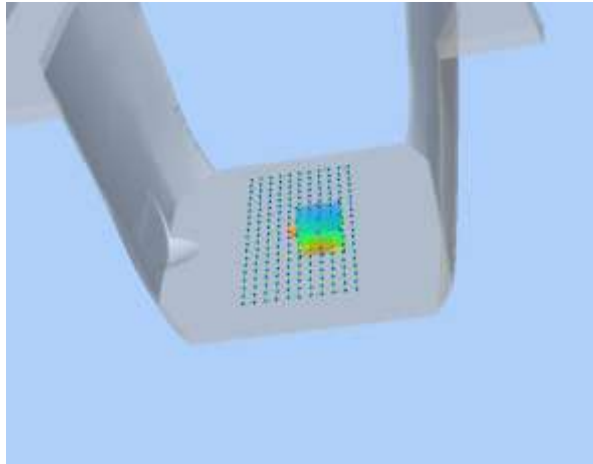

Maximum location: X=17.00, Y=-14.00

SAR Peak: 0.46 W/kg

SAR 10g (W/Kg)	0.130274
SAR 1g (W/Kg)	0.251455

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4484	0.2619	0.1215	0.0489	0.0155



3D screen shot	Hot spot position
	

# MEASUREMENT 102

Type: Phone measurement (Complete)

Date of measurement: 08/29/2018

Measurement duration: 12 minutes 3 seconds

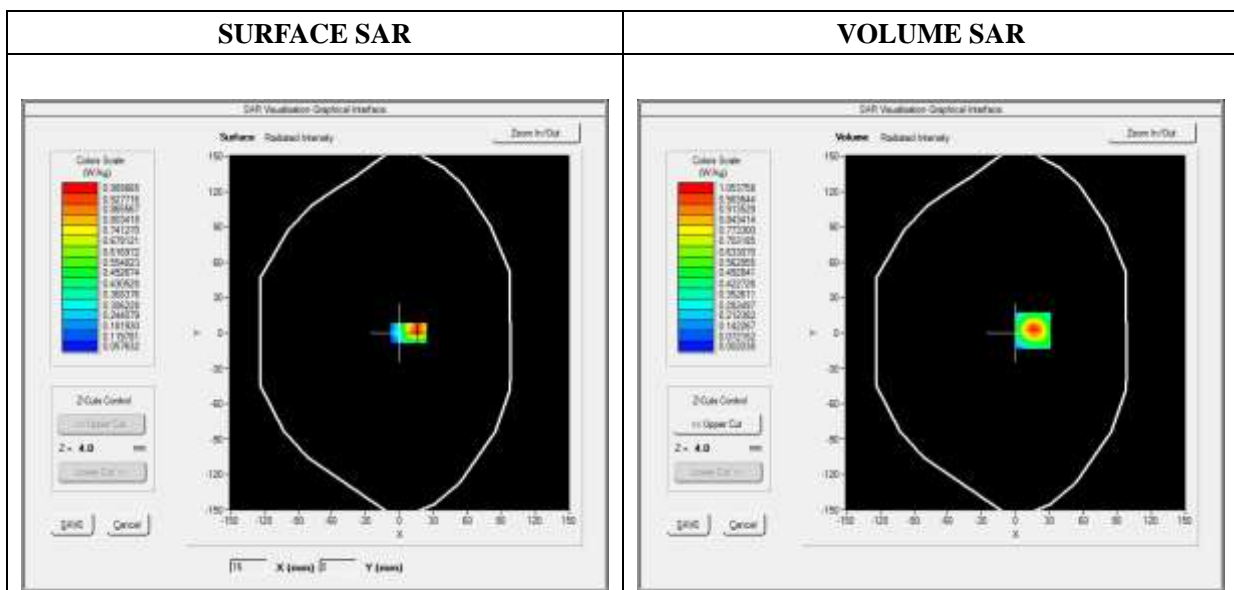
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.58; Calibrated: 06/01/2018

## A. Experimental conditions

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

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	2510.000000
<b>Relative Permittivity (real part)</b>	52.241202
<b>Conductivity (S/m)</b>	2.120943
<b>Power Variation (%)</b>	3.672346
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2

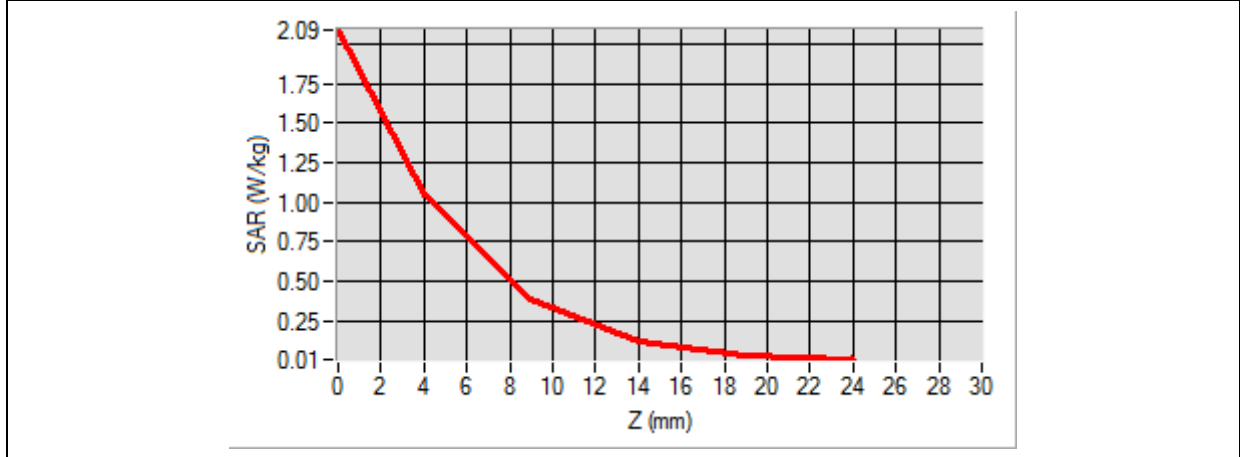


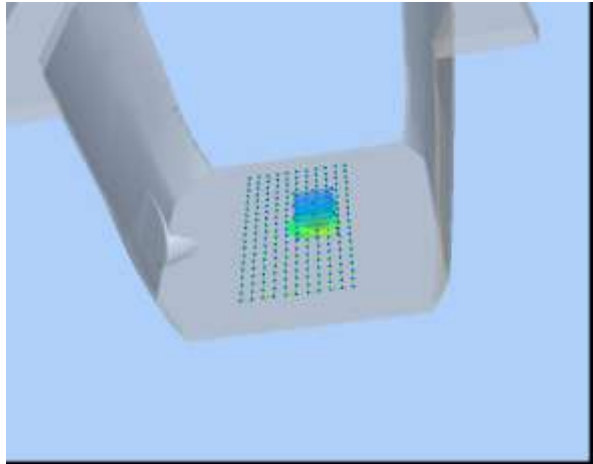
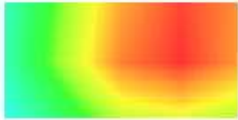
**Maximum location: X=16.00, Y=2.00**

**SAR Peak: 2.08 W/kg**

SAR 10g (W/Kg)	0.394435
SAR 1g (W/Kg)	0.958139

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.0906	1.0538	0.3858	0.1193	0.0328



3D screen shot	Hot spot position
	

# MEASUREMENT 115

Type: Phone measurement (Complete)

Date of measurement: 08/29/2018

Measurement duration: 12 minutes 3 seconds

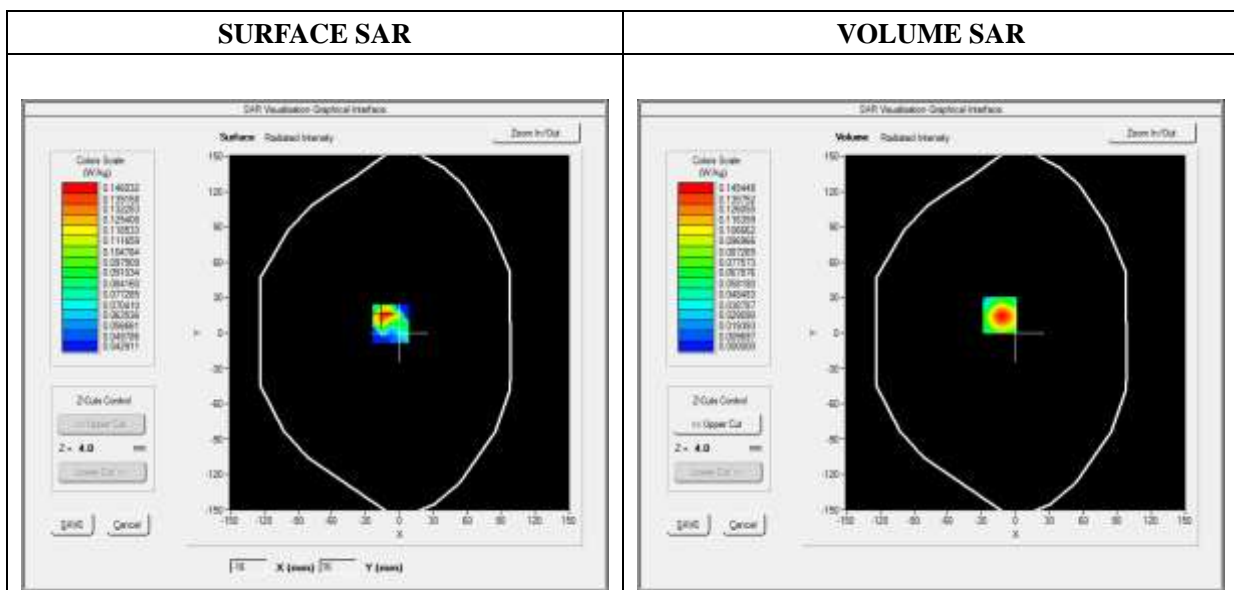
E-field Probe: SSE5 - SN 09/13 EP168; ConvF: 5.80; Calibrated: 06/01/2018

## A. Experimental conditions

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

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	2462.000000
<b>Relative Permittivity (real part)</b>	52.010212
<b>Conductivity (S/m)</b>	1.910255
<b>Power Variation (%)</b>	2.492743
<b>Ambient Temperature</b>	21.1
<b>Liquid Temperature</b>	21.2



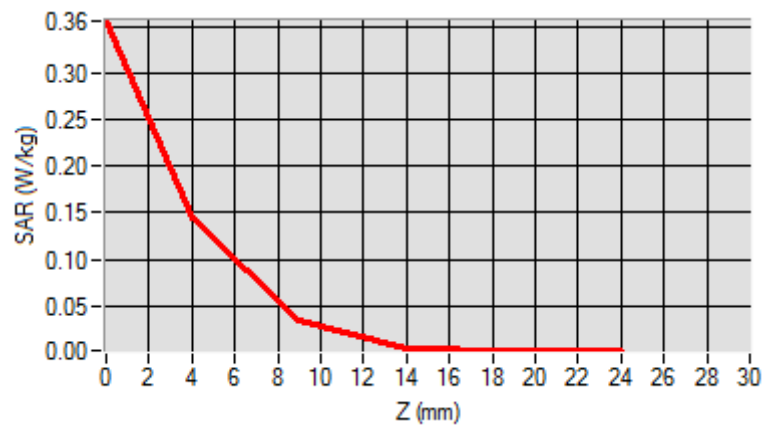


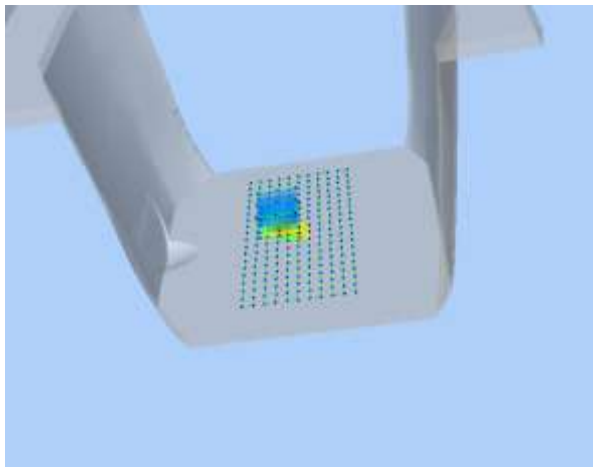
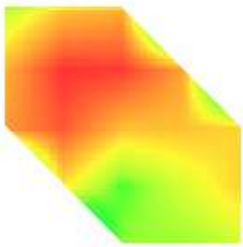
Maximum location: X=-14.00, Y=15.00

SAR Peak: 0.36 W/kg

SAR 10g (W/Kg)	0.058131
SAR 1g (W/Kg)	0.144045

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3572	0.1454	0.0330	0.0042	0.0013



3D screen shot	Hot spot position
	

## Annex C. EUT Photos

---

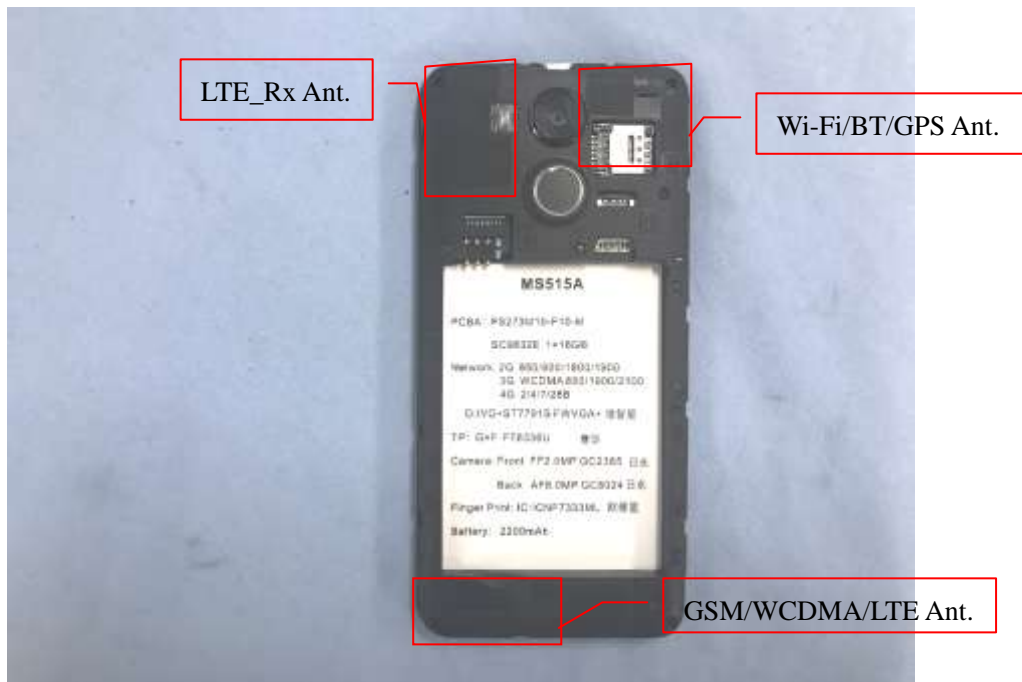
### EUT View Front



### EUT View Back



### Antenna View

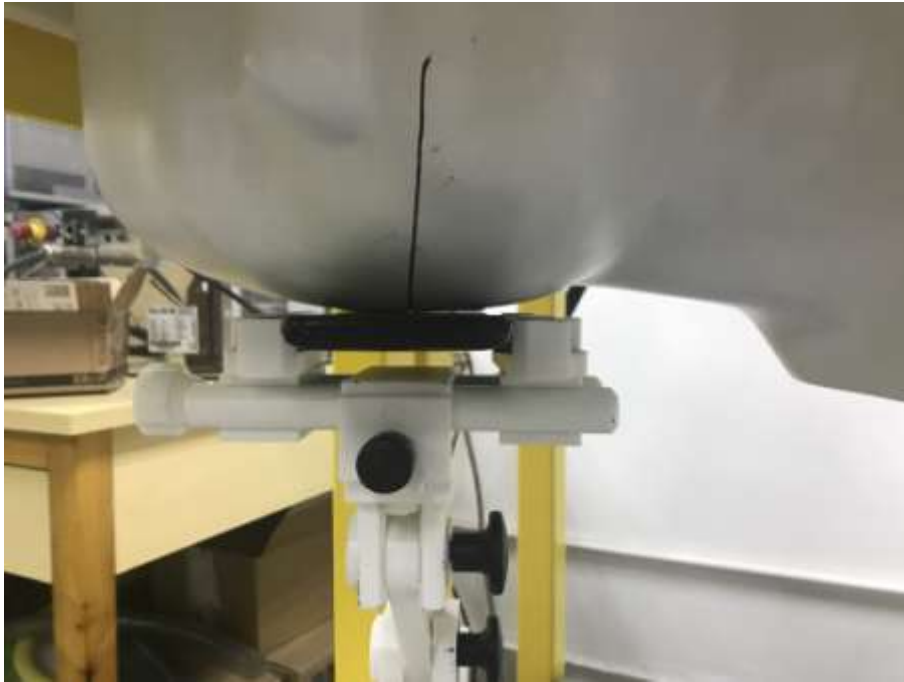


## Annex D. Test Setup Photos

---

### Head Exposure Conditions

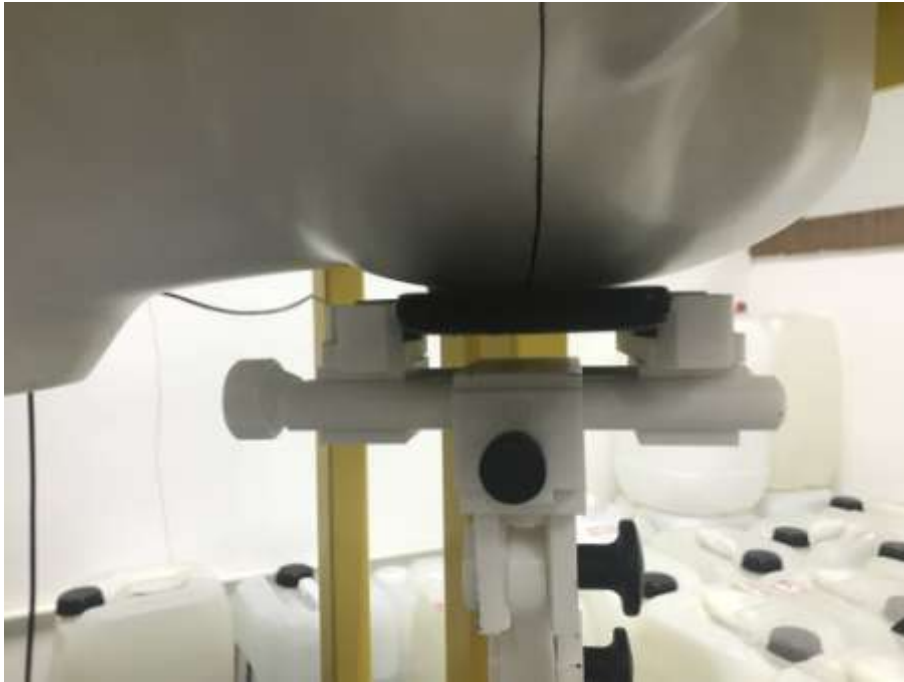
**Cheek**



**Tilt**



### Cheek



### Tilt



## Body-worn & Hotspot mode Exposure Conditions

### Body Front

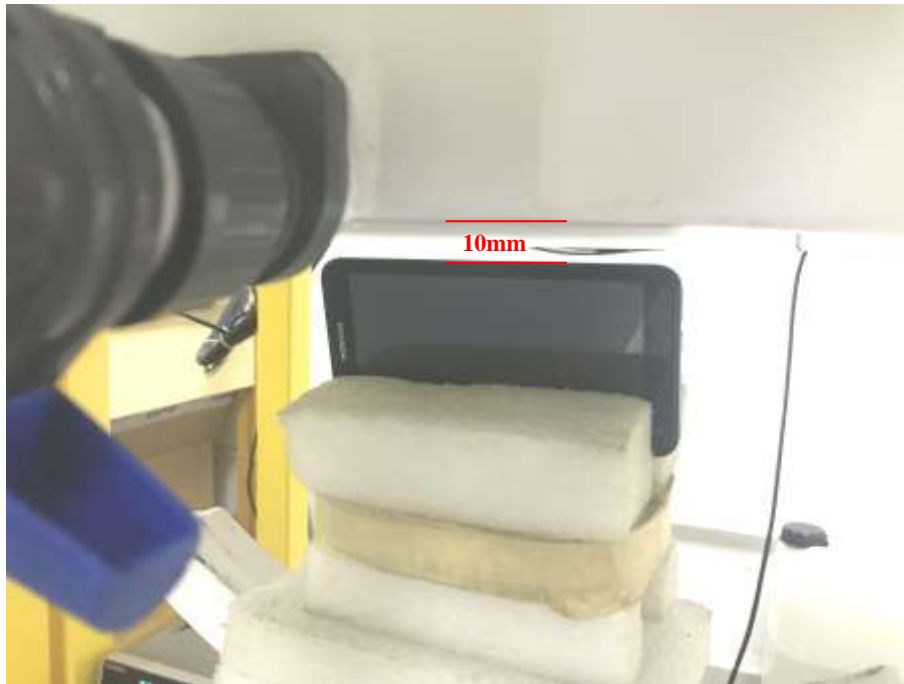


### Body Back



## Hotspot Exposure Conditions

### Body Left



### Body Right



### Body Top



### Body Bottom





## Annex E. Calibration Certificate

---

*Please refer to the exhibit for the calibration certificate*

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